Competencies and Educational Needs of Colorado's Public Health Workforce

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Final Report

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Abstract

Problem and Purpose. Experts agree that the nation's public health workforce is under-prepared and insufficiently skilled to effectively carry out today's public health agenda and to respond to emergency situations including bioterrorism. Improving workforce competencies is an urgent need. Before educational initiatives are implemented, there is a need to understand current competencies and learning needs. The purpose of this study was to describe the characteristics, proficiencies, educational needs, and educational preferences of the public health workforce in Colorado.

Methodology. A survey design was used targeting all public workers in traditional public health settings. A 97-item self-assessment tool, *Towards 21st Century Public Health Practice* (2002), was developed to collect proficiency data in eight core competency domains and seven bioterrorism/ emergency preparedness domains. Workers also rated their educational needs in these 15 areas and described educational preferences regarding course length, format, time of course offering, and educational recognition. In the last section of the tool, demographic information was elicited. Workers were directed to an Internet website for completing the online tool. Workers without access to computers completed a paper and pencil version and returned it by mail.

Characteristics. Colorado public health workers who responded (N=1,249) were primarily white (81%), female (83%), and college-degreed (71%). The average age was 44 years. Workers averaged 14.4 years of experience in their discipline/major and 9.6 years of experience in public health. All but two of Colorado's 64 counties (97%) were represented in the study; 9% (n=110) were employed by the state health department. For county employees, more respondents were employed in organized health departments (82%) than local health agencies (18%). Many more workers were from urban counties (79%) than from rural (16%) and frontier (5%) counties. Almost three-fourths (73%) of the respondents were employed in administrative or professional positions, with public health nurses representing the largest enumeration category (22%). More than half (55%) were front line staff; 26% were supervisory/management staff, and 20% were senior level staff. Most workers were employed full-time (82%), and the median full-time equivalent salary was $43,241. Twenty-nine percent of respondents reported they knew at least one non-English language; the most frequently reported was Spanish with 23 other languages reported.

Proficiencies in Core Competencies. The Colorado workforce was found to be moderately prepared in Core Competencies: 13% were in the two lowest proficiency levels, one-half were in the two mid-range levels, and one-third were in the two higher levels. Workers were most proficient in Cultural Competency Skills (1st), Communication Skills (2nd), and Leadership/Systems Thinking Skills (3rd) and least proficient in Basic Public Health Sciences Skills (6th), Policy Development/Program Planning Skills (7th), and Financial Planning/Management Skills (8th). Rated in the middle were Community Dimensions of Practice Skills (4th) and Analytic/Assessment Skills (5th).

Educational Needs in Core Competencies. Only 11% of the workforce saw little or no need for additional education in Core Competencies, one-third indicated some need, and more than half indicated moderate or high educational needs. In descending order, statewide workers identified their educational needs to be Financial Planning/Management Skills (1st), Policy Development/ Program Planning Skills (2nd), Basic Public Health Sciences Skills (3rd), Analytic/Assessment Skills (4th), Leadership/Systems Thinking Skills (5th), Community Dimensions of Practice Skills (6th), Cultural Competency Skills (7th), and Communication Skills (8th).

Proficiencies in Bioterrorism/Emergency Preparedness. The Colorado workforce was found to be ill-prepared in Bioterrorism/Emergency Preparedness. More than half were in the two lowest proficiency levels, about a third were in the two moderate categories, and only 12% were in the two highest levels. They were most proficient in Disaster Response Skills (1st) and Emergency Communication Skills (2nd). They were least proficient in Biological/Infectious Disease Skills (6th) and

Toxic Chemical/Environmental Hazard Skills (7th). Dimensions rated in the middle were Physical Injury Skills (3rd), Crisis Management Skills (4th), and Disaster Planning Skills (5th).

Educational Needs in Bioterrorism/Emergency Preparedness. Many educational needs were acknowledged in Bioterrorism/Emergency Preparedness: 36% indicated a high need, 38% indicated a moderate need, 17% indicated some need, and only 9% indicated little or no need. Thus, almost three-fourths of all public health workers rated themselves as having moderate or high educational needs. In descending order, workers identified their educational needs to be Disaster Planning Skills (tied for 1st), Toxic Chemical/Environmental Hazard Skills (tied for 1st), Disaster Response Skills (3rd), Biological/ Infectious Disease Skills (4th), Crisis Management Skills (5th), Physical Injury Skills (6th), and Emergency Communication Skills (7th).

Comparisons Within Worker Groups. To examine group differences within the workforce, 20 comparisons across groups were made. The following profession/position comparisons were made: between professional and non-professional workers, within six largest professional groups, within six largest non-professional groups, among five position categories, among three types of positions, and between full-time and part-time workers. These demographic comparisons were made: among six age groups, between college degree and no degree groups, among six levels of educational preparation, among six professional experience groups, and among six public health experience groups. These differences by public health setting were examined: among eight regions, within four county sizes, within six largest counties, within seven medium-sized counties, among seven small county regional groups, between organized and local health departments, and by type of county.

Conclusions and Recommendations

1. *Public health workers need to improve their competencies.*

   Only a small percentage of the workforce was found to be well prepared in both Core Competencies and Bioterrorism/Emergency Preparedness. Although workers were considerably less prepared in Bioterrorism/ Emergency Preparedness, it would be inappropriate and unwise to focus on this area to the exclusion of Core Competencies.

2. *Workers acknowledge learning needs and appear ready to participate in educational programs.*

   Colorado public health workers have an acute awareness and a readiness to participate in educational programs in both Core Competencies and Bioterrorism/Emergency Preparedness.

3. *Worker preferences for educational offerings may not be realistic or feasible.*

   Workers clearly indicated a strong preference for traditional face-to-face classes held during the weekday. This preference is inconsistent with Colorado's Lifelong Learning System that incorporates innovative web-based and distance learning opportunities.

4. *Education on workforce expectations may need to precede educational offerings.*

   Even when workers acknowledged low proficiencies, they did not always identify proportionately greater educational needs. Clarifying expectations of the public health workforce is warranted.

5. *Knowing worker characteristics is very helpful in tailoring Core Competency education, but less helpful in tailoring Bioterrorism/Emergency Preparedness education.*

   In Core Competencies, proficiencies and educational needs varied widely with position, worker characteristics, and setting. On the contrary, in Bioterrorism/Emergency Preparedness low competencies across groups suggest a common need for learning fundamental knowledge/skills.

6. *The findings provide a baseline for evaluating the effectiveness of future educational offerings.*

   These baseline competencies should be used in a longitudinal evaluation of educational initiatives in Colorado workforce development.

7. *Public health educators in all disciplines must re-evaluate their curricula to include content on core competencies and bioterrorism/emergency preparedness.*

   Faculty in various public health disciplines must engage in curricular reform.

EXECUTIVE SUMMARY

1. Introduction

Statement of Problem. Experts agree that the nation's public health workforce is under-prepared and insufficiently skilled to effectively carry out today's public health agenda. Following the release of an Institute of Medicine report in 1988 that was highly critical of the public health system, considerable work has been done to clarify and define the scope and mission of public health. Public health reform resulted in the identification of three core functions and ten essential services. Despite the progress in articulating a vision for public health, workforce development has lagged behind. Analysts have found that public health departments are poorly staffed and workers lack the specific skills, qualifications, and abilities they need to fulfill their responsibilities of protecting the public health. The tragic events of September 11th, 2001 exposed other weaknesses and heightened the recognition that public health workers must also be better prepared to respond to emergency situations including bioterrorism. The basic premise is that if the public health workforce is competent, essential public health services will be delivered, programs will be effective, and the health of people and communities will be promoted and protected. Improving the competencies of the public health workforce is an urgent need.

Core Competencies. Over a 10-year period, the Council on Linkages Between Academia and Public Health Practice worked to define core competencies for all public health professionals. Compiled from various source documents and cross-referenced with the essential public health services, they reached consensus on core competencies in April 2001. The core competencies represent a set of skills, knowledge, and attitudes necessary for the broad practice of public health that transcend the boundaries of the specific disciplines within public health. These competencies were designed to help guide curriculum and content development of public health education and training programs for preparation of new practitioners and for the ongoing development of practitioners in the field. The competencies also were designed for use in practice settings as a framework for hiring and evaluating staff.

Bioterrorism and Emergency Preparedness Competencies. In the years preceding September 11th, several key publications outlined goals and objectives for protecting the nation from the threat of biological and chemical attacks. Three areas in the public health infrastructure were identified as necessary to handle these threats: a skilled public health workforce, robust information and data systems, and effective health departments and laboratories. Following the terrorist acts of 2001, public health system deficiencies were identified in disaster planning, linkages with other agencies involved in disaster response, capacity to communicate with other groups, capacity to detect microbiological threats to health, and capacity to detect other threats to health and respond to them. Contributing to the shortcomings were the large number of local health departments, varying widely in size and sophistication, operating in a politicized home-rule atmosphere with a history of minimal funding. To focus workforce development, competencies in bioterrorism and emergency preparedness for all public health workers were adopted in 2002.

Colorado Workforce Issues. Public health in Colorado is practiced in diverse regions including densely populated metropolitan areas, mountain resorts, and sparsely populated rural plains; each encompasses diverse populations and health concerns. Forty of Colorado's 64 counties are either wholly or partially designated as medically underserved areas/populations or health professional shortage areas. There are 15 organized health departments in the state and 39 local county public health nursing services. In rural counties, one or more public health workers are charged with implementing population-specific programs as well as meeting the unique public health needs of their often medically underserved community.

Public health professionals in Colorado hold various credentials and represent multiple disciplines. Evidence suggests that many professional public health workers are not academically prepared for their responsibilities, and many do not have basic education in public health. Public health personnel in the most populous areas of the Front Range have greater access to educational programs than those in other regions because travel distances are great, mountainous terrain creates physical boundaries, and unpredictable weather conditions are common. With the diversity of geographical settings for practice, the diversity of the educational preparation, and the difficult access to education for rural public health workers, workforce development in Colorado is challenging.

The Colorado Department of Public Health (CDPHE) and the state's educational institutions offering public health academic programs have taken the leadership in public health workforce development. Universities around the state are responding to the challenge by revising curricula and making programs more accessible. Developed in 2001, *The Colorado Public and Environmental Health Professional Education Plan: Lifelong Learning System* is guiding statewide public health workforce development. In addition to articulating workforce expectations, the goal of this plan is to develop the infrastructure to strategically link public health professionals with educational resources to improve the workforce. Assessing competencies and learning needs from the perspective of the public health workers is an important component. This project was an academic/practice collaborative project between the University of Colorado Health Sciences Center (UCHSC) and CDPHE.

Purpose. The purpose of this project was to describe the characteristics, proficiencies, educational needs, and educational preferences of the public health workforce in Colorado. More specifically, this was an assessment of 1) proficiencies and educational needs in core competencies and 2) proficiencies and educational needs in bioterrorism/emergency preparedness. Educators and administrators can use information from this study in planning efficient, effective educational programs to improve the Colorado public health workforce.

2. Methodology

Design. Given the diversity of workers and paucity of knowledge about the Colorado public health workforce, the goal was to include all workers in traditional public health settings. Limited time and resources necessitated a survey methodology using a self-report strategy. The research design employed in this study was a descriptive comparative survey. Findings from this study can be triangulated with knowledge gained in different ways for a greater understanding of workforce development issues.

Measurement. A new self-assessment tool, *Towards 21st Century Public Health Practice,* was developed and used to collect data. In the first section, public health workers were asked to assess their proficiencies in eight Core Competency domains (i.e., Analytic/Assessment Skills, Policy Development/Program Planning Skills, Communication Skills, Cultural Competency Skills, Community Dimensions of Practice Skills, Basic Public Health Sciences Skills, Financial Planning/Management Skills, and Leadership/Systems Thinking Skills). In the second section, participants rated their proficiencies in seven Bioterrorism/Emergency Preparedness areas (i.e., Disaster Planning Skills, Disaster Response Skills, Emergency Communication Skills, Biological/Infectious Disease Skills, Toxic Chemical/Environment Hazard Skills, Physical Injury Skills, and Crisis Management Skills). In the third section, public health workers provided a self-assessment of their educational needs in these 15 Core and Bioterrorism/Emergency Preparedness domains and then described their preferences for educational programs and learning modalities. Demographic information (e.g., age, gender, ethnicity, professional discipline, educational preparation, profession, professional experience, experience in public health, current position, county of employment, salary) was elicited in the final section of this tool. Instrument development

was a deliberate and iterative process. A panel of public health experts established content validity. The survey instrument was pilot tested in three counties (n=238). As calculated using Cronbach's alpha, internal consistency reliability for the full sample of 1,249 respondents was .97 for Core Competencies Skills and .94 for Bioterrorism/Emergency Preparedness Skills. Subscale reliabilities ranged from .81 to .89 demonstrating ideal psychometric properties for this tool.

Data Collection. Identified professional public health workers in Colorado were contacted through supervisory personnel or by email, invited by CDPHE to participate, and directed to an Internet website at UCHSC for completing the survey tool. *TELEform™* software was used to receive and store incoming online data. Public health workers without email or access to computers received a paper and pencil form and returned their completed tool in pre-addressed envelopes to UCHSC. Potential respondents received follow-up reminders and the deadline was extended on three occasions to maximize participation rates. Data were collected between June and November 2002.

Data Analyses. Descriptive analyses were done on all items including measures of centrality and dispersion. Other preliminary analyses were done to test whether the data met the assumptions for the intended statistical tests. When a scale or subscale did not meet these assumptions, transformations and other adjustments were made. Statistical tests were done to see whether differences among means of comparison groups were greater than would be expected by chance alone. Differences in means between two groups were examined using t-tests. Differences among three or more groups were tested using analysis of variance; when the overall F ratio was statistically significant, post-hoc comparisons were made.

Target Population and Sample. The initial target population was all professional public health workers in Colorado. As the study unfolded, administrators requested permission to include their non-professional staff. A total of 1,249 Colorado public health workers participated in this study. The response rate is difficult to estimate and interpret since not all non-professional workers were invited to participate and the exact number of public health workers in Colorado at the time of the survey was not precisely known. An enumeration report prepared by CDPHE in 2001 indicated that 1,950 FTE professional and non-professional workers were employed in local public health agencies. In this study, 1,139 workers from this segment responded. In September 2002, 1,034 workers were employed at the CDPHE; however, only 110 workers from the state health department responded. The sample is clearly more representative of local public health workers than state level workers.

3. Results for Colorado Public Health Workers as a Group

Characteristics. Colorado public health workers who responded (N=1,249) were primarily white (81%), female (83%), and college-degreed (71%). The average age was 44 years. Workers averaged 14.4 years of experience in their discipline or major and 9.6 years of experience in public health. All but two of Colorado's 64 counties (97%) were represented in the study. Nine percent of the sample was employed by CDPHE (n=110). For county employees, more respondents were employed in organized health departments (82%) than local health agencies (18%). Most workers were from urban counties (79%), with the remaining from rural (16%) and frontier (5%) counties. Seventy-three percent of the respondents were employed in administrative or professional positions with public health nurses representing the largest group of workers (22%). When asked to classify their position, more than half of the workers (55%) classified themselves as front line staff; 26% classified themselves as supervisory/management staff, and the remaining 20% chose senior level staff. Most workers were employed full-time (82%) and the median full-time equivalent salary of respondents was $43,241. Twenty-nine percent of respondents reported they knew at least one non-English language. The most frequently reported non-English language was Spanish with 23 other languages reported; they reported greater skills in speaking than reading or writing this language.

Core Competency Proficiencies and Educational Needs. Respondents rated their proficiency in Core Competencies on a scale of 1 to 7 (where 1=*Not Proficient at this Time* and 7=*Highly Proficient at this Time*). When proficiency items in the Core Competency domain were summarized as a composite score, the mean was 4.40, and the median was 4.54. Based on their composite scores, Colorado public health workers were grouped into six proficiency levels: Level I (scores in the 1.00 to 1.99 range); Level II (scores in the 2.00 to 2.99 range); Level III (scores in the 3.00 to 3.99 range); Level IV (scores in the 4.00 to 4.99 range); Level V (scores in the 5.00 to 5.99 range); and Level VI (scores in the 6.00 to 7.00 range). The resulting distribution is noted below.

Level I	Little or No Proficiency	49 workers	4%
Level II	Low Proficiency	116 workers	9%
Level III	Fairly Moderate Proficiency	264 workers	21%
Level IV	Moderate Proficiency	379 workers	32%
Level V	Fairly High Proficiency	339 workers	27%
Level VI	High Proficiency	92 workers	7%

When these six levels were aggregated into three groups for greater simplicity, 13% were found in the lower proficiency group (i.e., Level I and II), about half of all workers (53%) were in the moderate proficiency group (i.e., Level III and IV), and about one-third (34%) were in the higher proficiency group (i.e., Level V and VI). Workers reported they were most proficient in Cultural Competency Skills (1st), Communication Skills (2nd), and Leadership/Systems Thinking Skills (3rd). They reported being least proficient in Basic Public Health Sciences Skills (6th), Policy Development/Program Planning Skills (7th), and Financial Planning/Management Skills (8th). Rated in the middle were Community Dimensions of Practice Skills (4th) and Analytic/Assessment Skills (5th). In descending order, the means for these subscales were: Cultural Competency Skills (5.07), Communication Skills (4.71), Leadership/Systems Thinking Skills (4.61), Community Dimensions of Practice Skills (4.38), Analytic/Assessment Skills (4.35), Basic Public Health Sciences Skills (4.09), Policy Development/Program Planning Skills (3.98), and Financial Planning/Management Skills (3.96).

Educational needs in Core Competencies were measured on a five-point scale (where 1=*No Need* and 5=*Highest Need*). When educational need items in this domain were summarized as a composite score, the mean score for Colorado workers was 2.99, and the median score was 3.00. Composite educational need was summarized into four levels: Level I (scores in the 1.00 to 1.99 range); Level II, (scores in the 2.00 to 2.99 range), Level III (scores in the 3.00 to 3.99 range); and Level IV (scores in the 4.00 to 5.00 range). The distribution for all Colorado public health workers by Core Competency educational need level is summarized below.

Level I	Little or No Educational Need	139 workers	11%
Level II	Some Educational Need	433 workers	35%
Level III	Moderate Educational Need	504 workers	41%
Level IV	High Educational Need	162 workers	13%

Almost half (46%) reported little or some educational needs in Core Competencies, and slightly more than half (54%) reported moderate or high educational needs. Workers reported their greatest educational needs were for Financial Planning/Management Skills (1st), Policy Development/ Program Planning Skills (2nd), and Basic Public Health Sciences Skills (3rd). Workers reported their least educational needs were in Community Dimensions of Practice (6th), Cultural Competency Skills (7th), and Communication Skills (8th). In the middle of these rankings were Analytic/Assessment Skills (4th) and Leadership/Systems Thinking Skills (5th). In descending order, the means for educational needs in these subscales were: Financial Planning/Management Skills (3.16), Policy Development/Program Planning Skills (3.13), Basic Public Health Sciences Skills (3.05), Analytic/

Assessment Skills (3.05), Leadership and Systems Thinking Skills (3.04), Community Dimensions of Practice Skills (2.96), Cultural Competency Skills (2.78), and Communication Skills (2.77).

Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs. Respondents rated their proficiency in Bioterrorism/Emergency Preparedness items on a scale of 1 to 7 (where 1=*Not Proficient at this Time* and 7=*Highly Proficient at this Time*). When items in the Bioterrorism/ Emergency Preparedness domain were summarized as a composite score, the average score (mean) of all respondents was 3.07, and the median was 2.86. Based on their composite scores, public health workers were grouped into six proficiency levels: Level I (scores in the 1.00 to 1.99 range); Level II (scores in the 2.00 to 2.99 range); Level III (scores in the 3.00 to 3.99 range); Level IV (scores in the 4.00 to 4.99 range); Level V (scores in the 5.00 to 5.99 range); and Level VI (scores in the 6.00 to 7.00 range). The distribution of the Colorado workforce by Bioterrorism/ Emergency Preparedness proficiency level is summarized below.

Level I	Little or No Proficiency	336 workers	27%
Level II	Low Proficiency	323 workers	26%
Level III	Fairly Moderate Proficiency	247 workers	20%
Level IV	Moderate Proficiency	183 workers	15%
Level V	Fairly High Proficiency	110 workers	9%
Level VI	High Proficiency	38 workers	3%

When these six levels of Bioterrorism/Emergency Preparedness proficiency were aggregated into three larger groups for greater simplicity, more than half (53%) were classified in the lower proficiency group (i.e., Level I and II), about one-third (35%) were categorized in the moderate proficiency group (i.e., Levels III and IV), and only 12% were classified in the higher proficiency group (i.e., Levels V and VI).

When Colorado public health workers were asked about their proficiencies in the seven Bioterrorism/Emergency Preparedness domains, they responded that they were most proficient in Disaster Response Skills (1st) and Emergency Communication Skills (2nd). They reported they were least proficient in Biological/Infectious Disease Skills (6th) and Toxic Chemical/Environmental Hazard Skills (7th). Rated in the middle were proficiencies in Physical Injury Skills (3rd), Crisis Management Skills (4th), and Disaster Planning Skills (5th). In descending order, the subscale means were Disaster Response Skills (3.88), Emergency Communication Skills (3.29), Physical Injury Skills (3.21), Crisis Management Skills (2.91), Disaster Planning Skills (2.80), Biological/Infectious Disease Skills (2.76), and Toxic Chemical/Environmental Hazard Skills (2.62).

Educational need for Bioterrorism/Emergency Preparedness was measured on a five-point scale (where 1=*No Need* and 5=*Highest Need*). The composite mean for the workforce was 3.45; the median was 3.57. Composite educational need was categorized into four levels: Level I (scores in the 1.00 to 1.99 range); Level II, (scores in the 2.00 to 2.99 range); Level III (scores in the 3.00 to 3.99 range); and Level IV (scores in the 4.00 to 5.00 range). The educational need level for Bioterrorism/Emergency Preparedness in the Colorado workforce sample is summarized below.

Level I	Little or No Educational Need	111 workers	9%
Level II	Some Educational Need	210 workers	17%
Level III	Moderate Educational Need	475 workers	38%
Level IV	High Educational Need	442 workers	36%

Thus, only about one-quarter (26%) rated themselves as having little or some educational need; the overwhelming majority (74%) identified moderate to high educational needs in Bioterrorism/

Emergency Preparedness. When workers were queried about their educational needs in the Bioterrorism/Emergency Preparedness subscales, respondents reported their greatest educational needs were for Toxic Chemical/Environmental Hazard Skills (tied at 1st) and Disaster Planning Skills (tied at 1st). They indicated their least educational needs were in Physical Injury Skills (6th) and Emergency Communication Skills (7th). Between these greatest and least needs were their educational needs for Disaster Response Skills (3rd), Biological/Infectious Disease Skills (4th), and Crisis Management Skills (5th). In descending order, the means for educational needs in these subscales were: Disaster Planning Skills (3.63) Toxic Chemical/Environmental Hazard Skills (3.63), Disaster Response Skills (3.61), Biological/Infectious Disease Skills (3.55), Crisis Management Skills (3.37), Physical Injury Skills (3.29), and Emergency Communication Skills (3.06).

Educational Preferences. Respondents were asked their degree of preference for four choices in each of these four areas: course length, format, time of course offering, and form of educational recognition. The response set for each of the 16 items was 1=*Not Preferred*; 2=*Somewhat Preferred*; and 3=*Most Preferred*. The clearly preferred learning format for Colorado public health workers was face-to-face classroom settings (2.74), followed by combination formats (2.01), Internet web-based instruction (1.79), and interactive teleconferences (1.73). Across the entire workforce, most preferred one-day workshops (2.49) or two-hour sessions (2.18) to several-day workshops (1.69) or academic semester courses (1.41). With respect to the time for course offerings, workers strongly preferred weekday classes (2.81) to self-determined web-based offerings (1.83), evening classes (1.39), or weekend classes (1.19). More workers preferred being recognized by receiving certificates (2.34) or continuing education units (2.19) than by earning graduate academic credits (1.92) or undergraduate academic credits (1.62). However, each educational preference was supported by segments of the sample.

4. Differences by Profession or Position

Differences Between Professional and Non-Professional Workers. Nearly three-fourths of the survey respondents were classified as Professionals (73%, n=899) vs. Non Professionals (27%, n=336). Professionals rated themselves as significantly ($p < .001$) more proficient in overall Core Competency Skills than Non-Professionals. The means on this composite scale for these two groups were 4.66 and 3.67, respectively. Means for the two groups were also statistically different ($p < .001$) in each of the eight Core Competency Skill subscales. Professionals consistently reported markedly higher proficiency levels than Non-Professionals.

The Non-Professional group reported a significantly greater overall educational need for Core Competency Skills ($p < .05$) than the Professional group. The means were 3.10 and 2.96, respectively. When educational needs for the two groups were compared on the eight core competency subscales, Non-Professionals had statistically higher educational needs in three subscales: Communication Skills ($p < .001$), Cultural Competency Skills ($p < .001$), and Basic Public Health Sciences Skills ($p < .01$). No differences were noted in other subscales.

For the composite Bioterrorism/Emergency Preparedness proficiency scale, Professionals were found to be significantly ($p < .01$) more proficient than Non-Professionals (mean=3.13, 2.90, respectively). When the subscales were compared, Professionals were statistically more proficient in four areas: Disaster Response Skills ($p < .001$), Biological/Infectious Disease Skills ($p < .01$), Physical Injury Skills ($p < .01$), and Crisis Management Skills ($p < .001$). No differences were found in Disaster Planning Skills, Emergency Communication Skills, and Toxic Chemical/Environmental Hazard Skills.

When overall educational need for Bioterrorism/Emergency Preparedness Competency Skills (composite) was compared for these two groups, no difference was found. Unexpectedly, workers in

the Professional group identified greater educational needs than workers in the Non-Professional group in two of the seven subscales: Disaster Planning Skills ($p < .05$) and Disaster Response Skills ($p < .01$). Educational needs in the other five subscales were remarkably similar.

The groups were similar in ranking their educational preferences regarding course length, educational format, and time of course offering. However, the Professional group preferred graduate academic credit to undergraduate academic credit while the Non-Professional group preferred undergraduate to graduate academic credit. This finding is not unexpected given the differences in educational levels between the two groups.

Differences in Professional Groups. Statistical comparisons were made among the six largest professional groups: Public Health Nurses (n=270), Environmental Health Specialists (n=142), Administrative/Business Professionals (n=126), Public Health Program Specialists (n=69), Public Health Educators (n=56), and Public Health Nutritionists (n=35). A significant difference between groups ($p < .001$) was found in overall proficiency in Core Competency Skills. In descending order, the means for Core Competency Skills (composite score) were: Administrative/Business Professionals (5.08), Public Health Program Specialists (4.72), Environmental Health Specialists (4.56), Public Health Educators (4.55), Public Health Nurses (4.48), and Public Health Nutritionists (4.20). Among these six professional groups, statistically significant differences were found in all eight Core Competency subscales. Some professional groups had different skill sets. While the Administrative/Business Professionals scored highest on nearly all subscales, Public Health Nurses and Public Health Educators scored highest on Cultural Competency Skills. For Basic Public Health Sciences Skills, Administrative/Business Professionals, Environmental Health Specialists and Public Health Nurses were equally proficient; these three groups were more proficient than Public Health Nutritionists, Public Health Educators, and Public Health Specialists. Public Health Nutritionists were least proficient in seven of the eight subscales.

No statistical difference was found among the six professional groups for overall educational need in Core Competency Skills (composite score). However, differences were found in five of the eight subscales: Policy Development/Program Planning Skills ($p < .001$), Communication Skills ($p < .05$), Cultural Competency Skills ($p < .05$), Community Dimensions of Practice Skills ($p < .01$), and Financial Planning/Management Skills ($p < .01$). Public Health Nurses indicated greater needs than other professional groups in Policy Development/Program Planning Skills and Financial Planning/ Management Skills but fewer needs than other groups in Cultural Competency Skills. Public Health Specialists expressed less educational needs than other groups in Communication Skills and Community Dimensions of Practice Skills. Public Health Nutritionists identified the highest educational need for Community Dimensions of Practice Skills.

Among these six professional groups, a significant difference ($p < .001$) was found for overall proficiency in Bioterrorism/Emergency Preparedness Skills. In descending order, the means on the composite score for these professional groups were: Administrative/Business Professionals (3.40), Environmental Health Specialists (3.36), Public Health Nurses (3.24), Public Health Educators (2.59), Public Health Program Specialists (2.57), and Public Health Nutritionists (2.13). Among these six groups, statistically significant differences ($p < .001$) were found in all eight Bioterrorism/ Emergency Preparedness Competency subscales. Professional groups demonstrated different skill sets (e.g., Administrative/Business Professionals scored highest on Disaster Planning Skills, Emergency Communication Skills, and Biological/Infectious Disease Skills; Public Health Nurses scored highest on Physical Injury Skills and Crisis Management Skills; Environmental Health Specialists scored highest on Disaster Response Skills and Toxic Chemical/Environmental Hazard Skills). Public Health Nutritionists reported the lowest proficiencies in all dimensions of Bioterrorism/ Emergency Preparedness.

The six professional groups did not differ on overall educational need for Bioterrorism/Emergency Preparedness Competency Skills (composite score). When the seven subscales were examined individually, statistical differences were found in two subscales: Emergency Communication Skills ($p < .001$) and Biological/Infectious Disease Skills ($p < .05$). Administrative/Business Professionals and Public Health Nurses reported higher needs in Emergency Communication Skills than other groups. Environmental Health Specialists reported lower levels of educational need for both Emergency Communication Skills and Biological/Infectious Disease Skills than did other groups.

Educational preferences were similar, with some differences noted between professional groups. No differences were found in preferred course length or time of course offering. For educational format, preferences were similar except for Public Health Nurses and Public Health Specialists who ranked Internet courses as least preferred among all options. Some professional differences were observed for educational recognition: Public Health Nurses and Public Health Nutritionists preferred continuing education units; other groups preferred certificates. All groups preferred graduate to undergraduate academic credit.

Differences in Non-Professional Groups. Comparisons were also made for the six largest non-professional groups: Administrative Support Staff (n=141), Other Paraprofessionals (n=79), Other Public Health Technicians (n=27), Community Outreach Workers (n=19), Computer Specialists (n=13), and Other Clerical Support (n=10). Despite the small sample sizes in some groups, a significant difference between groups ($p < .05$) was found in overall Core Competency Skills proficiency. In descending order, the means for this composite score were: Community Outreach Worker (4.25), Other Paraprofessional (3.95), Computer Specialist (3.90), Other Public Health Technician (3.66), Administrative Support Staff (3.41), and Other Clerical/Support (2.99). Statistically significant differences were found in six of eight of the Core Competency subscales. Non-professional groups demonstrated differences in skill sets (e.g., the Community Outreach Worker group scored highest on Assessment/Analytic Skills, Policy Development/Program Planning Skills, Communication Skills, Cultural Competency Skills, and Community Dimensions of Practice Skills; the Computer Specialist group scored highest on Financial Planning/Management Skills; and the Other Paraprofessional group scored highest on Leadership/Systems Thinking Skills). The Other Clerical/Support group was least proficient in all but one dimension.

Among these six non-professional groups, no significant differences were found in either the Core Competency educational need composite scale or any of its eight subscales, perhaps due to the small sample sizes in several groups.

Similarly, no significant differences were found in overall Bioterrorism/Emergency Preparedness proficiency or in proficiencies on the seven subscales. However it was noted that the Computer Specialist group far exceeded other groups in Emergency Communication Skills. Community Outreach Workers scored highest in Disaster Response Skills, Toxic Chemical/Environment Hazard Skills, and Crisis Management Skills. The Other Clerical/Support group was the most proficient in Disaster Planning Skills.

When educational needs for Bioterrorism/Emergency Preparedness Skills were examined, no statistically significant differences were found, likely due to small sample sizes. However, several observations were made: Community Outreach Workers and Other Paraprofessionals reported the greatest educational needs; Computer Specialists reported the least educational needs.

Educational preferences were similar across non-professional groups with the exception that Computer Specialists expressed greater interest in earning graduate academic credit. This finding is not unexpected given that this group had a higher percentage of college graduates.

Differences by Position Category. The standard public health enumeration coding system was used to classify workers into eight position categories. Sufficient respondents in five categories permitted comparisons. These categories and the number of workers in each were: Officials/Administrators (n=31), Professionals (n=868), Technicians (n=70), Paraprofessionals (n=98), and Administrative Support (n=164). In descending order, the means for proficiency in Core Competency Skills (composite score) among these groups were Officials/Administrators (5.48), Professionals (4.63), Paraprofessionals (4.01), Technicians (3.83), and Administrative Support (3.39). A similar pattern of marked, significant differences ($p < .001$) were found in all eight Core Competency Skill subscales. Officials/Administrators consistently were the most proficient, followed by Professionals. The Administrative Support group was found to be least proficient across all dimensions.

A significant difference ($p < .001$) in overall educational need for Core Competency Skills (composite score) was found among these position categories. Except for Policy Development/Program Planning Skills, significant differences were found in all subscales. Educational needs were markedly less for the Official/Administrator group. While educational needs for the Professional group were less in Communication Skills and Cultural Competency Skills, their educational needs did not differ much from the Technicians, Paraprofessionals, and Administrative Support groups.

Differences ($p < .01$) were found in overall proficiency in Bioterrorism/Emergency Preparedness Skills. In descending order, the means for these groups on the composite score were Officials/ Administrators (3.77), Professionals (3.11), Technicians (3.01), Paraprofessionals (3.00), and Administrative Support (2.77). Except for Toxic Chemical/Environmental Hazard Skills, significant differences were found in all Bioterrorism/Emergency Preparedness subscales. The Officials/ Administrators group was most proficient in all dimensions. The Technicians group was the next most proficient in Emergency Communication Skills. In Disaster Response Skills, Physical Injury Skills, and Crisis Management Skills, the Professionals and Paraprofessionals groups were more proficient than the Technicians and Administrative Support groups.

In overall educational need for Bioterrorism/Emergency Preparedness Skills (composite score), no significant difference was found among the five position categories. When the seven subscales were examined individually, no statistical differences were found. It is interesting to note that although the Officials/Administrators were the most proficient in all Bioterrorism/Emergency Preparedness dimensions, they rated their educational needs higher or nearly as high as other groups.

When educational preferences among these position categories were compared, the groups were similar in their preferences for course length, educational format, and time of course offering. The Officials/Administrators group indicated their highest preference for educational recognition was to receive graduate academic credit; other groups noted higher preference for certificates and continuing educational units.

Differences by Type of Position. When provided with definitions of three types of positions, the majority of workers (54%) classified themselves as Front Line Staff (n=659); others categorized themselves as either Senior Level Staff (n=236) or Supervisory/Management Staff (n=315). A significant difference ($p < .001$) was found among these three groups in overall proficiency in Core Competency Skills. In descending order, the means for the composite score were Supervisory/ Management Staff (4.97), Senior Level Staff (4.57), and Front Line Staff (4.08). When the eight competency subscales were compared, a similar patterns of significant differences were found.

In overall educational need for Core Competency Skills (composite score), a significant difference ($p < .001$) was found among types of positions. Front Line Staff (3.07) reported greater educational need than the Senior Level Staff (2.90) or Supervisory/Management Staff (2.93). For six subscales, the pattern of higher educational needs among the Front Line Staff was statistically supported. No

differences were found in Policy Development/Program Planning Skills or Financial Planning/ Management Skills; educational needs were uniformly high across all groups.

A significant difference ($p < .05$) was found in overall proficiency in Bioterrorism/Emergency Preparedness Skills (composite scale). The Supervisory/Management Staff reported a higher proficiency (3.25) than Front Line Staff (3.04) and Senior Level Staff (2.93). This pattern of higher proficiency among the Supervisory/Management Staff was also apparent in four subscales: Disaster Planning Skills ($p < .001$), Disaster Response Skills ($p < .05$), Emergency Communication Skills ($p < .01$), and Biological/Infectious Disease Skills ($p < .001$).

No difference was found among the three types of positions on overall educational need in Bioterrorism/Emergency Preparedness Skills (composite score). When the seven subscales were examined individually, no statistical differences were found.

When educational preferences were compared, rank orders of preferences for course length, educational format, time of course offering, and educational recognition were similar across the three groups.

Differences Between Full-Time and Part-Time Workers. A comparison was made of Full-Time workers (n=1,008) and Part-Time workers (n=219). No difference between Full-Time and Part-Time workers was found in overall proficiency in Core Competency Skills (composite scale). Full-Time workers scored higher than Part-Time workers on Policy Development/Program Planning Skills ($p < .01$) and Financial Planning/Management Skills ($p < .05$). Part-Time workers were more proficient ($p < .05$) than Full-Time workers on Cultural Competency Skills. No differences were found in the other five subscales.

Similarly, few differences between these two groups were noted in educational needs for Core Competency Skills. No difference on the composite measure was noted. Full-Time workers reported a greater educational need for Cultural Competency Skills ($p < .05$) and Basic Public Health Sciences Skills ($p < .05$) than Part-Time workers. No differences were found in the other six subscales.

No difference was found in overall proficiency in Bioterrorism/Emergency Preparedness (composite scale). When subscales were examined, Full-Time workers were found to be more proficient in Disaster Planning Skills ($p < .05$), Emergency Communication Skills ($p < .01$), Biological/Infectious Disease Skills ($p < .05$), and Toxic Chemical/Environmental Hazard Skills ($p < .01$). No differences were noted in the other three subscales.

When educational need for Bioterrorism/Emergency Preparedness Skills (composite) was compared for Full-Time and Part-Time groups, no difference was found. No differences were found between these two groups in any of the seven subscales.

When a comparison of the educational preferences for Full-Time and Part-Time workers was made, no differences in rank-ordered preferences were noted except that Full-Time workers' greatest preference for educational recognition was a certificate while Part-Time workers chose continuing education units as their highest preference.

5. Differences by Public Health Worker Demographics

Differences by Age Group. To examine potential age differences, respondents were classified into five groups: Under 30 Years (n=148), 30 to 39 Years (n=246), 40 to 49 Years (n=398), 50 to 59 Years (n=349), and 60 Years and Over (n=71). A significant difference between age groups (p. <.05)

was found in overall proficiency in Core Competency Skills. In descending order, the means for this composite score for the age groups were: 50 to 59 Years (4.56), 30 to 39 years (4.39), 40 to 49 Years (4.36), Under 30 Years (4.25), and 60 Years and Over (4.21). Among these groups, significant differences were found in five of eight Core Competency subscales: Assessment/Analytic Skills ($p < .05$), Policy Development/Program Planning Skills ($p < .001$), Communication Skills ($p < .05$), Financial Planning/Management Skills ($p < .05$), and Leadership/Systems Thinking Skills ($p < .001$). No consistent patterns across the age groups were observed. The youngest workers were least proficient in Policy Development/Program Planning Skills and Financial Planning/ Management Skills, but most proficient in Cultural Competency Skills.

Regarding educational need for Core Competencies, no significant differences were found among these five age groups in either the composite scale or any of its eight subscales.

Among the five age groups, no significant difference was found in overall proficiency in Bioterrorism/Emergency Preparedness Skills (composite); no differences were observed in any of its seven subscales.

No difference was found in overall educational need for Bioterrorism/Emergency Preparedness Skills (composite) across age groups. Statistical differences in educational needs were found for three subscales: Emergency Communication Skills ($p < .01$), Physical Injury Skills ($p < .05$), and Crisis Management Skills ($p < .01$). For Emergency Communication Skills, educational needs increased incrementally with age. For Physical Injury Skills and Crisis Management Skills, workers in the 30 to 39 Years group and the 50 to 59 Years group identified greater educational needs than workers in other age categories; in addition, the oldest group reported the least educational needs in these two dimensions. Few differences in educational preference were noted across age groups. The rank order of preference regarding educational format was slightly different across age. Workers in the 40 to 49 Year and 60 Years and Over groups preferred interactive teleconferences over Internet/web based instruction; respondents in the other age groups preferred Internet/web based instruction to interactive teleconferences.

Differences Between College Degree and Non-College Degree Workers. In another contrast between demographic characteristics of Colorado public health workers, a comparison was made between those workers with a College Degree (n=868) and those with No College Degree (n=354). College Degree workers rated themselves as markedly ($p < .001$) more proficient in overall Core Competency Skills than the No College Degree workers. The means on the composite scale were 4.65 and 3.78, respectively. Means for the two groups were statistically different ($p. < .001$) in each of the eight Core Competency Skill subscales with degreed workers consistently showing higher proficiency levels than non-degreed workers.

In the Core Competency educational needs composite scale, the No College Degree group reported significantly ($p < .05$) greater needs than the College Degree group. When educational needs were compared within the eight subscales, the non-degreed group had a statistically higher need for education in three subscales: Communication Skills ($p < .001$), Cultural Competency Skills ($p < .001$), and Basic Public Health Sciences Skills ($p < .05$).

No difference in overall proficiency in Bioterrorism/Emergency Preparedness Competency Skills (composite scale) was found between the College Degree and the No College Degree groups. When the subscales were compared, the degree group was more proficient in three subscales: Disaster Response Skills ($p < .001$), Biological/Infectious Disease Skills ($p < .01$), and Crisis Management Skills ($p < .05$). No differences were found in Disaster Planning Skills, Emergency Communication Skills, Toxic Chemical/Environmental Hazard Skills, and Physical Injury Skills.

When overall educational need for Bioterrorism/Emergency Preparedness (composite) was compared for these two groups, no difference was found. When comparisons were made on the seven subscales, workers in the College Degree group identified greater educational need in three subscales: Disaster Planning Skills ($p < .05$), Disaster Response Skills ($p < .01$), and Toxic Chemical/ Environmental Hazards Skills ($p < .05$). No differences in educational preferences were noted for format or time of course offering. However, college-degree workers preferred one-day workshops to shorter 2-hour sessions, and those without a college degree preferred 2-hour sessions to one-day workshops. Not unexpected, those in the degree group indicated a higher preference for graduate academic credit; those in the no degree group preferred undergraduate academic credit.

Differences by Level of Educational Preparation. Workers were compared in six categories of educational preparation. These categories and the numbers of workers in each group follows: High School Diploma (n=174), Professional/Vocational Diploma (n=78), Associate Degree (n=102), Baccalaureate Degree (n=547), Master's Degree (n=287), and Doctoral Degree (n=34). A large significant difference ($p < .001$) was found in overall Core Competency Skill proficiency by level of education. A higher proficiency corresponded with higher educational preparation. In descending order, the means for this composite proficiency were: Doctoral Degree (5.26), Master's Degree (4.95), Baccalaureate Degree (4.46), Associate Degree (4.05), Professional/Vocational Diploma (3.88), and High School Diploma (3.57). Among these six groups, a similar pattern of marked statistically significant differences ($p < .001$) was found in all eight subscales.

A significant difference ($p < .01$) in educational need for Core Competency Skills (composite score) was found among these six educational groups. Significant differences were also found in five of the eight subscales: Analytic/Assessment Skills ($p < .05$), Communication Skills ($p < .001$), Cultural Competency Skills ($p < .001$), Community Dimensions of Practice Skills ($p < .05$), and Leadership/ Systems Thinking Skills ($p < .05$). In general, educational needs were higher for the High School Diploma, Professional/Vocational Diploma, and Associate Degree groups than for the Baccalaureate Degree, Master's Degree, and Doctoral Degree groups. The doctoral prepared group expressed least educational needs across all dimensions.

For overall proficiency in Bioterrorism/Emergency Preparedness Skills, a difference ($p < .001$) was found among the six groups. However, proficiency was not systematically associated with level of education. In descending order, means for these groups on the composite score were: Doctoral Degree (3.66), Associate Degree (3.28), Baccalaureate Degree (3.14), Professional/Vocational Diploma (3.03), Master's Degree (2.97), and High School Diploma (2.75). Significant differences and a similar pattern were found in five of the seven Bioterrorism/Emergency Preparedness subscales: Disaster Response Skills; Biological/Infectious Disease Skills; Toxic Chemical/Environment Hazard Skills; Physical Injury Skills; and Crisis Management Skills. Those with doctoral degrees were most proficient in all subscales. Those with high school diplomas were the least proficient. Those with Associate Degrees showed greater proficiency in Emergency Communication Skills and Physical Injury Skills than might have been expected by educational achievement.

No differences in overall educational needs for Bioterrorism/Emergency Preparedness Skills (composite score) were found among the six levels of education. When the seven subscales were examined individually, no statistical differences were found. It is interesting that those with a high school diploma identified the lowest levels of educational need in most categories.

Educational preferences across groups were remarkably similar except for educational recognition. Those without a baccalaureate degree preferred certificates, followed by continuing education units and undergraduate credits. Although there was support for all types of recognition, the Baccalaureate Degree group preferred undergraduate academic credit to other forms of educational

recognition. As expected, those in the Master's Degree and Doctoral Degree groups preferred graduate to undergraduate academic credit.

Differences by Years Since Last Degree. To examine potential differences related to time elapsed since workers received their last formal degree or diploma, respondents were classified into six groups. These categories and the number of respondents in each were: 1 Year or Less (n=57), 2 to 4 Years (n=152), 5 to 9 Years (n=206), 10 to 14 Years (n=173), 15 to 19 Years (n=134), and 20 Years or More (n=437). An analysis of variance showed no significant difference in overall proficiency in Core Competency Skills (composite) between groups. Differences were found in two subscales: Communication Skills ($p < .001$) and Cultural Competency Skills ($p < .05$). Most recent graduates scored higher in these two proficiencies than did workers with two or more years since their last degree.

No difference was found between groups in overall Core Competency educational needs (composite). When subscales were compared, differences were found in Policy Development/ Program Planning Skills ($p < .05$) and Financial Planning/Management Skills ($p < .01$). In both subscales, new graduates reported the highest educational needs.

In the composite Bioterrorism/Emergency Preparedness proficiency rating, no difference was found across groups. When subscales were examined, differences were found on two subscales: Emergency Communication Skills ($p < .01$) and Physical Injury Skills ($p < .001$). In both areas, the most recent graduates had greater proficiencies than less recent graduates.

Similarly, no difference in groups was found for overall educational need in Bioterrorism/Emergency Preparedness (composite). A significant difference was found on one subscale; in Emergency Communication Skills ($p < .001$), educational need increased with time since last degree. Other differences were noted but were not statistically significant, likely due to the small number in the recent graduate group. Workers with 20 or more years since last degree had less educational needs in Disaster Planning Skills and Disaster Response Skills. Most recent graduates identified greater educational needs in Biological/Infectious Disease Skills and Toxic Chemical/Environmental Hazard Skills.

Educational preferences for course length, educational format, and time of course offering were similar across groups. New graduates expressed a higher preference for graduate academic credit.

Differences by Years of Experience in Discipline or Major. To examine potential differences related to experience in the discipline or major, respondents were classified into six groups. These groups and the number of workers in each were as follows: 1 Year or Less (n=85), 2 to 4 Years (n=149), 5 to 9 Years (n=193), 10 to 14 Years (n=150), 15 to 19 Years (n=118), and 20 Years or More (n=361). A significant difference between groups ($p < .001$) was found in overall Core Competency Skills proficiency. In descending order, the means for the composite score among professional experience groups were: 20 Years or More (4.76), 15 to 19 Years (4.60), 5 to 9 Years (4.53), 10 to 14 Years (4.51), 2 to 4 Years (4.29) and 1 Year or Less (3.91). Among these six experience groups, statistically significant differences were found in all eight Core Competency subscales with a similar pattern of experienced workers demonstrating greater proficiency.

For educational needs in Core Competency Skills, no significant differences were found among these six experience categories in either the composite scale or any of its eight subscales.

A significant difference between groups ($p < .05$) was found in overall proficiency in Bioterrorism/ Emergency Preparedness Skills. In descending order, the means for this composite score among professional experience groups were: 20 Years or More (3.22), 5 to 9 Years (3.21), 2 to 4 Years

(3.11), 15 to 19 Years (3.03), 10 to 14 Years (2.99), and 1 Year or Less (2.69). Among these six groups, significant differences were found in five of the seven subscales: Disaster Planning Skills ($p < .01$), Disaster Response Skills ($p < .01$), Biological/Infectious Disease Skills ($p < .05$), Physical Injury Skills ($p < .01$), and Crisis Management Skills ($p < .05$). In general, workers with less than 2 years of experience in the discipline were less proficient than those with two or more years.

When the overall educational need for Bioterrorism/Emergency Preparedness (composite score) was compared across the six levels of professional experience, no significant difference was found. Similarly, no differences were observed for six of the seven subscales. In Emergency Communication Skills ($p < .001$), the groups with more professional experience reported greater educational needs than those with less experience.

When workers' educational preferences by years of experience were compared, no differences in rank orderings across categories were found for course length, educational format, or time of course offering. Workers with 1 Year or Less in the discipline expressed a higher preference for recognition through graduate academic credit than workers in other groups.

Differences by Years of Experience in Public Health. To examine potential differences related to years of public health experience, respondents were classified into six groups. The categories and number of respondents were: 1 Year or Less (n=202), 2 to 4 Years (n=226), 5 to 9 Years (n=260), 10 to 14 Years (n=219), 15 to 19 Years (n=101), and 20 Years or More (n=189). A significant difference between groups ($p < .001$) was found in overall Core Competency Skills proficiency. In descending order, the means for this composite score among public health experience groups were: 20 Years or More (4.75), 15 to 19 Years (4.58), 5 to 9 Years (4.40), 10 to 14 Years (4.35), 2 to 4 Years (4.35), and 1 Year or Less (4.16). Among these groups, statistically significant differences were found in seven of the eight Core Competency subscales. No difference was found for the Cultural Competency Skills subscale. For all other subscales, proficiencies were higher the longer the worker had been employed in public health.

Regarding educational need for Core Competency Skills, a significant difference between groups ($p < .001$) was found for the composite score and five of its subscales: Assessment/Analytic Skills ($p < .01$); Policy Development/Program Planning Skills ($p < .001$); Basic Public Health Sciences Skills ($p < .001$); Financial Planning/Management Skills ($p < .001$), and Leadership/Systems Thinking Skills ($p < .01$). The pattern demonstrated greater educational needs in groups with less public health experience.

No difference between groups was found in overall proficiency in Bioterrorism/Emergency Preparedness Skills (composite measure). Significant differences were found in two of the seven subscales: Disaster Planning Skills ($p < .05$) and Biological/Infectious Disease Skills ($p < .01$). For both subscales, public health workers with 15 or more years of experience in public health were more proficient than workers with less than 15 years experience.

No significant difference was found among the six public health experience groups in overall educational need for Bioterrorism/Emergency Preparedness Skills (composite score). Differences were found on three of its subscales: Disaster Planning ($p < .01$), Emergency Communication ($p < .001$), and Biological/Infectious Disease Skills ($p < .05$). In Disaster Planning Skills and Biological/Infectious Disease Skills, workers with less public health experience had higher educational needs than those with more experience. However, for Emergency Communication Skills, workers with more experience in public health identified a greater need than those with less experience.

When educational preferences among groups were compared, no differences in rank orderings were observed for preferred course length, educational format, or time of course offering. While more experienced public health workers preferred continuing educational units, newer workers expressed a higher preference for certificates.

6. Differences by Public Health Setting or Context

Workers at the Colorado Department of Public Health and Environment. When proficiency items in the Core Competency domain were summarized as a composite score for state health department workers (n=110), the mean score was 4.51 and the median score was 4.61. State public health workers reported they were most proficient in Communication Skills (1st), Cultural Competency Skills (tied for 2nd), and Leadership/Systems Thinking Skills (tied for 2nd). They reported being least proficient in Financial Planning/Management Skills (6th), Community Dimensions of Practice Skills (7th), and Basic Public Health Sciences Skills (8th). Rated in the middle were Analytic/Assessment Skills (4th) and Policy Development/Program Planning Skills (5th). In descending order, the means for the subscales were: Communication Skills (5.17), Cultural Competency Skills (5.00), Leadership/Systems Thinking Skills (5.00), Analytic/Assessment Skills (4.75), Policy Development/ Program Planning Skills (4.50), Financial Planning/Management Skills (4.40), Community Dimensions of Practice Skills (4.25), and Basic Public Health Sciences Skills (4.13).

When educational needs in Core Competencies were summarized as a composite measure, the mean score for state health department workers was 2.98 and the median score was 3.00. When queried about their educational needs in subscales, workers reported their greatest educational needs were for Leadership/Systems Thinking Skills (1st), Financial Planning/Management Skills (2nd), and Policy Development/Program Planning Skills (3rd). Workers reported their least educational needs were in Basic Public Health Sciences Skills (6th), Analytic/Assessment Skills (7th), and Communication Skills (8th). Rated in the middle were Community Dimensions of Practice (4th) and Cultural Competency Skills (5th). In descending order, the means for educational needs were: Leadership/Systems Thinking Skills (3.18), Financial Planning/Management Skills (3.15), Policy Development/Program Planning Skills (3.07), Community Dimensions of Practice Skills (3.04), Cultural Competency Skills (3.01), Basic Public Health Sciences Skills (2.84), Analytic/Assessment Skills (2.82), and Communication Skills (2.71).

When proficiency items in Bioterrorism/Emergency Preparedness were summarized as a composite score, the average (mean) score was 2.28 and the median score was 2.04. Workers responded they were most proficient in Disaster Response Skills (1st) and Emergency Communication Skills (2nd) and least proficient in Crisis Management Skills (6th) and Toxic Chemical/Environmental Hazard Skills (7th). Rated in the middle were proficiencies in Physical Injury Skills (3rd), Biological/Infectious Disease Skills (4th), and Disaster Planning Skills (5th). In descending order, the means for these subscales were: Disaster Response Skills (3.07), Emergency Communication Skills (2.67), Physical Injury Skills (2.28), Biological/Infectious Disease Skills (2.10), Disaster Planning Skills (2.04), Crisis Management Skills (1.96), and Toxic Chemical/Environmental Hazard Skills (1.86).

When the overall educational need for Bioterrorism/Emergency Preparedness (composite score) was calculated for CDPHE, the mean was 3.17 and the median score was 3.23. In the seven subscales, respondents reported their greatest educational needs were for Disaster Response Skills (1st) and Disaster Planning Skills (2nd). Their least educational needs were in Physical Injury Skills (6th) and Emergency Communication Skills (7th). Between these greatest and least educational needs, they ranked Toxic Chemical/Environmental Hazard Skills (3rd), Crisis Management Skills (4th), and Biological/Infectious Disease Skills (5th). In descending order, the means for educational need were: Disaster Response Skills (3.44), Disaster Planning Skills (3.38), Toxic Chemical/

Environmental Hazard Skills (3.33), Crisis Management Skills (3.12), Biological/Infectious Disease Skills (3.10), Physical Injury Skills (3.05), and Emergency Communication Skills (2.73). It is interesting that although state health department workers reported they were most proficient in Disaster Response Skills, they rated Disaster Response Skills as their highest educational need.

The preferred learning format for these state health department workers was face-to-face classroom settings, followed by combination formats, Internet web-based instruction, and interactive teleconferences. Most preferred one-day workshops or two-hour sessions to several-day workshops or academic semester courses. With respect to the time for course offerings, workers strongly preferred weekday classes and self-determined web-based offerings to evening classes or weekend classes. State health department workers expressed a higher preference for recognition through certificates or continuing education units than undergraduate or graduate academic credits.

Differences by Region. To examine differences by region, respondents were grouped into eight public health regions. Workers employed at the CDPHE were excluded from this analysis. The eight regions and the sample size in each were as follows: Metro (n=524), Central (n=182), Northeast (n=165), West Central (n=77), Southeast (n=58), Northwest (n=39), Southwest (n=26), and San Luis Valley (n=24). A statistically significant difference among regions was found for overall proficiency in Core Competency Skills ($p < .001$). The Northwest, West Central, and Northeast regions reported the highest proficiency levels; the Southwest and San Luis Valley regions reported the lowest proficiency levels. The Metro, Southeast, and Central regions were at similar midrange scores. In descending order, the means for this composite score among the regions were: Northwest (4.84), West Central (4.65), Northeast (4.58), Metro (4.34), Southeast (4.33), Central (4.29), Southwest (3.94), and San Luis Valley (3.57). Among the eight regional groups, differences ($p < .01$ to $p < .001$) were found in all eight Core Competency subscales. Across subscales, the pattern is similar to the overall competency ratings; workers in the Northwest region had the highest scores and those in the San Luis Valley consistently had the lowest scores.

In overall educational need for Core Competency Skills, a significant difference ($p < .01$) was observed between regions. In descending order, the composite score means were: San Luis Valley (3.28), Northwest (3.23), Central (3.10), Northeast (3.10), Southwest (3.08), Southeast (3.03), West Central (2.98), and Metro (2.88). Differences were also found in five of the eight Core Competency educational need subscales: Assessment/Analytic Skills ($p < .01$), Policy Development/Program Planning Skills ($p < .001$), Community Dimensions of Practice Skills ($p < .001$), Basic Public Health Sciences Skills ($p < .05$), and Financial Planning/Management Skills ($p < .01$). It is interesting to note that the region with the highest proficiency (Northwest) and the region with the lowest proficiency (San Luis Valley) often rated their educational needs higher than the six other regions.

A significant difference among regional groups ($p < .001$) was found in overall Bioterrorism/ Emergency Preparedness proficiency. In descending order, the means for the composite score among regions were: Northwest (3.73), Central (3.55), Northeast (3.24), San Luis Valley (3.21), Southeast (3.18), Metro (2.98), West Central (2.92), and Southwest (2.84). Significant differences were also found in all seven of the Bioterrorism/Emergency Preparedness Competency subscales. Proficiency varied by subscale and region. While the Northwest region reported highest proficiency in Disaster Planning Skills, Disaster Response Skills, Biological/Infectious Disease Skills, and Chemical/Environmental Hazard Skills, the Central region showed highest proficiency in Emergency Communication Skills. The San Luis Valley region was most proficient in Physical Injury Skills and Crisis Management Skills. Except for Physical Injury Skills and Crisis Management Skills, the West Central and Southwest regions reported the lowest proficiency levels.

Workers in the Southeast and Southwest regions rated their overall educational need for Bioterrorism/Emergency Preparedness (composite) lower than other regions; however, no statistical

difference was observed, perhaps due to the small sample sizes in these two regions. Two educational needs subscales had significant differences by region. For Disaster Response Skills ($p < .01$), the Northwest, West Central, and San Luis Valley regions reported higher needs while the Southeast region reported lowest need. In Toxic Chemical/Environmental Hazards Skills ($p < .05$), the Northwest, West Central, Northeast, and Central regions reported higher educational needs, the Metro and San Luis Valley regions reported mid-range needs, and the Southeast and Southwest regions reported lower educational needs.

No differences were observed in rankings for the most preferred educational format or time of course offering. While all other regions preferred one-day workshops followed by a preference for 2-hour sessions, the Southwest region preferred several-day workshops to 2-hour sessions. While most regions indicated a certificate as the most preferred type of educational recognition, respondents in the West Central and Southeast regions indicated continuing education units was their most preferred type of recognition. Except in the San Luis Valley region, workers preferred graduate to undergraduate academic credit.

Differences by County Size. Counties were classified on size by the number of workers who responded to the survey; this indicator was used as a proxy for county size and public health workforce size. County size categories, definitions, and the number of participants in each group were: Very Small Counties (less than 5 workers; n=44); Small Counties, (5 to 14 workers; n=118); Medium Counties (15 to 49 Workers; n=124); and Large Counties (50 or More Workers; n=809). No overall difference was found among these four groups in overall proficiency in Core Competency Skills. Statistically significant differences were found in two subscales: Community Dimensions of Practice Skills ($p < .01$) and Financial Planning/Management Skills ($p < .01$). In both cases, workers in Very Small, Small, and Medium Counties were more proficient than workers in Large Counties.

Although no statistical difference was found among the four county sizes in overall educational need in Core Competency Skills (composite score), workers in Very Small Counties identified greater educational need than did other county size groups. The lack of statistical difference may be due to the small sample size of this group. Statistical differences were found in two of the eight Core Competency Skill subscales: Policy Development/Program Planning Skills ($p < .01$) and Community Dimensions of Practice Skills ($p < .01$) where the greatest need was in Very Small Counties.

A significant difference among the four groups ($p < .01$) was found for overall proficiency in Bioterrorism/Emergency Preparedness Skills. The two smaller county-sized groups had higher proficiency than the two larger county-sized groups. In descending order, the means for Bioterrorism/Emergency Preparedness Skills (composite score) among the groups were: Small County (3.48), Very Small County (3.45), Large County (3.12), and Medium County (2.91). Among these four groups, significant differences were found in five of the seven Bioterrorism/Emergency Preparedness subscales: Disaster Planning Skills ($p < .001$), Disaster Response Skills ($p < .05$), Biological/Infectious Disease Skills ($p < .05$), Toxic Chemical/Environmental Hazard Skills ($p < .05$), and Physical Injury Skills ($p < .001$). In each of these dimensions, workers in the two smaller size counties were more proficient than workers in the two larger size counties. In most dimensions, workers in Medium Counties were the least proficient.

Although workers in the two smallest county-sized groups generally identified higher educational needs than their counterparts in the two larger-sized counties, the four groups did not statistically differ on overall educational need for Bioterrorism/Emergency Preparedness Competency Skills (composite score). When the seven subscales were examined individually, statistical differences were found in three subscales: Disaster Planning Skills ($p < .05$), Disaster Response Skills ($p < .01$), and Physical Injury Skills ($p < .01$). Workers in the Very Small Counties, Small Counties and Medium Counties identified higher educational needs in Disaster Planning Skills and Disaster Response

Skills than workers in the Large Counties. The pattern for Physical Injury Skills was somewhat different; workers in the two smallest county size groups again indicated the highest needs, but workers in large counties identified greater needs than workers in medium-sized counties.

No differences in rank orderings were found for preferred time of course offering. Workers from the Very Small Counties showed higher preference for several-day workshops, web-based instruction, and continuing education units than the other three groups. Workers in Medium Counties rated web-based Internet instruction as their lowest preference for course format.

Differences Among Largest Counties. Additional comparisons were undertaken to determine whether there were differences in proficiencies and educational needs among the counties within county size category. The seven largest counties and their respective number of survey respondents were: Tri-County (n=201), El Paso County (n=164), Denver City and County (n=137), Boulder County (n=89), Weld County (n=83), Jefferson County (n=69), and Larimer County (n=66). No statistical difference was found in overall proficiency in Core Competency Skills (composite). However, statistical differences were found in five subscales: Analytic/Assessment Skills ($p < .01$), Policy Development/Program Planning Skills ($p < .01$), Communication Skills ($p < .05$), Basic Public Health Sciences ($p < .01$), and Financial Planning/Management Skills ($p < .01$). Although some general patterns were observed, the workforces in different large counties had different strengths. Larimer County workers had the highest proficiency in Communication Skills, Policy Development/ Program Planning Skills, and Basic Public Health Sciences Skills. Workers in Denver City and County had the highest proficiency in Analytic/Assessment Skills. Although Tri-County workers had one of the higher proficiencies in Cultural Competency Skills, they had the lowest proficiencies in Analytic/Assessment Skills, Policy Development/Program Planning Skills, and Financial Planning/ Management Skills.

A statistically significant difference ($p < .01$) was found in overall educational need for Core Competency Skills among these seven large counties. When the subscales were examined, significant differences were found for educational needs in Analytic/Assessment Skills ($p < .001$), Community Dimensions of Practice Skills ($p < .01$), Basic Public Health Sciences Skills ($p < .01$), and Financial Planning/Management Skills ($p < .01$). Although educational needs in counties varied by subscale, several patterns were discerned. Workers in Weld County and Boulder County reported the highest educational needs across most competencies. Jefferson County workers reported lower needs in Analytic/Assessment Skills than other counties. Boulder County workers reported lower needs in Community Dimensions of Practice Skills than other counties. Denver City and County workers reported the least educational needs across most categories.

When means for overall Bioterrorism/Emergency Preparedness proficiency were compared among counties, a significant difference ($p < .001$) was found. Workers in El Paso County (3.52), Boulder County (3.24), and Weld County (3.20) rated their overall proficiency higher than workers in Larimer County (3.11) Jefferson County (3.11), Denver City and County (2.86), and Tri-County (2.88). When subscales of Bioterrorism/Emergency Preparedness proficiency were examined, differences were found in Disaster Planning Skills ($p < .001$), Emergency Communication Skills ($p < .001$), Biological/ Infectious Disease Skills ($p < .01$), Physical Injury Skills ($p < .01$), and Crisis Management Skills ($p < .001$). Worker proficiency in different large counties varied by subscale. El Paso County workers were highest in Disaster Planning Skills, Emergency Communication Skills, Biological/Infectious Disease Skills, and Physical Injury Skills. Boulder County excelled in Crisis Management Skills. Denver City and County and Tri-County workers were found to be least proficient in most dimensions.

No difference was found among the seven largest counties in overall educational need for Bioterrorism/Emergency Preparedness. Statistically significant differences were found on two

subscales: Biological/Infectious Disease Skills ($p < .05$) and Toxic Chemical/Environmental Hazard Skills ($p < .05$). Boulder County and El Paso County identified highest needs in Biological/Infectious Disease Skills while Tri-County workers identified least needs. For Toxic Chemical/Environmental Hazard Skills, Weld County and El Paso County identified greatest needs; again Tri-County workers identified the least needs.

A consistent pattern of preferences was observed across large counties for course length, educational format, time of course offering, and educational recognition. Workers in Weld County demonstrated a greater preference for graduate academic credit than workers from other large counties.

Differences Among Medium-Sized Counties. Six counties were classified as medium-sized counties: Mesa County (n=27), Montrose County (n=24), Prowers County (n=24), Montezuma County (n=17), Delta County (n=16), and Pueblo City and County (n=16). Comparisons were made to determine if there were differences within these medium-sized counties. A significant difference ($p < .001$) among the six counties was found for overall proficiency in Core Competency Skills. In descending order, the composite means among the counties were: Mesa County (4.88), Delta County (4.78), Prowers County (4.36), Montrose County (4.34), Pueblo City and County (4.32), and Montezuma County (3.69). Significant differences were found in all eight Core Competency subscales. Workers in Mesa County and Delta County were consistently most proficient across all domains; workers in Montezuma County were least proficient in all subscales.

A significant difference ($p < .01$) was observed among these six counties in overall educational need for Core Competency Skills. In descending order, the composite score means among the counties were: Montrose County (3.21), Montezuma County (3.14), Prowers County (3.10), Pueblo City and County (2.99), Mesa County (2.98), and Delta County (2.78). Differences were also found in seven of the eight Core Competency educational need subscales: Assessment/Analytic Skills ($p < .01$), Policy Development/Program Planning Skills ($p < .01$), Cultural Competency Skills ($p < .05$), Community Dimensions of Practice ($p < .01$), Basic Public Health Sciences Skills ($p < .05$), Financial Planning/Management ($p < .01$), and Leadership/Systems Thinking Skills ($p < .01$). No differences were noted for Communication Skills. In most areas, workers in Montezuma County, Prowers County, and Montrose County identified the highest needs.

In overall proficiency in Bioterrorism/Emergency Preparedness Skills, a significant difference among these counties ($p < .05$) was found. In descending order, the means for this composite score were: Prowers County (3.25), Montrose County (2.97), Mesa County (2.88), Delta County (2.83), Pueblo City and County (2.70), and Montezuma County (2.70). Among these counties, statistically significant differences were also found in five of the seven Bioterrorism/Emergency Preparedness Competency subscales: Disaster Planning Skills ($p < .05$), Disaster Response Skills ($p < .01$), Emergency Communication Skills ($p < .01$), Physical Injury Skills ($p < .01$), and Crisis Management Skills ($p < .05$). No differences were found for Biological/Infectious Disease Skills and Toxic Chemical/Environmental Hazard Skills. Except for Physical Injury Skills and Crisis Management Skills, workers in Prowers County were the most proficient in all domains. Workers from Montezuma County and Pueblo City and County were least proficient in most subscales.

A significant difference ($p < .05$) among medium-sized counties was found in overall educational need for Bioterrorism/Emergency Preparedness Skills. In descending order, the means for this composite score were: Montezuma County (3.80), Delta County (3.62), Prowers County (3.57), Montrose County (3.56), Mesa County (3.26), and Pueblo City and County (3.10). Statistically significant differences were also found in six of the seven Bioterrorism/Emergency Preparedness Competency subscales: Disaster Planning Skills ($p < .05$), Disaster Response Skills ($p < .01$), Emergency Communication Skills ($p < .05$), Biological/Infectious Disease Skills, ($p < .01$), Toxic

Chemical/Environmental Hazard Skills ($p < .01$), and Physical Injury Skills ($p < .05$). No difference was found for Crisis Management Skills. The educational needs level varied widely across subscales and counties. Workers in Montezuma County expressed highest learning needs across many dimensions. Workers in Prowers County indicated high needs in Biological/Infectious Disease Skills and Toxic Chemical/Environmental Hazard Skills. Compared to other counties, Mesa County and Pueblo City and County reported less educational needs in most subscales. Pueblo City and County indicated the least need for education in Biological/Infectious Disease Skills and Toxic Chemical/Environmental Hazard Skills.

When educational preferences of workers in the six counties were compared, a similar rank ordering of preferences were observed for course length and time of course offering. Workers in Prowers County indicated a higher preference for web-based courses. Mesa County workers expressed a higher preference for graduate academic credit. Across all counties, graduate credit was preferred to undergraduate credit.

Differences Among Small County Regional Groups. Because the sample sizes for the smallest counties were so small (range=1 to 14 respondents), data from these counties were aggregated into small county regional groups using two principles: 1) traditional regional clustering or geographical proximity; and 2) at least 15 respondents per group to preserve anonymity. Using these principles, seven small county regional groups were established. These groups and the number of respondents in each were as follows: 1) Central Region--Chaffee, Custer, Fremont, Lake, Park, and Teller (n=18); 2) Metro Region--Broomfield, Clear Creek, Elbert, and Gilpin (n=28); 3) Northeast Region--Kit Carson, Lincoln, Logan, Morgan, Phillips, Sedgwick, Washington, and Yuma (n=16); 4) Northwest Region--Eagle, Garfield, Grand, Jackson, Moffat, Pitkin, Rio Blanco, Routt, and Summit (n=39); 5) San Luis Valley Region--Alamosa, Conejos, Costilla, Mineral, Rio Grande, and Saguache (n=24); 6) Southeast Region--Baca, Bent, Cheyenne, Crowley, Huerfano, Kiowa, Las Animas, and Otero (n=18); and 7) Southwest/West Central Region--Archuleta, Delores, Gunnison, Hinsdale, LaPlata, Ouray, San Juan, and San Miguel (n=19).

Despite the small sample sizes in many of these regional groups, a statistically significant difference ($p < .001$) was found in overall proficiency in Core Competency Skills (composite) among groups. Statistical differences ($p < .01$ to $p < .001$) were also found in all eight subscales. Small county workers in the Metro, Northeast, Northwest, and Central regions had the highest scores across all categories. Small county workers in the San Luis Valley, Southeast, and Southwest/West Central regions had the lowest proficiencies across categories. The proficiency level of workers in the San Luis Valley was markedly lower than all other regions.

No statistically significant difference was found in overall educational need for Core Competency Skills among these seven regional groups. When the subscales were examined, significant differences were found for educational needs in Policy Development/Program Planning Skills ($p < .01$) where workers in the Central, Northwest, and San Luis Valley regions reported higher needs than workers in the other four regions. Although educational needs in other subscales were not statistically different (likely due to small sample sizes), descriptive differences were noted.

No significant difference in overall proficiency in Bioterrorism/Emergency Preparedness was found among the seven small county regional groups, perhaps due to small sample sizes. In descending order, scores on this composite were: Northeast Region (3.96), Central Region (3.85), Northwest Region (3.73), Southeast Region (3.50), San Luis Valley Region (3.21), Southwest/West Central Region (3.11), and Metro Region (3.06). Similarly when subscales of Bioterrorism/Emergency Preparedness Skills were examined, no significant differences were found (also likely due to small sample sizes). However, a descriptive analysis showed workers from different regional groups varied in proficiency by domain. Small county workers in the Central, Northeast, and Northwest

regions had the highest proficiencies in five of the seven subscales: Disaster Planning Skills, Disaster Response Skills, Emergency Communication, Biological/Infectious Disease Skills, and Toxic Chemical/Environmental Skills. Workers in the Metro, Southwest/West Central, and San Luis Valley regional groups were found to be least proficient in most dimensions. Workers from the Central, San Luis Valley, and Northeast regions were highest in Physical Injury Skills. Workers in the San Luis Valley, Northeast, and Northwest regions were highest among the regions in Crisis Management Skills.

No statistical differences were found among the seven regional groups in overall educational need for Bioterrorism/Emergency Preparedness or in any of the educational needs subscales (likely due to small sample sizes). However, differences in educational needs across regional groups were descriptively observed. Except for Physical Injury Skills, workers in the Southwest/West Central Region reported the highest educational needs across all dimensions. The Metro and San Luis Valley regions also reported high needs across most dimensions. The three regional groups reporting the least educational needs across most subscales were the Southeast, Central, and Northeast regions.

A fairly consistent pattern of preferences was reported across regional groups for course length, educational format, time of course offering, and educational recognition. Workers in the Southwest/ West Central Region expressed a greater preference for several-day workshops than did other groups. While small county workers in the Central and Southeast regions showed more preference for Internet courses than did other groups, workers in the Southwest/West Central Region indicated they least preferred Internet courses to all other options. Workers in the Southwest/West Central Region also distinguished themselves by preferring weekend classes to evening classes. Except for the San Luis Valley Region, workers across all regional groups preferred graduate academic credits to undergraduate academic credits.

Differences Between Organized Health Departments vs. Local Health Agencies. For another comparison between settings, workers were divided into two groups by the structure of their county public health service. These two groups and the number of respondents in each were: Organized Health Department (n=893) and Local Health Agency (n=202). No difference was observed between these two groups in overall proficiency in Core Competency Skills. Means for the two groups were statistically different in three of the eight subscales: Organized Health Department workers reported a higher proficiency level in Cultural Competency Skills ($p < .05$), while Local Health Agency workers reported a higher proficiency level in Community Dimensions of Practice Skills ($p < .05$) and Financial Planning/Management Skills ($p < .05$).

In the educational needs composite scale for Core Competency Skills, the Local Health Agency group reported significantly ($p < .01$) greater overall needs than the Organized Health Department group. When educational needs for the two groups were compared within subscales, workers in the Local Health Agency group had a statistically higher need for education in three subscales: Assessment/Analytic Skills ($p < .01$), Policy Development/Program Planning Skills ($p < .001$), and Community Dimensions of Practice Skills ($p < .01$).

In overall proficiency in Bioterrorism/Emergency Preparedness Skills (composite), a statistical difference ($p < .01$) was found between the Organized Health Department group and the Local Health Agency group: workers in Local Health Agencies had a higher proficiency level (3.37) than workers in Organized Health Departments (3.10). When the subscales within this area were compared, the Local Health Agency group was statistically more proficient than the Organized Health Department group in four subscales: Disaster Planning Skills ($p < .01$), Biological/Infectious Disease Skills ($p < .01$), Physical Injury Skills ($p < .001$), and Crisis Management Skills ($p < .05$). No

differences were found in Disaster Response Skills, Emergency Communication Skills, and Toxic Chemical/Environmental Hazard Skills.

When educational need for Bioterrorism/Emergency Preparedness Competency Skills (composite) was compared for these two groups, the Local Health Agency group reported higher overall educational needs (3.66) than the Organized Health Department group (3.44). When comparisons were made on the subscales, workers in Local Health Agencies identified greater educational need in four subscales: Disaster Planning Skills ($p < .01$), Disaster Response Skills ($p < .01$), Emergency Communication Skills ($p < .01$), and Toxic Chemical/Environmental Hazard Skills ($p < .01$).

No differences in rank ordering of preferences for course length, educational format, time of course offering, or educational recognition were found between these two groups.

Differences by Type of County. In another comparison by work setting, workers were divided into three groups by population density in their county of employment. Using US Census definitions for population density, the groups and the number of participants in each were as follows: Urban (n=864), Rural (n=171), and Frontier (n=57). No differences among the groups were found in Core Competency Skills proficiency levels. Means for the three groups were statistically different ($p < .05$) in only one of the eight subscales; in Financial Planning/Management Skills, workers in the Rural and Frontier groups rated themselves more proficient than workers in the Urban group.

Similarly, in the educational needs composite scale for Core Competency Skills, no difference was observed. When educational needs were compared within the subscales, one difference was found ($p < .001$); respondents in the Rural and Frontier groups reported a higher proficiency in Policy Development/Program Planning Skills than respondents in the Urban group.

No differences were found between the three groups in overall proficiency in Bioterrorism/ Emergency Preparedness Skills (composite scale). When the subscales within this area were compared, a statistical difference ($p < .001$) was noted in one subscale; for Physical Injury Skills, the Frontier and Rural groups were more proficient than the Urban group.

When educational need for overall Bioterrorism/Emergency Preparedness Skills (composite) was compared for these three groups, a statistical difference ($p < .05$) was found. The Rural and Frontier groups identified a higher educational need than did the Urban group. When comparisons were made on the seven subscales, differences were found in four: Disaster Planning Skills ($p < .05$), Disaster Response Skills ($p < .01$), Emergency Communication Skills ($p < .05$), and Toxic Chemical/ Environmental Hazard Skills ($p < .05$). The pattern was the same in all subscales; workers in the Rural and Frontier counties rated their educational needs higher than workers in Urban counties.

The groups expressed similar preferences in course length, educational format, and time of course offering. While workers in Rural and Urban counties preferred graduate to undergraduate credit, workers in the Frontier counties preferred undergraduate to graduate credit.

7. Other Observations

Correlations Among Core Competency Domains. The correlations among all pairs of proficiencies in the eight Core Competency subscales were all statistically significant ($p < .001$) and demonstrated a moderate to high relationship (Pearson's r ranged from .46 to .82). While many correlations were high, the highest correlations were between these sets of domain proficiencies: Financial Planning/ Management Skills with Policy Development/Program Planning Skills (r=.82); Basic Public Health Sciences Skills with Analytic/Assessment Skills (r=.81); Community Dimensions of Practice Skills

with Leadership/Systems Thinking Skills (*r*=.81); and Leadership/Systems Thinking Skills with Policy Development/Program Planning Skills (*r*=.80). The Core Competency domain that demonstrated the lowest correlations with all other domains was Cultural Competency Skills (*r* ranged from .46 to .67). These moderate to high correlations show that Core Competency proficiencies are interrelated. If workers were proficient in one dimension, they were also likely to be proficient in all other dimensions. Similarly if workers were weak in one area, they were likely to be weak in other areas.

The correlations among educational needs in each of the Core Competency domains were all statistically significant but lower in magnitude than the proficiencies (*r* ranged from .11 to .62). The highest correlations among educational needs were between these subscale sets: Leadership/Systems Thinking Skills with Community Dimensions of Practice Skills (*r*=.62); Financial Planning/Management Skills with Policy Development/Program Planning Skills (*r*=.61), Basic Public Health Sciences Skills with Analytic/Assessment Skills (*r*=.60), and Policy Development/Program Planning Skills with Analytic/Assessment Skills (*r*=.57). Cultural Competency Skills was again the domain that had the lowest correlation with other educational need domains; Cultural Competency Skills educational needs correlated least with Financial Planning/Management Skills educational needs (*r*=.11) and correlated highest with Communication Skills educational needs (*r*=.52). With the exception of Cultural Competency Skills, workers who have educational needs in one dimension were likely to have educational needs in other dimensions.

Correlations Among Bioterrorism/Emergency Preparedness Domains. The correlations among proficiencies in the Bioterrorism/Emergency Preparedness Skill subscales were significant ($p < .001$) and relationships were moderate to high (Pearson's *r* ranged from .50 to .76). The highest correlations were for Disaster Planning Skills proficiencies with four other proficiencies: Biological/Infectious Disease Skills (*r*=.76), Emergency Communication Skills (*r*=.75), Disaster Response Skills (*r*=.74), and Toxic Chemical/Environmental Hazard Skills (*r*=.74). Although Physical Injury Skills and Crisis Management Skills showed a fairly high correlation between themselves (*r*=.63), these two dimensions showed the lowest correlations with other dimensions (*r* ranged from .50 to .64). This correlation matrix suggests workers who were more proficient in one domain were more proficient in all others. Similarly, workers not prepared in one domain were likely not to be prepared in others.

When a correlation matrix of educational needs in Bioterrorism/Emergency Preparedness subscales was prepared, the highest correlations were between these subscales: Disaster Planning Skills with Disaster Response Skills (*r*=.79), Toxic Chemical/Environmental Hazard Skills with Biological/ Infectious Disease Skills (*r*=.72), Physical Injury Skills with Crisis Management Skills (*r*=.68), and Physical Injury Skills with Biological/Infectious Disease Skills (*r*=.62). Educational need in Emergency Communication Skills was the least correlated with all other educational need dimensions (*r* ranged from .34 to .49). Workers who had educational needs in one dimension were likely to have educational needs in other dimensions.

Correlations Among Proficiencies and Educational Needs. Educational assessment theory suggests that educational need should be strongly and inversely related to proficiency level. The more proficient an individual is in a given area, the less the learning need. Conversely, learning needs should be highest in areas where the competency levels are lowest.

When a correlation matrix of proficiency level with educational need level in each Core Competency Skill domain was prepared, the correlations between proficiency level and educational need across all eight domains were inverse but low (*r*=-.05 to -.25). The correlation coefficients were highest for Cultural Competency Skills (*r*=-.25), Communication Skills (*r*=-.23), and Community Dimensions of Practice (*r*=-.21). The correlation between proficiency level and educational need was lowest for

Financial Planning/Management Skills (*r*=-.05), Policy Development/Planning Skills (*r*=-.11), and Analytic/Assessment Skills (*r*=-.13).

When a correlation matrix of proficiency level with educational need level in each Bioterrorism/ Emergency Preparedness Skill subscale was prepared, the correlations for all subscales were inverse, but surprisingly low (*r*=-.12 to -.20). The need/proficiency correlations were highest for Crisis Management Skills (*r*=-.20) and Physical Injury Skills (*r*=-.20). The need/proficiency correlations were lowest for Biological/Infectious Disease Skills (*r*=-.12) and Toxic Chemical/Environmental Hazard Skills (*r*=-.13). The low correlation between educational need level and proficiency level in each dimension of Bioterrorism/Emergency Preparedness suggests that even when workers acknowledge a very low level of proficiency in some dimension, they may not see a proportionately greater need for education in that area. Workers may view some dimensions as less relevant to their position, professional responsibilities, or setting.

8. Limitations and Strengths of the Study

Methodology. One limitation of this study is that public health workers reported on their own levels of proficiency. No independent external evaluations of competencies were done (e.g., supervisor ratings, standardized test scores). However, research demonstrates that self-reports of perceived ability are positively related to effort, persistence, and perseverance. Social psychologists suggest that individuals use the processes of self-reflection and self-efficacy to evaluate their own experiences and thought processes. Some suggest that behavior is often better predicted by one's own beliefs about one's capabilities than by what others would objectively judge one to be capable of accomplishing. From this perspective, the self-reported assessment of competency is a strength representing a valid approach to assessing proficiency levels. The self-evaluation of educational need is of less concern. Many educational researchers have argued that self-report is the most valid assessment method for this phenomenon. Further, because enrolling in educational opportunities is voluntary, self-reported educational needs may be a better indicator of which educational offerings would be attended.

A related criticism could be the use of Likert scales where the anchoring terms may not have the same meaning. Because individuals do have different frames of reference based on their personal and professional experience, expectations and absolute standards are likely to vary across workers. However, because individuals made these self-assessments across a number of competencies, the study findings still illuminate the areas workers believe are their stronger and weaker areas, making the exact proficiency level or precise educational need level less important. These response scales will also work well in measuring change over time; workers are likely to continue to rate themselves from a similar framework.

The survey methodology was an efficient cost-effective way to collect information from a large number of public health workers. Compared to other strategies, a greater statewide representation of workers was achieved. However, the use of online technology was not as productive or efficient as anticipated. Using TELEForms™ was expected to be less costly as data would come in electronically and be stored in a database suitable for statistical analysis. However, a large majority of workers were either unable or unwilling to complete the online survey and submitted hard copies of the instrument. The problems with Internet usage elucidates another need that public health leaders must address—workers need appropriate equipment and training to communicate effectively and to obtain information via the Internet.

Measurement. One of the strengths of the study was that the new instrument developed for this purpose was found to be psychometrically sound. Content validity for *Towards 21st Century Public*

Health Practice was established *a priori* using two panels of public health experts. The instrument demonstrated excellent internal consistency reliability in this sample. Given the range of responses in both competencies and educational needs, the instrument appears to be sensitive and is likely to be able to detect changes over time. Another strength is that both proficiency levels and educational needs were measured—most assessments only do one or the other. The study findings document that one rating does not substitute for the other rating. Self-assessed educational need ratings were expected to be highly related and inversely correlated with self-rated proficiency ratings. The low correlations in this study suggest other factors are mediating this relationship, such as the relevance of the competency for their position or the likelihood of being called upon to use particular skills.

Sample. Although a precise response rate could not be calculated, the high participation among workers from local public health agencies was gratifying. The very low participation from workers at the state health department was very disappointing. It is unclear why the participation was so different in these two segments. The strategies for inviting participation and following up were similar. One difference was that incentives were used to increase participation at local health agencies. Perhaps workers at local health agencies considered the study to be more relevant. Perhaps state workers were more concerned about issues of confidentiality. The sample clearly overrepresented local workers and underrepresented state workers. Thus, the findings are more generalizable to workers in local agency settings.

The large numbers of respondents permitted a large number of comparisons. The sample sizes within groups were usually large enough for meaningful comparisons and statistical analyses. Thus, a strength of the study was that it permitted a comprehensive understanding of the whole Colorado workforce as well as multiple groups within it. Information to aid in tailoring educational offerings is abundant. On the other hand, the sheer volume of comparisons may be overwhelming. Readers are encouraged to focus their attention on the findings for the entire workforce and then on groups of greatest interest.

Analyses. The use of parametric vs. nonparametric statistics could be questioned. Parametric statistics were used when the level of measurement was at least ordinal scaling. While some argue that parametric statistics require at least interval scaling, a large body of research suggests that the statistical procedures used in this study are robust when violations in scaling are present. Further, assumptions underlying statistical procedures were tested before parametric statistics were calculated. To meet the assumption requiring normal distribution, square root and logarithmic transformations were done prior to subsequent statistical analyses. Adjustments were also made when violations to homogeneity of variance between groups were apparent.

Despite the extensive analyses that were performed, more complex relationships were not addressed. For the most part, the analyses were comparative and bivariate, examining the differences within groups (e.g., age groups, professional discipline groups, regional groups) on one competency or educational need dimension at a time. The relationships are clearly more complex. Inappropriate conclusions or inaccurate inferences may be drawn from these simple comparisons. While additional analyses may have been instructive, the exceedingly large number of potential combinations of variables was prohibitive.

Some may question the value of going beyond simple descriptive summary statistics to the more complicated task of calculating and specifying statistical differences between or among groups. First, descriptive summary statistics are foundational to understanding the phenomena and were presented in detail. Additional descriptive information such as medians and the rank order among various dimensions were added to ease reading and understanding. Those who wish to only use this descriptive level of information may focus their attention to these data. However, the question of which differences are statistically significant addresses the matter of chance occurrences. For

example, when differences are examined with a t-test, statistics aid in understanding whether these two means were in fact different from each other and how often erroneous conclusion may be made. Even when some differences appeared small, the use of inferential statistics permits the reader to have confidence that the differences were not due to chance.

A related issue is whether differences that are statistically significant have practical significance. Even though probability levels provide confidence that there is in fact a real difference, the practical significance addresses whether or not it really matters. For example, the same educational offerings may be highly appropriate for two groups that have small but significant differences. The large numbers in some group comparisons made it easier to find statistically significant differences when in fact the differences are so small as to not make a practical difference. Similarly the large number of comparisons (composites and subscales) increased the chance of a Type I error.

Baseline for Subsequent Evaluation. Another strength of the study is that it establishes individual worker baselines for a longitudinal study of Colorado workforce development. Individual baseline levels were obtained by using a personal identifier that will be linked to subsequent studies. A surprising 1,211 of the 1,249 participants (97%) complied with the request to enter the last six digits of their Social Security Number as their Identification Code. This high rate of identification was likely related to the assurance of strict confidentiality. Surveys were returned directly to the UCHSC with the condition that individual data would not be accessible to anyone outside the research team and that only aggregated data would be reported. This identifying method permits both individual and aggregate changes to be tracked over time. Baseline data are critical for evaluating the effectiveness of future educational initiatives in Colorado's workforce development.

Collaborative Approach. A major strength of the study was the collaboration among public health academic, research, and practice leaders in Colorado. Although lead by the research team, the development of the instrument was a shared endeavor: researchers at UCHSC developed the conceptual and methodological framework; practice and education leaders from throughout the state selected the specific items. Colleagues at the state health department provided information about the survey to the Colorado workforce, invited workers to participate, and followed up with all counties. The research group was responsible for data management, coding data, constructing new variables, and data analyses. The principle investigator wrote the reports, but other public health educators, researchers, and practice leaders offered valuable suggestions. This collaborative project demonstrated a successful cooperative, collegial statewide approach in workforce assessment.

9. Conclusions and Recommendations

1. *Public health workers need to improve their competencies.*

   Only a small percentage of the workforce was found to be well prepared in both Core Competencies and Bioterrorism/Emergency Preparedness. Workers were better prepared in the Core Competencies. The public health workforce's self-assessment of its overall proficiency in the Core Competencies indicated that 13% were in the two lowest levels, one-half were in the two mid-range levels, and one-third were in the two higher levels. When the eight dimensions were rated, workers were found to be most proficient in Cultural Competency Skills (1st), Communication Skills (2nd), and Leadership/Systems Thinking Skills (3rd). They were least proficient in Basic Public Health Sciences Skills (6th), Policy Development/Program Planning Skills (7th), and Financial Planning/Management Skills (8th). Rated in the middle were Community Dimensions of Practice Skills (4th) and Analytic/Assessment Skills (5th). Access to and participation in courses to improve Core Competencies is warranted with particular attention to

Basic Public Health Sciences, Policy Development/Program Planning, and Financial Planning/ Management.

The Colorado public health workforce is ill-prepared in Bioterrorism/Emergency Preparedness. More than half of the workforce rated their overall proficiency in the two lowest levels. About a third rated themselves in the moderate proficiency categories, and only 12% rated themselves in the two highest proficiency groups. When the seven dimensions were assessed, respondents reported they were most proficient in Disaster Response Skills (1st) and Emergency Communication Skills (2nd). They reported their least proficiencies were in Biological/Infectious Disease Skills (6th) and Toxic Chemical/Environmental Hazard Skills (7th). Dimensions rated in the middle were Physical Injury Skills (3rd), Crisis Management Skills (4th), and Disaster Planning Skills (5th). Courses to improve proficiency in all Bioterrorism and Emergency Preparedness areas are urgently needed, but special attention should be given to assisting workers to become more knowledgeable about Disaster Planning, Biological/Infectious Diseases, and Toxic Chemical/Environmental Hazards. Protecting the health of populations in the event of bioterrorism or other emergencies will require extensive substantive learning of new knowledge and skills so that workers will be better prepared to protect communities and minimize consequences in the event of natural or man-made disasters.

While the serious lack of preparedness in Bioterrorism/Emergency Preparedness must be addressed, it would be inappropriate and unwise for Colorado public health educators and practice leaders to focus on Bioterrorism/Emergency Preparedness to the exclusion of Core Competencies. Proficiencies in the Core Competencies are foundational to handling Bioterrorism/Emergency Preparedness situations. Further, Core Competencies are required for the public health workforce's effectiveness in meeting established goals for the health of our state and nation as reflected in documents such as *Healthy People 2010*. Creating an excellent public health workforce will require additional education in both Core Competencies and Bioterrorism/Emergency Preparedness.

2. *Workers acknowledge learning needs and appear ready to participate in educational programs to improve their skills.*

The results of the Core Competencies educational needs assessment indicate that only 11% of the workforce saw little or no need for additional education, one-third indicated some need, and more than half rated themselves as having moderate or high educational needs. In descending order, statewide workers identified their educational needs to be Financial Planning/Management Skills (1st), Policy Development/Program Planning Skills (2nd), Basic Public Health Sciences Skills (3rd), Analytic/Assessment Skills (4th), Leadership/Systems Thinking Skills (5th), Community Dimensions of Practice Skills (6th), Cultural Competency Skills (7th), and Communication Skills (8th). Nearly every group identified Financial Planning/Management and Policy Development/ Program Planning as the areas of highest learning need. Needs in other areas were more dependent on factors such as discipline, experience, and position.

In Bioterrorism/Emergency Preparedness, many educational needs were acknowledged: 36% indicated a high need, 38% indicated a moderate need, 17% indicated some need, and only 9% indicated little or no need. Thus, almost three-fourths of all public health workers rated themselves as having moderate or high educational needs in this area. In descending order, workers identified their educational needs to be Disaster Planning Skills (tied for 1st), Toxic Chemical/Environmental Hazard Skills (tied for 1st), Disaster Response Skills (3rd), Biological/ Infectious Disease Skills (4th), Crisis Management Skills (5th), Physical Injury Skills (6th), and Emergency Communication Skills (7th). While workers identified greatest educational needs in Disaster Planning, Toxic Chemical/Environmental Hazards, and Disaster Response, Colorado

public health workers have an acute awareness and a readiness to participate in educational programs in all aspects of Bioterrorism/Emergency Preparedness.

3. *Worker preferences for educational offerings may not be realistic or feasible.*

   Workers clearly indicated a strong preference for traditional face-to-face learning in a classroom setting. This preference is inconsistent with Colorado's Lifelong Learning System that incorporates innovative web-based, Internet, and distance learning opportunities to strategically link the workforce with needed educational resources. While worker preferences cannot be ignored, traditional classroom settings may be unrealistic. Distance, geological barriers, and unpredictable weather make travel to central locations difficult. Further, traditional classes are often more resource-intensive and may not be financially feasible. Although some support for web-based and combined strategies was expressed, workers may need assistance in learning how to participate in new educational technologies. The overwhelming majority of the workforce expressed strong preference for weekday classes; thus, another issue is whether educational programs will be held during the workweek, or whether workers will be expected to use some of their weekend and evening time for these educational endeavors. Many preferred offerings to be daylong or 2-hour sessions; others expressed preference for several-day workshops and semester academic courses. Preferences for types of educational recognition were varied. Certificates or continuing education units were preferred by most; many others expressed preference for academic credit. Not surprising, workers without a bachelor's degree indicated interest in earning undergraduate credit and those holding a baccalaureate or higher degree expressed interest in graduate credit. Access to a variety of educational program is essential so that offerings and recognition are consistent with individual worker's long-term educational goals.

4. *Education on workforce expectations may need to precede educational offerings.*

   The low correlation between educational need and proficiency level in all dimensions of Core Competency and Bioterrorism/Emergency Preparedness suggests that even when workers acknowledge a very low level of proficiency in an area, they may not see a proportionately greater need for more education in that area. Some workers may view some dimensions as less relevant to their position, professional responsibilities, or setting. Public health workers may not have had sufficient exposure to the work of the Council on Linkages whose premise is that regardless of discipline, these core competency skills are prerequisite to optimally carrying out today's public health agenda. Similarly, some may not believe having a full range of Bioterrorism/Emergency Preparedness competencies is an expectation or high priority--perhaps because of where they are located, their professional responsibilities, or the low likelihood of such an event. Attention to clarifying the expectations of the public health workforce is warranted.

5. *Knowing worker characteristics is very helpful in tailoring Core Competency education, but less helpful in tailoring Bioterrorism/Emergency Preparedness education.*

   In the Core Competencies, proficiencies and educational needs varied widely with characteristics of the individual worker such as academic preparation and experience. Differences were also found by most profession, position, and setting characteristics. For increasing proficiency in Core Competencies, educational planning must recognize existing knowledge/skill and build on those foundations. On the contrary, most Colorado public health workers have little proficiency in Bioterrorism/Emergency Preparedness competencies. Although some differences in overall proficiency were found within some worker groups (i.e., position, profession, level of education, experience in discipline, region, county size, and county structure), public health workers across

all groups reported similar overall educational needs in Bioterrorism/Emergency Preparedness. It appears that all workers would benefit from learning fundamental knowledge and skills in Bioterrorism/Emergency Preparedness. Once this basic understanding is achieved, courses might then be tailored based on worker characteristics, position, profession, and setting.

6. *The findings provide a baseline for evaluating the effectiveness of future educational offerings.*

   The findings of this study provide a baseline of proficiencies and educational needs for the Colorado public health workforce and for different groups of public health workers. Not only does this competency assessment and learning needs identification serve as the basis for offering future educational initiatives, it should serve to document baseline competencies for a longitudinal study to evaluate the effectiveness of educational initiatives in workforce development.

7. *Public health educators in all disciplines must re-evaluate their curricula to include content on core competencies and bioterrorism/emergency preparedness.*

   The findings suggest that some disciplines are historically better prepared across all Core Competencies than other disciplines. If the widely agreed premise is accepted that these eight competencies are expected across all disciplines, faculty in various public health disciplines must be engaged in curricular reform. Although these Core Competencies were only officially adopted a short time ago, discussion of the core competencies has extended over a decade. Although the emphasis on Bioterrorism/Emergency Preparedness has spanned fewer years, little evidence of competency is seen in the workforce, even among the most recent graduates. Faculty offering degree and continuing education programs must make refinements or dramatic changes to assure that students in all public health disciplines exhibit an acceptable proficiency in all core competencies and bioterrorism/emergency preparedness areas.

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1. Introduction

1a. Statement of Problem

Experts agree that the nation's public health workforce is under-prepared and insufficiently skilled to effectively carry out today's public health agenda. Public health reform resulted in the identification of three core functions and ten essential services. Professional organizations working together on the *Council on Linkages between Practice and Academia* achieved consensus on core competencies for all public health professionals in April 2001. The tragic events of September 11th, 2001 heightened the recognition that public health workers must also be better prepared to respond to emergency situations including bioterrorism. Competencies for all public health workers in bioterrorism and emergency readiness were released in 2002. The basic premise is that if the public health workforce is competent, essential public health services will be delivered, programs will be effective, and the health of people and communities will be promoted and protected. Improving the public health workforce's core competencies and competencies in bioterrorism and emergency preparedness competencies is seen as an urgent need.

The *Colorado Public and Environmental Health Professional Education Plan: Lifelong Learning System* (2001) is guiding public health workforce development in Colorado. In addition to articulating workforce expectations, the goal of this plan is to develop the infrastructure to strategically link public health professionals with educational resources to improve the workforce. Assessing competencies and learning needs from the perspective of the public health workers is an important component. Public health educators and administrators can use the information from this assessment to make informed decisions in planning suitable, efficient, and effective educational programs to improve the Colorado workforce. This study will serve as a baseline for evaluating the educational plan. This assessment project was an academic/practice collaborative project between the University of Colorado Health Sciences Center and the Colorado Department of Public Health and Environment.

1b. Background

Public Health Reform. During the past two decades, considerable work has been done by numerous organizations to clarify and define the scope and mission of public health practice and to suggest strategies that would reform public health. In a study commissioned by the Institute of Medicine in 1988, the United States public health system was critiqued as having "lost sight of its public health goals" and that "the system of public health activities [has fallen] into disarray" (IOM, 1888, p. 19). The findings of this study revealed that decision-making in public health was being driven by crises and the concerns of organized special interest groups rather than by accurate data and continual assessment. In addition, there was sparse evidence of constituency building or effective communication between health departments and the stakeholders within their communities. The IOM concluded its study by defining the mission of public health as assuring conditions in which people can be healthy. Three core functions to be carried out at all levels of governmental public health agencies were suggested as a guiding framework for the future of public health. Those core functions were defined as:

- Assessment – the regular collection, analysis, and sharing of information about health conditions, risks, and resources in communities.
- Policy Development – the use of scientific information to develop local and state health policies, and to direct resources toward those policies.
- Assurance – the mandate that public health agencies assure the availability of necessary health services throughout the community.

This major change in the public health system was seen as requiring new skills training for the entire public health workforce. In 1993 the United States Public Health Service (USPHS) published a paper as part of its Core Functions Project. In this paper the core functions were expanded through a list of population-focused essential public health services. The ten essential services adopted in Fall 1994 were:

- Monitor health status to identify community health problems.
- Diagnose and investigate health problems and health hazards in the community.
- Inform, educate, and empower people about health issues.
- Mobilize community partnerships to identify and solve health problems.
- Develop policies and plans that support individual and community health efforts.
- Enforce laws and regulations that protect health and ensure safety.
- Link people to needed personal health services and assure the provision of health care when otherwise unavailable.
- Assure a competent public health and personal health care workforce.
- Evaluate effectiveness, accessibility, and quality of personal and population-based health services.
- Research for new insights and innovative solutions to health problems.

Following the establishment of these ten essential public health services necessary to carry out the core public health functions, the USPHS published a report entitled *The Public Health Workforce: An Agenda for the 21st Century* (1997). In this report the current and future skills needed by the public health workforce were elaborated. The report included competencies for each of the ten essential services. The Core Functions Project team suggested that subsets of these overall competencies should be refined and validated for each of the various professions that comprise the public health workforce.

Despite the progress in articulating a vision for public health, workforce development has lagged behind. Public health departments are poorly staffed, and workers lack the specific skills, qualifications, and abilities they need to fulfill their responsibilities of protecting the public health (Gebbie & Hwang, 1998; Gebbie, 1999). Only a small portion of the total public health workforce has had formal public health education. Because of rapid evolutions in the field these workers need to continually update existing skills (Gebbie, Rosenstock, & Hernandez, 2002). Most workers with some public health training have attended certificate programs, short courses, continuing education programs, conferences, and workshops offered by a variety of institutions and organizations (Fee, 2002). Other workers have had little if any exposure to public health theory and research.

Public Health Core Competencies. To assist the U.S. Public Health Service in defining core public health competencies, leaders from national organizations representing the public health practice and academic communities formed the Council on Linkages Between Academia and Public Health Practice. Over a 10-year period, the Council and numerous other organizations and individuals in public health academia and practice settings developed a list of core competencies for public health professionals. Their work was compiled from various source documents and cross-referenced with the Essential Public Health Services to ensure that the competencies help build the skills necessary for providing essential services. Following comment from public health professionals in a broad array of disciplines and practice settings, a consensus set of core competencies to guide public health workforce development efforts was adopted in April 2001. These competencies were designed to help guide curriculum and content development of public health education and training programs for preparation of practitioners and for the ongoing development of practitioners in the field. The competencies also were designed for use by those in practice settings as a framework for hiring and evaluating staff.

The core competencies represent a set of skills, knowledge, and attitudes necessary for the broad practice of public health. They transcend the boundaries of the specific disciplines within public health and help to unify the public health profession. The competencies were clustered into eight domains: Analytic/Assessment Skills, Basic Public Health Sciences Skills, Cultural Competency Skills, Communication Skills, Community Dimensions of Practice Skills, Financial Planning and Management Skills, Leadership and Systems Thinking Skills, and Policy Development/Program Planning Skills.

This effort of the Council focused on core competencies as they apply to front line staff, senior level staff, and supervisory and management staff. Based on these three job categories, levels of skill were assigned to each competency. The three skill levels are aware, knowledgeable, and proficient. The Council acknowledged that these job categories are defined broadly and the lines of distinction between them are not always clear. They also recognized the diversity of opinion about the skill levels expected for each competency by job category. Skill level was assigned on the basis of the majority opinion of reviewers; when the opinion was evenly split, both levels were noted. While the Council recognized that core competencies for clerical or support staff (e.g. clerks, dental, laboratory or nursing assistants, data entry staff) were also important, this task was not addressed.

Bioterrorism and Emergency Preparedness. Concerns about terrorism and the potential use of biological warfare agents near the end of the century increased the awareness of the need to improve the public health infrastructure regarding bioterrorism. *Preventing Emerging Infectious Diseases: A Strategy for the 21st Century* (CDC, 1998) outlined goals and objectives for protecting the United States from the threat of infectious diseases. In *Biological and Chemical Terrorism: Strategic Plan for Preparedness and Response* (CDC, 2000), the nation's vulnerability to biological and chemical attacks was highlighted; implementation priorities and specific recommendations for terrorism preparedness were made. In *Public Health Infrastructure: A Status Report* (2000), three areas were identified as necessary to handle these threats: a skilled public health workforce, robust information and data systems, and effective health departments and laboratories.

Deficiencies in the public health system were highlighted during the horrorific terrorist acts of 2001. Shortcomings were identified in a) disaster planning, b) linkages with other agencies involved in disaster response; c) capacity to communicate with other groups, d) capacity to detect microbiological threats to health, and e) capacity to detect other threats to health and respond to them. Contributing to the shortcoming were the large number of local health departments, varying widely in size and sophistication, operating in a politicized home-rule atmosphere with a history of minimal funding (Keck & Erme, 2003).

Health departments are front-line responders to bioterrorist attacks. A skilled workforce and their disease surveillance, response systems, and communications links with the medical community are key components for the recognition and response to bioterrorist attacks. The terrorist incidents of September and October 2001 demonstrated how much more needs to be done to bring the public health system and its workforce into an acceptable level of capacity and competence.

Emergency preparedness in public health has had a longer history. During the last quarter century, there has been a heightened recognition of the role of public health professionals in managing disasters. Whether caused by nature (e.g., floods, earthquakes, hurricanes), the result of technological or manmade error (e.g., chemical, physical, biological, nuclear), or from emerging diseases (e.g., anthrax, botulism, brucellosis, cholera, plague, tularemia, viral encephalitis), public health workers have been involved in warning and evacuation, search and rescue, triage and casualty distribution, and coordination among multiple jurisdictions, levels of government offices, and private sector organizations (Landesman, 2001).

The concern of public health workers is to prevent or reduce the illness or injury related to exposure to toxic agents and other environmental conditions that are potentially detrimental for human health. To assist public health workers in improving their preparedness in disaster planning and response and in carrying out interventions to mitigate the human impact of these events, the Centers for Disease Control and Prevention initiated a national system of Centers for Public Health Preparedness to ensure that frontline public health workers have the skills and competencies required to effectively respond to current and emerging health threats (CDC, 2002b). Training courses have been developed across the country in an attempt to meet these needs.

Competencies in emergency preparedness were established for all public health workers. For the public health system to meet performance standards in emergency preparedness, all public health workers must have these nine competencies: 1) describe the public health role in emergency response in a range of emergencies that might arise; 2) describe the chain of command in emergency response; 3) identify and locate the agency emergency response plan; 4) describe functional roles in emergency response and demonstrate this role in regular drills; 5) demonstrate correct use of all communication equipment used for emergency communication (e.g., phone, fax, radio); 6) describe communication roles in emergency response (within agency, with media, with general public, with personal contacts such as family or neighbors); 7) identify own limitations and identify key systems resources for referring when exceeds these limits; 8) apply creative problem solving and flexible thinking to unusual challenges within functional responsibilities and evaluate effectiveness of all actions taken; and 9) recognize deviations from the norm that might indicate an emergency and describe appropriate action (CDC, 2002a).

Building on these emergency preparedness competencies, a set of bioterrorism and emergency readiness competencies have been established for public health leaders communicable disease staff, clinical staff, environmental health staff, laboratory staff, medical examiner/coroner, public health information staff, and other public health professional staff. These competencies were established under the framework of 1) preparedness and planning, 2) response and mitigation, and 3) recovery and evaluation (CDC, 2002a).

Colorado Workforce Issues. Public health in Colorado is practiced in diverse regions including densely populated metropolitan areas, mountain resorts, and sparsely populated rural plains; each encompasses different populations and health concerns. Forty of Colorado's 64 counties are either wholly or partially designated as medically underserved areas/populations or health professional shortage areas. There are 15 organized health departments in the state and 39 local county public health nursing services. In rural counties, one or more public health workers are charged with the implementation of population-specific programs as well as meeting the unique public health needs of the rural medically underserved community. The mountainous terrain of the state separates the workers on the Western Slope from those on the Front Range.

Public health professionals represent multiple disciplines. Evidence in Colorado suggests that many professional public health workers are not academically prepared for their responsibilities and many do not have basic education in public health. Data about public health nurses—the largest group of public health workers—serves to illustrate this issue. A 1998 survey of Colorado registered nurses, distributed with re-licensure information by the Colorado State Board of Nursing, revealed that 57% of public health nurses in rural areas and 29% of those in urban areas of Colorado have less than a baccalaureate degree. In this survey 29% of non-baccalaureate prepared public health nurses in rural areas and 24% in urban areas expressed interest in seeking a higher degree. The State Board of Nursing and the CDPHE have not mandated a baccalaureate degree for all public health nurses practicing in the state; however, the annual contract with the CDPHE issued to the 39 rural county public health nursing agencies states that "preference shall be given to the employment of nurses

who possess a Bachelor of Science in nursing . . . and at the management level, preference shall be given to the employment of nurses who possess a Master of Science in nursing."

Public health workforce development and educational issues have received some attention in Colorado. In the Fall 1997, the CDPHE conducted a survey of the learning and training needs of rural public health nurses across the State. Thirty-seven nurses responded to this survey. The three top educational needs identified were: 1) core public health functions; 2) legal issues; and 3) the essential services. Other work has been undertaken by the Colorado Alliance of Nursing Work Force Development Opportunities (CANDO), a membership organization whose mission is to identify and address nursing workforce issues in Colorado through regional and statewide-facilitated collaboration among employers and educators. Projects included under the umbrella of CANDO include collaboratives between nursing education and service designed to impact the development of nurses in Colorado. The Colorado Public Health Academic/Practice Collaborative composed of nurse educators and public health nursing service providers in the state agreed that a baccalaureate degree in nursing is the desired entry level into public health nursing practice in Colorado. In a February 1998 task force meeting of this group, the essential competencies for quality public health nursing practice were identified. A summary of these competencies include: skills in building partnerships in communities, community assessment, analysis of data, political savvy, community mobilization, critical thinking, policy development, effective verbal and written communication skills, informatics, resource management, leadership, and analysis of epidemiological data.

The Colorado Department of Public Health and Environment (CDPHE) and educational institutions offering public health academic programs in Colorado have taken the leadership in public health workforce development. One example of an offering by CDPHE to improve the workforce is the Core Functions Training Program offered during the summer of 1999. Attended by 370 workers, the program was held in 10 regional locations and consisted of an 8-hour day related to the core functions of assessment, assurance, and policy; participants were also introduced to the transition in public health from individual/family care services to population-focused services. Universities around the state have also responded to the challenge by revising curricula and making programs more accessible. One example is a federally funded educational program at the University of Colorado School of Nursing where two Internet-based, semester-long courses have been developed and are being offered for six academic credits. Another group of public health leaders recently recommended that Colorado create a collaborative, accredited school of public health for the state of Colorado and the surrounding region (Colorado Public Health Education and Research Advisory Committee, 2002).

Public health personnel in the most populous areas of the Front Range have greater access to educational programs than those in other regions because travel distances are great, mountainous terrain creates physical boundaries, and unpredictable weather conditions are common. With the variety of geographical settings for practice, the diversity of the educational preparation, and the difficult access to education for rural public health workers, workforce development in Colorado is challenging.

Evolving Educational Technologies. Workforce reports have recommended the maximum use of evolving technologies such as distance learning to deliver continuing education programs to the workforce and to disseminate the most current information on best practices in public health practice. While some continue to debate the learning outcomes of distance education, the preponderance of research supports the conclusion that distance learning technologies are at least as effective as classroom approaches. According to one report (American Association of Colleges of Nursing, 2000), the results of 248 studies conducted from 1928-1997 affirm that there are no

significant differences in learning outcomes between traditional classroom and distance learning approaches.

Other more recent studies support that there are no significant differences in test scores and other types of learning outcomes between web-based instruction and face-to-face classroom instruction (Ball, 1999; Clark, 1999; Dobrin, 1999; Schulman & Sims, 1999). Two studies found learning outcomes to be significantly better with web-based instruction as compared to classroom instruction (Dutton & Perry, 1999; Narvarro & Shoemaker, 1999). The use of web-based instruction has the great potential for providing access, flexibility, and quality in addressing the development of the public health workforce.

1c. Purpose

The purpose of this project was to assess the competencies and educational needs of the public health workforce in Colorado. The specific aims of the study were to:

1. Describe the characteristics of the Colorado public health workforce.
2. Assess the workforce's proficiencies in core competencies.
3. Assess the workforce's proficiencies in bioterrorism/emergency preparedness.
4. Assess educational needs in core competencies and bioterrorism/emergency preparedness.
5. Determine workers' educational preferences.
6. Describe differences between and among subgroups of the Colorado workforce.

2. Methodology

2a. Design

The research aims coupled with limited time and resources suggested using a survey methodology with a self-report strategy. Given the expected diversity and lack of information about the Colorado public health workforce, consensus was reached that all workers in traditional public health settings would be invited to participate. Thus, a descriptive comparative survey design was employed in this project. Findings from this study can be triangulated with knowledge gained in different ways for a more complete understanding of workforce development issues.

2b. Measurement

A self-assessment tool, *Towards 21st Century Public Health Practice* (Stember, 2002), was developed and used to collect data. In Part I, public health workers were asked to assess their proficiencies in eight Core Competency subscales (i.e., Assessment/Analytic Skills; Policy Development/Program Planning Skills; Communication Skills; Cultural Competency Skills; Community Dimensions of Practice Skills; Basic Public Health Sciences Skills; Financial Planning/Management Skills; and Leadership/Systems Thinking Skills). In Part II, participants rated their proficiencies in seven Bioterrorism and Emergency Preparedness areas (i.e., Disaster Planning Skills; Disaster Response Skills; Emergency Communication Skills; Biological/Infectious Disease Skills; Toxic Chemical/Environment Hazard Skills; Physical Injury Skills; and Crisis Management Skills). In the third section of this instrument (Part III), public health workers provided a self-assessment of their educational needs in these 15 domains and then described their preferences for educational programs and learning modalities. Demographic information was elicited in the final section (Part IV) of this tool.

Instrument development was a deliberate and iterative process. Items in Part I relating to Core Competency were based on the core competency work of the Council on Linkages (2001). In developing this scale and its subscales, the first task was to reduce the 68 items in the Council's list to a more feasible number. Nine public health experts were asked to identify the best six items within each of the eight domains. This process resulted in 48 items; these items were randomly ordered using random number generator software.

The foundation for items in the Bioterrorism and Emergency Preparedness section (Part II) was current literature including the *Emergency Preparedness Core Competencies for All Public Health Workers* (CDC, 2002a). A panel of public health experts at CDPHE established content validity for the Bioterrorism and Emergency Preparedness items. These items were also randomly ordered.

Because the goal was to use this assessment to evaluate change in the public health workforce over time, an important consideration in measurement was sensitivity to small increments. Thus, the three level framework from the Council's work (i.e., awareness, knowledgeable, proficiency) was seen as an unsuitable rating scale for this study. A statewide public health advisory group recommended designing the items in Part I and Part II using a scale depicting a continuum of proficiency. Thus the instrument was designed to have respondents rate their proficiencies in Core Competencies and Bioterrorism/Emergency Preparedness items using a Likert scales of 1 to 7 (where 1=*Not Proficient at this Time* and 7=*Highly Proficient at this Time*).

Items in Part III of the instrument were designed to measure self-assessed educational needs and preferences. Conceptually, educational needs were defined as gaps in knowledge that exist between a desired level of performance and the actual level of performance (Healthcare Education Association, 1985). This gap is the difference between what someone presently knows or is able to do and what they need to know or be able to do. It represents an interval along a continuum between and individual's present level of cognitive, affective and/or psychomotor performance and the desired or necessary level of performance (Alspach, 1995). Participants were asked to indicate their level of educational need in each of the 15 domains (8 Core Competency; 7 Bioterrorism/ Emergency Preparedness). Educational need was measured on a five-point Likert scale where the response anchors were 1=*No Need* and 5=*Highest Need*). Participants were asked to rate their preference for each of the four options within each of four educational dimensions: course length, format, time of course offerings, and educational recognition. The response set for these 16 educational preference items was 1=*Not Preferred*; 2=*Somewhat Preferred*; and 3=*Most Preferred*.

Workforce information was gathered in Part IV. Age, gender, and ethnicity were among the demographic items. Participants were asked to indicate highest level of education achieved (six levels), to provide the year received highest degree or diploma, and to name discipline or major. Participants were asked to indicate the number of years of experience in their discipline or major and to indicate the number of years of experience in public health. Workers were asked to enter their specific position title and they were asked to select one of three terms (i.e., front line staff, senior level staff, supervisory or management staff) that best described their current position using definitions provided. They were also asked to write in the name of the state and county where they were employed. Participants were asked to indicate the number of hours worked per week and their current annual salary before taxes. The final set of items in the survey related to the participant's ability to speak a language other than English (i.e., yes, no). If they answered this filter question 'yes', they were asked to write in the name of the language and rate their speaking ability, reading skills, and written expression using this 3-point rating scale: 1=*fair*, 2=*good*, and 3= *excellent*.

To provide a tracking device for individual workers across time, respondents were asked to enter the last six digits of their Social Security Number as their Identification Code. While this identifying method did not guarantee absolute uniqueness, it was not deemed very likely that two or more individuals would have the same six-digit code.

The survey instrument was pilot tested in three counties. The purposes of the pilot study were 1) to assess the feasibility of the proposed data collection method and 2) to assess the psychometric properties of the tool, with the expectation of refining or reducing items. The pilot study suggested that the instructions were clear, participants averaged 20 minutes to complete the tool, and faxed submissions were problematic. Some workers indicated that some of the items in the competency and needs assessment sections did not apply to them. As calculated using Cronbach's alpha, reliabilities of the scales and subscales in the pilot test were very high indicating excessive redundancy among items. To reduce subject burden in the full statewide survey, some items were eliminated based on their item-to-total correlations.

The final *Towards 21st Century Public Health Practice* instrument is included in Appendix A. Internal consistency reliability (Cronbach's alpha) for the full sample of 1,249 respondents was .97 for Core Competency Skills (composite measure) and .94 for Bioterrorism/Emergency Preparedness Skills (composite measure). Subscale reliabilities ranged from .81 to .89 demonstrating ideal psychometric properties for this tool. The subscale items and reliabilities for scales and subscales in this study are included in Appendix B.

Other variables and measures were created from the information collected in the instrument. From the position title provided, each worker was classified into one of 46 standard public health enumeration categories. Unable to achieve satisfactory inter-rater reliability in this classification during the first round of assignment to classifications, raters were also provided information about the highest degree, discipline or major, and place of employment. Rating continued until congruence in classification assignment was achieved. Other variables were more easily created using external references. From the information respondents provided about county of employment, assignment to one of eight regions was made. Similarly, this information was used to classify respondents as working in an urban county (metropolitan areas), rural county (not metropolitan; not frontier), or frontier county (6 persons or less per square mile), based on 2000 Census data. Other data were grouped to facilitate data analyses and reporting. A *Glossary of Variables, Values and Levels of Measurement* is included in Appendix B.

2c. Data Collection

Identified professional public health workers in Colorado were contacted in person or by email through supervisory personnel, invited by the Colorado Department of Public Health and Environment to participate, and directed to an Internet website at the University of Colorado for completing the survey tool. *TELEform*^{TM} software was used to receive and store incoming online data. Public health workers without email or access to computers received a paper and pencil form and returned their completed tool in pre-addressed envelopes to the University of Colorado.

Potential respondents received several follow-up reminders and the deadline for submitting responses was extended on three occasions to maximize participation rates. The majority of the data were collected between June and September 2002. Surveys received through November 2002 were included in this report. Although most surveys were expected to be submitted online, the great majority of completed surveys were received as hard copies. Several factors appear to have contributed to participants' choice. Some did not have access to a computer or the Internet. Some experienced trouble with online submitting due to firewalls at their institution or incompatible Adobe Acrobat software. Others noted that their supervisor had distributed the instrument as a paper and pencil document and they were encouraged to place them in a central collecting station for mailing to the research team at the University of Colorado.

2d. Data Analyses

Data were analyzed using *SPSS Inc.* (2002) software. Descriptive analyses were done on all items including measures of centrality and dispersion. Preliminary analyses also included psychometric analyses as reported in the measurement section. When proficiency and educational need variables did not meet the assumptions for statistical testing (e.g., normal distribution, homogeneity of variance), transformations were made prior to analyses. Variables with moderate skewness were transformed using a square root transformation and variables with substantial skewness required logarithmic transformations. Results of the tests for normality and transformations required for proficiency and educational need variables are summarized as technical notes in Appendix C. All subsequent statistical tests used these normalized variables.

Differences in means between two groups were examined using independent sample t-tests. To determine differences among three or more groups, analysis of variance (ANOVA) was used to test whether the differences among means of the groups were greater than would be expected by chance alone. An overall F-ratio statistic was calculated; the probability (p) levels are reported when

the probability was less than or equal to .001, .01, and .05, respectively; other non-significant probability levels are noted as n.s. When the overall F ratio in ANOVA was statistically significant, post-hoc comparisons between all possible pairs of groups were made using Scheffe and Tukey methods. Differences among these pairs are too numerous (k*k-1) to systematically include in this report.

In this final report, data are summarized in tables and presented visually in graphs. The general structure of this report follows this order: 1) characteristics of the group(s), 2) Core Competency proficiencies and educational needs of the group(s), 3) Bioterrorism/Emergency Preparedness proficiencies and educational needs of the group(s), and 4) educational preferences of the group(s).

2e. Target Population, Sample, and Response Rate

The initial target population was all professional public health workers employed in traditional public health settings in Colorado. Traditional public health settings were defined as agencies providing public health services at the county or state level. As the study unfolded, some administrators presented convincing rationale and requested permission to include their non-professional staff, many of whom were either performing professional responsibilities or were viewed as essential in carrying out the public health agenda within their agencies. A decision was made to include non-professional public health workers as requested; differences between these two groups could be addressed in the analyses.

The total sample size for this study was 1,249 Colorado public health workers: 899 professional workers and 336 non-professional workers responded. Actual response rate is difficult to estimate and interpret for three reasons: 1) the actual number of workers at the time of the study was not precisely known, 2) different methods of counting workers were employed, and 3) not all non-professional workers were invited to participate in the survey.

First, the number of public health workers in Colorado at the time of the survey was not precisely known. An enumeration report completed one year earlier focused on local public health agencies (CDPHE, 2001). This report indicated that there were 1,949.6 FTE (full-time equivalent) workers in this segment. Professional workers numbered 1,241.6 FTE (64%) and non-professional workers numbered 708 FTE (36%). It is generally agreed that subsequent budget reductions in many agencies resulted in fewer public health workers in this segment at the time of the study than in the 2001 enumeration report. Enumeration of the workers at the state health department corresponded more closely with the timing of this study. In September 2002, 1,034 FTE workers were employed at the Colorado Department of Public Health and Environment: 679.8 FTE (66%) in professional positions and 345.2 FTE (34%) in non-professional positions. Combining the reports from these two segments, 2,983.6 FTE public health workers were employed in traditional public health positions, 65% from the local health agency segment and 35% from the state health department segment.

A second issue in estimating response rate relates to the method of counting: the enumeration reports employed FTE and this study used head count (i.e., each worker was invited to participate). The third issue is more difficult to address. Some non-professional workers were invited to participate. However, it is not known whether only select individuals were invited or whether all non-professional workers were invited. Thus a precise response rate cannot be calculated given the issues noted above.

However, a description of the study participants permits some estimates of overrepresented or underrepresented groups. In this study, 1,249 public health workers responded. For the 1,235 who

identified their place of employment in this survey, the overwhelming majority (91%) were from the local health agency segment. Only 110 respondents (9%) identified CDPHE as their place of employment. Comparing these numbers to the earlier FTE enumeration counts, the sample was clearly more representative of local public health workers. State health department workers were very underrepresented. In this study, 899 (73%) were professionals and 336 (27%) were non-professionals. Compared to the earlier statewide enumeration of 64.4% professionals and 36% non-professionals, professional workers were proportionately more represented in this study than non-professionals.

3. Results for Colorado Public Health Workers as a Group

3a. Characteristics

The characteristics of the Colorado public health workforce (n=1,249) are reported in Table 1. Workers in the study ranged in age from 19 to 73 years of age with a median age of 45 years. Figure 1 shows the proportion of workers in six age categories; more than two-thirds of the workforce (68%) was at least 40 years old. Workers were predominately female (83%) and white (81%). The largest group of non-white workers was Hispanic (13%), followed by Black (2%), and Asian (1%); all other or multiracial accounted for the other 2%.

The majority of workers (71%) held at least a baccalaureate degree. Figure 2 graphically illustrates the proportion of workers at each level of educational attainment: 14% (n=174) held a high school diploma, 6% (n=78) had earned a professional or vocational diploma, 8% (n=102) held an associate degree, 45% (n=547) held a baccalaureate degree, 23% (n=287) had earned a master's degree, and 3% (n=34) reported a doctoral degree. Years elapsed since completing the last degree ranged from 0 to 49 years, with a median of 14 years. Workers averaged 14.4 years of work experience in their discipline or major and 9.6 years of public health experience.

All Colorado counties and the state health department were represented in the sample. The counties with more than 50 respondents were Tri-County (n=201), El Paso County (n=164), Denver City and County (n=137), Boulder County (n=89), Weld County (n=83), Jefferson County (n=69), and Larimer County (n=66). On the other extreme, fewer than 10 workers responded from 31 counties or combined agencies. For county workers, many more respondents were employed in organized health departments (82%) than local health agencies (18%). Most workers were from urban counties (79%), with the remaining from rural counties (16%) and frontier (5%) counties. Nine percent of the sample (n=110) was employed by the Colorado Department of Health and Environment.

Representation by region is summarized in Figure 3. Nearly half (48%) of the respondents (n=524) were from the Metro region; other regions with large numbers of respondents were Central (n=182) and Northeast (n=165). Regions with the fewest respondents were San Luis Valley (n=24) and Southwest (n=26). The number of public health workers in the seven traditional public health position categories is shown in Figure 4.

When workers were classified into one of the eight public health position categories, by far the largest number of workers was in the Professional group (n=868, 70%). Next in order of size were the Administrative Support group (n=164, 13%), Paraprofessional group (n=98, 8%), Technicians (n=70, 6%), and Officials and Administrators group (n=31, 3%). Less than one percent of respondents were members of the Protective Service, Skilled Craft, and Service/Maintenance groups. When workers were dichotomized into 'professional' vs. 'nonprofessional' categories, nearly three-fourths of the workers (n=899) were in professional positions.

After workers' position titles were coded into standard public enumeration categories, the largest single group of workers was Public Health Nurses (n=270, 22%), followed by Environmental Health Specialists (n=142, 12%), Administrative Support Staff (n=141, 12%), and Administrative/Business Professionals (n=126, 10%). More than half of the workers (55%) classified themselves as Front Line Staff; the remaining identified themselves as Supervisory/Management staff (26%) or Senior Level Staff (20%).

The majority of public health workers were employed full-time (82%). Full-time equivalent annual salaries ranged from $12,000 to $151,000. The median full-time equivalent salary of all respondents was $40,000 and the mean was $43,241.

Twenty-nine percent of public health workers (n=360) reported they knew at least one non-English language. The most frequently reported was Spanish (n=276), with French (n=27) and German (n=21) a distant second and third, respectively. The 20 other languages reported were Amarigna, American Sign Language, Arabic, Bosnian, Cambodian, Cantonese, Chinese, Farsi, Filipino, Greek, Hungarian, Italian, Korean, Melanesian Pidgin English, Portuguese, Romanian, Russian, Swahili, Tagalog, and Vietnamese. If the respondent knew a non-English language, speaking skills were rated the highest, followed by reading ability and then writing ability.

Table 1. Characteristics of the Colorado Public Health Workforce (N=1,249)

Variables and Values	n	%	Min.	Max.	Mean	SD	Median
Age			19	73	43.97	10.71	45.00
Under 29 Years	148	12.2					
30-39 Years	246	20.3					
40-49 Years	398	32.8					
50-59 Years	349	28.8					
60 Years and Over	71	5.9					
Gender							
Male	204	17.5					
Female	964	82.5					
Race							
White	984	81.2					
Hispanic	161	13.3					
Black	22	1.8					
Asian	16	1.3					
Other or Multiracial	29	2.4					
Highest Level of Education							
High School Diploma	174	14.2					
Professional or Vocational Diploma	78	6.4					
Associate Degree	102	8.3					
Baccalaureate Degree	547	44.8					
Master's Degree	287	23.0					
Doctoral Degree	34	2.8					
College Degree							
No	354	29.0					
Yes	868	71.0					
Years Since Last Degree			0	49	16.17	11.25	14.00
Less than 2 Years	57	4.6					
2-5 Years	152	12.2					
5-9 Years	206	16.5					
10-14 Years	173	13.9					
15-19 Years	134	10.7					
20 or More Years	437	35.0					
Years Experience in Discipline or Major			0	46	14.42	10.63	13.00
1 Year or Less	85	8.0					
2-4 Years	149	14.1					
5-9 Years	193	18.3					
10-14 Years	150	14.2					
15-19 Years	118	11.2					
20 or More Years	361	34.2					
Years Experience in Public Health			0	46	9.59	8.42	7.00
1 Year or Less	202	16.9					
2 to 4 Years	226	18.9					

Table 1 (continued).

Variables and Values	n	%	Min.	Max.	Mean	SD	Median
5-9 Years	260	21.7					
10-14 Years	219	18.3					
15-19 Years	101	8.4					
20 or More Years	189	15.8					
Place of Employment							
Alamosa County	4	.3					
Baca County	1	.0					
Bent County	7	.6					
Boulder County	89	7.1					
Broomfield County	14	1.1					
Colorado Dept. of Public Health & Environment	110	8.8					
Chaffee County	4	.3					
Cheyenne County	1	.0					
Clear Creek County	7	.6					
Conejos County	2	.2					
Costilla County	12	1.0					
Delta County	16	1.3					
Denver City and County	137	11.0					
Dolores County	2	.2					
Eagle County	5	.4					
El Paso County	164	13.1					
Elbert County	6	.5					
Fremont County	5	.4					
Garfield County	3	.2					
Gilpin County	1	.1					
Grand County	3	.2					
Gunnison County	8	.6					
Hinsdale County	1	.1					
Jackson County	1	.1					
Jefferson County	69	5.5					
Kit Carson County	10	.8					
Lake County	3	.2					
Larimer County	66	5.3					
Lincoln County	1	.1					
Mesa County	27	2.2					
Mineral County	2	.2					
Montezuma County	17	1.4					
Montrose County	24	1.9					
Northeast Colorado	5	.4					
Northwest Colorado	11	.9					
Otero-Crowley County	9	.7					

Table 1 (continued).

Variables and Values	n	%	Min.	Max.	Mean	SD	Median
Ouray County	1	.1					
Park County	3	.2					
Pitkin County	9	.7					
Prowers County	24	1.9					
Pueblo City and County	16	1.3					
Rio Blanco County	2	.2					
Rio Grande County	3	.2					
Saguache County	1	.1					
San Juan County	1	.1					
San Juan Basin	5	.4					
San Miguel County	1	.1					
Summit County	5	.4					
Teller County	3	.2					
Tri-County	201	16.1					
United States	16	1.3					
University of Colorado Health Science Center	1	.1					
Weld County	83	6.6					
Type of County							
Rural	171	15.9					
Frontier	57	5.3					
Urban	850	78.8					
Regional Designation							
Northwest	39	3.6					
Northeast	165	15.1					
Metro	524	47.9					
West Central	77	7.0					
Central	182	16.6					
Southeast	58	5.3					
Southwest	26	2.4					
San Luis Valley	24	2.2					
Size of County's Respondents							
Very Small	44	4.0					
Small	118	10.8					
Medium	124	11.4					
Large	825	73.9					
Organized Health Department							
No	202	18.4					
Yes	893	81.6					
Position Category							
Officials & Administrators	31	2.5					
Professionals	868	70.3					

Table 1 (continued).

Variables and Values	n	%	Min.	Max.	Mean	SD	Median
Technicians	70	5.7					
Protective Service	3	.2					
Paraprofessionals	98	7.9					
Administrative Support	164	13.3					
Skilled Craft	0	.0					
Service/Maintenance	1	.1					
Worker Groups by Position Category							
Officials & Administrators							
Health Administrator	31	2.5					
Professionals							
Administrative/Business Professional	126	10.2					
Attorney/Hearing Officer	0	.0					
Biostatistician	5	.4					
Clinical Counseling & School Psychologist	0	.0					
Environmental Engineer	10	.8					
Environmental Health & Protect. Specialist	142	11.5					
Epidemiologist	9	.7					
Health Economist	0	.0					
Health Planner/Researcher/Analyst	14	1.1					
Infection Control/Disease Investigation	8	.6					
Licensure/Inspector/Regulatory Specialist	14	1.1					
Marriage & Family Therapist	0	.0					
Medical & Public Health Social Worker	14	1.1					
Mental Health/Substance Abuse Social Worker	0	.0					
Mental Health Counselor	11	.9					
Occupation Safety & Health Specialist	1	.1					
Public Health Dental Worker	0	.0					
Public Health Educator	56	4.5					
Public Health Laboratory Professional	3	.2					
Public Health Nurse	270	21.9					
Public Health Nutritionist	35	2.8					
Public Health Optometrist	0	.0					
Public Health Public Health Pharmacist	0	.0					
Public Health Physical Therapist	0	.0					
Public Health Physician	4	.3					
Public Health Program Specialist	69	5.6					
Public Health Student	1	.1					
Public Health Veterinarian/Animal Control Specialist	0	.0					
Psychiatric Nurse	1	.1					
Psychiatrist	0	.0					
Psychologist	0	.0					

Table 1 (continued).

Variables and Values	n	%	Min.	Max.	Mean	SD	Median
Public Relations/Media Specialist	6	.5					
Substance Abuse & Behavior Disorder	8	.6					
Other Public Health Professional	33	2.7					
Public Health Professional, Title Unspecified	28	2.3					
Technicians							
Computer Specialist	13	1.1					
Environmental Engineering Technician	1	.1					
Environmental Science & Protection Technician	7	.6					
Health Information Systems/Data Analyst	7	.6					
Occupational Health & Safety Technician	0	.0					
Public Health Laboratory Specialist	8	.6					
Other Public Health Technician	27	2.2					
Technician, Title Unspecified	7	.6					
Protective Service							
Investigations Specialist	0	.0					
Unspecified Protective Service Worker	3	.2					
Paraprofessionals							
Community Outreach/Field Worker	19	1.5					
Unspecified Paraprofessional	79	6.4					
Administrative Support							
Administrative/Business Staff	13	1.1					
Administrative/Support Staff	141	11.4					
Unspecified Clerical/Support	10	.8					
Skilled Craft							
Skilled Craft Worker	0	.0					
Service/Maintenance							
Food Services/Housekeeping	0	.0					
Patient Services	0	.0					
Other or Unspecified Services	1	.1					
Professional Position							
No	336	27.2					
Yes	899	72.8					
Type of Position							
Front Line Staff	659	54.5					
Senior Level Staff	236	19.5					
Supervisory/Management Staff	315	26.0					
Full-Time Employment							
No	219	17.8					
Yes	1,008	82.2					
Annual Salary (FTE)			$12,000	$151,000	$43,241	$18,115	$40,000
Less Than $20,000	41	4.0					

Table 1 (continued).

Variables and Values	n	%	Min.	Max.	Mean	SD	Median
$20,000 to $29,999	175	17.2					
$30,000 to $39,999	271	26.6					
$40,000 to $49,999	219	21.5					
$50,000 to $59,999	141	13.9					
$60,000 to $69,999	79	7.8					
$70,000 to $79,999	41	4.0					
Over $80,000	51	5.0					
Know Non-English Language							
No	865	70.6					
Yes	360	29.4					
If so, Language Known							
Spanish	276	22.1					
French	27	2.2					
German	21	1.7					
Russian	4	.3					
Vietnamese	6	.5					
Portuguese	4	.3					
Russian	4	.3					
Greek	3	.2					
American Sign Language	2	.2					
Farsi	2	.2					
Filipino	2	.2					
Amarigna	1	.1					
Arabic	1	.1					
Bosnian	1	.1					
Cambodian	1	.1					
Cantonese	1	.1					
Chinese	1	.1					
Hungarian	1	.1					
Italian	1	.1					
Korean	1	.1					
Melanesian Pidgin English	1	.1					
Romanian	1	.1					
Swahili	1	.1					
Tagalog	1	.1					
Other Language Speaking Ability							
Fair	120	33.6					
Good	116	32.5					
Excellent	121	33.9					
Other Language Reading Ability							
Fair	122	34.8					

Table 1 (continued).

Variables and Values	n	%	Min.	Max.	Mean	SD	Median
Good	123	35.0					
Excellent	106	30.2					
Other Language Writing Ability							
Fair	163	47.8					
Good	95	27.9					
Excellent	83	24.3					

Figure 1. Colorado Public Health Workers by Age Group

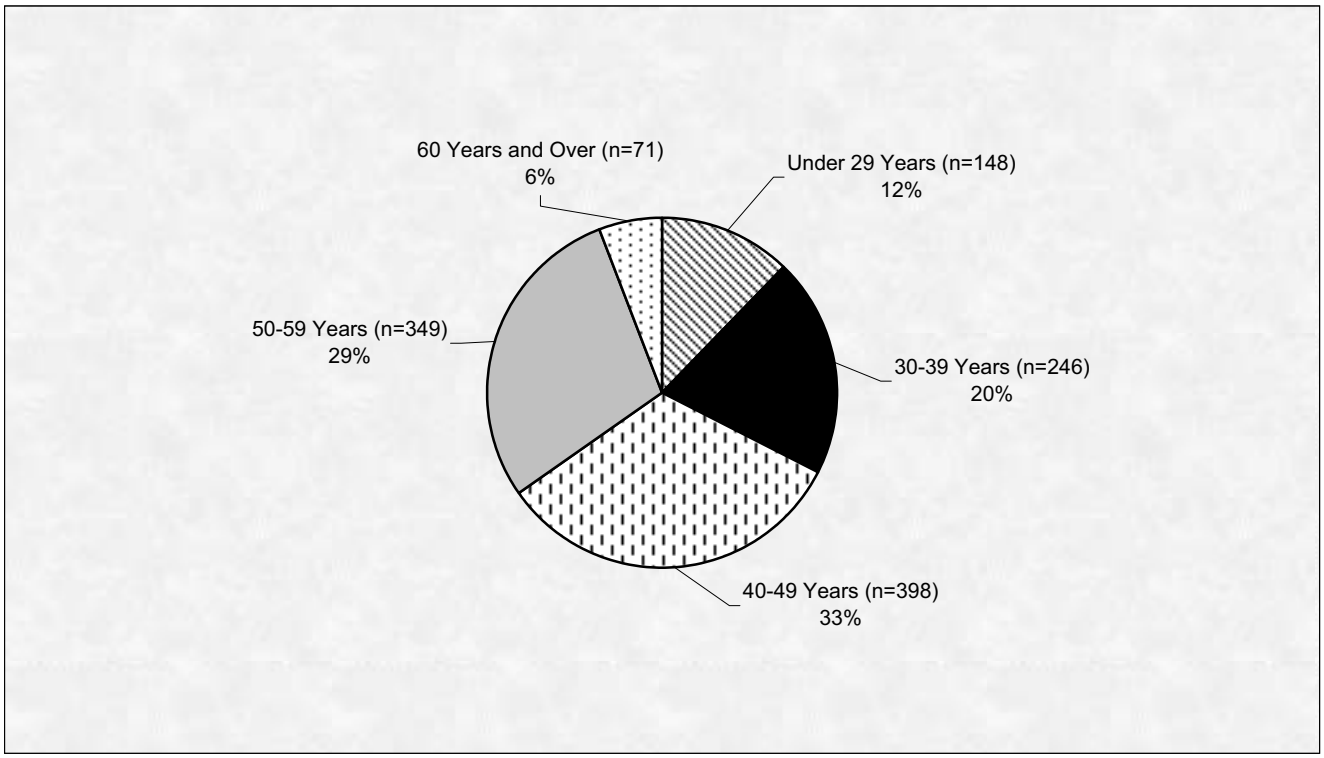


Figure 2. Colorado Public Health Workers by Highest Level of Education

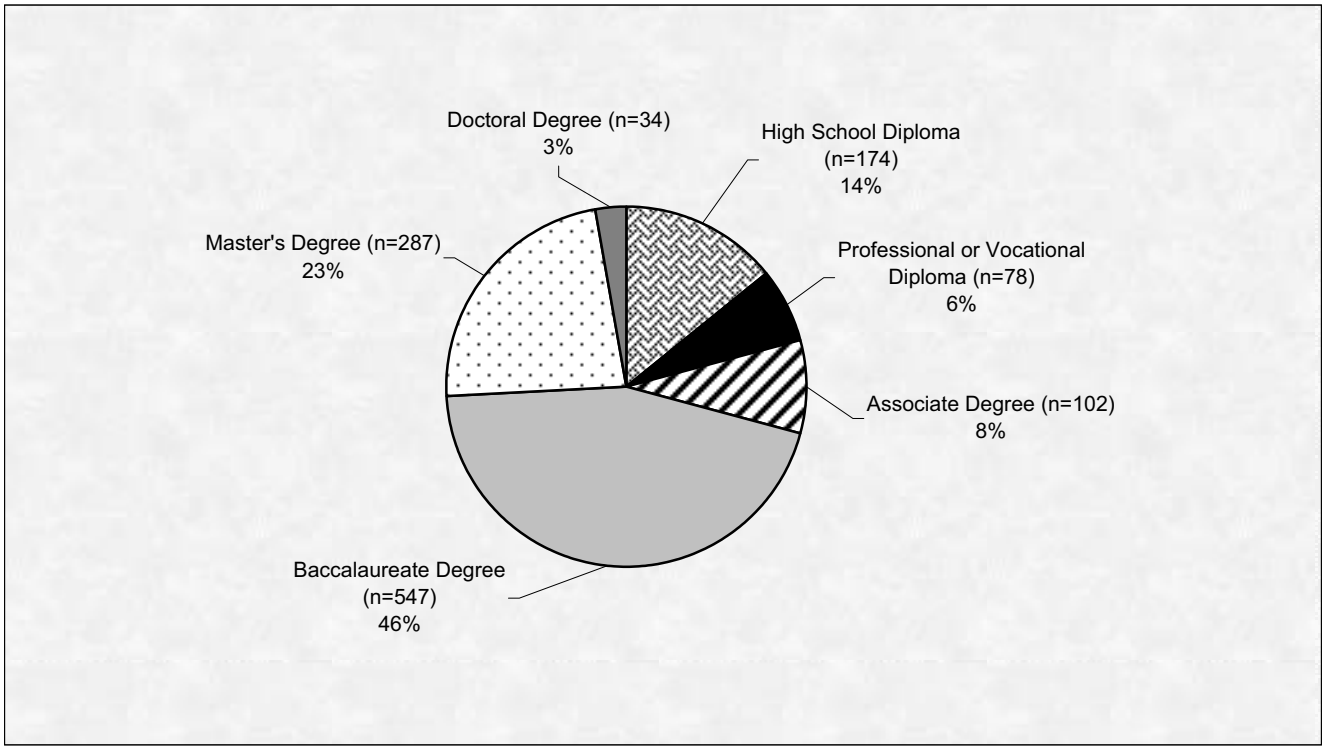


Figure 3. Colorado Public Health Workers by Regional Designation

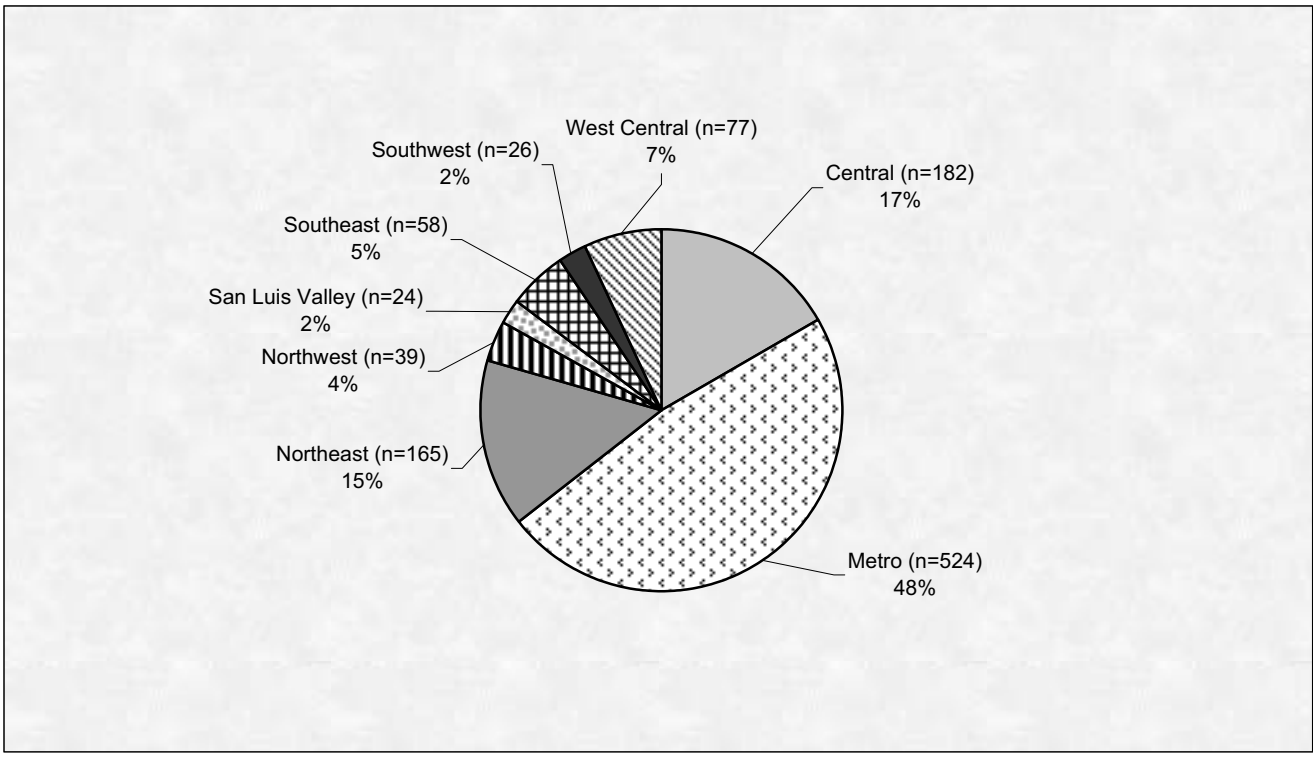
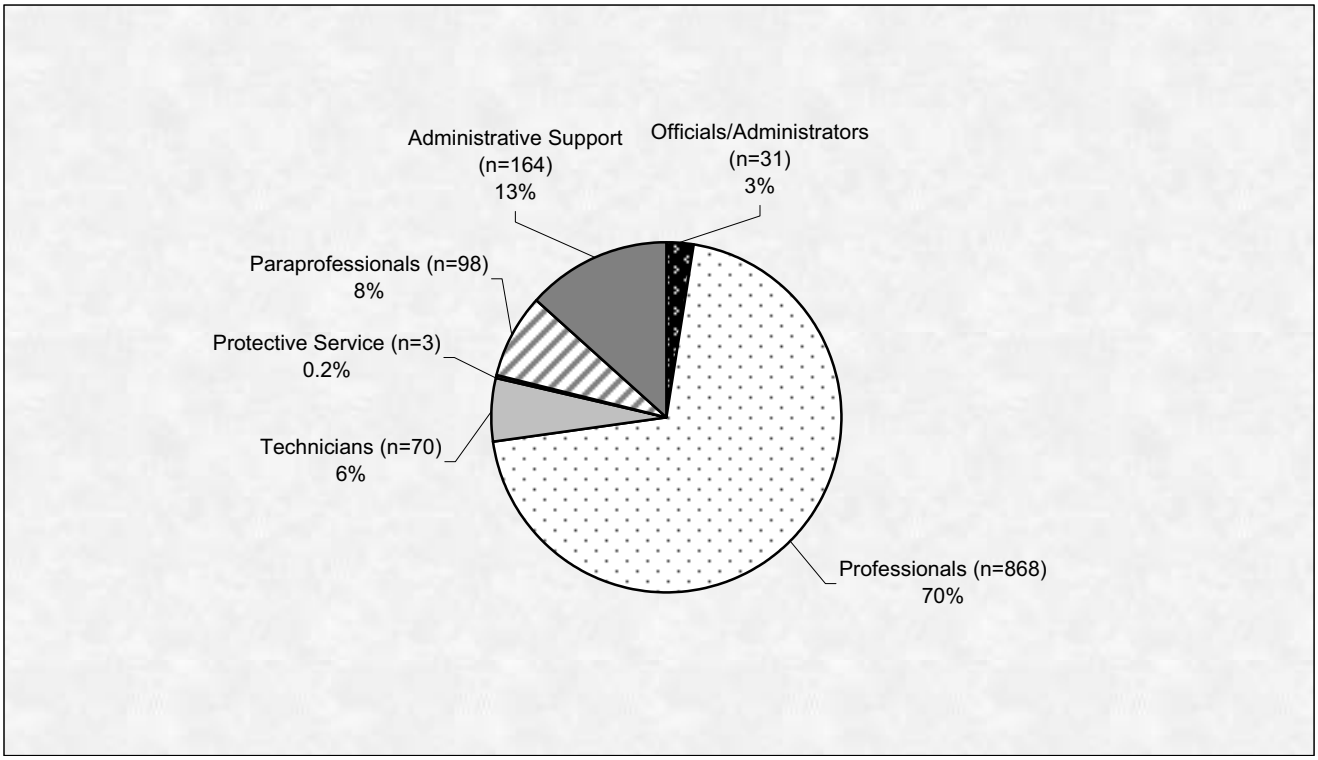


Figure 4. Colorado Public Health Workers by Position Category



3b. Core Competency Proficiencies and Educational Needs

Respondents rated their proficiency in Core Competencies on a scale of 1 to 7 (where 1=*Not Proficient at this Time* and 7=*Highly Proficient at this Time*). When proficiency items in the Core Competency domain were summarized as a composite score, the mean score was 4.40 and the median score was 4.54.

Based on their composite scores in Core Competencies, Colorado public health workers were grouped into six proficiency levels: Level I (scores in the 1.00 to 1.99 range); Level II (scores in the 2.00 to 2.99 range); Level III (scores in the 3.00 to 3.99 range); Level IV (scores in the 4.00 to 4.99 range); Level V (scores in the 5.00 to 5.99 range); and Level VI (scores in the 6.00 to 7.00 range). The distribution of the Colorado public health workforce by Core Competency proficiency level is summarized below and graphically illustrated in Figure 5.

Level I	Little or No Proficiency	49 workers	4%
Level II	Low Proficiency	116 workers	9%
Level III	Fairly Moderate Proficiency	264 workers	21%
Level IV	Moderate Proficiency	379 workers	32%
Level V	Fairly High Proficiency	339 workers	27%
Level VI	High Proficiency	92 workers	7%

When these six levels were aggregated into three groups for greater simplicity, 13% (n=165) were found in the lower proficiency group (i.e., Level I and II), about half of all workers (n=639, 53%) were in the moderate proficiency group (i.e., Level III and IV), and about one-third (34%, n=431) were in the higher proficiency group (i.e., Level V and VI).

Educational needs in Core Competencies were measured on a five-point scale (where 1=*No Need* and 5=*Highest Need*). When educational need items in the Core Competency domain were summarized as a composite score, the mean score for Colorado workers was 2.99 and the median score was 3.0.

Composite educational need in Core Competencies was summarized into four levels: Level I (scores in the 1.00 to 1.99 range); Level II, (scores in the 2.00 to 2.99 range), Level III (scores in the 3.00 to 3.99 range); and Level IV (scores in the 4.00 to 5.00 range). The distribution for all Colorado public health workers by Core Competency educational need level is summarized below.

Level I	Little or No Educational Need	139 workers	11%
Level II	Some Educational Need	433 workers	35%
Level III	Moderate Educational Need	504 workers	41%
Level IV	High Educational Need	162 workers	13%

As graphically illustrated in Figure 6, almost half (46%) reported little or some educational needs in Core Competencies, and slightly more than half (54%) reported moderate or high educational needs in this area.

Additional information about proficiencies and educational needs in the Core Competencies was gained by examining the subscale scores. As documented in Table 2, Colorado public health workers reported they were most proficient in Cultural Competency Skills (1st), Communication Skills (2nd), and Leadership/Systems Skills (3rd). They reported being least proficient in Basic Public

Health Sciences Skills (6th), Policy Development/Program Planning Skills (7th), and Financial Planning/Management Skills (8th). Rated in the middle were Community Dimensions of Practice Skills (4th) and Analytic/Assessment Skills (5th). In descending order, the means for the eight Core Competency Skill subscales were: Cultural Competency Skills (5.07), Communication Skills (4.71), Leadership/System Thinking Skills (4.61), Community Dimensions of Practice Skills (4.38), Analytic/ Assessment Skills (4.35), Basic Public Health Sciences Skills (4.09), Policy Development/Program Planning Skills (3.98), and Financial Planning/Management Skills (3.96). Proficiencies in Core Competency Skills for the Colorado public health workforce are graphically illustrated in Figure 7.

When queried about their educational needs in Core Competencies domains, workers reported their greatest educational needs were for Financial Planning/Management Skills (1st), Policy Development/Program Planning Skills (2nd), and Basic Public Health Sciences Skills (3rd). Workers reported their least educational needs were in Community Dimensions of Practice (6th), Cultural Competency Skills (7th), and Communication Skills (8th). In the middle of these rankings were Analytic/Assessment Skills (4th) and Leadership/Systems Thinking Skills (5th). In descending order, the means for educational needs in the eight Core Competency Skill subscales were: Financial Planning/Management Skills (3.16), Policy Development/Program Planning Skills (3.13), Basic Public Health Sciences Skills (3.05), Analytic/Assessment Skills (3.05), Leadership and System Thinking Skills (3.04), Community Dimensions of Practice Skills (2.96), Cultural Competency Skills (2.78), and Communication Skills (2.77). Educational needs in Core Competency Skills for the Colorado public health workforces are graphically presented in Figure 8.

Figure 5. Colorado Public Health Workers at Each Core Competency Proficiency Level

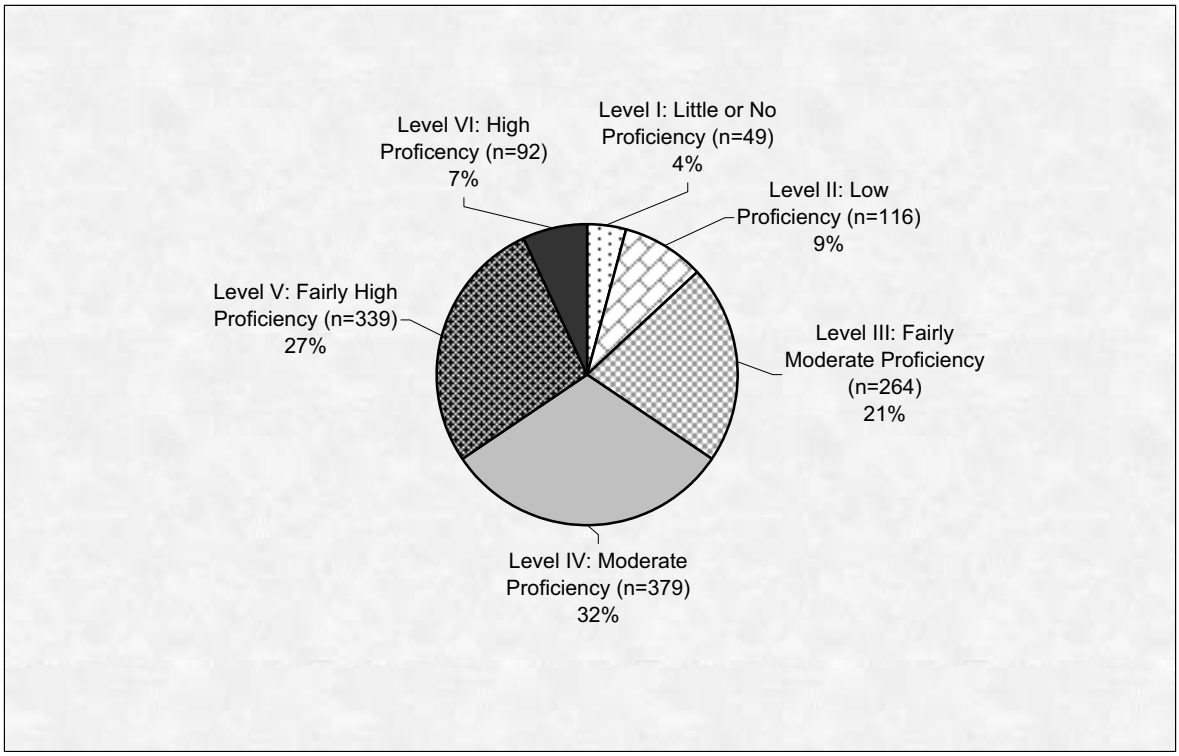


Figure 6. Colorado Public Health Workers at Each Core Competency Educational Need Level

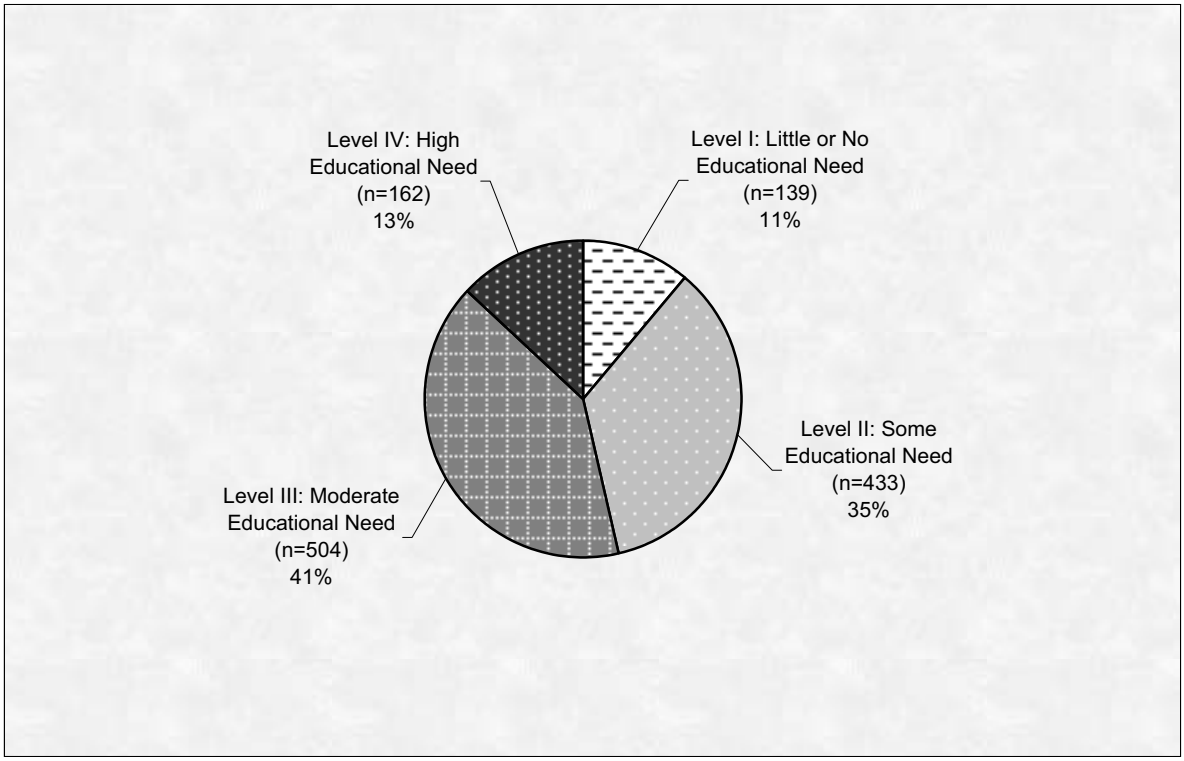


Table 2. Core Competency Proficiencies and Educational Needs in the Colorado Public Health Workforce (N=1,249)

Core Competency Domains	Min.	Max.	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains						
Analytic/Assessment Skills	1	7	4.35	1.45	5	4.50
Policy Development/Program Planning Skills	1	7	3.98	1.52	7	4.25
Communication Skills	1	7	4.71	1.25	2	4.83
Cultural Competency Skills	1	7	5.07	1.21	1	5.25
Community Dimensions of Practice Skills	1	7	4.38	1.36	4	4.50
Basic Public Health Sciences Skills	1	7	4.09	1.53	6	4.25
Financial Planning & Management Skills	1	7	3.96	1.42	8	4.00
Leadership & Systems Thinking Skills	1	7	4.61	1.38	3	4.75
Core Competencies Composite Skills	*1*	*7*	*4.40*	*1.21*		*4.54*
Educational Needs in Core Competency Domains						
Analytic/Assessment Educ. Needs	1	5	3.05	1.15	4	3.00
Policy Development/Prog. Planning Educ. Needs	1	5	3.13	1.20	2	3.00
Communication Educ. Needs	1	5	2.77	1.18	8	3.00
Cultural Competency Educ. Needs	1	5	2.78	1.15	7	3.00
Community Dimensions of Practice Educ. Needs	1	5	2.96	1.16	6	3.00
Basic Public Health Sciences Educ. Needs	1	5	3.05	1.26	3	3.00
Financial Planning & Management Educ. Needs	1	5	3.16	1.38	1	3.00
Leadership & Systems Thinking Educ. Needs	1	5	3.04	1.16	5	3.00
Core Competencies Composite Educ. Needs	*1*	*5*	*2.99*	*0.84*		*3.00*

Figure 7. Proficiency in Core Competency Skills for the Colorado Public Health Workforce

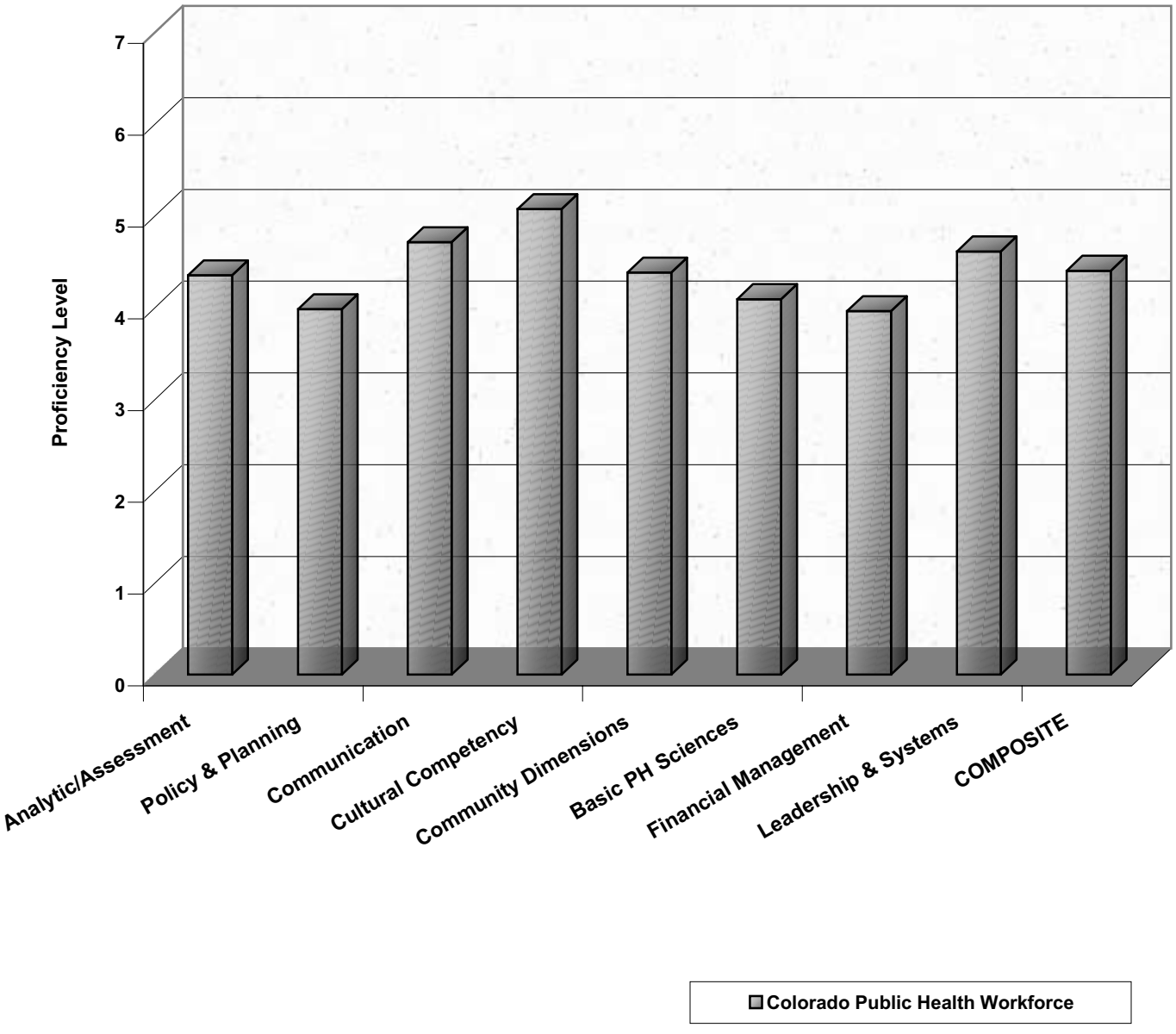
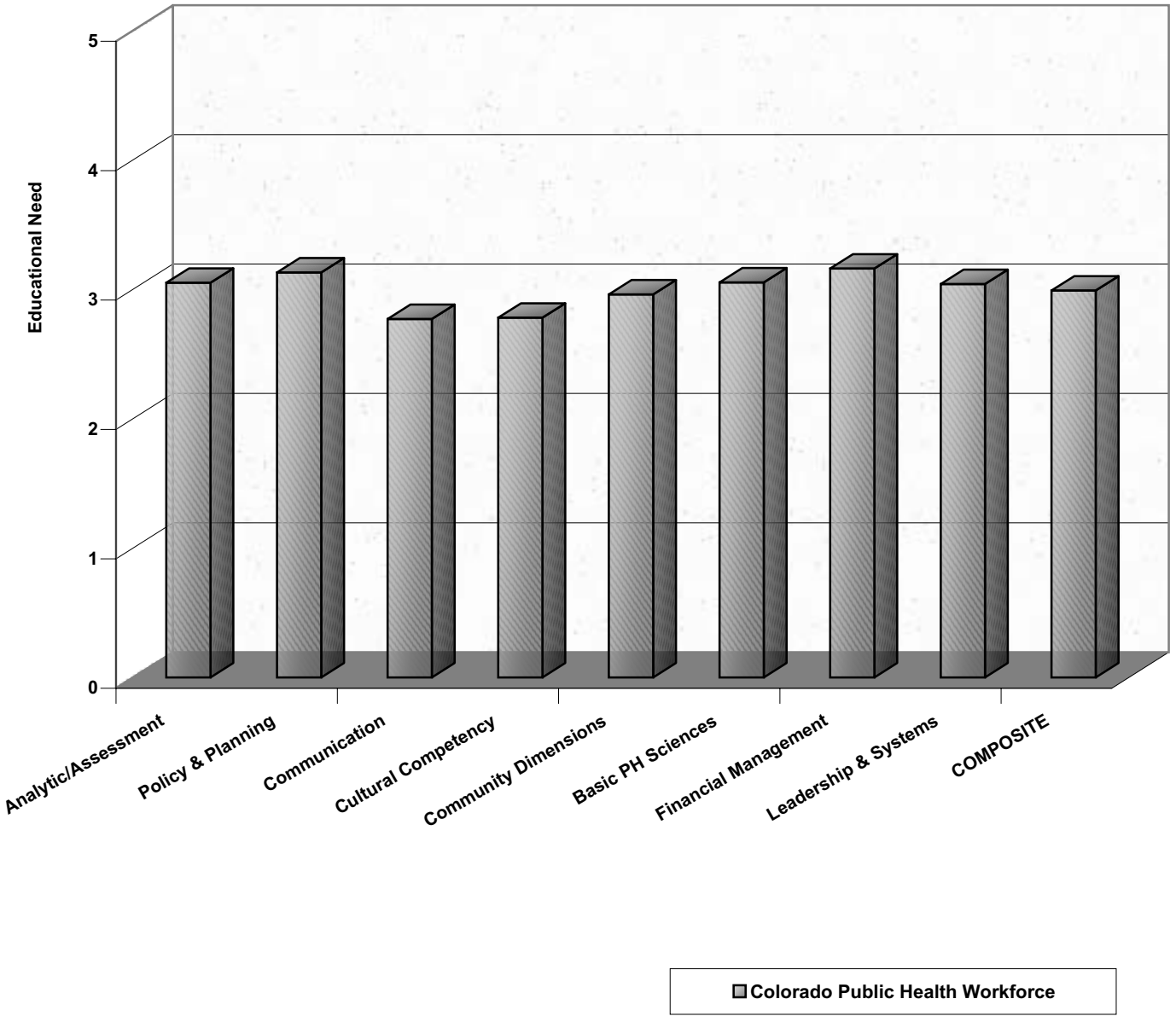


Figure 8. Educational Needs in Core Competency Skills for the Colorado Public Health Workforce



3c. Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs

Respondents rated their proficiency in Bioterrorism/Emergency Preparedness items on a scale of 1 to 7 (where 1=*Not Proficient at this Time* and 7=*Highly Proficient at this Time*). When items in the Bioterrorism/Emergency Preparedness domain were summarized as a composite score, the average score (mean) of all respondents was 3.07 and the median score was 2.86.

Based on their composite scores in Bioterrorism/Emergency Preparedness, public health workers were grouped into six proficiency levels: Level I (scores in the 1.00 to 1.99 range); Level II (scores in the 2.00 to 2.99 range); Level III (scores in the 3.00 to 3.99 range); Level IV (scores in the 4.00 to 4.99 range); Level V (scores in the 5.00 to 5.99 range); and Level VI (scores in the 6.00 to 7.00 range). The distribution of the Colorado workforce by Bioterrorism/Emergency Preparedness proficiency level is summarized below and graphically illustrated in Figure 9.

Level I	Little or No Proficiency	336 workers	27%
Level II	Low Proficiency	323 workers	26%
Level III	Fairly Moderate Proficiency	247 workers	20%
Level IV	Moderate Proficiency	183 workers	15%
Level V	Fairly High Proficiency	110 workers	9%
Level VI	High Proficiency	38 workers	3%

When these six levels of Bioterrorism/Emergency Preparedness proficiency were aggregated into three larger groups for greater simplicity, more than half (n=659, 53%) were classified in the lower proficiency group (i.e., Level I and II), about one-third (35%, n=430) were classified in the moderate proficiency group (i.e., Levels III and IV), and only 12% (n=148) were classified in the higher proficiency group (i.e., Levels V and VI).

Educational need for Bioterrorism/Emergency Preparedness was measured on a five-point scale (where 1=*No Need* and 5=*Highest Need*). The composite mean for the workforce was 3.45; the median score was 3.57.

To better understand educational needs across the workforce, composite educational need in the Bioterrorism/Emergency Preparedness domain was categorized into four levels: Level I (scores in the 1.00 to 1.99 range); Level II, (scores in the 2.00 to 2.99 range); Level III (scores in the 3.00 to 3.99 range); and Level IV (scores in the 4.00 to 5.00 range). The distribution by educational need level for Bioterrorism/Emergency Preparedness in the sample is summarized below.

Level I	Little or No Educational Need	111 workers	9%
Level II	Some Educational Need	210 workers	17%
Level III	Moderate Educational Need	475 workers	38%
Level IV	High Educational Need	442 workers	36%

As graphically illustrated in Figure 10, only one-quarter (26%) rated themselves as having little or some educational need; the overwhelming majority (74%) identified moderate to high educational needs in Bioterrorism/Emergency Preparedness.

Table 3 summarizes the proficiencies and educational needs in Bioterrorism/Emergency Preparedness domains for the Colorado public health workforce. Workers responded that they were most proficient in Disaster Response Skills (1st) and Emergency Communication Skills (2nd). They

reported they were least proficient in Biological/Infectious Disease Skills (6th) and Toxic Chemical/Environmental Hazard Skills (7th). Rated in the middle were proficiencies in Physical Injury Skills (3rd), Crisis Management Skills (4th), and Disaster Planning Skills (5th). In descending order, the means for Bioterrorism/Emergency Preparedness Competency subscales were Disaster Response Skills (3.88), Emergency Communication Skills (3.29), Physical Injury Skills (3.21), Crisis Management Skills (2.91), Disaster Planning Skills (2.80), Biological/Infectious Disease Skills (2.76), and Toxic Chemical/Environmental Hazard Skills (2.62). Differences in proficiencies across Bioterrorism/Emergency Preparedness domains are visually displayed in Figure 11.

When workers were queried about their educational needs in the Bioterrorism/Emergency Preparedness subscales, respondents reported their greatest educational needs were for Toxic Chemical/Environmental Hazard Skills (tied at 1st) and Disaster Planning Skills (tied at 1st). They indicated their least educational needs were in Physical Injury Skills (6th) and Emergency Communication Skills (7th). Between these greatest and least needs were their educational needs for Disaster Response Skills (3rd), Biological/Infectious Disease Skills (4th), and Crisis Management Skills (5th). In descending order, the means for educational needs in these subscales were: Disaster Planning Skills (3.63) Toxic Chemical/Environmental Hazard Skills (3.63), Disaster Response Skills (3.61), Biological/Infectious Disease Skills (3.55), Crisis Management Skills (3.37), Physical Injury Skills (3.29), and Emergency Communication Skills (3.06). Educational needs in Bioterrorism/Emergency Preparedness domains are graphically presented in Figure 12.

Figure 9. Colorado Public Health Workers at Each Bioterrorism/Emergency Preparedness Proficiency Level

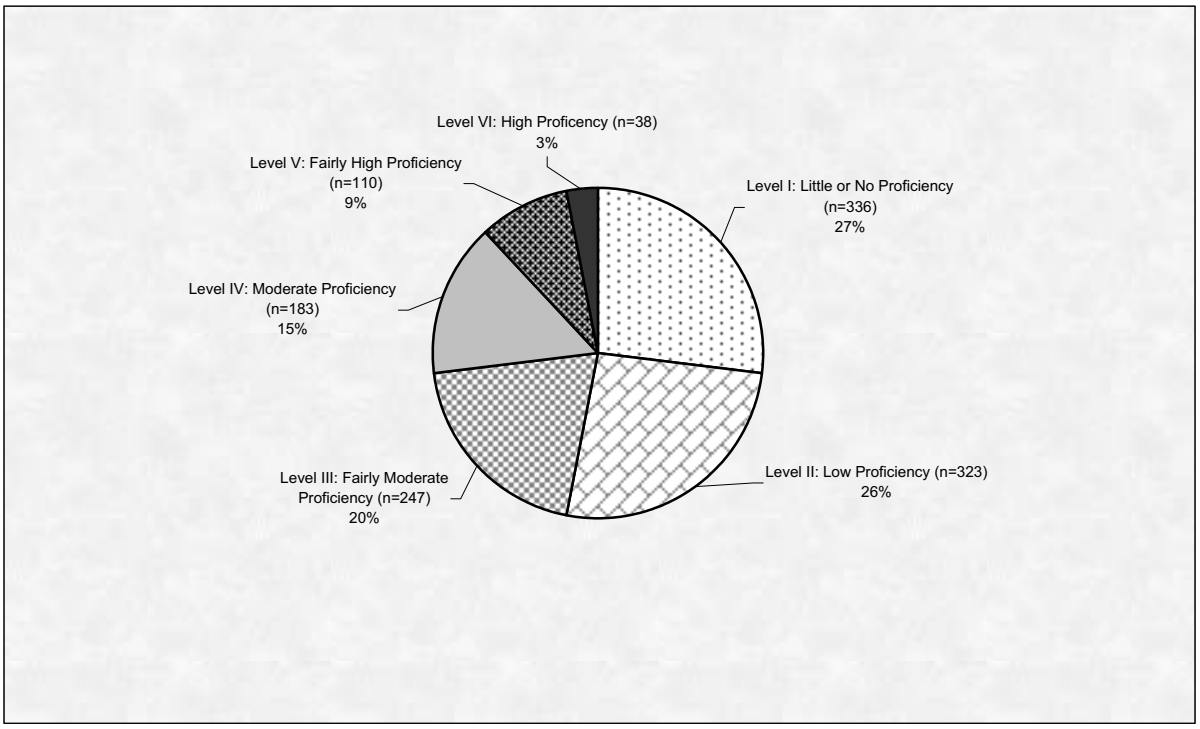


Figure 10. Colorado Public Health Workers at Each Bioterrorism/Emergency Preparedness Educational Need Level

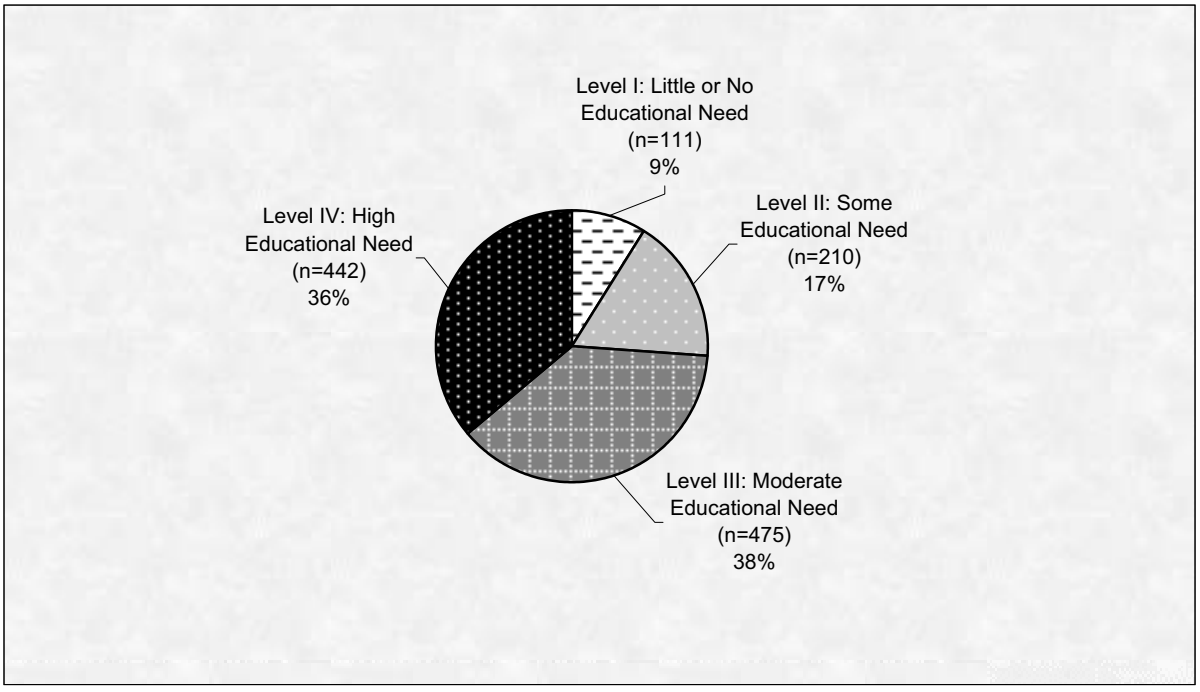


Table 3. Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs in the Colorado Public Health Workforce (N=1,249)

Bioterrorism/Emergency Preparedness Competency Domains	Min.	Max.	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/Emergency Preparedness						
Disaster Planning Skills	1	7	2.80	1.64	5	2.00
Disaster Response Skills	1	7	3.88	1.51	1	4.00
Emergency Communication Skills	1	7	3.29	1.68	2	3.00
Biological/Infectious Disease Skills	1	7	2.76	1.72	6	2.00
Toxic Chem. & Env. Hazard Skills	1	7	2.62	1.74	7	2.00
Physical Injury Skills	1	7	3.21	1.87	3	3.00
Crisis Management Skills	1	7	2.91	1.83	4	2.00
Bioterrorism Composite Skills	*1*	*7*	*3.07*	*1.42*		*2.86*
Educational Needs in Bioterrorism/Emergency Preparedness						
Disaster Planning Educ. Needs	1	5	3.63	1.27	1	4.00
Disaster Response Educ. Needs	1	5	3.61	1.24	3	4.00
Emergency Communication Educ. Needs	1	5	3.06	1.25	7	3.00
Biological/Infectious Disease Educ. Needs	1	5	3.55	1.34	4	4.00
Toxic Chem. & Env. Hazard Educ. Needs	1	5	3.63	1.37	1	4.00
Physical Injury Educ. Needs	1	5	3.29	1.33	6	3.00
Crisis Management Educ. Needs	1	5	3.37	1.24	5	3.00
Bioterrorism Composite Educ. Needs	*1*	*5*	*3.45*	*1.01*		*3.57*

Figure 11. Proficiency in Bioterrorism/Emergency Preparedness Skills for the Colorado Public Health Workforce

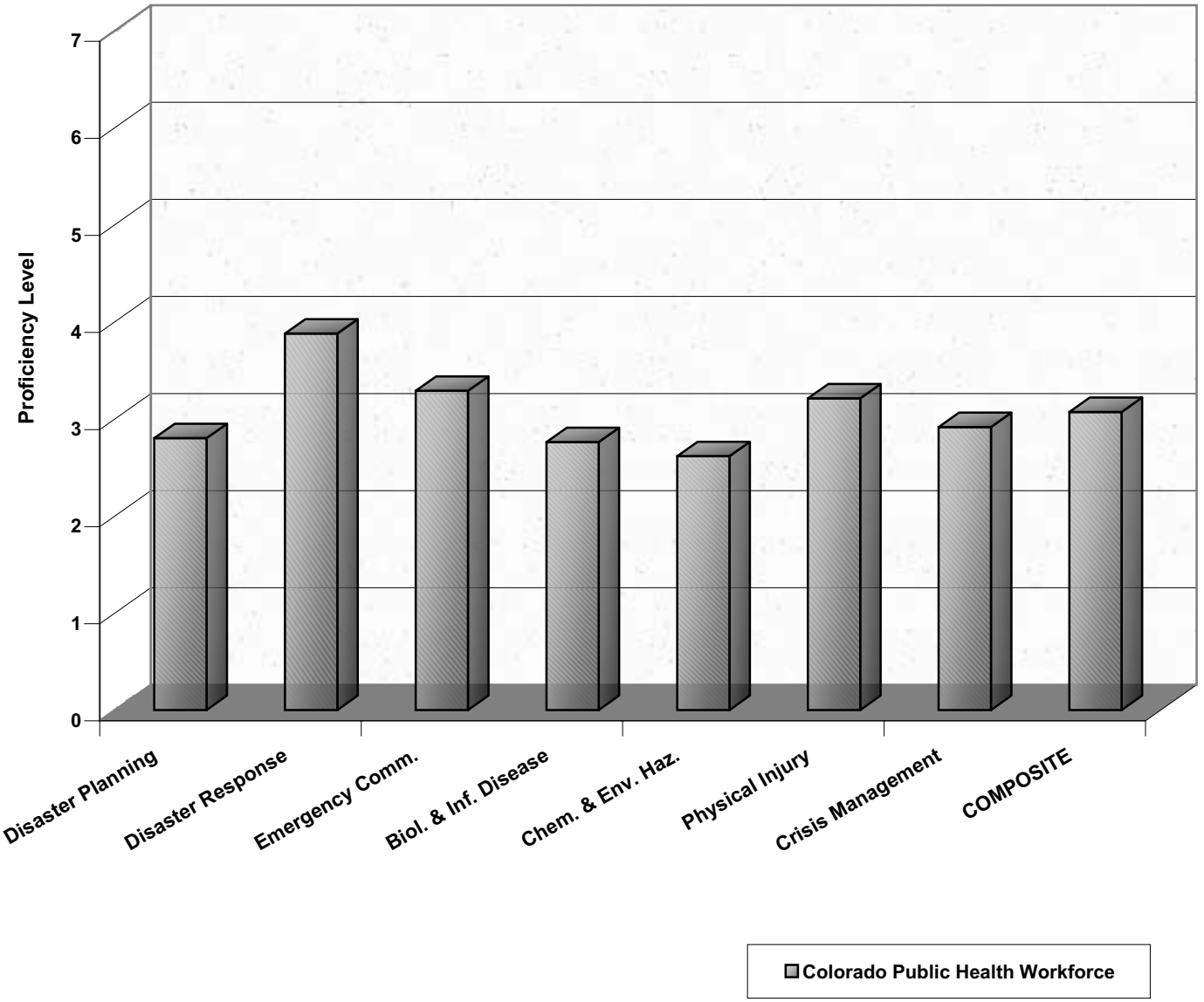
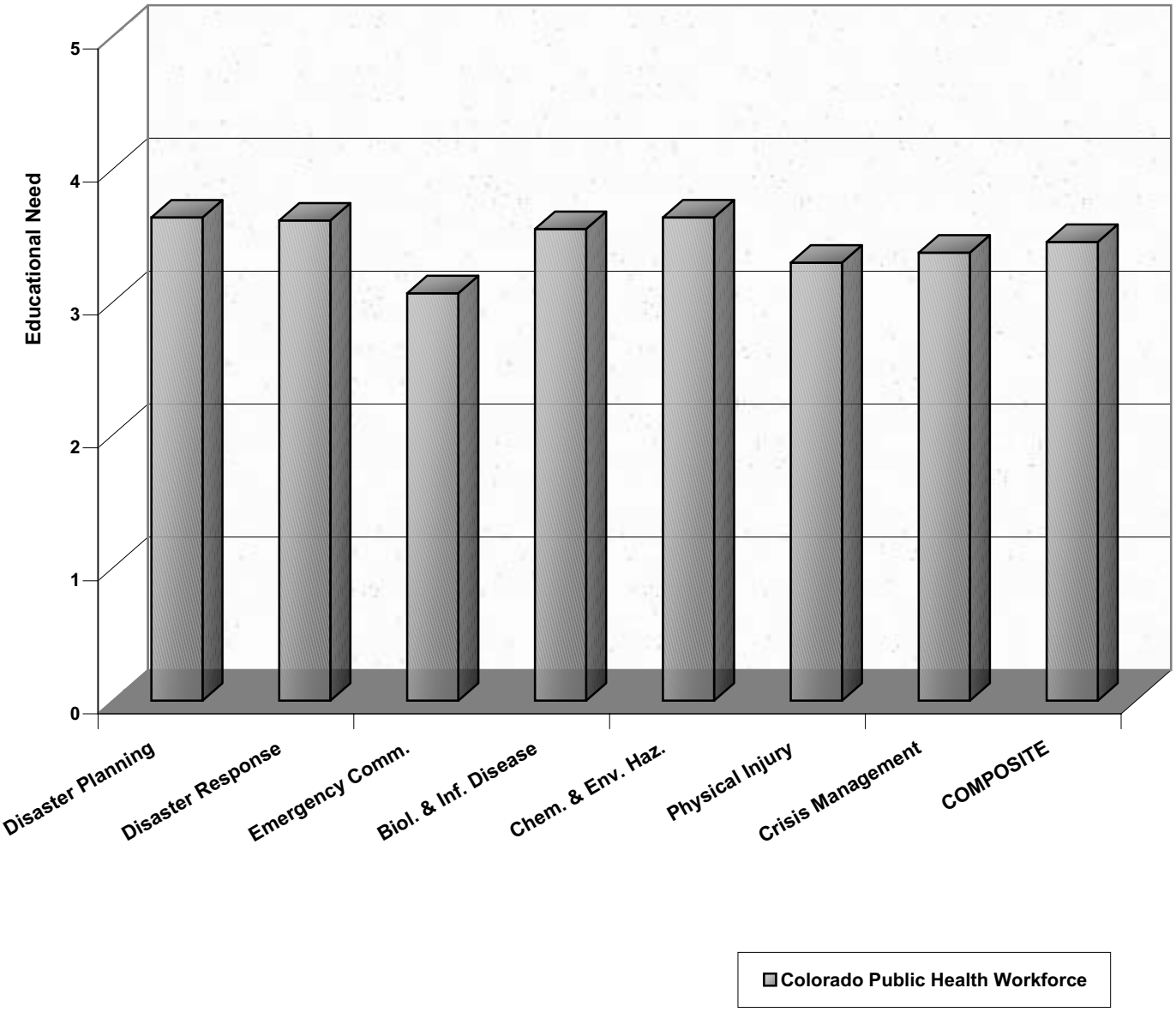


Figure 12. Educational Needs in Bioterrorism/Emergency Preparedness Skills for the Colorado Public Health Workforce



3d. Educational Preferences

Respondents were asked their degree of preference for four choices in each of these four areas: course length, format, time of course offering, and form of educational recognition. The response set for each of the 16 items was 1=*Not Preferred*; 2=*Somewhat Preferred*; and 3=*Most Preferred*. The resulting preferences for the Colorado public health workforce are summarized in Table 4.

Examining the mean scores for various options, the clearly preferred learning format for Colorado public health workers was the face-to-face classroom settings (2.74). This preference was followed by combination formats (2.01), Internet web-based instruction alone (1.79), and interactive teleconferences (1.73).

Across the entire workforce, most preferred one-day workshops (2.49) or two-hour sessions (2.18) to several-day workshops (1.69) or academic semester courses (1.41). With respect to the time for course offerings, workers strongly preferred weekday classes (2.81) to self-determined web-based offerings (1.83), evening classes (1.39), or weekend classes (1.19).

Workers expressed a higher preference for educational recognition by receiving a certificate (2.34) or being awarded continuing education units (2.19) than by earning graduate academic credits (1.92) or undergraduate academic credits (1.62). However, there was some support for each of the educational preferences across the sample.

Table 4. Educational Preferences in the Colorado Public Health Workforce (N=1,249)

Types of Preference	Min.	Max.	Mean	SD	Rank	Median
Preferences for Course Length						
2-Hour Sessions	1	3	2.18	0.72	2	2.00
1-Day Workshops	1	3	2.49	0.60	1	3.00
Several-Day Workshops	1	3	1.69	0.74	3	2.00
Academic Semester Courses	1	3	1.41	0.67	4	1.00
Preferences for Educational Format						
Face-to-Face Classroom Setting	1	3	2.74	0.50	1	3.00
Interactive Teleconferences	1	3	1.73	0.64	4	2.00
Internet, Web-Based Instruction	1	3	1.79	0.70	3	2.00
Combination Format	1	3	2.01	0.69	2	2.00
Preferences for Time of Course Offering						
Weekday Classes	1	3	2.81	0.47	1	3.00
Weekend Classes	1	3	1.19	0.45	4	1.00
Evening Classes	1	3	1.39	0.61	3	1.00
Self-Determined Web-Based	1	3	1.83	0.71	2	2.00
Preferences for Educational Recognition						
Certificate	1	3	2.34	0.69	1	2.00
Continuing Education Units	1	3	2.19	0.79	2	2.00
Undergraduate Academic Credit	1	3	1.62	0.74	4	1.00
Graduate Academic Credit	1	3	1.92	0.84	3	2.00

4. Differences by Profession or Position

4a. Differences Between Professional and Non-Professional Workers

Nearly three-fourths of the survey respondents were classified as Professionals (73%, n=899) vs. Non Professionals (27%, n=336). Characteristics of these two groups of workers are summarized in Table 5.

Professional workers were slightly older than Non-Professional workers; the medians of these two groups were 46 years and 43 years, respectively. While the Non-Professional group was composed of nearly all women (males=9%), the Professional group included a higher proportion of men (males=21%). A higher percentage of white workers were found in the Professional group (89%) than in the Non-Professional group (60%); Hispanics made up one-third (33%) of the Non-Professional group.

As expected, a higher proportion of Professional workers held college degrees (91%) than did Non-Professional workers (16%). When workers in the Professional group were compared with their Non-Professional counterparts on experience, Professionals had more experience both in their discipline/major (medians=14 years, 5 years, respectively) and in public health (medians=8 years, 5 years, respectively). Far more Non-Professionals (80%) than Professionals (45%) were employed in Front Line positions.

Workers in these two categories were equally likely to be employed in an organized health department vs. a local health agency. A greater proportion of Non-Professionals than Professionals worked full-time (88% to 80%). The median salary for Professionals was $44,384 compared to $25,123 for Non-Professionals. Workers in the Non-Professional category were more likely to know a non-English language (38%) than their counterparts in the Professional category (26%).

As reported in Table 6, Professionals rated themselves as significantly ($p < .001$) more proficient in overall Core Competency Skills than Non-Professionals. The means on this composite scale for these two groups were 4.66 and 3.67, respectively. Means for the two groups were statistically different ($p < .001$) in each of the eight Core Competency Skill subscales with Professionals consistently reporting markedly higher proficiency levels than Non-Professionals. Figure 13 graphically illustrates these differences.

The Non-Professional group reported a significantly greater overall educational need for Core Competency Skills ($p < .05$) than the Professional group. The means were 3.10 and 2.96, respectively. When educational needs for the two groups were compared on the eight core competency subscales, Non-Professionals had statistically higher educational needs in three subscales: Communication Skills ($p < .001$), Cultural Competency Skills ($p < .001$), and Basic Public Health Science Skills ($p < .01$). No differences were noted in other subscales. These similarities and differences are visually displayed in Figure 14.

Table 7 summarizes the findings related to Bioterrorism/Emergency Preparedness proficiencies and educational needs. For the composite Bioterrorism/Emergency Preparedness scale, Professionals were significantly ($p < .01$) more proficient than Non-Professionals (mean=3.13, 2.90, respectively). When the subscales within this area were compared, Professionals were statistically more proficient in four of the subscales: Disaster Response Skills ($p < .001$), Biological/Infectious Disease Skills ($p < .01$), Physical Injury Skills ($p < .01$), and Crisis Management Skills ($p < .001$). No differences were found in Disaster Planning Skills, Emergency Communication Skills, and Toxic Chemical/

Environmental Hazard Skills. A comparison of proficiencies for these two groups is graphically presented in Figure 15.

When the educational need for Bioterrorism/Emergency Preparedness Competency Skills (composite) was compared for these two groups, no difference was found. As illustrated in Figure 16, workers in the Professional group identified greater educational needs than workers in the Non-Professional group in two of the seven subscales: Disaster Planning Skills ($p < .05$) and Disaster Response Skills ($p < .01$). Educational needs in the other five subscales were remarkably similar.

Educational preferences of Professional and Non-Professional workers are summarized in Table 8. The groups were similar in ranking their preferences regarding course length, educational format and time of course offering. However, the Professional group preferred graduate academic credit to undergraduate academic credit while the Non-Professional group preferred undergraduate academic credit to graduate academic credit. This finding is not unexpected given the differences in educational levels between the two groups.

Table 5. Characteristics of Professional and Non-Professional Public Health Workers (N=1,235)

	Professional Workers (n=899)					Non-Professional Workers (n=336)				
Variables and Values	**n**	**%**	**Mean**	**SD**	**Median**	**n**	**%**	**Mean**	**SD**	**Median**
Age			44.80	10.27	46			41.60	11.54	43
Under 29	89	10.1				59	18.2			
30-39	171	19.3				75	23.1			
40-49	294	33.3				104	32.1			
50-59	276	31.2				69	21.3			
Over 60	54	6.1				17	5.2			
Gender										
Male	177	20.8				27	8.6			
Female	674	79.2				286	91.4			
Race										
White	788	89.0				193	59.8			
Hispanic	53	6.0				107	33.1			
Black	12	1.4				10	3.1			
Asian	9	1.0				7	2.2			
Other or Multiracial	23	2.6				6	1.9			
Highest Education										
High School Diploma	7	0.8				166	51.2			
Profess./Vocational Diploma	20	2.2				56	17.3			
Associate Degree	51	5.7				51	15.7			
Baccalaureate Degree	501	56.0				45	13.9			
Master's Degree	281	31.4				6	1.9			
Doctoral Degree	34	3.8								
College Degree										
No	78	8.7				273	84.3			
Yes	816	91.3				51	15.7			
Years Since Last Degree			15.39	10.77	14			18.33	12.27	16
Less than 2 Years	42	4.8				15	5.3			
2-5 Years	123	14.1				29	10.2			
5-9 Years	166	19.0				40	14.1			
10-14 Years	132	15.1				41	14.5			
15-19 Years	99	11.4				35	12.4			
20 or More Years	310	35.6				123	43.5			
Years Experience in Discipline			15.40	10.53	14			9.46	9.64	5
Less than 2 Years	43	4.9				42	23.5			
2-5 Years	110	12.6				39	21.8			
5-9 Years	167	19.1				26	14.5			
10-14 Years	129	14.8				20	11.2			
15-19 Years	102	11.7				16	8.9			
20 or More Years	323	37.0				36	20.1			
Years Experience in Public Health			10.35	8.70	8			7.41	7.20	5
Less than 2 Years	122	13.8				80	26.0			

Table 5. Characteristics of Professional and Non-Professional Public Health Workers (N=1,235)

	Professional Workers (n=899)					Non-Professional Workers (n=336)				
Variables and Values	**n**	**%**	**Mean**	**SD**	**Median**	**n**	**%**	**Mean**	**SD**	**Median**
2-5 Years	163	18.4				63	20.5			
5-9 Years	197	22.3				61	19.8			
10-14 Years	161	18.2				57	18.5			
15-19 Years	82	9.3				18	5.8			
20 or More Years	160	18.1				29	9.4			
County Survey Response										
Very Small	37	4.7				7	2.3			
Small	94	11.9				24	8.0			
Medium	90	11.4				31	10.4			
Large	569	72.0				237	79.3			
Organized Health Department										
No	149	18.9				50	16.7			
Yes	641	81.1				249	83.3			
Position Category										
Officials & Administrators	31	3.4				0	0.0			
Professionals	868	96.6				0	0.0			
Technicians	0	0.0				70	20.8			
Protective Service	0	0.0				3	0.9			
Paraprofessionals	0	0.0				98	29.2			
Administrative Support	0	0.0				164	48.8			
Skilled Craft	0	0.0				0	0.0			
Service/Maintenance	0	0.0				1	0.3			
Professional Position										
No	0	0.0				336	100.0			
Yes	899	100.0				0	0.0			
Type of Position										
Front Line Staff	399	45.0				259	80.4			
Senior Level Staff	196	22.1				40	12.4			
Supervisory/Mgmt. Staff	292	32.9				23	7.1			
Full-Time Employment										
No	178	20.0				41	12.3			
Yes	714	80.0				293	87.7			
Annual Salary (FTE)			$48,424	$17,449	$44,384			$28,484	$10,133	$25,123
Less Than $20,000	5	0.7				36	13.6			
$20,000 to $29,999	42	5.6				133	50.4			
$30,000 to $39,999	211	28.0				59	22.3			
$40,000 to $49,999	198	26.3				21	8.0			
$50,000 to $59,999	130	17.3				11	4.2			
$60,000 to $69,999	76	10.1				3	1.1			
$70,000 to $79,999	41	5.4				0	0.0			

Table 5. Characteristics of Professional and Non-Professional Public Health Workers (N=1,235)

	Professional Workers (n=899)					Non-Professional Workers (n=336)				
Variables and Values	**n**	**%**	**Mean**	**SD**	**Median**	**n**	**%**	**Mean**	**SD**	**Median**
Over $80,000	50	6.6				1	0.4			
Know Non-English Language										
No	657	73.7				207	62.3			
Yes	235	26.3				125	37.7			
Other Language Speaking										
Fair	104	86.7				16	13.3			
Good	71	61.2				45	38.8			
Excellent	57	47.1				64	52.9			
Other Language Reading										
Fair	96	78.7				26	21.3			
Good	83	67.5				40	32.5			
Excellent	46	43.4				60	56.6			
Other Language Writing										
Fair	129	79.1				34	20.9			
Good	54	56.8				41	43.2			
Excellent	37	44.6				46	55.4			

Table 6. Differences in Core Competency Proficiencies and Educational Needs Between Professional and Non-Professional Workers (N=1,235)

Core Competency Domains	Professional (n=899)				Non-Professional (n=336)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]									
Analytic/Assessment Skills	4.67	1.28	4	4.75	3.49	1.55	5	3.50	<.001
Policy Development/Program Planning Skills	4.23	1.42	7	4.50	3.29	1.57	7	3.25	<.001
Communication Skills	4.99	1.09	2	5.17	3.94	1.34	2	4.00	<.001
Cultural Competency Skills	5.26	1.05	1	5.50	4.59	1.44	1	4.75	<.001
Community Dimensions of Practice Skills	4.62	1.21	5	4.75	3.71	1.49	4	3.75	<.001
Basic Public Health Sciences Skills	4.45	1.35	6	4.50	3.11	1.54	8	3.00	<.001
Financial Planning & Management Skills	4.19	1.32	8	4.20	3.32	1.46	6	3.20	<.001
Leadership & Systems Thinking Skills	4.87	1.23	3	5.00	3.89	1.52	3	4.00	<.001
Core Competencies Composite Skills	*4.66*	*1.05*		*4.77*	*3.67*	*1.30*		*3.71*	*<.001*
Educ. Needs in Core Competency Domains[2]									
Analytic/Assessment Educ. Needs	3.04	1.08	3	3.00	3.09	1.32	4	3.00	n.s.
Policy Development/Prog. Planning Educ. Needs	3.16	1.19	2	3.00	3.07	1.39	5	3.00	n.s.
Communication Educ. Needs	2.65	1.12	8	3.00	3.10	1.27	3	3.00	<.001
Cultural Competency Educ. Needs	2.70	1.09	7	3.00	3.02	1.26	8	3.00	<.001
Community Dimensions of Practice Educ. Needs	2.93	1.10	6	3.00	3.07	1.29	5	3.00	n.s.
Basic Public Health Sciences Educ. Needs	2.99	1.19	5	3.00	3.24	1.43	1	3.00	<.01
Financial Planning & Management Educ. Needs	3.19	1.34	1	3.00	3.07	1.47	5	3.00	n.s.
Leadership & Systems Thinking Educ. Needs	3.01	1.14	4	3.00	3.14	1.20	2	3.00	n.s.
Core Competencies Composite Educ. Needs	*2.96*	*0.77*		*3.00*	*3.10*	*1.00*		*3.13*	*<.05*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]Independent t-tests were used to test for differences in means between the two groups. Prior to these analyses, all variables met or were transformed to meet the assumption of normal distribution. Levene's test for equality of variances was used to assess the homogeneity of variance assumption and make required adjustments. Although directionality could have been hypothesized, conservative 2-tailed significance tests were employed. The probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When differences between groups were non-significant, n.s. is noted.

Figure 13. Proficiencies in Core Competency Skills for Professional and Non-Professional Workers

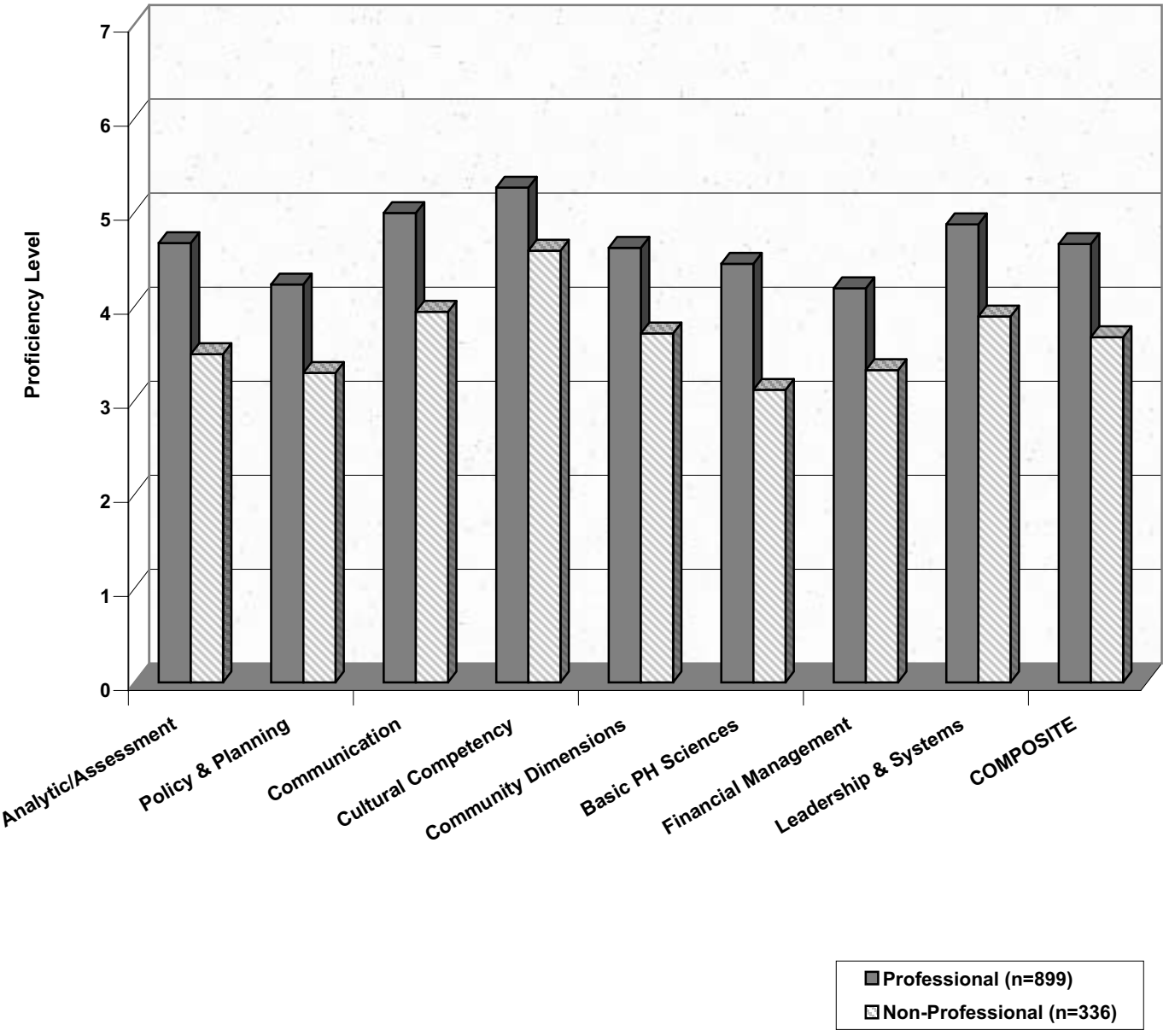


Figure 14. Educational Needs in Core Competency Skills for Professional and Non-Professional Workers

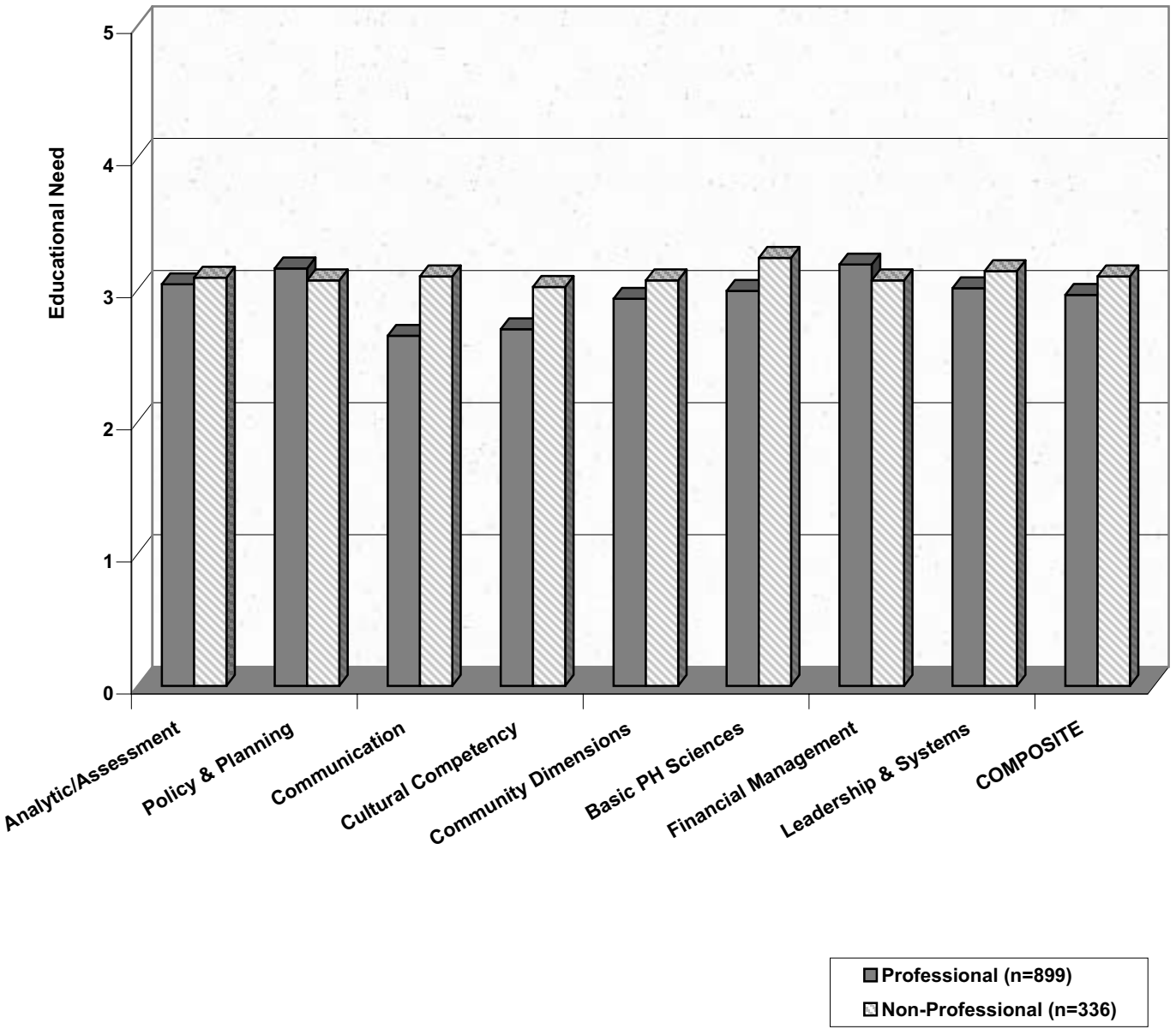


Table 7. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs Between Professional and Non-Professional Workers (N=1,235)

Bioterrorism/Emergency Preparedness Competency Domains	Professional (n=899)				Non-Professional (n=336)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]									
Disaster Planning Skills	2.83	1.61	5	2.67	2.72	1.70	4	2.33	n.s.
Disaster Response Skills	3.99	1.45	1	4.00	3.55	1.64	1	3.67	<.001
Emergency Communication Skills	3.27	1.65	3	3.00	3.31	1.76	2	3.00	n.s.
Biological/Infectious Disease Skills	2.82	1.69	6	2.00	2.59	1.78	6	2.00	<.01
Toxic Chem. & Env. Hazard Skills	2.65	1.72	7	2.00	2.51	1.80	7	2.00	n.s.
Physical Injury Skills	3.31	1.86	2	3.00	2.95	1.86	3	3.00	<.01
Crisis Management Skills	3.02	1.84	4	3.00	2.63	1.80	5	2.00	<.001
Bioterrorism Composite Skills	*3.13*	*1.38*		*2.92*	*2.90*	*1.52*		*2.55*	*<.01*
Educational Needs in Bioterrorism/EP[2]									
Disaster Planning Educ. Needs	3.71	1.20	2	4.00	3.44	1.43	2	4.00	<.05
Disaster Response Educ. Needs	3.68	1.19	3	4.00	3.42	1.34	4	4.00	<.01
Emergency Communication Educ. Needs	3.09	1.21	7	3.00	3.00	1.32	7	3.00	n.s.
Biological/Infectious Disease Educ. Needs	3.56	1.27	4	4.00	3.51	1.52	1	4.00	n.s.
Toxic Chem & Env Hazard Educ. Needs	3.72	1.29	1	4.00	3.43	1.56	3	4.00	n.s.
Physical Injury Educ. Needs	3.27	1.29	6	3.00	3.36	1.42	5	4.00	n.s.
Crisis Management Educ. Needs	3.38	1.20	5	3.00	3.34	1.35	3	4.00	n.s.
Bioterrorism Composite Educ. Needs	*3.49*	*0.94*		*3.57*	*3.36*	*1.19*		*3.57*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]Independent t-tests were used to test for differences in means between the two groups. Prior to these analyses, all variables met or were transformed to meet the assumption of normal distribution. Levene's test for equality of variances was used to assess the homogeneity of variance assumption and make required adjustments. Although directionality could have been hypothesized, conservative 2-tailed significance tests were employed. The probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When differences between groups were non-significant, n.s. is noted.

Figure 15. Proficiencies in Bioterrorism/Emergency Preparedness Competency Skills for Professional and Non-Professional Workers

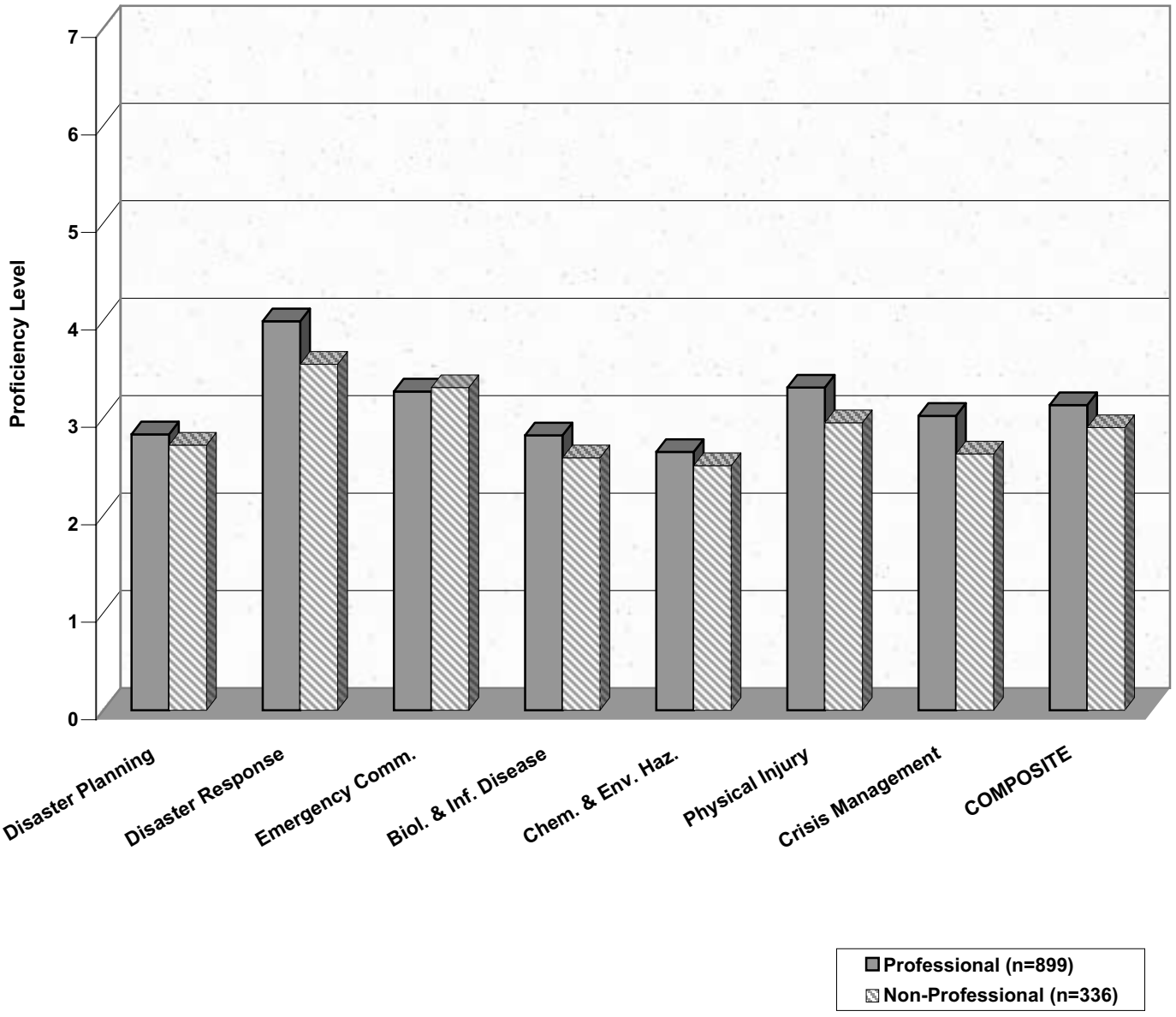


Figure 16. Educational Needs in Bioterrorism/Emergency Preparedness Competency Skills for Professional and Non-Professional Workers

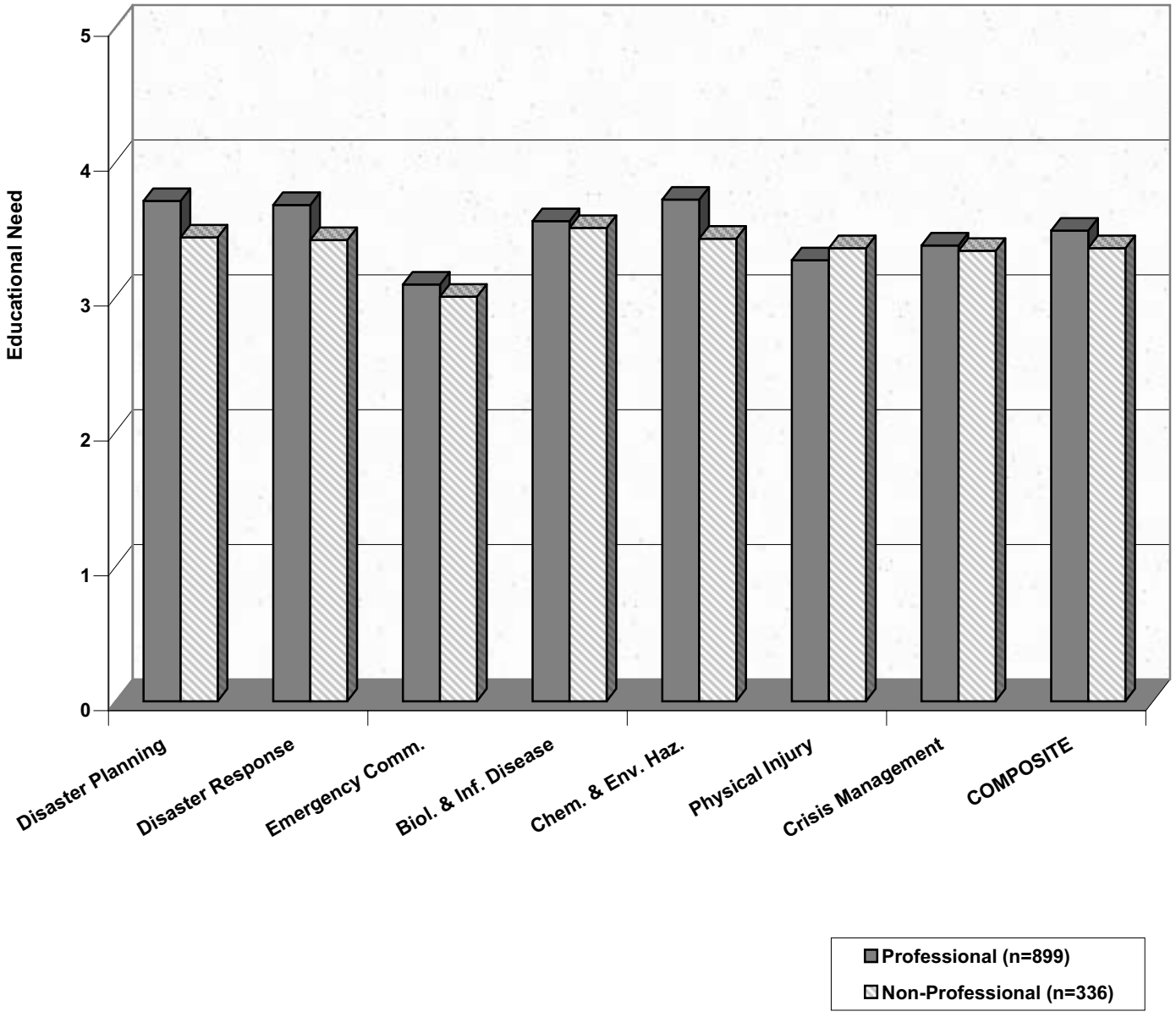


Table 8. Educational Preferences of Professional and Non-Professional Workers (N=1,235)

Types of Preference	Professional (n=899)				Non-Professional (n=336)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length								
2-Hour Sessions	2.22	0.72	2	2.00	2.09	0.72	2	2.00
1-Day Workshops	2.53	0.57	1	3.00	2.38	0.66	1	2.00
Several-Day Workshops	1.68	0.74	3	2.00	1.71	0.75	3	2.00
Academic Semester Courses	1.34	0.61	4	1.00	1.59	0.78	4	1.00
Preferences for Educational Format								
Face-to-Face Classroom Setting	2.77	0.48	1	3.00	2.66	0.55	1	3.00
Interactive Teleconferences	1.76	0.63	4	2.00	1.65	0.67	4	2.00
Internet, Web-Based Instruction	1.78	0.69	3	2.00	1.82	0.71	3	2.00
Combination Format	2.05	0.69	2	2.00	1.89	0.69	2	2.00
Preferences for Time of Course Offering								
Weekday Classes	2.83	0.44	1	3.00	2.74	0.55	1	3.00
Weekend Classes	1.16	0.41	4	1.00	1.27	0.55	4	1.00
Evening Classes	1.36	0.57	3	1.00	1.49	0.70	3	1.00
Self-Determined Web-Based	1.87	0.71	2	2.00	1.72	0.71	2	2.00
Preferences for Educational Recognition								
Certificate	2.30	0.71	1	2.00	2.46	0.65	1	3.00
Continuing Education Units	2.23	0.78	2	2.00	2.08	0.79	2	2.00
Undergraduate Academic Credit	1.53	0.69	4	1.00	1.91	0.82	3	2.00
Graduate Academic Credit	1.95	0.85	3	2.00	1.82	0.81	4	2.00

4b. Differences in Professional Groups

Demographic characteristics for workers in the 13 largest professional groups are presented in Table 9. Professional groups with the largest number of respondents were Health Administrators, Administrative/Business Professionals, Environmental Engineers, Environmental Health Specialists, Health Planners/Researchers, Licensing/Inspection/Regulatory Specialists, Medical Public Health Social Workers, Public Health Educators, Public Health Nurses, Public Health Nutritionists, Public Health Specialists, 'Other' Public Health Professionals, and Public Health Professionals 'Unspecified.' The largest of these groups was Public Health Nurses (n=270, 32%), followed by Environmental Health Specialists (n=142, 17%) and Administrative/Business Professionals (n=126, 15%).

Workers in the Health Administrator and Administrative/Business Professional groups were the oldest and workers in the Public Health Educator group were the youngest. Gender differences among professional groups were noted. Men dominated these four groups: Environmental Engineer (males=89%), Environmental Health Specialist (males=53%), Health Planner/Researcher (males =69%), and Licensing/Inspection/Regulatory Specialist (males=57%). Women dominated the other nine groups. Professional groups that were all or almost exclusively female were Medical/Public Health Social Worker (females=100%), Public Health Educator (females=98%), Public Health Nurse (females=98%), and Public Health Nutritionist (females=100%). For all professional groups, the majority of public health workers was white and held either a baccalaureate or master's degree. The average number of years working in the discipline was greater than 10 years for all disciplines with Health Administrators reporting the longest time (mean=20.1 years) and Public Health Educators the shortest time (mean=10.2 years).

The professional group with the highest average number of years in the public health field was the Administrative/Business Professional group (mean=15.2 years) followed by the Health Administrator group (mean=15.1 years). Medical/Public Health Social Workers had the lowest average number of years in public health (mean=4.9 years). Forty-three percent of the respondents in the Health Planner/Researcher group and 44% of the respondents in the Public Health Educator group indicated that they knew a non-English language. In all other groups, less than 30% reported familiarity with a non-English language.

Proficiencies and educational needs in the Core Competency domains for these 13 largest professional groups are reported in Table 10. Table 11 summarizes proficiencies and educational needs in the Bioterrorism/Emergency Preparedness domains for these groups.

In Table 12, educational preferences are reported. Educational preferences were similar with some differences across professional groups. No differences were found in course length or time of course offering. For educational format, preferences were similar except for Public Health Nurses and Public Health Specialists who ranked Internet courses as least preferred among all options. Some professional differences were observed for educational recognition: Public Health Nurses and Public Health Nutritionists preferred continuing education units; other groups preferred certificates. All groups preferred graduate to undergraduate academic credit.

Statistical comparisons were made among the six largest professional groups: Public Health Nurse (n=270), Environmental Health Specialist (n=142), Administrative/Business Professional (n=126), Public Health Program Specialist (n=69), Public Health Educator (n=56), and Public Health Nutritionist (n=35). As shown in Table 13, a significant difference between groups ($p < .001$) was found in overall Core Competency Skills proficiency. In descending order, the means for Core Competency Skills (composite score) among these professional groups were: Administrative/

Business Professional (5.08), Public Health Program Specialist (4.72), Environmental Health Specialist (4.56), Public Health Educator (4.55), Public Health Nurse (4.48), and Public Health Nutritionist (4.20). Among these six professional groups, statistically significant differences were found in all eight Core Competency subscales. As shown in Figure 17, some professional groups have different skill sets. While the Administrative/Business Professionals scored highest on nearly all subscales, Public Health Nurses and Public Health Educators scored highest on Cultural Competency Skills. For Basic Public Health Sciences Skills, Administrative/Business Professionals, Environmental Health Specialists and Public Health Nurses were equally proficient, and these groups were more proficient than the Public Health Nutritionists, Public Health Educators, and Public Health Specialists. Public Health Nutritionists were least proficient in seven of the eight subscales.

No statistical difference was found among the six professional groups for overall educational need in Core Competency Skills (composite score). However, differences were found in five of the eight Core Competency educational need subscales: Policy Development/Program Planning Skills ($p < .001$), Communication Skills ($p < .05$), Cultural Competency Skills ($p < .05$), Community Dimensions of Practice Skills ($p < .01$), and Financial Planning/Management Skills ($p < .01$). Public Health Nurses indicated greater needs than other professional groups in Policy Development/Program Planning Skills and Financial Planning/Management Skills but fewer needs than other groups in Cultural Competency Skills. Public Health Specialists expressed less educational needs than other groups in Communication Skills and Community Dimensions of Practice Skills. Public Health Nutritionists identified the highest educational need for Community Dimensions of Practice Skills. These differences among professional groups are apparent in Figure 18.

As seen in Table 14, a statistically significant difference among the six largest professional groups ($p < .001$) was found for proficiency in Bioterrorism/Emergency Preparedness Skills. In descending order, the means for Bioterrorism/Emergency Preparedness Competency Skills (composite score) among the six largest professional groups were Administrative/Business Professional (3.40), Environmental Health Specialist (3.36), Public Health Nurse (3.24), Public Health Educator (2.59), Public Health Program Specialist (2.57), and Public Health Nutritionist (2.13). Among these six professional groups, statistically significant differences ($p < .001$) were found in all eight Bioterrorism/Emergency Preparedness Competency subscales. Again, professional groups demonstrated differences in skill sets (e.g., Administrative/Business Professional scored highest on Disaster Planning Skills, Emergency Communication Skills, and Biological/Infectious Disease Skills; Public Health Nurses scored highest on Physical Injury Skills and Crisis Management Skills; Environmental Health Specialist scored highest on Disaster Response Skills and Toxic Chemical/Environmental Hazard Skills). Public Health Nutritionists reported the lowest proficiencies in all dimensions of Bioterrorism/Emergency Preparedness. These differences across disciplines are graphically presented in Figure 19.

The six professional groups did not differ on overall educational need for Bioterrorism/Emergency Preparedness Competency Skills (composite score). When the seven subscales were examined individually, statistical differences were found in two subscales: Emergency Communication Skills ($p < .001$) and Biological/Infectious Disease Skills ($p < .05$). Administrative/Business Professionals and Public Health Nurses reported higher needs in Emergency Communication Skills than other groups. Environmental Health Specialists reported less educational needs in both Emergency Communication Skills and Biological/Infectious Disease Skills than other groups. These differences are illustrated in Figure 20.

Table 9. Characteristics of Colorado Public Health Workers in the 13 Largest Professional Groups (N=337)

	Health Admin. (n=31)				Admin./Bus. Prof. (n=126)				Environmental Engnr. (n=10)			
Variables and Values	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**
Age			50.32	7.04			49.33	8.18			42	7.85
Under 29 Years	0	.0			0	.0			1	10.0		
30-39 Years	3	9.7			18	14.4			2	2.0		
40-49 Years	12	38.7			39	31.2			5	50.0		
50-59 Years	13	41.9			56	44.8			2	20.0		
Over 60 Years	3	9.7			12	9.6			0	.0		
Gender												
Male	13	44.8			30	24.6			8	88.9		
Female	16	55.2			92	75.4			1	11.1		
Race												
White	30	96.8			118	94.4			8	88.9		
Hispanic	0	.0			5	4.0			0	.0		
Black	0	.0			0	.0			0	.0		
Asian	1	3.2			2	1.6			0	.0		
Other or Multiracial	0	.0			0	.0			1	11.1		
Highest Education												
High School Diploma	0	.0			1	.8			0	.0		
Profess./Vocational Diploma	2	6.7			5	4.0			0	.0		
Associate Degree	2	6.7			5	4.0			0	.0		
Baccalaureate Degree	9	30.0			48	38.1			4	40.0		
Master's Degree	12	40.0			61	48.4			5	50.0		
Doctoral Degree	5	16.7			6	4.8			1	10.0		
College Degree												
No	4	13.3			11	8.7			0	.0		
Yes	26	86.7			115	91.3			10	100.0		
Years Since Last Degree			22.23	11.07			17.87	11.06			11	6.25
Less than 2 Years	0	.0			4	3.3			0	.0		
2-5 Years	3	9.7			11	8.9			2	20.0		
5-9 Years	3	9.7			23	18.7			2	20.0		
10-14 Years	2	6.5			16	13.0			3	30.0		
15-19 Years	3	9.7			15	12.2			3	30.0		
20 or More Years	20	64.5			54	43.9			0	.0		
Years Experience in Discipline			20.10	10.86			19.9	10.13			13.7	7.13
Less than 2 Years	0	.0			2	1.6			0	.0		
2-5 Years	3	9.7			6	4.8			2	20.0		
5-9 Years	5	16.1			18	14.4			1	10.0		
10-14 Years	2	6.5			12	9.6			3	30.0		
15-19 Years	3	9.7			18	14.4			2	20.0		
20 or More Years	18	58.1			69	55.2			2	20.0		
Years Experience in Pub. Health			15.06	9.39			15.16	9.75			7.8	6.65
Less than 2 Years	3	9.7			5	4.0			2	20.0		

Table 9 (continued).

Variables and Values	Health Admin. (n=31)				Admin./Bus. Prof. (n=126)				Environmental Engnr. (n=10)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	2	6.5			13	10.3			2	20.0		
5-9 Years	4	12.9			25	19.8			2	20.0		
10-14 Years	8	25.8			22	17.5			3	30.0		
15-19 Years	5	16.1			14	11.1			0	.0		
20 or More Years	9	29.0			47	37.3			1	10.0		
County Survey Response												
Very Small	5	17.2			13	12.1			0	.0		
Small	10	34.5			16	15.0			0	.0		
Medium	3	10.3			10	9.3			0	.0		
Large	11	37.9			68	63.6			6	100.0		
Organized Health Department												
No	14	48.3			28	26.2			0	.0		
Yes	15	51.7			79	73.8			6	100.0		
Position Category												
Officials & Administrators	31	100.0			0	.0			0	.0		
Professionals	0	.0			126	100.0			10	100.0		
Technicians	0	.0			0	.0			0	.0		
Protective Service	0	.0			0	.0			0	.0		
Paraprofessionals	0	.0			0	.0			0	.0		
Administrative Support	0	.0			0	.0			0	.0		
Skilled Craft	0	.0			0	.0			0	.0		
Service/Maintenance	0	.0			0	.0			0	.0		
Professional Position												
No	0	.0			0	.0			0	.0		
Yes	0	.0			0	.0			0	.0		
Type of Position												
Front Line Staff	1	3.2			8	6.5			2	20.0		
Senior Level Staff	2	6.5			9	7.3			7	70.0		
Supervisory/Mgmt Staff	28	90.3			107	86.3			1	10.0		
Full-Time Employment												
No	3	10.3			7	5.6			0	.0		
Yes	26	89.7			117	94.4			10	100.0		
Annual Salary (FTE)			$61,544	$25,084			$63,390	$19,480			$72,821	$13,020
Less Than $20,000	0	.0			0	.0			0	.0		
$20,000 to $29,999	0	.0			0	.0			0	.0		
$30,000 to $39,999	3	12.5			7	6.7			0	.0		
$40,000 to $49,999	5	20.8			21	20.0			0	.0		
$50,000 to $59,999	6	25.0			23	21.9			2	25.0		
$60,000 to $69,999	5	20.8			18	17.1			0	.0		
$70,000 to $79,999	1	4.2			15	14.3			4	50.0		

Table 9 (continued).

Variables and Values	Health Admin. (n=31)				Admin./Bus. Prof. (n=126)				Environmental Engnr. (n=10)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Over $80,000	4	16.7			21	20.0			2	25.0		
Know Non-English Language												
No	26	83.9			99	79.8			8	80.0		
Yes	5	16.1			25	20.2			2	20.0		
Other Language Speaking												
Fair	0	.0			14	58.3			1	50.0		
Good	2	50.0			9	37.5			0	.0		
Excellent	2	50.0			1	4.2			1	50.0		
Other Language Reading												
Fair	2	50.0			14	60.9			1	50.0		
Good	0	.0			8	34.8			1	50.0		
Excellent	2	50.0			1	4.3			0	.0		
Other Language Writing												
Fair	1	33.3			18	81.8			1	50.0		
Good	0	.0			3	13.6			1	50.0		
Excellent	2	66.7			1	4.5			0	.0		

Table 9 (continued).

Variables and Values	Environ. Health Spec. (n=142)				Hlth. Planner/Rschr. (n=14)				Licen./Regul. Spec. (n=14)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			40.5	9.90			44.93	10.40			47.71	11.35
Under 29 Years	26	18.4			1	7.1			2	14.3		
30-39 Years	37	26.2			3	21.4			0	.0		
40-49 Years	52	36.9			5	35.7			3	21.4		
50-59 Years	22	15.6			4	28.6			8	57.1		
Over 60 Years	4	2.8			1	7.1			1	7.1		
Gender												
Male	70	52.6			9	69.2			8	57.1		
Female	63	47.4			4	30.8			6	42.9		
Race												
White	127	92.7			11	78.6			14	100.0		
Hispanic	2	1.5			1	7.1			0	.0		
Black	1	.7			1	7.1			0	.0		
Asian	1	.7			1	7.1			0	.0		
Other or Multiracial	6	4.4			0	.0			0	.0		
Highest Education												
High School Diploma	1	.7			0	.0			0	.0		
Profess./Vocational Diploma	0	.0			0	.0			0	.0		
Associate Degree	2	1.4			0	.0			0	.0		
Baccalaureate Degree	105	73.9			2	14.3			9	64.3		
Master's Degree	32	22.5			11	78.6			4	28.6		
Doctoral Degree	2	1.4			1	7.1			1	7.1		
College Degree												
No	3	2.1			0	.0			0	.0		
Yes	139	97.9			14	100.0			14	100.0		
Years Since Last Degree			13.25	9.91			16.29	10.71			18.14	11.53
Less than 2 Years	5	3.5			0	.0			0	.0		
2-5 Years	25	17.6			4	28.6			1	7.1		
5-9 Years	36	25.4			1	7.1			3	21.4		
10-14 Years	23	16.2			0	.0			3	21.4		
15-19 Years	10	7.0			2	14.3			0	.0		
20 or More Years	43	30.3			7	50.0			7	50.0		
Years Experience in Discipline			10.58	8.59			16.21	9.24			16.36	10.47
Less than 2 Years	11	8.0			1	7.1			1	7.1		
2-5 Years	30	21.7			1	7.1			2	14.3		
5-9 Years	33	23.9			2	14.3			1	7.1		
10-14 Years	27	19.6			1	7.1			1	7.1		
15-19 Years	10	7.2			2	14.3			1	7.1		
20 or More Years	27	19.6			7	50.0			8	57.1		
Years Experience in Pub. Health			10.28	7.77			12.43	8.62			12.50	8.38
Less than 2 Years	12	8.8			1	7.1			2	14.3		

Table 9 (continued).

Variables and Values	Environ. Health Spec. (n=142)				Hlth. Planner/Rschr. (n=14)				Licen./Regul. Spec. (n=14)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	25	18.4			3	21.4			1	7.1		
5-9 Years	36	26.5			3	21.4			1	7.1		
10-14 Years	25	18.4			1	7.1			5	35.7		
15-19 Years	17	12.5			2	14.3			2	14.3		
20 or More Years	21	15.4			4	28.6			3	21.4		
County Survey Response												
Very Small	1	.8			0	.0			0	.0		
Small	11	8.7			0	.0			0	.0		
Medium	7	5.6			0	.0			0	.0		
Large	107	84.9			9	100.0			11	100.0		
Organized Health Department												
No	13	10.3			0	.0			0	.0		
Yes	113	89.7			9	100.0			11	100.0		
Position Category												
Officials & Administrators	0	.0			0	.0			0	.0		
Professionals	142	100.0			14	100.0			14	100.0		
Technicians	0	.0			0	.0			0	.0		
Protective Service	0	.0			0	.0			0	.0		
Paraprofessionals	0	.0			0	.0			0	.0		
Administrative Support	0	.0			0	.0			0	.0		
Skilled Craft	0	.0			0	.0			0	.0		
Service/Maintenance	0	.0			0	.0			0	.0		
Professional Position												
No	0	.0			0	.0			0	.0		
Yes	0	.0			0	.0			0	.0		
Type of Position												
Front Line Staff	86	61.4			2	14.3			5	35.7		
Senior Level Staff	39	27.9			8	57.1			5	35.7		
Supervisory/Mgmt Staff	15	10.7			4	28.6			4	28.6		
Full-Time Employment												
No	9	6.3			2	14.3			1	7.1		
Yes	133	93.7			12	85.7			13	92.9		
Annual Salary (FTE)			$47,426	$15,206			$60,359	$17,538			$56,178	$17,447
Less Than $20,000	0	.0			0	.0			0	.0		
$20,000 to $29,999	5	4.2			0	.0			0	.0		
$30,000 to $39,999	33	28.0			1	8.3			3	21.4		
$40,000 to $49,999	34	28.8			3	25.0			1	7.1		
$50,000 to $59,999	25	21.2			1	8.3			5	35.7		
$60,000 to $69,999	11	9.3			4	33.3			2	14.3		
$70,000 to $79,999	2	1.7			2	16.7			0	.0		

Table 9 (continued).

Variables and Values	Environ. Health Spec. (n=142)				Hlth. Planner/Rschr. (n=14)				Licen./Regul. Spec. (n=14)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Over $80,000	8	6.8			1	8.3			3	21.4		
Know Non-English Language												
No	107	75.4			8	57.1			12	85.7		
Yes	35	24.6			6	42.9			2	14.3		
Other Language Speaking												
Fair	19	55.9			3	50.0			1	50.0		
Good	12	35.3			1	16.7			1	50.0		
Excellent	3	8.8			2	33.3			0	.0		
Other Language Reading												
Fair	11	33.3			2	33.3			1	50.0		
Good	17	51.5			2	33.3			1	50.0		
Excellent	5	15.2			2	33.3			0	.0		
Other Language Writing												
Fair	19	59.4			3	50.0			1	50.0		
Good	10	31.3			1	16.7			1	50.0		
Excellent	3	9.4			2	33.3			0	.0		

Table 9 (continued).

Variables and Values	Medical/PH Social Worker (n=14)				Public Health Educator (n=56)				Public Health Nurse (n=270)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			42.00	10.63			37.80	10.95			46.84	9.64
Under 29 Years	1	7.1			17	30.4			17	6.5		
30-39 Years	6	42.9			17	30.4			37	14.1		
40-49 Years	3	21.4			13	23.2			96	36.6		
50-59 Years	3	21.4			8	14.3			90	34.4		
Over 60 Years	1	7.1			1	1.8			22	8.4		
Gender												
Male	0	.0			1	1.9			5	1.9		
Female	14	100.0			52	98.1			252	98.1		
Race												
White	11	78.6			44	78.6			232	87.2		
Hispanic	1	7.1			8	14.3			23	8.6		
Black	1	7.1			1	1.8			3	1.1		
Asian	0	.0			1	1.8			1	.4		
Other or Multiracial	1	7.1			2	3.6			7	2.6		
Highest Education												
High School Diploma	0	.0			0	.0			0	.0		
Profess./Vocational Diploma	0	.0			1	1.8			7	2.6		
Associate Degree	0	.0			4	7.1			29	10.7		
Baccalaureate Degree	6	42.9			32	57.1			182	67.4		
Master's Degree	8	57.1			19	33.9			48	17.8		
Doctoral Degree	0	.0			0	.0			4	1.5		
College Degree												
No	0	.0			5	8.9			36	13.3		
Yes	14	100.0			51	91.1			234	86.7		
Years Since Last Degree			12.50	7.44			12.45	10.71			15.66	11.12
Less than 2 Years	1	7.1			4	7.5			13	5.0		
2-5 Years	0	.0			12	22.6			38	14.6		
5-9 Years	5	35.7			12	22.6			50	19.2		
10-14 Years	4	28.6			9	17.0			37	14.2		
15-19 Years	2	14.3			3	5.7			28	10.7		
20 or More Years	2	14.3			13	24.5			95	36.4		
Years Experience in Discipline			14.79	9.34			10.24	7.70			17.79	11.02
Less than 2 Years	0	.0			3	5.5			7	2.6		
2-5 Years	1	7.1			10	18.2			29	10.9		
5-9 Years	3	21.4			17	30.9			43	16.2		
10-14 Years	5	35.7			12	21.8			36	13.6		
15-19 Years	1	7.1			5	9.1			30	11.3		
20 or More Years	4	28.6			8	14.5			120	45.3		
Years Experience in Pub. Health			4.93	3.65			8.34	7.80			8.88	8.51
Less than 2 Years	2	14.3			10	17.9			54	20.1		

Table 9 (continued).

Variables and Values	Medical/PH Social Worker (n=14)				Public Health Educator (n=56)				Public Health Nurse (n=270)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	7	50.0			10	17.9			54	20.1		
5-9 Years	3	21.4			19	33.9			58	21.6		
10-14 Years	2	14.3			9	16.1			43	16.0		
15-19 Years	0	.0			2	3.6			19	7.1		
20 or More Years	0	.0			6	10.7			40	14.9		
County Survey Response												
Very Small	0	.0			0	.0			17	6.4		
Small	2	14.3			4	7.5			31	11.7		
Medium	0	.0			3	5.7			52	19.7		
Large	12	85.7			46	86.8			164	62.1		
Organized Health Department												
No	1	7.1			4	7.5			67	25.4		
Yes	13	92.9			49	92.5			197	74.6		
Position Category												
Officials & Administrators	0	.0			0	.0			0	.0		
Professionals	14	100.0			56	100.0			270	100.0		
Technicians	0	.0			0	.0			0	.0		
Protective Service	0	.0			0	.0			0	.0		
Paraprofessionals	0	.0			0	.0			0	.0		
Administrative Support	0	.0			0	.0			0	.0		
Skilled Craft	0	.0			0	.0			0	.0		
Service/Maintenance	0	.0			0	.0			0	.0		
Professional Position												
No	0	.0			0	.0			0	.0		
Yes	0	.0			0	.0			0	.0		
Type of Position												
Front Line Staff	8	61.5			42	75.0			169	63.5		
Senior Level Staff	4	30.8			11	19.6			56	21.1		
Supervisory/Mgmt Staff	1	7.7			3	5.4			41	15.4		
Full-Time Employment												
No	8	57.1			20	35.7			76	28.4		
Yes	6	42.9			36	64.3			192	71.6		
Annual Salary (FTE)			$38,342	$9,588			$36,191	$11,364			$42,359	$10,147
Less Than $20,000	0	.0			0	.0			1	.5		
$20,000 to $29,999	1	9.1			14	29.8			7	3.2		
$30,000 to $39,999	6	54.5			19	40.4			81	37.2		
$40,000 to $49,999	2	18.2			6	12.8			81	37.2		
$50,000 to $59,999	2	18.2			4	8.5			33	15.1		
$60,000 to $69,999	0	.0			4	8.5			11	5.0		
$70,000 to $79,999	0	.0			0	.0			3	1.4		

Table 9 (continued).

Variables and Values	Medical/PH Social Worker (n=14)				Public Health Educator (n=56)				Public Health Nurse (n=270)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Over $80,000	0	.0			0	.0			1	.5		
Know Non-English Language												
No	12	85.7			31	55.4			200	74.3		
Yes	2	14.3			25	44.6			69	25.7		
Other Language Speaking												
Fair	0	.0			8	32.0			31	44.3		
Good	1	50.0			11	44.0			14	20.0		
Excellent	1	50.0			6	24.0			25	35.7		
Other Language Reading												
Fair	0	.0			9	36.0			30	45.5		
Good	1	50.0			11	44.0			22	33.3		
Excellent	1	50.0			5	20.0			14	21.2		
Other Language Writing												
Fair	0	.0			15	60.0			34	53.1		
Good	1	50.0			5	20.0			19	29.7		
Excellent	1	50.0			5	20.0			11	17.2		

Table 9 (continued).

Variables and Values	Public Health Nutritionist (n=35)				Public Health Specialist (n=69)				Other Public Health Prof. (n=33)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			41.21	9.80			44.01	10.26			42.66	10.21
Under 29 Years	5	14.7			8	11.6			4	12.5		
30-39 Years	9	26.5			12	17.4			8	25.0		
40-49 Years	11	32.4			25	36.2			7	21.9		
50-59 Years	7	20.6			21	30.4			13	40.6		
Over 60 Years	2	5.9			3	4.3			0	.0		
Gender												
Male	0	.0			9	13.4			9	31.0		
Female	32	100.0			58	86.6			20	69.0		
Race												
White	30	88.2			59	85.5			29	90.6		
Hispanic	1	2.9			5	7.2			3	9.4		
Black	1	2.9			1	1.4			0	.0		
Asian	0	.0			1	1.4			0	.0		
Other or Multiracial	2	5.9			3	4.3			0	.0		
Highest Education												
High School Diploma	0	.0			3	4.3			0	.0		
Profess./Vocational Diploma	0	.0			1	1.4			2	6.3		
Associate Degree	0	.0			1	1.4			2	6.3		
Baccalaureate Degree	20	58.8			29	42.0			19	59.4		
Master's Degree	14	41.2			30	43.5			8	25.0		
Doctoral Degree	0	.0			5	7.2			1	3.1		
College Degree												
No	0	.0			5	7.2			4	12.5		
Yes	34	100.0			64	92.8			28	87.5		
Years Since Last Degree			12.91	8.45			15.58	9.78			14.81	10.60
Less than 2 Years	3	9.1			3	4.5			1	3.2		
2-5 Years	2	6.1			10	15.2			7	22.6		
5-9 Years	6	18.2			7	10.6			4	12.9		
10-14 Years	10	30.3			10	15.2			5	16.1		
15-19 Years	5	15.2			10	15.2			3	9.7		
20 or More Years	7	21.2			26	39.4			11	35.5		
Years Experience in Discipline			14.36	8.03			14.4	10.25			10.81	9.70
Less than 2 Years	1	3.0			5	7.7			4	12.5		
2-5 Years	3	9.1			8	12.3			6	18.8		
5-9 Years	7	21.2			11	16.9			7	21.9		
10-14 Years	6	18.2			10	15.4			6	18.8		
15-19 Years	5	15.2			9	13.8			3	9.4		
20 or More Years	11	33.3			22	33.8			6	18.8		
Years Experience in Pub. Health			9.79	6.67			10.35	9.03			6.25	5.58
Less than 2 Years	5	15.2			9	13.0			8	25.0		

Table 9 (continued).

Variables and Values	Public Health Nutritionist (n=35)				Public Health Specialist (n=69)				Other Public Health Prof. (n=33)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	3	9.1			14	20.3			9	28.1		
5-9 Years	11	33.3			13	18.8			5	15.6		
10-14 Years	7	21.2			15	21.7			8	25.0		
15-19 Years	4	12.1			5	7.2			1	3.1		
20 or More Years	3	9.1			13	18.8			1	3.1		
County Survey Response												
Very Small	0	.0			0	.0			0	.0		
Small	1	3.3			12	21.4			3	12.5		
Medium	4	13.3			8	14.3			3	12.5		
Large	25	83.3			36	64.3			18	75.0		
Organized Health Department												
No	2	6.7			11	19.6			5	20.8		
Yes	28	93.3			45	80.4			19	79.2		
Position Category												
Officials & Administrators	0	.0			0	.0			0	.0		
Professionals	35	100.0			69	100.0			33	100.0		
Technicians	0	.0			0	.0			0	.0		
Protective Service	0	.0			0	.0			0	.0		
Paraprofessionals	0	.0			0	.0			0	.0		
Administrative Support	0	.0			0	.0			0	.0		
Skilled Craft	0	.0			0	.0			0	.0		
Service/Maintenance	0	.0			0	.0			0	.0		
Professional Position												
No	0	.0			0	.0			0	.0		
Yes	0	.0			0	.0			0	.0		
Type of Position												
Front Line Staff	11	31.4			17	25.4			16	50.0		
Senior Level Staff	5	14.3			16	23.9			7	21.9		
Supervisory/Mgmt Staff	19	54.3			34	50.7			9	28.1		
Full-Time Employment												
No	18	51.4			10	14.7			8	24.2		
Yes	17	48.6			58	85.3			25	75.8		
Annual Salary (FTE)			$45,444	$9,989			$47,258	$18,073			$44,537	$19,878
Less Than $20,000	0	.0			1	1.6			2	6.9		
$20,000 to $29,999	1	3.0			8	12.9			3	10.3		
$30,000 to $39,999	8	24.2			17	27.4			12	41.4		
$40,000 to $49,999	12	36.4			14	22.6			3	10.3		
$50,000 to $59,999	9	27.3			6	9.7			1	3.4		
$60,000 to $69,999	3	9.1			4	6.5			3	10.3		
$70,000 to $79,999	0	.0			9	14.5			4	13.8		

Table 9 (continued).

Variables and Values	Public Health Nutritionist (n=35)				Public Health Specialist (n=69)				Other Public Health Prof. (n=33)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Over $80,000	0	.0			3	4.8			1	3.4		
Know Non-English Language												
No	25	71.4			48	70.6			24	72.7		
Yes	10	28.6			20	29.4			9	27.3		
Other Language Speaking												
Fair	6	60.0			6	31.6			6	66.7		
Good	4	40.0			7	36.8			3	33.3		
Excellent	0	.0			6	31.6			0	.0		
Other Language Reading												
Fair	8	80.0			8	42.1			3	33.3		
Good	2	20.0			6	31.6			5	55.6		
Excellent	0	.0			5	26.3			1	11.1		
Other Language Writing												
Fair	8	80.0			11	57.9			5	55.6		
Good	2	20.0			4	21.1			4	44.4		
Excellent	0	.0			4	21.1			0	.0		

Table 9 (continued).

Variables and Values	PH Professional Unspec. (n=28)			
	n	%	Mean	SD
Age			46.08	8.93
Under 29 Years	0	.0		
30-39 Years	7	28.0		
40-49 Years	6	24.0		
50-59 Years	12	48.0		
Over 60 Years	0	.0		
Gender				
Male	4	15.4		
Female	22	84.6		
Race				
White	25	92.6		
Hispanic	1	3.7		
Black	1	3.7		
Asian	0	.0		
Other or Multiracial	0	.0		
Highest Education				
High School Diploma	2	7.4		
Profess./Vocational Diploma	1	3.7		
Associate Degree	3	11.1		
Baccalaureate Degree	13	48.1		
Master's Degree	7	25.9		
Doctoral Degree	1	3.7		
College Degree				
No	6	22.2		
Yes	21	77.8		
Years Since Last Degree			18.6.	10.52
Less than 2 Years	1	4.2		
2-5 Years	0	.0		
5-9 Years	4	16.7		
10-14 Years	4	16.7		
15-19 Years	5	20.8		
20 or More Years	10	41.7		
Years Experience in Discipline			11.52	9.96
Less than 2 Years	5	23.8		
2-5 Years	2	9.5		
5-9 Years	3	14.3		
10-14 Years	2	9.5		
15-19 Years	5	23.8		
20 or More Years	4	19.0		
Years Experience in Pub. Health			11.40	9.10
Less than 2 Years	3	12.0		

Table 9 (continued).

Variables and Values	PH Professional Unspec. (n=28)			
	n	%	Mean	SD
2-5 Years	6	24.0		
5-9 Years	2	8.0		
10-14 Years	4	16.0		
15-19 Years	4	16.0		
20 or More Years	6	24.0		
County Survey Response				
Very Small	1	8.3		
Small	1	8.3		
Medium	0	.0		
Large	10	83.3		
Organized Health Department				
No	2	16.7		
Yes	10	83.3		
Position Category				
Officials & Administrators	0	.0		
Professionals	28	100.0		
Technicians	0	.0		
Protective Service	0	.0		
Paraprofessionals	0	.0		
Administrative Support	0	.0		
Skilled Craft	0	.0		
Service/Maintenance	0	.0		
Professional Position				
No	0	.0		
Yes	0	.0		
Type of Position				
Front Line Staff	10	35.7		
Senior Level Staff	8	28.6		
Supervisory/Mgmt Staff	10	35.7		
Full-Time Employment				
No	4	14.3		
Yes	24	85.7		
Annual Salary (FTE)			$49,754	$13,455
Less Than $20,000	0	.0		
$20,000 to $29,999	1	5.0		
$30,000 to $39,999	5	25.0		
$40,000 to $49,999	4	20.0		
$50,000 to $59,999	3	15.0		
$60,000 to $69,999	6	30.0		
$70,000 to $79,999	1	5.0		

Table 9 (continued).

Variables and Values	PH Professional Unspec. (n=28)			
	n	%	Mean	SD
Over $80,000	0	.0		
Know Non-English Language				
No	22	84.6		
Yes	4	15.4		
Other Language Speaking				
Fair	3	75.0		
Good	1	25.0		
Excellent	0	.0		
Other Language Reading				
Fair	2	66.7		
Good	1	33.3		
Excellent	0	.0		
Other Language Writing				
Fair	3	100.0		
Good	0	.0		
Excellent	0	.0		

Table 10. Core Competency Proficiencies and Educational Needs in the 13 Largest Professional Groups (N=337)

	Health Administrator (n=31)				Admin./Bus. Prof. (n=126)				Environ. Engineer (n=10)			
Core Competency Domains	**Mean**	**SD**	**Rank**	**Median**	**Mean**	**SD**	**Rank**	**Median**	**Mean**	**SD**	**Rank**	**Median**
Proficiencies in Core Competency Domains												
Analytic/Assessment Skills	5.37	1.10	6	5.75	5.05	1.10	5	5.25	5.05	1.14	1	5.25
Policy Development/Prog. Planning Skills	5.28	1.13	7	5.50	4.99	1.11	6	5.00	4.40	1.12	5	4.75
Communication Skills	5.72	0.86	2	6.00	5.29	0.95	2	5.45	4.97	0.92	2	5.00
Cultural Competency Skills	5.53	.93.	4	5.75	5.28	0.94	3	5.25	4.63	1.16	4	4.50
Community Dimensions of Practice Skills	5.56	1.14	3	6.00	4.93	1.12	7	5.00	3.95	1.07	6	3.63
Basic Public Health Sciences Skills	5.11	1.31	8	5.50	4.57	1.30	8	4.75	3.89	1.23	7	3.96
Financial Planning & Management Skills	5.39	0.94	5	5.60	5.06	1.02	4	5.20	3.88	1.08	8	3.50
Leadership & Systems Thinking Skills	5.81	1.00	1	6.00	5.41	0.98	1	5.50	4.68	1.24	3	4.88
Core Competencies Composite Skills	*5.48*	*0.90*		*5.74*	*5.08*	*0.91*		*5.21*	*4.45*	*0.87*		*4.39*
Educ. Needs in Core Competency Domains												
Analytic/Assessment Educ. Needs	2.45	0.96	3	2.00	3.09	0.99	3	3.00	2.50	0.85	6	2.50
Policy Devel./Prog. Planning Educ. Needs	2.61	1.33	2	2.00	3.11	1.13	2	3.00	3.00	0.82	4	3.00
Communication Educ. Needs	2.03	0.84	8	2.00	2.67	1.11	8	2.50	3.20	1.03	2	3.00
Cultural Competency Educ. Needs	2.35	0.95	7	2.00	2.84	1.05	7	3.00	2.40	0.97	8	2.00
Community Dimen. of Practice Educ. Needs	2.39	0.95	4	2.00	2.96	1.12	6	3.00	3.00	0.67	4	3.00
Basic Public Health Sciences Educ. Needs	2.65	1.28	2	2.00	3.06	1.13	5	3.00	2.50	0.53	6	2.50
Financial Planning & Mgmt. Educ. Needs	2.35	1.20	5	2.00	3.14	1.20	1	3.00	3.30	0.82	1	3.00
Leadership & Systems Thinking Educ. Needs	2.35	1.11	5	2.00	3.07	1.17	4	3.00	3.10	1.10	3	3.00
Core Competencies Composite Educ. Needs	*2.40*	*0.68*		*2.38*	*2.99*	*0.78*		*2.88*	*2.88*	*0.39*		*2.81*

Table 10 (continued).

Core Competency Domains	Env. Health Spec. (n=142)				Health Planner/Rschr. (n=14)				Licen./Regul. Spec. (n=14)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains												
Analytic/Assessment Skills	4.67	1.18	4	4.75	5.29	0.94	3	5.13	4.61	1.00	4	4.75
Policy Development/Prog. Planning Skills	4.27	1.32	7	4.25	4.90	0.84	7	5.00	4.34	1.64	5	4.88
Communication Skills	5.05	0.99	1	5.17	5.45	0.67	1	5.17	4.96	0.93	3	4.83
Cultural Competency Skills	4.91	1.07	2	5.00	5.18	1.06	4	5.25	5.11	1.16	1	5.75
Community Dimensions of Practice Skills	4.34	1.21	6	4.38	5.00	0.95	5	4.88	4.18	1.19	6	3.88
Basic Public Health Sciences Skills	4.52	1.26	5	4.63	5.32	0.96	2	5.50	3.82	1.70	8	4.25
Financial Planning & Management Skills	3.93	1.30	8	3.80	4.56	0.82	8	4.40	4.11	0.91	7	4.00
Leadership & Systems Thinking Skills	4.73	1.18	3	4.88	4.98	0.86	6	5.25	5.07	1.14	2	5.00
Core Competencies Composite Skills	*4.56*	*0.99*		*4.54*	*5.09*	*0.72*		*5.09*	*4.53*	*0.92*		*4.57*
Educ. Needs in Core Competency Domains												
Analytic/Assessment Educ. Needs	3.08	1.05	4	3.00	2.71	1.33	6	3.00	2.64	1.22	2	3.00
Policy Devel./Prog. Planning Educ. Needs	3.10	1.14	2	3.00	3.21	1.05	1	3.00	2.43	1.02	5	2.50
Communication Educ. Needs	2.77	1.12	8	3.00	2.57	1.02	8	2.50	2.36	0.74	6	2.50
Cultural Competency Educ. Needs	2.89	1.12	7	3.00	2.64	0.93	7	3.00	2.14	0.86	8	2.00
Community Dimen. of Practice Educ. Needs	3.04	1.07	5	3.00	2.79	1.05	4	3.00	2.36	0.93	6	2.50
Basic Public Health Sciences Educ. Needs	2.95	1.16	6	3.00	2.93	1.21	3	3.00	2.79	1.05	1	3.00
Financial Planning & Mgmt. Educ. Needs	3.10	1.39	2	3.00	3.14	1.03	2	3.00	2.43	1.34	5	2.00
Leadership & Systems Thinking Educ. Needs	3.11	1.15	1	3.00	2.79	0.89	4	3.00	2.50	1.02	3	3.00
Core Competencies Composite Educ. Needs	*3.00*	*0.78*		*3.00*	*2.85*	*0.72*		*3.00*	*2.46*	*0.65*		*2.38*

Table 10 (continued).

Core Competency Domains	Med./PH Soc. Worker (n=14)				Pub. Health Educator (n=56)				Public Health Nurse (n=270)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains												
Analytic/Assessment Skills	4.44	1.29	5	4.50	4.46	1.42	5	4.75	4.49	1.26	6	4.75
Policy Development/Prog. Planning Skills	4.07	1.46	6	4.38	3.82	1.70	8	4.13	3.80	1.42	7	3.75
Communication Skills	5.09	0.80	2	4.92	5.00	1.43	2	5.50	4.63	1.10	2	4.80
Cultural Competency Skills	5.68	0.67	1	5.75	5.39	1.06	1	5.50	5.45	1.02	1	5.50
Community Dimensions of Practice Skills	4.60	1.16	4	4.63	4.76	1.33	4	4.88	4.61	1.17	4	4.75
Basic Public Health Sciences Skills	3.75	1.41	8	3.50	4.19	1.56	6	4.50	4.53	1.21	5	4.50
Financial Planning & Management Skills	3.95	1.38	7	4.10	3.92	1.43	7	4.00	3.80	1.28	7	3.80
Leadership & Systems Thinking Skills	4.72	1.25	3	4.63	4.77	1.38	3	5.13	4.63	1.25	2	4.75
Core Competencies Composite Skills	*4.56*	*1.01*		*4.46*	*4.55*	*1.23*		*4.74*	*4.48*	*1.05*		*4.53*
Educ. Needs in Core Competency Domains												
Analytic/Assessment Educ. Needs	3.93	1.00	1	4.00	2.85	1.04	6	3.00	3.13	1.08	4	3.00
Policy Devel./Prog. Planning Educ. Needs	3.43	1.22	3	3.50	2.80	1.39	7	2.00	3.44	1.18	2	4.00
Communication Educ. Needs	2.93	1.38	6	3.00	2.47	1.29	8	2.00	2.79	1.07	7	3.00
Cultural Competency Educ. Needs	2.79	1.31	8	2.50	2.87	1.20	5	3.00	2.55	1.03	8	2.00
Community Dimen. of Practice Educ. Needs	3.14	1.23	4	3.00	2.91	1.19	3	3.00	3.02	1.04	5	3.00
Basic Public Health Sciences Educ. Needs	3.86	1.23	2	4.00	3.00	1.29	2	3.00	2.98	1.11	6	3.00
Financial Planning & Mgmt. Educ. Needs	3.14	1.51	4	3.00	3.07	1.41	1	3.00	3.50	1.36	1	4.00
Leadership & Systems Thinking Educ. Needs	2.86	1.10	7	3.00	2.91	1.31	3	3.00	3.17	1.05	3	3.00
Core Competencies Composite Educ. Needs	*3.26*	*0.88*		*3.31*	*2.86*	*0.84*		*2.75*	*3.07*	*0.70*		*3.13*

Table 10 (continued).

Core Competency Domains	Pub. Hlth. Nutritionist (n=35)				Public Health Spec. (n=69)				Other Pub. Hlth. Prof. (n=33)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains												
Analytic/Assessment Skills	4.10	1.34	5	4.38	4.39	1.30	7	4.50	4.28	1.52	4	4.75
Policy Development/Prog. Planning Skills	3.59	1.62	8	3.63	4.49	1.19	6	4.75	3.76	1.51	8	3.75
Communication Skills	4.60	1.03	2	4.67	5.17	1.04	2	5.33	4.70	1.41	2	5.17
Cultural Competency Skills	4.80	1.08	1	4.75	5.25	0.98	1	5.25	4.91	1.21	1	5.25
Community Dimensions of Practice Skills	4.06	1.20	6	4.00	4.82	1.15	4	5.00	4.03	1.27	5	4.00
Basic Public Health Sciences Skills	4.21	1.27	4	4.25	4.00	1.44	8	4.50	3.77	1.70	7	3.50
Financial Planning & Management Skills	3.69	1.45	7	3.60	4.52	1.14	5	4.80	3.87	1.53	6	4.60
Leadership & Systems Thinking Skills	4.47	1.45	3	4.50	4.99	1.24	3	5.25	4.42	1.33	3	5.00
Core Competencies Composite Skills	*4.20*	*1.16*		*4.09*	*4.72*	*1.00*		*4.99*	*4.23*	*1.26*		*4.54*
Educ. Needs in Core Competency Domains												
Analytic/Assessment Educ. Needs	3.29	1.12	2	3.00	2.96	1.08	4	3.00	2.85	1.18	4	3.00
Policy Devel./Prog. Planning Educ. Needs	3.24	1.13	3	3.00	3.00	1.18	3	3.00	3.12	1.22	1	3.00
Communication Educ. Needs	2.82	1.11	8	3.00	2.29	1.09	8	2.00	2.52	1.00	8	2.00
Cultural Competency Educ. Needs	2.88	1.09	7	3.00	2.75	1.16	5	3.00	2.76	1.12	5	3.00
Community Dimen. of Practice Educ. Needs	3.32	1.07	1	3.00	2.53	1.15	7	2.00	2.72	1.11	6	3.00
Basic Public Health Sciences Educ. Needs	3.15	1.10	5	3.00	3.03	1.35	1	3.00	3.03	1.36	2	3.00
Financial Planning & Mgmt. Educ. Needs	3.18	1.34	4	3.00	3.03	1.23	1	3.00	3.00	1.46	3	3.00
Leadership & Systems Thinking Educ. Needs	3.00	1.04	6	3.00	2.71	1.23	6	3.00	2.72	1.11	7	3.00
Core Competencies Composite Educ. Needs	*3.11*	*0.69*		*3.25*	*2.78*	*0.79*		*2.75*	*2.84*	*0.87*		*2.88*

Table 10 (continued).

Core Competency Domains	Pub. Htlh. Prof. Unspec. (n=28) Mean	SD	Rank	Median
Proficiencies in Core Competency Domains				
Analytic/Assessment Skills	4.60	1.38	5	4.88
Policy Development/Prog. Planning Skills	4.61	1.00	4	4.75
Communication Skills	5.06	1.08	1	5.08
Cultural Competency Skills	5.01	1.09	2	5.00
Community Dimensions of Practice Skills	4.44	1.28	7	4.13
Basic Public Health Sciences Skills	4.27	1.50	8	4.50
Financial Planning & Management Skills	4.52	1.16	6	4.70
Leadership & Systems Thinking Skills	4.89	1.14	3	5.25
Core Competencies Composite Skills	*4.68*	*1.02*		*4.89*
Educ. Needs in Core Competency Domains				
Analytic/Assessment Educ. Needs	3.04	1.19	2	3.00
Policy Devel./Prog. Planning Educ. Needs	2.93	1.05	4	3.00
Communication Educ. Needs	2.71	1.30	8	3.00
Cultural Competency Educ. Needs	2.79	1.03	7	3.00
Community Dimen. of Practice Educ. Needs	3.14	1.04	1	3.00
Basic Public Health Sciences Educ. Needs	2.93	1.36	4	3.00
Financial Planning & Mgmt. Educ. Needs	2.86	1.33	6	3.00
Leadership & Systems Thinking Educ. Needs	2.96	1.07	3	3.00
Core Competencies Composite Educ. Needs	*2.92*	*0.78*		*3.06*

Table 11. Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs in the 13 Largest Professional Groups (N=337)

Bioterrorism/Emergency Preparedness Competency Domains	Health Administrator (n=31)				Admin./Bus. Prof. (n=126)				Environ. Engineer (n=10)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP												
Disaster Planning Skills	3.80	1.68	4	3.67	3.33	1.56	3	3.33	2.57	1.32	5	2.33
Disaster Response Skills	4.58	1.43	1	4.67	4.25	1.42	1	4.33	3.70	1.24	1	3.50
Emergency Communication Skills	3.85	1.75	3	4.00	3.80	1.59	2	4.00	3.25	1.55	2	3.00
Biological/Infectious Disease Skills	3.71	1.95	5	4.00	3.27	1.67	4	3.00	1.90	1.45	6	1.00
Toxic Chem. & Env. Hazard Skills	3.13	1.77	7	3.00	2.74	1.66	7	3.00	2.70	1.25	4	3.00
Physical Injury Skills	3.94	1.95	2	4.00	3.26	1.76	5	3.00	2.80	1.75	3	2.50
Crisis Management Skills	3.35	1.82	6	3.00	3.10	1.65	6	3.00	1.70	1.25	7	1.00
Bioterrorism/EP Composite Skills	*3.77*	*1.53*		*3.55*	*3.40*	*1.34*		*3.27*	*2.66*	*1.06*		*2.40*
Educational Needs in Bioterrorism/EP												
Disaster Planning Educ. Needs	3.74	1.21	2	4.00	3.75	1.14	4	4.00	3.60	1.07	2	4.00
Disaster Response Educ. Needs	3.68	1.28	3	4.00	3.83	1.10	2	4.00	3.70	0.67	1	4.00
Emergency Communication Educ. Needs	3.16	1.10	6	3.00	3.26	1.15	7	3.00	2.80	0.79	6	3.00
Biological/Infectious Disease Educ. Needs	3.23	1.33	4	3.00	3.80	1.12	3	4.00	2.60	1.43	7	2.50
Toxic Chem. & Env. Hazard Educ. Needs	3.84	1.29	1	4.00	3.85	1.19	1	4.00	3.50	1.35	3	3.50
Physical Injury Educ. Needs	3.19	1.25	5	3.00	3.39	1.29	6	4.00	2.90	0.99	5	3.00
Crisis Management Educ. Needs	3.16	1.16	6	3.00	3.61	1.07	5	4.00	3.00	1.15	4	3.00
Bioterrorism/EP Composite Educ. Needs	*3.43*	*0.91*		*3.71*	*3.64*	*0.83*		*3.71*	*3.16*	*0.57*		*3.14*

Table 11 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	Environ. Health Spec. (n=142)				Health Planner/Rschr. (n=14)				Licen./Reg. Spec. (n=14)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP												
Disaster Planning Skills	3.18	1.83	4	3.00	2.43	1.34	6	2.00	2.43	1.77	7	1.50
Disaster Response Skills	4.33	1.44	1	4.50	3.23	1.27	2	3.08	4.00	1.63	1	4.00
Emergency Communication Skills	3.71	1.76	2	4.00	3.29	1.82	1	2.75	3.54	1.65	2	4.00
Biological/Infectious Disease Skills	3.18	1.82	4	3.00	2.57	1.60	4	2.00	2.50	1.83	6	2.00
Toxic Chem. & Env. Hazard Skills	3.60	1.86	3	4.00	2.69	1.80	3	2.00	2.79	1.97	3	2.00
Physical Injury Skills	2.96	1.80	6	3.00	2.50	1.83	5	2.00	2.79	1.63	3	2.50
Crisis Management Skills	2.60	1.72	7	2.00	2.14	1.66	7	1.50	2.57	1.55	5	2.00
Bioterrorism/EP Composite Skills	*3.36*	*1.47*		*3.23*	*2.69*	*1.12*		*2.48*	*2.94*	*1.46*		*2.40*
Educational Needs in Bioterrorism/EP												
Disaster Planning Educ. Needs	3.50	1.19	2	4.00	3.36	1.08	5	4.00	3.00	1.04	4	3.00
Disaster Response Educ. Needs	3.48	1.18	3	4.00	3.50	1.22	3	4.00	3.50	1.29	1	4.00
Emergency Communication Educ. Needs	2.81	1.15	7	3.00	2.79	1.12	7	3.00	2.86	1.03	5	3.00
Biological/Infectious Disease Educ. Needs	3.33	1.24	4	4.00	3.50	1.45	3	4.00	3.07	1.44	3	3.50
Toxic Chem. & Env. Hazard Educ. Needs	3.54	1.21	1	4.00	3.57	1.34	1	4.00	3.07	1.33	3	3.00
Physical Injury Educ. Needs	3.32	1.33	6	4.00	3.50	1.56	3	4.00	2.79	1.42	6	3.00
Crisis Management Educ. Needs	3.33	1.28	5	3.00	3.29	1.20	6	3.50	2.79	1.25	6	3.00
Bioterrorism/EP Composite Educ. Needs	*3.34*	*0.93*		*3.57*	*3.36*	*0.97*		*3.79*	*3.01*	*0.95*		*3.21*

Table 11 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	Med./PH Soc. Worker (n=14)				Pub. Health Educator (n=56)				Pub. Health Nurse (n=270)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP												
Disaster Planning Skills	2.57	1.78	6	2.00	2.35	1.44	5	2.00	2.73	1.46	6	2.67
Disaster Response Skills	3.80	1.35	2	3.50	3.55	1.36	1	3.67	4.16	1.31	1	4.33
Emergency Communication Skills	2.79	1.71	3	2.25	2.98	1.61	2	2.50	2.97	1.52	4	2.50
Biological/Infectious Disease Skills	2.36	1.98	7	1.50	2.00	1.38	7	1.00	2.85	1.58	5	3.00
Toxic Chem. & Env. Hazard Skills	2.64	2.06	4	2.00	2.04	1.57	6	1.00	2.57	1.55	7	2.00
Physical Injury Skills	2.64	1.86	4	2.00	2.69	1.87	3	2.00	4.00	1.71	2	4.00
Crisis Management Skills	5.21	1.63	1	6.00	2.38	1.62	4	2.00	3.36	1.72	3	3.00
Bioterrorism/EP Composite Skills	*3.14*	*1.47*		*2.61*	*2.59*	*1.25*		*2.20*	*3.24*	*1.29*		*3.17*
Educational Needs in Bioterrorism/EP												
Disaster Planning Educ. Needs	3.36	1.15	3	3.00	3.85	1.03	2	4.00	3.86	1.15	2	4.00
Disaster Response Educ. Needs	3.43	1.22	1	3.50	3.66	1.18	3	4.00	3.81	1.16	3	4.00
Emergency Communication Educ. Needs	2.71	0.99	7	3.00	2.93	1.44	7	3.00	3.33	1.17	6	3.00
Biological/Infectious Disease Educ. Needs	3.29	1.54	5	3.00	3.62	1.41	4	4.00	3.69	1.12	4	4.00
Toxic Chem. & Env. Hazard Educ. Needs	3.36	1.50	4	3.00	3.85	1.37	2	4.00	3.89	1.17	1	4.00
Physical Injury Educ. Needs	3.21	1.63	6	3.00	3.54	1.41	6	4.00	3.18	1.12	7	3.00
Crisis Management Educ. Needs	3.43	1.22	1	3.50	3.55	1.32	5	4.00	3.36	1.06	5	3.00
Bioterrorism/EP Composite Educ. Needs	*3.26*	*0.98*		*3.00*	*3.54*	*1.06*		*3.71*	*3.58*	*0.84*		*3.57*

Table 11 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	Pub. Health Nutritionist (n=35)				Public Health Spec. (n=69)				Other Pub. Health Prof. (n=33)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP												
Disaster Planning Skills	2.02	1.17	4	1.67	2.23	1.47	6	1.67	2.49	1.50	5	2.33
Disaster Response Skills	3.11	1.24	1	3.00	3.28	1.31	1	3.17	3.56	1.73	1	3.67
Emergency Communication Skills	2.49	1.39	2	2.00	2.74	1.50	3	2.50	3.33	1.65	2	3.50
Biological/Infectious Disease Skills	1.62	1.04	6	1.00	2.26	1.40	5	2.00	2.44	1.52	6	2.00
Toxic Chem. & Env. Hazard Skills	1.59	1.16	7	1.00	1.88	1.45	7	1.00	2.00	1.44	7	1.50
Physical Injury Skills	2.24	1.44	3	2.00	2.69	1.73	4	3.00	3.15	2.06	3	2.00
Crisis Management Skills	1.85	1.31	5	1.00	2.87	1.96	2	2.50	2.73	1.91	4	2.00
Bioterrorism/EP Composite Skills	*2.13*	*1.03*		*1.71*	*2.57*	*1.24*		*2.24*	*2.81*	*1.37*		*2.38*
Educational Needs in Bioterrorism/EP												
Disaster Planning Educ. Needs	3.62	1.37	3	4.00	3.81	1.37	1	4.00	3.42	1.50	1	4.00
Disaster Response Educ. Needs	3.47	1.24	5	3.00	3.75	1.36	2	4.00	3.42	1.37	1	4.00
Emergency Communication Educ. Needs	2.97	1.17	7	3.00	3.03	1.33	7	3.00	3.03	1.38	7	3.00
Biological/Infectious Disease Educ. Needs	3.62	1.30	3	4.00	3.63	1.52	3	4.00	3.33	1.47	4	4.00
Toxic Chem. & Env. Hazard Educ. Needs	3.62	1.37	3	4.00	3.62	1.56	4	4.00	3.21	1.62	5	4.00
Physical Injury Educ. Needs	3.47	1.28	5	3.00	3.32	1.47	6	4.00	3.15	1.52	6	4.00
Crisis Management Educ. Needs	3.74	1.26	1	4.00	3.38	1.34	5	3.50	3.36	1.27	3	3.00
Bioterrorism/EP Composite Educ. Needs	*3.50*	*1.01*		*3.64*	*3.51*	*1.18*		*3.93*	*3.28*	*1.16*		*3.71*

Table 11 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	Pub. Hlth. Prof. Unspec. (n=28)			
	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP				
Disaster Planning Skills	1.93	1.13	6	1.67
Disaster Response Skills	2.90	1.27	1	3.00
Emergency Communication Skills	2.64	1.17	3	2.50
Biological/Infectious Disease Skills	2.21	1.34	5	2.00
Toxic Chem. & Env. Hazard Skills	1.71	1.01	7	1.00
Physical Injury Skills	2.48	1.53	4	2.00
Crisis Management Skills	2.70	1.77	2	2.00
Bioterrorism/EP Composite Skills	*2.39*	*1.02*		*2.32*
Educational Needs in Bioterrorism/EP				
Disaster Planning Educ. Needs	3.54	1.40	1	3.00
Disaster Response Educ. Needs	3.39	1.37	2	3.00
Emergency Communication Educ. Needs	2.57	1.26	7	3.00
Biological/Infectious Disease Educ. Needs	3.14	1.43	4	3.00
Toxic Chem. & Env. Hazard Educ. Needs	3.29	1.51	3	3.00
Physical Injury Educ. Needs	2.93	1.46	6	3.00
Crisis Management Educ. Needs	2.96	1.23	5	3.00
Bioterrorism/EP Composite Educ. Needs	*3.12*	*1.08*		*3.07*

Table 12. Educational Preferences of Workers in the 13 Largest Professional Groups (N=337)

Types of Preference	Health Administrator (n=31)				Admin/Business Prof. (n=126)				Environ. Engineer (n=10)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.13	0.82	2	2.00	2.20	0.76	2	2.00	2.30	0.67	2	2.00
1-Day Workshops	2.59	0.63	1	3.00	2.51	0.56	1	3.00	2.50	0.53	1	2.50
Several-Day Workshops	1.31	0.47	3	1.00	1.71	0.73	3	2.00	1.70	0.82	3	1.50
Academic Semester Courses	1.17	0.47	4	1.00	1.27	0.53	4	1.00	1.40	0.70	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.74	0.44	1	3.00	2.70	0.53	1	3.00	2.60	0.70	1	3.00
Interactive Teleconferences	2.03	0.63	4	2.00	1.79	0.60	4	2.00	1.80	0.63	4	2.00
Internet, Web-Based Instruction	2.21	0.62	2	2.00	1.88	0.69	3	2.00	2.00	0.67	3	2.00
Combination Format	2.18	0.61	3	2.00	2.10	0.72	2	2.00	2.30	0.48	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.84	0.37	1	3.00	2.84	0.41	1	3.00	2.70	0.48	1	3.00
Weekend Classes	1.14	0.35	4	1.00	1.13	0.34	4	1.00	1.10	0.32	4	1.00
Evening Classes	1.28	0.53	3	1.00	1.23	0.46	3	1.00	1.60	0.70	3	1.50
Self-Determined Web-Based	2.24	0.74	2	2.00	2.06	0.71	2	2.00	2.00	0.67	2	2.00
Preferences for Educational Recognition												
Certificate	2.10	0.72	2	2.00	2.39	0.73	1	3.00	2.30	0.82	1	2.50
Continuing Education Units	1.90	0.82	3	2.00	2.18	0.79	2	2.00	2.00	0.67	2	2.00
Undergraduate Academic Credit	1.39	0.69	4	1.00	1.50	0.66	4	1.00	1.70	0.67	4	2.00
Graduate Academic Credit	2.22	0.80	1	2.00	1.84	0.85	3	2.00	1.90	0.74	3	2.00

Table 12 (continued).

Types of Preference	Env. Health Specialist (n=142)				Health Planner/Rschr. (n=14)				Licen./Reg. Specialist (n=14)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.01	0.78	2	2.00	2.14	0.66	2	2.00	2.00	0.39	2	2.00
1-Day Workshops	2.57	0.53	1	3.00	2.57	0.51	1	3.00	2.71	0.47	1	3.00
Several-Day Workshops	1.88	0.74	3	2.00	1.46	0.52	3	1.00	1.86	0.77	3	2.00
Academic Semester Courses	1.53	0.70	4	1.00	1.36	0.63	4	1.00	1.57	0.94	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.83	0.42	1	3.00	2.86	0.36	1	3.00	2.93	0.27	1	3.00
Interactive Teleconferences	1.71	0.63	4	2.00	1.93	0.73	4	2.00	1.64	0.50	3	2.00
Internet, Web-Based Instruction	1.72	0.68	3	2.00	2.00	0.68	3	2.00	1.50	0.52	4	1.50
Combination Format	2.10	0.70	2	2.00	2.21	0.43	2	2.00	1.93	0.73	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.83	0.45	1	3.00	2.71	0.47	1	3.00	2.79	0.43	1	3.00
Weekend Classes	1.13	0.36	4	1.00	1.15	0.55	4	1.00	1.14	0.36	4	1.00
Evening Classes	1.44	0.59	3	1.00	1.54	0.66	3	1.00	1.50	0.65	3	1.00
Self-Determined Web-Based	1.81	0.68	2	2.00	1.93	0.62	2	2.00	1.62	0.51	2	2.00
Preferences for Educational Recognition												
Certificate	2.49	0.66	1	3.00	2.36	0.93	1	3.00	2.14	0.53	2	2.00
Continuing Education Units	2.34	0.73	2	2.00	1.79	0.80	2	2.00	2.21	0.80	1	2.00
Undergraduate Academic Credit	1.60	0.69	4	1.00	1.38	0.51	4	1.00	1.29	0.61	3	1.00
Graduate Academic Credit	2.12	0.84	3	2.00	1.69	0.63	3	2.00	1.57	0.76	4	1.00

Table 12 (continued).

Types of Preference	Med./PH Social Worker (n=14)				Public Health Educator (n=56)				Public Health Nurse (n=270)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.62	0.51	1	3.00	2.42	0.67	2	3.00	2.18	0.73	2	2.00
1-Day Workshops	2.50	0.52	2	2.50	2.47	0.63	1	3.00	2.54	0.60	1	3.00
Several-Day Workshops	1.45	0.69	3	1.00	1.58	0.69	3	1.00	1.74	0.75	3	2.00
Academic Semester Courses	1.18	0.40	4	1.00	1.23	0.58	4	1.00	1.36	0.61	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.93	0.27	1	3.00	2.80	0.52	1	3.00	2.75	0.47	1	3.00
Interactive Teleconferences	1.33	0.49	4	1.00	1.47	0.58	4	1.00	1.84	0.62	3	2.00
Internet, Web-Based Instruction	1.69	0.75	3	2.00	1.69	0.64	3	2.00	1.72	0.72	4	2.00
Combination Format	1.83	0.72	2	2.00	1.81	0.69	2	2.00	2.05	0.70	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	3.00	0.00	1	3.00	2.89	0.32	1	3.00	2.84	0.47	1	3.00
Weekend Classes	1.00	0.00	4	1.00	1.13	0.40	4	1.00	1.18	0.45	4	1.00
Evening Classes	1.33	0.49	3	1.00	1.29	0.50	3	1.00	1.35	0.57	3	1.00
Self-Determined Web-Based	1.85	0.80	2	2.00	1.60	0.64	2	2.00	1.79	0.70	2	2.00
Preferences for Educational Recognition												
Certificate	2.23	0.73	1	2.00	2.26	0.76	1	2.00	2.22	0.67	2	2.00
Continuing Education Units	2.23	0.83	1	2.00	1.92	0.77	2	2.00	2.43	0.70	1	3.00
Undergraduate Academic Credit	1.75	0.87	2	1.50	1.43	0.64	4	1.00	1.63	0.72	4	1.00
Graduate Academic Credit	1.75	0.87	2	1.50	1.90	0.87	3	2.00	2.02	0.83	3	2.00

Table 12 (continued).

Types of Preference	Pub. Health Nutritionist (n=35)				Pub. Health Specialist (n=69)				Other Pub. Health Prof. (n=33)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.35	0.69	2	2.00	2.35	0.66	2	2.00	2.36	0.60	2	2.00
1-Day Workshops	2.52	0.62	1	3.00	2.55	0.53	1	3.00	2.42	0.62	1	2.00
Several-Day Workshops	1.61	0.75	3	1.00	1.62	0.79	3	1.00	1.45	0.68	3	1.00
Academic Semester Courses	1.21	0.60	4	1.00	1.32	0.59	4	1.00	1.19	0.48	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.85	0.36	1	3.00	2.70	0.55	1	3.00	2.84	0.37	1	3.00
Interactive Teleconferences	1.67	0.60	4	2.00	1.87	0.68	3	2.00	1.66	0.70	4	2.00
Internet, Web-Based Instruction	1.73	0.63	3	2.00	1.76	0.64	4	2.00	1.87	0.76	3	2.00
Combination Format	1.97	0.73	2	2.00	2.19	0.56	2	2.00	2.03	0.66	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.91	0.29	1	3.00	2.77	0.52	1	3.00	2.84	0.45	1	3.00
Weekend Classes	1.09	0.29	3	1.00	1.19	0.43	4	1.00	1.19	0.48	4	1.00
Evening Classes	1.09	0.30	3	1.00	1.37	0.61	3	1.00	1.38	0.61	3	1.00
Self-Determined Web-Based	1.79	0.74	2	2.00	2.03	0.72	2	2.00	1.90	0.79	2	2.00
Preferences for Educational Recognition												
Certificate	2.03	0.53	2	2.00	2.30	0.73	1	2.00	2.52	0.67	1	3.00
Continuing Education Units	2.76	0.55	1	3.00	2.00	0.79	2	2.00	1.97	0.91	2	2.00
Undergraduate Academic Credit	1.39	0.61	4	1.00	1.44	0.69	4	1.00	1.44	0.72	4	1.00
Graduate Academic Credit	1.82	0.81	3	2.00	1.95	0.90	3	2.00	1.61	0.80	3	1.00

Table 12 (continued).

Types of Preference	Pub. Hlth Prof. Unspec. (n=28)			
	Mean	SD	Rank	Median
Preferences for Course Length				
2-Hour Sessions	2.44	0.64	1	3.00
1-Day Workshops	2.31	0.55	2	2.00
Several-Day Workshops	1.46	0.65	3	1.00
Academic Semester Courses	1.35	0.63	4	1.00
Preferences for Educational Format				
Face-to-Face Classroom Setting	2.68	0.55	1	3.00
Interactive Teleconferences	1.67	0.62	4	2.00
Internet, Web-Based Instruction	1.78	0.70	3	2.00
Combination Format	2.22	0.64	2	2.00
Preferences for Time of Course Offering				
Weekday Classes	2.81	0.48	1	3.00
Weekend Classes	1.19	0.49	4	1.00
Evening Classes	1.38	0.50	3	1.00
Self-Determined Web-Based	2.08	0.69	2	2.00
Preferences for Educational Recognition				
Certificate	2.04	0.77	2	2.00
Continuing Education Units	1.62	0.75	3	1.00
Undergraduate Academic Credit	1.56	0.71	4	1.00
Graduate Academic Credit	2.08	0.89	1	2.00

Table 13. Differences in Core Competency Proficiencies and Educational Needs in the Six Largest Professional Groups (N=698)

Core Competency Domains	Admin/Bus. Prof (n=126)				Env. Health Spec. (n=142)				Pub. Health Educator (n=56)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	5.05	1.10	5	5.25	4.67	1.18	4	4.75	4.46	1.42	5	4.75
Policy Development/Prog. Planning Skills	4.99	1.11	6	5.00	4.27	1.32	7	4.25	3.82	1.70	8	4.13
Communication Skills	5.29	0.95	2	5.45	5.05	0.99	1	5.17	5.00	1.43	2	5.50
Cultural Competency Skills	5.28	0.94	3	5.25	4.91	1.07	2	5.00	5.39	1.06	1	5.50
Community Dimensions of Practice Skills	4.93	1.12	7	5.00	4.34	1.21	6	4.38	4.76	1.33	4	4.88
Basic Public Health Sciences Skills	4.57	1.30	8	4.75	4.52	1.26	5	4.63	4.19	1.56	6	4.50
Financial Planning & Management Skills	5.06	1.02	4	5.20	3.93	1.30	8	3.80	3.92	1.43	7	4.00
Leadership & Systems Thinking Skills	5.41	0.98	1	5.50	4.73	1.18	3	4.88	4.77	1.38	3	5.13
Core Competencies Composite Skills	*5.08*	*0.91*		*5.21*	*4.56*	*0.99*		*4.54*	*4.55*	*1.23*		*4.74*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	3.09	0.99	3	3.00	3.08	1.05	4	3.00	2.85	1.04	6	3.00
Policy Devel./Prog. Planning Educ. Needs	3.11	1.13	2	3.00	3.10	1.14	2	3.00	2.80	1.39	7	2.00
Communication Educ. Needs	2.67	1.11	8	2.50	2.77	1.12	8	3.00	2.47	1.29	8	2.00
Cultural Competency Educ. Needs	2.84	1.05	7	3.00	2.89	1.12	7	3.00	2.87	1.20	5	3.00
Community Dimen. of Practice Educ. Needs	2.96	1.12	6	3.00	3.04	1.07	5	3.00	2.91	1.19	3	3.00
Basic Public Health Sciences Educ. Needs	3.06	1.13	5	3.00	2.95	1.16	6	3.00	3.00	1.29	2	3.00
Financial Planning & Mgmt. Educ. Needs	3.14	1.20	1	3.00	3.10	1.39	2	3.00	3.07	1.41	1	3.00
Leadership & Systems Thinking Educ. Needs	3.07	1.17	4	3.00	3.11	1.15	1	3.00	2.91	1.31	3	3.00
Core Competencies Composite Educ. Needs	*2.99*	*0.78*		*2.88*	*3.00*	*0.78*		*3.00*	*2.86*	*0.84*		*2.75*

Table 13 (continued).

Core Competency Domains	Pub. Health Nurse (n=270)				Pub Hlth Nutritionist(n=35)				Pub Hlth Prog Spec (n=69)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]													
Analytic/Assessment Skills	4.49	1.26	6	4.75	4.10	1.34	5	4.38	4.39	1.30	7	4.50	<.001
Policy Development/Prog. Planning Skills	3.80	1.42	7	3.75	3.59	1.62	8	3.63	4.49	1.19	6	4.75	<.001
Communication Skills	4.63	1.10	2	4.80	4.60	1.03	2	4.67	5.17	1.04	2	5.33	<.001
Cultural Competency Skills	5.45	1.02	1	5.50	4.80	1.08	1	4.75	5.25	0.98	1	5.25	<.001
Community Dimensions of Practice Skills	4.61	1.17	4	4.75	4.06	1.20	6	4.00	4.82	1.15	4	5.00	<.001
Basic Public Health Sciences Skills	4.53	1.21	5	4.50	4.21	1.27	4	4.25	4.00	1.44	8	4.50	<.05
Financial Planning & Management Skills	3.80	1.28	7	3.80	3.69	1.45	7	3.60	4.52	1.14	5	4.80	<.001
Leadership & Systems Thinking Skills	4.63	1.25	2	4.75	4.47	1.45	3	4.50	4.99	1.24	3	5.25	<.001
Core Competencies Composite Skills	*4.48*	*1.05*		*4.53*	*4.20*	*1.16*		*4.09*	*4.72*	*1.00*		*4.99*	*<.001*
Educ. Needs in Core Competency Domains[2]													
Analytic/Assessment Educ. Needs	3.13	1.08	4	3.00	3.29	1.12	2	3.00	2.96	1.08	4	3.00	n.s.
Policy Devel./Prog. Planning Educ. Needs	3.44	1.18	2	4.00	3.24	1.13	3	3.00	3.00	1.18	3	3.00	<.001
Communication Educ. Needs	2.79	1.07	7	3.00	2.82	1.11	8	3.00	2.29	1.09	8	2.00	<.05
Cultural Competency Educ. Needs	2.55	1.03	8	2.00	2.88	1.09	7	3.00	2.75	1.16	5	3.00	<.05
Community Dimen. of Practice Educ. Needs	3.02	1.04	5	3.00	3.32	1.07	1	3.00	2.53	1.15	7	2.00	<.01
Basic Public Health Sciences Educ. Needs	2.98	1.11	6	3.00	3.15	1.10	5	3.00	3.03	1.35	1	3.00	n.s.
Financial Planning & Mgmt. Educ. Needs	3.50	1.36	1	4.00	3.18	1.34	4	3.00	3.03	1.23	1	3.00	<.01
Leadership & Systems Thinking Educ. Needs	3.17	1.05	3	3.00	3.00	1.04	6	3.00	2.71	1.23	6	3.00	n.s.
Core Competencies Composite Educ. Needs	*3.07*	*0.70*		*3.13*	*3.11*	*0.69*		*3.25*	*2.78*	*0.79*		*2.75*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the six groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 17. Proficiencies in Core Competencies in the Six Largest Professional Groups

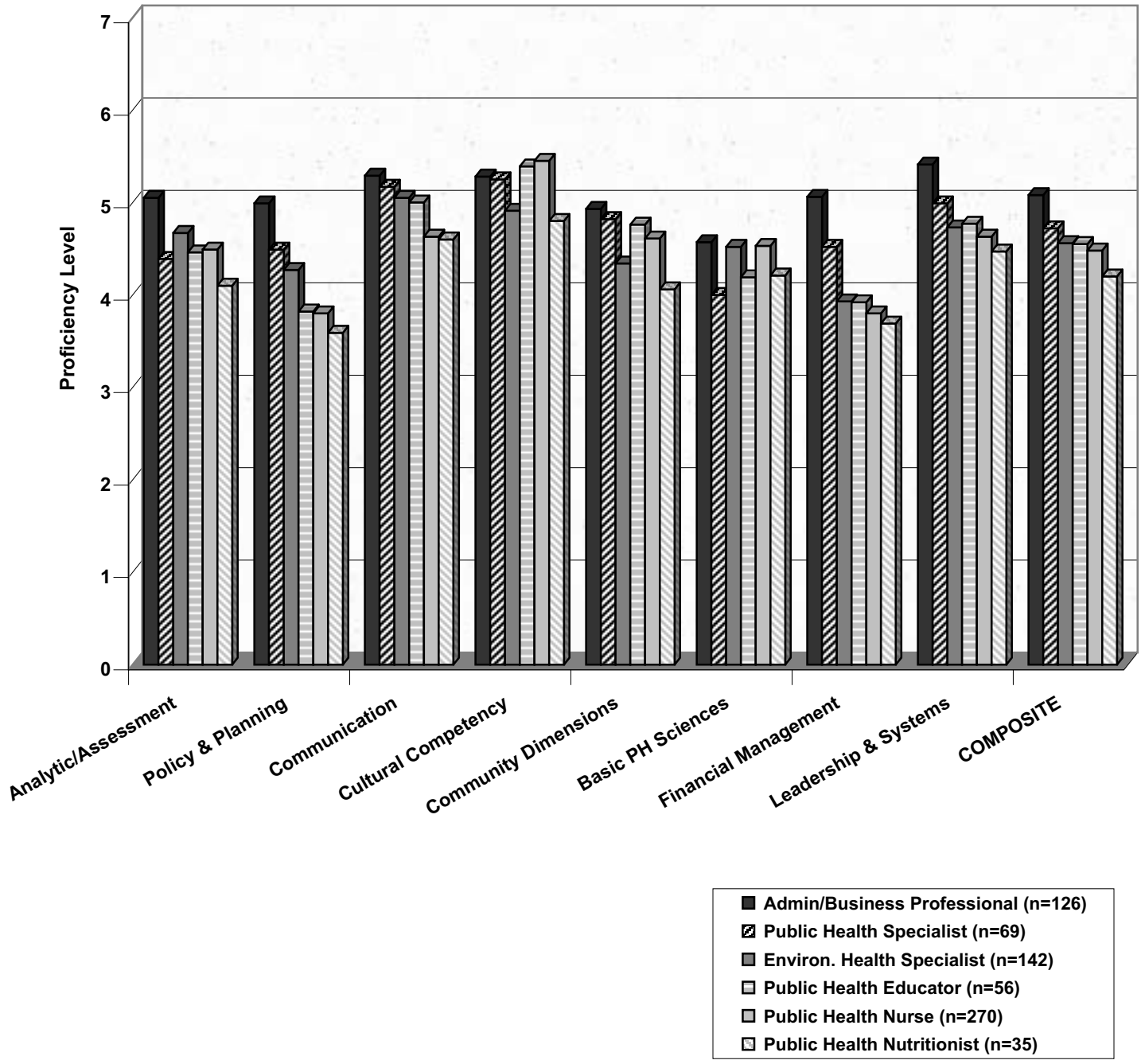


Figure 18. Educational Needs in Core Competencies for the Six Largest Professional Groups

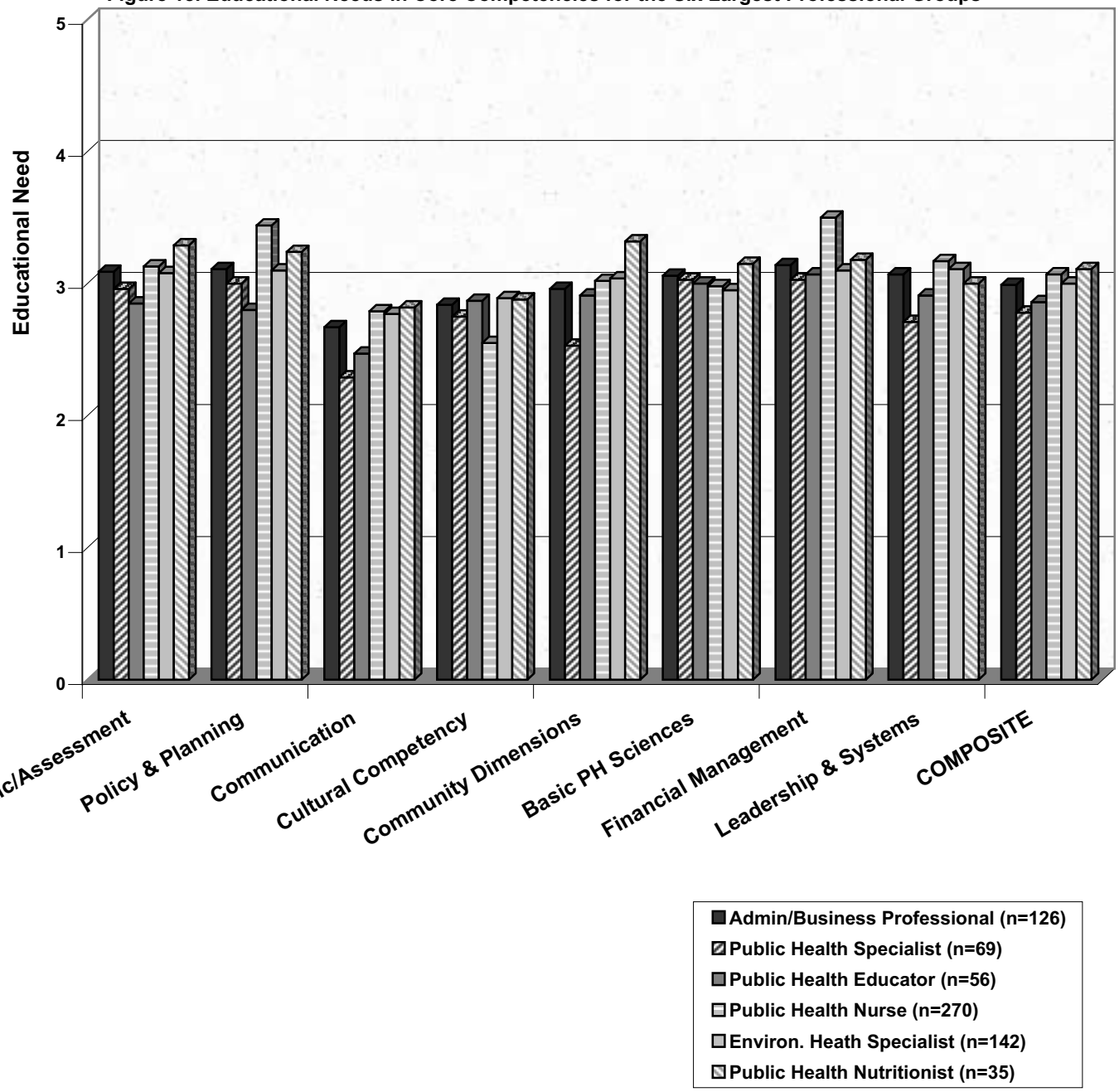


Table 14. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs in Six Largest Professional Groups (N=698)

Bioterrorism/Emergency Preparedness Competency Domains	Admin./Bus. Prof. (n=126)				Env. Health Spec. (n=142)				Pub. Health Educator (n=56)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	3.33	1.56	3	3.33	3.18	1.83	4	3.00	2.35	1.44	5	2.00
Disaster Response Skills	4.25	1.42	1	4.33	4.33	1.44	1	4.50	3.55	1.36	1	3.67
Emergency Communication Skills	3.80	1.59	2	4.00	3.71	1.76	2	4.00	2.98	1.61	2	2.50
Biological/Infectious Disease Skills	3.27	1.67	4	3.00	3.18	1.82	4	3.00	2.00	1.38	7	1.00
Toxic Chem. & Env. Hazard Skills	2.74	1.66	7	3.00	3.60	1.86	3	4.00	2.04	1.57	6	1.00
Physical Injury Skills	3.26	1.76	5	3.00	2.96	1.80	6	3.00	2.69	1.87	3	2.00
Crisis Management Skills	3.10	1.65	6	3.00	2.60	1.72	7	2.00	2.38	1.62	4	2.00
Bioterrorism/EP Composite Skills	*3.40*	*1.34*		*3.27*	*3.36*	*1.47*		*3.23*	*2.59*	*1.25*		*2.20*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.75	1.14	4	4.00	3.50	1.19	2	4.00	3.85	1.03	2	4.00
Disaster Response Educ. Needs	3.83	1.10	2	4.00	3.48	1.18	3	4.00	3.66	1.18	3	4.00
Emergency Communication Educ. Needs	3.26	1.15	7	3.00	2.81	1.15	7	3.00	2.93	1.44	7	3.00
Biological/Infectious Disease Educ. Needs	3.80	1.12	3	4.00	3.33	1.24	4	4.00	3.62	1.41	4	4.00
Toxic Chem. & Env. Hazard Educ. Needs	3.85	1.19	1	4.00	3.54	1.21	1	4.00	3.85	1.37	2	4.00
Physical Injury Educ. Needs	3.39	1.29	6	4.00	3.32	1.33	6	4.00	3.54	1.41	6	4.00
Crisis Management Educ. Needs	3.61	1.07	5	4.00	3.33	1.28	5	3.00	3.55	1.32	5	4.00
Bioterrorism/EP Composite Educ. Needs	*3.64*	*0.83*		*3.71*	*3.34*	*0.93*		*3.57*	*3.54*	*1.06*		*3.71*

Table 14 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	Public Health Nurse (n=270)				Pub.Hlth.Nutritionist (n=35)				Pub.Hlth.Prog.Spec. (n=69)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]													
Disaster Planning Skills	2.73	1.46	6	2.67	2.02	1.17	4	1.67	2.23	1.47	6	1.67	<.001
Disaster Response Skills	4.16	1.31	1	4.33	3.11	1.24	1	3.00	3.28	1.31	1	3.17	<.001
Emergency Communication Skills	2.97	1.52	4	2.50	2.49	1.39	2	2.00	2.74	1.50	3	2.50	<.001
Biological/Infectious Disease Skills	2.85	1.58	5	3.00	1.62	1.04	6	1.00	2.26	1.40	5	2.00	<.001
Toxic Chem. & Env. Hazard Skills	2.57	1.55	7	2.00	1.59	1.16	7	1.00	1.88	1.45	7	1.00	<.001
Physical Injury Skills	4.00	1.71	2	4.00	2.24	1.44	3	2.00	2.69	1.73	4	3.00	<.001
Crisis Management Skills	3.36	1.72	3	3.00	1.85	1.31	5	1.00	2.87	1.96	2	2.50	<.001
Bioterrorism/EP Composite Skills	*3.24*	*1.29*		*3.17*	*2.13*	*1.03*		*1.71*	*2.57*	*1.24*		*2.24*	*<.001*
Educational Needs in Bioterrorism/EP[2]													
Disaster Planning Educ. Needs	3.86	1.15	2	4.00	3.62	1.37	3	4.00	3.81	1.37	1	4.00	n.s.
Disaster Response Educ. Needs	3.81	1.16	3	4.00	3.47	1.24	5	3.00	3.75	1.36	2	4.00	n.s.
Emergency Communication Educ. Needs	3.33	1.17	6	3.00	2.97	1.17	7	3.00	3.03	1.33	7	3.00	<.001
Biological/Infectious Disease Educ. Needs	3.69	1.12	4	4.00	3.62	1.30	3	4.00	3.63	1.52	3	4.00	<.05
Toxic Chem. & Env. Hazard Educ. Needs	3.89	1.17	1	4.00	3.62	1.37	3	4.00	3.62	1.56	4	4.00	n.s.
Physical Injury Educ. Needs	3.18	1.12	7	3.00	3.47	1.28	5	3.00	3.32	1.47	6	4.00	n.s.
Crisis Management Educ. Needs	3.36	1.06	5	3.00	3.74	1.26	1	4.00	3.38	1.34	5	3.50	n.s.
Bioterrorism/EP Composite Educ. Needs	*3.58*	*0.84*		*3.57*	*3.50*	*1.01*		*3.64*	*3.51*	*1.18*		*3.93*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the six groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When the overall difference among groups was not significant, n.s. is noted. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 19. Proficiencies in Bioterrorism/Emergency Preparedness Skills in the Six Largest Professional Groups

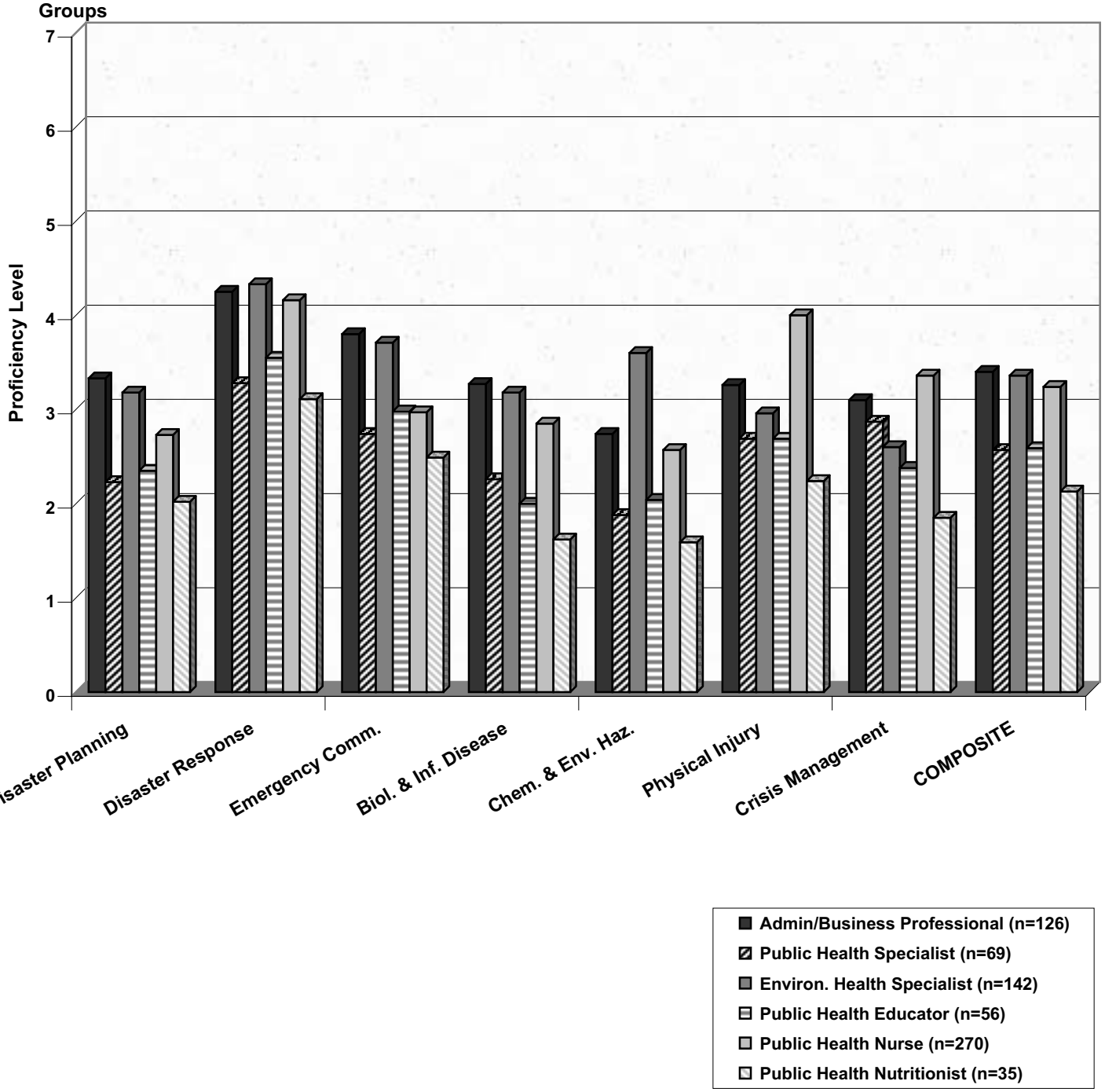
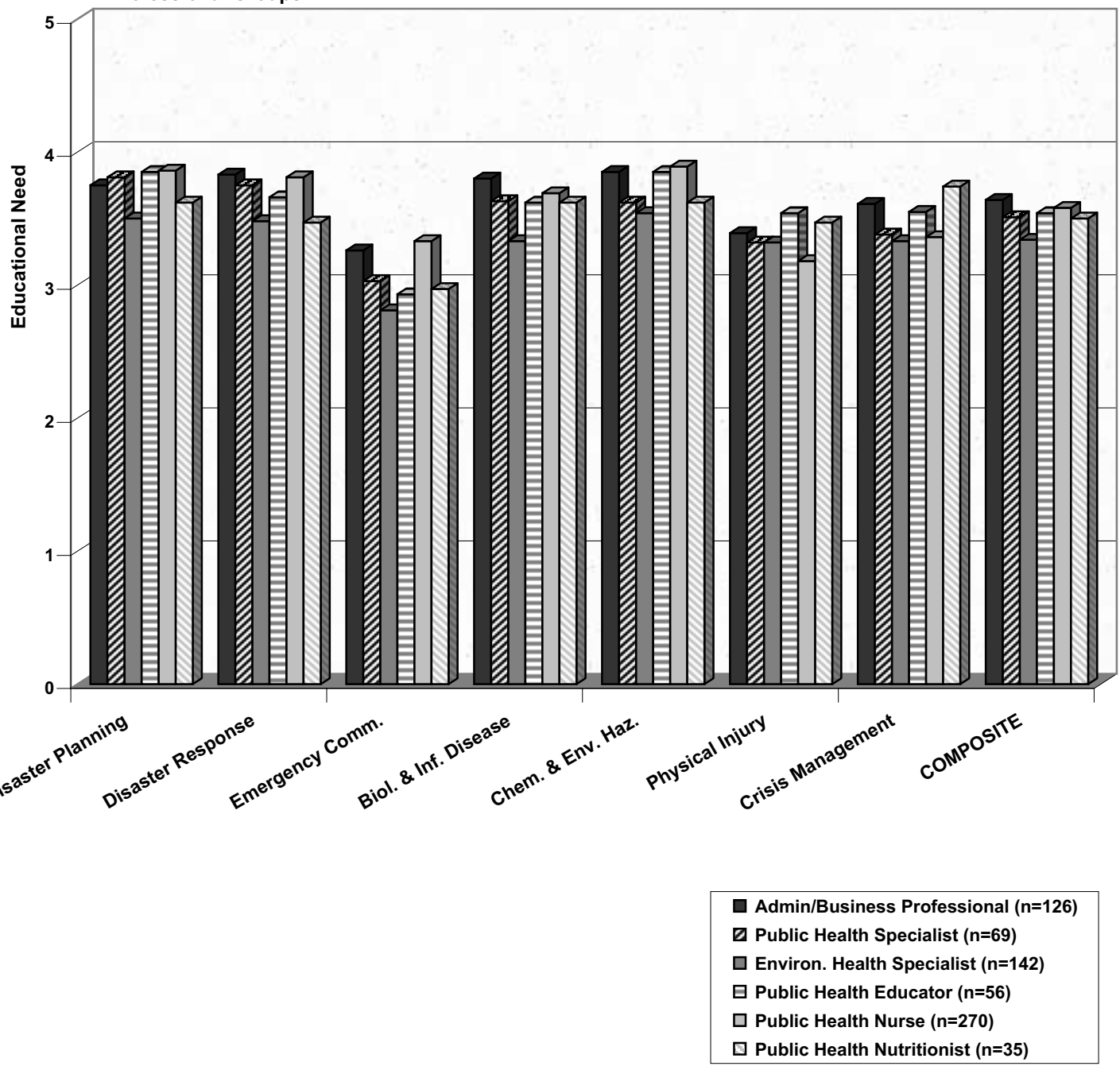


Figure 20. Educational Needs in Bioterrorism/Emergency Preparedness Skills in the Six Largest Professional Groups



4c. Differences in Non-Professional Groups

Table 15 presents the characteristics of the six largest non-professional groups: Administrative Support Staff (n=141), Other Paraprofessional (n=79), Other Public Health Technician (n=27), Community Outreach Worker (n=19), Computer Specialist (n=13), and Other Clerical/Support (n=10). Workers in the Other Clerical/Support and Other Public Health Technician groups were the oldest. Workers in the Other Paraprofessional and Community Outreach Worker groups were the youngest.

The majority of respondents in all non-professional groups were female; with the exception of Computer Specialists (males=46%), more than 90% were female across groups. The majority of Computer Specialists (85%), Other Public Health Technicians (58%), and Administrative Support Staff (60%) were white. Hispanics represented the largest proportion of respondents in the Other Clerical/Support group (60%), Community Outreach Worker group (53%), and Other Paraprofessional group (49%).

Except for the Computer Specialists (where 50% held a college degree), less than 20% held a college degree in other non-professional groups. When level of education was examined, the majority of non-professional groups indicated a high school diploma or professional/vocational degree as the highest degree earned. Community Outreach Workers was the group with the highest percentage of workers (53%) who knew a non-English language.

Table 16 summarizes differences in Core Competency proficiencies and educational needs in the six largest non-professional worker groups. A significant difference between groups ($p < .05$) was found in overall Core Competency Skills proficiency. In descending order, the means for Core Competency Skills (composite score) among the largest non-professional groups were Community Outreach Worker (4.25), Other Paraprofessional (3.95), Computer Specialist (3.90), Other Public Health Technician (3.66), Administrative Support Staff (3.41), and Other Clerical/Support (2.99). As shown in Table 16, statistically significant differences were found in six of eight of the Core Competency subscales. As seen in Figure 21, non-professional groups demonstrated differences in skill sets (e.g., the Community Outreach Worker group scored highest on Assessment/Analytic Skills, Policy Development/Program Planning Skills, Communication Skills, Cultural Competency Skills, and Community Dimensions of Practice Skills; the Computer Specialist group scored highest on Financial Planning/Management Skills; and the Other Paraprofessional group scored highest on Leadership/System Thinking Skills). The Other Clerical/Support group was least proficient in all but one dimension.

No significant differences were found among these six non-professional groups in either the Core Competency educational need composite scale or any of its eight subscales, perhaps due to the small sample sizes in several groups. As shown in Figure 22, the Other Clerical/Support group reported the least educational needs for Core Competency Skills.

Table 17 summarizes Bioterrorism/Emergency Preparedness proficiencies and educational needs across the six non-professional groups. No significant differences were found in any dimensions, likely due to the small sample sizes in some groups. As illustrated in Figure 23, the Computer Specialist group far exceeded other groups in Emergency Communication Skills and they reported higher proficiency in Physical Injury Skills than other groups. Community Outreach Workers scored highest in Disaster Response Skills, Toxic Chemical/Environment Hazard Skills, and Crisis Management Skills. The Other Clerical/Support group was the most proficient in Disaster Planning Skills and Biological/Infectious Disease Skills.

Figure 24 displays educational needs for Bioterrorism/Emergency Preparedness Skills among these six non-professional groups. While differences are not statistically significant due to small sample sizes, Community Outreach Workers and Other Paraprofessionals reported the greatest educational needs; Computer Specialists reported the least educational needs.

Educational preferences for these non-professional groups are summarized in Table 18. Preferences were similar across groups with the exception that Computer Specialists expressed greater interest in earning graduate academic credit. This finding is not unexpected given that this group has a higher percentage of college graduates than other groups.

Table 15. Characteristics of Colorado Public Health Workers in the Six Largest Non-Professional Groups (N=289)

	Computer Specialist (n=13)				Other PH Technician (n=27)				Comm. Outreach Worker (n=19)			
Variables and Values	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**
Age			40.83	6.70			44.00	11.86			38.11	8.16
Under 29 Years	1	8.3			5	18.5			2	10.5		
30-39 Years	4	33.3			1	3.7			10	52.6		
40-49 Years	6	50.0			12	44.4			5	26.3		
50-59 Years	1	8.3			7	25.9			2	10.5		
Over 60 Years	0	.0			2	7.4			0	.0		
Gender												
Male	6	46.2			1	3.8			2	10.5		
Female	7	53.8			25	96.2			17	89.5		
Race												
White	11	84.6			15	57.7			8	42.1		
Hispanic	1	7.7			8	30.8			10	52.6		
Black	1	7.7			0	.0			0	.0		
Asian	0	.0			1	3.8			0	.0		
Other or Multiracial	0	.0			2	7.7			1	5.3		
Highest Education												
High School Diploma	1	8.3			6	22.2			4	21.1		
Profess./Vocational Diploma	1	8.3			11	40.7			9	47.4		
Associate Degree	4	33.3			5	18.5			4	21.1		
Baccalaureate Degree	6	50.0			3	11.1			2	10.5		
Master's Degree	0	.0			2	7.4			0	.0		
Doctoral Degree	0	.0			0	.0			0	.0		
College Degree												
No	6	50.0			22	81.5			17	89.5		
Yes	6	50.0			5	18.5			2	10.5		
Years Since Last Degree			13.08	10.57			20.09	11.63			14.35	9.65
Less than 2 Years	2	16.7			1	4.5			1	5.9		
2-5 Years	2	16.7			1	4.5			3	17.6		
5-9 Years	0	.0			2	9.1			3	17.6		
10-14 Years	3	25.0			3	13.6			2	11.8		
15-19 Years	3	25.0			3	13.6			3	17.6		
20 or More Years	2	16.7			12	54.5			5	29.4		
Years Experience in Discipline			8.55	6.23			15.76	13.21			8.00	7.96
Less than 2 Years	0	.0			2	11.8			3	27.3		
2-5 Years	3	27.3			3	17.6			2	18.2		
5-9 Years	4	36.4			1	5.9			2	18.2		
10-14 Years	2	18.2			2	11.8			2	18.2		
15-19 Years	1	9.1			3	17.6			1	9.1		
20 or More Years	1	9.1			6	35.3			1	9.1		
Years Experience in Pub. Health			5.00	6.78			6.92	4.77			5.63	7.65
Less than 2 Years	6	50.0			3	12.0			6	31.6		

Table 15 (continued).

Variables and Values	Computer Specialist (n=13)				Other PH Technician (n=27)				Comm. Outreach Worker (n=19)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	2	16.7			6	24.0			8	42.1		
5-9 Years	2	16.7			9	36.0			0	.0		
10-14 Years	0	.0			5	20.0			3	15.8		
15-19 Years	1	8.3			2	8.0			1	5.3		
20 or More Years	1	8.3			0	.0			1	5.3		
County Survey Response												
Very Small	0	.0			0	.0			1	5.3		
Small	1	8.3			2	9.1			2	10.5		
Medium	1	8.3			3	13.6			3	15.8		
Large	10	83.3			17	77.3			13	68.4		
Organized Health Department												
No	0	.0			5	22.7			3	15.8		
Yes	12	100.0			17	77.3			16	84.2		
Position Category												
Officials & Administrators	0	.0			0	.0			0	.0		
Professionals	0	.0			0	.0			0	.0		
Technicians	13	100.0			27	100.0			0	.0		
Protective Service	0	.0			0	.0			0	.0		
Paraprofessionals	0	.0			0	.0			19	100.0		
Administrative Support	0	.0			0	.0			0	.0		
Skilled Craft	0	.0			0	.0			0	.0		
Service/Maintenance	0	.0			0	.0			0	.0		
Professional Position												
No	13	100.0			27	100.0			19	100.0		
Yes	0	.0			0	.0			0	.0		
Type of Position												
Front Line Staff	9	69.2			26	96.3			17	89.5		
Senior Level Staff	1	7.7			1	3.7			1	5.3		
Supervisory/Mgmt Staff	3	23.1			0	.0			1	5.3		
Full-Time Employment												
No	1	7.7			5	18.5			3	15.8		
Yes	12	92.3			22	81.5			16	84.2		
Annual Salary (FTE)			$40,735	$11,577			$25,527	$8,879			$25,010	$4,407
Less Than $20,000	1	11.1			7	31.8			2	12.5		
$20,000 to $29,999	1	11.1			8	36.4			11	68.8		
$30,000 to $39,999	2	22.2			4	18.2			3	18.8		
$40,000 to $49,999	3	33.3			3	13.6			0	.0		
$50,000 to $59,999	2	22.2			0	.0			0	.0		
$60,000 to $69,999	0	.0			0	.0			0	.0		
$70,000 to $79,999	0	.0			0	.0			0	.0		

Table 15 (continued).

Variables and Values	Computer Specialist (n=13)				Other PH Technician (n=27)				Comm. Outreach Worker (n=19)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Over $80,000	0	.0			0	.0			0	.0		
Know Non-English Language												
No	10	76.9			15	55.6			9	47.4		
Yes	3	23.1			12	44.4			10	52.6		
Other Language Speaking												
Fair	1	33.3			2	18.2			0	.0		
Good	1	33.3			1	9.1			3	33.3		
Excellent	1	33.3			8	72.7			6	66.7		
Other Language Reading												
Fair	1	33.3			1	9.1			3	30.0		
Good	1	33.3			2	18.2			1	10.0		
Excellent	1	33.3			8	72.7			6	60.0		
Other Language Writing												
Fair	1	33.3			2	20.0			3	30.0		
Good	1	33.3			3	30.0			2	20.0		
Excellent	1	33.3			5	50.0			5	50.0		

Table 15 (continued).

Variables and Values	Other Paraprofessionals (n=79)				Admin. Support Staff (n=141)				Other Clerical/Support (n=10)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			36.81	11.80			42.91	12.14			45.78	9.80
Under 29 Years	23	31.1			26	18.8			0	.0		
30-39 Years	20	27.0			26	18.8			3	33.3		
40-49 Years	16	21.6			43	31.2			2	22.2		
50-59 Years	13	17.6			33	23.9			3	33.3		
Over 60 Years	2	2.7			10	7.2			1	11.1		
Gender												
Male	1	1.4			6	4.7			0	.0		
Female	72	98.6			122	95.3			9	100.0		
Race												
White	33	44.6			82	60.3			4	40.0		
Hispanic	36	48.6			43	31.6			6	60.0		
Black	3	4.1			5	3.7			0	.0		
Asian	1	1.4			4	2.9			0	.0		
Other or Multiracial	1	1.4			2	1.5			0	.0		
Highest Education												
High School Diploma	56	75.7			77	56.2			8	80.0		
Profess./Vocational Diploma	6	8.1			23	16.8			1	10.0		
Associate Degree	8	10.8			17	12.4			1	10.0		
Baccalaureate Degree	3	4.1			17	12.4			0	.0		
Master's Degree	1	1.4			3	2.2			0	.0		
Doctoral Degree	0	.0			0	.0			0	.0		
College Degree												
No	70	94.6			117	85.4			10	100.0		
Yes	4	5.4			20	14.6			0	.0		
Years Since Last Degree			16.4	12.21			19.23	12.97			25.67	9.91
Less than 2 Years	3	4.8			8	6.5			0	.0		
2-5 Years	12	19.0			8	6.5			0	.0		
5-9 Years	9	14.3			21	16.9			0	.0		
10-14 Years	11	17.5			14	11.3			1	16.7		
15-19 Years	5	7.9			14	11.3			1	16.7		
20 or More Years	23	36.5			59	47.6			4	66.7		
Years Experience in Discipline			6.04	7.19			8.29	9.42			2.00	0.00
Less than 2 Years	8	30.8			24	30.0			0	.0		
2-5 Years	7	26.9			18	22.5			1	100.0		
5-9 Years	6	23.1			11	13.8			0	.0		
10-14 Years	0	.0			7	8.8			0	.0		
15-19 Years	2	7.7			4	5.0			0	.0		
20 or More Years	3	11.5			16	20.0			0	.0		
Years Experience in Pub. Health			6.54	6.06			7.72	7.63			13.44	9.58
Less than 2 Years	15	22.1			36	27.7			0	.0		

Table 15 (continued).

Variables and Values	Other Paraprofessionals (n=79)				Admin. Support Staff (n=141)				Other Clerical/Support (n=10)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	16	23.5			26	20.0			0	.0		
5-9 Years	17	25.0			24	18.5			4	44.4		
10-14 Years	14	20.6			21	16.2			1	11.1		
15-19 Years	2	2.9			7	5.4			2	22.2		
20 or More Years	4	5.9			16	12.3			2	22.2		
County Survey Response												
Very Small	0	.0			1	8.3			5	4.0		
Small	9	12.3			2	16.7			6	4.8		
Medium	11	15.1			2	16.7			9	7.3		
Large	53	72.6			7	58.3			104	83.9		
Organized Health Department												
No	17	23.3			16	12.9			2	20.0		
Yes	56	76.7			108	87.1			8	80.0		
Position Category												
Officials & Administrators	0	.0			0	.0			0	.0		
Professionals	0	.0			0	.0			0	.0		
Technicians	0	.0			0	.0			0	.0		
Protective Service	0	.0			0	.0			0	.0		
Paraprofessionals	79	100.0			0	.0			0	.0		
Administrative Support	0	.0			141	100.0			10	100.0		
Skilled Craft	0	.0			0	.0			0	.0		
Service/Maintenance	0	.0			0	.0			0	.0		
Professional Position												
No	79	100.0			41	100.0			10	100.0		
Yes	0	.0			0	.0			0	.0		
Type of Position												
Front Line Staff	59	78.7			114	83.8			6	75.0		
Senior Level Staff	11	14.7			16	11.8			2	25.0		
Supervisory/Mgmt Staff	5	6.7			6	4.4			0	.0		
Full-Time Employment												
No	9	11.4			16	11.3			1	11.1		
Yes	70	88.6			125	88.7			8	88.9		
Annual Salary (FTE)			$25,421	$5,239			$26,620	$8,122			$29,371	$6,947
Less Than $20,000	6	9.0			18	17.1			0	.0		
$20,000 to $29,999	43	64.2			54	51.4			3	60.0		
$30,000 to $39,999	18	26.9			23	21.9			1	20.0		
$40,000 to $49,999	0	.0			8	7.6			1	20.0		
$50,000 to $59,999	0	.0			2	1.9			0	.0		
$60,000 to $69,999	0	.0			0	.0			0	.0		
$70,000 to $79,999	0	.0			0	.0			0	.0		

Table 15 (continued).

Variables and Values	Other Paraprofessionals (n=79)				Admin. Support Staff (n=141)				Other Clerical/Support (n=10)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Over $80,000	0	.0			0	.0			0	.0		
Know Non-English Language												
No	40	50.6			90	64.7			5	55.6		
Yes	39	49.4			49	35.3			4	44.4		
Other Language Speaking												
Fair	7	18.4			4	7.8			0	.0		
Good	13	34.2			21	41.2			2	50.0		
Excellent	18	47.4			26	51.0			2	50.0		
Other Language Reading												
Fair	9	23.1			8	16.3			0	.0		
Good	13	33.3			18	36.7			3	60.0		
Excellent	17	43.6			23	46.9			2	40.0		
Other Language Writing												
Fair	14	36.8			9	18.8			2	50.0		
Good	11	28.9			19	39.6			2	50.0		
Excellent	13	34.2			20	41.7			0	.0		

Table 16. Differences in Core Competency Proficiencies and Educational Needs in the Six Largest Non-Professional Groups (N=289)

	Computer Specialist (n=13)				Other PH Tech. (n=27)				Comm. Outreach (n=19)			
Core Competency Domains	**Mean**	**SD**	**Rank**	**Median**	**Mean**	**SD**	**Rank**	**Median**	**Mean**	**SD**	**Rank**	**Median**
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	3.98	1.51	4	3.75	3.45	1.40	5	3.38	4.16	1.57	4	4.50
Policy Development/Prog. Planning Skills	3.67	1.44	6	3.50	3.33	1.58	6	3.50	3.82	1.35	7	4.25
Communication Skills	4.58	1.02	1	4.40	3.72	1.39	4	4.00	4.67	0.83	2	4.67
Cultural Competency Skills	4.40	1.54	2	4.50	4.53	1.39	1	5.00	5.08	1.13	1	4.75
Community Dimensions of Practice Skills	3.40	1.52	7	3.50	3.80	1.46	3	3.75	4.53	1.11	3	4.75
Basic Public Health Sciences Skills	2.85	1.54	8	3.00	3.18	1.66	7	2.50	3.59	1.37	8	4.00
Financial Planning & Management Skills	3.97	1.14	5	4.00	3.17	1.45	8	3.20	3.88	1.19	6	3.80
Leadership & Systems Thinking Skills	4.06	1.53	3	4.50	4.07	1.29	2	4.00	4.13	1.42	5	4.25
Core Competencies Composite Skills	*3.90*	*1.24*		*3.91*	*3.66*	*1.21*		*3.66*	*4.25*	*0.96*		*4.00*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	2.77	1.64	6	3.00	3.31	1.29	2	3.00	3.32	1.20	1	3.00
Policy Devel./Prog. Planning Educ. Needs	3.00	1.22	5	3.00	3.42	1.50	1	4.00	2.78	1.44	8	2.50
Communication Educ. Needs	3.08	1.19	3	3.00	3.31	0.97	2	3.00	3.00	1.41	6	3.00
Cultural Competency Educ. Needs	2.54	1.56	8	2.00	3.08	1.20	7	3.00	2.83	1.65	7	2.00
Community Dimen. of Practice Educ. Needs	2.69	1.44	7	3.00	3.31	1.32	2	3.00	3.28	1.02	3	3.00
Basic Public Health Sciences Educ. Needs	3.08	1.71	3	3.00	3.23	1.18	6	3.00	3.22	1.35	4	3.00
Financial Planning & Mgmt. Educ. Needs	3.23	1.54	1	3.00	2.88	1.40	8	3.00	3.17	1.42	5	3.50
Leadership & Systems Thinking Educ. Needs	3.15	1.41	2	3.00	3.31	1.09	2	3.00	3.28	1.02	3	3.00
Core Competencies Composite Educ. Needs	*2.94*	*1.28*		*3.00*	*3.23*	*0.99*		*3.31*	*3.11*	*0.75*		*3.13*

Table 16 (continued).

Core Competency Domains	Other Paraprofess. (n=79)				Admin. Support (n=141)				Other Clerical (n=10)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]													
Analytic/Assessment Skills	3.73	1.50	5	4.00	3.21	1.56	5	3.25	2.65	1.03	7	2.75	<.05
Policy Development/Prog. Planning Skills	3.62	1.51	6	3.75	2.92	1.59	7	2.63	2.95	1.25	5	3.38	<.05
Communication Skills	4.15	1.26	3	4.20	3.73	1.36	2	3.83	3.09	1.58	4	3.00	<.05
Cultural Competency Skills	4.97	1.35	1	5.25	4.39	1.45	1	4.50	3.25	1.90	3	2.88	<.05
Community Dimensions of Practice Skills	4.11	1.34	4	4.25	3.41	1.50	4	3.50	3.35	1.74	1	3.38	<.01
Basic Public Health Sciences Skills	3.48	1.45	7	3.50	2.82	1.56	8	2.50	2.50	1.19	8	2.38	n.s.
Financial Planning & Management Skills	3.30	1.43	8	3.20	3.16	1.53	6	3.00	2.84	1.17	6	2.60	n.s.
Leadership & Systems Thinking Skills	4.35	1.44	2	4.50	3.52	1.48	3	3.75	3.26	1.91	2	3.00	<.01
Core Competencies Composite Skills	*3.95*	*1.21*		*3.91*	*3.41*	*1.33*		*3.31*	*2.99*	*1.35*		*2.90*	*<.05*
Educ. Needs in Core Competency Domains[2]													
Analytic/Assessment Educ. Needs	3.11	1.25	8	3.00	3.01	1.39	6	3.00	2.30	1.25	8	2.50	n.s.
Policy Devel./Prog. Planning Educ. Needs	3.13	1.37	6	3.00	2.96	1.44	8	3.00	2.70	1.57	1	3.00	n.s.
Communication Educ. Needs	3.15	1.22	3	3.00	3.16	1.37	2	3.00	2.40	1.17	5	2.50	n.s.
Cultural Competency Educ. Needs	3.14	1.18	5	3.00	3.10	1.28	4	3.00	2.50	1.35	3	2.50	n.s.
Community Dimen. of Practice Educ. Needs	3.12	1.14	7	3.00	3.07	1.39	5	3.00	2.40	1.58	5	2.00	n.s.
Basic Public Health Sciences Educ. Needs	3.37	1.26	1	3.00	3.17	1.57	1	3.00	2.70	1.70	1	2.50	n.s.
Financial Planning & Mgmt. Educ. Needs	3.15	1.45	3	3.00	2.99	1.57	7	3.00	2.40	1.43	5	2.50	n.s.
Leadership & Systems Thinking Educ. Needs	3.16	1.11	2	3.00	3.16	1.26	2	3.00	2.50	1.58	3	2.50	n.s.
Core Competencies Composite Educ. Needs	*3.16*	*0.87*	*2*	*3.25*	*3.08*	*1.08*		*3.13*	*2.49*	*1.30*		*2.56*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the six groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When the overall difference among groups was non-significant, n.s. is noted. When the overall F ratio was statistically significant, post-hoc comparisons between all possible pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparisons may be obtained from the author.

Figure 21. Proficiencies in Core Competency Skills for the Six Largest Non-Professional Groups

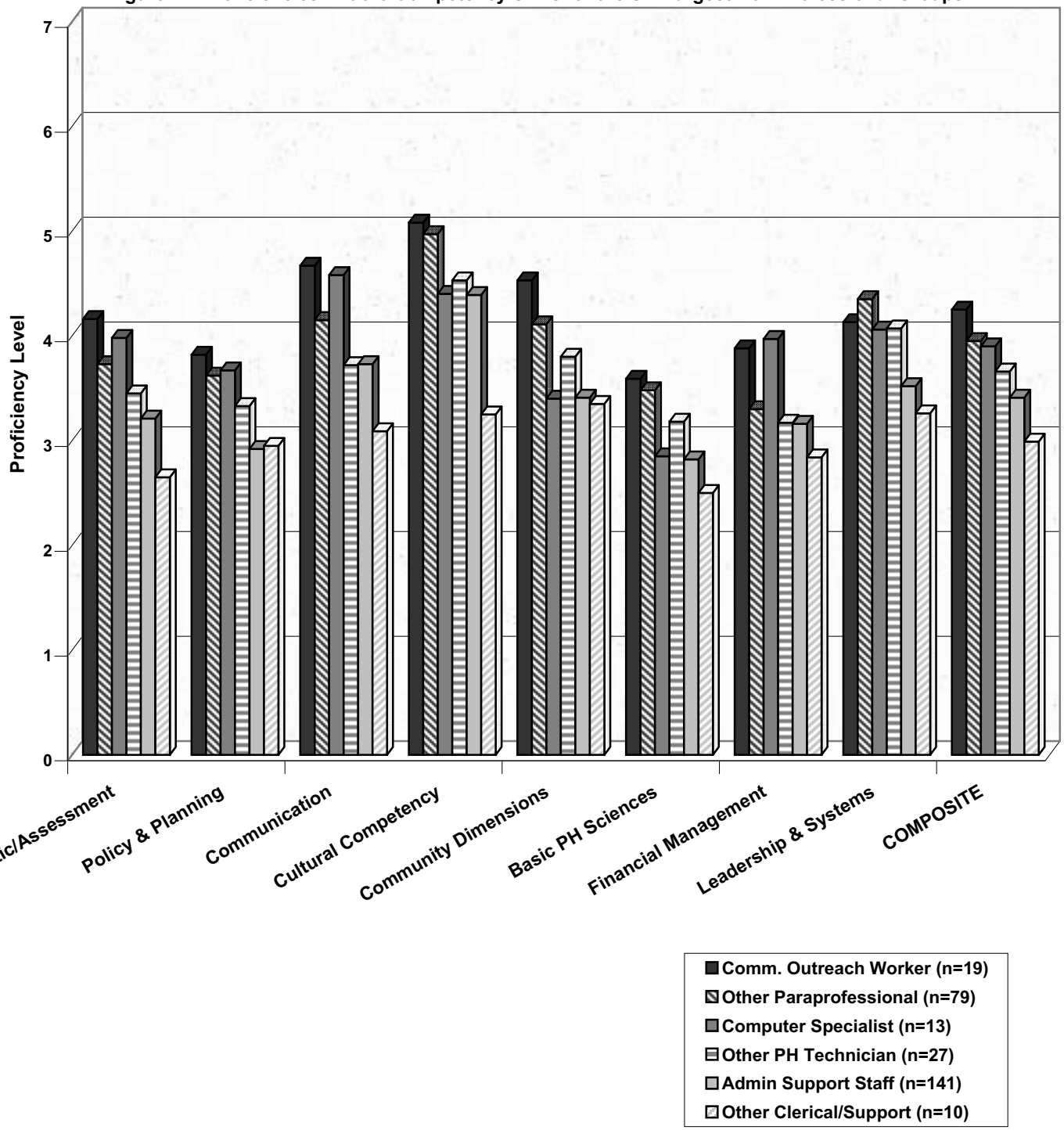


Figure 22. Educational Needs in Core Competency Skills for the Six Largest Non-Professional Groups

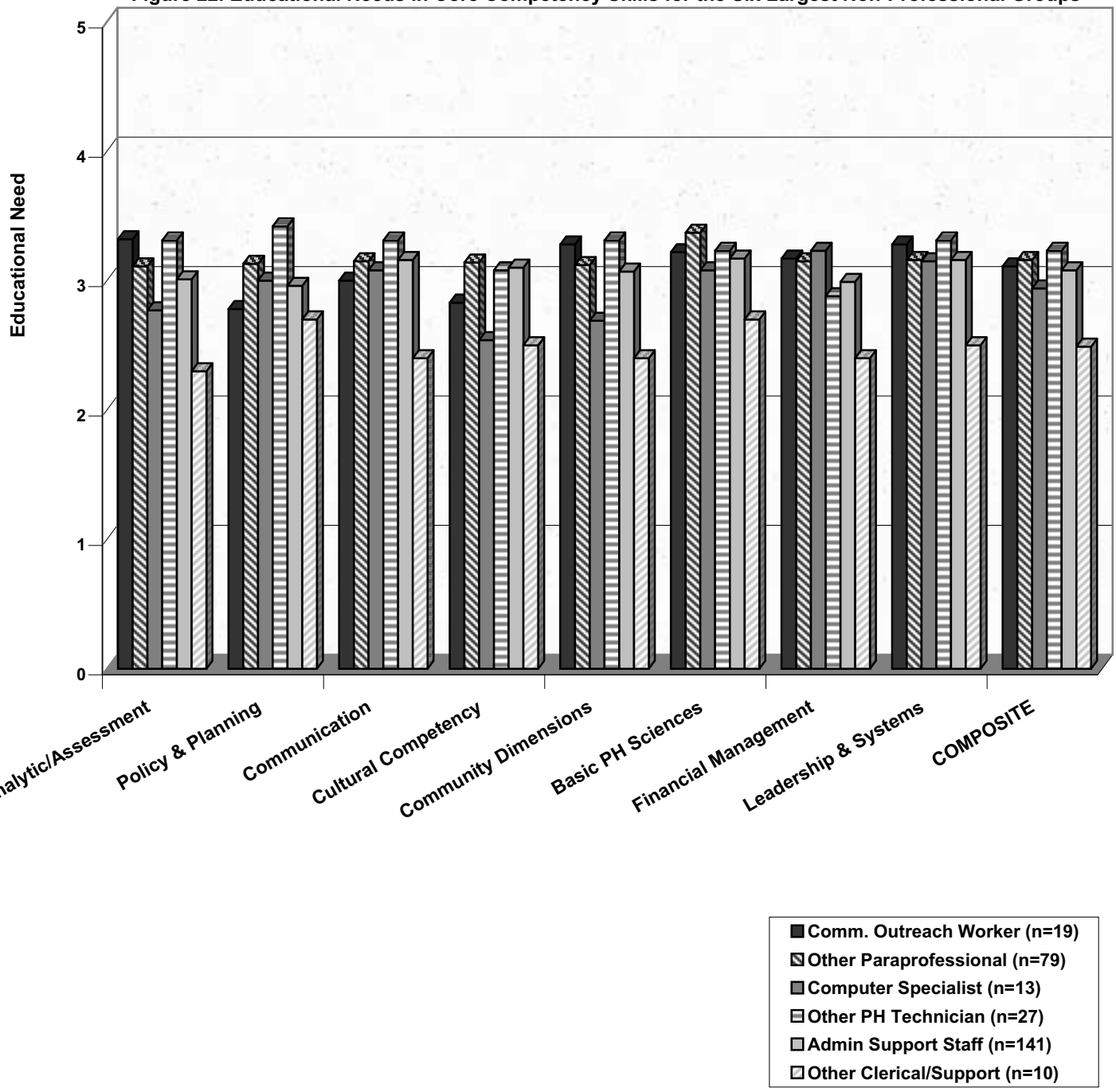


Table 17. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs in the Six Largest Non-Professional Groups (N=289)

Bioterrorism/Emergency Preparedness Competency Domains	Computer Specialist (n=13)				Other PH Technician (n=27)				Comm. Outreach Wkr (n=19)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	2.77	1.72	5	3.00	2.76	1.46	5	2.50	2.95	1.60	6	3.67
Disaster Response Skills	3.26	1.79	3	2.33	3.50	1.53	1	3.83	3.93	1.39	1	4.00
Emergency Communication Skills	4.50	1.83	1	4.50	3.48	1.76	2	4.00	3.63	1.27	2	4.00
Biological/Infectious Disease Skills	3.00	2.08	4	2.00	2.85	1.71	4	2.50	2.95	1.84	6	2.00
Toxic Chem. & Env. Hazard Skills	2.38	1.71	7	1.00	2.58	1.65	6	2.00	3.16	1.74	3	3.00
Physical Injury Skills	3.54	1.98	2	3.00	3.04	1.73	3	3.00	3.16	1.64	3	3.00
Crisis Management Skills	2.77	1.69	5	3.00	2.58	1.68	6	2.00	3.16	1.86	3	4.00
Bioterrorism/EP Composite Skills	*3.17*	*1.67*		*2.55*	*2.97*	*1.38*		*2.88*	*3.28*	*1.31*		*3.57*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.23	1.69	2	4.00	3.33	1.36	3	3.00	3.16	1.57	6	3.00
Disaster Response Educ. Needs	3.46	1.61	1	4.00	3.44	1.22	1	4.00	3.68	1.06	3	4.00
Emergency Communication Educ. Needs	3.23	1.59	2	3.00	2.89	1.37	7	3.00	2.95	1.47	7	2.00
Biological/Infectious Disease Educ. Needs	2.92	1.93	5	3.00	3.33	1.54	3	3.00	3.58	1.64	5	4.00
Toxic Chem. & Env. Hazard Educ. Needs	2.85	1.95	6	2.00	3.19	1.49	5	3.00	3.63	1.50	4	4.00
Physical Injury Educ. Needs	3.08	1.55	4	3.00	3.04	1.40	6	3.00	3.79	1.27	2	4.00
Crisis Management Educ. Needs	2.85	1.28	6	3.00	3.31	1.16	4	3.00	3.83	1.34	1	4.00
Bioterrorism/EP Composite Educ. Needs	*3.09*	*1.41*		*3.43*	*3.21*	*1.18*		*3.14*	*3.52*	*1.00*		*3.86*

Table 17 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	Other Paraprofess. (n=79)				Admin. Supp. Staff (n=141)				Other Clerical/Supp. (n=10)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]													
Disaster Planning Skills	2.79	1.69	5	2.33	2.60	1.76	4	2.00	3.43	1.92	2	3.33	n.s.
Disaster Response Skills	3.72	1.60	1	3.67	3.37	1.71	1	3.00	3.63	1.99	1	3.50	n.s.
Emergency Communication Skills	3.25	1.65	2	3.00	3.13	1.81	2	3.00	3.00	1.90	4	2.75	n.s.
Biological/Infectious Disease Skills	2.47	1.70	6	2.00	2.49	1.82	6	2.00	3.10	2.28	3	2.50	n.s.
Toxic Chem. & Env. Hazard Skills	2.38	1.67	7	2.00	2.48	1.93	7	1.00	3.00	2.21	4	2.50	n.s.
Physical Injury Skills	3.08	1.89	3	3.00	2.83	1.87	3	2.00	2.80	1.93	6	2.00	n.s.
Crisis Management Skills	2.83	1.84	4	2.00	2.52	1.80	5	2.00	2.40	1.90	7	2.00	n.s.
Bioterrorism/EP Composite Skills	*2.94*	*1.48*		*2.52*	*2.78*	*1.59*		*2.28*	*3.05*	*1.76*		*2.83*	*n.s.*
Educational Needs in Bioterrorism/EP[2]													
Disaster Planning Educ. Needs	3.61	1.27	2	4.00	3.34	1.51	2	4.00	3.10	1.66	6	3.00	n.s.
Disaster Response Educ. Needs	3.53	1.26	5	4.00	3.30	1.39	3	3.00	3.30	1.49	4	3.00	n.s.
Emergency Communication Educ. Needs	3.11	1.31	7	3.00	2.95	1.33	7	3.00	3.00	1.41	7	3.00	n.s.
Biological/Infectious Disease Educ. Needs	3.58	1.40	3	4.00	3.46	1.52	1	4.00	3.60	1.71	1	4.50	n.s.
Toxic Chem. & Env. Hazard Educ. Needs	3.62	1.41	1	4.00	3.30	1.61	3	4.00	3.40	1.90	2	4.50	n.s.
Physical Injury Educ. Needs	3.58	1.24	3	4.00	3.21	1.50	5	3.00	3.40	1.71	2	4.00	n.s.
Crisis Management Educ. Needs	3.51	1.12	6	4.00	3.21	1.46	5	3.00	3.20	1.93	5	4.00	n.s.
Bioterrorism/EP Composite Educ. Needs	*3.51*	*1.07*		*3.57*	*3.25*	*1.26*		*3.57*	*3.29*	*1.57*		*3.93*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the six groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When the overall difference among groups was not significant, n.s. is noted. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 23. Proficiencies in Bioterrorism/Emergency Preparedness Competency Skills for the Six Largest Non-Professional Groups

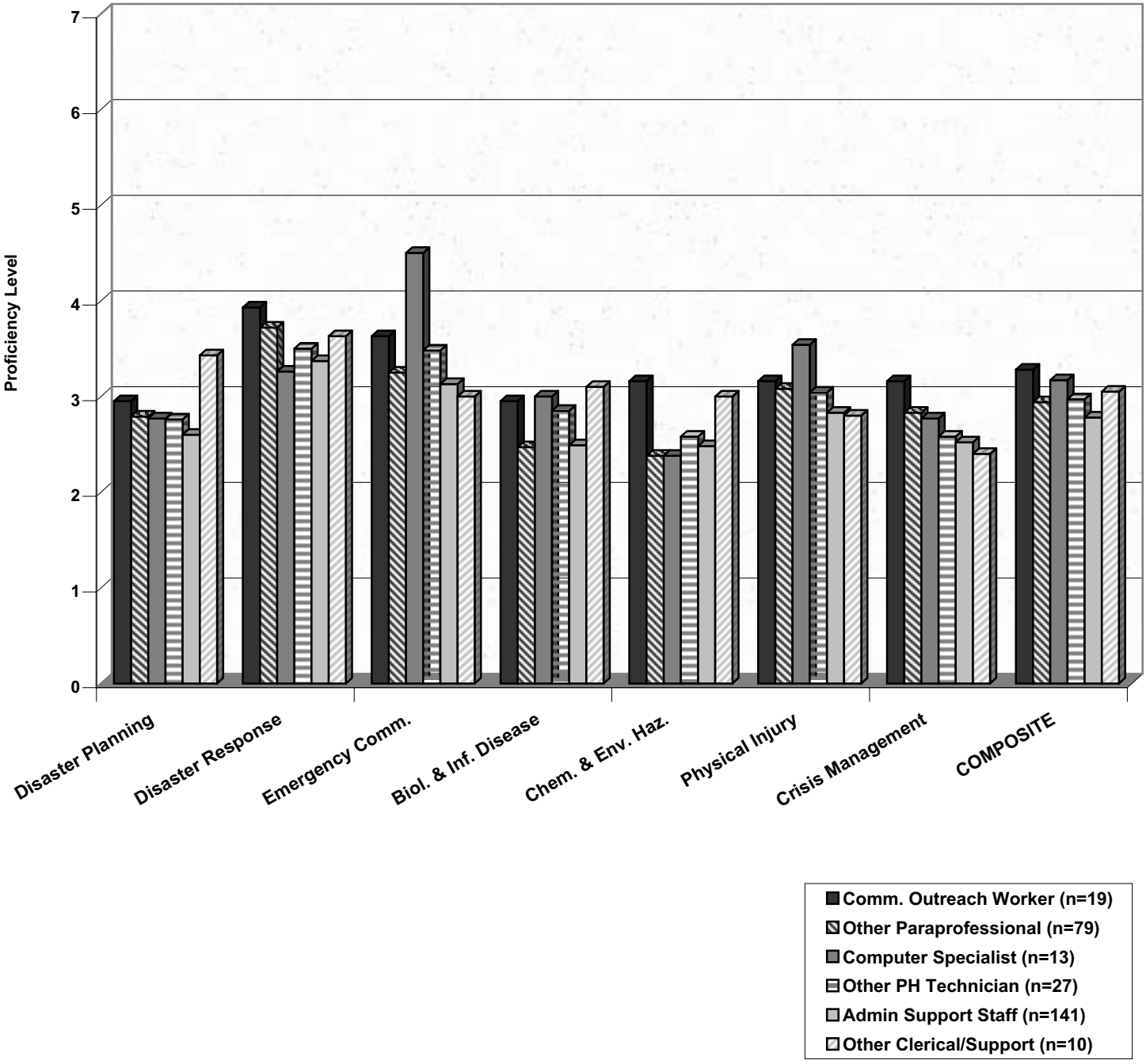


Figure 24. Educational Needs in Bioterrorism/Emergency Preparedness Competency Skills for the Six Largest Non-Professional Groups

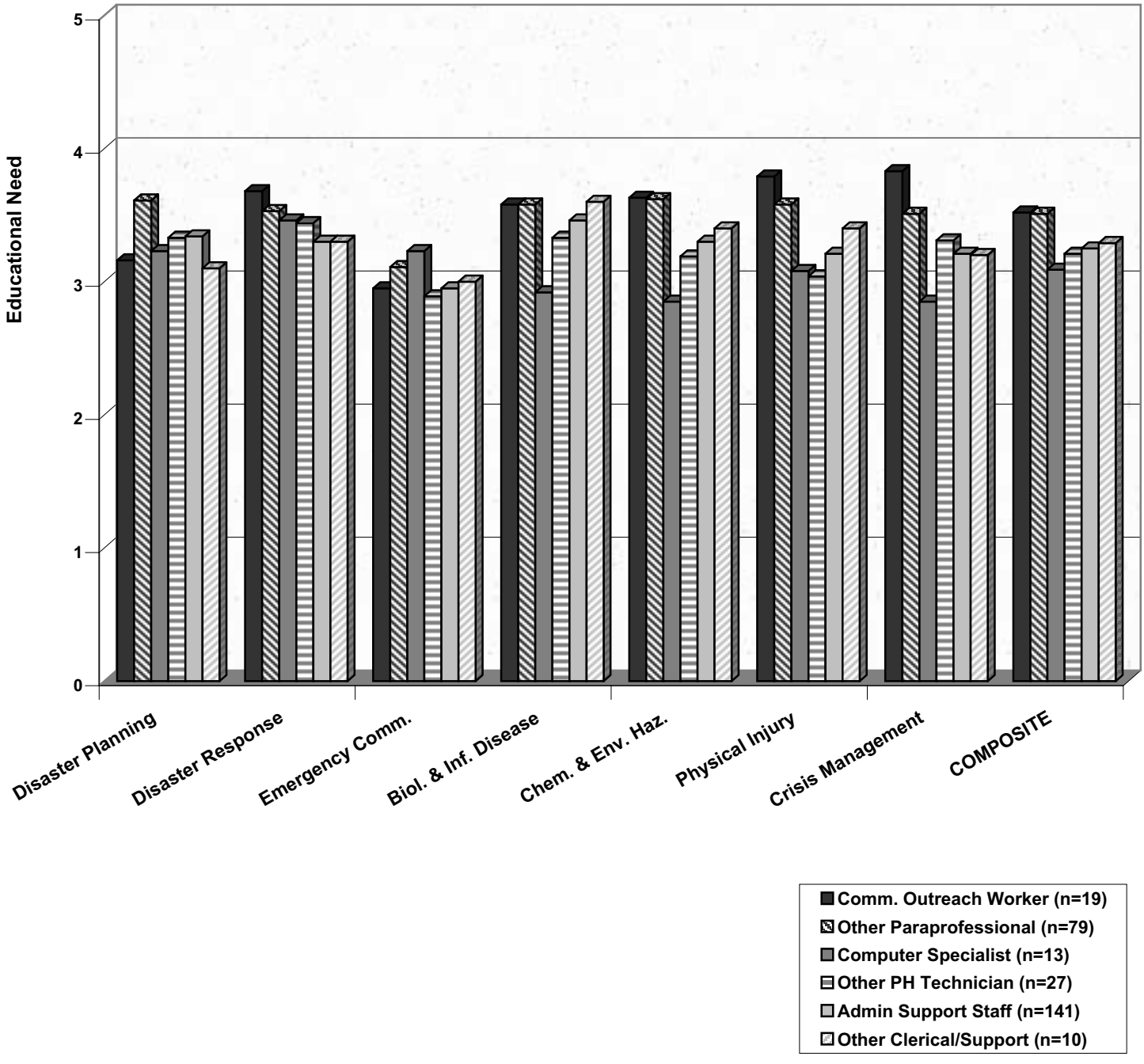


Table 18. Educational Preferences of Workers in the Six Largest Non-Professional Groups (N=289)

Types of Preference	Computer Specialist (n=13)				Other PH Technician (n=27)				Comm. Outreach Wkr. (n=19)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	1.92	0.90	2	2.00	2.12	0.73	2	2.00	2.53	0.64	1	3.00
1-Day Workshops	2.54	0.52	1	3.00	2.36	0.76	1	3.00	2.22	0.65	2	2.00
Several-Day Workshops	1.77	0.73	3	2.00	1.65	0.65	3	2.00	1.63	0.81	3	1.00
Academic Semester Courses	1.50	0.80	4	1.00	1.63	0.71	4	1.50	1.47	0.74	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.62	0.65	1	3.00	2.71	0.55	1	3.00	2.71	0.47	1	3.00
Interactive Teleconferences	1.77	0.83	4	2.00	1.67	0.70	4	2.00	1.73	0.59	4	2.00
Internet, Web-Based Instruction	2.15	0.80	2	2.00	1.71	0.75	3	2.00	2.13	0.81	3	2.00
Combination Format	1.85	0.69	3	2.00	1.87	0.69	2	2.00	2.24	0.75	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.77	0.60	1	3.00	2.76	0.60	1	3.00	2.63	0.68	1	3.00
Weekend Classes	1.23	0.44	4	1.00	1.42	0.72	4	1.00	1.13	0.35	4	1.00
Evening Classes	1.54	0.66	3	1.00	1.57	0.73	2	1.00	1.27	0.59	3	1.00
Self-Determined Web-Based	2.15	0.55	2	2.00	1.52	0.67	3	1.00	1.88	0.81	2	2.00
Preferences for Educational Recognition												
Certificate	2.46	0.66	1	3.00	2.36	0.70	2	2.00	2.68	0.67	1	3.00
Continuing Education Units	2.08	0.76	2	2.00	2.39	0.84	1	3.00	2.44	0.63	2	2.50
Undergraduate Academic Credit	1.92	0.86	3	2.00	1.74	0.81	3	2.00	2.13	0.52	4	2.00
Graduate Academic Credit	2.08	0.86	2	2.00	1.61	0.72	4	1.00	2.27	0.59	3	2.00

Table 18 (continued).

Types of Preference	Other Paraprofess. (n=79)				Admin. Support Staff (n=141)				Other Clerical/Support (n=10)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.07	0.73	2	2.00	2.09	0.70	2	2.00	1.88	0.64	2	2.00
1-Day Workshops	2.36	0.65	1	2.00	2.35	0.66	1	2.00	2.44	0.88	1	3.00
Several-Day Workshops	1.75	0.76	3	2.00	1.71	0.75	3	2.00	1.75	0.89	3	1.50
Academic Semester Courses	1.51	0.71	4	1.00	1.62	0.84	4	1.00	1.43	0.79	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.53	0.64	1	3.00	2.67	0.53	1	3.00	2.50	0.71	1	3.00
Interactive Teleconferences	1.54	0.67	4	1.00	1.65	0.67	4	2.00	1.75	0.71	2	2.00
Internet, Web-Based Instruction	1.83	0.65	3	2.00	1.77	0.72	3	2.00	1.50	0.76	3	1.00
Combination Format	1.95	0.66	2	2.00	1.88	0.72	2	2.00	1.50	0.76	3	1.00
Preferences for Time of Course Offering												
Weekday Classes	2.65	0.60	1	3.00	2.78	0.51	1	3.00	2.67	0.71	1	3.00
Weekend Classes	1.29	0.62	4	1.00	1.24	0.50	4	1.00	1.00	0.00	4	1.00
Evening Classes	1.49	0.69	3	1.00	1.43	0.66	3	1.00	1.44	0.73	2	1.00
Self-Determined Web-Based	1.75	0.73	2	2.00	1.69	0.73	2	2.00	1.38	0.52	3	1.00
Preferences for Educational Recognition												
Certificate	2.51	0.60	1	3.00	2.44	0.67	1	3.00	2.60	0.70	1	3.00
Continuing Education Units	2.01	0.77	2	2.00	1.94	0.78	2	2.00	2.13	0.83	2	2.00
Undergraduate Academic Credit	1.92	0.81	3	2.00	1.85	0.85	3	2.00	1.75	0.89	3	1.50
Graduate Academic Credit	1.82	0.78	4	2.00	1.75	0.84	4	1.00	1.63	0.74	4	1.50

4d. Differences by Position Category

A public health enumeration coding system was used to classify workers into the eight standard positions categories. Sufficient respondents in five of these categories permitted comparisons. As described in Table 19, these five position categories and the number of workers in each category were: Officials/Administrators (n=31), Professionals (n=868), Technicians (n=70), Paraprofessionals (n=98), and Administrative Support (n=164).

The average age ranged from 37.1 years for the Paraprofessional group to 50.3 years for the Officials/Administrators group. Females dominated all categories with the exception of the Officials/Administrators group, where the gender was more balanced (males=45%; females=55%). The Officials/Administrators group also had the highest percentage of white workers (97%). Paraprofessionals had the highest percentage of non-white workers; in this group half (50%) were Hispanic.

Officials/Administrators reported the highest level of education with more than half of the respondents (57%) prepared at a master's degree level or beyond; in this group 17% held a doctoral degree. In the Professional group, 57% of the respondents had earned a baccalaureate degree, 31% a master's degree, and 3% a doctoral degree. About one-third (32.4%) of the Technicians group indicated that they had earned a baccalaureate degree. The most frequently reported educational achievement in the Paraprofessional and Administrative Support groups was a high school diploma (65% and 57%, respectively).

The average number of years of experience in the discipline ranged from 6.6 years for Paraprofessionals to 20.1 years for Officials/Administrators. Professionals averaged 15.2 years in the discipline and Technicians 13.2 years. The pattern was similar for experience in public health. Again the Officials/Administrators had highest average number of years in public health (15.1 years) and the Paraprofessionals the lowest (6.3 years).

Average annual salaries (means) varied across groups as follows: Officials/Administrators ($61,543), Professionals ($47,993), Technicians ($35,269), Paraprofessionals ($25,342), and Administrative Support ($27,126). The percentage of respondents who reported they knew a non-English language also differed across position categories: Officials/Administrators (16%), Professionals (27%), Technicians (30%), Paraprofessionals (50%), and Administrative Support (34%).

Table 20 summarizes the Core Competency proficiencies and educational needs for these five position categories. In descending order, the means for proficiency in Core Competency Skills (composite score) among these groups were Officials/Administrators (5.48), Professionals (4.63), Paraprofessionals (4.01), Technicians (3.83), and Administrative Support (3.39). Among these five groups, a similar pattern of marked, statistically significant differences ($p < .001$) were found in all eight Core Competency Skill subscales. These differences are graphically displayed in Figure 25. Administrators consistently were the most proficient, followed by the Professionals group. The Administrative Support group was found to be the least proficient across all dimensions.

A significant difference ($p < .001$) in overall educational need for Core Competency Skills (composite score) was found among these five groups. Except for Policy Development/Program Planning Skills, significant differences were found in all subscales. As documented in Figure 26, educational needs were markedly less for the Official/Administrator group. While educational needs for the Professional group were less in Communication Skills and Cultural Competency Skills, their educational needs did not differ much from the Technicians, Paraprofessionals, and Administrative Support groups.

As shown in Table 21, differences ($p < .01$) were found in overall proficiency for Bioterrorism/ Emergency Preparedness Skills among the five position category groups. In descending order, the means for these groups on the composite score were Officials/Administrators (3.77), Professionals (3.11), Technicians (3.01), Paraprofessionals (3.00), and Administrative Support (2.77). Except for Toxic Chemical/Environmental Hazard Skills, significant differences were found in all Bioterrorism/ Emergency Preparedness competency subscales. The Officials/Administrator group was most proficient in all dimensions. The Professionals and Paraprofessionals groups were more proficient than the other three groups in Disaster Response Skills, Physical Injury Skills and Crisis Management Skills. The Technicians group was more proficient in Emergency Communication Skills than the other three groups. These differences are graphically illustrated in Figure 27.

However, no significant difference in overall educational need for Bioterrorism/Emergency Preparedness Competency Skills (composite score) was found among the five position categories. When the seven subscales were examined individually, no statistical differences were found. This pattern is conveyed in Figure 28. It is interesting to note that although the Officials/Administrators were most proficient in all Bioterrorism/Emergency Preparedness dimensions, they rated their educational needs higher or nearly as high as other groups in most categories.

Table 22 summarizes the educational preferences among these five position categories. The groups were similar in their preferences for course length, educational format, and time of course offering. While other groups noted preferences for certificates and continuing educational units, the Officials/Administrators group indicated their highest preference for educational recognition was to receive graduate academic credit.

Table 19. Characteristics of Colorado Public Health Workforce by Position Category (N=1,231)

Variables and Values	Officials/Admins. (n=31)				Professionals (n=868)				Technicians (n=70)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			50.32	7.04			44.60	10.32			42.79	9.63
Under 29 Years	0	.0			89	10.4			7	10.4		
30-39 Years	3	9.7			168	19.7			15	22.4		
40-49 Years	12	38.7			282	33.1			31	46.3		
50-59 Years	13	41.9			263	30.8			12	17.9		
Over 60 Years	31	9.7			51	6.0			2	3.0		
Gender												
Male	13	44.8			164	20.0			13	19.4		
Female	16	55.2			658	80.0			54	80.6		
Race												
White	30	96.8			758	88.8			52	77.6		
Hispanic	0	.0			53	6.2			9	13.4		
Black	0	.0			12	1.4			2	3.0		
Asian	1	32.2			8	.9			2	3.0		
Other or Multiracial	0	.0			23	2.7			2	3.0		
Highest Education												
High School Diploma	0	.0			7	.8			12	17.6		
Profess./Vocational Diploma	2	6.7			18	2.1			15	22.1		
Associate Degree	2	6.7			49	5.7			17	25.0		
Baccalaureate Degree	9	30.0			492	56.9			22	32.4		
Master's Degree	12	40.0			269	31.1			2	2.9		
Doctoral Degree	5	16.7			29	3.4			0	.0		
College Degree												
No	4	13.3			74	8.6			44	64.7		
Yes	26	86.7			790	91.4			24	35.3		
Years Since Last Degree			22.23	11.07			15.14	10.69			17.47	11.14
Less than 2 Years	0	.0			42	5.0			3	5.2		
2-5 Years	3	9.7			120	14.3			6	10.3		
5-9 Years	3	9.7			163	19.4			5	8.6		
10-14 Years	2	6.5			130	15.5			10	17.2		
15-19 Years	3	9.7			96	11.4			11	19.0		
20 or More Years	20	64.5			290	34.5			23	39.7		
Years Experience in Discipline			20.10	10.86			15.23	10.49			13.24	10.20
Less than 2 Years	0	.0			43	5.1			4	8.0		
2-5 Years	3	9.7			107	12.7			9	18.0		
5-9 Years	5	16.1			162	19.2			7	14.0		
10-14 Years	2	6.5			127	15.1			9	18.0		
15-19 Years	3	9.7			99	11.7			8	16.0		
20 or More Years	18	58.1			305	36.2			13	26.0		
Years Experience in Public Health			15.06	9.39			10.17	8.63			6.76	6.45
Less than 2 Years	3	9.7			119	13.9			20	30.3		

Table 19 (continued).

Variables and Values	Officials/Admins. (n=31)				Professionals (n=868)				Technicians (n=70)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	2	6.5			161	18.9			11	16.7		
5-9 Years	4	12.9			193	22.6			13	19.7		
10-14 Years	8	25.8			153	17.9			13	19.7		
15-19 Years	5	16.1			77	9.0			6	9.1		
20 or More Years	9	29.0			151	17.7			3	4.5		
County Survey Response												
Very Small	5	17.2			32	4.2			0	.0		
Small	10	34.5			84	11.0			4	6.9		
Medium	3	10.3			87	11.4			5	8.6		
Large	11	37.9			558	73.3			49	84.5		
Organized Health Department												
No	14	48.3			135	17.7			7	12.1		
Yes	15	51.7			626	82.3			51	87.9		
Position Category												
Officials & Administrators	31	100.0			0	.0			0	.0		
Professionals	0	.0			868	100.0			0	.0		
Technicians	0	.0			0	.0			70	100.0		
Protective Service	0	.0			0	.0			0	.0		
Paraprofessionals	0	.0			0	.0			0	.0		
Administrative Support	0	.0			0	.0			0	.0		
Skilled Craft	0	.0			0	.0			0	.0		
Service/Maintenance	0	.0			0	.0			0	.0		
Professional Position												
No	0	.0			0	.0			70	100.0		
Yes	31	100.0			868	100.0			0	.0		
Type of Position												
Front Line Staff	1	3.2			398	46.5			55	82.1		
Senior Level Staff	2	6.5			194	22.7			6	9.0		
Supervisory/Mgmt Staff	28	90.3			264	30.8			6	9.0		
Full-Time Employment												
No	3	10.3			175	20.3			10	14.5		
Yes	26	89.7			688	79.7			59	85.5		
Annual Salary (FTE)			$61,543	$25,084			$47,992	$16,993			$35,269	$14,905
Less Than $20,000	0	.0			5	.7			9	15.8		
$20,000 to $29,999	0	.0			42	5.8			16	28.1		
$30,000 to $39,999	3	12.5			208	28.5			11	19.3		
$40,000 to $49,999	5	20.8			19	26.5			9	15.8		
$50,000 to $59,999	6	25.0			124	17.0			8	14.0		
$60,000 to $69,999	5	20.8			71	9.7			3	5.3		
$70,000 to $79,999	1	4.2			40	5.5			0	.0		

Table 19 (continued).

Variables and Values	Officials/Admins. (n=31)				Professionals (n=868)				Technicians (n=70)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Over $80,000	4	16.7			46	6.3			1	1.8		
Know Non-English Language												
No	26	83.9			631	73.3			48	69.6		
Yes	5	16.1			230	26.7			21	30.4		
Other Language Speaking												
Fair	0	.0			104	45.6			5	23.8		
Good	2	50.0			69	30.3			5	23.8		
Excellent	2	50.0			55	24.1			11	52.4		
Other Language Reading												
Fair	2	50.0			94	42.5			5	23.8		
Good	0	.0			83	37.6			5	23.8		
Excellent	2	50.0			44	19.9			11	52.4		
Other Language Writing												
Fair	1	33.3			128	59.0			5	26.3		
Good	0	.0			54	24.9			6	31.6		
Excellent	2	66.7			35	16.1			8	42.1		

Table 19 (continued).

Variables and Values	Paraprofessionals (n=98)				Admin. Support (n=164)			
	n	%	Mean	SD	n	%	Mean	SD
Age			37.08	11.13			43.64	11.88
Under 29 Years	25	26.9			26	16.8		
30-39 Years	30	32.3			30	18.8		
40-49 Years	21	22.6			51	31.9		
50-59 Years	15	16.1			40	25.0		
Over 60 Years	2	2.2			13	8.1		
Gender								
Male	3	3.3			8	5.3		
Female	89	96.7			142	94.7		
Race								
White	41	44.1			96	60.4		
Hispanic	46	49.5			52	32.7		
Black	3	3.2			5	3.1		
Asian	1	1.1			4	2.5		
Other or Multiracial	2	2.2			2	1.3		
Highest Education								
High School Diploma	60	64.5			91	57.2		
Profess./Vocational Diploma	15	16.1			26	16.4		
Associate Degree	12	12.9			21	13.2		
Baccalaureate Degree	5	5.4			18	11.3		
Master's Degree	1	1.1			3	1.9		
Doctoral Degree	0	.0			0	.0		
College Degree								
No	87	93.5			138	86.8		
Yes	6	6.5			21	13.2		
Years Since Last Degree			37.08	11.13			43.64	11.88
Less than 2 Years	4	5.0			8	5.6		
2-5 Years	15	18.8			8	5.6		
5-9 Years	12	15.0			22	15.5		
10-14 Years	13	16.3			18	12.7		
15-19 Years	8	10.0			16	11.3		
20 or More Years	28	35.0			70	49.3		
Years Experience in Discipline			6.62	7.37			8.49	9.48
Less than 2 Years	11	29.7			26	29.2		
2-5 Years	9	24.3			20	22.5		
5-9 Years	8	21.6			11	12.4		
10-14 Years	2	5.4			9	10.1		
15-19 Years	3	8.1			5	5.6		
20 or More Years	4	10.8			18	20.2		
Years Experience in Public Health			6.34	6.40			8.31	7.87
Less than 2 Years	21	24.1			38	25.0		

Table 19 (continued).

Variables and Values	Paraprofessionals (n=98)				Admin. Support (n=164)			
	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	24	27.6			28	18.4		
5-9 Years	17	19.5			30	19.7		
10-14 Years	17	19.5			26	17.1		
15-19 Years	3	3.4			9	5.9		
20 or More Years	5	5.7			21	13.8		
County Survey Response								
Very Small	1	1.1			6	4.1		
Small	11	12.0			9	6.2		
Medium	14	15.2			12	8.2		
Large	66	71.7			119	81.5		
Organized Health Department								
No	20	21.7			23	15.8		
Yes	72	78.3			123	84.2		
Position Category								
Officials & Administrators	0	.0			0	.0		
Professionals	0	.0			0	.0		
Technicians	0	.0			0	.0		
Protective Service	0	.0			0	.0		
Paraprofessionals	98	100.0			0	.0		
Administrative Support	0	.0			164	100.0		
Skilled Craft	0	.0			0	.0		
Service/Maintenance	0	.0			0	.0		
Professional Position								
No	98	100.0			164	100.0		
Yes	0	.0			0	.0		
Type of Position								
Front Line Staff	76	80.9			127	80.9		
Senior Level Staff	12	12.8			20	12.7		
Supervisory/Mgmt Staff	6	6.4			10	6.4		
Full-Time Employment								
No	12	12.2			19	11.7		
Yes	86	87.8			144	88.3		
Annual Salary (FTE)			$25,342	$5,066			$27,126	$8,147
Less Than $20,000	8	9.6			19	15.7		
$20,000 to $29,999	54	65.1			62	51.2		
$30,000 to $39,999	21	25.3			27	22.3		
$40,000 to $49,999	0	.0			11	9.1		
$50,000 to $59,999	0	.0			2	1.7		
$60,000 to $69,999	0	.0			0	.0		
$70,000 to $79,999	0	.0			0	.0		

Table 19 (continued).

Variables and Values	Paraprofessionals (n=98)				Admin. Support (n=164)			
	n	%	Mean	SD	n	%	Mean	SD
Over $80,000	0	.0			0	.0		
Know Non-English Language								
No	49	50.0			106	65.8		
Yes	49	50.0			55	34.2		
Other Language Speaking								
Fair	7	14.9			4	7.0		
Good	16	34.0			24	42.1		
Excellent	24	51.1			29	50.9		
Other Language Reading								
Fair	12	24.5			9	16.1		
Good	14	28.6			21	37.5		
Excellent	23	46.9			26	46.4		
Other Language Writing								
Fair	17	35.4			12	22.2		
Good	13	27.1			22	40.7		
Excellent	18	37.5			20	37.0		

Table 20. Differences in Core Competency Proficiencies and Educational Needs by Position Category (n=1,231)

Core Competency Domains	Officials/Admins. (n=31)				Professionals (n=868)				Technicians (n=70)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	5.37	1.10	6	5.75	4.64	1.28	4	4.75	3.76	1.50	4	3.75
Policy Development/Prog. Planning Skills	5.28	1.13	7	5.50	4.19	1.42	7	4.50	3.46	1.56	7	3.50
Communication Skills	5.72	0.86	2	6.00	4.96	1.09	2	5.17	4.09	1.33	2	4.18
Cultural Competency Skills	5.53	0.93	4	5.75	5.25	1.05	1	5.25	4.62	1.39	1	4.88
Community Dimensions of Practice Skills	5.56	1.14	3	6.00	4.59	1.20	5	4.75	3.69	1.46	5	3.75
Basic Public Health Sciences Skills	5.11	1.31	8	5.50	4.43	1.35	6	4.50	3.28	1.57	8	3.25
Financial Planning & Management Skills	5.39	0.94	5	5.60	4.14	1.32	8	4.20	3.55	1.36	6	3.80
Leadership & Systems Thinking Skills	5.81	1.00	1	6.00	4.84	1.22	3	5.00	4.09	1.45	2	4.00
Core Competencies Composite Skills	*5.48*	*0.90*		*5.74*	*4.63*	*1.04*		*4.74*	*3.83*	*1.22*		*3.90*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	2.45	0.96	3	2.00	3.06	1.08	3	3.00	3.19	1.32	2	3.00
Policy Devel./Prog. Planning Educ. Needs	2.61	1.33	2	2.00	3.18	1.18	2	3.00	3.19	1.34	2	3.00
Communication Educ. Needs	2.03	0.84	8	2.00	2.67	1.12	8	3.00	3.03	1.08	7	3.00
Cultural Competency Educ. Needs	2.35	0.95	5	2.00	2.71	1.09	7	3.00	2.90	1.23	8	3.00
Community Dimen. of Practice Educ. Needs	2.39	0.95	4	2.00	2.95	1.10	6	3.00	3.07	1.28	5	3.00
Basic Public Health Sciences Educ. Needs	2.65	1.28	1	2.00	3.00	1.19	5	3.00	3.22	1.33	1	3.00
Financial Planning & Mgmt. Educ. Needs	2.35	1.20	5	2.00	3.22	1.33	1	3.00	3.07	1.33	5	3.00
Leadership & Systems Thinking Educ. Needs	2.35	1.11	5	2.00	3.03	1.13	4	3.00	3.17	1.20	4	3.00
Core Competencies Composite Educ. Needs	*2.40*	*0.68*		*2.38*	*2.98*	*0.76*		*3.00*	*3.11*	*1.02*		*3.13*

Table 20 (continued).

Core Competency Domains	Paraprofessionals (n=98)				Admin. Support (n=164)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]									
Analytic/Assessment Skills	3.82	1.51	5	4.00	3.17	1.54	5	3.00	<.001
Policy Development/Prog. Planning Skills	3.66	1.47	6	3.75	2.96	1.54	7	2.75	<.001
Communication Skills	4.25	1.20	3	4.40	3.69	1.40	2	3.82	<.001
Cultural Competency Skills	4.99	1.31	1	5.13	4.31	1.50	1	4.50	<.001
Community Dimensions of Practice Skills	4.19	1.30	4	4.25	3.42	1.55	4	3.50	<.001
Basic Public Health Sciences Skills	3.50	1.43	7	3.50	2.81	1.56	8	2.50	<.001
Financial Planning & Management Skills	3.41	1.40	8	3.20	3.15	1.53	6	3.00	<.001
Leadership & Systems Thinking Skills	4.31	1.43	2	4.50	3.52	1.53	3	3.75	<.001
Core Competencies Composite Skills	*4.01*	*1.17*		*3.93*	*3.39*	*1.36*		*3.30*	*<.001*
Educ. Needs in Core Competency Domains[2]									
Analytic/Assessment Educ. Needs	3.15	1.24	3	3.00	3.01	1.39	6	3.00	<.05
Policy Devel./Prog. Planning Educ. Needs	3.06	1.38	8	3.00	3.01	1.43	6	3.00	n.s.
Communication Educ. Needs	3.12	1.25	6	3.00	3.12	1.37	2	3.00	<.001
Cultural Competency Educ. Needs	3.08	1.28	7	3.00	3.04	1.28	4	3.00	<.001
Community Dimen. of Practice Educ. Needs	3.15	1.11	3	3.00	3.03	1.40	5	3.00	<.05
Basic Public Health Sciences Educ. Needs	3.34	1.27	1	3.00	3.20	1.57	1	3.00	<.01
Financial Planning & Mgmt. Educ. Needs	3.15	1.44	3	3.00	3.00	1.55	8	3.00	<.01
Leadership & Systems Thinking Educ. Needs	3.18	1.09	2	3.00	3.09	1.27	3	3.00	<.01
Core Competencies Composite Educ. Needs	*3.15*	*0.85*		*3.00*	*3.06*	*1.10*		*3.00*	*<.001*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the five groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When the overall difference among groups was non-significant, n.s. is noted. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparisons may be obtained from the author.

Figure 25. Proficiencies in Core Competency Skills by Position Category

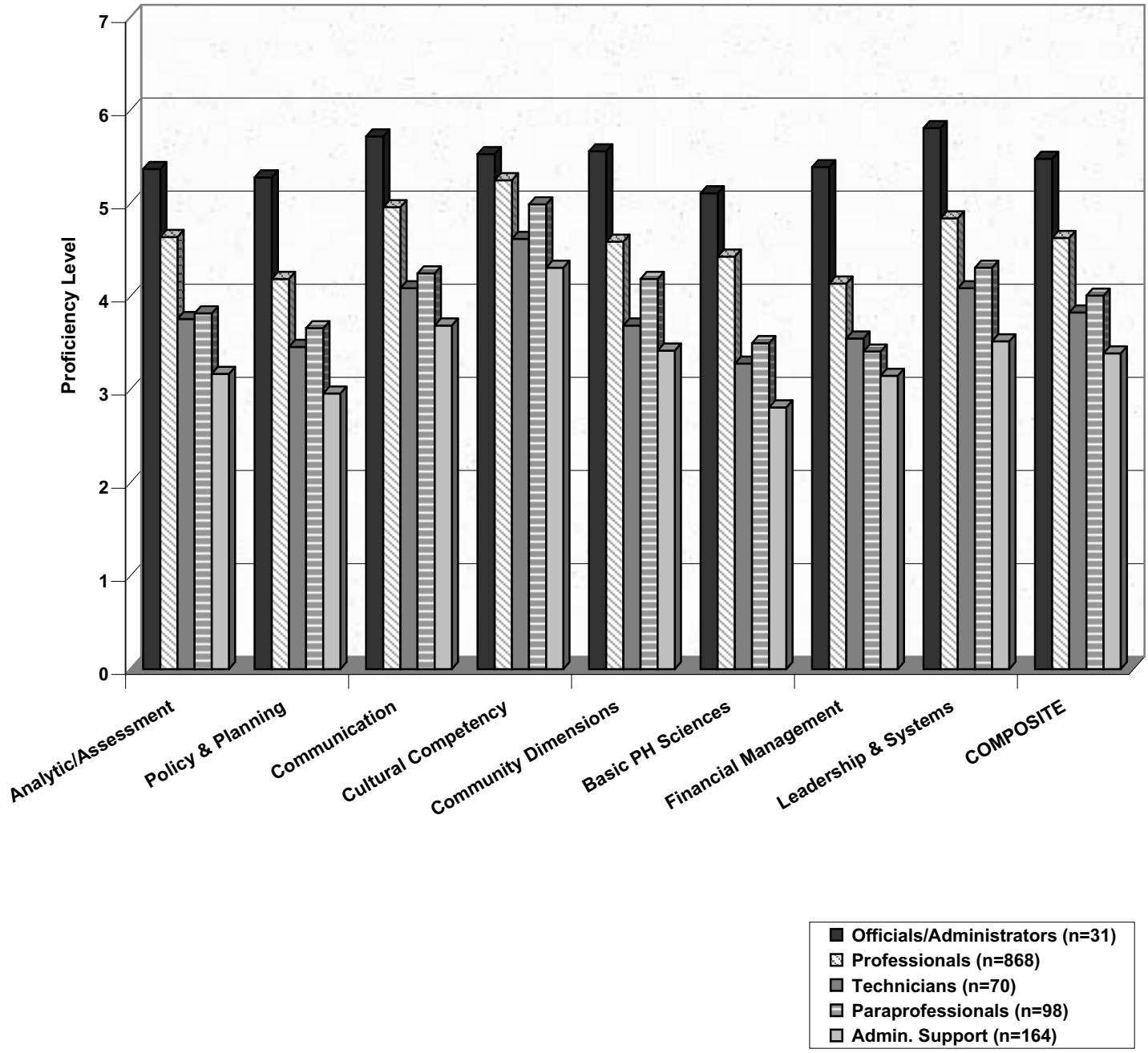


Figure 26. Educational Needs in Core Competency Skills by Position Category

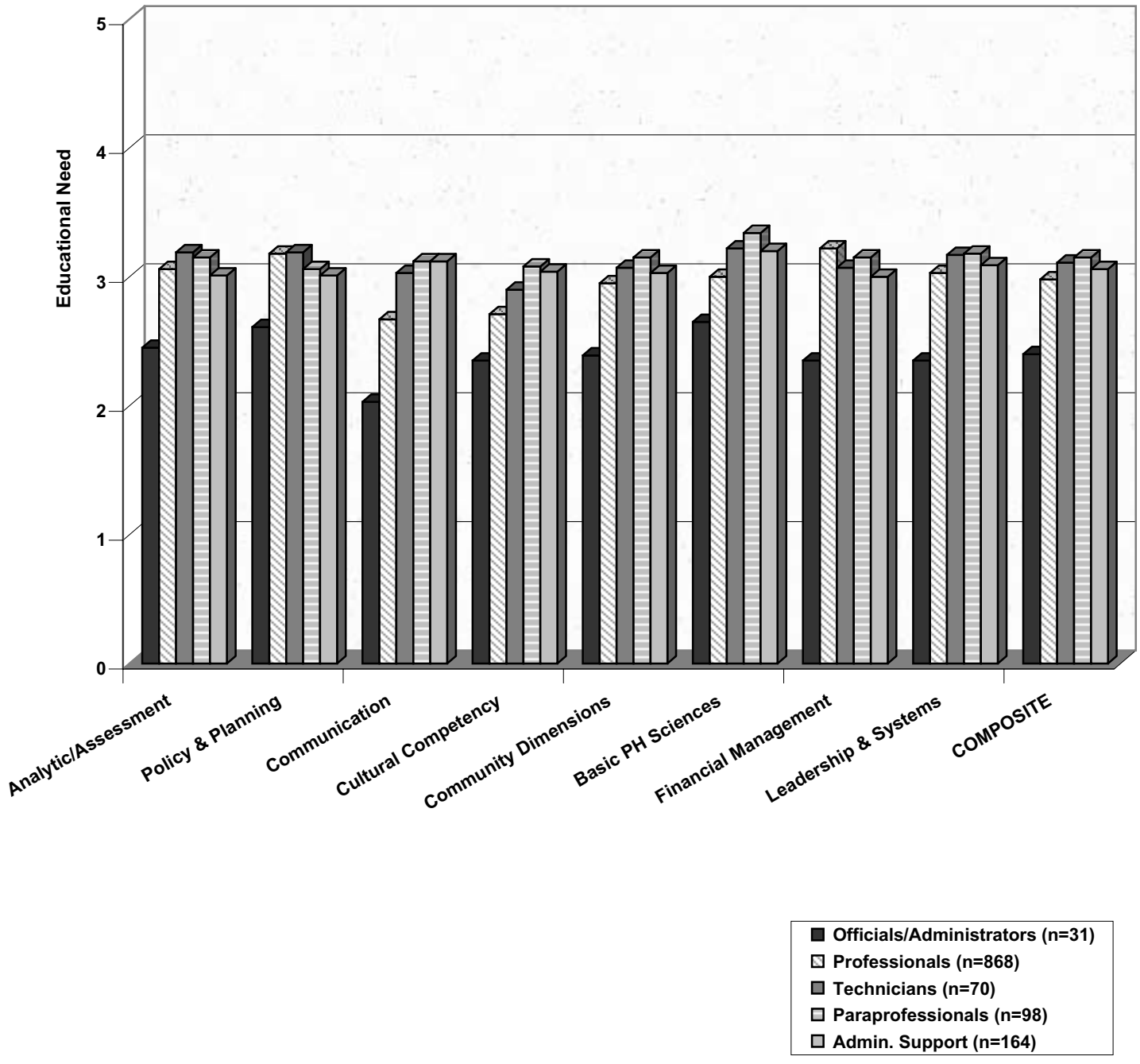


Table 21. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs by Position Category (N=1,231)

Bioterrorism/Emergency Preparedness Competency Domains	Officials/Admins. (n=31)				Professionals (n=868)				Technicians (n=70)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	3.80	1.68	4	3.67	2.79	1.60	5	2.33	2.78	1.64	5	2.67
Disaster Response Skills	4.58	1.43	1	4.67	3.97	1.44	1	4.00	3.56	1.55	2	3.67
Emergency Communication Skills	3.85	1.75	3	4.00	3.25	1.64	3	3.00	3.73	1.89	1	4.00
Biological/Infectious Disease Skills	3.71	1.95	5	4.00	2.79	1.68	5	2.00	2.81	1.80	4	2.00
Toxic Chem. & Env. Hazard Skills	3.13	1.77	7	3.00	2.63	1.71	7	2.00	2.58	1.72	6	2.00
Physical Injury Skills	3.94	1.95	2	4.00	3.28	1.85	2	3.00	3.04	1.80	3	3.00
Crisis Management Skills	3.35	1.82	6	3.00	3.00	1.84	4	3.00	2.54	1.70	7	2.00
Bioterrorism/EP Composite Skills	*3.77*	*1.53*		*3.55*	*3.11*	*1.38*		*2.90*	*3.01*	*1.46*		*2.71*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.74	1.21	2	4.00	3.70	1.20	2	4.00	3.51	1.44	2	4.00
Disaster Response Educ. Needs	3.68	1.28	3	4.00	3.69	1.19	3	4.00	3.53	1.38	1	4.00
Emergency Commun. Educ. Needs	3.16	1.10	6	3.00	3.09	1.22	7	3.00	2.99	1.38	7	3.00
Biol./Infect. Disease Educ. Needs	3.23	1.33	4	3.00	3.58	1.27	4	4.00	3.43	1.61	3	4.00
Toxic Chem./Env. Haz. Educ. Needs	3.84	1.29	1	4.00	3.71	1.29	1	4.00	3.31	1.61	4	3.50
Physical Injury Educ. Needs	3.19	1.25	5	3.00	3.27	1.30	6	3.00	3.26	1.44	6	3.50
Crisis Management Educ. Needs	3.16	1.16	6	3.00	3.39	1.20	5	3.00	3.28	1.28	5	3.00
Bioterrorism/EP Composite Educ. Needs	*3.43*	*0.91*		*3.71*	*3.49*	*0.94*		*3.57*	*3.33*	*1.24*		*3.43*

Table 21 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	Paraprofessionals (n=98)				Admin. Support (n=164)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]									
Disaster Planning Skills	2.82	1.66	5	2.33	2.63	1.76	4	2.17	<.01
Disaster Response Skills	3.76	1.56	1	3.67	3.39	1.71	1	3.00	<.001
Emergency Communication Skills	3.33	1.58	2	3.00	3.13	1.80	2	3.00	<.05
Biological/Infectious Disease Skills	2.57	1.73	6	2.00	2.50	1.82	5	2.00	<.01
Toxic Chem. & Env. Hazard Skills	2.54	1.70	7	2.00	2.46	1.90	7	1.00	n.s.
Physical Injury Skills	3.09	1.84	3	3.00	2.78	1.87	3	2.00	<.01
Crisis Management Skills	2.90	1.84	4	3.00	2.49	1.78	6	2.00	<.001
Bioterrorism/EP Composite Skills	*3.00*	*1.45*		*2.63*	*2.77*	*1.58*		*2.29*	*<.01*
Educational Needs in Bioterrorism/EP[2]									
Disaster Planning Educ. Needs	3.52	1.33	6	4.00	3.35	1.49	3	3.50	n.s.
Disaster Response Educ. Needs	3.56	1.22	5	4.00	3.30	1.38	4	3.00	n.s.
Emergency Commun. Educ. Needs	3.08	1.34	7	3.00	2.96	1.29	7	3.00	n.s.
Biol./Infect. Disease Educ. Needs	3.58	1.44	3	4.00	3.51	1.52	1	4.00	n.s.
Toxic Chem./Env. Haz. Educ. Needs	3.62	1.42	1	4.00	3.36	1.61	2	4.00	n.s.
Physical Injury Educ. Needs	3.62	1.25	1	4.00	3.28	1.51	5	3.00	n.s.
Crisis Management Educ. Needs	3.57	1.16	4	4.00	3.25	1.48	6	4.00	n.s.
Bioterrorism/EP Composite Educ. Needs	*3.51*	*1.05*		*3.64*	*3.29*	*1.25*		*3.57*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the five groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 27. Proficiencies in Bioterrorism/Emergency Preparedness Skills by Position Category

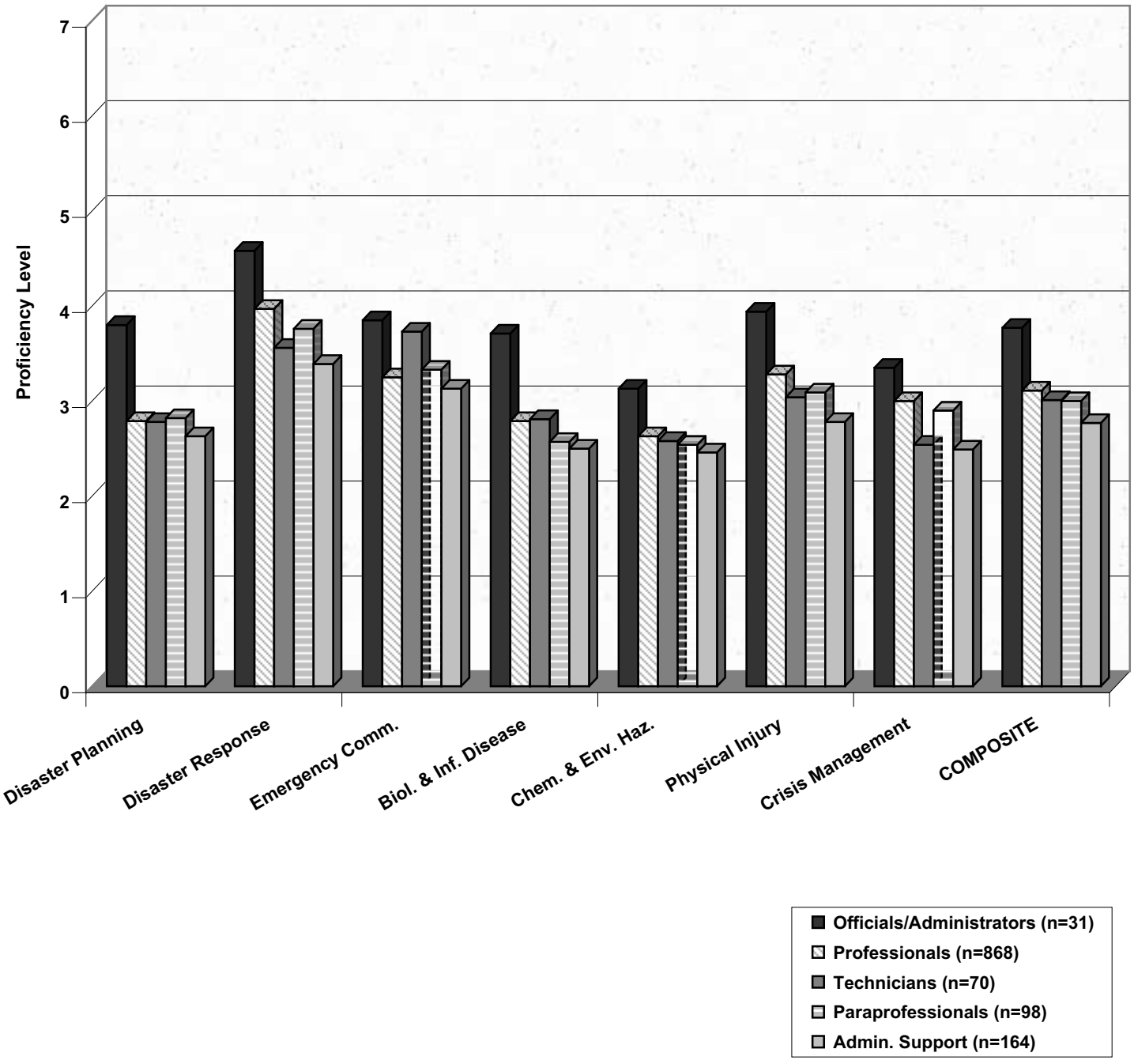


Figure 28. Educational Needs for Bioterrorism/Emergency Preparedness Skills by Position Category

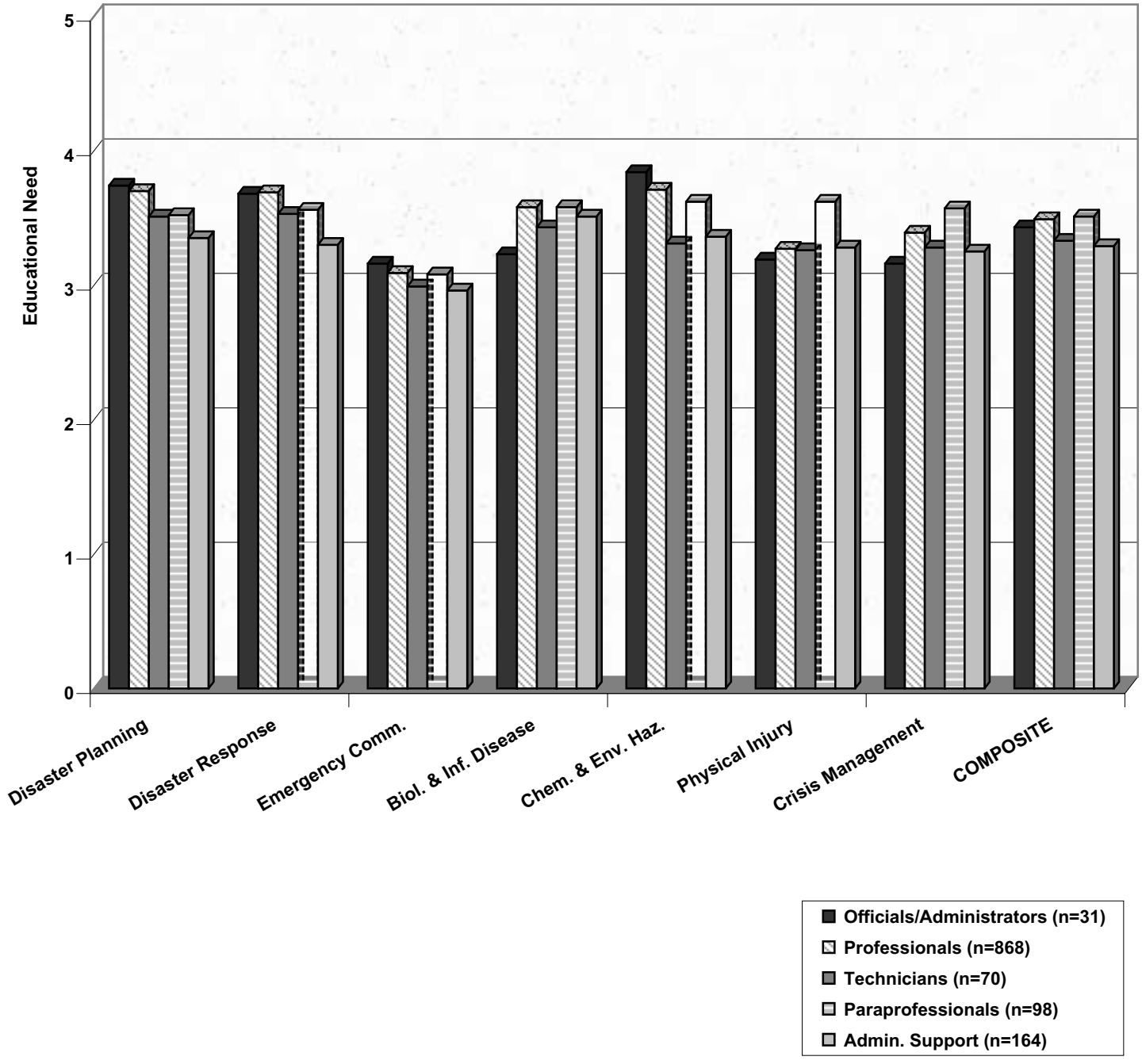


Table 22. Educational Preferences of Workers by Position Category (N=1,231)

Types of Preference	Officials/Admins. (n=31)				Professionals (n=868)				Technicians (n=70)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.13	0.82	2	2.00	2.22	.72	2	2.00	2.05	0.76	2	2.00
1-Day Workshops	2.59	0.63	1	3.00	2.53	.57	1	3.00	2.45	0.64	1	3.00
Several-Day Workshops	1.31	0.47	3	1.00	1.70	.74	3	2.00	1.69	0.71	3	2.00
Academic Semester Courses	1.17	0.47	4	1.00	1.35	.62	4	1.00	1.67	0.78	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.74	0.44	1	3.00	2.77	.48	1	3.00	2.74	0.51	1	3.00
Interactive Teleconferences	2.03	0.63	4	2.00	1.75	.63	4	2.00	1.75	0.74	4	2.00
Internet, Web-Based Instruction	2.21	0.62	2	2.00	1.76	.69	3	2.00	1.87	0.73	2	2.00
Combination Format	2.18	0.61	3	2.00	2.05	.69	2	2.00	1.84	0.68	3	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.84	0.37	1	3.00	2.83	.44	1	3.00	2.77	0.52	1	3.00
Weekend Classes	1.14	0.35	4	1.00	1.16	.41	4	1.00	1.39	0.66	4	1.00
Evening Classes	1.28	0.53	3	1.00	1.36	.57	3	1.00	1.60	0.75	3	1.00
Self-Determined Web-Based	2.24	0.74	2	2.00	1.85	.71	2	2.00	1.77	0.69	2	2.00
Preferences for Educational Recognition												
Certificate	2.10	0.72	2	2.00	2.30	.70	1	2.00	2.32	0.67	1	2.00
Continuing Education Units	1.90	0.82	3	2.00	2.24	.78	2	2.00	2.30	0.82	2	3.00
Undergraduate Academic Credit	1.39	0.69	4	1.00	1.53	.69	4	1.00	1.97	0.85	3	2.00
Graduate Academic Credit	2.22	0.80	1	2.00	1.94	.85	3	2.00	1.92	0.82	4	2.00

Table 22 (continued).

Types of Preference	Paraprofessionals (n=98)				Admin. Support (n=164)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length								
2-Hour Sessions	2.15	0.74	2	2.00	2.07	0.70	2	2.00
1-Day Workshops	2.34	0.65	1	2.00	2.37	0.67	1	2.00
Several-Day Workshops	1.73	0.77	3	2.00	1.70	0.77	3	2.00
Academic Semester Courses	1.51	0.71	4	1.00	1.62	0.83	4	1.00
Preferences for Educational Format								
Face-to-Face Classroom Setting	2.56	0.62	1	3.00	2.69	0.53	1	3.00
Interactive Teleconferences	1.57	0.66	4	1.00	1.65	0.65	4	2.00
Internet, Web-Based Instruction	1.89	0.69	3	2.00	1.74	0.70	3	2.00
Combination Format	2.00	0.68	2	2.00	1.85	0.71	2	2.00
Preferences for Time of Course Offering								
Weekday Classes	2.65	0.61	1	3.00	2.77	0.53	1	3.00
Weekend Classes	1.26	0.58	4	1.00	1.22	0.48	4	1.00
Evening Classes	1.45	0.68	3	1.00	1.47	0.68	3	1.00
Self-Determined Web-Based	1.77	0.74	2	2.00	1.67	0.70	2	2.00
Preferences for Educational Recognition								
Certificate	2.55	0.61	1	3.00	2.47	0.66	1	3.00
Continuing Education Units	2.09	0.76	2	2.00	1.99	0.78	2	2.00
Undergraduate Academic Credit	1.95	0.77	3	2.00	1.85	0.85	3	2.00
Graduate Academic Credit	1.90	0.77	4	2.00	1.74	0.82	4	1.50

4e. Differences by Type of Position

When provided with definitions of three types of positions, the majority of workers (54%) classified themselves as Front Line Staff (n=659); others categorized themselves as either Senior Level Staff (n=236) or Supervisory/Management Staff (n=315).

Characteristics of workers in these three types of positions groups are noted in Table 23. Workers in the Supervisory/Management group were the oldest (mean=48.3 years), and workers in the Front Line group were the youngest (mean=41.6 years). The Front Line group had a larger percentage of females (89%) than did the Senior Level group (73%) or Supervisory/Management groups (76%). The Supervisory/Management group was composed of the highest percentage of white respondents (92%), followed by the Senior Level group (85%) and Front Line (75%) groups.

With respect to highest level of education achieved, 62% of Front Line Staff, 80% of Senior Level Staff, and 86% of Supervisory/Management Staff reported they had earned a college degree. Higher percentages of workers in the Senior Level Staff (37%) and Supervisory/Management Level Staff (46%) had attained a master's degree or higher when compared to those in Front Line Staff positions (14%). Workers in Front Line positions had the least work experience in both their discipline (mean=10.2 years) and public health (mean=6.9 years), while those in Supervisory/ Management positions had the most experience in their discipline (mean=19.2 years) and public health (mean=14.1 years).

While 61% of Front Line workers were in professional positions, 83% and 93% of Senior Level and Supervisory/Management workers, respectively, were in professional positions. Annual salaries varied across groups: Front Line workers (mean=$34,883), Senior Level workers (mean=$49,008), and Supervisory/Management workers (mean=$56,216). A greater percentage of Front Line workers indicated that they knew a non-English language (33%) than respondents in either the Senior Level positions (28%) or Supervisory/Management positions (22%).

Differences in Core Competency proficiencies and educational needs by type of position are summarized in Table 24. A significant difference ($p < .001$) was found among these three groups in overall proficiency in Core Competency Skills. In descending order, the means for this composite score were Supervisory/Management Staff (4.97), Senior Level Staff (4.57), and Front Line Staff (4.08). When the eight competency subscales were compared, similar patterns of statistically significant differences were found in all eight Core Competency subscales. These differences are graphically illustrated in Figure 29.

Similarly, a significant difference ($p < .001$) was found among these three types of positions in overall educational need for Core Competency Skills (composite score). Front Line Staff (mean=3.07) reported greater educational need than the Senior Level Staff (mean=2.90) or Supervisory/ Management Staff (mean=2.93). For six subscales, the pattern of higher educational needs among the Front Line Staff was statistically supported. No differences were found in Policy Development/ Program Planning Skills or Financial Planning/Management Skills where educational needs were uniformly high across all groups. The comparisons of educational needs across types of positions are graphically presented in Figure 30.

As noted in Table 25, a statistically significant difference ($p < .05$) in overall proficiency in Bioterrorism/Emergency Preparedness Skills (composite scale) was found among the three types of position groups. The Supervisory/Management Staff reported a higher proficiency (mean=3.25) than Front Line Staff (mean=3.04) and Senior Level Staff (mean=2.93). As seen in Figure 31, this pattern of higher proficiency among the Supervisory/Management Staff was also apparent in the four

subscales with significant differences: Disaster Planning Skills ($p < .001$), Disaster Response Skills ($p < .05$), Emergency Communication Skills ($p < .01$), and Biological/Infectious Disease Skills ($p < .001$).

No difference was found among the three types of positions on overall education need in Bioterrorism/Emergency Preparedness Competency Skills (composite score). When the seven subscales were examined individually, no statistical differences were found. Figure 32 shows the remarkably similar needs across the three types of positions for all dimensions.

Educational preferences for the three types of positions are summarized in Table 26. Rank orders of preferences for course length, educational format, time of course offering, and educational recognition were similar across Front Line Staff, Senior Level Staff, and Supervisory/Management Staff.

Table 23. Characteristics of Colorado Public Health Workforce by Type of Position (N=1,210)

	Front Line (n=659)				Senior Level (n=236)				Supervisory/Mgmnt. (n=315)			
Variables and Values	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**
Age			41.57	11.22			44.97	10.01			48.3	8.43
Under 29 Years	122	18.9			16	7.0			6	1.9		
30-39 Years	148	23.0			50	21.7			41	13.3		
40-49 Years	202	31.4			83	36.1			107	34.6		
50-59 Years	143	22.2			66	28.7			130	42.1		
Over 60 Years	29	4.5			15	6.5			25	8.1		
Gender												
Male	72	11.5			59	26.9			70	23.6		
Female	553	88.5			160	73.1			227	76.4		
Race												
White	483	75.4			196	84.5			286	92.0		
Hispanic	113	17.6			26	11.2			14	4.5		
Black	15	2.3			2	.9			5	1.6		
Asian	11	1.7			3	1.3			2	.6		
Other or Multiracial	19	3.0			5	2.2			4	1.3		
Highest Education												
High School Diploma	127	19.6			22	9.3			15	4.8		
Profess./Vocational Diploma	55	8.5			10	4.2			11	3.5		
Associate Degree	65	10.0			16	6.8			18	5.8		
Baccalaureate Degree	310	47.9			104	44.1			124	40.0		
Master's Degree	85	13.1			74	31.4			123	39.7		
Doctoral Degree	5	.8			10	4.2			19	6.1		
College Degree												
No	247	38.2			48	20.3			44	14.2		
Yes	400	61.8			188	79.7			266	85.8		
Years Since Last Degree			14.86	11.5			16.32	10.78			18.51	10.52
Less than 2 Years	38	6.3			11	4.9			7	2.3		
2-5 Years	103	16.9			26	11.6			19	6.4		
5-9 Years	123	20.2			31	13.8			49	16.4		
10-14 Years	75	12.3			52	23.1			41	13.7		
15-19 Years	69	11.3			19	8.4			45	15.1		
20 or More Years	200	32.9			86	38.2			138	46.2		
Years Experience in Discipline			11.59	10.24			14.83	9.91			19.2	9.92
Less than 2 Years	61	11.6			12	5.6			8	2.7		
2-5 Years	105	19.9			28	13.1			12	4.1		
5-9 Years	114	21.6			39	18.3			39	13.2		
10-14 Years	80	15.2			30	14.1			38	12.9		
15-19 Years	48	9.1			22	10.3			45	15.3		
20 or More Years	120	22.7			82	38.5			153	51.9		
Years Experience in Pub. Health			6.89	7.03			10.87	8.07			14.05	9.14
Less than 2 Years	155	24.6			18	7.8			25	8.1		

Table 23 (continued).

Variables and Values	Front Line (n=659)				Senior Level (n=236)				Supervisory/Mgmnt. (n=315)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	154	24.4			41	17.7			27	8.8		
5-9 Years	139	22.1			58	25.0			57	18.6		
10-14 Years	101	16.0			50	21.6			63	20.5		
15-19 Years	36	5.7			21	9.1			40	13.0		
20 or More Years	45	7.1			44	19.0			95	30.9		
County Survey Response												
Very Small	18	3.0			3	1.5			21	7.7		
Small	57	9.5			18	9.3			41	15.1		
Medium	70	11.7			22	11.3			28	10.3		
Large	455	75.8			151	77.8			182	66.9		
Organized Health Department												
No	98	16.3			31	16.0			66	24.3		
Yes	502	83.7			163	84.0			206	75.7		
Position Category												
Officials & Administrators	1	.2			2	.8			28	8.9		
Professionals	398	60.5			194	82.2			264	83.8		
Technicians	55	8.4			6	2.5			6	1.9		
Protective Service	1	.2			1	.4			1	.3		
Paraprofessionals	76	11.6			12	5.1			6	1.9		
Administrative Support	127	19.3			20	8.5			10	3.2		
Skilled Craft	0	.0			0	.0			0	.0		
Service/Maintenance	0	.0			1	.4			0	.0		
Professional Position												
No	259	39.4			40	16.9			23	7.3		
Yes	399	60.6			196	83.1			292	92.7		
Type of Position												
Front Line Staff	659	100.0			0	.0			0	.0		
Senior Level Staff	0	.0			236	100.0			0	.0		
Supervisory/Mgmt Staff	0	.0			0	.0			315	100.0		
Full-Time Employment												
No	132	20.1			48	20.3			36	11.5		
Yes	526	79.9			188	79.7			276	88.5		
Annual Salary (FTE)			$34,883	$11,864			$49,008	$17,662			$56,216	$19,654
Less Than $20,000	34	6.3			4	2.0			2	.8		
$20,000 to $29,999	146	27.1			13	6.4			11	4.2		
$30,000 to $39,999	179	33.3			47	23.3			41	15.5		
$40,000 to $49,999	120	22.3			48	23.8			50	18.9		
$50,000 to $59,999	40	7.4			43	21.3			58	21.9		
$60,000 to $69,999	13	2.4			26	12.9			39	14.7		
$70,000 to $79,999	4	.7			6	3.0			30	11.3		
Over $80,000	2	.4			15	7.4			34	12.8		

Table 23 (continued).

Variables and Values	Front Line (n=659)				Senior Level (n=236)				Supervisory/Mgmnt. (n=315)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Know Non-English Language												
No	438	66.8			169	72.2			244	78.0		
Yes	218	33.2			65	27.8			69	22.0		
Other Language Speaking												
Fair	60	27.8			23	35.9			34	50.0		
Good	71	32.9			19	29.7			21	30.9		
Excellent	85	39.4			22	34.4			13	19.1		
Other Language Reading												
Fair	63	29.6			23	36.5			33	50.0		
Good	71	33.3			26	41.3			22	33.3		
Excellent	79	37.1			14	22.2			11	16.7		
Other Language Writing												
Fair	85	40.7			31	50.8			45	71.4		
Good	62	29.7			17	27.9			11	17.5		
Excellent	62	29.7			13	21.3			7	11.1		

Table 24. Differences in Core Competency Proficiencies and Educational Needs by Type of Position (N=1,210)

Core Competency Domains	Front Line (n=659)				Senior Level (n=236)				Supervisory/Mgmt. (n=315)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]													
Analytic/Assessment Skills	4.05	1.45	5	4.25	4.54	1.43	5	4.75	4.88	1.25	4	5.00	<.001
Policy Development/Prog. Planning Skills	3.50	1.48	8	3.67	4.21	1.39	7	4.50	4.83	1.25	7	5.00	<.001
Communication Skills	4.39	1.28	2	4.50	4.97	1.17	2	5.17	5.22	1.00	3	5.33	<.001
Cultural Competency Skills	5.00	1.27	1	5.25	5.12	1.17	1	5.25	5.25	1.01	2	5.50	<.05
Community Dimensions of Practice Skills	4.10	1.37	4	4.25	4.57	1.27	4	4.75	4.84	1.22	5	5.00	<.001
Basic Public Health Sciences Skills	3.82	1.54	6	4.00	4.35	1.48	6	4.50	4.51	1.38	8	4.75	<.001
Financial Planning & Management Skills	3.53	1.37	7	3.40	4.00	1.31	8	4.20	4.84	1.13	5	5.00	<.001
Leadership & Systems Thinking Skills	4.25	1.40	3	4.50	4.74	1.30	3	5.00	5.30	1.09	1	5.50	<.001
Core Competencies Composite Skills	*4.08*	*1.21*		*4.19*	*4.57*	*1.11*		*4.69*	*4.97*	*0.99*		*5.09*	*<.001*
Educ. Needs in Core Competency Domains[2]													
Analytic/Assessment Educ. Needs	3.11	1.19	5	3.00	2.89	1.15	4	3.00	3.08	1.04	2	3.00	<.05
Policy Devel./Prog. Planning Educ. Needs	3.19	1.30	1	3.00	3.10	1.19	2	3.00	3.06	1.16	3	3.00	n.s.
Communication Educ. Needs	2.94	1.21	7	3.00	2.57	1.18	8	2.00	2.59	1.06	8	2.00	<.001
Cultural Competency Educ. Needs	2.85	1.20	8	3.00	2.74	1.15	7	3.00	2.71	1.04	7	3.00	<.05
Community Dimen. of Practice Educ. Needs	3.06	1.19	6	3.00	2.85	1.10	5	3.00	2.89	1.09	6	3.00	<.01
Basic Public Health Sciences Educ. Needs	3.15	1.29	2	3.00	2.84	1.28	6	3.00	3.03	1.17	4	3.00	n.s.
Financial Planning & Mgmt. Educ. Needs	3.15	1.42	2	3.00	3.23	1.36	1	3.00	3.15	1.29	1	3.00	<.01
Leadership & Systems Thinking Educ. Needs	3.14	1.15	4	3.00	3.00	1.17	3	3.00	2.90	1.14	5	3.00	<.01
Core Competencies Composite Educ. Needs	*3.07*	*0.88*		*3.13*	*2.90*	*0.78*		*2.88*	*2.93*	*0.76*		*2.94*	

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the three groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When the overall difference among groups was non-significant, n.s. is noted. When the overall F ratio was statistically significant, post-hoc comparisons between all possible pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparisons may be obtained from the author.

Figure 29. Proficiencies in Core Competency Skills by Type of Position

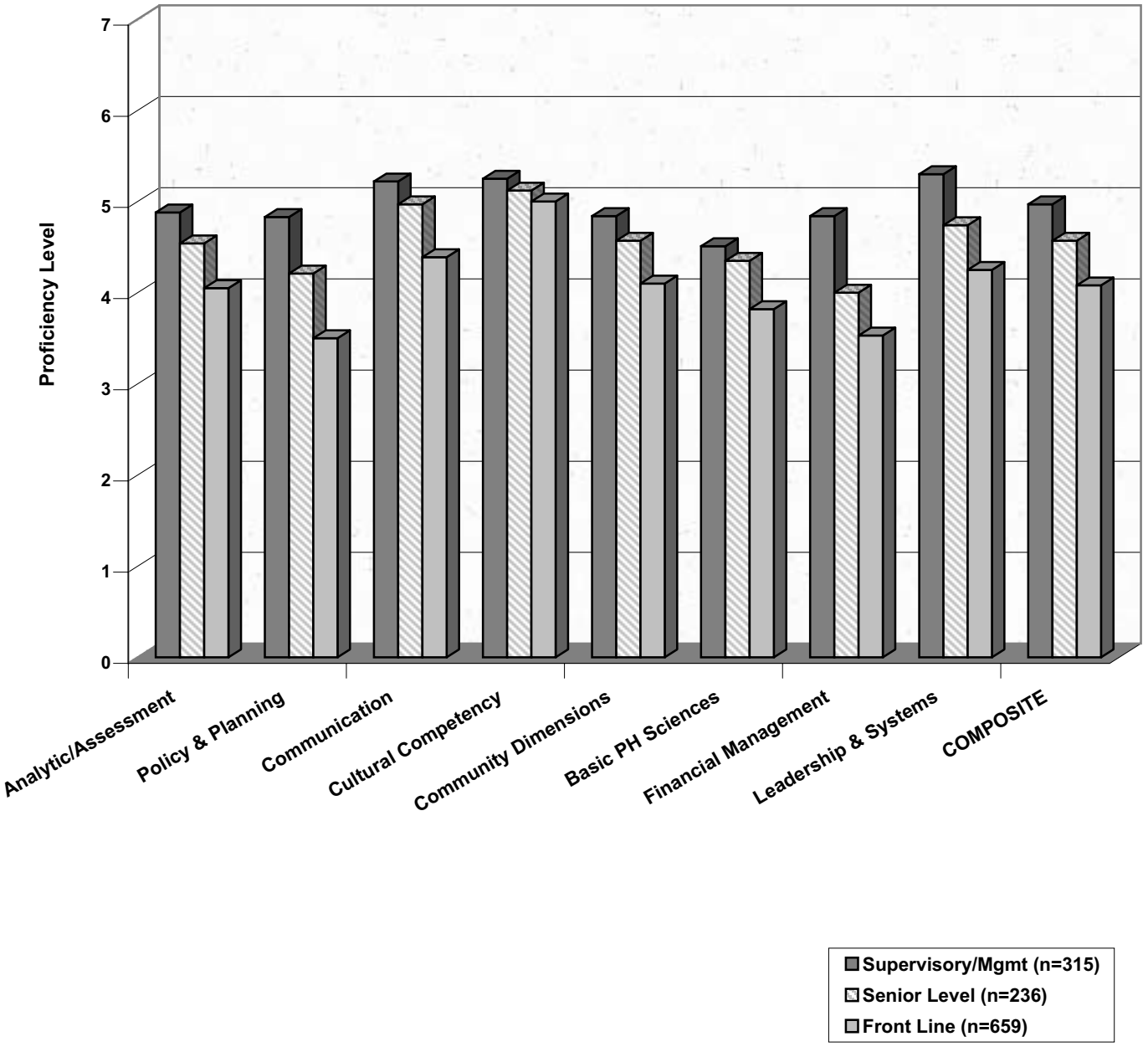


Figure 30. Educational Needs in Core Competency Skills by Type of Position

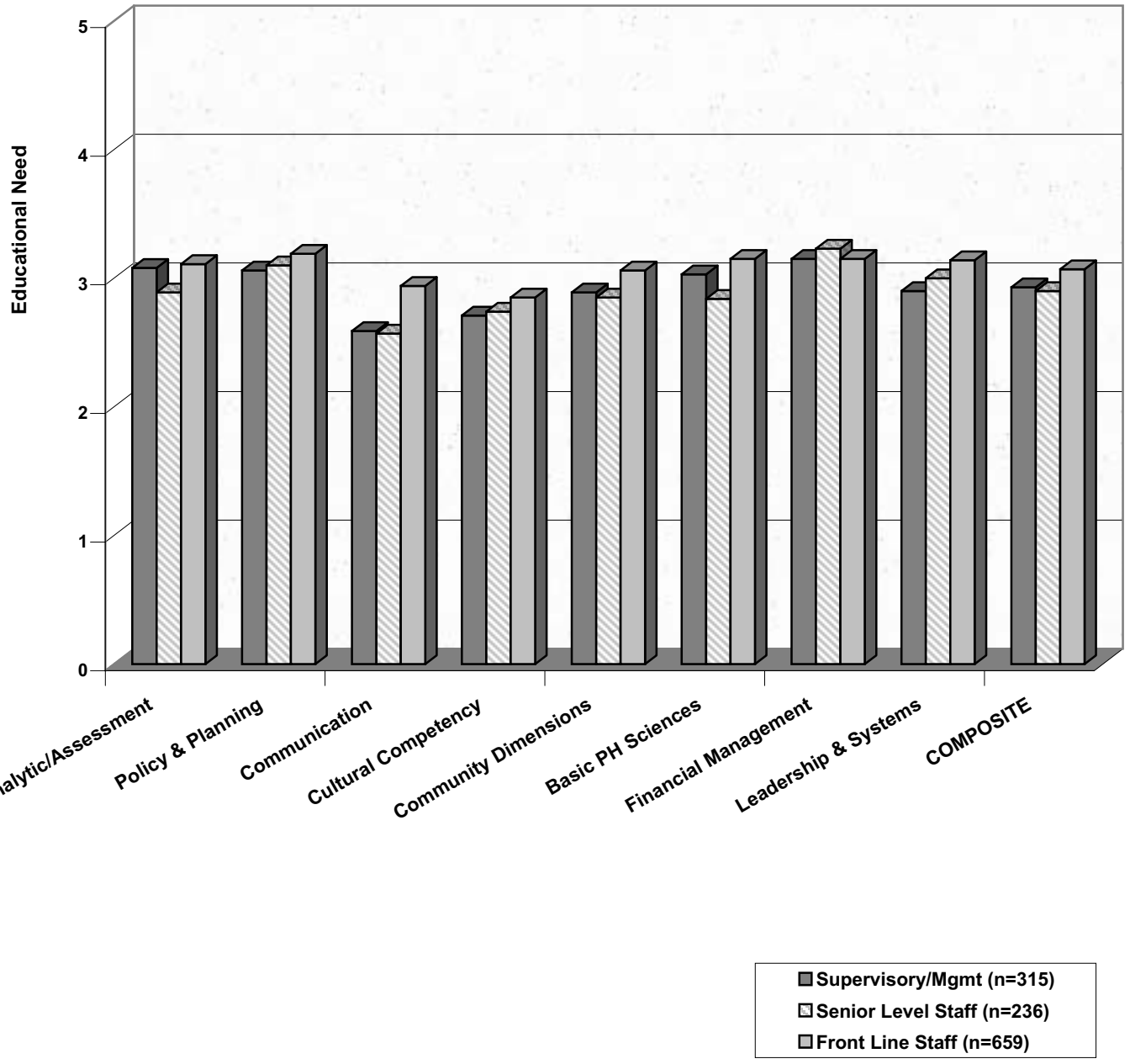


Table 25. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs by Type of Position (N=1,210)

Bioterrorism/Emergency Preparedness Competency Domains	Front Line (n=659)				Senior Level (n=236)				Supervisory/Mgmt. (n=315)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]													
Disaster Planning Skills	2.73	1.63	5	2.33	2.60	1.61	7	2.00	3.10	1.65	4	3.00	<.001
Disaster Response Skills	3.84	1.55	1	4.00	3.73	1.50	1	3.67	4.06	1.44	1	4.00	<.05
Emergency Communication Skills	3.21	1.69	3	3.00	3.14	1.66	2	3.00	3.57	1.64	2	3.50	<.01
Biological/Infectious Disease Skills	2.65	1.68	6	2.00	2.62	1.75	9	2.00	3.08	1.74	5	3.00	<.001
Toxic Chem. & Env. Hazard Skills	2.59	1.74	7	2.00	2.69	1.83	5	2.00	2.62	1.70	7	2.00	n.s.
Physical Injury Skills	3.27	1.91	2	3.00	3.03	1.79	3	3.00	3.23	1.82	3	3.00	n.s.
Crisis Management Skills	2.95	1.88	4	3.00	2.69	1.76	5	2.00	3.03	1.78	6	3.00	n.s.
Bioterrorism/EP Composite Skills	*3.04*	*1.45*		*2.82*	*2.93*	*1.39*		*2.61*	*3.25*	*1.39*		*3.11*	*<.05*
Educational Needs in Bioterrorism/EP[2]													
Disaster Planning Educ. Needs	3.58	1.30	2	4.00	3.65	1.27	3	4.00	3.75	1.17	1	4.00	n.s.
Disaster Response Educ. Needs	3.55	1.24	3	4.00	3.68	1.19	2	4.00	3.71	1.22	2	4.00	n.s.
Emergency Communication Educ. Needs	3.03	1.28	7	3.00	3.07	1.23	7	3.00	3.16	1.14	7	3.00	n.s.
Biological/Infectious Disease Educ. Needs	3.53	1.37	4	4.00	3.59	1.31	4	4.00	3.58	1.28	4	4.00	n.s.
Toxic Chem. & Env. Hazard Educ. Needs	3.59	1.43	1	4.00	3.69	1.31	1	4.00	3.71	1.29	2	4.00	n.s.
Physical Injury Educ. Needs	3.27	1.34	6	3.00	3.33	1.34	5	3.00	3.34	1.31	6	3.00	n.s.
Crisis Management Educ. Needs	3.34	1.26	5	3.00	3.32	1.30	6	3.00	3.47	1.14	5	4.00	n.s.
Bioterrorism/EP Composite Educ. Needs	*3.41*	*1.06*		*3.57*	*3.47*	*0.97*		*3.57*	*3.53*	*0.91*		*3.71*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the three groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 31. Proficiencies in Bioterrorism/Emergency Preparedness Skills by Type of Position

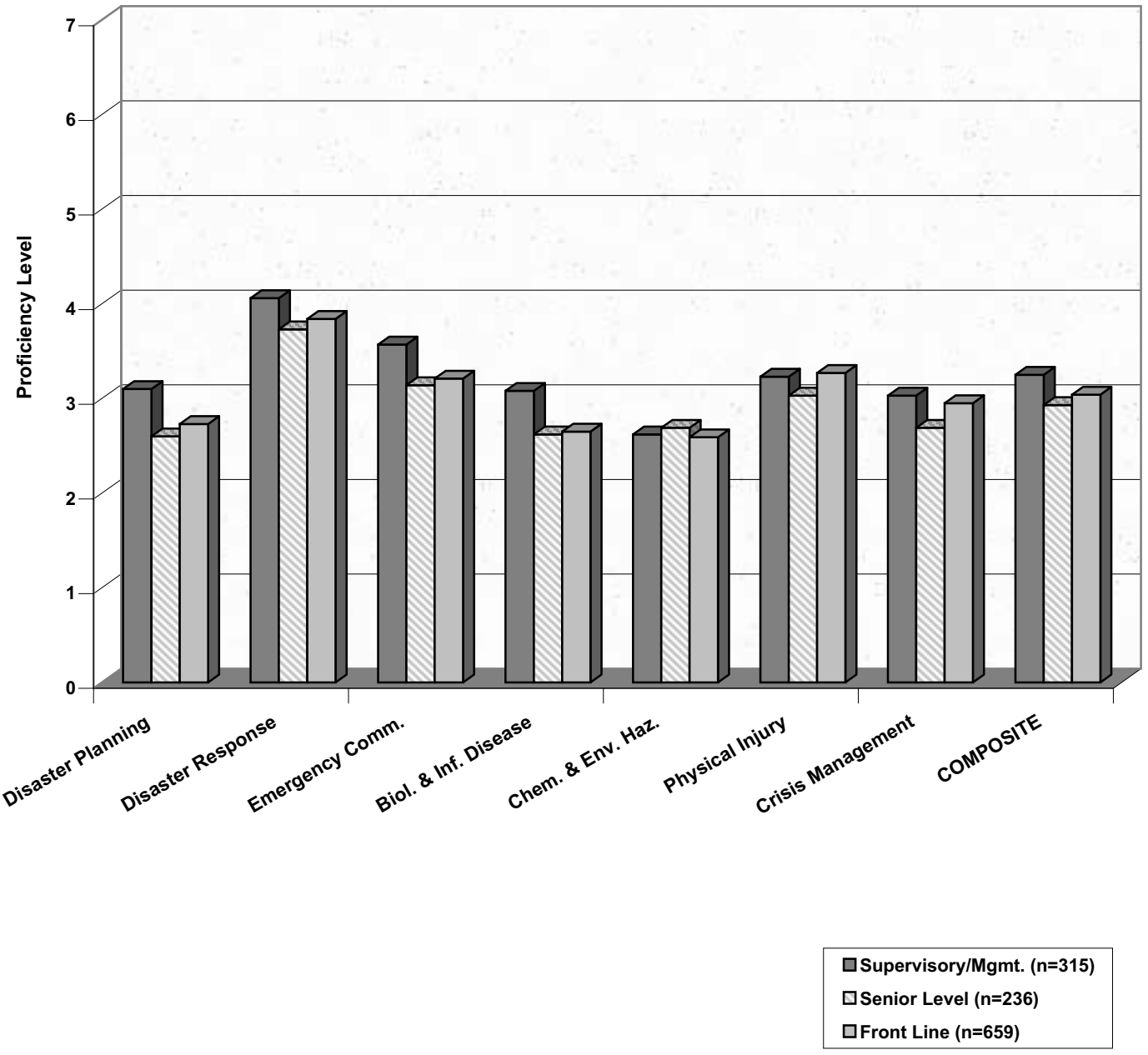


Figure 32. Educational Needs in Bioterrorism/Emergency Preparedness Skills by Type of Position

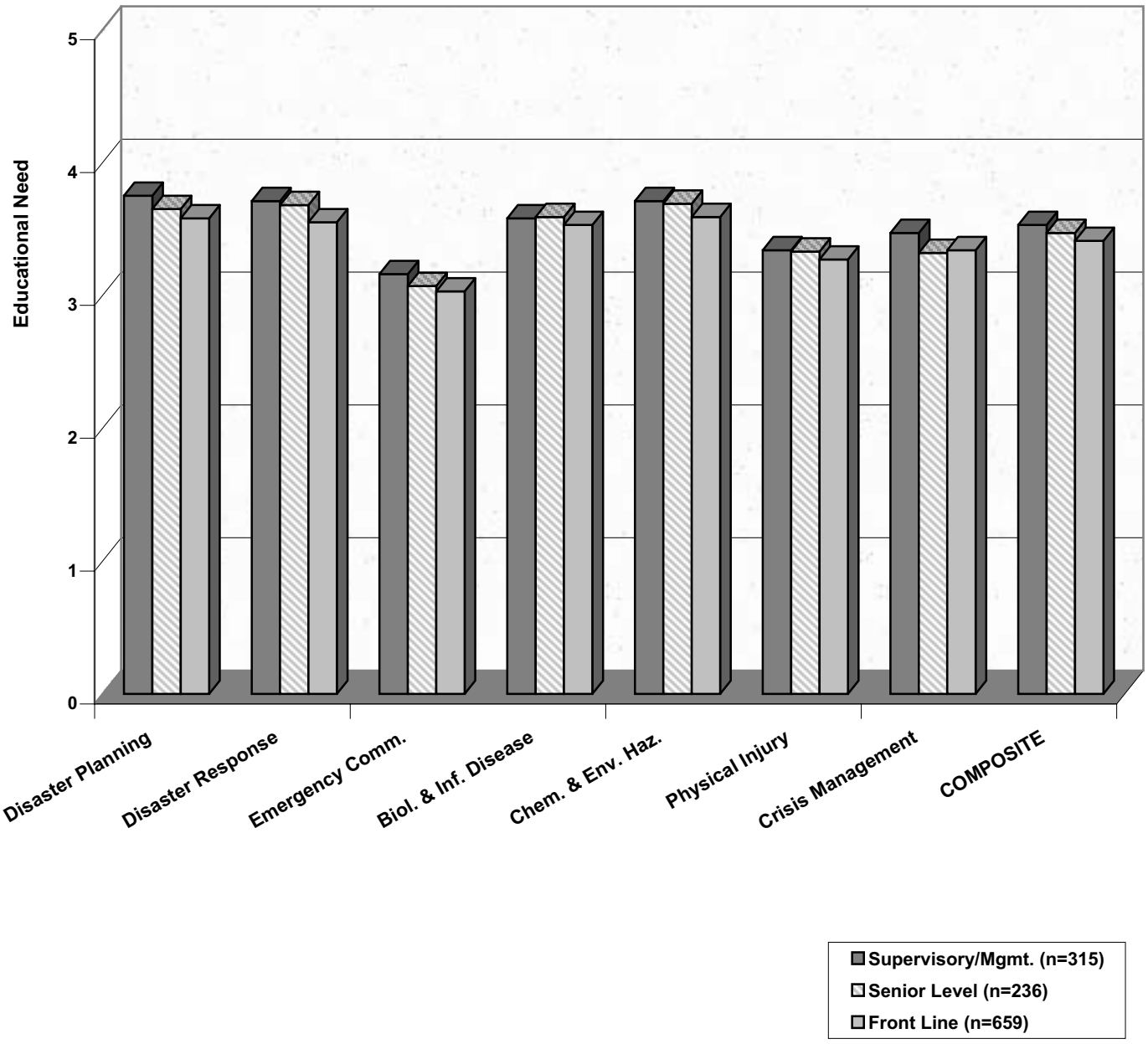


Table 26. Educational Preferences of Workers by Type of Position (N=1,210)

Types of Preference	Front Line (n=659)				Senior Level (n=236)				Supervisory/Mgmt. (n=315)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.16	0.73	2	2.00	2.14	0.70	2	2.00	2.26	0.73	2	2.00
1-Day Workshops	2.46	0.62	1	3.00	2.53	0.60	1	3.00	2.53	0.57	1	3.00
Several-Day Workshops	1.73	0.76	3	2.00	1.73	0.75	3	2.00	1.60	0.70	3	1.00
Academic Semester Courses	1.47	0.71	4	1.00	1.38	0.66	4	1.00	1.30	0.56	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.74	0.51	1	3.00	2.77	0.47	1	3.00	2.74	0.47	1	3.00
Interactive Teleconferences	1.72	0.64	4	2.00	1.71	0.67	3	2.00	1.78	0.63	4	2.00
Internet, Web-Based Instruction	1.79	0.71	3	2.00	1.71	0.68	3	2.00	1.85	0.68	3	2.00
Combination Format	1.99	0.69	2	2.00	2.00	0.68	2	2.00	2.06	0.71	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.79	0.50	1	3.00	2.84	0.42	1	3.00	2.83	0.44	1	3.00
Weekend Classes	1.19	0.47	4	1.00	1.21	0.44	4	1.00	1.15	0.40	4	1.00
Evening Classes	1.44	0.65	3	1.00	1.39	0.59	3	1.00	1.29	0.51	3	1.00
Self-Determined Web-Based	1.79	0.71	2	2.00	1.80	0.69	2	2.00	1.93	0.73	2	2.00
Preferences for Educational Recognition												
Certificate	2.36	0.68	1	2.00	2.28	0.73	1	2.00	2.36	0.71	1	2.00
Continuing Education Units	2.22	0.77	2	2.00	2.17	0.81	2	2.00	2.14	0.81	2	2.00
Undergraduate Academic Credit	1.71	0.77	4	2.00	1.53	0.70	4	1.00	1.50	0.69	4	1.00
Graduate Academic Credit	1.93	0.84	3	2.00	1.91	0.82	3	2.00	1.88	0.84	3	2.00

4f. Differences Between Full-Time and Part-Time Workers

Characteristics of Full-Time workers (n=1,008) and Part-Time workers (n=219) are presented in Table 27. The two groups were very similar in age. A higher percentage of women were in Part-Time positions (95%) than in Full-Time positions (80%). A higher percentage of white workers were in the Part-Time group (86%) than in the Full-Time group (80%).

Part-Time workers were better educated than their Full-Time counterparts: 81% of Part-Time workers held a college degree compared to 69% of Full-Time workers. Part-Time workers had more experience in their discipline (mean=15.5 years) than did Full-Time employees (mean=14.1 years). However, Full-Time workers had more experience in public health (mean=9.8 years) than did Part-Time workers (mean=8.5 years). More professionals were represented in the Part-Time worker category (81%) than in the Full-Time worker category (71%).

A higher percentage of Part-Time workers (61%) held front line positions than did Full-Time workers (53%). On an annualized basis, Part-Time workers earned less (mean=$40,607) than Full-Time workers (mean=$43,776). More Full-Time (31%) than Part-Time (25%) employees reported knowing a non-English language.

Table 28 summarizes the differences in Core Competency proficiencies and educational needs between Full-Time workers and Part-Time workers. No difference was found in overall Core Competency Skills (composite scale). Full-Time workers scored higher than Part-Time workers on Policy Development/Program Planning Skills ($p < .01$) and Financial Planning/Management Skills ($p < .05$). Part-Time workers were more proficient ($p < .05$) than Full-Time workers on Cultural Competency Skills. No differences were found in the other five subscales. These differences and similarities are illustrated in Figure 33.

Similarly, few differences between these two groups were noted in educational needs for Core Competency Skills. No difference on the composite measure was noted. Full-Time workers reported a greater educational need for Cultural Competency Skills ($p < .05$) and Basic Public Health Sciences Skills ($p < .05$) than Part-Time workers. No differences were found in the other six subscales. Comparison of educational need by work status is graphically presented in Figure 34.

Table 29 reports the differences in Bioterrorism/Emergency Preparedness proficiencies and educational needs between Full-Time and Part-Time Workers. No difference was found in overall proficiency in Bioterrorism/Emergency Preparedness (composite scale). When subscales were examined, Full-Time workers were found to be more proficient in Disaster Planning Skills ($p < .05$), Emergency Communication Skills ($p < .01$), Biological/Infectious Disease Skills ($p < .05$), and Toxic Chemical/Environmental Hazard Skills ($p < .01$). No differences were noted in the other three subscales. These differences and similarities are graphically illustrated in Figure 35.

When educational need for Bioterrorism/Emergency Preparedness Competency Skills (composite) was compared for Full-Time and Part-Time groups, no difference was found. No differences were found between these two groups in any of the seven subscales. The similarity in educational needs between the Full-Time group and the Part-Time group can be observed in Figure 36.

Table 30 presents a comparison of the educational preferences for Full-Time and Part-Time workers. No differences in rank-ordered preferences were noted except that Full-Time workers' greatest preference for educational recognition was for a certificate while Part-Time workers choose continuing education units as their greatest preference.

Table 27. Characteristics of Full-Time and Part-Time Public Health Workers (N=1,227)

Variables and Values	Full-Time (n=1,008)					Part-Time (n=219)				
	n	%	Mean	SD	Median	n	%	Mean	SD	Median
Age			43.97	10.72	46			43.58	10.72	44
Under 29	128	13.0				20	9.4			
30-39	191	19.4				54	25.4			
40-49	320	32.5				75	35.2			
50-59	293	29.7				49	23.0			
Over 60	54	5.5				15	7.0			
Gender										
Male	190	20.0				11	5.3			
Female	759	80.0				195	94.7			
Race										
White	788	80.1				185	86.0			
Hispanic	137	13.9				22	10.2			
Black	21	2.1				1	.5			
Asian	15	1.5				1	.5			
Other or Multiracial	23	2.3				6	2.8			
Highest Education										
High School Diploma	153	15.4				19	8.8			
Profess./Vocational Diploma	61	6.1				15	6.9			
Associate Degree	93	9.4				8	3.7			
Baccalaureate Degree	429	43.2				116	53.5			
Master's Degree	227	22.9				55	25.3			
Doctoral Degree	30	3.0				4	1.8			
College Degree										
No	307	30.9				42	19.4			
Yes	686	69.1				175	80.6			
Years Since Last Degree			16.27	11.18	15			15.47	11.53	12
Less than 2 Years	47	5.0				10	4.9			
2-5 Years	120	12.8				31	15.0			
5-9 Years	167	17.8				37	18.0			
10-14 Years	130	13.8				41	19.9			
15-19 Years	114	12.1				18	8.7			
20 or More Years	362	38.5				69	33.5			
Years Experience in Discipline			14.12	10.62	12			15.46	10.5	14
Less than 2 Years	78	9.2				7	3.6			
2-5 Years	121	14.2				27	14.0			
5-9 Years	154	18.1				37	19.2			
10-14 Years	119	14.0				29	15.0			
15-19 Years	96	11.3				20	10.4			
20 or More Years	284	33.3				73	37.8			
Years Experience in Pub. Health			9.81	8.57	8			8.48	7.66	7
Less than 2 Years	166	17.1				33	15.5			

Table 27 (continued).

Variables and Values	Full-Time (n=1,008)					Part-Time (n=219)				
	n	%	Mean	SD	Median	n	%	Mean	SD	Median
2-5 Years	173	17.8				53	24.9			
5-9 Years	211	21.7				46	21.6			
10-14 Years	174	17.9				43	20.2			
15-19 Years	86	8.9				13	6.1			
20 or More Years	161	16.6				25	11.7			
County Survey Response										
Very Small	36	4.1				8	3.8			
Small	91	10.4				26	12.4			
Medium	91	10.4				30	14.4			
Large	653	75.0				145	69.4			
Organized Health Department										
No	155	17.8				43	20.6			
Yes	716	82.2				166	79.4			
Position Category										
Officials & Administrators	26	2.6				3	1.4			
Professionals	688	68.3				175	79.9			
Technicians	59	5.9				10	4.6			
Protective Service	3	.3				0	.0			
Paraprofessionals	86	8.5				12	5.5			
Administrative Support	144	14.3				19	8.7			
Skilled Craft	0	.0				0	.0			
Service/Maintenance	1	.1				0	.0			
Professional Position										
No	293	29.1				41	18.7			
Yes	714	70.9				178	81.3			
Type of Position										
Front Line Staff	526	53.1				132	61.1			
Senior Level Staff	188	19.0				48	22.2			
Supervisory/Mgmt Staff	276	27.9				36	16.7			
Annual Salary (FTE)			$43,776	$18,627	$40,000			$40,607	$15,195	$38,261
Less Than $20,000	31	3.7				10	5.7			
$20,000 to $29,999	149	17.7				25	14.3			
$30,000 to $39,999	216	25.7				55	31.4			
$40,000 to $49,999	181	21.5				38	21.7			
$50,000 to $59,999	110	13.1				30	17.1			
$60,000 to $69,999	68	8.1				10	5.7			
$70,000 to $79,999	38	4.5				3	1.7			
Over $80,000	47	5.6				4	2.3			
$20,000 to $29,999										
Know Non-English Language										
No	696	69.5				165	75.3			

Table 27 (continued).

Variables and Values	Full-Time (n=1,008)					Part-Time (n=219)				
	n	%	Mean	SD	Median	n	%	Mean	SD	Median
Yes	306	30.5				54	24.7			
Other Language Speaking										
Fair	101	33.3				19	35.2			
Good	101	33.3				15	27.8			
Excellent	101	33.3				20	37.0			
Other Language Reading										
Fair	102	34.2				20	37.7			
Good	105	35.2				18	34.0			
Excellent	91	30.5				15	28.3			
Other Language Writing										
Fair	139	48.1				24	46.2			
Good	78	27.0				17	32.7			
Excellent	72	24.9				11	21.2			

Table 28. Differences in Core Competency Proficiencies and Educational Needs Between Full-Time and Part-Time Workers (N=1,227)

Core Competency Domains	Full-Time (n=1,008)				Part-Time (n=219)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]									
Analytic/Assessment Skills	4.35	1.47	5	4.50	4.35	1.37	5	4.50	n.s.
Policy Development/Program Planning Skills	4.02	1.53	7	4.25	3.75	1.45	7	3.75	<.01
Communication Skills	4.72	1.27	2	4.83	4.64	1.20	2	4.83	n.s.
Cultural Competency Skills	5.04	1.23	1	5.25	5.24	1.08	1	5.50	<.05
Community Dimensions of Practice Skills	4.36	1.37	4	4.50	4.43	1.28	4	4.50	n.s.
Basic Public Health Sciences Skills	4.06	1.55	6	4.25	4.21	1.39	6	4.50	n.s.
Financial Planning & Management Skills	4.00	1.43	8	4.00	3.74	1.35	8	3.80	<.05
Leadership & Systems Thinking Skills	4.62	1.41	3	4.75	4.53	1.30	3	4.75	n.s.
Core Competencies Composite Skills	*4.40*	*1.23*		*4.54*	*4.36*	*1.11*		*4.51*	*n.s.*
Educ. Needs in Core Competency Domains[2]									
Analytic/Assessment Educ. Needs	3.06	1.16	5	3.00	2.98	1.13	3	3.00	n.s.
Policy Development/Prog. Planning Educ. Needs	3.13	1.25	2	3.00	3.15	1.24	2	3.00	n.s.
Communication Educ. Needs	2.79	1.19	8	3.00	2.68	1.16	7	3.00	n.s.
Cultural Competency Educ. Needs	2.82	1.15	7	3.00	2.63	1.16	8	2.00	<.05
Community Dimensions of Practice Educ. Needs	3.00	1.18	6	3.00	2.83	1.04	6	3.00	n.s.
Basic Public Health Sciences Educ. Needs	3.08	1.27	3	3.00	2.89	1.22	5	3.00	<.05
Financial Planning & Management Educ. Needs	3.15	1.37	1	3.00	3.19	1.40	1	3.00	n.s.
Leadership & Systems Thinking Educ. Needs	3.07	1.17	4	3.00	2.92	1.08	4	3.00	n.s.
Core Competencies Composite Educ. Needs	*3.01*	*0.85*		*3.00*	*2.91*	*0.79*		*2.88*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]Independent t-tests were used to test for differences in means between the two groups. Prior to these analyses, all variables met or were transformed to meet the assumption of normal distribution. Levene's test for equality of variances was used to assess the homogeneity of variance assumption and make required adjustments. Although directionality could have been hypothesized, conservative 2-tailed significance tests were employed. The probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When differences between groups were non-significant, n.s. is noted.

Figure 33. Proficiencies in Core Competency Skills for Full-Time and Part-Time Workers

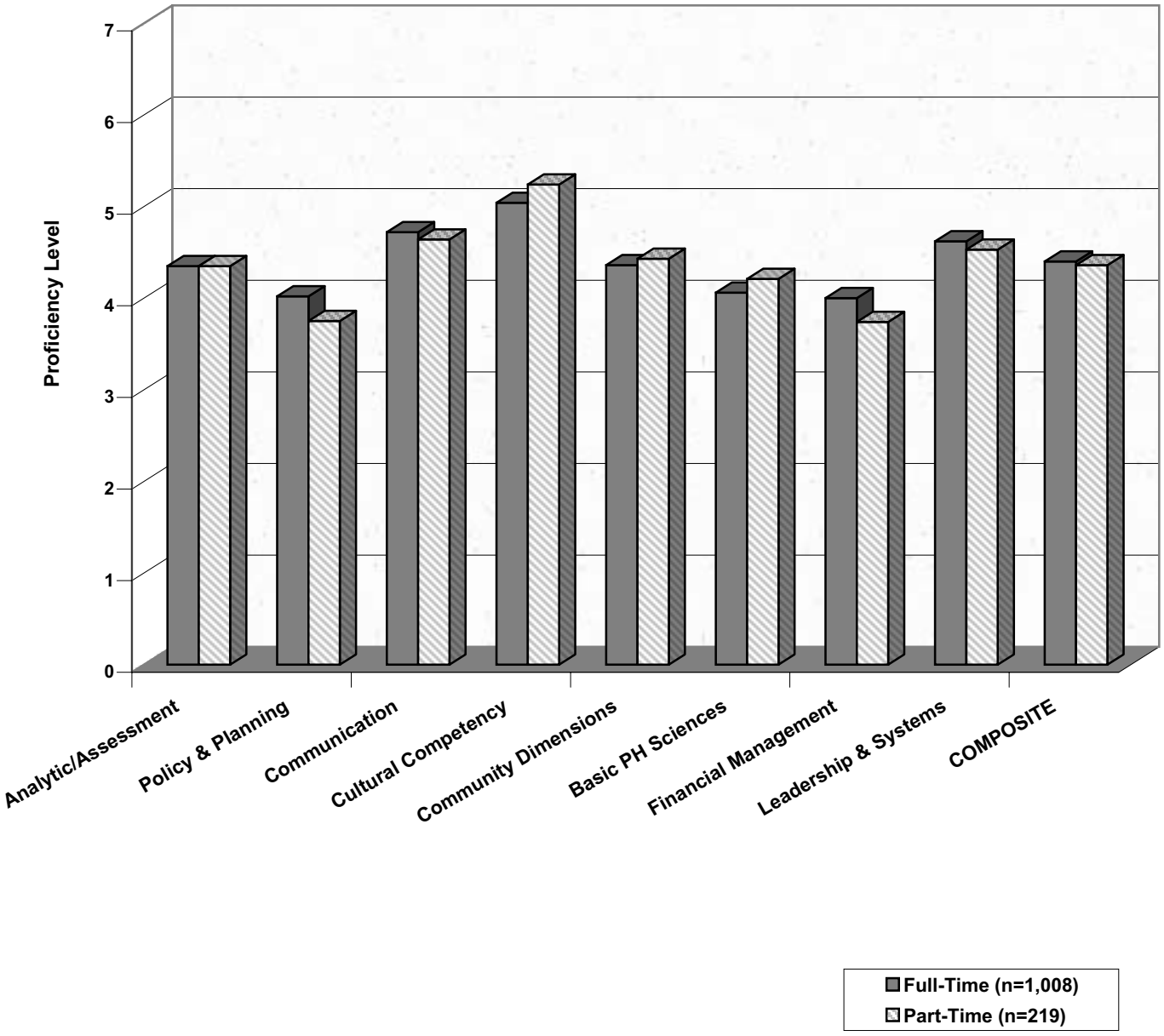


Figure 34. Educational Needs in Core Competency Skills for Full-Time and Part-Time Workers

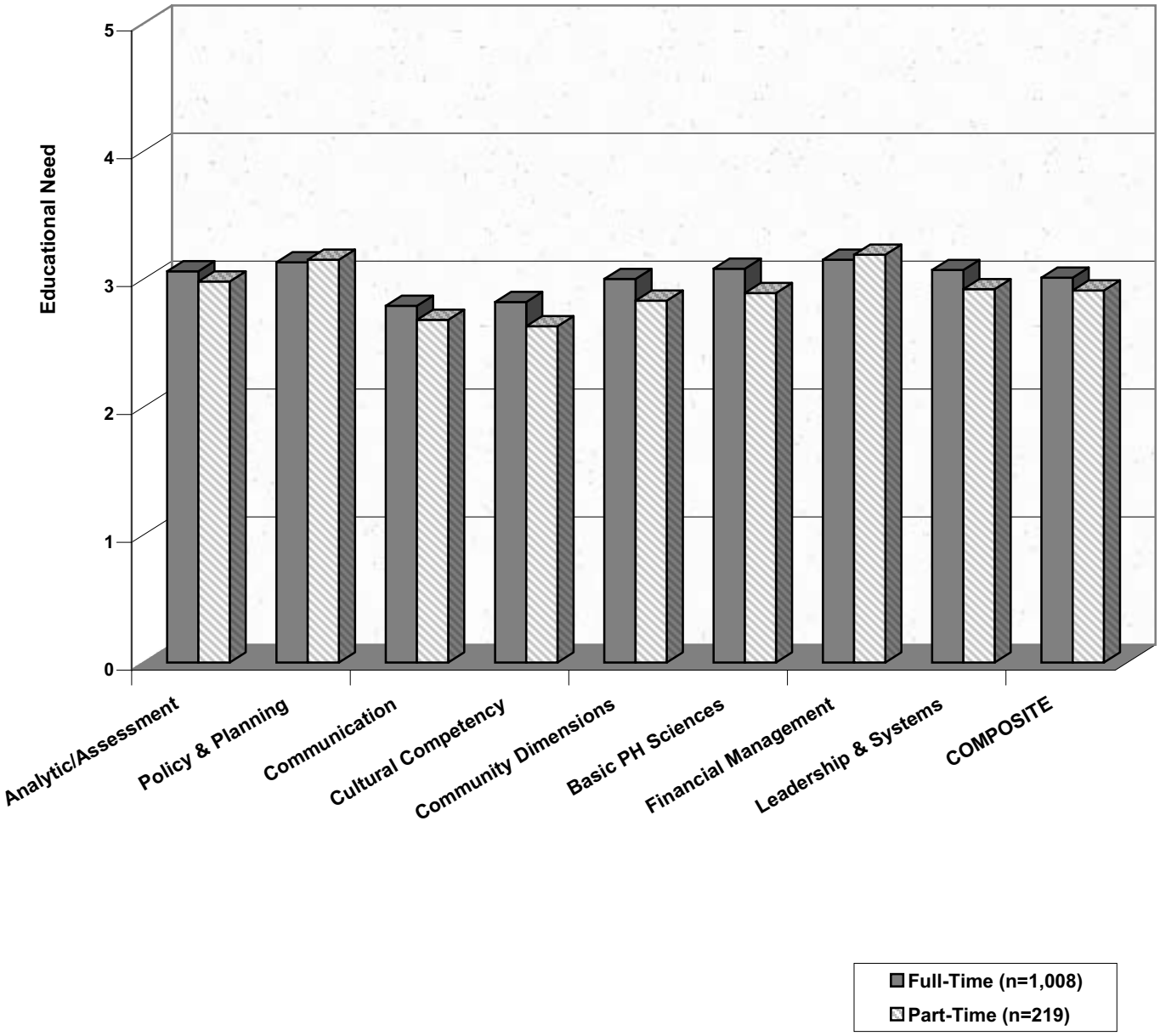


Table 29. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs Between Full-Time and Part-Time Workers (N=1,227)

Bioterrorism/Emergency Preparedness Competency Domains	Full-Time (n=1,008)				Part-Time (n=219)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]									
Disaster Planning Skills	2.85	1.66	5	2.67	2.54	1.49	5	2.00	<.05
Disaster Response Skills	3.90	1.53	1	4.00	3.74	1.43	1	3.83	n.s.
Emergency Communication Skills	3.35	1.68	2	3.00	3.00	1.63	4	2.50	<.01
Biological/Infectious Disease Skills	2.82	1.75	6	2.00	2.48	1.54	6	2.00	<.05
Toxic Chem & Env Hazard Skills	2.67	1.76	7	2.00	2.34	1.61	7	2.00	<.01
Physical Injury Skills	3.18	1.86	3	3.00	3.34	1.87	2	3.00	n.s.
Crisis Management Skills	2.87	1.81	4	2.00	3.10	1.92	3	3.00	n.s.
Bioterrorism Composite Skills	*3.10*	*1.44*		*2.90*	*2.94*	*1.36*		*2.67*	*n.s.*
Educational Needs in Bioterrorism/EP[2]									
Disaster Planning Educ Needs	3.62	1.27	1	4.00	3.65	1.31	2	4.00	n.s.
Disaster Response Educ Needs	3.61	1.23	3	4.00	3.61	1.24	4	4.00	n.s.
Emergency Communication Educ Needs	3.06	1.25	7	3.00	3.03	1.21	7	3.00	n.s.
Biological/Infectious Disease Educ Needs	3.53	1.35	4	4.00	3.62	1.28	3	4.00	n.s.
Toxic Chem & Env Hazard Educ Needs	3.62	1.37	1	4.00	3.68	1.39	1	4.00	n.s.
Physical Injury Educ Needs	3.31	1.34	6	3.00	3.18	1.27	6	3.00	n.s.
Crisis Management Educ Needs	3.38	1.26	5	4.00	3.28	1.17	5	3.00	n.s.
Bioterrorism Composite Educ Needs	*3.45*	*1.02*		*3.57*	*3.44*	*0.99*		*3.57*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]Independent t-tests were used to test for differences in means between the two groups. Prior to these analyses, all variables met or were transformed to meet the assumption of normal distribution. Levene's test for equality of variances was used to assess the homogeneity of variance assumption and make required adjustments. Although directionality could have been hypothesized, conservative 2-tailed significance tests were employed. The probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When differences between groups were non-significant, n.s. is noted.

Figure 35. Proficiencies in Bioterrorism/Emergency Preparedness Skills for Full-Time and Part-Time Workers

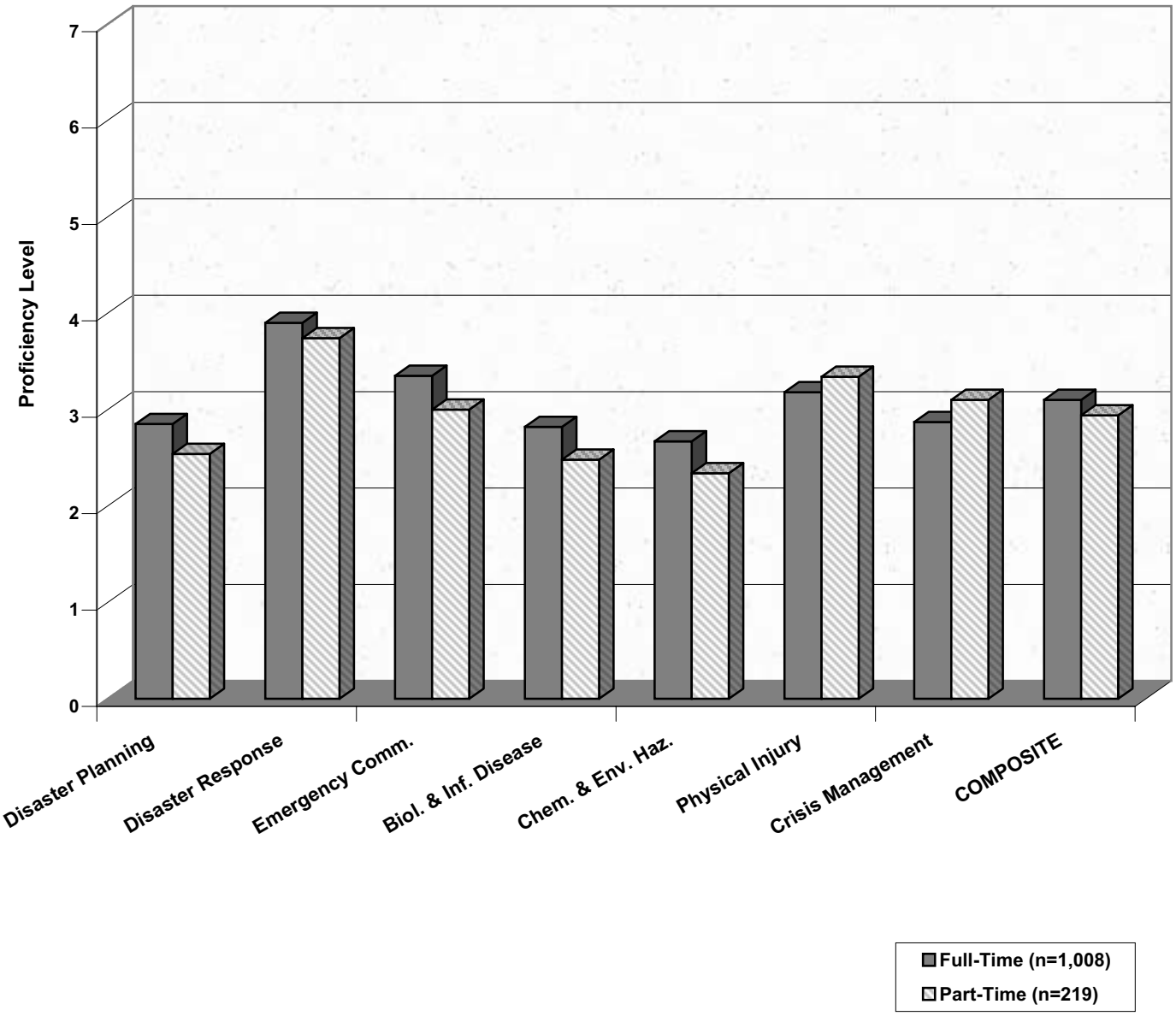


Figure 36. Educational Need in Bioterrorism/Emergency Preparedness Skills for Full-Time and Part-Time Workers

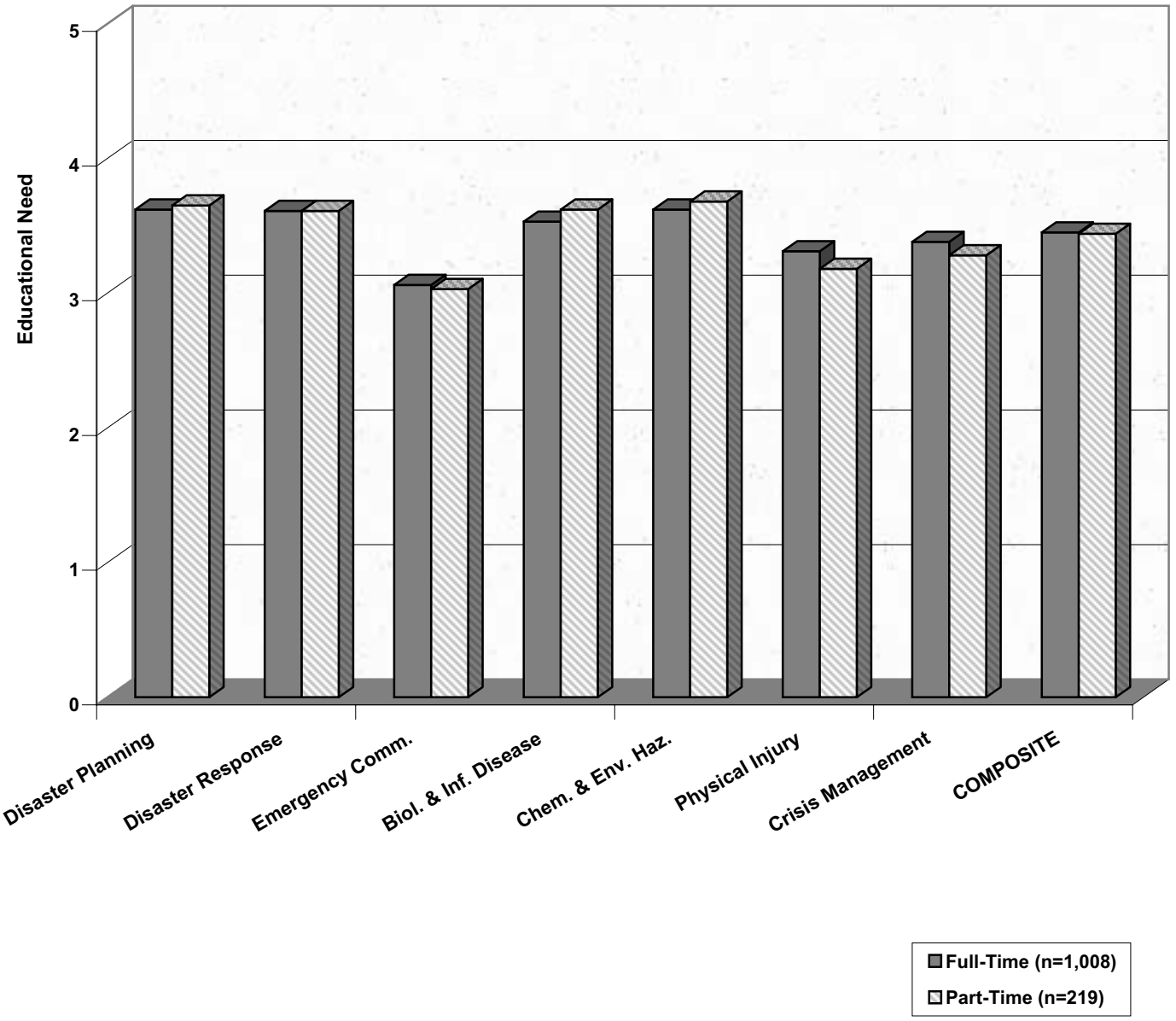


Table 30. Educational Preferences of Full-Time and Part-Time Workers (N=1,227)

Types of Preference	Full-Time (n=1,008)				Part-Time (n=219)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length								
2-Hour Sessions	2.16	0.73	2	2.00	2.30	0.69	2	2.00
1-Day Workshops	2.49	0.60	1	3.00	2.48	0.63	1	3.00
Several-Day Workshops	1.70	0.75	3	2.00	1.65	0.70	3	2.00
Academic Semester Courses	1.43	0.68	4	1.00	1.30	0.59	4	1.00
Preferences for Educational Format								
Face-to-Face Classroom Setting	2.74	0.50	1	3.00	2.76	0.48	1	3.00
Interactive Teleconferences	1.74	0.64	4	2.00	1.66	0.64	4	2.00
Internet, Web-Based Instruction	1.80	0.70	3	2.00	1.73	0.67	3	2.00
Combination Format	2.01	0.69	2	2.00	1.98	0.71	2	2.00
Preferences for Time of Course Offering								
Weekday Classes	2.81	0.47	1	3.00	2.81	0.51	1	3.00
Weekend Classes	1.19	0.45	4	1.00	1.20	0.48	4	1.00
Evening Classes	1.40	0.62	3	1.00	1.34	0.56	3	1.00
Self-Determined Web-Based	1.83	0.71	2	2.00	1.80	0.73	2	2.00
Preferences for Educational Recognition								
Certificate	2.38	0.68	1	2.00	2.19	0.73	2	2.00
Continuing Education Units	2.17	0.78	2	2.00	2.29	0.81	1	3.00
Undergraduate Academic Credit	1.64	0.76	4	1.00	1.54	0.66	4	1.00
Graduate Academic Credit	1.93	0.84	3	2.00	1.88	0.81	3	2.00

5. Differences by Public Health Worker Demographics

5a. Differences by Age Group

To examine potential age differences, respondents were classified into five groups: Under 30 Years (n=148), 30 to 39 Years (n=246), 40 to 49 Years (n=398), 50 to 59 Years (n=349), and 60 Years and Over (n=71). As documented in Table 31, the Under 30 Year group had the highest percentages of women (90%), non-white workers (37%), and workers whose highest level of education was a high school diploma (30%).

As expected, years of experience in both the discipline/major and public health increased with age. Average (mean) years in the discipline increased across the five age groups as follows: 3.9 years, 7.5 years, 14.3 years, 20.6 years and 28.5 years. Experience in public health across these categories showed a similar pattern: 2.8 years, 5.2 years, 9.5 years, 13.8 years, and 17.4 years. Older workers were also more likely to be in professional positions and hold Senior Level Staff or Supervisory/Management Staff positions.

Average (mean) salary for workers across these increasing age categories were: $31,624, $39,772, $44,967, $49,506, and $44,236, respectively. Younger workers reported more knowledge and skills in non-English languages; the percentages of workers knowing a non-English language across the five age groups were 50%, 34%, 26%, 23%, and 25%, respectively.

Table 32 summarizes the differences in Core Competency proficiencies and educational needs by age group. A significant difference between groups ($p. <.05$) was found in overall Core Competency Skills proficiency. In descending order, the means for Core Competency Skills (composite score) among the age groups were 50 to 59 Years (4.56), 30 to 39 years (4.39), 40 to 49 Years (4.36), Under 30 Years (4.25), and 60 Years and Over (4.21). Among these five age groups, statistically significant differences were found in five of eight of the Core Competency subscales: Assessment/Analytic Skills ($p <.05$), Policy Development/Program Planning Skills ($p <.001$), Communication Skills ($p <.05$), Financial Planning/Management Skills ($p <.05$), and Leadership/ System Thinking Skills ($p <.001$). No consistent pattern across the age groups was observed. The youngest workers were least proficient in Policy Development/Program Planning Skills and Financial Planning/Management Skills, but most proficient in Cultural Competency Skills. Differences across age group categories are visually illuminated in Figure 37.

Regarding educational need for Core Competencies, no significant differences were found among these five age groups in either the composite scale or any of its eight subscales. The similarities in educational needs in Core Competency Skills across age group are presented in Figure 38.

Differences in Bioterrorism/Emergency Preparedness proficiencies and educational need by age group are summarized in Table 33. No significant differences among the five age groups were found in Bioterrorism/Emergency Preparedness Competency Skills (composite) or in any of its seven subscales. The similarity in proficiencies across age groups is graphically illustrated in Figure 39.

No difference was found in overall educational need for Bioterrorism/Emergency Preparedness Skills (composite) across age groups. Statistical differences in educational needs were found for three subscales: Emergency Communication Skills ($p <.01$), Physical Injury Skills ($p <.05$), and Crisis Management Skills ($p <.01$). For Emergency Communication Skills, educational need increased incrementally with age. For Physical Injury Skills and Crisis Management Skills, workers in the 30 to 39 Years group and the 50 to 59 Years group identified greater educational needs than

workers in other age categories; in addition, the oldest group reported the least educational needs in these two dimensions. These patterns are illustrated in Figure 40.

As documented in Table 34, there were few differences in educational preference across age groups. The rank order of preference regarding educational format was slightly different across age. Workers in the 40 to 49 Year group and 60 Years and Over group preferred interactive teleconferences over Internet/web based instruction; respondents in the other age groups preferred Internet/web based instruction to interactive teleconferences.

Table 31. Characteristics of Colorado Public Health Workforce by Age Group (N=1,212)

Variables and Values	Under 30 Years (n=148)				30 to 39 Years (n=246)				40 to 49 Years (n=398)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			25.82	2.70			34.28	2.88			44.93	2.88
Under 29 Years	148	100.0			0	.0			0	.0		
30-39 Years	0	.0			246	100.0			0	.0		
40-49 Years	0	.0			0	.0			398	100.0		
50-59 Years	0	.0			0	.0			0	.0		
Over 60 Years	0	.0			0	.0			0	.0		
Gender												
Male	15	10.4			34	14.5			69	18.2		
Female	129	89.6			200	85.5			310	81.8		
Race												
White	93	63.3			182	74.3			320	81.8		
Hispanic	43	29.3			44	18.0			47	12.0		
Black	3	2.0			8	3.3			9	2.3		
Asian	2	1.4			4	1.3			4	1.0		
Other or Multiracial	6	4.1			7	2.9			11	2.8		
Highest Education												
High School Diploma	44	29.9			34	13.9			41	10.4		
Profess./Vocational Diploma	2	1.4			15	6.1			32	8.1		
Associate Degree	10	6.8			24	9.8			39	9.9		
Baccalaureate Degree	70	47.6			118	48.2			179	45.4		
Master's Degree	21	14.3			47	19.2			90	22.8		
Doctoral Degree	0	.0			7	2.9			13	3.3		
College Degree												
No	56	38.1			73	29.8			112	28.4		
Yes	91	61.9			172	70.2			282	71.6		
Years Since Last Degree			3.80	2.84			8.92	5.34			16.01	8.06
Less than 2 Years	26	19.0			14	5.9			9	2.3		
2-5 Years	60	43.8			41	17.4			35	9.1		
5-9 Years	44	32.1			83	35.2			47	12.3		
10-14 Years	6	4.4			60	25.4			71	18.5		
15-19 Years	1	.7			33	14.0			72	18.8		
20 or More Years	0	.0			5	2.1			149	38.9		
Years Experience in Discipline			3.87	3.45			7.5	4.82			14.25	7.97
Less than 2 Years	27	22.5			16	7.6			19	5.4		
2-5 Years	53	44.2			49	23.2			29	8.3		
5-9 Years	35	29.2			78	37.0			52	14.9		
10-14 Years	3	2.5			48	22.7			73	20.9		
15-19 Years	1	.8			18	8.5			64	18.3		
20 or More Years	1	.8			2	.9			113	32.3		
Years Experience in Pub. Health			2.78	3.79			5.21	4.20			9.45	6.79
Less than 2 Years	61	45.5			50	20.5			53	13.6		

Table 31 (continued).

Variables and Values	Under 30 Years (n=148)				30 to 39 Years (n=246)				40 to 49 Years (n=398)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	48	35.8			80	32.8			63	16.2		
5-9 Years	22	16.4			69	28.3			90	23.1		
10-14 Years	1	.7			40	16.4			91	23.3		
15-19 Years	0	.0			3	1.2			48	12.3		
20 or More Years	2	1.5			2	.8			45	11.5		
Size of County												
Small	1	.7			7	3.3			14	4.0		
Medium	24	17.5			39	18.1			95	27.1		
Large	112	81.8			112	78.6			242	68.9		
Organized Health Department												
No	15	10.9			31	14.4			76	21.7		
Yes	122	89.1			184	85.6			275	78.3		
Position Category												
Officials & Administrators	0	.0			3	1.2			12	3.0		
Professionals	89	60.1			168	68.3			282	70.9		
Technicians	7	4.7			15	6.1			31	7.8		
Protective Service	1	.7			0	.0			1	.3		
Paraprofessionals	25	16.9			30	12.2			21	5.3		
Administrative Support	26	17.6			30	12.2			51	12.8		
Skilled Craft	0	.0			0	.0			0	.0		
Service/Maintenance	0	.0			0	.0			0	.0		
Professional Position												
No	59	39.9			75	30.5			104	26.2		
Yes	80	60.1			171	69.5			294	73.9		
Type of Position												
Front Line Staff	122	84.7			148	61.9			202	51.5		
Senior Level Staff	16	11.1			50	20.9			83	21.2		
Supervisory/Mgmt Staff	6	4.2			41	17.2			107	27.3		
Full-Time Employment												
No	20	13.5			54	22.0			75	19.0		
Yes	128	78.0			191	78.0			320	81.0		
Annual Salary (FTE)			$31,624	$10,591			$39,772	$14,778			$44,967	$19,420
Less Than $20,000	14	10.7			5	2.4			18	5.3		
$20,000 to $29,999	41	31.3			43	20.9			45	13.2		
$30,000 to $39,999	50	38.2			69	33.5			79	23.2		
$40,000 to $49,999	18	13.7			44	21.4			83	24.4		
$50,000 to $59,999	7	5.3			23	11.2			55	16.2		
$60,000 to $69,999	0	.0			14	6.8			23	6.8		
$70,000 to $79,999	1	.8			4	1.9			13	3.8		
Over $80,000	0	.0			4	1.9			24	7.1		

Table 31 (continued).

Variables and Values	Under 30 Years (n=148)				30 to 39 Years (n=246)				40 to 49 Years (n=398)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Know Non-English Language												
No	74	50.0			161	66.3			294	74.1		
Yes	74	50.0			82	33.7			103	25.9		
Other Language Speaking												
Fair	19	25.3			24	30.4			38	36.9		
Good	26	34.7			25	31.6			31	30.1		
Excellent	30	40.0			30	38.0			34	33.0		
Other Language Reading												
Fair	19	25.7			31	39.7			34	33.0		
Good	28	37.8			18	23.1			44	42.7		
Excellent	27	36.5			29	37.2			25	24.3		
Other Language Writing												
Fair	28	37.8			36	46.8			47	48.5		
Good	24	32.4			17	22.1			30	30.9		
Excellent	22	29.7			24	31.2			20	20.6		

Table 31 (continued).

Variables and Values	50 to 59 Years (n=349)				60 Years and Over (n=71)			
	n	%	Mean	SD	n	%	Mean	SD
Age			56.63	2.75			62.56	2.86
Under 29 Years	0	.0			0	.0		
30-39 Years	0	.0			0	.0		
40-49 Years	0	.0			0	.0		
50-59 Years	349	100.0			0	.0		
Over 60 Years	0	.0			71	100.0		
Gender								
Male	75	22.8			10	14.9		
Female	254	77.2			57	85.1		
Race								
White	314	91.3			62	88.6		
Hispanic	19	5.5			6	8.6		
Black	1	.3			1	1.4		
Asian	6	1.7			0	.0		
Other or Multiracial	4	1.2			1	1.4		
Highest Education								
High School Diploma	43	12.4			9	12.7		
Profess./Vocational Diploma	16	4.6			11	15.5		
Associate Degree	19	5.5			7	9.9		
Baccalaureate Degree	154	44.4			21	29.6		
Master's Degree	104	30.0			20	28.2		
Doctoral Degree	11	3.2			3	4.2		
College Degree								
No	78	22.5			27	38.0		
Yes	269	77.5			44	62.0		
Years Since Last Degree			23.62	10.40			32.34	11.78
Less than 2 Years	6	1.8			1	1.5		
2-5 Years	13	4.0			0	.0		
5-9 Years	28	8.5			3	4.6		
10-14 Years	30	9.1			5	7.7		
15-19 Years	23	7.0			3	4.6		
20 or More Years	229	69.6			53	81.5		
Years Experience in Discipline			20.62	10.65			28.49	12.22
Less than 2 Years	21	6.8			2	3.5		
2-5 Years	16	5.2			2	3.5		
5-9 Years	26	8.4			2	3.5		
10-14 Years	24	7.8			0	.0		
15-19 Years	25	8.1			8	14.0		
20 or More Years	197	63.8			43	75.4		
Years Experience in Pub. Health			13.79	9.49			17.37	10.49
Less than 2 Years	33	9.6			4	5.6		

Table 31 (continued).

Variables and Values	50 to 59 Years (n=349)				60 Years and Over (n=71)			
	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	33	9.6			1	1.4		
5-9 Years	61	17.7			15	21.1		
10-14 Years	73	21.2			12	16.9		
15-19 Years	38	11.0			8	11.3		
20 or More Years	106	30.8			31	43.7		
Size of County								
Small	16	5.2			6	8.8		
Medium	66	21.5			16	23.5		
Large	225	73.3			46	67.6		
Organized Health Department								
No	66	21.5			14	20.6		
Yes	241	78.5			54	79.4		
Position Category								
Officials & Administrators	13	3.8			3	4.2		
Professionals	263	76.2			51	71.8		
Technicians	12	3.5			2	2.8		
Protective Service	1	.3			0	.0		
Paraprofessionals	15	4.3			2	2.8		
Administrative Support	40	11.6			13	18.3		
Skilled Craft	1	.3			0	.0		
Service/Maintenance	0	.0			0	.0		
Professional Position								
No	69	20.0			17	23.9		
Yes	276	80.0			54	76.0		
Type of Position								
Front Line Staff	143	42.2			29	42.0		
Senior Level Staff	66	19.5			15	21.7		
Supervisory/Mgmt Staff	130	38.3			25	36.2		
Full-Time Employment								
No	49	14.3			15	21.7		
Yes	293	85.7			54	78.3		
Annual Salary (FTE)			$49,506	$19,216			$44,236	$13,997
Less Than $20,000	3	1.1			0	.0		
$20,000 to $29,999	32	11.6			8	15.7		
$30,000 to $39,999	60	21.7			11	21.6		
$40,000 to $49,999	53	19.1			18	35.3		
$50,000 to $59,999	49	17.7			6	11.8		
$60,000 to $69,999	37	13.4			5	9.8		
$70,000 to $79,999	20	7.2			3	5.9		
Over $80,000	23	8.3			0	.0		

Table 31 (continued).

Variables and Values	50 to 59 Years (n=349)				60 Years and Over (n=71)			
	n	%	Mean	SD	n	%	Mean	SD
Know Non-English Language								
No	263	77.1			52	75.4		
Yes	78	22.9			17	24.6		
Other Language Speaking								
Fair	33	42.3			4	25.0		
Good	26	33.3			6	37.5		
Excellent	19	24.4			6	37.5		
Other Language Reading								
Fair	30	40.5			6	37.5		
Good	26	35.1			5	31.3		
Excellent	18	24.3			5	31.3		
Other Language Writing								
Fair	42	58.3			8	53.3		
Good	17	23.6			5	33.3		
Excellent	13	18.1			2	13.3		

Table 32. Differences in Core Competency Proficiencies and Educational Needs by Age Group (N=1,212)

Core Competency Domains	Under 30 Years (n=148)				30 to 39 Years (n=246)				40 to 49 Years (n=398)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	4.13	1.50	5	4.25	4.40	1.38	4	4.50	4.32	1.48	4	4.50
Policy Development/Prog. Planning Skills	3.62	1.49	7	3.75	3.85	1.39	8	4.00	3.99	4.53	7	4.25
Communication Skills	4.70	1.17	2	4.80	4.85	1.13	2	5.00	4.64	1.33	2	4.83
Cultural Competency Skills	5.23	1.14	1	5.50	5.08	1.11	1	5.25	4.98	1.28	1	5.25
Community Dimensions of Practice Skills	4.31	1.32	4	4.25	4.32	1.23	5	4.50	4.32	1.34	4	4.50
Basic Public Health Sciences Skills	4.01	1.54	6	4.25	4.08	1.47	6	4.25	4.08	1.55	6	4.25
Financial Planning & Management Skills	3.52	1.31	8	3.40	3.92	1.34	7	4.00	3.90	1.44	8	4.00
Leadership & Systems Thinking Skills	4.42	1.30	3	4.50	4.55	1.29	3	4.75	4.53	1.41	3	4.75
Core Competencies Composite Skills	*4.25*	*1.14*		*4.34*	*4.39*	*1.08*		*4.51*	*4.36*	*1.25*		*4.49*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	2.82	1.13	6	3.00	3.17	1.07	4	3.00	3.04	1.22	3	3.00
Policy Devel./Prog. Planning Educ. Needs	3.01	1.30	3	3.00	3.26	1.18	2	3.00	3.05	1.30	2	3.00
Communication Educ. Needs	2.61	1.22	8	2.00	2.72	1.25	8	3.00	2.78	1.18	8	3.00
Cultural Competency Educ. Needs	2.71	1.17	7	3.00	2.84	1.18	7	3.00	2.85	1.14	7	3.00
Community Dimen. of Practice Educ. Needs	2.94	1.14	4	3.00	2.99	1.13	6	3.00	2.99	1.17	6	3.00
Basic Public Health Sciences Educ. Needs	2.86	1.29	5	3.00	3.23	1.24	3	3.00	3.03	1.29	4	3.00
Financial Planning & Mgmt. Educ. Needs	3.31	1.38	1	4.00	3.27	1.28	1	3.00	3.17	1.40	1	3.00
Leadership & Systems Thinking Educ. Needs	3.07	1.18	2	3.00	3.15	1.12	5	3.00	3.01	1.20	5	3.00
Core Competencies Composite Educ. Needs	*2.91*	*0.77*		*3.00*	*3.08*	*0.79*		*3.00*	*3.00*	*0.88*		*3.00*

Table 32 (continued).

Core Competency Domains	50 to 59 Years (n=349)				60 Years and Over (n=71)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]									
Analytic/Assessment Skills	4.52	1.42	5	4.75	4.14	1.49	5	4.25	<.05
Policy Development/Prog. Planning Skills	4.23	1.56	6	4.50	3.88	1.66	7	4.00	<.001
Communication Skills	4.78	1.23	3	5.00	4.28	1.44	3	4.67	<.05
Cultural Competency Skills	5.15	1.19	1	5.50	4.93	1.37	1	5.25	n.s.
Community Dimensions of Practice Skills	4.54	1.42	4	4.75	4.28	1.58	3	4.75	n.s.
Basic Public Health Sciences Skills	4.18	1.56	8	4.50	3.93	1.53	6	3.75	n.s.
Financial Planning & Management Skills	4.20	1.45	7	4.40	3.85	1.39	8	4.20	<.001
Leadership & Systems Thinking Skills	4.86	1.38	2	5.25	4.46	1.67	2	5.00	<.001
Core Competencies Composite Skills	*4.56*	*1.23*		*4.77*	*4.21*	*1.39*		*4.63*	*<.05*
Educ. Needs in Core Competency Domains[2]									
Analytic/Assessment Educ. Needs	3.06	1.11	2	3.00	2.99	1.20	3	3.00	n.s.
Policy Devel./Prog. Planning Educ. Needs	3.09	1.21	1	3.00	2.99	1.24	3	3.00	n.s.
Communication Educ. Needs	2.79	1.10	7	3.00	2.90	1.24	6	3.00	n.s.
Cultural Competency Educ. Needs	2.73	1.11	8	3.00	2.68	1.20	8	3.00	n.s.
Community Dimen. of Practice Educ. Needs	2.94	1.14	6	3.00	2.80	1.27	7	3.00	n.s.
Basic Public Health Sciences Educ. Needs	3.01	1.24	3	3.00	3.06	1.23	1	3.00	n.s.
Financial Planning & Mgmt. Educ. Needs	3.00	1.39	4	3.00	3.04	1.44	2	3.00	n.s.
Leadership & Systems Thinking Educ. Needs	2.99	1.15	5	3.00	2.92	1.13	5	3.00	n.s.
Core Competencies Composite Educ. Needs	*2.95*	*0.83*		*3.00*	*2.92*	*0.95*		*3.00*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the five groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When the overall difference among groups was non-significant, n.s. is noted. When the overall F ratio was statistically significant, post-hoc comparisons between all possible pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparisons may be obtained from the author.

Figure 37. Proficiencies in Core Competency Skills by Age Group

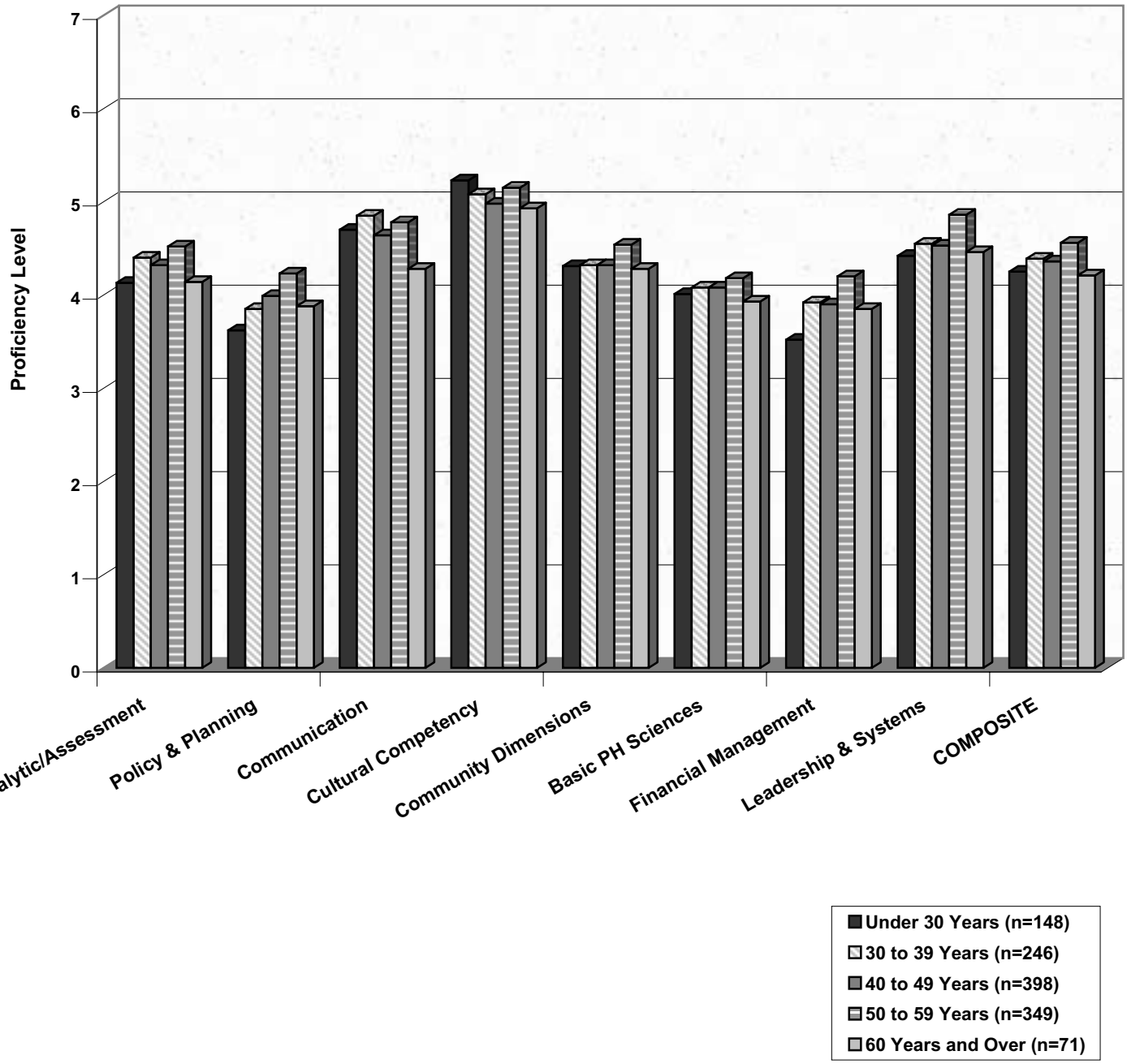


Figure 38. Educational Needs in Core Competency Skills by Age Group

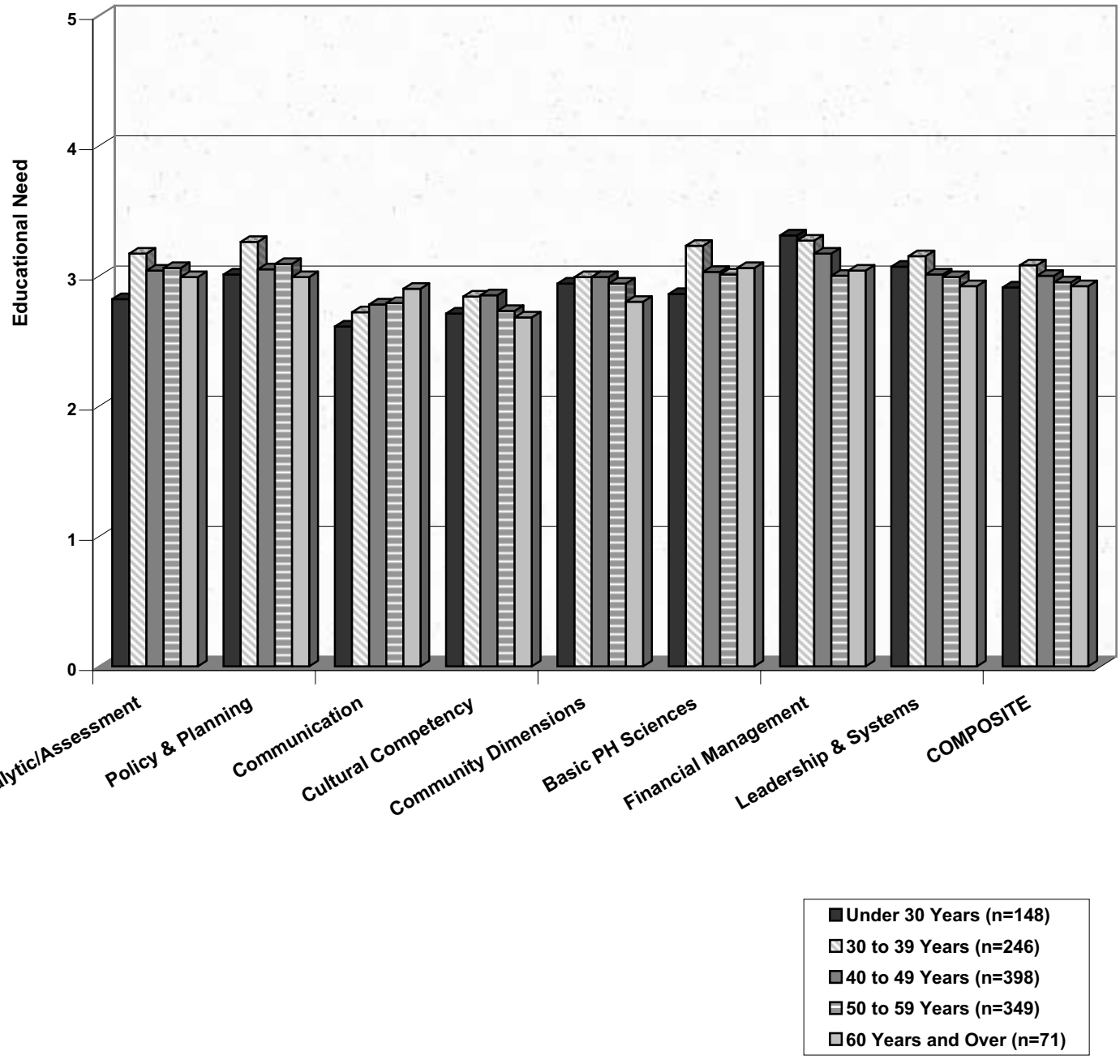


Table 33. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs by Age Group (N=1,212)

Bioterrorism/Emergency Preparedness Competency Domains	Under 30 Years (n=148)				30 to 39 Years (n=246)				40 to 49 Years (n=398)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	2.88	1.72	4	2.67	2.70	1.56	5	2.33	2.76	1.65	5	2.33
Disaster Response Skills	3.89	1.61	1	4.00	3.79	1.51	1	4.00	3.84	1.50	1	4.00
Emergency Communication Skills	3.50	1.70	2	3.50	3.37	1.70	2	3.00	3.20	1.67	2	3.00
Biological/Infectious Disease Skills	2.64	1.78	7	2.00	2.68	1.67	6	2.00	2.70	1.72	6	2.00
Toxic Chem. & Env. Hazard Skills	2.69	1.88	6	2.00	2.61	1.73	7	2.00	2.55	1.72	7	2.00
Physical Injury Skills	3.41	1.99	3	3.00	3.28	1.85	3	3.00	3.17	1.89	3	3.00
Crisis Management Skills	2.86	1.91	5	2.00	2.92	1.86	4	2.00	2.84	1.84	4	2.00
Bioterrorism/EP Composite Skills	*3.13*	*1.47*		*2.88*	*3.05*	*1.40*		*2.85*	*3.01*	*1.43*		*2.79*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.57	1.28	1	4.00	3.75	1.26	1	4.00	3.59	1.27	1	4.00
Disaster Response Educ. Needs	3.46	1.26	4	4.00	3.70	1.22	3	4.00	3.57	1.24	3	4.00
Emergency Communication Educ. Needs	2.69	1.31	7	2.50	2.86	1.27	7	3.00	3.10	1.22	7	3.00
Biological/Infectious Disease Educ. Needs	3.53	1.41	3	4.00	3.62	1.30	4	4.00	3.56	1.36	4	4.00
Toxic Chem. & Env. Hazard Educ. Needs	3.55	1.40	2	4.00	3.75	1.25	1	4.00	3.58	1.43	2	4.00
Physical Injury Educ. Needs	3.22	1.36	5	3.00	3.45	1.28	6	4.00	3.23	1.35	6	3.00
Crisis Management Educ. Needs	3.20	1.26	6	3.00	3.51	1.24	5	4.00	3.30	1.25	5	3.00
Bioterrorism/EP Composite Educ. Needs	*3.32*	*1.04*		*3.43*	*3.52*	*0.99*		*3.71*	*3.41*	*1.03*		*3.57*

Table 33 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	50 to 59 Years (n=349)				60 Years and Over (n=71)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]									
Disaster Planning Skills	2.88	1.68	5	2.67	2.91	1.44	6	2.67	n.s.
Disaster Response Skills	3.94	1.51	1	4.00	3.97	1.48	1	4.00	n.s.
Emergency Communication Skills	3.29	1.73	2	3.00	3.17	1.49	3	3.50	n.s.
Biological/Infectious Disease Skills	2.85	1.76	6	2.00	3.07	1.58	4	3.00	n.s.
Toxic Chem. & Env. Hazard Skills	2.65	1.76	7	2.00	2.69	1.46	7	3.00	n.s.
Physical Injury Skills	3.09	1.82	3	3.00	3.23	1.82	2	3.00	n.s.
Crisis Management Skills	3.02	1.80	4	3.00	2.94	1.71	5	3.00	n.s.
Bioterrorism/EP Composite Skills	*3.11*	*1.46*		*2.90*	*3.15*	*1.29*		*3.00*	*n.s.*
Educational Needs in Bioterrorism/EP[2]									
Disaster Planning Educ. Needs	3.66	1.28	2	4.00	3.46	1.21	3	3.00	n.s.
Disaster Response Educ. Needs	3.68	1.23	1	4.00	3.48	1.25	2	4.00	n.s.
Emergency Communication Educ. Needs	3.28	1.23	7	3.00	3.34	0.98	4	3.00	<.01
Biological/Infectious Disease Educ. Needs	3.55	1.30	4	4.00	3.30	1.35	5	3.00	n.s.
Toxic Chem. & Env. Hazard Educ. Needs	3.65	1.37	3	4.00	3.57	1.46	1	4.00	n.s.
Physical Injury Educ. Needs	3.35	1.34	6	4.00	2.97	1.24	7	3.00	<.05
Crisis Management Educ. Needs	3.47	1.24	5	4.00	3.10	1.20	6	3.00	<.01
Bioterrorism/EP Composite Educ. Needs	*3.52*	*1.00*		*3.71*	*3.32*	*0.96*		*3.43*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the five groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 39. Proficiencies in Bioterrorism/Emergency Preparedness Skills by Age Group

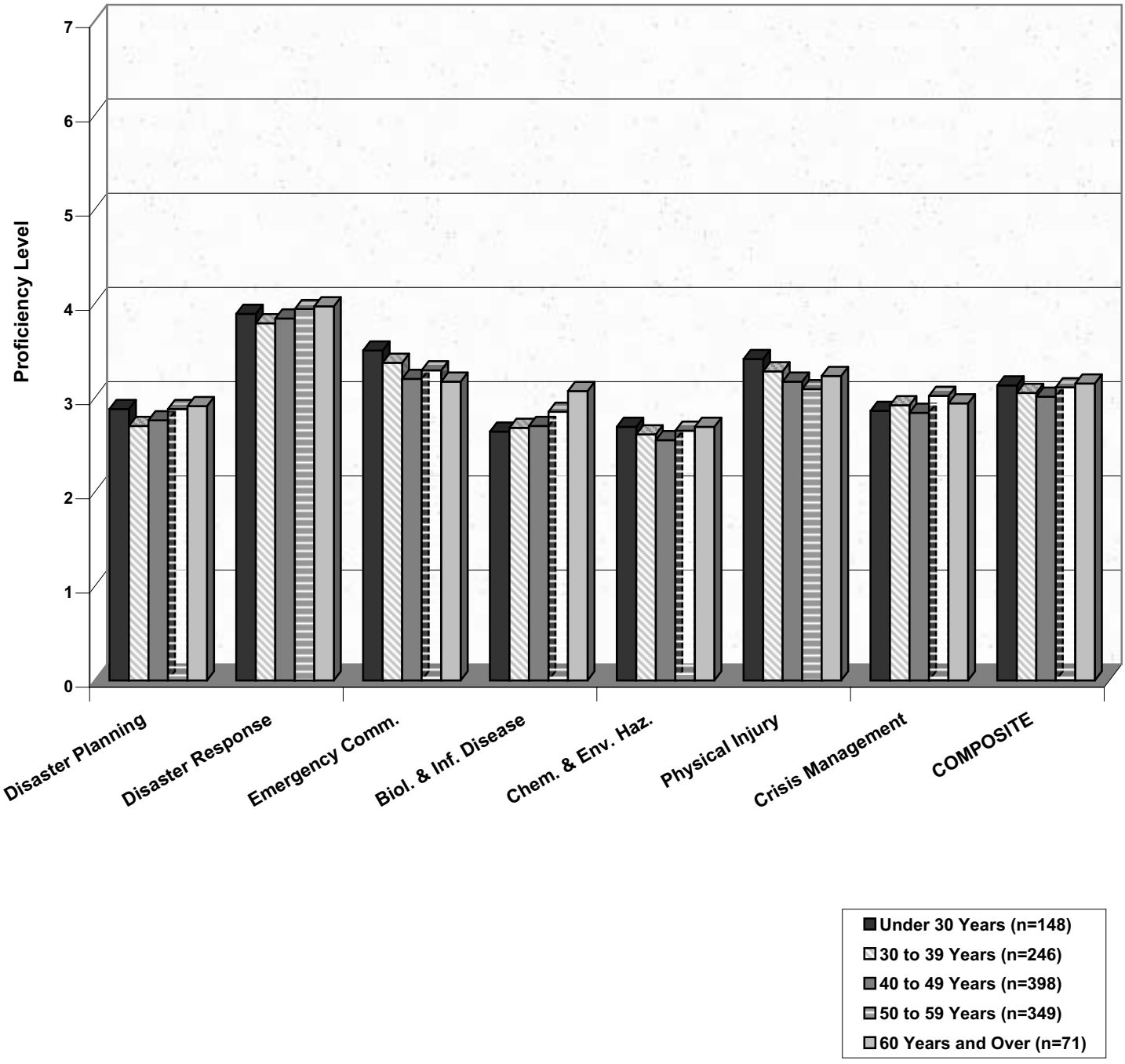


Figure 40. Educational Needs in Bioterrorism/Emergency Preparedness Skills by Age Group

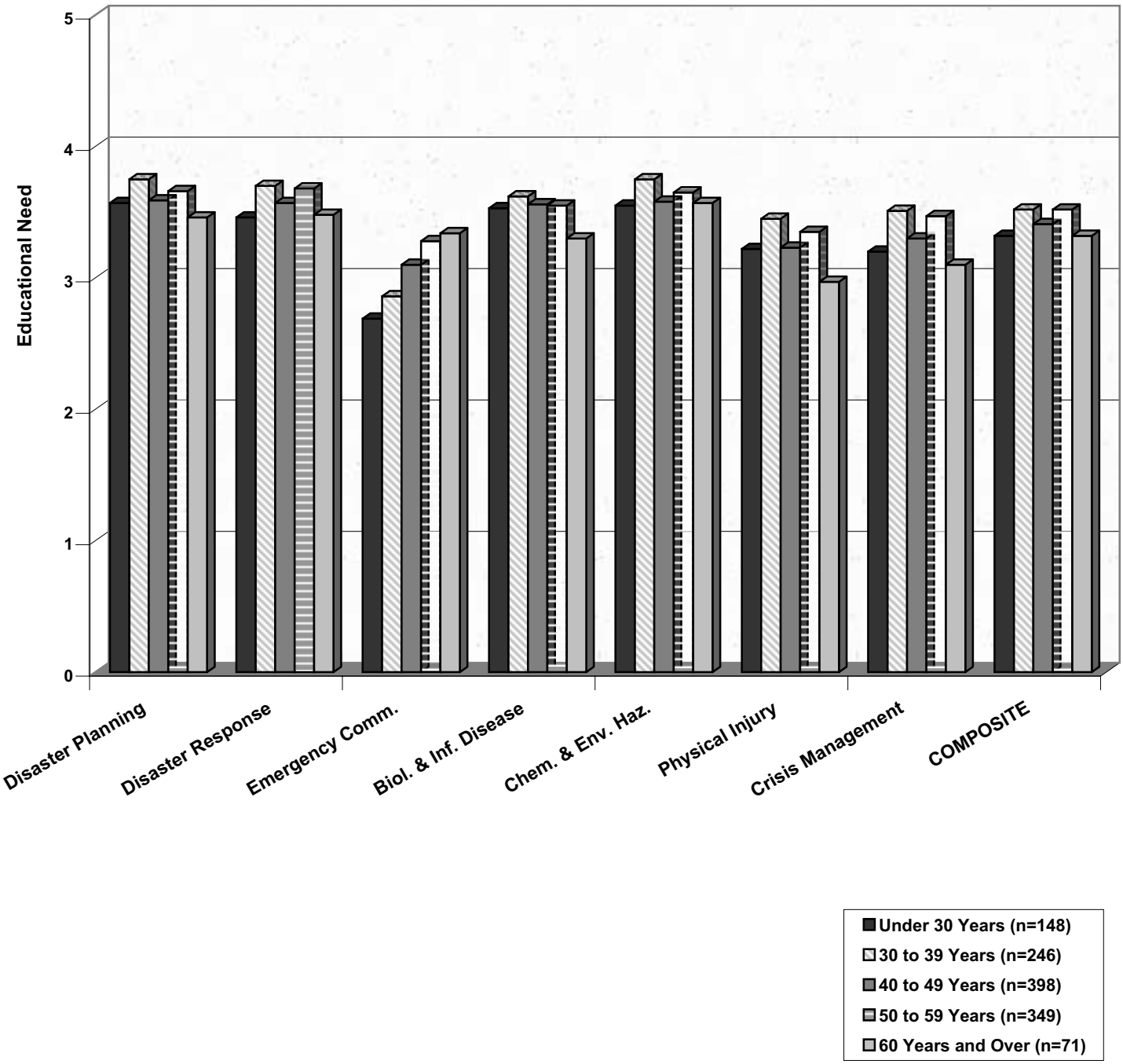


Table 34. Educational Preferences of Workers by Age Group (N=1,212)

Types of Preference	Under 30 Years (n=148)				30 to 39 Years (n=246)				40 to 49 Years (n=398)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.18	0.71	2	2.00	2.24	0.71	2	2.00	2.18	0.73	2	2.00
1-Day Workshops	2.51	0.57	1	3.00	2.41	0.63	1	2.00	2.50	0.59	1	3.00
Several-Day Workshops	1.78	0.74	3	2.00	1.68	0.74	3	2.00	1.68	0.75	3	2.00
Academic Semester Courses	1.47	0.73	4	1.00	1.49	0.71	4	1.00	1.39	0.65	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.72	0.54	1	3.00	2.74	0.52	1	3.00	2.72	0.49	1	3.00
Interactive Teleconferences	1.64	0.61	4	2.00	1.62	0.64	4	2.00	1.78	0.64	3	2.00
Internet, Web-Based Instruction	1.76	0.68	3	2.00	1.77	0.69	3	2.00	1.81	0.72	4	2.00
Combination Format	1.98	0.68	2	2.00	1.98	0.70	2	2.00	2.03	0.70	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.74	0.56	1	3.00	2.77	0.50	1	3.00	2.81	0.47	1	3.00
Weekend Classes	1.21	0.50	4	1.00	1.25	0.51	4	1.00	1.17	0.45	4	1.00
Evening Classes	1.55	0.70	3	1.00	1.47	0.66	3	1.00	1.36	0.60	3	1.00
Self-Determined Web-Based	1.74	0.65	2	2.00	1.82	0.73	2	2.00	1.85	0.72	2	2.00
Preferences for Educational Recognition												
Certificate	2.38	0.64	1	2.00	2.34	0.73	1	2.00	2.36	0.70	1	2.00
Continuing Education Units	2.18	0.77	2	2.00	2.16	0.76	2	2.00	2.24	0.79	2	2.00
Undergraduate Academic Credit	1.77	0.78	4	2.00	1.72	0.74	4	2.00	1.63	0.77	4	1.00
Graduate Academic Credit	2.20	0.77	3	2.00	2.06	0.82	3	2.00	1.94	0.85	3	2.00

Table 34 (continued).

Types of Preference	50 to 59 Years (n=349)				60 Years and Over (n=71)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length								
2-Hour Sessions	2.15	0.74	2	2.00	2.14	0.73	2	2.00
1-Day Workshops	2.53	0.58	1	3.00	2.46	0.67	1	3.00
Several-Day Workshops	1.72	0.74	3	2.00	1.51	0.66	3	1.00
Academic Semester Courses	1.38	0.65	4	1.00	1.23	0.49	4	1.00
Preferences for Educational Format								
Face-to-Face Classroom Setting	2.77	0.49	1	3.00	2.70	0.49	1	3.00
Interactive Teleconferences	1.74	0.64	4	2.00	1.80	0.59	3	2.00
Internet, Web-Based Instruction	1.82	0.70	3	2.00	1.64	0.67	4	2.00
Combination Format	2.01	0.69	2	2.00	1.96	0.66	2	2.00
Preferences for Time of Course Offering								
Weekday Classes	2.87	0.38	1	3.00	2.73	0.59	1	3.00
Weekend Classes	1.15	0.37	4	1.00	1.20	0.44	4	1.00
Evening Classes	1.32	0.51	3	1.00	1.27	0.51	3	1.00
Self-Determined Web-Based	1.86	0.72	2	2.00	1.75	0.69	2	2.00
Preferences for Educational Recognition								
Certificate	2.30	0.70	1	2.00	2.42	0.66	1	3.00
Continuing Education Units	2.18	0.80	2	2.00	2.07	0.78	2	2.00
Undergraduate Academic Credit	1.54	0.71	4	1.00	1.44	0.64	4	1.00
Graduate Academic Credit	1.76	0.82	3	2.00	1.45	0.71	3	1.00

5b. Differences Between College Degree and Non-College Degree Workers

Table 35 presents a comparison of the characteristics of Colorado public health workers with a College Degree (n=868) and those with No College Degree (n=354). Those with this degree were slightly older (mean=44.5 years) than those without this degree (mean=42.7 years). Men were disproportionately represented in the degreed group (22%) compared to the non-degreed group (7%). White workers were disproportionately represented in the College Degree group (89%) when compared to the No College Degree group (62%).

The average (mean) years of experience in the discipline and in public health was higher for those with a degree (15.1 years, 10.1 years, respectively) than for those who did not have this degree (11.5 years, 8.2 years, respectively). As expected, the majority of public health workers with a college degree were in professional positions (94%) and the majority of public health workers without a college degree were in non-professional positions (78%). Workers without a college degree held more front line staff positions (73%) than college degree workers (47%).

A higher percentage of workers in the No College Degree group held full-time positions (88%) than workers in the College Degree group (80%). The median salary for those with this degree was $44,800 compared to $27,000 for those without this degree. A greater percentage of workers without a college degree (34%) reported they knew a non-English language than those with a college degree (27%).

Table 36 summarizes the differences in Core Competency proficiencies and educational needs between these two groups. College Degree workers rated themselves as markedly ($p < .001$) more proficient in overall Core Competency Skills than the No College Degree workers. The means on the composite scale for these two groups were 4.65 and 3.78, respectively. Means for the two groups were statistically different (p. <.001) in each of the eight Core Competency Skill subscales with degreed workers consistently showing higher proficiency levels than non-degreed workers. This pattern is clearly revealed in Figure 41.

In the Core Competency educational needs composite scale, the No College Degree group reported significantly ($p < .05$) greater needs than the College Degree group. When educational needs for the two groups were compared within the eight subscales, the non-degreed group had a statistically higher need for education in three subscales: Communication Skills ($p < .001$), Cultural Competency Skills ($p < .001$), and Basic Public Health Science Skills ($p < .05$). The similarities and differences in educational needs between the two groups are graphically presented in Figure 42.

Differences in Bioterrorism/Emergency Preparedness proficiencies and educational needs between College Degree workers and No College Degree workers are summarized in Table 37. No difference was found between the two groups in overall Bioterrorism/Emergency Preparedness Competency Skills (composite scale). When the subscales were compared, the College Degree group was statistically more proficient in three of the subscales: Disaster Response Skills ($p < .001$), Biological/Infectious Disease Skills ($p < .01$), and Crisis Management Skills ($p < .05$). No differences were found in Disaster Planning Skills, Emergency Communication Skills, Toxic Chemical/Environmental Hazard Skills, or Physical Injury Skills. These comparisons in proficiencies are illustrated in Figure 43.

When overall educational need for Bioterrorism/Emergency Preparedness Competency Skills (composite) was compared for these two groups, no difference was found. When comparisons were made on the seven subscales, workers in the College Degree group identified greater educational need in three subscales: Disaster Planning Skills ($p < .05$), Disaster Response Skills ($p < .01$), and

Toxic Chemical/Environmental Hazards Skills ($p < .05$). Educational needs for these two groups are graphically presented in Figure 44.

Table 38 documents the educational preferences of workers with College Degrees and No College Degrees. No differences in preferences were noted for educational format or the time of course offering. However, public health workers with a college degree preferred one-day workshops over shorter 2-hour sessions, and those without a college degree preferred 2-hour sessions over one-day workshops. Not unexpected, those with a college degree indicated a higher preference for graduate academic credit; those without a college degree indicated a higher preference for undergraduate academic credit.

Table 35. Characteristics of Colorado Public Health Workers with College Degrees and No College Degrees (N=1,222)

	College Degree (n=868)					No College Degree (n=354)				
Variables and Values	**n**	**%**	**Mean**	**SD**	**Median**	**n**	**%**	**Mean**	**SD**	**Median**
Age			44.48	10.30	46			42.73	11.62	44
Under 29 Years	91	10.6				56	16.2			
30-39 Years	172	20.0				73	21.1			
40-49 Years	282	32.9				112	32.4			
50-59 Years	269	31.4				78	22.5			
Over 60 Years	44	5.1				27	7.8			
Gender										
Male	179	21.7				24	7.2			
Female	647	78.3				310	92.8			
Race										
White	765	89.3				214	61.7			
Hispanic	43	5.0				116	33.4			
Black	14	1.6				7	2.0			
Asian	12	1.4				4	1.2			
Other or Multiracial	23	2.7				6	1.7			
Highest Education										
High School Diploma	0	.0				174	49.2			
Profess./Vocational Diploma	0	.0				78	22.0			
Associate Degree	0	.0				102	28.8			
Baccalaureate Degree	547	63.0				0	.0			
Master's Degree	287	33.1				0	.0			
Doctoral Degree	34	3.9				0	.0			
College Degree										
No	0	.0				354	100.0			
Yes	868	100.0				0	.0			
Years Since Last Degree			15.20	10.61	14			18.87	12.51	16
Less than 2 Years	47	5.5				9	2.9			
2-5 Years	117	13.8				35	11.4			
5-9 Years	157	18.5				49	16.0			
10-14 Years	131	15.5				40	13.0			
15-19 Years	93	11.3				37	12.1			
20 or More Years	299	35.3				137	44.6			
Years Experience in Discipline			15.10	10.38	14			11.52	11.22	8
Less than 2 Years	47	5.5				37	18.8			
2-5 Years	112	13.1				37	18.8			
5-9 Years	157	18.4				34	17.3			
10-14 Years	126	14.8				24	12.2			
15-19 Years	100	11.7				17	8.6			
20 or More Years	312	36.5				48	24.4			
Years Experience in Pub. Health			10.14	8.59	8			8.23	7.82	6
Less than 2 Years	127	14.8				74	22.3			

Table 35 (continued).

Variables and Values	College Degree (n=868)					No College Degree (n=354)				
	n	%	Mean	SD	Median	n	%	Mean	SD	Median
2-5 Years	153	17.8				71	21.4			
5-9 Years	194	22.6				65	19.6			
10-14 Years	154	17.9				64	19.3			
15-19 Years	86	10.0				15	4.5			
20 or More Years	145	16.9				43	13.0			
County Survey Response										
Very Small	22	2.9				22	6.7			
Small	77	10.2				37	11.3			
Medium	79	10.4				45	13.8			
Large	579	76.5				223	68.2			
Organized Health Department										
No	114	15.1				85	26.0			
Yes	643	84.9				242	74.0			
Position Category										
Officials & Administrators	4	1.1				26	3.0			
Professionals	74	21.1				790	91.1			
Technicians	44	12.5				24	2.8			
Protective Service	3	.9				0	.0			
Paraprofessionals	87	24.8				6	.7			
Administrative Support	13	39.3				21	2.4			
Skilled Craft	0	.0				0	.0			
Service/Maintenance	1	.3				0	.0			
Professional Position										
No	51	5.9				273	77.8			
Yes	816	94.1				78	22.2			
Type of Position										
Front Line Staff	400	46.8				247	72.9			
Senior Level Staff	188	22.0				48	14.2			
Supervisory/Mgmt Staff	266	31.1				44	13.0			
Full-Time Employment										
No	175	20.3				42	12.0			
Yes	686	79.7				307	88.0			
Annual Salary (FTE)			$48,499	$17,626	$44,800			$30,052	$11,245	$27,000
Less Than $20,000	7	1.0				31	11.3			
$20,000 to $29,999	42	5.8				125	45.6			
$30,000 to $39,999	195	26.7				74	27.0			
$40,000 to $49,999	192	26.3				26	9.5			
$50,000 to $59,999	128	17.6				13	4.7			
$60,000 to $69,999	76	10.4				2	.7			
$70,000 to $79,999	40	5.5				1	.4			
Over $80,000	49	6.7				2	.7			

Table 35 (continued).

Variables and Values	College Degree (n=868)					No College Degree (n=354)				
	n	%	Mean	SD	Median	n	%	Mean	SD	Median
Know Non-English Language										
No	625	72.6				228	65.7			
Yes	236	27.4				119	34.3			
Other Language Speaking										
Fair	105	45.3				15	12.5			
Good	69	29.7				45	37.5			
Excellent	58	25.0				60	50.0			
Other Language Reading										
Fair	95	41.9				26	21.8			
Good	82	36.1				40	33.6			
Excellent	50	22.0				53	44.5			
Other Language Writing										
Fair	124	56.1				38	33.0			
Good	56	25.3				38	33.0			
Excellent	41	18.6				39	33.9			

Table 36. Differences in Core Competency Proficiencies and Educational Needs Between College Degree and No College Degree Workers (N=1,222)

Core Competency Domains	College Degree (n=868)				No College Degree (n=354)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]									
Analytic/Assessment Skills	4.66	1.28	4	4.75	3.58	1.56	5	3.50	<.001
Policy Development/Program Planning Skills	4.22	1.43	7	4.50	3.38	1.58	7	3.50	<.001
Communication Skills	4.98	1.09	2	5.17	4.03	1.35	2	4.00	<.001
Cultural Competency Skills	5.26	1.06	1	5.50	4.64	1.41	1	4.75	<.001
Community Dimensions of Practice Skills	4.58	1.23	5	4.75	3.87	1.50	4	4.00	<.001
Basic Public Health Sciences Skills	4.43	1.37	6	4.50	3.26	1.57	8	3.00	<.001
Financial Planning & Management Skills	4.17	1.32	8	4.20	3.42	1.50	6	3.40	<.001
Leadership & Systems Thinking Skills	4.86	1.22	3	5.00	3.99	1.55	3	4.00	<.001
Core Competencies Composite Skills	*4.65*	*1.05*		*4.74*	*3.78*	*1.33*		*3.77*	*<.001*
Educ. Needs in Core Competency Domains[2]									
Analytic/Assessment Educ. Needs	3.04	1.08	3	3.00	3.07	1.30	4	3.00	n.s.
Policy Development/Prog. Planning Educ. Needs	3.15	1.18	2	3.00	3.08	1.41	3	3.00	n.s.
Communication Educ. Needs	2.65	1.13	8	3.00	3.03	1.27	7	3.00	<.001
Cultural Competency Educ. Needs	2.70	1.08	7	3.00	3.00	1.27	8	3.00	<.001
Community Dimensions of Practice Educ. Needs	2.92	1.10	6	3.00	3.06	1.28	6	3.00	n.s.
Basic Public Health Sciences Educ. Needs	2.99	1.20	5	3.00	3.19	1.42	1	3.00	<.05
Financial Planning & Management Educ. Needs	3.20	1.33	1	3.00	3.07	1.49	4	3.00	n.s.
Leadership & Systems Thinking Educ. Needs	3.01	1.13	4	3.00	3.12	1.23	2	3.00	n.s.
Core Competencies Composite Educ. Needs	*2.96*	*0.77*		*3.00*	*3.08*	*0.99*		*3.13*	*<.05*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]Independent t-tests were used to test for differences in means between the two groups. Prior to these analyses, all variables met or were transformed to meet the assumption of normal distribution. Levene's test for equality of variances was used to assess the homogeneity of variance assumption and make required adjustments. Although directionality could have been hypothesized, conservative 2-tailed significance tests were employed. The probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When differences between groups were non-significant, n.s. is noted.

Figure 41. Proficiencies in Core Competency Skills for Workers with College Degrees and No College Degrees

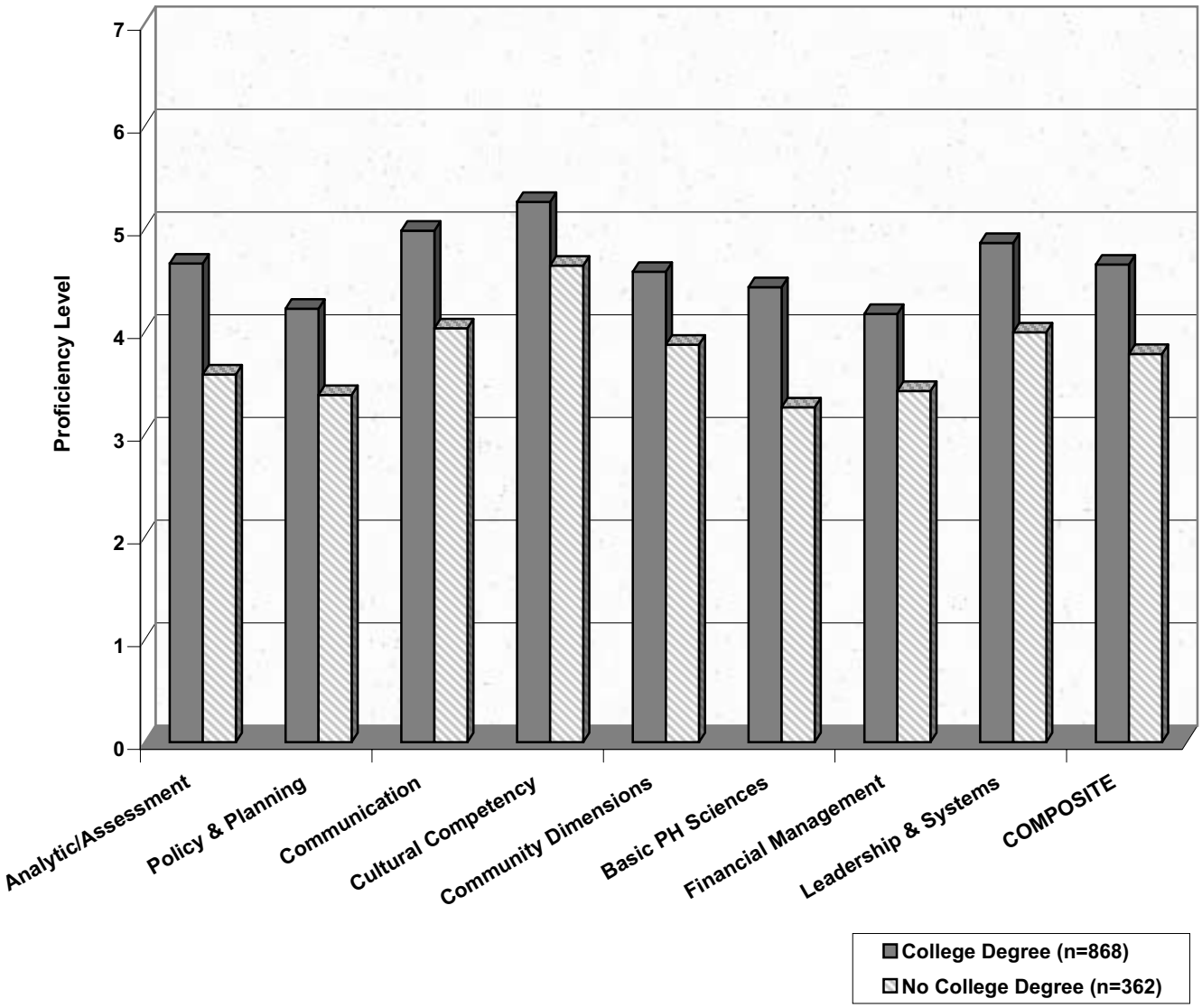


Figure 42. Educational Needs in Core Competency Skills for Workers with College Degrees and No College Degrees

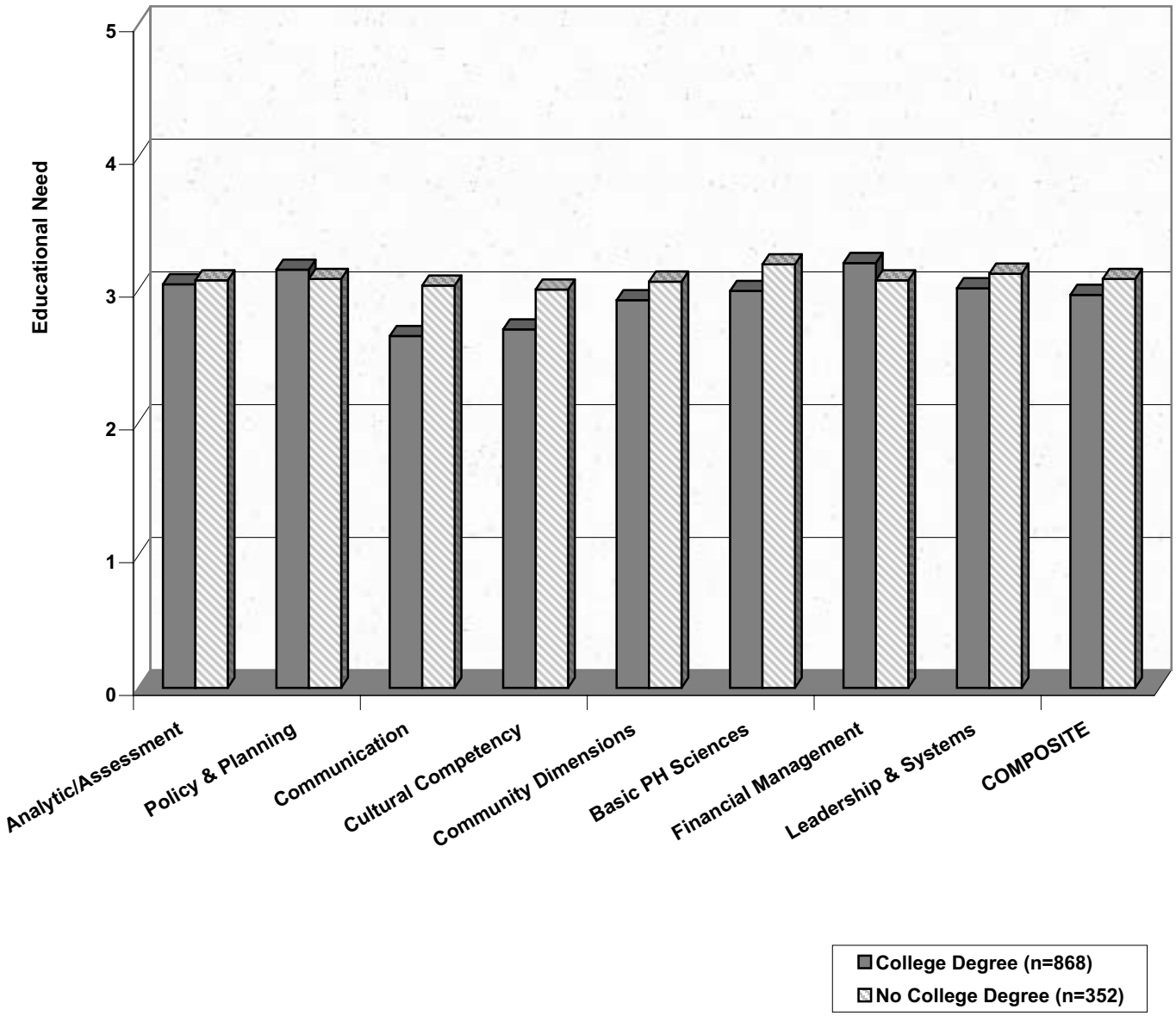


Table 37. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs Between College Degree and No College Degree Workers (N=1,222)

Bioterrorism/Emergency Preparedness Competency Domains	College Degree (n=868)				No College Degree (n=354)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]									
Disaster Planning Skills	2.82	1.62	5	2.67	2.74	1.66	5	2.33	n.s.
Disaster Response Skills	3.97	1.45	1	4.00	3.64	1.62	1	3.67	<.001
Emergency Communication Skills	3.28	1.65	2	3.00	3.29	1.74	2	3.00	n.s.
Biological/Infectious Disease Skills	2.82	1.70	5	2.00	2.58	1.75	6	2.00	<.01
Toxic Chem. & Env. Hazard Skills	2.66	1.73	7	2.00	2.51	1.76	7	2.00	n.s.
Physical Injury Skills	3.22	1.84	3	3.00	3.18	1.93	3	3.00	n.s.
Crisis Management Skills	2.97	1.82	4	3.00	2.76	1.83	4	2.00	<.05
Bioterrorism Composite Skills	*3.11*	*1.39*		*2.90*	*2.96*	*1.51*		*2.71*	*n.s.*
Educational Needs in Bioterrorism/EP[2]									
Disaster Planning Educ. Needs	3.70	1.21	2	4.00	3.47	1.40	2	4.00	<.05
Disaster Response Educ. Needs	3.68	1.20	3	4.00	3.44	1.31	3	4.00	<.01
Emergency Communication Educ. Needs	3.08	1.22	7	3.00	3.01	1.30	7	3.00	n.s.
Biological/Infectious Disease Educ. Needs	3.57	1.29	4	4.00	3.50	1.46	1	4.00	n.s.
Toxic Chem & Env Hazard Educ. Needs	3.72	1.29	1	4.00	3.43	1.55	4	4.00	<.05
Physical Injury Educ. Needs	3.29	1.30	6	3.00	3.28	1.40	6	3.00	n.s.
Crisis Management Educ. Needs	3.39	1.21	5	4.00	3.30	1.33	5	3.00	n.s.
Bioterrorism Composite Educ. Needs	*3.49*	*0.95*		*3.64*	*3.35*	*1.15*		*3.43*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]Independent t-tests were used to test for differences in means between the two groups. Prior to these analyses, all variables met or were transformed to meet the assumption of normal distribution. Levene's test for equality of variances was used to assess the homogeneity of variance assumption and make required adjustments. Although directionality could have been hypothesized, conservative 2-tailed significance tests were employed. The probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When differences between groups were non-significant, n.s. is noted.

Figure 43. Proficiencies in Bioterrorism/Emergency Preparedness Competency Skills for Workers with College Degrees and No College Degrees

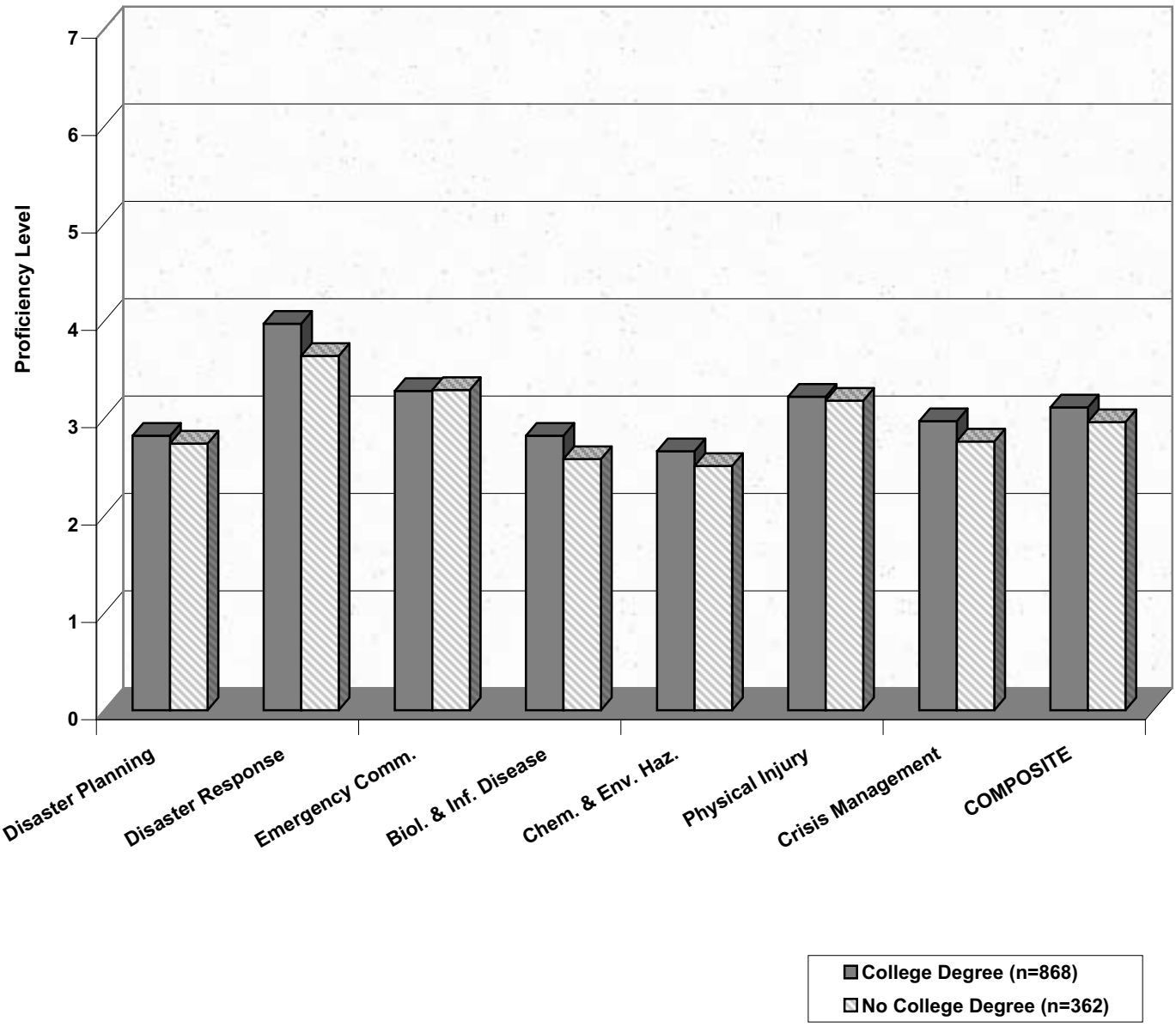


Figure 44. Educational Needs in Bioterrorism/Emergency Preparedness Competency Skills for Workers with College Degrees and No College Degrees

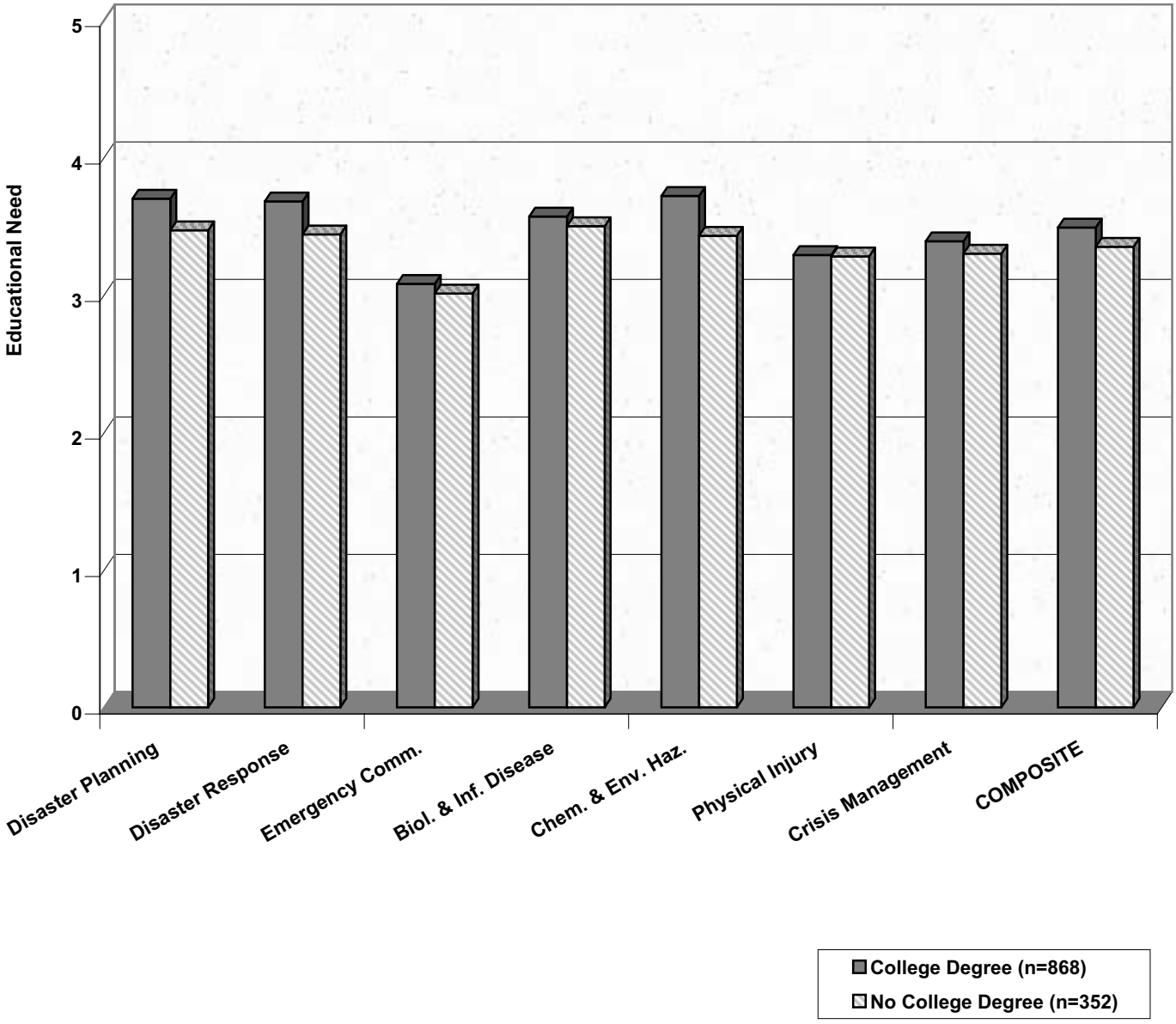


Table 38. Educational Preferences of Workers with College Degrees and No College Degrees (N=1,222)

Types of Preference	College Degree (n=868)				No College Degree (n=354)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length								
2-Hour Sessions	2.23	0.72	2	2.00	2.08	0.72	1	2.00
1-Day Workshops	2.52	0.58	1	3.00	2.41	0.65	2	3.00
Several-Day Workshops	1.69	0.73	3	2.00	1.69	0.76	3	2.00
Academic Semester Courses	1.36	0.63	4	1.00	1.52	0.74	4	1.00
Preferences for Educational Format								
Face-to-Face Classroom Setting	2.77	0.47	1	3.00	2.66	0.55	1	3.00
Interactive Teleconferences	1.74	0.63	4	2.00	1.66	0.65	4	2.00
Internet, Web-Based Instruction	1.78	0.70	3	2.00	1.80	0.69	3	2.00
Combination Format	2.06	0.69	2	2.00	1.88	0.68	2	2.00
Preferences for Time of Course Offering								
Weekday Classes	2.84	0.44	1	3.00	2.75	0.54	1	3.00
Weekend Classes	1.16	0.42	4	1.00	1.25	0.53	4	1.00
Evening Classes	1.36	0.58	3	1.00	1.46	0.66	3	1.00
Self-Determined Web-Based	1.86	0.71	2	2.00	1.73	0.71	2	2.00
Preferences for Educational Recognition								
Certificate	2.30	0.71	1	2.00	2.46	0.64	1	3.00
Continuing Education Units	2.24	0.78	2	2.00	2.07	0.78	2	2.00
Undergraduate Academic Credit	1.51	0.67	4	1.00	1.91	0.83	3	2.00
Graduate Academic Credit	1.99	0.85	3	2.00	1.73	0.78	4	2.00

5c. Differences by Level of Educational Preparation

Workers were compared in six categories of educational preparation. These categories and the numbers of workers in each group follows: High School Diploma (n=174), Professional/Vocational Diploma (n=78), Associate Degree (n=102), Baccalaureate Degree (n=547), Master's Degree (n=287), and Doctoral Degree (n=34). Characteristics of these six groups are noted in Table 39.

Proportionately more high school diplomas were held among the youngest workers (25%) and proportionately more professional/vocational diplomas and graduate degrees were held among the older workers. A higher proportion of men were found in each successive higher level of educational achievement; men comprised only a very small part (males=6%) of those prepared at the high school level, but more men than women (males=53%) were prepared at the doctoral level. A greater percentage of non-white workers reported lower educational levels; Hispanic workers made up nearly half (47%) of workers with a high school diploma.

The majority of those prepared at or beyond a baccalaureate degree held professional positions, while most respondents in the High School Diploma and Professional/Vocational Diploma groups held non-professional positions. For the Associate Degree group, half (50%) worked in professional positions and the other half (50%) worked in non-professional positions. The majority of respondents prepared at a baccalaureate level or below worked in front line positions; the largest percentages of public health workers prepared at the master's and doctoral levels were employed in supervisory/management staff positions. The groups with the largest percentage of respondents knowing a non-English language were the doctoral prepared group (47%) followed by those with a high school diploma (42%).

As documented in Table 40, a large significant difference ($p < .001$) was found in overall Core Competency Skill proficiency by level of education. A higher proficiency corresponded to higher educational preparation. In descending order, the means for proficiency in Core Competency Skills (composite score) among these groups were Doctoral Degree (5.26), Master's Degree (4.95), Baccalaureate Degree (4.46), Associate Degree (4.05), Professional/Vocational Diploma (3.88), and High School Diploma (3.57). Among these six groups, a similar pattern of marked statistically significant differences ($p < .001$) was found in all eight Core Competency Skill subscales. See Figure 45 for a graphic depiction of these differences.

A significant difference ($p < .01$) in educational need for Core Competency Skills (composite score) was found among these six educational groups. Significant differences were found in five of the eight subscales: Analytic/Assessment Skills ($p < .05$), Communication Skills ($p < .001$), Cultural Competency Skills ($p < .001$), Community Dimensions of Practice Skills ($p < .05$), and Leadership/ Systems Thinking Skills ($p < .05$). In general, educational needs were higher for the High School Diploma, Professional/Vocational Diploma, and Associate Degree groups than for the Baccalaureate Degree, Master's Degree, and Doctoral Degree groups. The doctorally prepared group expressed least educational needs across all dimensions. These differences are visually apparent in Figure 46.

As shown in Table 41, a difference ($p < .001$) was found for overall proficiency in Bioterrorism/Emergency Preparedness Skills among the six levels of educational preparation groups. However, proficiency was not systematically associated with level of education. In descending order, the means for these groups on the composite score were Doctoral Degree (3.66), Associate Degree (3.28), Baccalaureate Degree (3.14), Professional/Vocational Diploma (3.03), Master's Degree (2.97), and High School Diploma (2.75). Significant differences and a similar pattern were found in five of the seven Bioterrorism/Emergency Preparedness competency subscales. No differences were found for the subscales Disaster Planning Skills and Emergency

Communication Skills. As seen in Figure 47, those with doctoral degrees were more proficient in all subscales than any other level of education. Those with high school diplomas were the least proficient. Those with Associate Degrees showed greater proficiency in Emergency Communication Skills and Physical Injury Skills than might have been expected by educational achievement.

No overall differences in educational needs for Bioterrorism/Emergency Preparedness Competency Skills (composite score) were found among the six levels of education categories. When the seven subscales were examined individually, no statistical differences were found. The similarities in need for additional education across levels of education are noted in Figure 48. It is interesting that those with a high school diploma identified lower educational needs that other groups in most categories.

Educational preferences across groups are summarized in Table 42. Preferences were remarkably similar except for educational recognition. Those without a baccalaureate degree most preferred certificates, followed by continuing education units and undergraduate credits. Those in the Baccalaureate Degree group most preferred undergraduate academic credit over all other forms of educational recognition. As expected, those in the Master's Degree and Doctoral Degree groups preferred graduate over undergraduate academic credit.

Table 39. Characteristics of Colorado Public Health Workforce by Level of Educational Preparation (N=1,222)

	High School Diploma (n=174)				Prof./Vocational Diploma (n=78)				Associate Degree (n=102)			
Variables and Values	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**
Age			40.71	12.81			46.54	9.73			43.29	9.96
Under 29 Years	44	25.7			2	2.6			10	10.1		
30-39 Years	34	19.9			15	19.7			24	24.2		
40-49 Years	41	24.0			32	42.1			39	39.4		
50-59 Years	43	25.1			16	21.1			19	19.2		
Over 60 Years	9	5.3			11	14.5			7	7.1		
Gender												
Male	10	6.0			7	1.4			13	13.5		
Female	156	94.0			71	98.6			83	86.5		
Race												
White	88	52.1			50	64.9			76	75.2		
Hispanic	79	46.7			20	26.0			17	16.8		
Black	2	1.2			3	3.9			2	2.0		
Asian	0	.0			2	2.6			2	2.0		
Other or Multiracial	0	.0			2	2.6			4	4.0		
Highest Education												
High School Diploma	174	100.0			0	.0			0	.0		
Profess./Vocational Diploma	0	.0			78	100.0			0	.0		
Associate Degree	0	.0			0	.0			102	100.0		
Baccalaureate Degree	0	.0			0	.0			0	.0		
Master's Degree	0	.0			0	.0			0	.0		
Doctoral Degree	0	.0			0	.0			0	.0		
College Degree												
No	174	100.0			78	100.0			102	100.0		
Yes	0	.0			0	.0			0	.0		
Years Since Last Degree			21.87	13.03			19.00	11.81			13.86	10.54
Less than 2 Years	2	1.4			2	2.9			5	5.6		
2-5 Years	17	11.6			6	8.6			12	13.3		
5-9 Years	16	10.9			11	15.7			22	24.4		
10-14 Years	16	10.9			11	15.7			13	14.4		
15-19 Years	15	10.2			8	11.4			14	15.6		
20 or More Years	81	55.1			32	45.7			24	26.7		
Years Experience in Discipline			6.51	9.25			17.12	13.54			11.24	9.32
Less than 2 Years	22	41.5			7	13.5			8	8.7		
2-5 Years	15	28.3			6	11.5			16	17.4		
5-9 Years	3	5.7			7	13.5			24	26.1		
10-14 Years	1	1.9			6	11.5			17	18.5		
15-19 Years	3	5.7			3	5.8			11	12.0		
20 or More Years	9	17.0			23	44.2			16	17.4		
Years Experience in Pub. Health			8.85	8.36			9.47	8.34			6.25	6.05
Less than 2 Years	33	21.0			17	22.4			24	24.2		

Table 39 (continued).

Variables and Values	High School Diploma (n=174)				Prof./Vocational Diploma (n=78)				Associate Degree (n=102)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	33	21.0			9	11.8			29	29.3		
5-9 Years	28	17.8			18	23.7			19	19.2		
10-14 Years	31	19.7			16	21.1			17	17.2		
15-19 Years	6	3.8			4	5.3			5	5.1		
20 or More Years	26	16.6			12	15.8			5	5.1		
County Survey Response												
Very Small	6	3.8			4	5.6			12	12.4		
Small	13	8.2			9	12.7			15	15.5		
Medium	19	11.9			15	21.1			11	11.3		
Large	121	76.1			43	60.6			59	60.8		
Organized Health Department												
No	35	22.0			20	28.2			30	30.9		
Yes	124	78.0			51	71.8			67	69.1		
Position Category												
Officials & Administrators	0	.0			2	2.6			2	2.0		
Professionals	7	4.0			18	23.7			49	48.0		
Technicians	12	6.9			15	19.7			17	16.7		
Protective Service	2	1.2			0	.0			1	1.0		
Paraprofessionals	60	34.7			15	19.7			12	11.8		
Administrative Support	91	52.6			26	34.2			21	20.6		
Skilled Craft	0	.0			0	.0			0	.0		
Service/Maintenance	1	.6			0	.0			0	.0		
Professional Position												
No	166	96.0			56	73.6			51	50.0		
Yes	7	4.0			20	26.3			51	50.0		
Type of Position												
Front Line Staff	127	77.4			55	72.4			65	65.7		
Senior Level Staff	22	13.4			10	13.2			16	16.2		
Supervisory/Mgmt Staff	15	9.1			11	14.5			18	18.2		
Full-Time Employment												
No	19	11.0			15	19.7			8	7.9		
Yes	153	89.0			61	80.3			93	92.1		
Annual Salary (FTE)			$26,955	$8,610			$31,658	$12,084			$33,777	$12,929
Less Than $20,000	19	14.5			4	6.7			8	9.6		
$20,000 to $29,999	74	56.5			28	46.7			23	.27.7		
$30,000 to $39,999	28	21.4			14	23.3			32	38.6		
$40,000 to $49,999	4	3.1			9	15.0			13	15.7		
$50,000 to $59,999	6	4.6			4	6.7			3	3.6		
$60,000 to $69,999	0	.0			0	.0			2	2.4		
$70,000 to $79,999	0	.0			0	.0			1	1.2		
Over $80,000	0	.0			1	1.7			1	1.2		

Table 39 (continued).

Variables and Values	High School Diploma (n=174)				Prof./Vocational Diploma (n=78)				Associate Degree (n=102)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Know Non-English Language												
No	99	58.2			50	65.8			79	78.2		
Yes	71	41.8			26	34.2			22	21.8		
Other Language Speaking												
Fair	8	11.1			3	12.5			4	16.7		
Good	27	37.5			9	37.5			9	37.5		
Excellent	37	51.4			12	50.0			11	45.8		
Other Language Reading												
Fair	13	18.6			7	29.2			6	24.0		
Good	25	35.7			6	25.0			9	36.0		
Excellent	32	45.7			11	45.8			10	40.0		
Other Language Writing												
Fair	20	29.0			7	31.8			11	45.8		
Good	25	36.2			7	31.8			6	25.0		
Excellent	24	34.8			8	36.4			7	29.2		

Table 39 (continued).

Variables and Values	Baccalaureate Degree (n=547)				Master's Degree (n=287)				Doctoral Degree (n=34)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			43.36	10.44			46.28	9.87			47.26	9.08
Under 29 Years	70	12.9			21	7.4			0	.0		
30-39 Years	118	21.8			47	16.7			7	20.6		
40-49 Years	179	33.0			90	31.9			13	38.2		
50-59 Years	154	28.4			104	36.9			11	32.4		
Over 60 Years	21	3.9			20	7.1			3	8.8		
Gender												
Male	95	18.2			66	24.5			18	52.9		
Female	428	81.8			203	75.5			16	47.1		
Race												
White	472	87.4			263	92.9			30	88.2		
Hispanic	33	6.1			8	2.8			2	5.9		
Black	9	1.7			5	1.8			0	.0		
Asian	8	1.5			4	1.4			0	.0		
Other or Multiracial	18	3.3			3	1.1			2	5.9		
Highest Education												
High School Diploma	0	.0			0	.0			0	.0		
Profess./Vocational Diploma	0	.0			0	.0			0	.0		
Associate Degree	0	.0			0	.0			0	.0		
Baccalaureate Degree	547	100.0			0	.0			0	.0		
Master's Degree	0	.0			287	100.0			0	.0		
Doctoral Degree	0	.0			0	.0			34	100.0		
College Degree												
No	0	.0			0	.0			0	.0		
Yes	547	100.0			287	100.0			34	100.0		
Years Since Last Degree			16.04	10.96			13.35	9.73			17.12	10.19
Less than 2 Years	27	5.1			18	6.5			2	5.9		
2-5 Years	65	12.2			50	17.9			2	5.9	3.00	8.80
5-9 Years	103	19.3			51	18.3			3	8.8		
10-14 Years	75	14.0			47	16.8			9	26.5		
15-19 Years	58	10.9			11	11.8			5	14.7		
20 or More Years	206	38.6			80	28.7			13	38.2		
Years Experience in Discipline			13.91	10.22			17.01	10.31			18.00	10.93
Less than 2 Years	37	6.9			9	3.2			1	2.9		
2-5 Years	78	14.5			31	11.0			3	8.8		
5-9 Years	112	20.9			41	14.5			4	11.8		
10-14 Years	79	14.7			40	14.1			7	20.6		
15-19 Years	59	11.0			38	13.4			9	8.8		
20 or More Years	172	32.0			124	43.8			16	47.1		
Years Experience in Pub. Health			9.32	8.16			11.48	8.86			11.88	11.20
Less than 2 Years	97	17.9			24	8.5			6	17.6		

Table 39 (continued).

Variables and Values	Baccalaureate Degree (n=547)				Master's Degree (n=287)				Doctoral Degree (n=34)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	97	17.9			51	18.0			5	14.7		
5-9 Years	124	22.9			62	21.8			8	23.5		
10-14 Years	94	17.4			56	19.7			4	11.8		
15-19 Years	54	10.0			28	9.9			4	11.8		
20 or More Years	75	13.9			63	22.2			7	20.6		
County Survey Response												
Very Small	19	3.8			3	1.3			0	.0		
Small	55	11.0			19	8.3			3	11.1		
Medium	61	12.2			17	7.4			1	3.7		
Large	366	73.1			190	83.0			23	85.2		
Organized Health Department												
No	85	17.0			25	10.9			4	14.8		
Yes	416	83.0			204	89.1			23	85.2		
Position Category												
Officials & Administrators	9	1.6			12	4.2			5	14.7		
Professionals	492	90.1			269	93.7			29	85.3		
Technicians	22	4.0			2	.7			0	.0		
Protective Service	0	.0			0	.0			0	.0		
Paraprofessionals	5	.9			1	.3			0	.0		
Administrative Support	18	3.3			3	1.0			0	.0		
Skilled Craft	0	.0			0	.0			0	.0		
Service/Maintenance	0	.0			0	.0			0	.0		
Professional Position												
No	45	8.2			6	2.0			0	.0		
Yes	501	91.7			281	97.9			34	100.0		
Type of Position												
Front Line Staff	310	57.6			85	30.1			5	14.7		
Senior Level Staff	104	19.3			74	26.2			10	29.4		
Supervisory/Mgmt Staff	124	23.0			12	43.6			19	55.9		
Full-Time Employment												
No	116	21.3			55	19.5			4	11.8		
Yes	429	78.7			227	80.5			30	88.2		
Annual Salary (FTE)			$43,118	$13,471			$56,004	$17,414			$73,563	$32,344
Less Than $20,000	7	1.5			0	.0			0	.0		
$20,000 to $29,999	39	8.5			2	.8			1	3.8		
$30,000 to $39,999	151	32.8			42	17.3			2	7.7		
$40,000 to $49,999	133	28.9			52	21.4			7	26.9		
$50,000 to $59,999	77	16.7			50	20.6			1	3.8		
$60,000 to $69,999	28	6.1			48	19.8			0	.0		
$70,000 to $79,999	15	3.3			23	9.5			2	7.7		
Over $80,000	10	2.2			26	10.7			13	50.0		

Table 39 (continued).

Variables and Values	Baccalaureate Degree (n=547)				Master's Degree (n=287)				Doctoral Degree (n=34)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Know Non-English Language												
No	401	73.7			206	72.8			18	52.9		
Yes	143	26.3			77	27.2			16	47.1		
Other Language Speaking												
Fair	59	41.3			40	54.1			6	40.0		
Good	45	31.5			21	28.4			3	20.0		
Excellent	39	27.3			13	17.6			6	40.0		
Other Language Reading												
Fair	57	41.0			35	47.3			3	21.4		
Good	48	34.5			28	37.8			6	42.9		
Excellent	34	24.5			11	14.9			5	35.7		
Other Language Writing												
Fair	73	53.7			44	62.0			7	50.0		
Good	34	25.0			20	28.2			2	14.3		
Excellent	29	21.3			7	9.9			5	35.7		

Table 40. Differences in Core Competency Proficiencies and Educational Needs by Level of Educational Preparation (N=1,222)

Core Competency Domains	High Sch. Diploma (n=174)				Prof./Voc. Diploma (n=78)				Associate Degree (n=102)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	3.34	1.54	5	3.50	3.71	1.61	5	3.75	3.90	1.52	5	4.00
Policy Development/Prog. Planning Skills	3.25	1.56	6	3.25	3.36	1.61	8	3.25	3.63	1.56	7	4.00
Communication Skills	3.83	1.32	2	3.83	4.01	1.50	3	4.33	4.39	1.22	2	4.50
Cultural Competency Skills	4.49	1.46	1	4.75	4.69	1.52	1	5.00	4.84	1.20	1	5.00
Community Dimensions of Practice Skills	3.71	1.50	4	3.75	4.00	1.65	4	4.25	4.07	1.37	4	4.25
Basic Public Health Sciences Skills	2.95	1.53	8	2.75	3.55	1.66	6	3.50	3.56	1.50	8	3.75
Financial Planning & Management Skills	3.21	1.49	7	3.00	3.54	1.60	7	3.60	3.69	1.41	6	3.60
Leadership & Systems Thinking Skills	3.78	1.56	3	4.00	4.14	1.67	2	4.25	4.24	1.39	3	4.25
Core Competencies Composite Skills	*3.57*	*1.32*		*3.59*	*3.88*	*1.44*		*3.94*	*4.05*	*1.23*		*4.00*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	2.95	1.32	8	3.00	3.22	1.38	2	3.00	3.15	1.20	3	3.00
Policy Devel./Prog. Planning Educ. Needs	3.01	1.43	7	3.00	3.19	1.49	3	3.00	3.12	1.31	4	3.00
Communication Educ. Needs	3.13	1.29	2	3.00	3.11	1.34	5	3.00	2.79	1.15	8	3.00
Cultural Competency Educ. Needs	3.12	1.28	3	3.00	3.00	1.32	8	3.00	2.80	1.23	7	3.00
Community Dimen. of Practice Educ. Needs	3.06	1.30	5	3.00	3.16	1.38	4	3.00	2.97	1.18	6	3.00
Basic Public Health Sciences Educ. Needs	3.16	1.52	1	3.00	3.25	1.40	1	3.00	3.21	1.25	1	3.00
Financial Planning & Mgmt. Educ. Needs	3.05	1.54	6	3.00	3.09	1.51	7	3.00	3.08	1.40	5	3.00
Leadership & Systems Thinking Educ. Needs	3.09	1.25	4	3.00	3.11	1.31	5	3.00	3.18	1.15	2	3.00
Core Competencies Composite Educ. Needs	*3.07*	*1.05*		*3.25*	*3.14*	*1.08*		*3.13*	*3.04*	*0.81*		*3.00*

Table 40 (continued).

Core Competency Domains	Bacc. Degree (n=547)				Master's Degree (n=287)				Doctoral Degree (n=34)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]													
Analytic/Assessment Skills	4.43	1.27	4	4.58	5.01	1.20	4	5.25	5.51	1.06	2	5.63	<.001
Policy Development/Prog. Planning Skills	3.93	1.41	7	4.00	4.67	1.31	7	4.75	5.01	1.34	7	5.00	<.001
Communication Skills	4.80	1.10	2	5.00	5.28	1.01	2	5.37	5.52	0.88	1	5.80	<.001
Cultural Competency Skills	5.23	1.07	1	5.25	5.29	1.08	1	5.50	5.49	0.87	3	5.50	<.001
Community Dimensions of Practice Skills	4.43	1.20	4	4.50	4.82	1.26	5	5.00	5.09	1.11	5	5.25	<.001
Basic Public Health Sciences Skills	4.23	1.35	6	4.50	4.74	1.31	6	5.00	5.02	1.59	6	5.25	<.001
Financial Planning & Management Skills	3.92	1.00	8	4.00	4.55	1.24	8	4.60	4.91	1.22	8	5.00	<.001
Leadership & Systems Thinking Skills	4.66	1.23	3	4.75	5.17	1.16	3	5.25	5.46	0.96	4	5.50	<.001
Core Competencies Composite Skills	*4.46*	*1.03*		*4.54*	*4.95*	*0.99*		*5.09*	*5.26*	*0.90*		*5.19*	*<.001*
Educ. Needs in Core Competency Domains[2]													
Analytic/Assessment Educ. Needs	3.08	1.06	4	3.00	3.01	1.11	3	3.00	2.52	1.09	7	3.00	<.05
Policy Devel./Prog. Planning Educ. Needs	3.23	1.20	2	3.00	3.05	1.10	2	3.00	2.76	1.23	4	3.00	n.s.
Communication Educ. Needs	2.74	1.14	7	3.00	2.53	1.08	8	2.00	2.38	1.18	8	2.00	<.001
Cultural Competency Educ. Needs	2.69	1.08	8	3.00	2.70	1.08	7	3.00	2.68	1.22	5	2.00	<.001
Community Dimen. of Practice Educ. Needs	3.01	1.11	6	3.00	2.77	1.07	6	3.00	2.79	1.15	2	3.00	<.05
Basic Public Health Sciences Educ. Needs	3.04	1.17	5	3.00	2.93	1.20	4	3.00	2.79	1.52	2	3.00	n.s.
Financial Planning & Mgmt. Educ. Needs	3.28	1.34	1	3.00	3.08	1.31	1	3.00	2.94	1.23	1	3.00	n.s.
Leadership & Systems Thinking Educ. Needs	3.09	1.10	3	3.00	2.90	1.16	5	3.00	2.55	1.25	6	2.00	<.05
Core Competencies Composite Educ. Needs	*3.02*	*0.77*		*3.00*	*2.87*	*0.74*		*2.88*	*2.68*	*0.87*		*2.61*	*<.01*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the six groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 45. Proficiencies in Core Competency Skills by Level of Educational Preparation

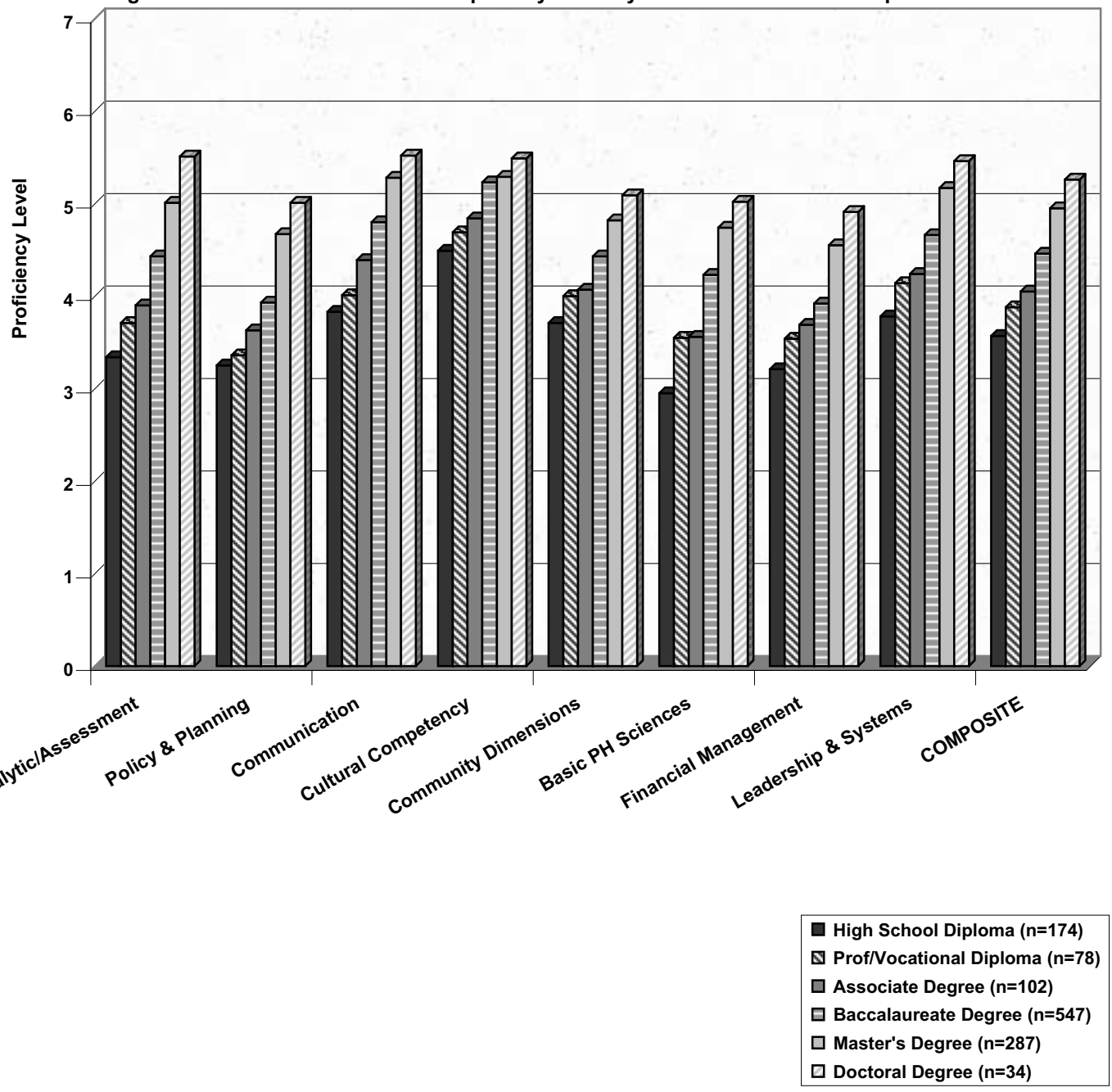


Figure 46. Educational Needs in Core Competency Skills by Level of Educational Preparation

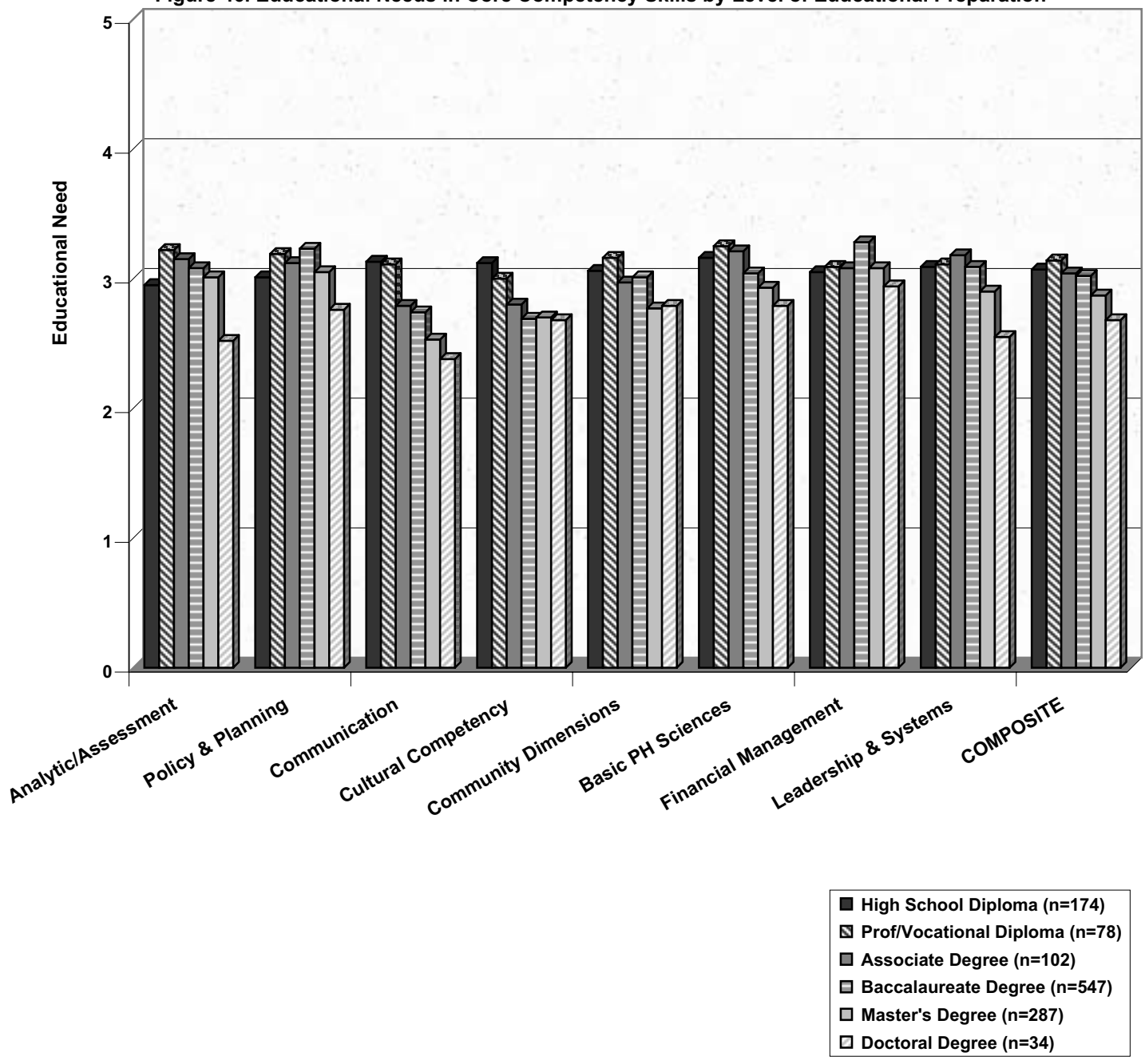


Table 41. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs by Level of Educational Preparation (N=1,222)

Bioterrorism/Emergency Preparedness Competency Domains	High Sch. Diploma (n= 174)				Prof./Voc. Diploma (n=78)				Associate Degree (n=102)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	2.57	1.65	4	2.00	2.90	1.74	4	2.50	2.90	1.62	5	2.67
Disaster Response Skills	3.38	1.61	1	3.00	3.73	1.72	1	3.67	4.03	1.50	1	4.00
Emergency Communication Skills	3.11	1.72	2	3.00	3.18	1.68	3	3.00	3.68	1.77	3	3.50
Biological/Infectious Disease Skills	2.45	1.77	6	2.00	2.53	1.72	7	2.00	2.83	1.72	6	2.00
Toxic Chem. & Env. Hazard Skills	2.37	1.74	7	2.00	2.65	1.78	6	2.00	2.64	1.79	7	2.00
Physical Injury Skills	2.82	1.91	3	2.00	3.30	1.95	2	3.00	3.69	1.86	2	4.00
Crisis Management Skills	2.53	1.75	5	2.00	2.83	1.83	5	3.00	3.10	1.94	4	3.00
Bioterrorism/EP Composite Skills	*2.75*	*1.48*		*2.29*	*3.03*	*1.55*		*3.01*	*3.28*	*1.46*		*3.12*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.39	1.45	2	4.00	3.37	1.42	6	3.00	3.67	1.27	1	4.00
Disaster Response Educ. Needs	3.36	1.39	3	4.00	3.51	1.27	2	4.00	3.50	1.19	2	4.00
Emergency Communication Educ. Needs	3.07	1.31	7	3.00	3.14	1.29	7	3.00	2.82	1.28	7	3.00
Biological/Infectious Disease Educ. Needs	3.42	1.54	1	4.00	3.72	1.41	4	4.00	3.48	1.35	4	4.00
Toxic Chem. & Env. Hazard Educ. Needs	3.33	1.58	4	4.00	3.59	1.52	1	4.00	3.49	1.51	3	4.00
Physical Injury Educ. Needs	3.27	1.47	5	3.00	3.49	1.37	3	4.00	3.13	1.27	6	3.00
Crisis Management Educ. Needs	3.27	1.39	5	3.00	3.39	1.35	5	3.00	3.27	1.21	5	3.00
Bioterrorism/EP Composite Educ. Needs	*3.30*	*1.23*		*3.43*	*3.46*	*1.20*		*3.57*	*3.34*	*1*		*3.43*

Table 41 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	Bacc. Degree (n=547)				Master's Degree (n=287)				Doctoral Degree (n=34)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]													
Disaster Planning Skills	2.83	1.58	6	2.67	2.72	1.63	5	2.00	3.39	1.97	5	3.00	n.s.
Disaster Response Skills	4.03	1.42	1	4.00	3.82	1.48	1	3.67	4.20	1.70	1	4.00	<.01
Emergency Communication Skills	3.31	1.65	2	3.00	3.17	1.63	2	3.00	3.71	1.85	3	4.00	n.s.
Biological/Infectious Disease Skills	2.84	1.69	5	3.00	2.71	1.62	6	2.00	3.65	2.21	4	4.00	<.01
Toxic Chem. & Env. Hazard Skills	2.71	1.72	7	2.00	2.49	1.68	7	2.00	3.24	2.03	7	3.50	<.05
Physical Injury Skills	3.26	1.81	3	3.00	3.05	1.87	3	3.00	4.12	1.92	2	4.00	<.001
Crisis Management Skills	2.99	1.82	4	3.00	2.87	1.82	4	2.00	3.35	1.95	6	3.00	<.05
Bioterrorism/EP Composite Skills	*3.14*	*1.38*		*2.98*	*2.97*	*1.35*		*2.74*	*3.66*	*1.66*		*3.18*	*<.001*
Educational Needs in Bioterrorism/EP[2]													
Disaster Planning Educ. Needs	3.71	1.22	2	4.00	3.70	1.19	6	4.00	3.65	1.28	2	4.00	n.s.
Disaster Response Educ. Needs	3.68	1.20	3	4.00	3.69	1.18	7	4.00	3.65	1.39	2	4.00	n.s.
Emergency Communication Educ. Needs	3.11	1.23	7	3.00	3.05	1.22	4	3.00	2.94	1.13	7	3.00	n.s.
Biological/Infectious Disease Educ. Needs	3.59	1.27	4	4.00	3.53	1.29	3	4.00	3.56	1.46	5	4.00	n.s.
Toxic Chem. & Env. Hazard Educ. Needs	3.78	1.28	1	4.00	3.53	1.32	2	4.00	3.85	1.16	1	4.00	n.s.
Physical Injury Educ. Needs	3.34	1.28	6	3.00	3.19	1.35	1	3.00	3.36	1.34	6	3.00	n.s.
Crisis Management Educ. Needs	3.40	1.20	5	3.00	3.35	1.22	5	4.00	3.59	1.21	4	4.00	n.s.
Bioterrorism/EP Composite Educ. Needs	*3.51*	*0.95*		*3.71*	*3.44*	*0.93*		*3.57*	*3.52*	*1.02*		*3.71*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the six groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 47. Proficiency in Bioterrorism/Emergency Preparedness Skills by Level of Educational Preparation

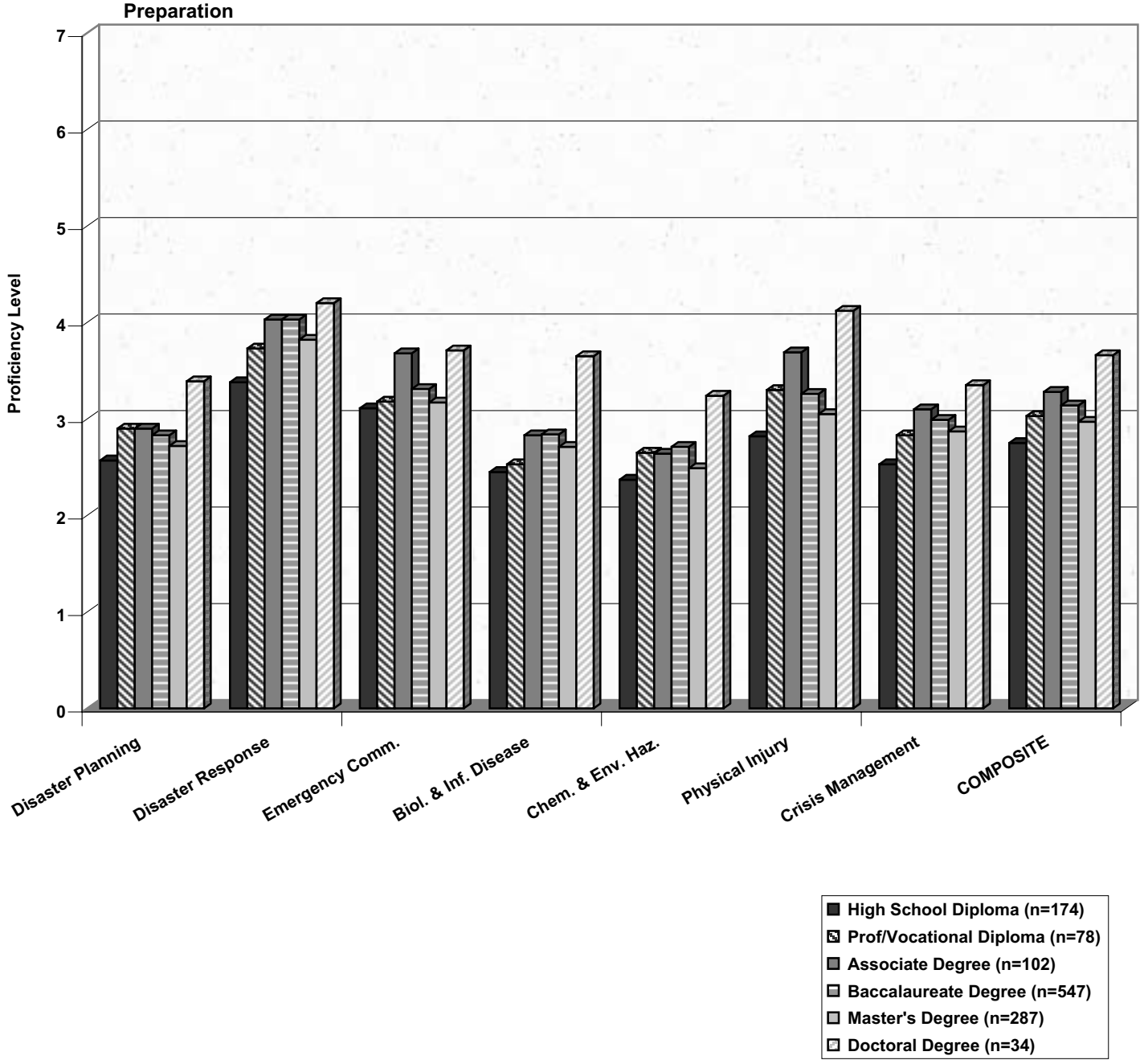


Figure 48. Educational Needs in Bioterrorism/Emergency Preparedness Skills by Level of Educational Preparation

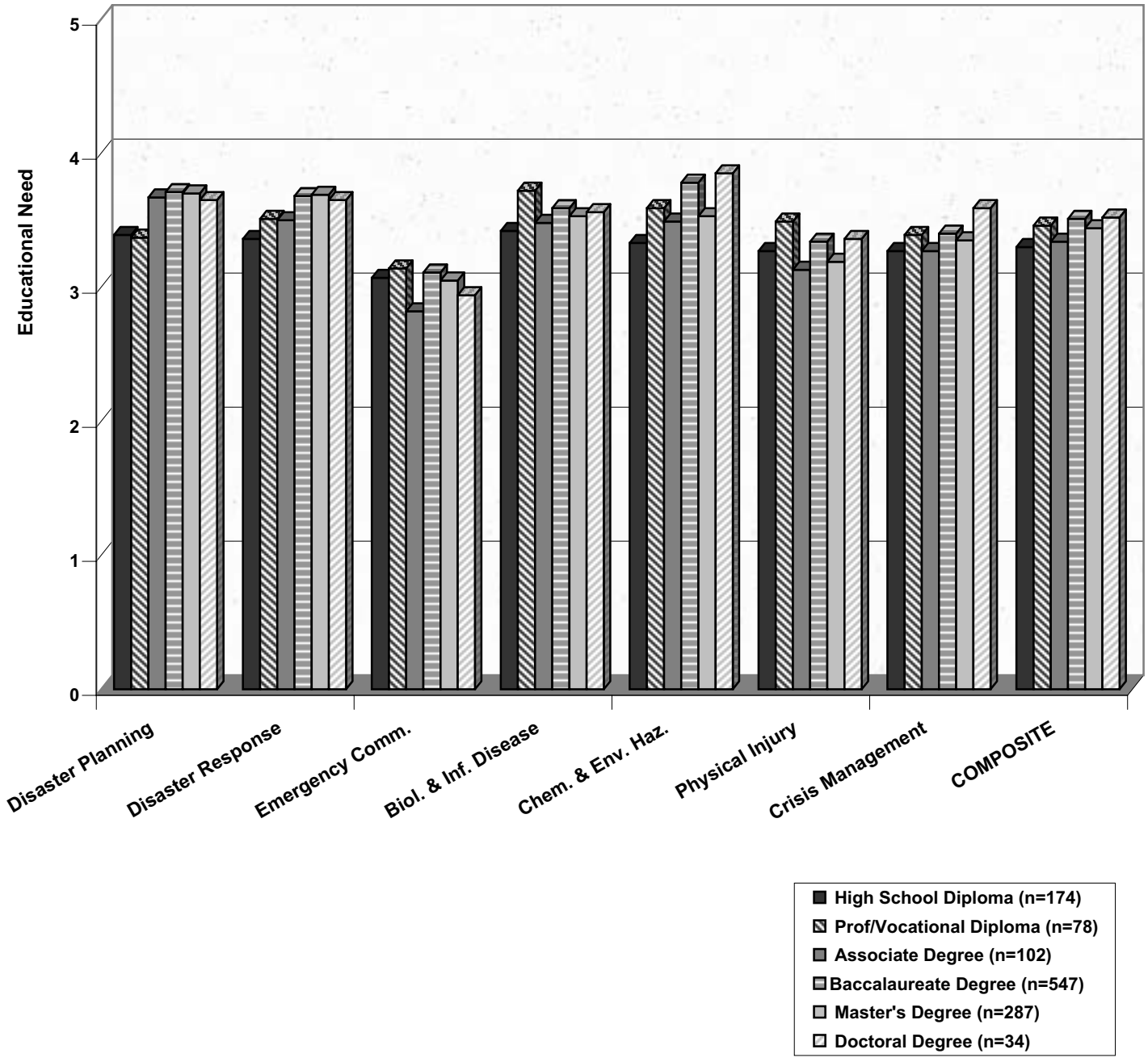


Table 42. Educational Preferences of Workers by Level of Educational Preparation (N=1,222)

Types of Preference	High School Diploma (n=174)				Prof./Voc. Diploma (n=78)				Associate Degree (n=102)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.11	0.72	2	2.00	2.01	0.73	2	2.00	2.09	0.72	2	2.00
1-Day Workshops	2.38	0.64	1	2.00	2.32	0.71	1	2.00	2.53	0.61	1	3.00
Several-Day Workshops	1.61	0.74	3	1.00	1.76	0.78	3	2.00	1.77	0.77	3	2.00
Academic Semester Courses	1.50	0.75	4	1.00	1.57	0.73	4	1.00	1.51	0.75	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.58	0.60	1	3.00	2.72	0.51	1	3.00	2.75	0.50	1	3.00
Interactive Teleconferences	1.65	0.68	4	2.00	1.74	0.65	4	2.00	1.63	0.61	4	2.00
Internet, Web-Based Instruction	1.82	0.70	3	2.00	1.81	0.69	3	2.00	1.77	0.70	3	2.00
Combination Format	1.85	0.69	2	2.00	2.03	0.66	2	2.00	1.82	0.66	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.71	0.57	1	3.00	2.69	0.61	1	3.00	2.85	0.38	1	3.00
Weekend Classes	1.25	0.54	4	1.00	1.24	0.55	4	1.00	1.24	0.50	4	1.00
Evening Classes	1.45	0.67	3	1.00	1.44	0.67	3	1.00	1.49	0.66	3	1.00
Self-Determined Web-Based	1.71	0.72	2	2.00	1.75	0.72	2	2.00	1.76	0.69	2	2.00
Preferences for Educational Recognition												
Certificate	2.47	0.65	1	3.00	2.55	0.60	1	3.00	2.37	0.64	1	2.00
Continuing Education Units	1.88	0.77	2	2.00	2.24	0.77	2	2.00	2.25	0.76	2	2.00
Undergraduate Academic Credit	1.84	0.81	3	2.00	1.94	0.83	3	2.00	2.01	0.85	3	2.00
Graduate Academic Credit	1.64	0.74	4	1.00	1.69	0.76	4	2.00	1.92	0.83	4	2.00

Table 42 (continued).

Types of Preference	Baccalaureate Degree (n=547)				Master's Degree (n=287)				Doctoral Degree (n=34)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.19	0.73	2	2.00	2.32	0.70	2	2.00	2.12	0.73	2	2.00
1-Day Workshops	2.53	0.58	1	3.00	2.51	0.55	1	3.00	2.58	0.66	1	3.00
Several-Day Workshops	1.70	0.74	3	2.00	1.69	0.73	3	2.00	1.50	0.62	3	1.00
Academic Semester Courses	1.40	0.65	4	1.00	1.29	0.58	4	1.00	1.38	0.70	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.76	0.48	1	3.00	2.78	0.46	1	3.00	2.79	0.41	1	3.00
Interactive Teleconferences	1.74	0.63	4	2.00	1.77	0.63	3	2.00	1.59	0.66	4	1.50
Internet, Web-Based Instruction	1.78	0.71	3	2.00	1.79	0.66	2	2.00	1.74	0.79	3	2.00
Combination Format	2.04	0.69	2	2.00	2.09	0.69	4	2.00	1.94	0.65	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.82	0.46	1	3.00	2.87	0.38	1	3.00	2.73	0.52	1	3.00
Weekend Classes	1.15	0.41	4	1.00	1.16	0.41	4	1.00	1.35	0.54	3	1.00
Evening Classes	1.35	0.57	3	1.00	1.38	0.60	3	1.00	1.35	0.60	3	1.00
Self-Determined Web-Based	1.82	0.72	2	2.00	1.92	0.70	2	2.00	2.00	0.74	2	2.00
Preferences for Educational Recognition												
Certificate	2.32	0.68	2	2.00	2.28	0.75	1	2.00	2.15	0.78	2	2.00
Continuing Education Units	2.28	0.75	3	2.00	2.15	0.83	2	2.00	2.21	0.84	1	2.00
Undergraduate Academic Credit	2.58	0.71	1	1.00	1.38	0.58	4	1.00	1.41	0.66	4	1.00
Graduate Academic Credit	2.10	0.83	4	2.00	1.80	0.84	3	2.00	1.79	0.88	3	1.50

5d. Differences by Years Since Last Degree

To examine potential differences related to when workers received their last formal education, respondents were classified into six groups. These categories and the number of respondents classified in each group were: 1 Year or Less (n=57), 2 to 4 Years (n=152), 5 to 9 Years (n=206), 10 to 14 Years (n=173), 15 to 19 Years (n=134), and 20 Years or More (n=437). Characteristics of these six groups are summarized in Table 43.

The average (mean) age ranged from 33.9 years to 52.0 years, increasing incrementally across these groups. A greater proportion of men were found in each successive group (11% to 21%). The greatest percent of non-white workers were the most recent graduate group (29%) and the smallest percent (11%) was found in the group with the longest time since completing their last degree. The highest percent of college graduates was found in the 1 Year or Less group (84%) and the lowest percent was found in the 20 Years or More group (69%).

Years of experience in the discipline and years in public health increased by years since last degree. The average (mean) years for experience in the discipline across the six groups were 5.5, 7.2, 9.5, 13.0, 15.1, and 21.3, respectively. The average (mean) years of experience in public health across these groups were 3.3, 3.5, 6.4, 8.8, 9.1, and 14.5, respectively.

Higher percentages of recent graduates were employed in organized health departments than in local health agencies. Annual salary increased across the categories of years since last degree. Recent graduates averaged $36,959 while workers with 15 or more years since last degree averaged just over $46,000. Recent graduates were the most likely group to report knowing a non-English language (47%).

Table 44 summarizes differences in Core Competency proficiencies and educational needs by years since last degree. An analysis of variance showed no significant difference in overall proficiency in Core Competency Skills (composite). Differences were found in two subscales: Communication Skills ($p < .001$) and Cultural Competency Skills ($p < .05$). As seen in Figure 49, the most recent graduates rated themselves higher in these two proficiencies than did workers with two or more years since last degree.

No difference was found between groups in overall Core Competency educational needs (composite). When ratings on subscales were compared, differences were found on Policy Development/Program Planning Skills ($p < .05$) and Financial Planning/Management Skills ($p < .01$). In both subscales, new graduates (workers with one year or less since last degree) reported the highest educational needs. Differences across groups are graphically presented in Figure 50.

Differences in Bioterrorism/Emergency Preparedness proficiencies and educational needs are summarized in Table 45. No difference was found across groups in the composite proficiency rating. When subscales were examined, differences were found on two subscales: Emergency Communication Skills ($p < .01$) and Physical Injury Skills ($p < .001$). In both areas, the group of most recent graduates had greater proficiencies than those who had completed their formal education two or more years earlier. Figure 51 displays these differences by years since last degree.

No difference was found for overall educational needs in Bioterrorism/Emergency Preparedness (composite). A significant difference was found on only one subscale: Emergency Communication Skills ($p < .001$) where educational needs increased with time since last degree. A perusal of Figure 52 shows workers with 20 years since last degree had less educational needs in Disaster Planning Skills and Disaster Response Skills. It also indicates that most recent graduates identified greater

educational needs for Biological/Infectious Disease Skills and Toxic Chemical/Environmental Hazard Skills. However, these differences were not statistically significant likely due to the relatively small number of workers in the recent graduate group.

Educational preferences of workers by years since last degree are summarized in Table 46. Preferences for course length, educational format, and time of course offering were similar across groups. New graduates expressed a higher preference for graduate academic credits than other groups.

Table 43. Characteristics of Colorado Public Health Workforce by Years Since Last Degree (N=1,159)

Variables and Values	1 Year or Less (n=57)				2 to 4 Years (n=152)				5 to 9 Years (n=206)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			33.88	10.85			34.45	9.87			37.68	9.66
Under 29 Years	26	46.4			60	40.3			44	21.5		
30-39 Years	14	25.0			41	27.5			83	40.5		
40-49 Years	9	16.1			35	23.5			47	22.9		
50-59 Years	6	10.7			13	8.7			28	13.7		
Over 60 Years	1	1.8			0	.0			3	1.5		
Gender												
Male	6	10.9			18	12.4			33	16.9		
Female	49	89.1			127	87.6			162	83.1		
Race												
White	40	71.4			122	80.8			163	79.9		
Hispanic	8	14.3			21	13.9			33	16.2		
Black	4	7.1			1	.7			3	1.5		
Asian	1	1.8			2	1.3			2	1.0		
Other or Multiracial	3	5.4			5	3.3			3	1.5		
Highest Education												
High School Diploma	2	3.6			17	11.2			16	7.8		
Profess./Vocational Diploma	2	3.6			6	3.9			11	5.3		
Associate Degree	5	8.9			12	7.9			22	10.7		
Baccalaureate Degree	27	48.2			65	42.8			103	50.0		
Master's Degree	18	32.1			50	32.9			51	24.8		
Doctoral Degree	2	3.6			2	1.3			3	1.5		
College Degree												
No	9	16.1			35	23.0			49	23.8		
Yes	47	83.9			117	77.0			157	76.2		
Years Since Last Degree			0.58	0.50			2.90	0.84			6.91	1.45
Less than 2 Years	57	100.0			0	.0			0	.0		
2-5 Years	0	.0			152	100.0			0	.0		
5-9 Years	0	.0			0	.0			206	100.0		
10-14 Years	0	.0			0	.0			0	.0		
15-19 Years	0	.0			0	.0			0	.0		
20 or More Years	0	.0			0	.0			0	.0		
Years Experience in Discipline			5.44	6.85			7.18	8.01			9.46	7.26
Less than 2 Years	21	40.4			9	6.4			9	4.7		
2-5 Years	12	23.1			72	51.4			27	14.0		
5-9 Years	9	17.3			31	22.1			94	48.7		
10-14 Years	4	7.7			10	7.1			29	15.0		
15-19 Years	2	3.8			1	.7			13	6.7		
20 or More Years	4	7.7			17	12.7			21	10.9		
Years Experience in Pub. Health			3.27	3.70			3.45	3.67			6.35	5.53
Less than 2 Years	25	49.0			50	33.3			35	17.3		

Table 43 (continued).

Variables and Values	1 Year or Less (n=57)				2 to 4 Years (n=152)				5 to 9 Years (n=206)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	15	29.4			66	44.0			56	27.7		
5-9 Years	4	7.8			21	14.0			71	35.1		
10-14 Years	6	11.8			9	6.0			18	8.9		
15-19 Years	1	2.0			2	1.3			13	6.4		
20 or More Years	0	.0			2	1.3			9	4.5		
County Survey Response												
Very Small	0	.0			6	4.2			8	4.2		
Small	6	12.0			12	8.3			18	9.5		
Medium	3	6.0			15	10.4			25	13.2		
Large	41	82.0			111	77.1			138	73.0		
Organized Health Department												
No	3	6.0			22	15.3			37	19.6		
Yes	47	94.0			122	84.7			152	80.4		
Position Category												
Officials & Administrators	0	.0			3	2.0			3	1.5		
Professionals	42	73.7			120	78.9			163	79.1		
Technicians	3	5.3			6	3.9			5	2.4		
Protective Service	0	.0			0	.0			1	.5		
Paraprofessionals	4	7.0			15	9.9			12	5.8		
Administrative Support	8	14.0			8	5.3			22	10.7		
Professional Position												
No	15	26.3			29	19.1			40	19.4		
Yes	42	73.7			123	80.9			166	80.6		
Type of Position												
Front Line Staff	38	67.9			103	69.6			123	60.6		
Senior Level Staff	11	19.6			26	17.6			31	15.3		
Supervisory/Mgmt Staff	7	12.5			19	12.8			49	24.1		
Full-Time Employment												
No	10	17.5			31	20.5			37	18.1		
Yes	47	82.5			120	79.5			167	81.9		
Annual Salary (FTE)			$36,959	$14,822			$38,068	$12,903			$42,674	$15,457
Less Than $20,000	3	6.0			7	5.4			5	3.0		
$20,000 to $29,999	13	26.0			23	17.7			20	11.9		
$30,000 to $39,999	16	32.0			47	36.2			55	32.7		
$40,000 to $49,999	9	18.0			31	23.8			40	23.8		
$50,000 to $59,999	6	12.0			13	10.0			25	14.9		
$60,000 to $69,999	1	2.0			7	5.4			13	7.7		
$70,000 to $79,999	1	2.0			1	.8			5	3.0		
Over $80,000	1	2.0			1	.8			5	3.0		
Know Non-English Language												
No	30	52.6			101	66.4			141	68.8		

Table 43 (continued).

Variables and Values	1 Year or Less (n=57)				2 to 4 Years (n=152)				5 to 9 Years (n=206)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Yes	27	47.4			51	33.6			64	31.2		
Other Language Speaking												
Fair	10	38.5			10	20.4			21	32.8		
Good	9	34.6			17	34.7			15	23.4		
Excellent	7	26.9			22	44.9			28	43.8		
Other Language Reading												
Fair	11	40.7			11	22.0			21	34.4		
Good	9	33.3			18	36.0			18	29.5		
Excellent	7	25.9			21	42.0			22	36.1		
Other Language Writing												
Fair	16	59.3			15	30.0			28	45.9		
Good	6	22.2			18	36.0			14	23.0		
Excellent	5	18.5			17	34.0			19	31.1		

Table 43 (continued).

Variables and Values	10 to 14 Years (n=173)				15 to 19 Years (n=134)				20 Years or More (n=437)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			42.68	8.33			43.93	6.75			51.95	6.11
Under 29 Years	6	3.5			1	.8			0	.0		
30-39 Years	60	34.9			33	25.0			5	1.1		
40-49 Years	71	41.3			72	54.5			149	34.2		
50-59 Years	30	17.4			23	17.4			229	52.5		
Over 60 Years	5	2.9			3	2.3			53	12.2		
Gender												
Male	30	18.2			24	18.6			86	20.9		
Female	135	81.8			105	81.4			325	79.1		
Race												
White	131	77.1			106	79.7			382	88.8		
Hispanic	29	17.1			14	10.5			30	7.0		
Black	3	1.8			5	3.8			5	1.2		
Asian	0	.0			3	2.3			8	1.9		
Other or Multiracial	7	4.1			5	3.8			5	1.2		
Highest Education												
High School Diploma	16	9.4			15	11.3			81	18.6		
Profess./Vocational Diploma	11	6.4			8	6.0			32	7.3		
Associate Degree	13	7.6			14	10.5			24	5.5		
Baccalaureate Degree	75	43.9			58	43.6			206	47.2		
Master's Degree	47	27.5			33	24.8			80	18.3		
Doctoral Degree	9	5.3			5	3.8			13	3.0		
College Degree												
No	40	23.4			37	27.8			137	31.4		
Yes	131	76.6			96	72.2			299	68.6		
Years Since Last Degree			11.95	1.53			16.87	1.41			28.64	6.04
Less than 2 Years	0	.0			0	.0			0	.0		
2-5 Years	0	.0			0	.0			0	.0		
5-9 Years	0	.0			0	.0			0	.0		
10-14 Years	173	100.0			0	.0			0	.0		
15-19 Years	0	.0			134	100.0			0	.0		
20 or More Years	0	.0			0	.0			437	100.0		
Years Experience in Discipline			12.96	8.12			15.09	7.01			21.29	11.04
Less than 2 Years	13	8.6			6	5.0			25	6.8		
2-5 Years	10	6.6			5	4.2			20	5.4		
5-9 Years	18	11.9			11	9.2			24	6.5		
10-14 Years	67	44.4			17	14.3			19	5.2		
15-19 Years	11	7.3			55	46.2			32	8.7		
20 or More Years	32	21.2			25	21.0			248	67.4		
Years Experience in Pub. Health			8.84	6.51			9.10	6.43			14.51	9.50
Less than 2 Years	16	9.4			25	18.7			37	8.6		

Table 43 (continued).

Variables and Values	10 to 14 Years (n=173)				15 to 19 Years (n=134)				20 Years or More (n=437)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	26	15.3			17	12.7			39	9.1		
5-9 Years	56	32.9			21	15.7			73	17.0		
10-14 Years	52	30.6			39	29.1			83	19.3		
15-19 Years	9	5.3			25	18.7			47	11.0		
20 or More Years	11	6.5			7	5.2			150	35.0		
County Survey Response												
Very Small	3	2.0			7	6.1			20	5.2		
Small	19	12.7			12	10.5			46	12.0		
Medium	19	12.7			9	7.9			46	12.0		
Large	109	72.7			86	75.4			271	70.8		
Organized Health Department												
No	23	15.3			19	16.7			88	23.0		
Yes	127	84.7			95	83.3			295	77.0		
Position Category												
Officials & Administrators	2	1.2			3	2.2			20	4.6		
Professionals	130	75.1			96	71.6			290	67.0		
Technicians	10	5.8			11	8.2			23	5.3		
Protective Service	0	.0			0	.0			1	.2		
Paraprofessionals	13	7.5			8	6.0			28	6.5		
Administrative Support	18	10.4			16	11.9			70	16.2		
Professional Position												
No	41	23.7			35	26.1			123	28.4		
Yes	132	76.3			99	73.9			310	71.6		
Type of Position												
Front Line Staff	75	44.6			69	51.9			200	47.2		
Senior Level Staff	52	31.0			19	14.3			86	20.3		
Supervisory/Mgmt Staff	41	24.4			45	33.8			138	32.5		
Full-Time Employment												
No	41	24.0			18	13.6			69	16.0		
Yes	130	76.0			114	86.4			362	84.0		
Annual Salary (FTE)			$45,882	$17,690			$46,087	$22,017			$46,011	$19,231
Less Than $20,000	3	2.0			5	4.1			7	2.0		
$20,000 to $29,999	24	16.1			20	16.3			55	16.1		
$30,000 to $39,999	29	19.5			28	22.8			82	24.0		
$40,000 to $49,999	37	24.8			23	18.7			77	22.5		
$50,000 to $59,999	30	20.1			16	13.0			48	14.0		
$60,000 to $69,999	11	7.4			17	13.8			27	7.9		
$70,000 to $79,999	6	4.0			8	6.5			18	5.3		
Over $80,000	9	6.0			6	4.9			28	8.2		
Know Non-English Language												
No	108	63.5			102	77.3			334	77.7		

Table 43 (continued).

Variables and Values	10 to 14 Years (n=173)				15 to 19 Years (n=134)				20 Years or More (n=437)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Yes	62	36.5			30	22.7			96	22.3		
Other Language Speaking												
Fair	27	44.3			14	45.2			33	34.4		
Good	18	29.5			12	38.7			36	37.5		
Excellent	16	26.2			5	16.1			27	28.1		
Other Language Reading												
Fair	28	45.2			13	44.8			29	31.9		
Good	21	33.9			11	37.9			38	41.8		
Excellent	13	21.0			5	17.2			24	26.4		
Other Language Writing												
Fair	33	55.9			16	55.2			46	52.9		
Good	17	28.8			10	34.5			23	26.4		
Excellent	9	15.3			3	10.3			18	20.7		

Table 44. Differences in Core Competency Proficiencies and Educational Needs by Years Since Last Degree (N=1,159)

Core Competency Domains	1 Year or Less (n=57)				2 to 4 Years (n=152)				5 to 9 Years (n=206)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	4.66	1.34	4	4.75	4.41	1.36	4	4.50	4.50	1.36	5	4.75
Policy Development/Prog. Planning Skills	3.85	1.47	8	4.00	3.86	1.39	7	3.88	4.00	1.42	8	4.25
Communication Skills	5.14	1.18	2	5.17	4.75	1.06	2	4.80	4.95	1.11	2	5.17
Cultural Competency Skills	5.43	1.18	1	5.75	5.15	1.08	1	5.25	5.19	1.07	1	5.25
Community Dimensions of Practice Skills	4.55	1.31	5	4.75	4.38	1.25	5	4.50	4.55	1.26	4	4.75
Basic Public Health Sciences Skills	4.38	1.40	6	4.50	4.24	1.48	6	4.50	4.31	1.45	6	4.50
Financial Planning & Management Skills	4.03	1.33	7	4.00	3.81	1.24	8	3.80	4.04	1.37	7	4.20
Leadership & Systems Thinking Skills	4.76	1.28	3	4.75	4.49	1.21	3	4.75	4.72	1.32	3	5.00
Core Competencies Composite Skills	*4.61*	*1.09*		*4.59*	*4.39*	*1.03*		*4.51*	*4.54*	*1.12*		*4.66*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	3.21	1.11	4	3.00	3.01	1.04	4	3.00	3.15	1.03	4	3.00
Policy Devel./Prog. Planning Educ. Needs	3.54	1.20	2	4.00	3.15	1.15	2	3.00	3.29	1.23	1	3.00
Communication Educ. Needs	2.61	1.32	8	3.00	2.68	1.16	8	3.00	2.75	1.14	8	3.00
Cultural Competency Educ. Needs	2.65	1.06	7	3.00	2.79	1.13	7	3.00	2.80	1.15	7	3.00
Community Dimen. of Practice Educ. Needs	3.07	1.19	6	3.00	2.95	1.05	5	3.00	2.98	1.09	6	3.00
Basic Public Health Sciences Educ. Needs	3.42	1.21	3	3.00	2.93	1.20	6	3.00	3.15	1.18	3	3.00
Financial Planning & Mgmt. Educ. Needs	3.63	1.17	1	4.00	3.29	1.31	1	3.50	3.22	1.32	2	3.00
Leadership & Systems Thinking Educ. Needs	3.14	1.27	5	3.00	3.12	1.14	3	3.00	3.03	1.10	5	3.00
Core Competencies Composite Educ. Needs	*3.16*	*0.79*		*3.25*	*2.99*	*0.70*		*3.00*	*3.05*	*0.75*		*3.00*

Table 44 (continued).

Core Competency Domains	10 to 14 Years (n=173)				15 to 19 Years (n=134)				20 Years or More (n=437)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]													
Analytic/Assessment Skills	4.26	1.54	5	4.50	4.54	1.45	4	4.75	4.30	1.45	5	4.50	n.s.
Policy Development/Prog. Planning Skills	3.92	1.54	7	4.00	4.16	1.55	8	4.25	4.04	1.58	6	4.25	n.s.
Communication Skills	4.70	1.28	2	4.83	4.88	1.21	2	5.00	4.57	1.31	3	4.80	<.001
Cultural Competency Skills	5.08	1.22	1	5.25	5.15	1.12	1	5.25	4.96	1.28	1	5.25	<.05
Community Dimensions of Practice Skills	4.27	1.36	4	4.33	4.54	1.26	5	4.75	4.31	1.44	4	4.50	n.s.
Basic Public Health Sciences Skills	4.04	1.58	6	4.25	4.21	1.44	6	4.25	3.95	1.58	8	4.25	n.s.
Financial Planning & Management Skills	3.81	1.46	8	4.00	4.16	1.40	7	4.20	3.99	1.46	7	4.00	n.s.
Leadership & Systems Thinking Skills	4.56	1.39	3	4.75	4.84	1.23	3	5.00	4.58	1.49	2	5.00	n.s.
Core Competencies Composite Skills	*4.33*	*1.23*		*4.49*	*4.57*	*1.15*		*4.61*	*4.34*	*1.28*		*4.54*	*n.s.*
Educ. Needs in Core Competency Domains[2]													
Analytic/Assessment Educ. Needs	3.04	1.19	4	3.00	3.00	1.22	5	3.00	3.02	1.17	1	3.00	n.s.
Policy Devel./Prog. Planning Educ. Needs	3.15	1.18	2	3.00	3.04	1.27	4	3.00	3.02	1.27	2	3.00	<.05
Communication Educ. Needs	2.82	1.21	8	3.00	2.68	1.17	8	3.00	2.78	1.17	7	3.00	n.s.
Cultural Competency Educ. Needs	2.83	1.17	7	3.00	2.83	1.17	7	3.00	2.75	1.14	8	3.00	n.s.
Community Dimen. of Practice Educ. Needs	2.92	1.10	6	3.00	2.88	1.19	6	3.00	2.97	1.21	5	3.00	n.s.
Basic Public Health Sciences Educ. Needs	2.97	1.29	5	3.00	3.12	1.33	1	3.00	3.02	1.27	3	3.00	n.s.
Financial Planning & Mgmt. Educ. Needs	3.34	1.34	1	4.00	3.09	1.44	3	3.00	3.01	1.41	4	3.00	<.01
Leadership & Systems Thinking Educ. Needs	3.14	1.16	3	3.00	3.12	1.17	2	3.00	2.94	1.19	6	3.00	n.s.
Core Competencies Composite Educ. Needs	*3.02*	*0.84*		*3.00*	*2.97*	*0.82*		*2.88*	*2.94*	*0.90*		*3.00*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the six groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

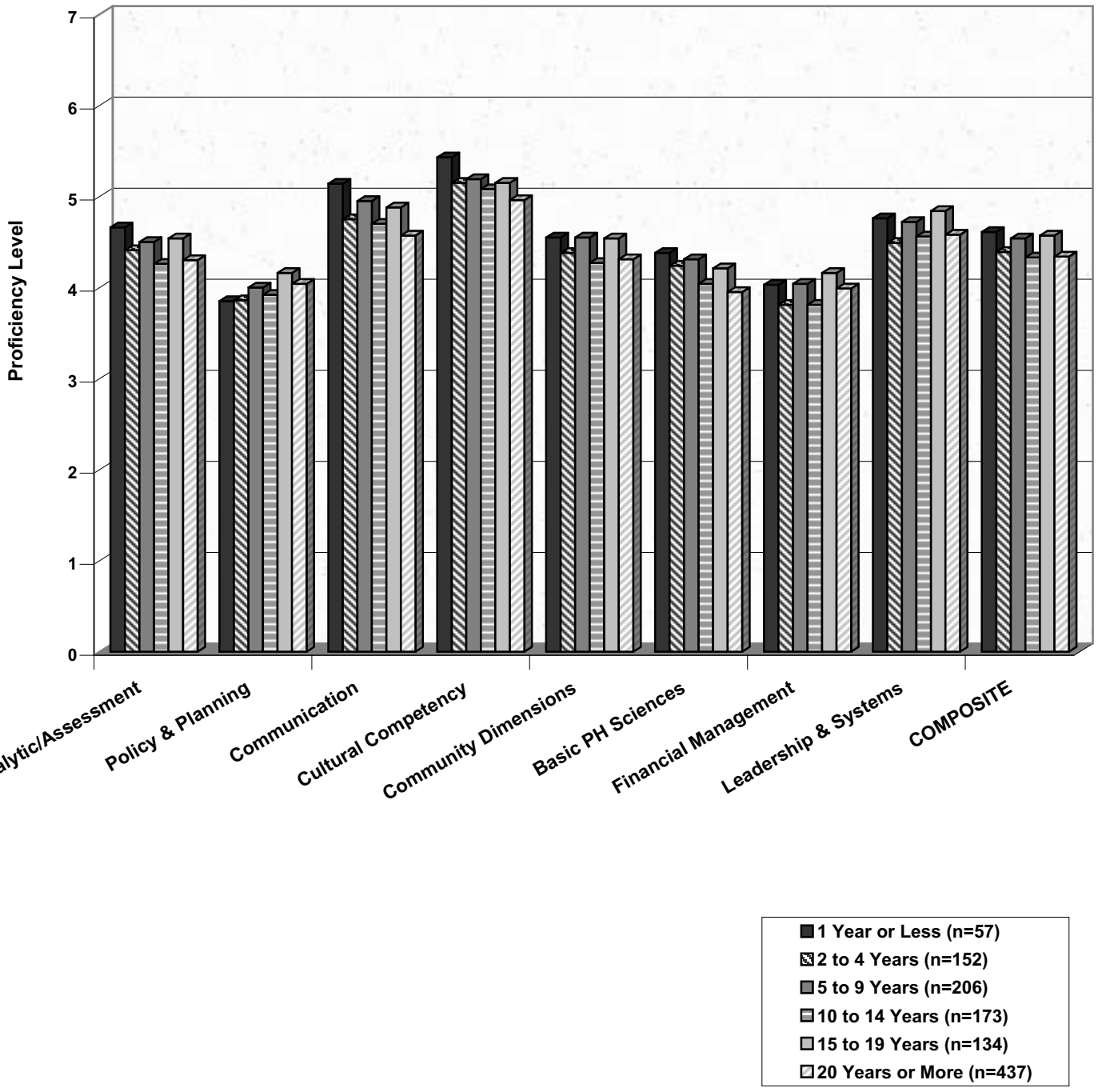

Proficiency Level
7
6
5
4
3
2
1
0
Analytic/Assessment
Policy & Planning
Communication
Cultural Competency
Community Dimensions
Basic PH Sciences
Financial Management
Leadership & Systems
COMPOSITE
1 Year or Less (n=57)
2 to 4 Years (n=152)
5 to 9 Years (n=206)
10 to 14 Years (n=173)
15 to 19 Years (n=134)
20 Years or More (n=437)

Figure 50. Educational Needs in Core Competency Skills by Years Since Last Degree

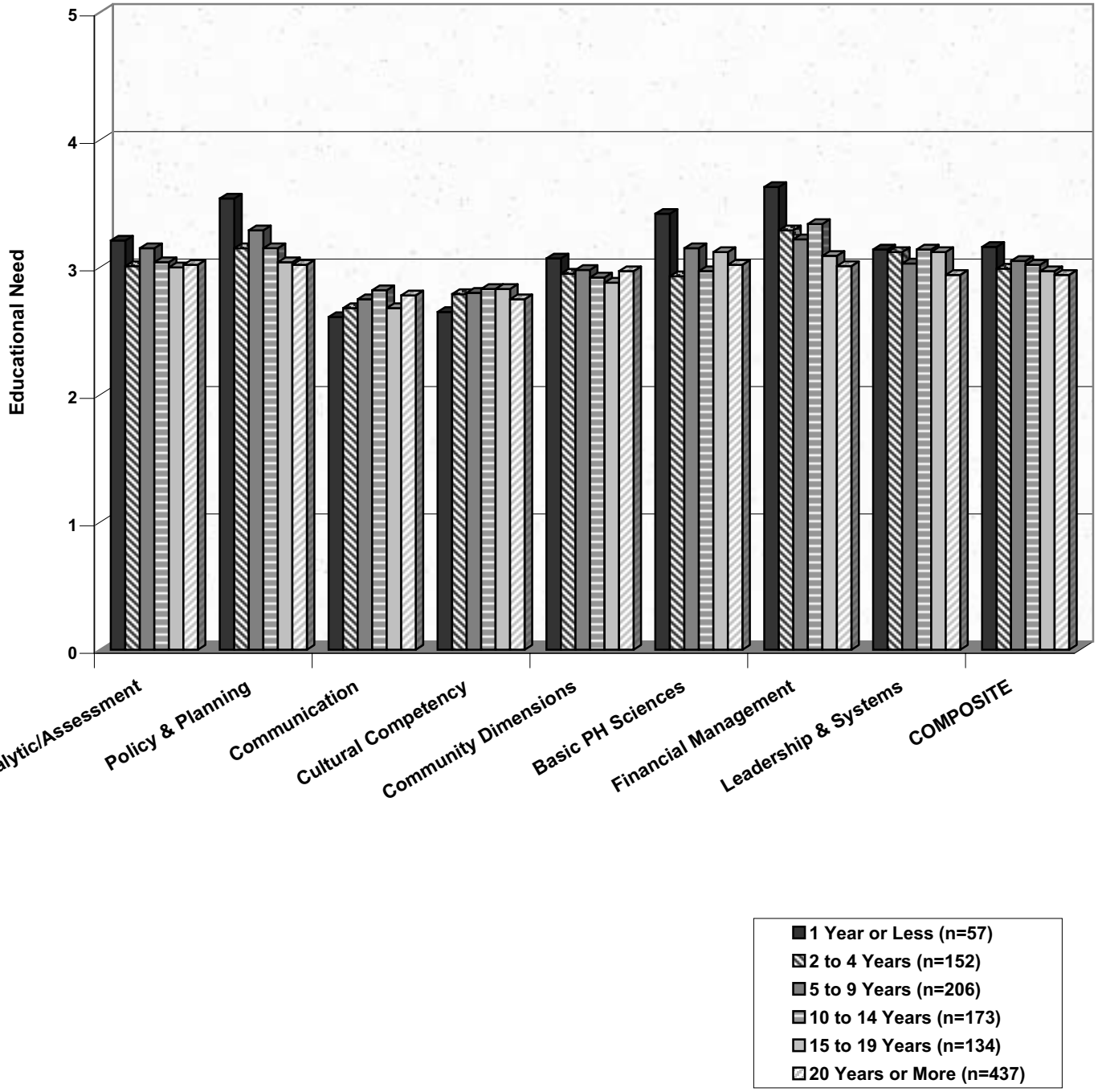


Table 45. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs by Years Since Last Degree (N=1,159)

Bioterrorism/Emergency Preparedness Competency Domains	1 Year or Less (n=57)				2 to 4 Years (n=152)				5 to 9 Years (n=206)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	3.05	1.81	5	3.00	2.76	1.61	5	2.33	2.95	1.61	5	2.67
Disaster Response Skills	4.15	1.68	1	4.33	3.81	1.46	1	4.00	4.06	1.44	1	4.00
Emergency Communication Skills	3.82	1.89	3	4.00	3.36	1.70	2	3.50	3.50	1.66	2	3.50
Biological/Infectious Disease Skills	3.00	1.93	6	3.00	2.62	1.65	6	2.00	2.81	1.62	6	3.00
Toxic Chem. & Env. Hazard Skills	2.63	1.86	7	2.00	2.61	1.77	7	2.00	2.74	1.71	7	2.00
Physical Injury Skills	3.84	2.09	2	4.00	3.32	1.81	3	3.00	3.45	1.83	3	3.00
Crisis Management Skills	3.35	2.04	4	3.00	2.83	1.88	4	2.00	3.09	1.79	4	3.00
Bioterrorism/EP Composite Skills	*3.41*	*1.61*		*3.17*	*3.05*	*1.34*		*2.83*	*3.23*	*1.34*		*3.07*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.72	1.26	3	4.00	3.74	1.23	1	4.00	3.69	1.24	1	4.00
Disaster Response Educ. Needs	3.70	1.18	4	4.00	3.69	1.19	2	4.00	3.59	1.22	3	4.00
Emergency Communication Educ. Needs	2.58	1.34	7	2.00	2.93	1.34	7	3.00	2.86	1.23	7	3.00
Biological/Infectious Disease Educ. Needs	3.91	1.06	2	4.00	3.54	1.36	4	4.00	3.57	1.29	4	4.00
Toxic Chem. & Env. Hazard Educ. Needs	4.04	0.93	1	4.00	3.67	1.37	3	4.00	3.66	1.33	2	4.00
Physical Injury Educ. Needs	3.42	1.32	5	3.00	3.38	1.25	6	4.00	3.15	1.30	6	3.00
Crisis Management Educ. Needs	3.40	1.28	6	3.00	3.48	1.13	5	4.00	3.34	1.18	5	3.00
Bioterrorism/EP Composite Educ. Needs	*3.54*	*0.81*		*3.57*	*3.50*	*0.93*		*3.57*	*3.41*	*0.98*		*3.57*

Table 45 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	10 to 14 Years (n=173)				15 to 19 Years (n=134)				20 Years or More (n=437)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]													
Disaster Planning Skills	2.65	1.57	5	2.33	2.78	1.71	7	2.33	2.75	1.64	6	2.33	n.s.
Disaster Response Skills	3.73	1.47	1	3.67	3.83	1.51	1	4.00	3.84	1.55	1	4.00	n.s.
Emergency Communication Skills	3.17	1.63	3	3.00	3.34	1.65	2	3.00	3.11	1.66	2	3.00	<.01
Biological/Infectious Disease Skills	2.56	1.62	6	2.00	2.91	1.76	5	2.50	2.75	1.77	5	2.00	n.s.
Toxic Chem. & Env. Hazard Skills	2.50	1.66	7	2.00	2.80	1.84	6	2.00	2.59	1.74	7	2.00	n.s.
Physical Injury Skills	3.19	1.93	2	3.00	3.29	1.97	3	3.00	2.92	1.77	3	2.00	<.001
Crisis Management Skills	2.85	1.94	4	2.00	3.07	1.89	4	3.00	2.78	1.75	4	2.00	n.s.
Bioterrorism/EP Composite Skills	*2.95*	*1.39*		*2.76*	*3.14*	*1.49*		*2.99*	*2.97*	*1.45*		*2.67*	*n.s.*
Educational Needs in Bioterrorism/EP[2]													
Disaster Planning Educ. Needs	3.66	1.27	1	4.00	3.60	1.27	3	4.00	2.58	1.30	7	4.00	n.s.
Disaster Response Educ. Needs	3.57	1.20	2	4.00	3.63	1.27	1	4.00	2.63	1.27	6	4.00	n.s.
Emergency Communication Educ. Needs	3.03	1.24	7	3.00	3.07	1.12	7	3.00	3.31	1.19	4	3.00	<.001
Biological/Infectious Disease Educ. Needs	3.38	1.35	4	4.00	3.62	1.35	2	4.00	3.56	1.36	2	4.00	n.s.
Toxic Chem. & Env. Hazard Educ. Needs	3.54	1.37	3	4.00	3.52	1.42	4	4.00	3.67	1.40	1	4.00	n.s.
Physical Injury Educ. Needs	3.23	1.39	6	3.00	3.45	1.32	6	4.00	3.30	1.34	5	3.00	n.s.
Crisis Management Educ. Needs	3.30	1.30	5	3.00	3.50	1.26	5	4.00	3.34	1.27	3	3.00	n.s.
Bioterrorism/EP Composite Educ. Needs	*3.39*	*1.05*		*3.43*	*3.48*	*1.02*		*3.71*	*3.48*	*1.05*		*3.71*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the six groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When the overall difference among groups was not significant, n.s. is noted. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 51. Proficiencies in Bioterrorism/Emergency Preparedness Skills by Years Since Last Degree

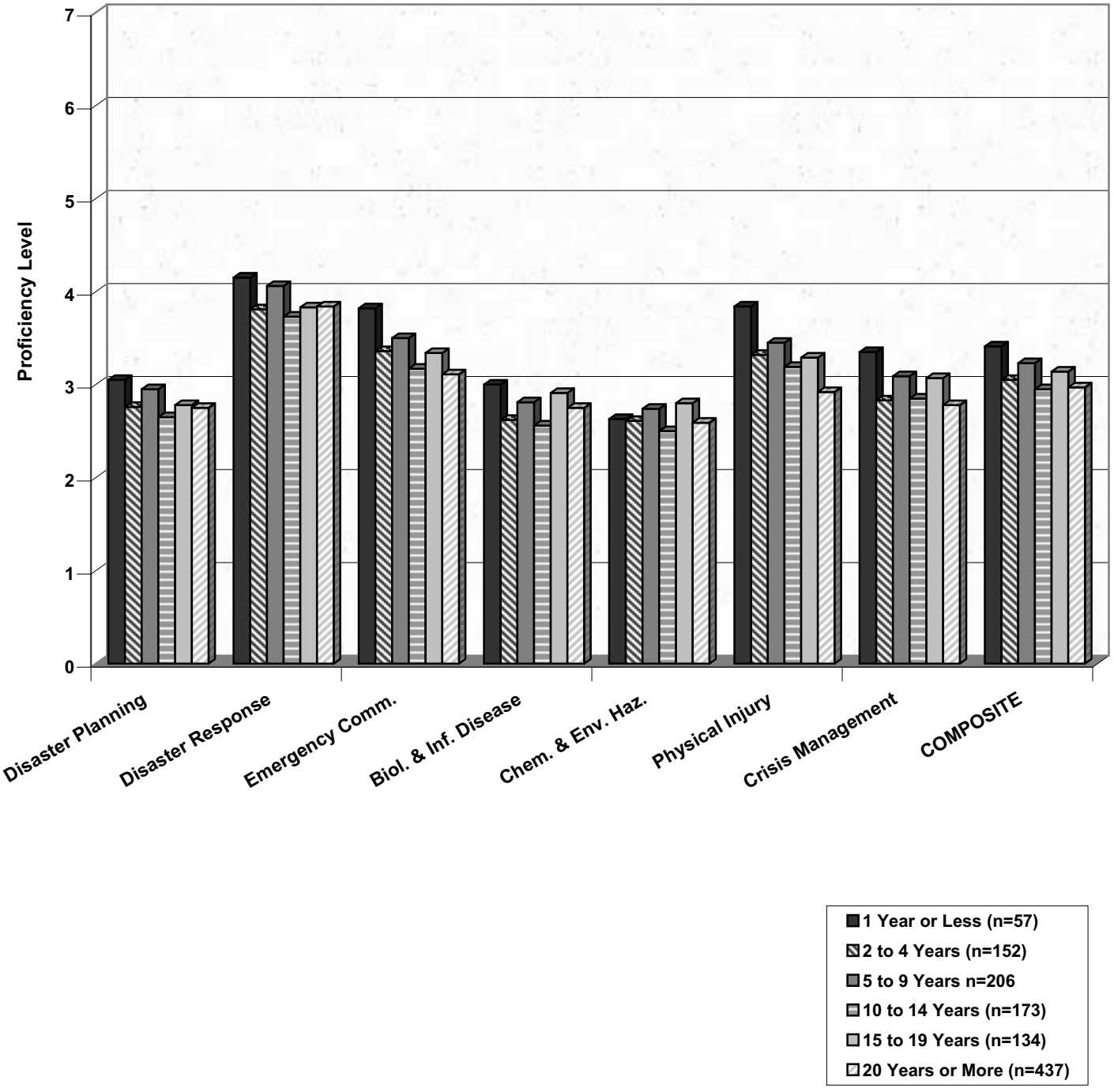


Figure 52. Educational Needs in Bioterrorism/Emergency Preparedness Skills by Years Since Last Degree

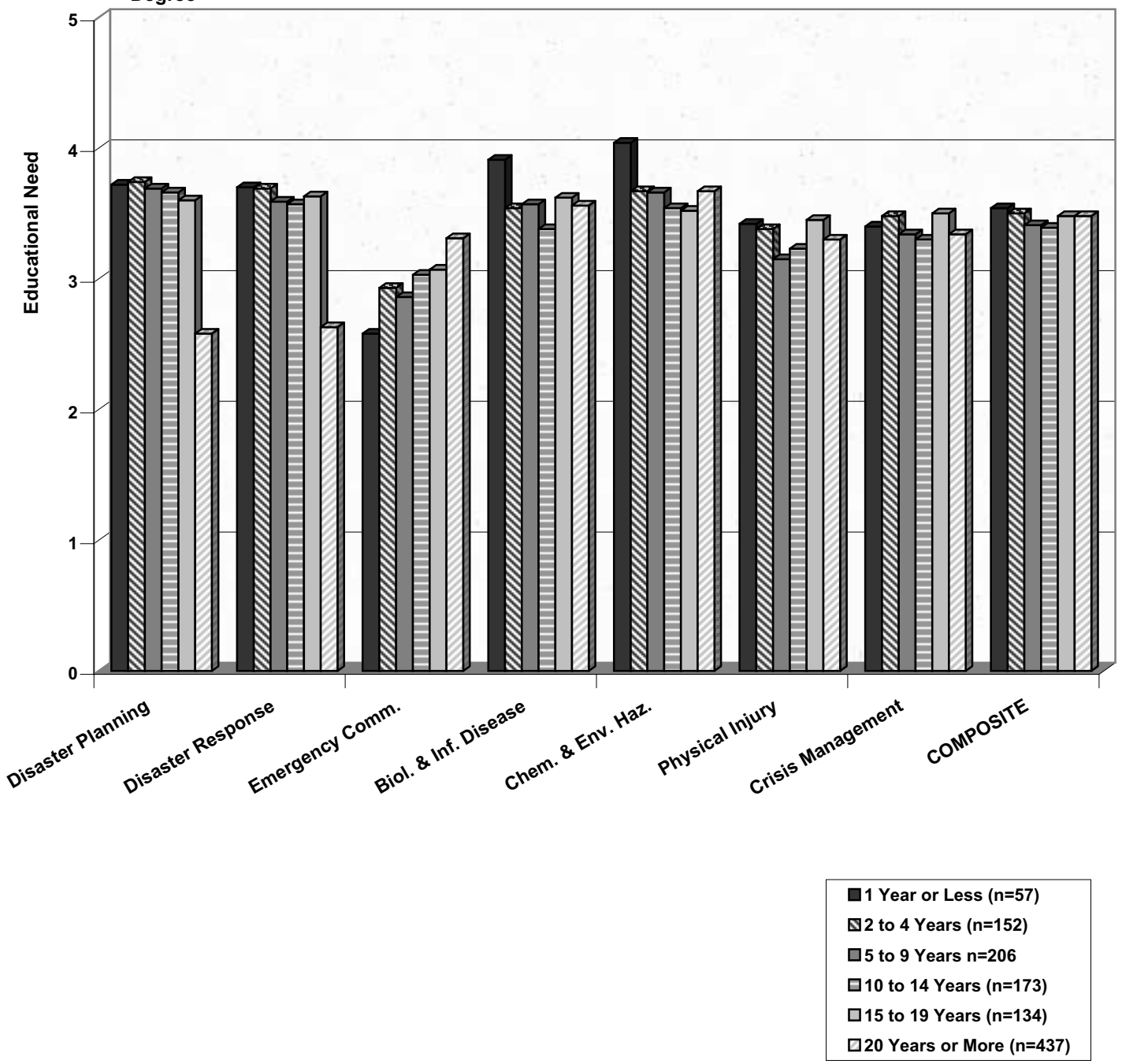


Table 46. Educational Preferences of Workers by Years Since Last Degree (N=1,159)

Types of Preference	1 Year or Less (n=57)				2 to 4 Years (n=152)				5 to 9 Years (n=206)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.13	0.70	2	2.00	2.15	0.72	2	2.00	2.25	0.70	2	2.00
1-Day Workshops	2.48	0.60	1	3.00	2.53	0.58	1	3.00	2.49	0.57	1	3.00
Several-Day Workshops	1.95	0.83	3	2.00	1.85	0.74	3	2.00	1.66	0.70	3	2.00
Academic Semester Courses	1.56	0.76	4	1.00	1.47	0.73	4	1.00	1.41	0.66	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.68	0.54	1	3.00	2.81	0.44	1	3.00	2.74	0.49	1	3.00
Interactive Teleconferences	1.70	0.69	4	2.00	1.67	0.63	4	2.00	1.82	0.65	4	2.00
Internet, Web-Based Instruction	1.80	0.75	3	2.00	1.79	0.69	3	2.00	1.82	0.68	3	2.00
Combination Format	2.05	0.72	2	2.00	2.00	0.66	2	2.00	2.12	0.72	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.67	0.66	1	3.00	2.73	0.55	1	3.00	2.84	0.42	1	3.00
Weekend Classes	1.20	0.48	4	1.00	1.26	0.54	4	1.00	1.22	0.47	4	1.00
Evening Classes	1.67	0.70	3	2.00	1.51	0.67	3	1.00	1.44	0.66	3	1.00
Self-Determined Web-Based	1.93	0.81	2	2.00	1.72	0.67	2	2.00	1.88	0.70	2	2.00
Preferences for Educational Recognition												
Certificate	2.37	0.64	1	2.00	2.35	0.69	1	2.00	2.31	0.71	1	2.00
Continuing Education Units	2.18	0.72	3	2.00	2.23	0.73	2	2.00	2.27	0.77	2	2.00
Undergraduate Academic Credit	1.66	0.82	4	1.00	1.83	0.77	4	2.00	1.69	0.75	4	2.00
Graduate Academic Credit	2.34	0.82	2	3.00	2.20	0.77	3	2.00	2.05	0.87	3	2.00

Table 46 (continued).

Types of Preference	10 to 14 Years (n=173)				15 to 19 Years (n=134)				20 Years or More (n=437)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.20	0.70	2	2.00	2.10	0.75	2	2.00	2.19	0.74	2	2.00
1-Day Workshops	2.48	0.61	1	3.00	2.48	0.63	1	3.00	2.50	0.60	1	3.00
Several-Day Workshops	1.64	0.72	3	1.00	1.74	0.77	3	2.00	1.62	0.73	3	1.00
Academic Semester Courses	1.48	0.72	4	1.00	1.47	0.69	4	1.00	1.29	0.56	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.66	0.57	1	3.00	2.78	0.49	1	3.00	2.74	0.48	1	3.00
Interactive Teleconferences	1.68	0.64	4	2.00	1.66	0.59	4	2.00	1.76	0.64	4	2.00
Internet, Web-Based Instruction	1.75	0.68	3	2.00	1.79	0.69	3	2.00	1.81	0.72	3	2.00
Combination Format	1.99	0.65	2	2.00	1.87	0.70	2	2.00	2.02	0.69	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.81	0.47	1	3.00	2.82	0.45	1	3.00	2.83	0.45	1	3.00
Weekend Classes	1.19	0.45	4	1.00	1.18	0.45	4	1.00	1.13	0.36	4	1.00
Evening Classes	1.43	0.62	3	1.00	1.35	0.56	3	1.00	1.28	0.52	3	1.00
Self-Determined Web-Based	1.87	0.74	2	2.00	1.88	0.68	2	2.00	1.82	0.72	2	2.00
Preferences for Educational Recognition												
Certificate	2.30	0.72	1	2.00	2.24	0.66	2	2.00	2.37	0.70	1	2.00
Continuing Education Units	2.23	0.83	2	2.00	2.31	0.76	1	2.00	2.10	0.81	2	2.00
Undergraduate Academic Credit	1.58	0.76	4	1.00	1.63	0.74	4	1.00	1.51	0.68	4	1.00
Graduate Academic Credit	1.88	0.85	3	2.00	1.98	0.86	3	2.00	1.69	0.78	3	1.00

5e. Differences by Years of Experience in Discipline or Major

To examine potential differences related to experience in the discipline or major, respondents were classified into six groups. These groups and the number of workers in each were: 1 Year or Less (n=85), 2 to 4 Years (n=149), 5 to 9 Years (n=193), 10 to 14 Years (n=150), 15 to 19 Years (n=118), and 20 Years or More (n=361). Table 47 summarized characteristics of the Colorado workforce by years of experience in the discipline or major.

Surprisingly, age did not directly correspond to years in the discipline. The mean age for those in the first three groups (i.e., less than 10 years experience in the discipline) was similar and ranged from 35.3 to 38.9 years. Average (mean) ages for the next three groups incrementally increased and were 42.6 years, 46.1 years, and 52.4 years, respectively. A higher percentage of non-white workers were in the two groups with less than five years in the discipline.

A higher percentage of respondents who indicated they were new to the discipline (1 Year or Less category) did not have a college degree (44%) when compared to other categories (range=13% to 25%). Years in the discipline generally corresponded with experience in public health. Workers new to the discipline/major (1 Year or Less) held a higher proportion of non-professional positions compared to other groups; in this group the number of professionals and non-professionals was nearly equal (49%, 51%, respectively).

More that three-fourths of new workers in the discipline held Front Line Staff positions. The more experience in the discipline, the more likely workers were to be in Senior Level Staff and Supervisory Management Staff positions. Annual salary corresponded with years in the discipline and ranged from $35,184 to $52,299. Workers with four or less years in the discipline were more likely to know a non-English language than groups with more years.

Differences in Core Competency proficiencies and educational needs by years of experience in discipline or major are reported in Table 48. A significant difference between groups ($p < .001$) was found in overall Core Competency Skills proficiency. In descending order, the means for Core Competency Skills (composite score) among professional experience groups were: 20 Years or More (4.76), 15 to 19 Years (4.60), 5 to 9 Years (4.53), 10 to 14 Years (4.51), 2 to 4 Years (4.29) and 1 Year or Less (3.91). Among these six experience groups, statistically significant differences were found in all eight Core Competency subscales with a similar pattern of experienced workers demonstrating greater proficiency. These differences are graphically presented in Figure 53.

For educational needs in Core Competency Skills, no significant differences were found among these six experience categories in either the composite scale or any of its eight subscales. The similarities in educational needs across groups are shown in Figure 54.

Table 49 summarizes differences in Bioterrorism/Emergency Preparedness proficiencies and educational needs. A significant difference between groups ($p < .05$) was found in overall proficiency in Bioterrorism/Emergency Preparedness Competency Skills. In descending order, the means for this composite score among professional experience groups were: 20 Years or More (3.22), 5 to 9 Years (3.21), 2 to 4 Years (3.11), 15 to 19 Years (3.03), 10 to 14 Years (2.99), and 1 Year or Less (2.69). Among these six professional experience groups, statistically significant differences were found in five of the seven subscales: Disaster Planning Skills ($p < .01$), Disaster Response Skills ($p < .01$), Biological/Infectious Disease Skills ($p < .05$), Physical Injury Skills ($p < .01$), and Crisis Management Skills ($p < .05$). In general those workers with less than 2 years of experience in the discipline were less proficient than those with two or more years in the discipline. No differences

across groups were found for Emergency Communication Skills and Toxic Chemical/Environment Hazard Skills. These differences are graphically illustrated in Figure 55.

When the overall educational need for Bioterrorism/Emergency Preparedness (composite score) was compared across the six levels of professional experience, no significant difference was found. Similarly, no differences were found for six of the seven subscales. The only group difference was in Emergency Communication Skills ($p < .001$) where the groups with more professional experience reported greater educational needs than those with less experience. See Figure 56 for a graphic presentation of educational needs by years in the discipline.

Workers' educational preferences by years of experience are summarized in Table 50. No differences in rank orderings across categories were found for course length, educational format, or time of course offering. Workers with 1 Year or Less in the discipline expressed a higher preference for recognition through graduate academic credit than workers in other groups.

Table 47. Characteristics of Colorado Public Health Workforce by Years of Experience in Discipline or Major (N=1,056)

	1 Year or Less (n=85)				2 to 4 Years (n=149)				5 to 9 Years (n=193)			
Variables and Values	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**
Age			38.87	11.97			35.28	9.87			38.25	8.97
Under 29 Years	27	31.8			53	35.6			35	18.1		
30-39 Years	16	18.8			49	32.9			78	40.4		
40-49 Years	19	22.4			29	19.5			52	26.9		
50-59 Years	21	24.7			16	10.7			26	13.5		
Over 60 Years	2	2.4			2	1.3			2	1.0		
Gender												
Male	13	16.5			28	19.7			40	20.9		
Female	66	83.5			114	80.3			151	79.1		
Race												
White	62	73.8			113	76.4			165	86.4		
Hispanic	14	16.7			22	14.9			13	6.8		
Black	4	4.8			4	2.7			1	.5		
Asian	2	2.4			1	.7			6	3.1		
Other or Multiracial	2	2.4			8	5.4			6	3.1		
Highest Education												
High School Diploma	22	26.2			15	10.1			3	1.6		
Profess./Vocational Diploma	7	8.3			6	4.0			7	3.7		
Associate Degree	8	9.5			16	10.7			24	12.6		
Baccalaureate Degree	37	44.0			78	52.3			112	58.6		
Master's Degree	9	10.7			31	20.8			41	21.5		
Doctoral Degree	1	1.2			3	2.0			4	2.1		
College Degree												
No	37	44.0			37	24.8			34	17.8		
Yes	47	56.0			112	75.2			157	82.2		
Years Since Last Degree			13.14	12.19			8.11	9.49			9.58	7.72
Less than 2 Years	21	25.3			12	8.2			9	4.8		
2-5 Years	9	10.8			72	49.3			31	16.6		
5-9 Years	9	10.8			27	18.5			94	50.3		
10-14 Years	13	15.7			10	6.8			18	9.6		
15-19 Years	6	7.2			5	3.4			11	5.9		
20 or More Years	25	30.1			20	13.7			24	12.8		
Years Experience in Discipline			0.42	0.50			3.01	0.86			6.62	1.44
Less than 2 Years	85	100.0			0	.0			0	.0		
2-5 Years	0	.0			149	100.0			0	.0		
5-9 Years	0	.0			0	.0			193	100.0		
10-14 Years	0	.0			0	.0			0	.0		
15-19 Years	0	.0			0	.0			0	.0		
20 or More Years	0	.0			0	.0			0	.0		
Years Experience in Pub. Health			7.57	7.93			4.14	5.29			5.79	5.45
Less than 2 Years	24	28.6			43	29.3			38	19.8		

Table 47 (continued).

Variables and Values	1 Year or Less (n=85)				2 to 4 Years (n=149)				5 to 9 Years (n=193)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	18	21.4			70	47.6			50	26.0		
5-9 Years	16	19.0			18	12.2			79	41.1		
10-14 Years	11	13.0			8	5.4			12	6.3		
15-19 Years	2	2.4			2	1.4			6	3.1		
20 or More Years	13	15.5			6	4.1			7	3.6		
County Survey Response												
Very Small	3	4.2			5	3.6			4	2.3		
Small	5	6.9			9	6.5			18	10.4		
Medium	4	5.6			14	10.1			24	13.9		
Large	60	83.3			110	79.7			127	73.4		
Organized Health Department												
No	8	11.1			18	13.0			27	15.6		
Yes	64	88.9			120	87.0			146	84.4		
Position Category												
Officials & Administrators	0	.0			3	2.0			5	2.6		
Professionals	43	50.6			107	71.8			162	83.9		
Technicians	4	4.7			9	6.0			7	3.6		
Protective Service	0	.0			1	.7			0	.0		
Paraprofessionals	11	12.9			9	6.0			8	4.1		
Administrative Support	26	30.6			20	13.4			11	5.7		
Professional Position												
No	42	49.4			39	26.2			26	13.5		
Yes	43	50.6			110	73.8			167	86.5		
Type of Position												
Front Line Staff	61	75.3			105	72.4			114	59.4		
Senior Level Staff	12	14.8			28	19.3			39	20.3		
Supervisory/Mgmt Staff	8	9.9			12	8.3			39	20.3		
Full-Time Employment												
No	7	8.2			27	18.2			37	19.4		
Yes	78	91.8			121	81.8			154	80.6		
Annual Salary (FTE)			$35,184	$13,930			$36,432	$13,565			$41,974	$14,272
Less Than $20,000	4	5.5			10	7.6			6	3.5		
$20,000 to $29,999	22	30.1			28	21.2			12	8.7		
$30,000 to $39,999	23	31.5			49	37.1			65	37.8		
$40,000 to $49,999	15	20.5			24	18.2			45	26.2		
$50,000 to $59,999	3	4.1			14	10.6			22	12.8		
$60,000 to $69,999	2	2.7			5	3.8			10	5.8		
$70,000 to $79,999	4	5.5			0	.0			3	1.7		
Over $80,000	0	.0			2	1.5			6	3.5		
Know Non-English Language												
No	58	68.2			90	60.8			141	73.4		

Table 47 (continued).

Variables and Values	1 Year or Less (n=85)				2 to 4 Years (n=149)				5 to 9 Years (n=193)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Yes	27	31.8			58	39.2			51	26.6		
Other Language Speaking												
Fair	8	32.0			16	28.1			18	35.3		
Good	8	32.0			19	33.3			19	37.3		
Excellent	9	36.0			22	38.6			14	27.5		
Other Language Reading												
Fair	9	36.0			16	27.6			20	41.7		
Good	7	28.0			24	41.4			15	31.3		
Excellent	9	36.0			18	31.0			13	27.1		
Other Language Writing												
Fair	9	37.5			25	43.9			25	53.2		
Good	11	45.8			20	35.1			10	21.3		
Excellent	4	16.7			12	21.1			12	25.5		

Table 47 (continued).

Variables and Values	10 to 14 Years (n=150)				15 to 19 Years (n=118)				20 Years or More (n=361)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			42.57	7.16			46.08	7.51			52.39	6.09
Under 29 Years	3	2.0			1	.9			1	.3		
30-39 Years	48	32.4			18	15.5			2	.6		
40-49 Years	73	49.3			64	55.2			113	31.7		
50-59 Years	24	16.2			25	21.6			197	55.3		
Over 60 Years	0	.0			8	6.9			43	12.1		
Gender												
Male	22	15.7			17	14.8			75	22.3		
Female	118	84.3			98	85.2			262	77.7		
Race												
White	124	83.8			99	86.1			332	93.0		
Hispanic	13	8.8			8	7.0			15	4.2		
Black	3	2.0			5	4.3			3	.8		
Asian	3	2.0			1	.9			2	.6		
Other or Multiracial	5	3.4			2	1.7			5	1.4		
Highest Education												
High School Diploma	1	.7			3	2.6			9	2.5		
Profess./Vocational Diploma	6	4.0			3	2.6			23	6.4		
Associate Degree	17	11.3			11	9.4			16	4.4		
Baccalaureate Degree	79	52.7			59	50.4			172	47.8		
Master's Degree	40	26.7			38	32.5			124	34.4		
Doctoral Degree	7	4.7			3	2.6			16	4.4		
College Degree												
No	24	16.0			17	14.5			48	13.3		
Yes	126	84.0			100	85.5			312	86.7		
Years Since Last Degree			12.18	6.59			17.63	7.47			23.17	9.92
Less than 2 Years	4	2.7			2	1.8			4	1.2		
2-5 Years	10	6.8			1	.9			17	4.9		
5-9 Years	29	19.9			13	11.4			21	6.1		
10-14 Years	67	45.9			11	9.6			32	9.2		
15-19 Years	17	11.6			55	48.2			25	7.2		
20 or More Years	19	13.0			32	28.1			248	71.5		
Years Experience in Discipline			11.64	1.55			16.61	1.56			27.04	5.55
Less than 2 Years	0	.0			0	.0			0	.0		
2-5 Years	0	.0			0	.0			0	.0		
5-9 Years	0	.0			0	.0			0	.0		
10-14 Years	150	100.0			0	.0			0	.0		
15-19 Years	0	.0			118	100.0			0	.0		
20 or More Years	0	.0			0	.0			361	100.0		
Years Experience in Pub. Health			7.93	5.09			10.33	6.48			14.78	9.68
Less than 2 Years	18	12.0			17	14.5			36	10.0		

Table 47 (continued).

Variables and Values	10 to 14 Years (n=150)				15 to 19 Years (n=118)				20 Years or More (n=361)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	26	17.3			11	9.4			28	7.8		
5-9 Years	39	26.0			19	16.2			56	15.5		
10-14 Years	61	40.7			30	25.6			66	18.3		
15-19 Years	4	2.7			35	29.9			43	11.9		
20 or More Years	2	1.3			5	4.3			132	36.6		
County Survey Response												
Very Small	6	4.4			5	5.0			18	5.6		
Small	17	12.6			10	9.9			42	13.2		
Medium	18	13.3			10	9.9			39	12.2		
Large	94	69.6			76	75.2			220	69.0		
Organized Health Department												
No	25	18.5			18	17.8			76	23.8		
Yes	110	81.5			83	82.2			243	76.2		
Position Category												
Officials & Administrators	2	1.3			3	2.5			18	5.0		
Professionals	127	85.2			99	83.9			305	85.0		
Technicians	9	6.0			8	6.8			13	3.6		
Protective Service	0	.0			0	.0			1	.3		
Paraprofessionals	2	1.3			3	2.5			4	1.1		
Administrative Support	9	6.0			5	4.2			18	5.0		
Professional Position												
No	20	13.5			16	13.6			36	10.0		
Yes	129	86.6			102	86.4			323	90.0		
Type of Position												
Front Line Staff	80	54.1			48	41.7			120	33.8		
Senior Level Staff	30	20.3			22	19.1			82	23.1		
Supervisory/Mgmt Staff	38	25.7			45	39.1			153	43.1		
Full-Time Employment												
No	29	19.6			20	17.2			73	20.4		
Yes	119	80.4			96	82.8			284	79.6		
Annual Salary (FTE)			$45,686	$19,517			$48,946	$18,037			$52,299	$19,013
Less Than $20,000	4	3.2			4	4.0			2	.7		
$20,000 to $29,999	14	11.1			9	9.0			15	5.2		
$30,000 to $39,999	36	28.6			18	18.0			53	18.4		
$40,000 to $49,999	33	26.2			22	22.0			73	25.3		
$50,000 to $59,999	18	14.3			17	17.0			60	20.8		
$60,000 to $69,999	8	6.3			15	15.0			36	12.5		
$70,000 to $79,999	3	2.4			9	9.0			22	7.6		
Over $80,000	10	7.9			6	6.0			27	9.4		
Know Non-English Language												
No	105	70.9			90	77.6			280	78.2		

Table 47 (continued).

Variables and Values	10 to 14 Years (n=150)				15 to 19 Years (n=118)				20 Years or More (n=361)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Yes	43	29.1			26	22.4			78	21.8		
Other Language Speaking												
Fair	17	40.5			13	50.0			41	51.9		
Good	16	38.1			4	15.4			20	25.3		
Excellent	9	21.4			9	34.6			18	22.8		
Other Language Reading												
Fair	17	42.5			9	34.6			36	46.8		
Good	17	42.5			9	34.6			27	35.1		
Excellent	6	15.0			8	30.8			14	18.2		
Other Language Writing												
Fair	24	60.0			13	54.2			46	61.3		
Good	10	25.0			4	16.7			16	21.3		
Excellent	6	15.0			7	29.2			13	17.3		

Table 48. Differences in Core Competency Proficiencies and Educational Needs by Years of Experience in Discipline or Major (N=1,056)

Core Competency Domains	1 Year or Less (n=85)				2 to 4 Years (n=149)				5 to 9 Years (n=193)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	3.80	1.69	5	4.00	4.30	1.38	4	4.50	4.53	1.27	4	4.75
Policy Development/Prog. Planning Skills	3.49	1.59	7	3.50	3.68	1.42	7	3.75	4.05	1.38	7	4.25
Communication Skills	4.29	1.53	2	4.50	4.76	1.07	2	4.83	4.93	1.04	2	5.00
Cultural Competency Skills	4.76	1.48	1	5.00	5.15	1.16	1	5.25	5.21	1.05	1	5.38
Community Dimensions of Practice Skills	3.90	1.61	4	4.00	4.25	1.22	5	4.50	4.47	1.27	5	4.63
Basic Public Health Sciences Skills	3.56	1.72	6	3.88	4.10	1.43	6	4.25	4.22	1.44	6	4.50
Financial Planning & Management Skills	3.47	1.56	8	3.60	3.66	1.19	8	3.60	4.01	1.33	8	4.20
Leadership & Systems Thinking Skills	3.97	1.62	3	4.25	4.33	1.24	3	4.50	4.78	1.20	3	5.00
Core Competencies Composite Skills	*3.91*	*1.45*		*4.09*	*4.29*	*1.02*		*4.40*	*4.53*	*1.06*		*4.69*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	3.00	1.20	4	3.00	3.02	1.11	5	3.00	3.14	1.06	5	3.00
Policy Devel./Prog. Planning Educ. Needs	3.11	1.24	2	3.00	3.07	1.23	8	3.00	3.23	1.15	2	3.00
Communication Educ. Needs	2.80	1.21	8	3.00	2.72	1.20	7	3.00	2.67	1.16	7	3.00
Cultural Competency Educ. Needs	2.88	1.20	7	3.00	2.83	1.16	6	3.00	2.68	1.10	7	3.00
Community Dimen. of Practice Educ. Needs	3.06	1.17	3	3.00	3.05	1.06	4	3.00	3.02	1.10	6	3.00
Basic Public Health Sciences Educ. Needs	3.13	1.34	1	3.00	3.06	1.21	3	3.00	3.14	1.23	4	3.00
Financial Planning & Mgmt. Educ. Needs	2.94	1.37	6	3.00	3.34	1.38	1	4.00	3.29	1.31	1	3.00
Leadership & Systems Thinking Educ. Needs	2.99	1.12	5	3.00	3.18	1.13	2	3.00	3.15	1.16	3	3.00
Core Competencies Composite Educ. Needs	*2.99*	*0.85*		*3.00*	*3.06*	*0.76*		*3.00*	*3.04*	*0.79*		*3.00*

Table 48 (continued).

Core Competency Domains	10 to 14 Years (n=150)				15 to 19 Years (n=118)				20 Years or More (n=361)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]													
Analytic/Assessment Skills	4.51	1.37	4	4.75	4.58	1.29	5	4.75	4.72	1.33	4	5.00	<.001
Policy Development/Prog. Planning Skills	3.98	1.47	8	4.00	4.24	1.43	7	4.50	4.46	1.46	6	4.75	<.001
Communication Skills	4.87	1.20	2	5.00	4.88	1.20	2	5.08	4.98	1.15	3	5.00	<.001
Cultural Competency Skills	5.22	1.16	1	5.50	5.17	1.02	1	5.25	5.27	1.08	1	5.50	<.05
Community Dimensions of Practice Skills	4.39	1.25	5	4.50	4.59	1.23	4	4.75	4.72	1.30	4	4.75	<.001
Basic Public Health Sciences Skills	4.33	1.43	6	4.50	4.33	1.42	6	4.50	4.45	1.41	7	4.75	<.001
Financial Planning & Management Skills	4.01	1.40	7	4.10	4.11	1.30	8	4.20	4.42	1.34	8	4.60	<.001
Leadership & Systems Thinking Skills	4.69	1.35	3	4.75	4.88	1.12	2	5.25	5.03	1.28	2	5.25	<.001
Core Competencies Composite Skills	*4.51*	*1.12*		*4.45*	*4.60*	*1.05*		*4.75*	*4.76*	*1.12*		*4.86*	*<.001*
Educ. Needs in Core Competency Domains[2]													
Analytic/Assessment Educ. Needs	3.01	1.17	4	3.00	3.06	1.16	4	3.00	3.08	1.11	1	3.00	n.s.
Policy Devel./Prog. Planning Educ. Needs	3.12	1.22	2	3.00	3.15	1.19	2	3.00	3.06	1.23	2	3.00	n.s.
Communication Educ. Needs	2.69	1.16	8	3.00	2.62	1.01	8	3.00	2.71	1.15	7	3.00	n.s.
Cultural Competency Educ. Needs	2.70	1.13	7	3.00	2.69	1.14	7	3.00	2.70	1.11	8	3.00	n.s.
Community Dimen. of Practice Educ. Needs	2.84	1.17	6	3.00	2.82	1.12	6	3.00	2.90	1.13	6	3.00	n.s.
Basic Public Health Sciences Educ. Needs	2.95	1.28	5	3.00	3.15	1.21	2	3.00	2.95	1.21	4	3.00	n.s.
Financial Planning & Mgmt. Educ. Needs	3.19	1.32	1	3.00	3.25	1.34	1	3.00	3.06	1.35	3	3.00	n.s.
Leadership & Systems Thinking Educ. Needs	3.07	1.21	3	3.00	2.96	1.17	5	3.00	2.93	1.14	5	3.00	n.s.
Core Competencies Composite Educ. Needs	*2.94*	*0.84*		*3.00*	*2.96*	*0.77*		*3.00*	*2.92*	*0.83*		*2.88*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the six groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 53. Proficiencies in Core Competency Skills by Years of Experience in Discipline or Major

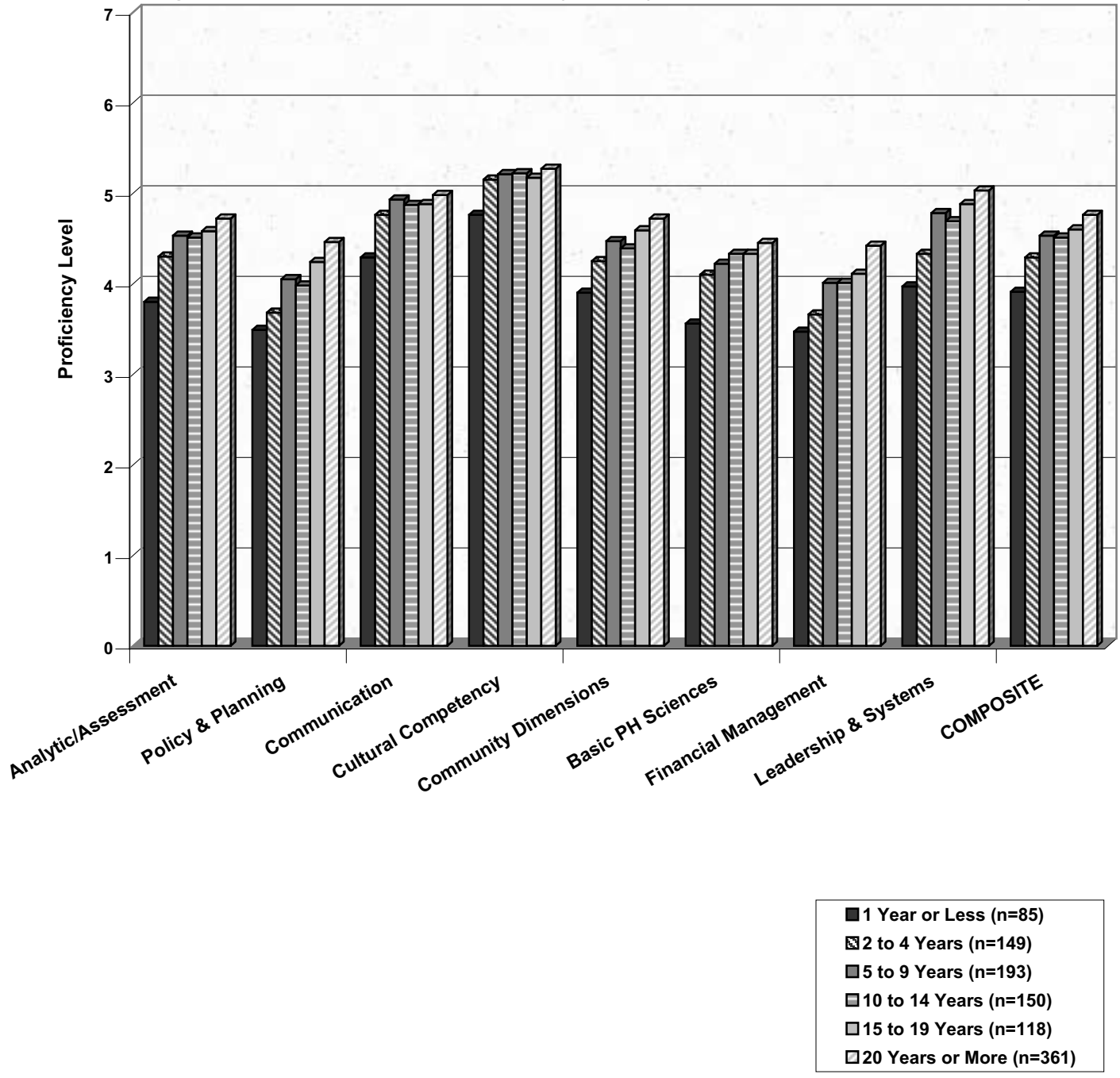


Figure 54. Educational Needs in Core Competency Skills by Years of Experience in Discipline or Major

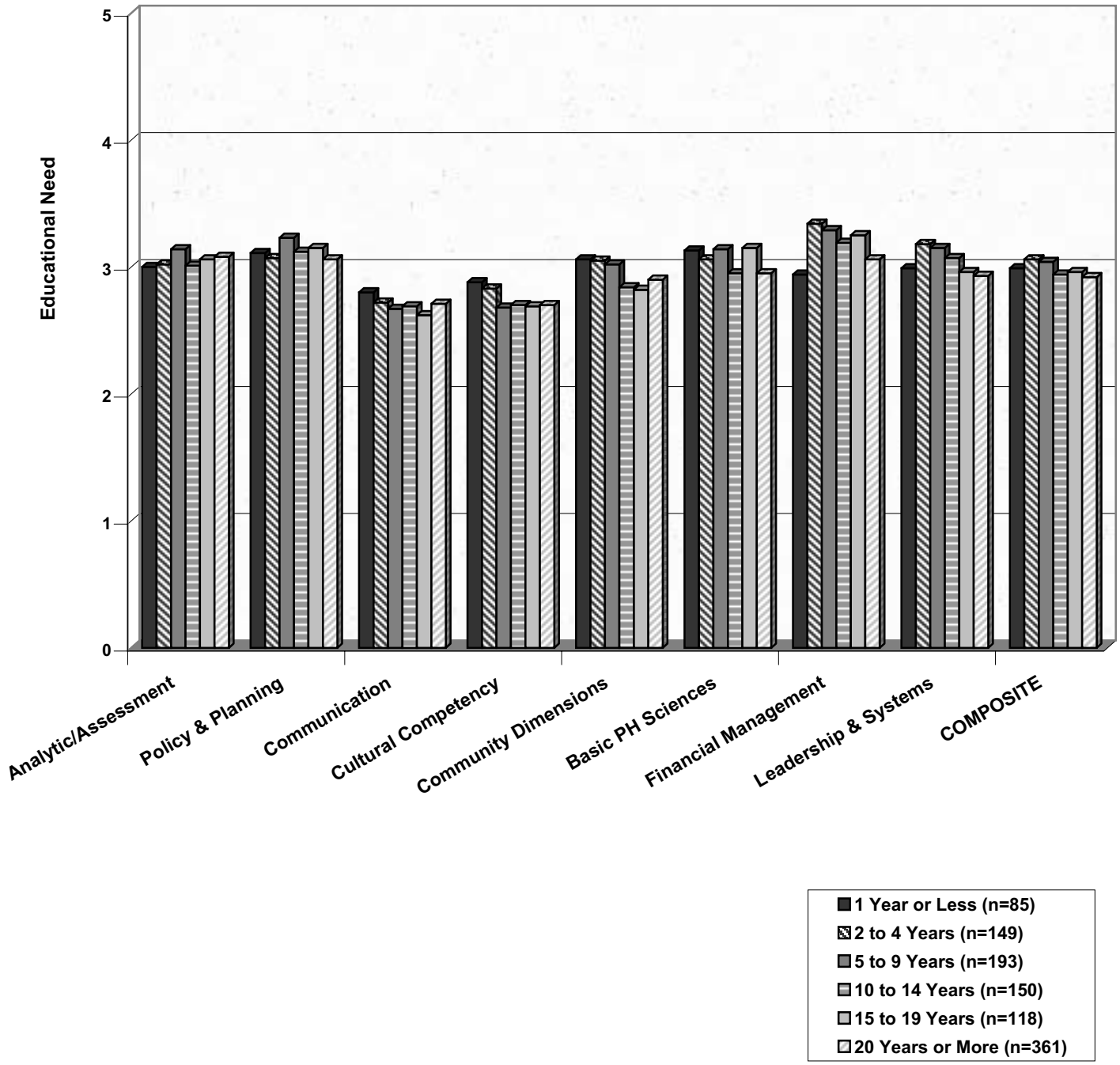


Table 49. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs by Years of Experience in Discipline or Major (N=1,056)

Bioterrorism/Emergency Preparedness Competency Domains	2 Year or Less (n=85)				2 to 4 Years (n=149)				5 to 9 Years (n=193)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	2.40	1.63	6	1.67	2.86	1.72	4	2.67	2.90	1.58	5	2.67
Disaster Response Skills	3.52	1.68	1	3.33	3.82	1.53	1	4.00	4.09	1.42	1	4.33
Emergency Communication Skills	3.05	1.73	2	2.50	3.37	1.73	3	3.50	3.52	1.71	2	3.50
Biological/Infectious Disease Skills	2.41	1.69	5	2.00	2.74	1.76	7	2.00	2.85	1.74	6	2.50
Toxic Chem. & Env. Hazard Skills	2.45	1.75	4	2.00	2.77	1.86	6	2.00	2.61	1.76	7	2.00
Physical Injury Skills	2.61	1.87	3	2.00	3.40	1.92	2	3.00	3.41	1.80	3	3.00
Crisis Management Skills	2.33	1.51	7	2.00	2.81	1.84	5	2.00	3.12	1.88	4	3.00
Bioterrorism/EP Composite Skills	*2.69*	*1.46*		*2.24*	*3.11*	*1.49*		*2.86*	*3.21*	*1.37*		*3.04*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.52	1.28	3	4.00	3.74	1.25	1	4.00	3.74	1.21	3	4.00
Disaster Response Educ. Needs	3.40	1.24	4	3.00	3.66	1.25	2	4.00	3.75	1.11	2	4.00
Emergency Communication Educ. Needs	2.87	1.24	7	3.00	2.91	1.28	7	3.00	2.85	1.21	7	3.00
Biological/Infectious Disease Educ. Needs	3.53	1.40	1	4.00	3.59	1.36	4	4.00	3.62	1.27	4	4.00
Toxic Chem. & Env. Hazard Educ. Needs	3.53	1.48	1	4.00	3.64	1.38	3	4.00	3.77	1.32	1	4.00
Physical Injury Educ. Needs	3.35	1.41	5	3.00	3.42	1.31	6	4.00	3.20	1.26	6	3.00
Crisis Management Educ. Needs	3.30	1.23	6	3.00	3.50	1.22	5	4.00	3.39	1.16	5	3.00
Bioterrorism/EP Composite Educ. Needs	*3.36*	*1.04*		*3.29*	*3.49*	*1.03*		*3.71*	*3.47*	*0.93*		*3.57*

Table 49 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	10 to 14 Years (n=150)				15 to 19 Years (n=118)				20 Years or More (n=361)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]													
Disaster Planning Skills	2.64	1.67	5	2.00	2.68	1.48	6	2.67	2.99	1.62	5	2.67	<.01
Disaster Response Skills	3.84	1.45	1	3.67	3.72	1.42	1	4.00	4.11	1.48	1	4.00	<.01
Emergency Communication Skills	3.12	1.64	3	3.00	3.20	1.62	3	3.00	3.34	1.66	2	3.00	n.s.
Biological/Infectious Disease Skills	2.59	1.59	6	2.00	2.80	1.67	5	3.00	2.99	1.75	5	3.00	<.05
Toxic Chem. & Env. Hazard Skills	2.48	1.74	7	2.00	2.54	1.69	7	2.00	2.73	1.69	7	2.00	n.s.
Physical Injury Skills	3.21	1.94	2	3.00	3.26	1.85	2	3.00	3.30	1.85	3	3.00	<.01
Crisis Management Skills	3.07	2.07	4	2.50	2.94	1.73	4	3.00	3.06	1.81	4	3.00	<.05
Bioterrorism/EP Composite Skills	*2.99*	*1.41*		*2.56*	*3.03*	*1.36*		*3.00*	*3.22*	*1.40*		*3.07*	*<.05*
Educational Needs in Bioterrorism/EP[2]													
Disaster Planning Educ. Needs	3.79	1.29	1	4.00	3.65	1.16	4	4.00	3.67	1.23	3	4.00	n.s.
Disaster Response Educ. Needs	3.61	1.30	3	4.00	3.67	1.19	3	4.00	3.68	1.22	2	4.00	n.s.
Emergency Communication Educ. Needs	3.14	1.35	7	3.00	3.03	1.20	7	3.00	3.30	1.18	6	3.00	<.001
Biological/Infectious Disease Educ. Needs	3.57	1.37	4	4.00	3.73	1.20	2	4.00	3.52	1.30	4	4.00	n.s.
Toxic Chem. & Env. Hazard Educ. Needs	3.66	1.40	2	4.00	3.76	1.25	1	4.00	3.71	1.32	1	4.00	n.s.
Physical Injury Educ. Needs	3.23	1.39	6	3.00	3.42	1.27	6	4.00	3.25	1.30	7	3.00	n.s.
Crisis Management Educ. Needs	3.37	1.34	5	4.00	3.48	1.17	5	4.00	3.33	1.23	5	3.00	n.s.
Bioterrorism/EP Composite Educ. Needs	*3.48*	*1.07*		*3.71*	*3.54*	*0.91*		*3.71*	*3.49*	*0.96*		*3.57*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the six groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When the overall difference among groups was not significant, n.s. is noted. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 55. Proficiencies in Bioterrorism/Emergency Preparedness Skills by Years of Experience in Discipline or Major

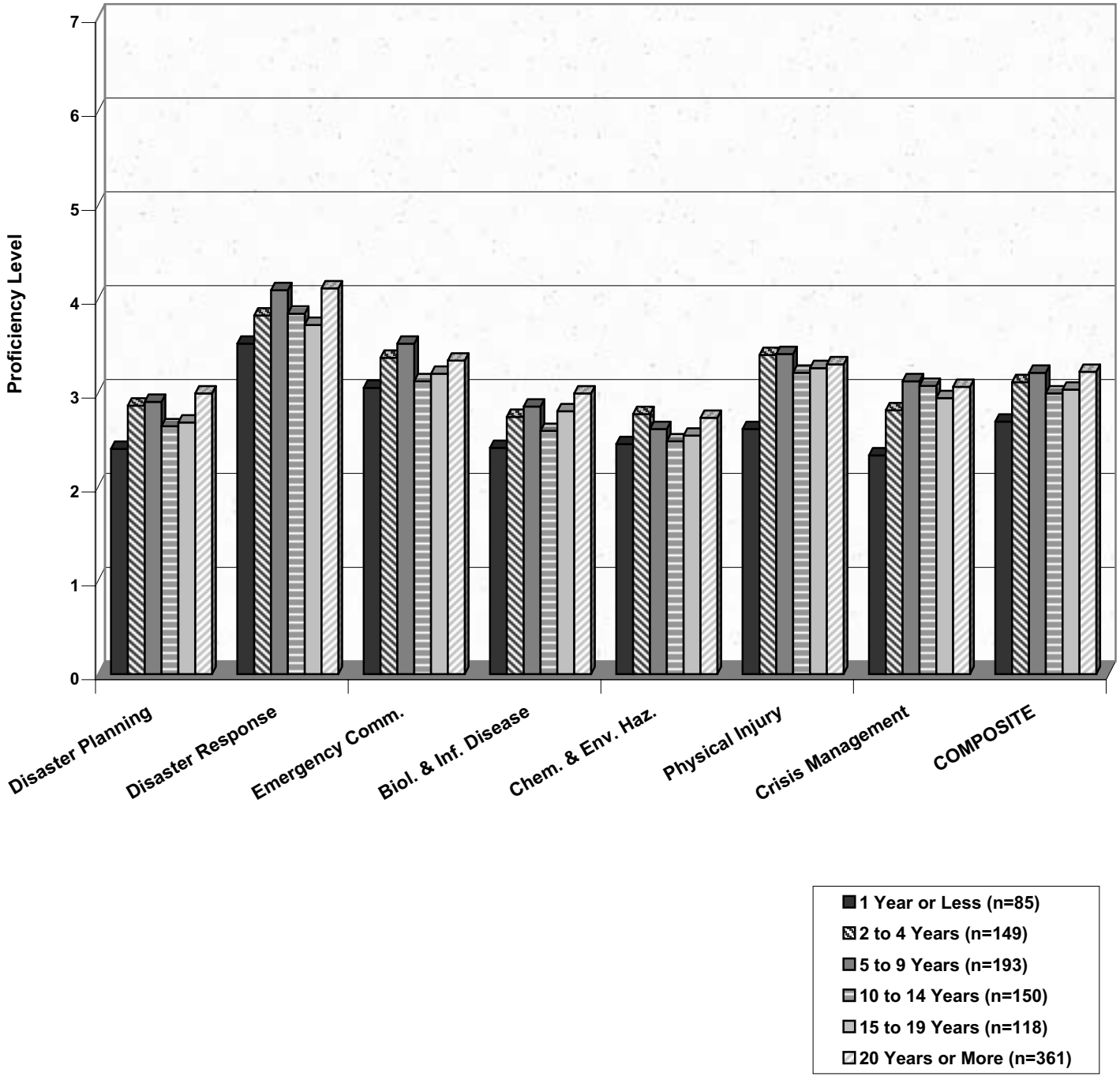


Figure 56. Educational Needs in Bioterrorism/Emergency Preparedness Skills by Years of Experience in Discipline or Major

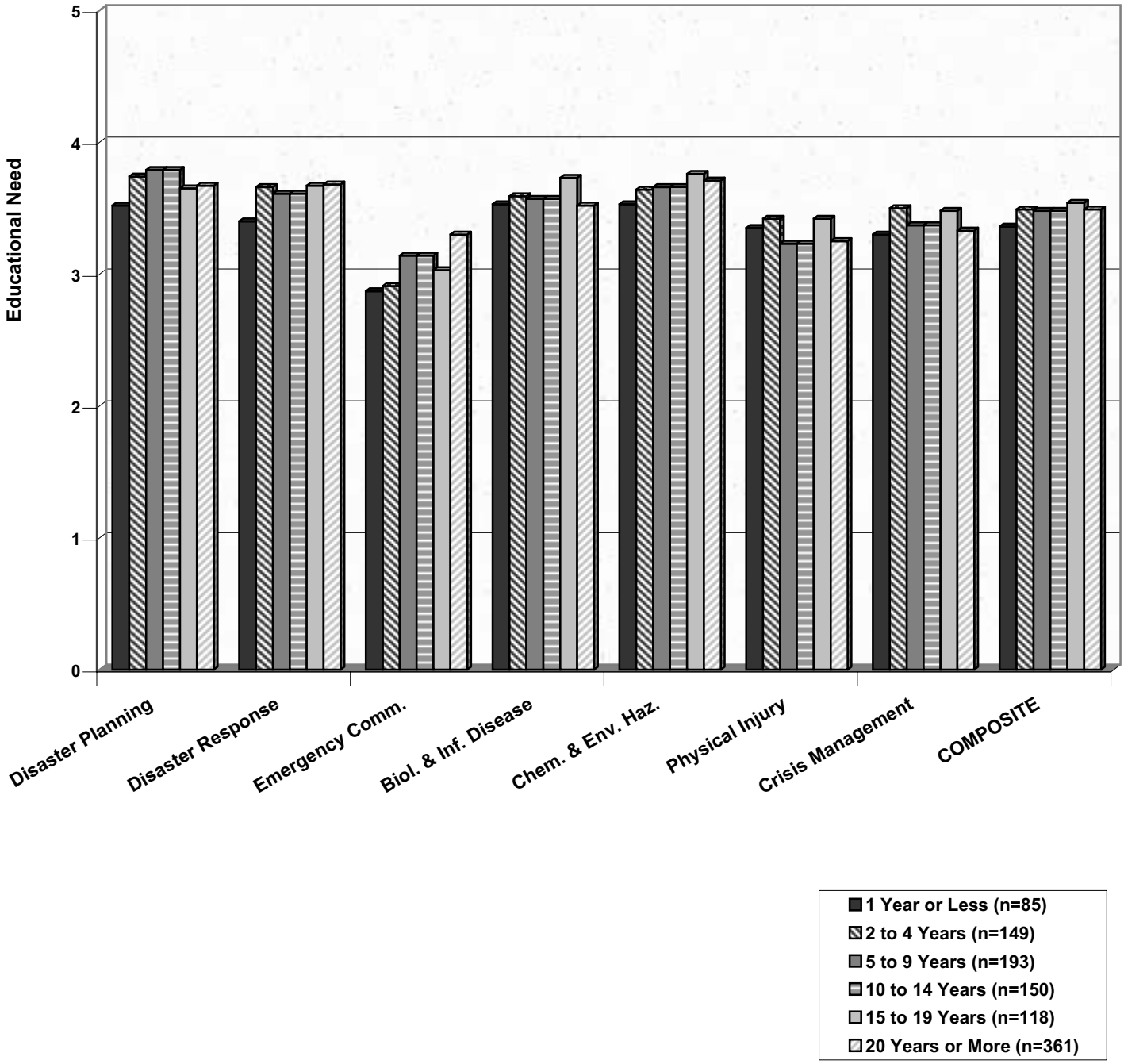


Table 50. Educational Preferences of Workers by Years of Experience in Discipline or Major (N=1,056)

Types of Preference	1 Year or Less (n=85)				2 to 4 Years (n=149)				5 to 9 Years (n=193)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.13	0.73	2	2.00	2.15	0.73	2	2.00	2.22	0.71	2	2.00
1-Day Workshops	2.42	0.61	1	2.00	2.54	0.58	1	3.00	2.50	0.57	1	3.00
Several-Day Workshops	1.71	0.75	3	2.00	1.87	0.76	3	2.00	1.71	0.73	3	2.00
Academic Semester Courses	1.53	0.75	4	1.00	1.53	0.73	4	1.00	1.36	0.64	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.63	0.55	1	3.00	2.80	0.49	1	3.00	2.79	0.46	1	3.00
Interactive Teleconferences	1.74	0.57	4	2.00	1.64	0.62	4	2.00	1.70	0.66	4	2.00
Internet, Web-Based Instruction	1.80	0.70	3	2.00	1.73	0.71	3	2.00	1.75	0.69	3	2.00
Combination Format	2.04	0.71	2	2.00	1.86	0.66	2	2.00	2.09	0.70	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.79	0.51	1	3.00	2.74	0.52	1	3.00	2.85	0.44	1	3.00
Weekend Classes	1.11	0.32	4	1.00	1.28	0.55	4	1.00	1.15	0.39	4	1.00
Evening Classes	1.45	0.61	3	1.00	1.52	0.70	3	1.00	1.35	0.57	3	1.00
Self-Determined Web-Based	1.82	0.75	2	2.00	1.71	0.67	2	2.00	1.84	0.71	2	2.00
Preferences for Educational Recognition												
Certificate	2.38	0.68	1	2.00	2.34	0.66	1	2.00	2.30	0.72	1	2.00
Continuing Education Units	1.95	0.81	3	2.00	2.33	0.72	2	2.00	2.20	0.79	2	2.00
Undergraduate Academic Credit	1.69	0.78	4	1.50	1.81	0.80	4	2.00	1.63	0.75	4	1.00
Graduate Academic Credit	1.96	0.85	2	2.00	2.15	0.81	3	2.00	2.01	0.85	3	2.00

Table 50 (continued).

Types of Preference	10 to 14 Years (n=150)				15 to 19 Years (n=118)				20 Years or More (n=361)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.19	0.73	2	2.00	2.24	0.69	2	2.00	2.21	0.73	2	2.00
1-Day Workshops	2.51	0.61	1	3.00	2.54.	0.54	1	3.00	2.52	0.60	1	3.00
Several-Day Workshops	1.61	0.72	3	1.00	1.72	0.74	3	2.00	1.65	0.72	4	2.00
Academic Semester Courses	1.38	0.69	4	1.00	1.42	0.67	4	1.00	1.30	0.57	3	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.78	0.48	1	3.00	2.78	0.45	1	3.00	2.75	0.46	1	3.00
Interactive Teleconferences	1.73	0.63	4	2.00	1.71	0.61	4	2.00	1.80	0.65	4	2.00
Internet, Web-Based Instruction	1.78	0.67	3	2.00	1.82	0.73	3	2.00	1.81	0.71	3	2.00
Combination Format	1.99	0.71	2	2.00	2.03	0.66	2	2.00	2.07	0.69	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.82	0.45	1	3.00	2.85	0.38	1	3.00	2.86	0.43	1	3.00
Weekend Classes	1.19	0.49	4	1.00	1.17	0.49	4	1.00	1.15	0.36	4	1.00
Evening Classes	1.50	0.67	3	1.00	1.35	0.57	3	1.00	1.29	0.49	3	1.00
Self-Determined Web-Based	1.82	0.73	2	2.00	1.94	0.74	2	2.00	1.88	0.72	2	2.00
Preferences for Educational Recognition												
Certificate	2.29	0.74	1	2.00	2.28	0.66	1	2.00	2.31	0.71	1	2.00
Continuing Education Units	2.28	0.75	2	2.00	2.32	0.76	2	2.00	2.25	0.78	2	2.00
Undergraduate Academic Credit	1.59	0.76	4	1.00	1.58	0.68	4	1.00	1.47	0.65	4	1.00
Graduate Academic Credit	1.95	0.86	3	2.00	2.11	0.86	3	2.00	1.76	0.80	3	2.00

5f. Differences by Years of Experience in Public Health

To examine potential differences related to years of public health experience, respondents were classified into six groups. The categories and number of respondents in each group were: 1 Year or Less (n=202), 2 to 4 Years (n=226), 5 to 9 Years (n=260), 10 to 14 Years (n=219), 15 to 19 Years (n=101), and 20 Years or More (n=189). Characteristics of the Colorado workforce by years of experience in public health are described in Table 51.

As expected, workers with more public health experience were older. A higher percentage of men were found in the more public health experienced groups. The work group with less than two years of public health experience had a lower percentage of college graduates than other groups. Public health experience was related to type of position; the longer workers had been employed in public health, the less likely they were to be in Front Line Staff positions and the more likely they were to be in Senior Level Staff or Supervisory/Management Staff positions.

Annual salary increased by public health experience and ranged from $35,241 (1 Year or Less) to $55,112 (20 Years or More). The percentage of workers who knew a non-English language was higher among workers with less experience in public health; over one-third (34%) of those in the one year or less experience in public health group reported knowing a non-English language.

The differences in Core Competency proficiencies and educational needs by years of experience in public health are presented in Table 52. A significant difference between groups ($p < .001$) was found in overall Core Competency Skills proficiency. In descending order, the means for Core Competency Skills (composite score) among public health experience groups were 20 Years or More (4.75), 15 to 19 Years (4.58), 5 to 9 Years (4.40), 10 to 14 Years (4.35), 2 to 4 Years (4.35) and 1 Year or Less (4.16). Among these six public health experience groups, statistically significant differences were found in seven of the eight Core Competency subscales. No difference was found for the Cultural Competency Skills subscale. For all other subscales, workers with the least public health experiences were least proficient, and workers with the most experience were always the most proficient. As can be seen in Figure 57, the general pattern is that proficiencies are higher the longer the worker had been employed in public health.

Regarding educational need for Core Competency Skills, a significant difference between groups ($p < .001$) was found for the composite score and five of its eight subscales: Assessment/Analytic Skills ($p < .01$); Policy Development/Program Planning Skills ($p < .001$); Basic Public Health Sciences Skills ($p < .001$); Financial Planning/Management Skills ($p < .001$), and Leadership/Systems Thinking Skills ($p < .01$). No differences in educational needs were found for Communication Skills, Cultural Competency Skills, or Community Dimensions of Practice Skills. For subscales where differences were found, the general pattern was the less the experience in public health, the greater the educational need. Figure 58 displays educational needs by years in public health.

Table 53 summarizes the differences in Bioterrorism/Emergency Preparedness proficiencies and educational needs by years of experience in public health. No difference between groups was found in overall Bioterrorism/Emergency Preparedness Competency Skills (composite measure). Among these six groups, significant differences were found in two of the seven subscales: Disaster Planning Skills ($p < .05$) and Biological/Infectious Disease Skills ($p < .01$). For both of these subscales, public health workers with 15 or more years of experience in public health were more proficient than workers with less than 15 years experience. These findings are graphically presented in Figure 59.

No significant difference was found among the six public health experience groups in overall educational need for Bioterrorism/Emergency Preparedness Skills (composite score). Differences

were found on three of its subscales: Disaster Planning ($p < .01$), Emergency Communication ($p < .001$), and Biological/Infectious Disease Skills ($p < .05$). Differences in educational needs across groups are displayed in Figure 60. In Disaster Planning Skills and Biological/Infectious Disease Skills, workers with less public health experience have higher educational needs than those with more experience. However, for Emergency Communication Skills, workers with more experience in public health identified a greater need than those with less experience.

Educational preferences by years of experience in public health are summarized in Table 54. No differences in rank orderings were observed for preferred course length, educational format, or time of course offering. While more experienced workers preferred continuing educational units over certificates, new workers in public health expressed a higher preference for certificates than continuing educational units.

Table 51. Characteristics of Colorado Public Health Workforce by Years of Experience in Public Health (N=1,197)

	1 Year or Less (n=202)				2 to 4 Years (n=226)				5 to 9 Years (n=260)			
Variables and Values	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**
Age			38.01	11.21			38.19	9.77			43.50	9.82
Under 29 Years	61	30.3			48	21.3			22	8.6		
30-39 Years	50	24.9			80	35.6			69	26.8		
40-49 Years	53	26.4			63	28.0			90	35.0		
50-59 Years	33	16.4			33	14.7			61	23.7		
Over 60 Years	4	2.0			1	.4			15	5.8		
Gender												
Male	28	14.6			26	12.3			38	15.1		
Female	164	85.4			186	87.7			214	84.9		
Race												
White	146	72.6			172	77.1			208	80.6		
Hispanic	37	18.4			39	17.5			30	11.6		
Black	6	3.0			3	1.3			7	2.7		
Asian	4	2.0			3	1.3			3	1.2		
Other or Multiracial	8	4.0			6	2.7			10	3.9		
Highest Education												
High School Diploma	33	16.4			33	14.7			28	10.8		
Profess./Vocational Diploma	17	8.5			9	4.0			18	6.9		
Associate Degree	24	11.9			29	12.9			19	7.3		
Baccalaureate Degree	97	48.3			97	43.3			124	47.9		
Master's Degree	24	11.9			51	22.8			62	23.9		
Doctoral Degree	6	3.0			5	2.2			8	3.1		
College Degree												
No	74	36.8			71	31.7			65	25.1		
Yes	127	63.2			153	68.3			194	74.9		
Years Since Last Degree			10.95	10.45			10.20	9.33			14.83	10.12
Less than 2 Years	25	13.3			15	6.8			4	1.6		
2-5 Years	50	26.6			66	30.1			21	8.5		
5-9 Years	35	18.6			56	25.6			71	28.9		
10-14 Years	16	8.5			26	11.9			56	22.8		
15-19 Years	25	13.3			17	7.8			21	8.5		
20 or More Years	37	19.7			39	17.8			73	29.7		
Years Experience in Discipline			10.38	9.45			8.66	8.37			12.73	10.12
Less than 2 Years	24	13.6			18	8.9			16	7.0		
2-5 Years	43	24.4			70	34.5			18	7.9		
5-9 Years	38	21.6			50	24.6			79	34.8		
10-14 Years	18	10.2			26	12.8			39	17.2		
15-19 Years	17	9.7			11	5.4			19	8.4		
20 or More Years	36	20.5			28	13.8			56	24.7		
Years Experience in Pub. Health			0.80	0.40			2.75	0.79			6.72	1.46
Less than 2 Years	202	100.0			0	.0			0	.0		

Table 51 (continued).

Variables and Values	1 Year or Less (n=202)				2 to 4 Years (n=226)				5 to 9 Years (n=260)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	0	.0			226	100.0			0	.0		
5-9 Years	0	.0			0	.0			260	100.0		
10-14 Years	0	.0			0	.0			0	.0		
15-19 Years	0	.0			0	.0			0	.0		
20 or More Years	0	.0			0	.0			0	.0		
County Survey Response												
Very Small	8	4.5			10	4.7			9	3.8		
Small	27	15.1			22	10.2			22	9.3		
Medium	20	11.2			23	10.7			35	14.8		
Large	124	69.3			160	74.4			170	72.0		
Organized Health Department												
No	40	22.3			37	17.2			46	19.5		
Yes	139	77.7			178	82.8			190	80.5		
Position Category												
Officials & Administrators	3	9.7			2	6.5			4	12.9		
Professionals	119	13.9			161	18.9			193	22.6		
Technicians	20	30.3			11	16.7			13	19.7		
Protective Service	1	50.0			0	.0			1	50.0		
Paraprofessionals	21	24.1			24	27.6			17	19.5		
Administrative Support	38	25.0			28	18.4			30	19.7		
Professional Position												
No	80	39.6			63	27.9			61	23.6		
Yes	122	60.4			163	72.1			197	76.4		
Type of Position												
Front Line Staff	155	78.3			154	69.4			139	54.7		
Senior Level Staff	18	9.1			41	18.5			58	22.8		
Supervisory/Mgmt Staff	25	12.6			27	12.2			57	22.4		
Full-Time Employment												
No	33	16.6			53	23.5			46	17.9		
Yes	166	83.4			173	76.5			211	82.1		
Annual Salary (FTE)			$35,241	$13,436			$37,532	$14,167			$42,449	$16,968
Less Than $20,000	13	7.7			14	6.9			5	2.4		
$20,000 to $29,999	42	24.9			40	19.8			33	16.1		
$30,000 to $39,999	65	38.5			70	34.7			56	27.3		
$40,000 to $49,999	27	16.0			46	22.8			60	29.3		
$50,000 to $59,999	14	8.3			18	8.9			27	13.2		
$60,000 to $69,999	2	1.2			8	4.0			10	4.9		
$70,000 to $79,999	5	3.0			3	1.5			7	3.4		
Over $80,000	1	.6			3	1.5			7	3.4		
Know Non-English Language												
No	132	66.0			153	67.7			179	69.9		

Table 51 (continued).

Variables and Values	1 Year or Less (n=202)				2 to 4 Years (n=226)				5 to 9 Years (n=260)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Yes	68	34.0			73	32.3			77	30.1		
Other Language Speaking												
Fair	15	13.0			21	18.3			31	27.0		
Good	27	24.8			17	15.6			22	20.2		
Excellent	29	26.1			32	28.8			21	18.9		
Other Language Reading												
Fair	15	12.9			22	19.0			32	27.6		
Good	28	23.7			18	15.3			24	20.3		
Excellent	28	29.5			29	30.5			16	16.8		
Other Language Writing												
Fair	27	17.5			25	16.2			39	25.3		
Good	24	26.1			18	19.6			21	22.8		
Excellent	20	27.4			25	34.2			10	13.7		

Table 51 (continued).

Variables and Values	10 to 14 Years (n=219)				15 to 19 Years (n=101)				20 Years or More (n=189)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			46.84	8.12			49.46	6.55			52.99	6.90
Under 29 Years	1	.5			0	.0			2	1.1		
30-39 Years	40	18.4			3	3.1			2	1.1		
40-49 Years	91	41.9			48	49.5			45	24.2		
50-59 Years	73	33.6			38	39.2			106	57.0		
Over 60 Years	12	5.5			8	8.2			31	16.7		
Gender												
Male	34	16.4			23	23.7			52	29.4		
Female	173	83.6			74	76.3			125	70.6		
Race												
White	179	82.9			89	91.8			172	93.0		
Hispanic	25	11.6			6	6.2			12	6.5		
Black	4	1.9			2	2.1			0	.0		
Asian	5	2.3			0	.0			0	.0		
Other or Multiracial	3	1.4			0	.0			1	.5		
Highest Education												
High School Diploma	31	14.2			6	5.9			26	13.8		
Profess./Vocational Diploma	16	7.3			4	4.0			12	6.4		
Associate Degree	17	7.8			5	5.0			5	2.7		
Baccalaureate Degree	94	43.1			54	53.5			75	39.9		
Master's Degree	56	25.7			28	27.7			63	33.5		
Doctoral Degree	4	1.8			4	4.0			7	3.7		
College Degree												
No	64	29.4			15	14.9			43	22.9		
Yes	154	70.6			86	85.1			145	77.1		
Years Since Last Degree			18.28	9.84			19.88	9.03			26.67	9.06
Less than 2 Years	6	2.9			1	1.0			0	.0		
2-5 Years	9	4.3			2	2.1			2	1.1		
5-9 Years	18	8.7			13	13.4			9	5.0		
10-14 Years	52	25.1			9	9.3			11	6.1		
15-19 Years	39	18.8			25	25.8			7	3.9		
20 or More Years	83	40.1			47	48.5			150	83.8		
Years Experience in Discipline			16.17	8.76			19.32	8.36			23.67	10.96
Less than 2 Years	11	5.9			2	2.2			13	7.9		
2-5 Years	8	4.3			2	2.2			6	3.6		
5-9 Years	12	6.4			6	6.5			7	4.2		
10-14 Years	61	32.4			4	4.3			2	1.2		
15-19 Years	30	16.0			35	38.0			5	3.0		
20 or More Years	66	35.1			43	46.7			132	80.0		
Years Experience in Pub. Health			11.55	1.38			16.51	1.44			25.15	4.44
Less than 2 Years	0	.0			0	.0			0	.0		

Table 51 (continued).

Variables and Values	10 to 14 Years (n=219)				15 to 19 Years (n=101)				20 Years or More (n=189)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	0	.0			0	.0			0	.0		
5-9 Years	0	.0			0	.0			0	.0		
10-14 Years	219	100.0			0	.0			0	.0		
15-19 Years	0	.0			101	100.0			0	.0		
20 or More Years	0	.0			0	.0			189	100.0		
County Survey Response												
Very Small	10	5.2			3	3.7			4	2.4		
Small	17	8.9			6	7.3			21	12.8		
Medium	21	10.9			9	11.0			14	8.5		
Large	144	75.0			64	78.0			125	76.2		
Organized Health Department												
No	34	17.7			13	15.9			27	16.5		
Yes	158	82.3			69	84.1			137	83.5		
Position Category												
Officials & Administrators	8	25.8			5	16.1			9	29.0		
Professionals	153	17.9			77	9.0			151	17.7		
Technicians	13	19.7			6	9.1			3	4.5		
Protective Service	0	.0			0	.0			0	.0		
Paraprofessionals	17	19.5			3	3.4			5	5.7		
Administrative Support	26	17.1			9	5.9			21	13.8		
Professional Position												
No	56	26.1			18	18.0			29	15.3		
Yes	161	73.9			82	82.0			160	84.7		
Type of Position												
Front Line Staff	101	47.2			36	37.1			45	24.5		
Senior Level Staff	50	23.4			21	21.6			44	23.9		
Supervisory/Mgmt Staff	63	29.4			40	41.2			95	51.6		
Full-Time Employment												
No	43	19.8			13	13.1			25	13.4		
Yes	174	80.2			86	86.9			161	86.6		
Annual Salary (FTE)			$46,385	$17,207			$52,521	$21,088			$55,116	$19,886
Less Than $20,000	0	.0			2	2.5			2	1.4		
$20,000 to $29,999	30	16.3			6	7.4			10	6.8		
$30,000 to $39,999	41	22.3			12	14.8			21	14.2		
$40,000 to $49,999	44	23.9			15	18.5			25	16.9		
$50,000 to $59,999	27	14.7			21	25.9			32	21.6		
$60,000 to $69,999	23	12.5			10	12.3			26	17.6		
$70,000 to $79,999	9	4.9			8	9.9			9	6.1		
Over $80,000	10	5.4			7	8.6			23	15.5		
Know Non-English Language												
No	165	76.4			73	73.7			143	77.3		

Table 51 (continued).

Variables and Values	10 to 14 Years (n=219)				15 to 19 Years (n=101)				20 Years or More (n=189)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Yes	51	23.6			26	26.3			42	22.7		
Other Language Speaking												
Fair	18	15.7			13	11.3			17	14.8		
Good	19	17.4			7	6.4			17	15.6		
Excellent	14	12.6			7	6.3			8	7.2		
Other Language Reading												
Fair	19	16.4			10	8.6			18	15.5		
Good	21	17.8			11	9.3			16	13.6		
Excellent	10	10.5			6	6.3			6	6.3		
Other Language Writing												
Fair	25	16.2			14	9.1			24	15.6		
Good	16	17.4			5	5.4			8	8.7		
Excellent	7	9.6			6	8.2			5	6.8		

Table 52. Differences in Core Competency Proficiencies and Educational Needs by Years of Experience in Public Health (N=1,197)

Core Competency Domains	1 Year or Less (n=202)				2 to 4 Years (n=226)				5 to 9 Years (n=260)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	4.09	1.42	4	4.25	4.38	1.44	4	4.50	4.38	1.39	5	4.75
Policy Development/Prog. Planning Skills	3.61	1.44	8	3.75	3.78	1.51	8	4.00	3.95	1.38	8	4.25
Communication Skills	4.56	1.22	2	4.67	4.77	1.13	2	4.83	4.73	1.23	2	4.83
Cultural Competency Skills	5.09	1.25	1	5.25	5.11	1.17	1	5.25	5.03	1.18	1	5.25
Community Dimensions of Practice Skills	4.05	1.34	5	4.13	4.33	1.31	5	4.50	4.39	1.33	4	4.50
Basic Public Health Sciences Skills	3.71	1.55	6	3.75	4.10	1.48	6	4.25	4.12	1.49	6	4.50
Financial Planning & Management Skills	3.66	1.35	7	3.60	3.81	1.37	7	3.80	3.96	1.34	7	4.20
Leadership & Systems Thinking Skills	4.40	1.37	3	4.50	4.48	1.33	3	4.75	4.60	1.33	3	4.75
Core Competencies Composite Skills	*4.16*	*1.16*		*4.17*	*4.35*	*1.13*		*4.46*	*4.40*	*1.16*		*4.60*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	3.26	1.12	3	3.00	3.01	1.16	6	3.00	3.10	1.08	4	3.00
Policy Devel./Prog. Planning Educ. Needs	3.26	1.24	3	3.00	3.21	1.31	1	3.00	3.29	1.17	1	3.00
Communication Educ. Needs	2.69	1.18	8	3.00	2.72	1.26	8	3.00	2.93	1.20	7	3.00
Cultural Competency Educ. Needs	2.81	1.22	7	3.00	2.76	1.18	7	3.00	2.83	1.11	8	3.00
Community Dimen. of Practice Educ. Needs	3.04	1.14	6	3.00	3.02	1.17	4	3.00	3.05	1.19	6	3.00
Basic Public Health Sciences Educ. Needs	3.40	1.31	1	4.00	3.11	1.27	3	3.00	3.07	1.19	5	3.00
Financial Planning & Mgmt. Educ. Needs	3.38	1.35	2	4.00	3.19	1.41	2	3.00	3.19	1.34	2	3.00
Leadership & Systems Thinking Educ. Needs	3.13	1.11	5	3.00	3.02	1.18	4	3.00	3.19	1.13	2	3.00
Core Competencies Composite Educ. Needs	*3.12*	*0.81*		*3.13*	*3.00*	*0.80*		*3.00*	*3.08*	*0.85*		*3.00*

Table 52 (continued).

Core Competency Domains	10 to 14 Years (n=219)				15 to 19 Years (n=101)				20 Years or More (n=189)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]													
Analytic/Assessment Skills	4.29	1.47	5	4.50	4.50	1.49	5	4.75	4.63	1.47	5	5.00	<.01
Policy Development/Prog. Planning Skills	3.99	1.55	7	4.25	4.24	1.52	7	4.50	4.57	1.54	6	5.00	<.001
Communication Skills	4.59	1.30	3	4.83	4.87	1.26	2	5.17	4.91	1.33	3	5.17	<.05
Cultural Competency Skills	4.99	1.23	1	5.25	5.17	1.05	1	5.25	5.22	1.22	1	5.50	n.s.
Community Dimensions of Practice Skills	4.38	1.31	4	4.50	4.54	1.31	4	4.75	4.77	1.42	4	5.00	<.001
Basic Public Health Sciences Skills	4.04	1.47	6	4.25	4.37	1.46	6	4.50	4.47	1.59	7	5.00	<.001
Financial Planning & Management Skills	3.91	1.41	8	4.00	4.15	1.38	8	4.20	4.45	1.51	8	4.80	<.001
Leadership & Systems Thinking Skills	4.63	1.40	2	4.88	4.76	1.26	3	5.00	4.97	1.46	2	5.25	<.001
Core Competencies Composite Skills	*4.35*	*1.21*		*4.49*	*4.58*	*1.18*		*4.74*	*4.75*	*1.30*		*5.00*	*<.001*
Educ. Needs in Core Competency Domains[2]													
Analytic/Assessment Educ. Needs	3.07	1.12	4	3.00	2.79	1.17	4	3.00	2.90	1.22	1	3.00	<.01
Policy Devel./Prog. Planning Educ. Needs	3.13	1.21	2	3.00	2.94	1.24	1	3.00	2.80	1.23	4	3.00	<.001
Communication Educ. Needs	2.75	1.10	8	3.00	2.59	1.00	8	2.00	2.69	1.18	7	3.00	n.s.
Cultural Competency Educ. Needs	2.77	1.10	7	3.00	2.80	1.09	3	3.00	2.65	1.16	8	3.00	n.s.
Community Dimen. of Practice Educ. Needs	2.94	1.05	6	3.00	2.75	1.16	6	3.00	2.78	1.19	5	3.00	n.s.
Basic Public Health Sciences Educ. Needs	3.07	1.22	4	3.00	2.71	1.25	7	3.00	2.74	1.22	6	3.00	<.001
Financial Planning & Mgmt. Educ. Needs	3.26	1.33	1	3.00	2.86	1.47	2	3.00	2.88	1.37	2	3.00	<.001
Leadership & Systems Thinking Educ. Needs	3.10	1.15	3	3.00	2.77	1.10	5	3.00	2.85	1.21	3	3.00	<.01
Core Competencies Composite Educ. Needs	*3.01*	*0.79*		*3.00*	*2.78*	*0.82*		*2.75*	*2.79*	*0.91*		*2.75*	*<.001*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the six groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When the overall difference among groups was non-significant, n.s. is noted. When the overall F ratio was statistically significant, post-hoc comparisons between all possible pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparisons may be obtained from the author.

Figure 57. Proficiencies in Core Competency Skills by Years of Experience in Public Health

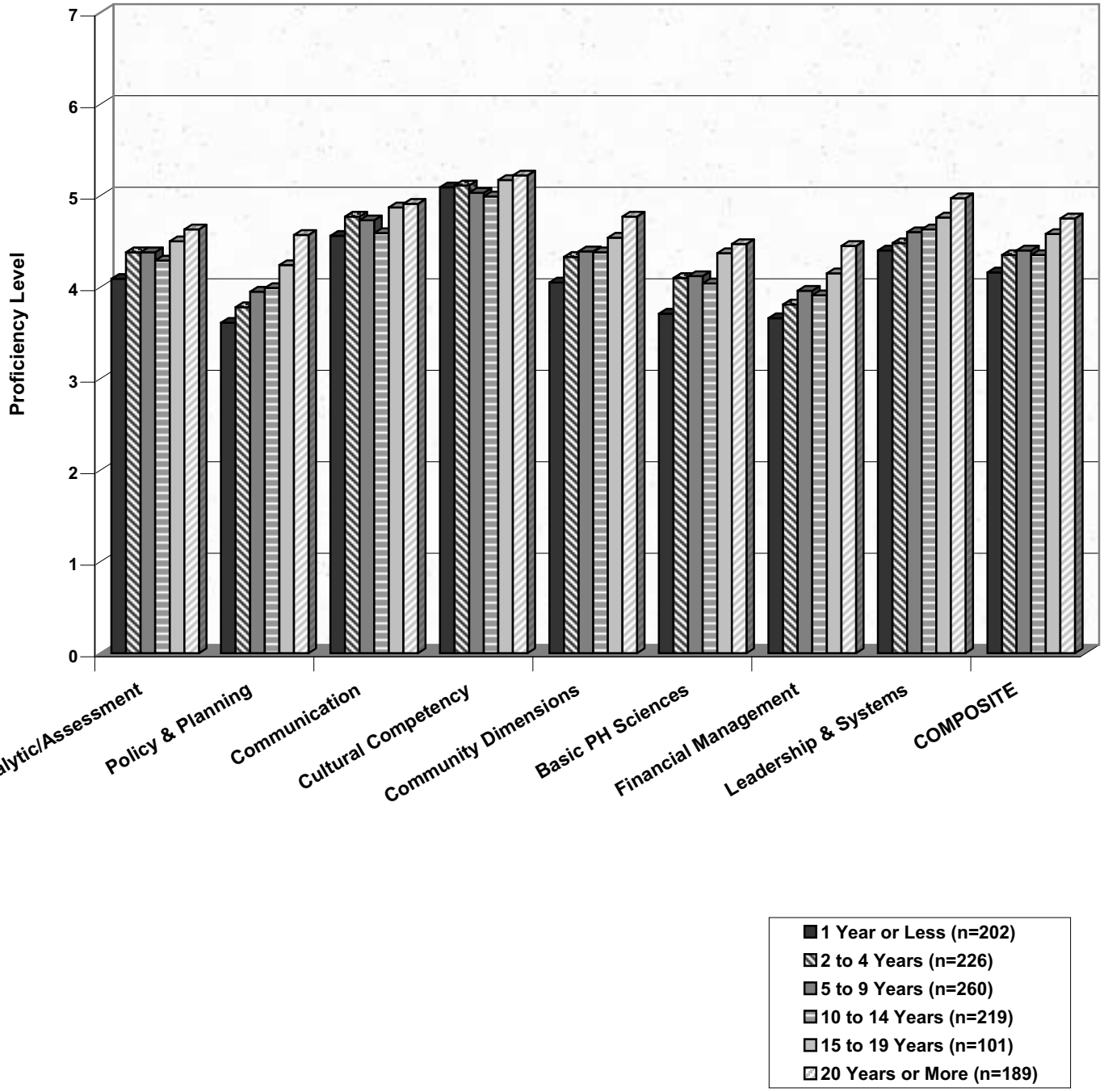


Figure 58. Educational Needs in Core Competency Skills by Years of Experience in Public Health

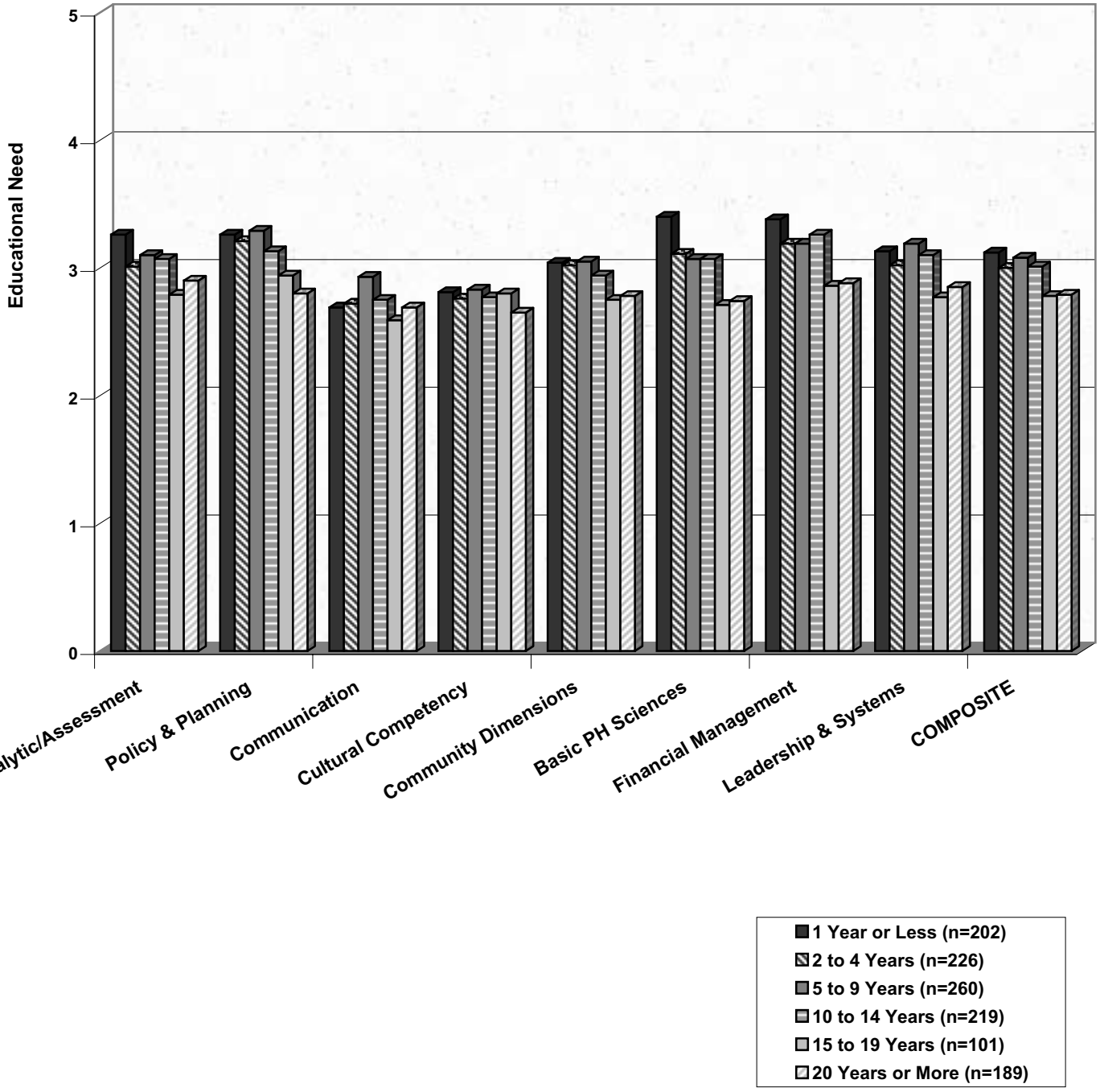


Table 53. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs by Years of Experience in Public Health (N=1,197)

Bioterrorism/Emergency Preparedness Competency Domains	1 Year or Less (n=202)				2 to 4 Years (n=226)				5 to 9 Years (n=260)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	2.74	1.67	5	2.33	2.74	1.66	6	2.33	2.79	1.53	5	2.67
Disaster Response Skills	3.81	1.58	1	4.00	3.86	1.60	1	4.00	3.86	1.38	1	4.00
Emergency Communication Skills	3.26	1.71	3	3.00	3.32	1.70	3	3.00	3.22	1.54	3	3.00
Biological/Infectious Disease Skills	2.64	1.68	6	2.00	2.75	1.71	5	2.00	2.70	1.63	6	2.00
Toxic Chem. & Env. Hazard Skills	2.52	1.77	7	2.00	2.71	1.80	7	2.00	2.58	1.64	7	2.00
Physical Injury Skills	3.36	1.93	2	3.00	3.47	2.03	2	3.00	3.24	1.74	2	3.00
Crisis Management Skills	3.10	1.88	4	3.00	3.14	2.06	4	3.00	2.85	1.67	4	3.00
Bioterrorism/EP Composite Skills	*3.06*	*1.43*		*2.82*	*3.14*	*1.50*		*2.95*	*3.03*	*1.28*		*2.82*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.66	1.24	3	4.00	3.64	1.34	1	4.00	3.72	1.19	1	4.00
Disaster Response Educ. Needs	3.60	1.27	4	4.00	3.55	1.31	4	4.00	3.71	1.11	2	4.00
Emergency Communication Educ. Needs	2.98	1.27	7	3.00	2.74	1.34	7	3.00	3.13	1.14	7	3.00
Biological/Infectious Disease Educ. Needs	3.68	1.34	2	4.00	3.56	1.37	3	4.00	3.57	1.29	4	4.00
Toxic Chem. & Env. Hazard Educ. Needs	3.80	1.34	1	4.00	3.60	1.42	2	4.00	3.67	1.33	3	4.00
Physical Injury Educ. Needs	3.39	1.34	5	4.00	3.23	1.39	6	3.00	3.27	1.24	6	3.00
Crisis Management Educ. Needs	3.38	1.19	6	3.00	3.36	1.31	5	3.00	3.38	1.16	5	3.00
Bioterrorism/EP Composite Educ. Needs	*3.50*	*1.00*		*3.71*	*3.38*	*1.07*		*3.43*	*3.49*	*0.94*		*3.57*

Table 53 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	10 to 14 Years (n=219)				15 to 19 Years (n=101)				20 Years or More (n=189)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]													
Disaster Planning Skills	2.55	1.54	5	2.00	3.00	1.69	4	2.67	3.12	1.73	4	2.67	<.05
Disaster Response Skills	3.74	1.36	1	3.67	3.91	1.54	1	4.00	4.15	1.60	1	4.33	n.s.
Emergency Communication Skills	3.07	1.6	2	3.00	3.43	1.75	2	3.50	3.48	1.76	2	3.50	n.s.
Biological/Infectious Disease Skills	2.50	1.61	6	2.00	2.93	1.79	5	3.00	3.20	1.84	3	3.00	<.01
Toxic Chem. & Env. Hazard Skills	2.39	1.57	7	2.00	2.67	1.79	6	2.00	2.84	1.85	7	2.00	n.s.
Physical Injury Skills	2.98	1.75	3	3.00	3.18	1.98	3	3.00	2.98	1.76	5	3.00	n.s.
Crisis Management Skills	2.69	1.78	4	2.00	2.57	1.61	7	2.00	2.95	1.77	6	2.50	n.s.
Bioterrorism/EP Composite Skills	*2.85*	*1.35*		*2.60*	*3.12*	*1.48*		*2.98*	*3.26*	*1.49*		*3.07*	*n.s.*
Educational Needs in Bioterrorism/EP[2]													
Disaster Planning Educ. Needs	3.82	1.22	1	4.00	3.45	1.24	3	4.00	3.40	1.32	3	4.00	<.01
Disaster Response Educ. Needs	3.75	1.15	2	4.00	3.52	1.26	2	4.00	3.46	1.32	2	4.00	n.s.
Emergency Communication Educ. Needs	3.25	1.19	7	3.00	3.12	1.24	7	3.00	3.28	1.22	5	3.00	<.001
Biological/Infectious Disease Educ. Needs	3.69	1.30	4	4.00	3.42	1.34	5	4.00	3.36	1.34	4	4.00	<.05
Toxic Chem. & Env. Hazard Educ. Needs	3.70	1.35	3	4.00	3.65	1.29	1	4.00	3.48	1.45	1	4.00	n.s.
Physical Injury Educ. Needs	3.39	1.30	6	4.00	3.31	1.38	6	3.00	3.21	1.34	7	3.00	n.s.
Crisis Management Educ. Needs	3.45	1.28	5	4.00	3.43	1.26	4	4.00	3.28	1.28	5	3.00	n.s.
Bioterrorism/EP Composite Educ. Needs	*3.57*	*0.99*		*3.79*	*3.41*	*0.95*		*3.43*	*3.35*	*1.05*		*3.57*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the six groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 59. Proficiencies in Bioterrorism/Emergency Preparedness Skills by Years of Experience in Public Health

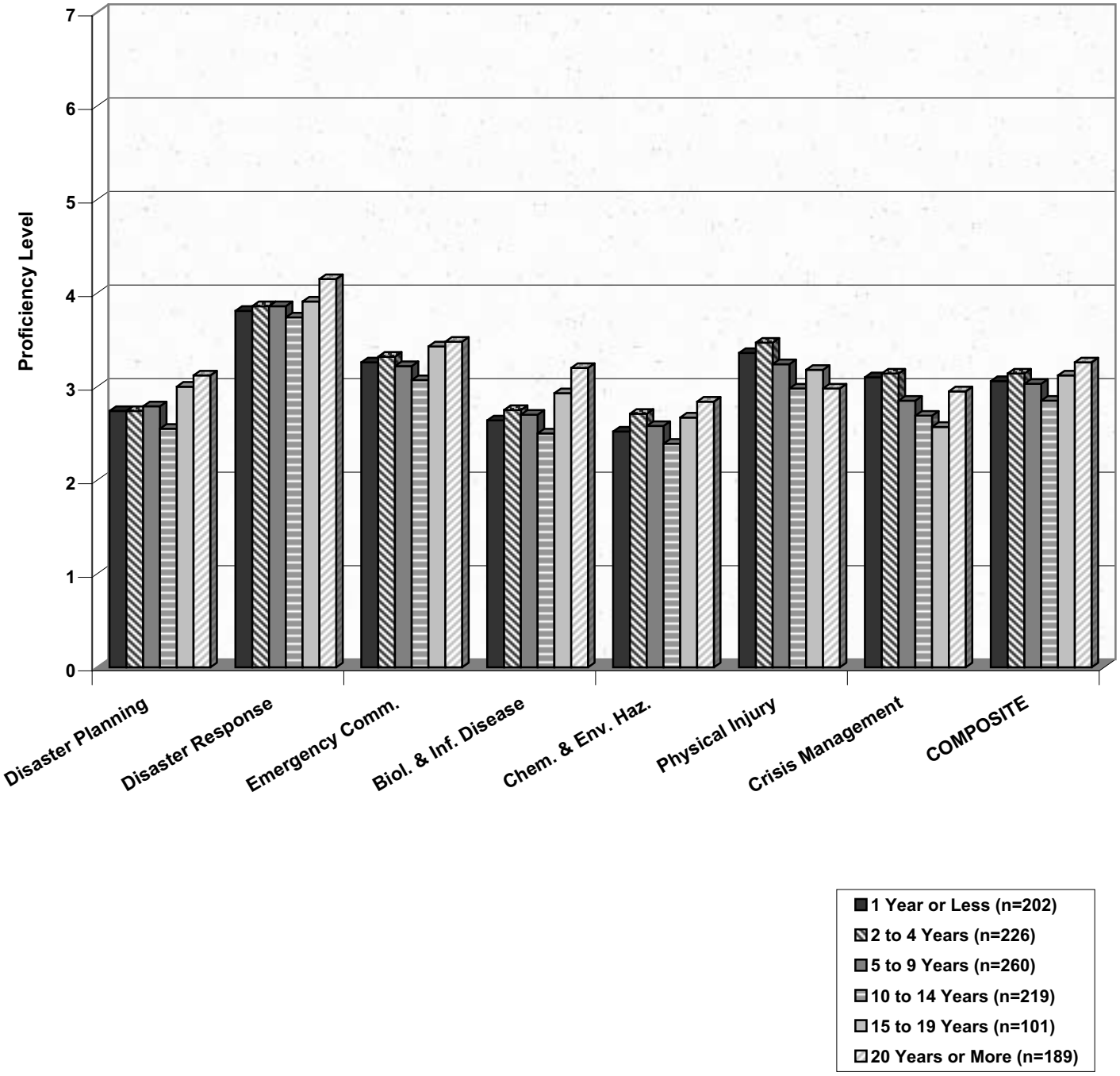


Figure 60. Educational Needs in Bioterrorism/Emergency Preparedness Skills by Years of Experience in Public Health

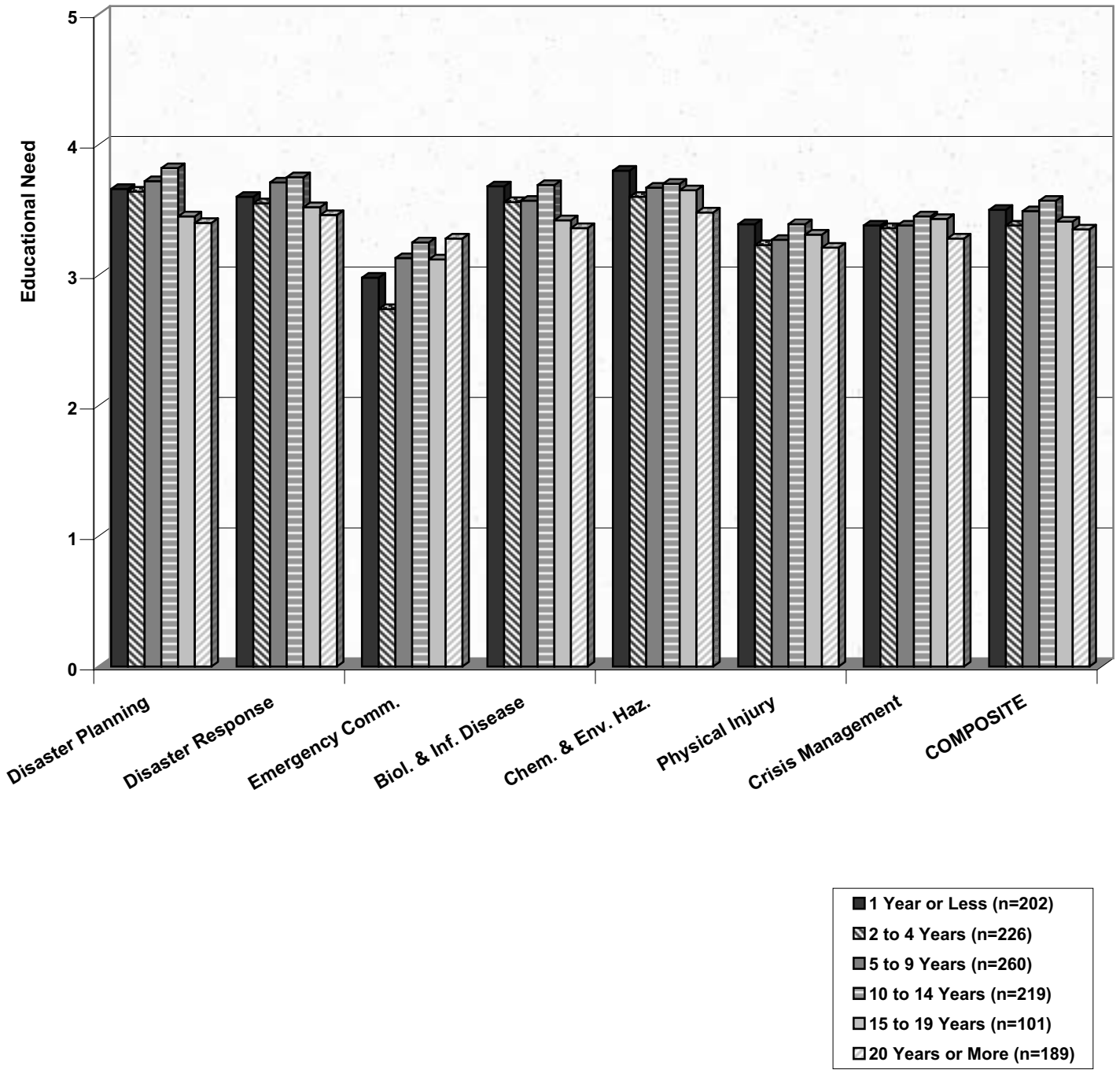


Table 54. Educational Preferences of Workers by Years of Experience in Public Health (N=1,197)

Types of Preference	1 Year or Less (n=202)				2 to 4 Years (n=226)				5 to 9 Years (n=260)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.14	0.70	2	2.00	2.22	0.75	2	2.00	2.23	0.69	2	2.00
1-Day Workshops	2.51	0.61	1	3.00	2.42	0.60	1	2.00	2.49	0.60	1	3.00
Several-Day Workshops	1.83	0.75	3	2.00	1.70	0.75	3	2.00	1.64	0.71	3	1.00
Academic Semester Courses	1.58	0.80	4	1.00	1.42	0.68	4	1.00	1.35	0.62	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.78	0.45	1	3.00	2.75	0.52	1	3.00	2.77	0.46	1	3.00
Interactive Teleconferences	1.59	0.61	4	2.00	1.73	0.64	4	2.00	1.67	0.62	4	2.00
Internet, Web-Based Instruction	1.86	0.72	3	2.00	1.78	0.68	3	2.00	1.71	0.68	3	2.00
Combination Format	1.97	0.64	2	2.00	2.01	0.71	2	2.00	2.05	0.72	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.79	0.48	1	3.00	2.75	0.54	1	3.00	2.80	0.48	1	3.00
Weekend Classes	1.26	0.54	4	1.00	1.23	0.47	4	1.00	1.17	0.44	4	1.00
Evening Classes	1.53	0.68	3	1.00	1.47	0.66	3	1.00	1.35	0.58	3	1.00
Self-Determined Web-Based	1.84	0.67	2	2.00	1.80	0.74	2	2.00	1.76	0.69	2	2.00
Preferences for Educational Recognition												
Certificate	2.27	0.65	2	2.00	2.34	0.71	1	2.00	2.37	0.69	1	2.00
Continuing Education Units	2.28	0.70	1	2.00	2.17	0.78	2	2.00	2.19	0.81	2	2.00
Undergraduate Academic Credit	1.87	0.81	4	2.00	1.73	0.77	4	2.00	1.56	0.70	4	1.00
Graduate Academic Credit	2.13	0.81	3	2.00	2.09	0.85	3	2.00	1.86	0.83	3	2.00

Table 54 (continued).

Types of Preference	10 to 14 Years (n=219)				15 to 19 Years (n=101)				20 Years or More (n=189)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.10	0.74	2	2.00	2.27	0.75	2	2.00	2.20	0.76	2	2.00
1-Day Workshops	2.49	0.63	1	3.00	2.57	0.56	1	3.00	2.52	0.59	1	3.00
Several-Day Workshops	1.72	0.78	3	2.00	1.60	0.66	3	1.50	1.61	0.73	3	1.00
Academic Semester Courses	1.41	0.67	4	1.00	1.33	0.58	4	1.00	1.30	0.56	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.73	0.52	1	3.00	2.76	0.48	1	3.00	2.65	0.56	1	3.00
Interactive Teleconferences	1.78	0.69	3	2.00	1.78	0.59	3	2.00	1.84	0.63	4	2.00
Internet, Web-Based Instruction	1.78	0.68	3	2.00	1.77	0.68	4	2.00	1.88	0.76	3	2.00
Combination Format	1.96	0.64	4	2.00	2.03	0.74	2	2.00	2.01	0.72	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.84	0.45	1	3.00	2.89	0.38	1	3.00	2.82	0.45	1	3.00
Weekend Classes	1.14	0.41	4	1.00	1.21	0.48	4	1.00	1.13	0.35	4	1.00
Evening Classes	1.36	0.55	3	1.00	1.29	0.57	3	1.00	1.29	0.54	3	1.00
Self-Determined Web-Based	1.82	0.71	2	2.00	1.94	0.81	2	2.00	1.90	0.73	2	2.00
Preferences for Educational Recognition												
Certificate	2.37	0.65	1	2.00	2.46	0.63	1	3.00	2.25	0.79	1	2.00
Continuing Education Units	2.25	0.77	2	2.00	2.23	0.84	2	2.00	2.09	0.82	2	2.00
Undergraduate Academic Credit	1.61	0.76	4	1.00	1.53	0.69	4	1.00	1.40	0.62	4	1.00
Graduate Academic Credit	1.88	0.84	3	2.00	1.90	0.85	3	2.00	1.65	0.76	3	1.00

6. Differences by Public Health Setting or Context

6a. Workers at the Colorado Department of Public Health and Environment

The characteristics of workers at the Colorado Department of Health and Environment are described in Table 55. State health department workers in the study (n=110) were primarily female (72%) and white (89%). The largest groups of non-white workers were Hispanic (n=6, 4%) and Black (n=6, 4%). Age ranged from 26 years to 67 years, with a median age of 47 years.

Nearly all workers at the state health department (94%) held at least a baccalaureate degree. More than half (51%) had earned a master's or doctoral degree. Years since earning last degree ranged from 0 to 43 years, with a median of 17 years. Workers averaged 15.1 years of work experience in their discipline or major and 11.5 years of public health experience.

When workers were examined by position categories, the largest numbers of workers were in the Professional group (n=88, 80%); most others were either in the Protective Service group (n=11, 10%) or the Administrative Support group (n=11, 10%). About a third of the workers classified themselves in each of the three types of position: 36% as Front Line Staff; 31% as Supervisory/Management Staff; and 33% as Senior Level Staff. Nearly all respondents (95%) were employed full-time. Full-time equivalent annual salaries ranged from $27,000 to $112,000. The median full-time equivalent salary of all respondents was $63,750, and the mean was $61,145. Thirty percent of state public health workers (n=33) reported they knew at least one non-English language.

Core Competency proficiencies and educational needs for state health department workers are summarized in Table 56. When proficiency items in the Core Competency domain were summarized as a composite score, the mean score was 4.51 and the median score was 4.61.

State public health workers reported they were most proficient in Communication Skills (1st), Cultural Competency Skills (tied for 2nd), and Leadership/Systems Skills (tied for 2nd). They reported being least proficient in Financial Planning/Management Skills (6th), Community Dimensions of Practice Skills (7th), and Basic Public Health Sciences Skills (8th). Rated in the middle were Analytic/ Assessment Skills (4th) and Policy Development/Program Planning Skills (5th). In descending order, the means for the eight Core Competency Skill subscales were: Communication Skills (5.17), Cultural Competency Skills (5.00), Leadership/System Thinking Skills (5.00), Analytic/Assessment Skills (4.75), Policy Development/Program Planning Skills (4.50), Financial Planning/Management Skills (4.40), Community Dimensions of Practice Skills (4.25), and Basic Public Health Sciences Skills (4.13). Proficiencies in Core Competency Skills for the state public health workforce are graphically illustrated in Figure 61.

Educational needs in Core Competencies were summarized as a composite measure. The mean score for state health department workers was 2.98 and the median score was 3.00. When queried about their educational needs in Core Competencies domains, workers reported their greatest educational needs were for Leadership/Systems Thinking Skills (1st), Financial Planning/ Management Skills (2nd), and Policy Development/Program Planning Skills (3rd). Workers reported their least educational needs were in Basic Public Health Sciences Skills (6th), Analytic/Assessment Skills (7th), and Communication Skills (8th). Rated in the middle were Community Dimensions of Practice (4th) and Cultural Competency Skills (5th). In descending order, the means for educational needs in the eight Core Competency Skill subscales were: Leadership/System Thinking Skills (3.18), Financial Planning/Management Skills (3.15), Policy Development/Program Planning Skills

(3.07), Community Dimensions of Practice Skills (3.04), Cultural Competency Skills (3.01), Basic Public Health Sciences Skills (2.84), Analytic/Assessment Skills (2.82), and Communication Skills (2.71). Educational needs in Core Competency Skills for state health department workers are graphically depicted in Figure 62.

Bioterrorism/Emergency Preparedness proficiencies and educational needs for state health department workers are summarized in Table 57. When proficiency items in this domain were summarized as a composite score, the average score (mean) of all respondents was 2.28 and the median score was 2.04.

Workers responded that they were most proficient in Disaster Response Skills (1st) and Emergency Communication Skills (2nd) and least proficient in Crisis Management Skills (6th) and Toxic Chemical/Environmental Hazard Skills (7th). Rated in the middle were proficiencies in Physical Injury Skills (3rd), Biological/Infectious Disease Skills (4th), and Disaster Planning Skills (5th). In descending order, the means for Bioterrorism/Emergency Preparedness Competency subscales were Disaster Response Skills (3.07), Emergency Communication Skills (2.67), Physical Injury Skills (2.28), Biological/Infectious Disease Skills (2.10), Disaster Planning Skills (2.04), Crisis Management Skills (1.96), and Toxic Chemical/Environmental Hazard Skills (1.86). Differences in proficiencies across Bioterrorism/Emergency Preparedness domains are visually presented in Figure 63.

When the overall educational need for Bioterrorism/Emergency Preparedness (composite score) was calculated for the Colorado Department of Public Health and Environment workforce, the mean was 3.17. The median score was 3.23.

In the Bioterrorism/Emergency Preparedness subscales, respondents reported their greatest educational needs were for Disaster Response Skills (1st) and Disaster Planning Skills (2nd). They indicated their least educational needs were in Physical Injury Skills (6th) and Emergency Communication Skills (7th). Between these greatest and least educational needs they ranked Toxic Chemical/Environmental Hazard Skills (3rd), Crisis Management Skills (4th), and Biological/Infectious Disease Skills (5th). In descending order, the means for educational needs in these subscales were: Disaster Response Skills (3.44), Disaster Planning Skills (3.38), Toxic Chemical/Environmental Hazard Skills (3.33), Crisis Management Skills (3.12), Biological/Infectious Disease Skills (3.10), Physical Injury Skills (3.05), and Emergency Communication Skills (2.73). Educational needs in Bioterrorism/Emergency Preparedness domains are displayed in Figure 64. It is interesting that although state health department workers reported they were most proficient in Disaster Response Skills, they rated Disaster Response Skills as their highest educational need.

Educational preferences of workers at the Colorado Department of Public Health and Environment are presented in Table 58. The strongly preferred learning format for these workers was face-to-face classroom settings (2.69). This was followed by combination formats (2.13), Internet web-based instruction alone (1.78), and interactive teleconferences (1.69). Most preferred one-day workshops (2.49) or two-hour sessions (2.36) to several-day workshops (1.56) or academic semester courses (1.36). With respect to the time for course offerings, workers strongly preferred weekday classes (2.79) and self-determined web-based offerings (2.06) to evening classes (1.42) or weekend classes (1.19). As a group, these workers expressed a higher preference for being recognized by receiving a certificate (2.28) or continuing education units (2.09) than earning graduate academic credits (1.84) or undergraduate academic credits (1.53).

Table 55. Characteristics of Workers at the Colorado Department of Public Health and Environment (N=110)

Variables and Values	n	%	Min.	Max.	Mean	SD	Median
Age			26	67	45.21	8.66	47.00
Under 29 Years	3	2.8					
30-39 Years	24	22.2					
40-49 Years	43	39.8					
50-59 Years	35	32.4					
Over 60 Years	3	2.8					
Gender							
Male	29	28.2					
Female	74	71.8					
Race							
White	94	88.7					
Hispanic	4	3.8					
Black	4	3.8					
Asian	2	1.9					
Other or Multiracial	2	1.9					
Highest Education							
High School Diploma	9	8.2					
Professional or Vocational Diploma	5	4.5					
Associate Degree	2	1.8					
Baccalaureate Degree	38	34.5					
Master's Degree	50	45.5					
Doctoral Degree	6	5.5					
College Degree							
No	16	14.5					
Yes	94	85.5					
Years Since Last Degree			0	43	17.71	9.67	17.00
Less than 2 Years	3	2.8					
2-5 Years	5	4.6					
5-9 Years	16	14.8					
10-14 Years	21	19.4					
15-19 Years	16	14.8					
20 or More Years	47	43.5					
Years Experience in Discipline or Major			0	40	15.07	9.96	15.00
Less than 2 Years	10	10.2					
2-5 Years	8	8.2					
5-9 Years	15	15.3					
10-14 Years	14	14.3					
15-19 Years	15	15.3					
20 or More Years	36	36.7					
Years Experience in Public Health			0	30	11.48	8.45	10.00
Less than 2 Years	17	15.9					
2-5 Years	11	10.3					

Table 55 (continued).

Variables and Values	n	%	Min.	Max.	Mean	SD	Median
5-9 Years	20	18.7					
10-14 Years	19	17.8					
15-19 Years	17	15.9					
20 or More Years	23	21.5					
Position Category							
Officials & Administrators	1	.9					
Professionals	88	80.0					
Technicians	9	8.2					
Protective Service	11	10.0					
Paraprofessionals	0	.0					
Administrative Support	11	10.0					
Skilled Craft	0	.0					
Service/Maintenance	1	.9					
Professional Position							
No	21	19.1					
Yes	89	80.9					
Type of Position							
Front Line Staff	39	36.1					
Senior Level Staff	33	30.6					
Supervisory/Management Staff	36	33.3					
Full-Time Employment							
No	6	5.5					
Yes	104	94.5					
Annual Salary (FTE)			$27,000	$112,050	$61,145	$18,429	$63,750
Less Than $20,000	0	.0					
$20,000 to $29,999	2	2.3					
$30,000 to $39,999	10	11.4					
$40,000 to $49,999	12	13.6					
$50,000 to $59,999	14	15.9					
$60,000 to $69,999	22	25.0					
$70,000 to $79,999	14	15.9					
Over $80,000	14	15.9					
Know Non-English Language							
No	76	69.7					
Yes	33	30.3					
Other Language Speaking Ability							
Fair	18	58.1					
Good	9	29.0					
Excellent	4	12.9					
Other Language Reading Ability							

Table 55 (continued).

Variables and Values	n	%	Min.	Max.	Mean	SD	Median
Fair	16	51.6					
Good	10	32.3					
Excellent	5	16.1					
Other Language Writing Ability							
Fair	22	73.3					
Good	4	13.3					
Excellent	4	13.3					

Table 56. Core Competency Proficiencies and Educational Needs in Colorado Department of Public Health and Environment's Workforce (N=110)

Core Competency Domains	Minimum	Maximum	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains						
Analytic/Assessment Skills	1	7	4.63	1.33	4	4.75
Policy Development/Program Planning Skills	1	7	4.30	1.30	5	4.50
Communication Skills	1	7	5.02	1.06	1	5.17
Cultural Competency Skills	1	7	4.77	1.19	2	5.00
Community Dimensions of Practice Skills	1	7	4.14	1.38	7	4.25
Basic Public Health Sciences Skills	1	7	4.02	1.65	8	4.13
Financial Planning & Management Skills	1	7	4.29	1.24	6	4.40
Leadership & Systems Thinking Skills	1	7	4.71	1.28	2	5.00
Core Competencies Composite Skills	*1*	*7*	*4.51*	*1.11*		*4.61*
Educational Needs in Core Competency Domains						
Analytic/Assessment Educ. Needs	1	5	2.82	1.18	7	3.00
Policy Development/Prog. Planning Educ. Needs	1	5	3.07	1.12	3	3.00
Communication Educ. Needs	1	5	2.71	1.21	8	3.00
Cultural Competency Educ. Needs	1	5	3.01	1.13	5	3.00
Community Dimensions of Practice Educ. Needs	1	5	3.04	1.15	4	3.00
Basic Public Health Sciences Educ. Needs	1	5	2.84	1.35	6	3.00
Financial Planning & Management Educ. Needs	1	5	3.15	1.25	2	3.00
Leadership & Systems Thinking Educ. Needs	1	5	3.18	1.21	1	3.00
Core Competencies Composite Educ. Needs	*1*	*5*	*2.98*	*0.85*		*3.00*

Figure 61. Proficiencies in Core Competency Skills for the Colorado Department of Public Health and Environment's Workforce

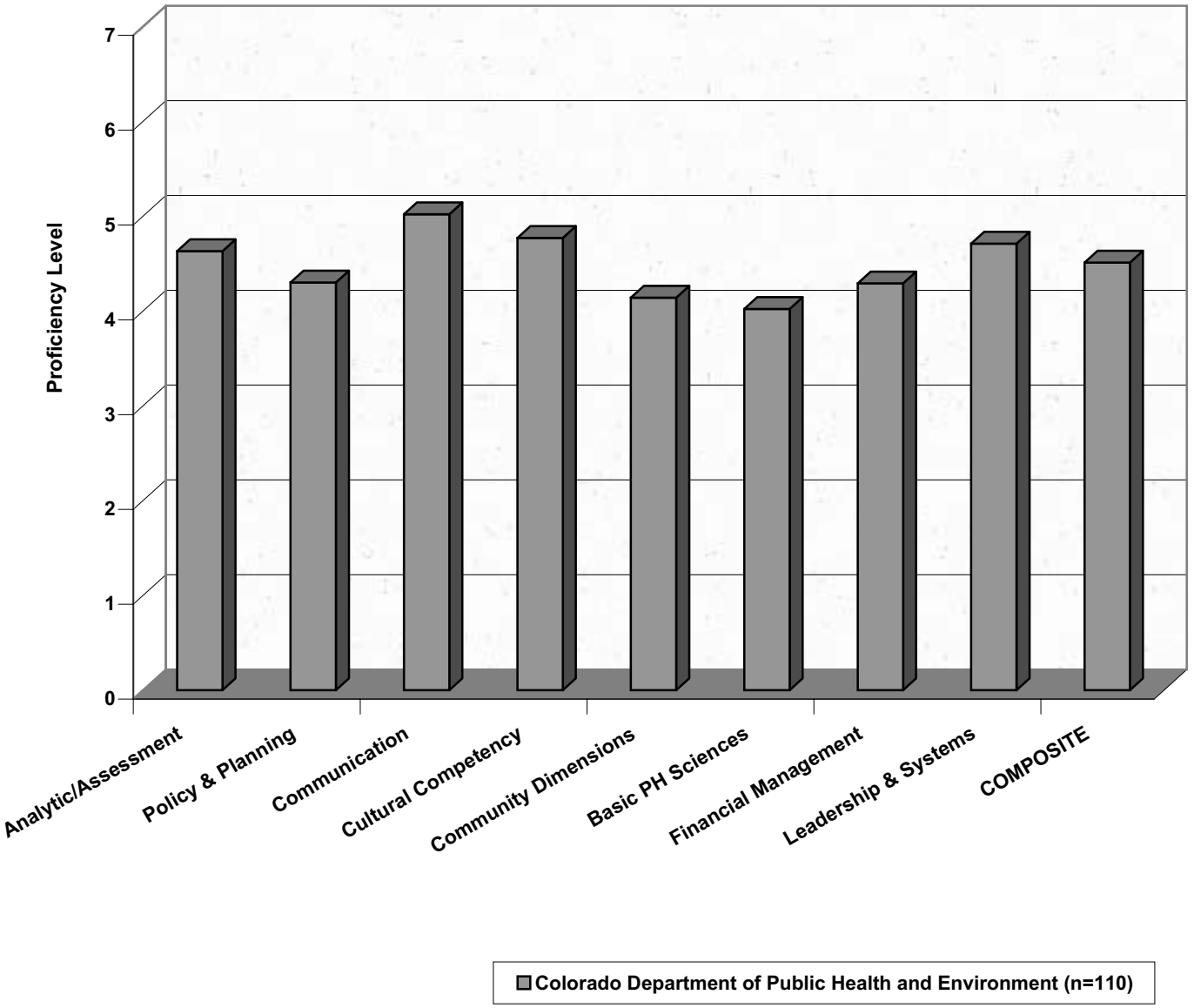


Figure 62. Educational Needs in Core Competency Skills for the Colorado Department of Public Health and Environment's Workforce

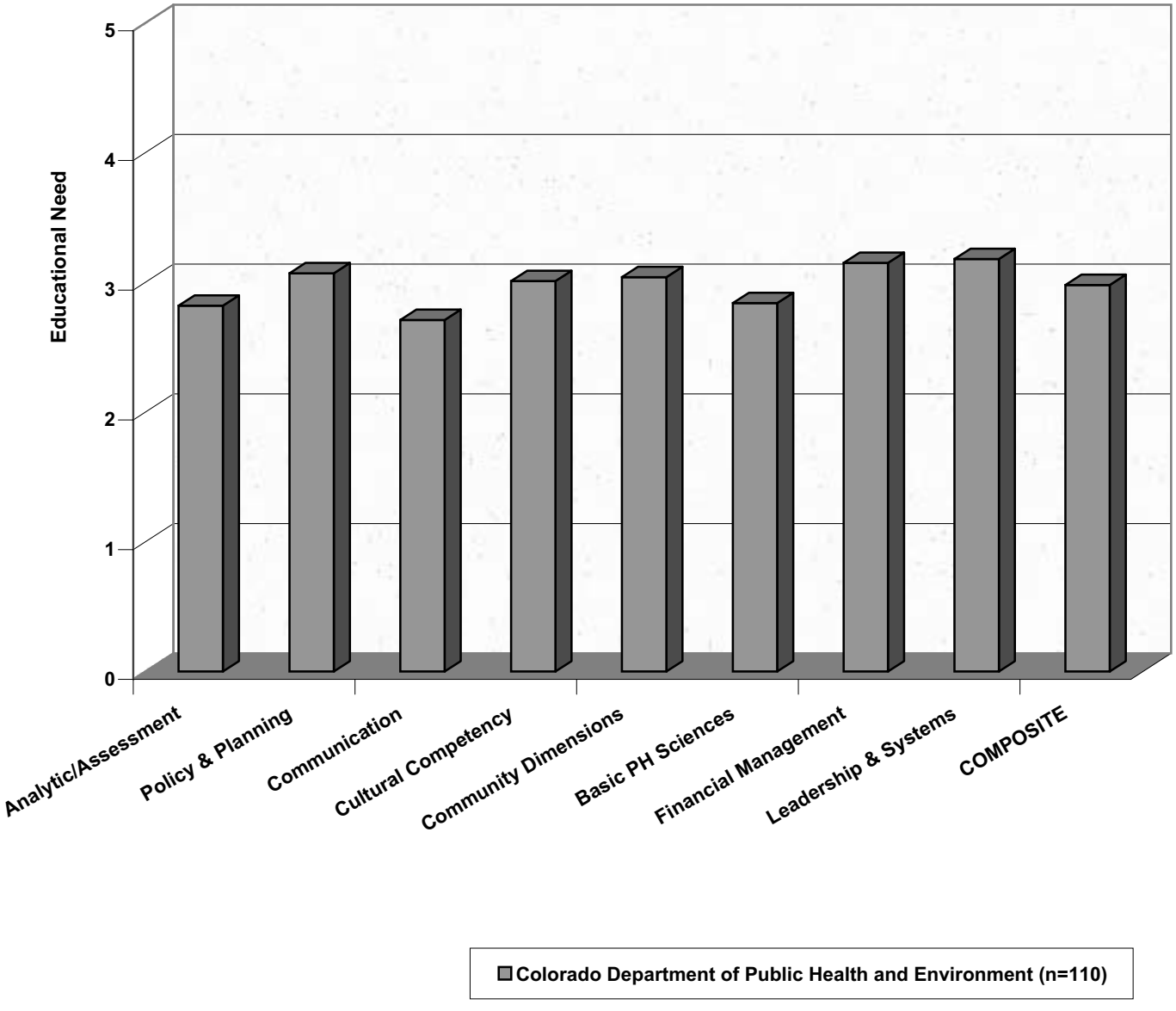


Table 57. Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs in the Colorado Department of Public Health and Environment's Workforce (N=110)

Bioterrorism/Emergency Preparedness Competency Domains	Min.	Max.	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP						
Disaster Planning Skills	1	7	2.04	1.31	5	1.33
Disaster Response Skills	1	7	3.07	1.48	1	3.00
Emergency Communication Skills	1	7	2.67	1.56	2	2.50
Biological/Infectious Disease Skills	1	7	2.10	1.45	4	1.00
Toxic Chem. & Env. Hazard Skills	1	7	1.86	1.45	7	1.00
Physical Injury Skills	1	7	2.28	1.59	3	2.00
Crisis Management Skills	1	7	1.96	1.34	6	1.00
Bioterrorism/EP Composite Skills	*1*	*7*	*2.28*	*1.17*		*2.04*
Educational Needs in Bioterrorism/EP						
Disaster Planning Educ. Needs	1	5	3.38	1.39	2	4.00
Disaster Response Educ. Needs	1	5	3.44	1.38	1	4.00
Emergency Communication Educ. Needs	1	5	2.73	1.26	7	3.00
Biological/Infectious Disease Educ. Needs	1	5	3.10	1.57	5	3.00
Toxic Chem. & Env. Hazard Educ. Needs	1	5	3.33	1.53	3	4.00
Physical Injury Educ. Needs	1	5	3.05	1.50	6	3.00
Crisis Management Educ. Needs	1	5	3.12	1.38	4	3.00
Bioterrorism/EP Composite Educ. Needs	*1*	*5*	*3.17*	*1.20*		*3.23*

Figure 63. Proficiencies in Bioterrorism/Emergency Preparedness Competency Skills for the Colorado Department of Public Health and Environment's Workforce

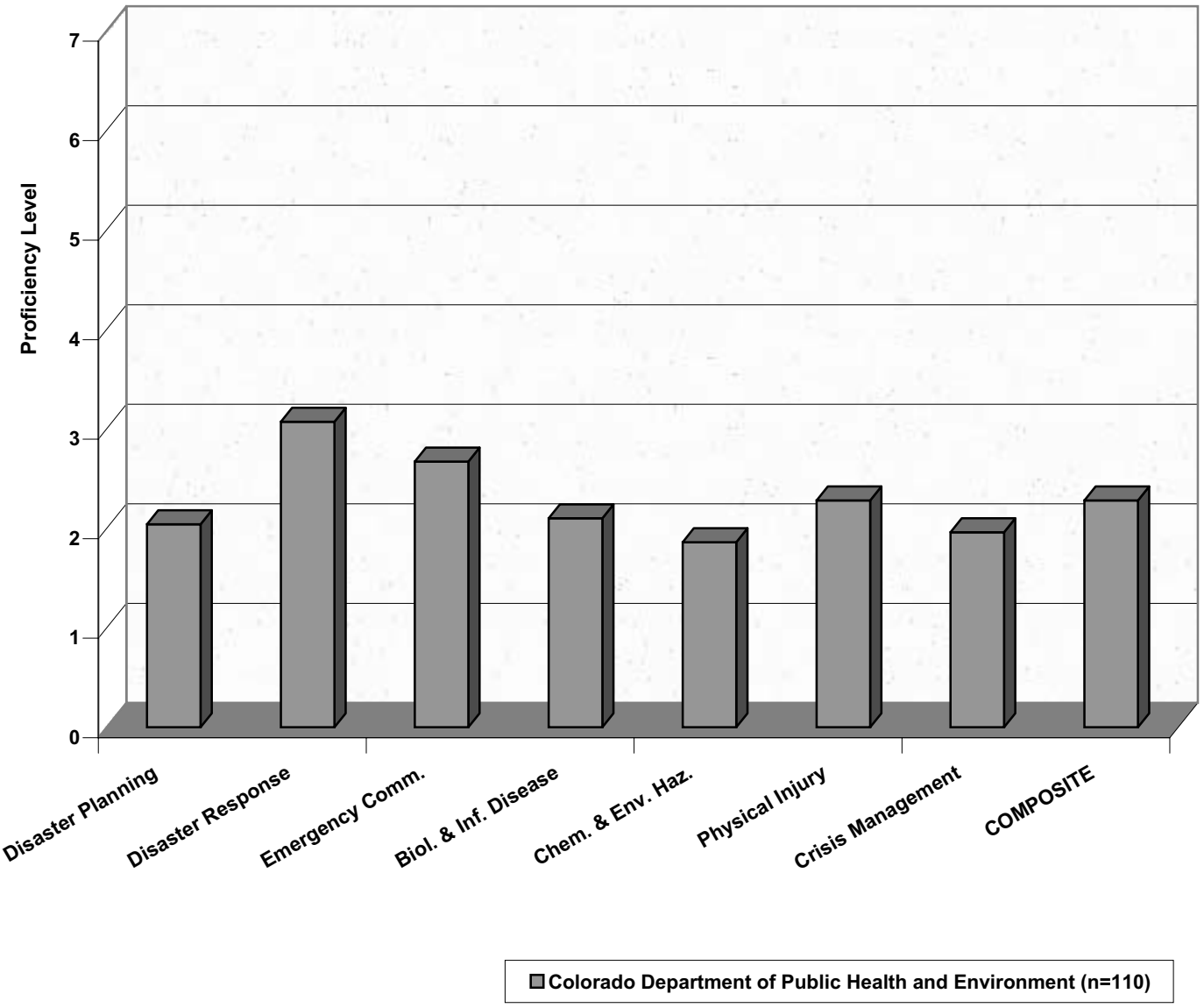


Figure 64. Educational Needs in Bioterrorism/Emergency Preparedness Competency Skills for the Colorado Department of Public Health and Environment's Workforce

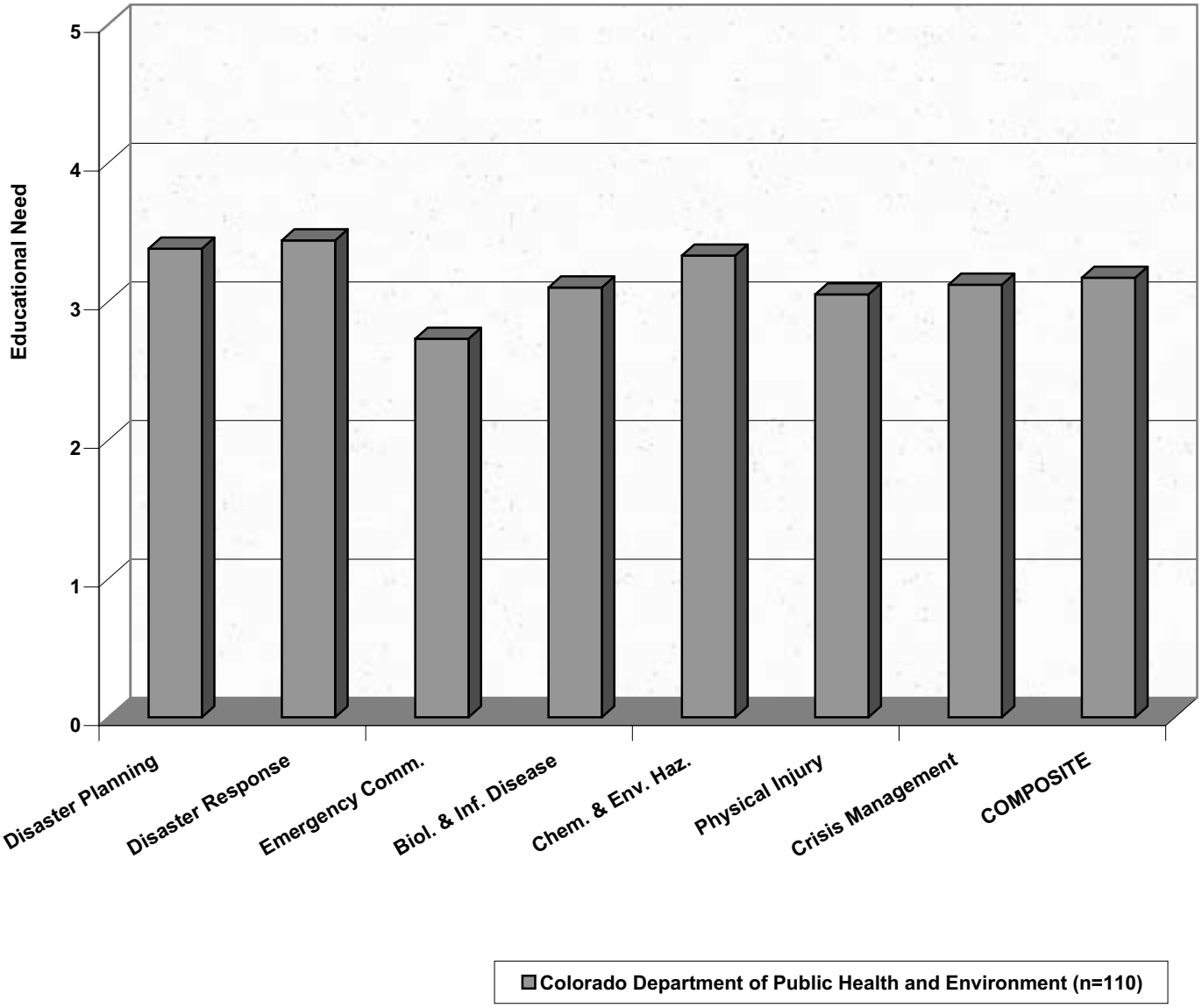


Table 58. Educational Preferences of Workers at the Colorado Department of Public Health and Environment (N=110)

Types of Preference	Min.	Max.	Mean	SD	Rank	Median
Preferences for Course Length						
2-Hour Sessions	1	3	2.36	0.69	2	2.00
1-Day Workshops	1	3	2.46	0.54	1	2.00
Several-Day Workshops	1	3	1.56	0.67	3	1.00
Academic Semester Courses	1	3	1.36	0.65	4	1.00
Preferences for Educational Format						
Face-to-Face Classroom Setting	1	3	2.69	0.50	1	3.00
Interactive Teleconferences	1	3	1.69	0.61	4	2.00
Internet, Web-Based Instruction	1	3	1.78	0.64	3	2.00
Combination Format	1	3	2.13	0.70	2	2.00
Preferences for Time of Course Offering						
Weekday Classes	1	3	2.79	0.49	1	3.00
Weekend Classes	1	3	1.19	0.46	4	1.00
Evening Classes	1	3	1.42	0.62	3	1.00
Self-Determined Web-Based	1	3	2.06	0.71	2	2.00
Preferences for Educational Recognition						
Certificate	1	3	2.28	0.78	1	2.00
Continuing Education Units	1	3	2.06	0.85	2	2.00
Undergraduate Academic Credit	1	3	1.53	0.72	4	1.00
Graduate Academic Credit	1	3	1.84	0.80	3	2.00

6b. Differences by Region

To examine differences by region, respondents were grouped into eight regions. These regions and the sample size in each were: Metro (n=524), Central (n=182), Northeast (n=165), West Central (n=77), Southeast (n=58), Northwest (n=39), Southwest (n=26), and San Luis Valley (n=24). Workers employed at the Colorado Department of Health and Environment (n=110) were excluded from this analysis. Characteristics of the Colorado workforce by region are presented in Table 59.

The Northwest and Southwest regions employed the oldest workers. A higher proportion of women were employed in the Southwest (96%), San Luis Valley (95%), Northwest (95%), and Southeast (93%) regions. The percentage of non-white workers varied greatly across regions; in descending order these percentages were: San Luis Valley (58%), Southeast (29%), Central (20%), Metro (19%), West Central (17%), Northeast (16%), Northwest (5%), and Southwest (0%).

Educational preparation also differed across regions. The baccalaureate degree was the highest level of educational preparation in all regions except the San Luis Valley region; for the San Luis Valley, more respondents held the associate degree (43.5%) than other degrees/diplomas. Regions with the lowest percentages of college-educated workers were the San Luis Valley (30%), Southwest (46%) and Southeast (47%) regions; all other regions had at least 70% of their workers with a minimum baccalaureate degree. Across regions, average years since last degree ranged from 15.1 years to 22.3 years, with the Southwest region reporting the longest average time since last degree. Experience in the discipline showed some variation across regions (range=12.1 to 16.7 years) as did experience in public health (range=7.3 to 10.5 years).

Employment settings and positions differed across regions. The majority of workers in the Northeast, Metro, Central, and Southeast regions were employed in organized health departments; the majority of workers in the Northwest, West Central, Southwest, and San Luis Valley regions worked in local health agencies. The percentage of workers in professional positions also varied across regions with the Northwest (92%), West Central (84%), and Central (84%) regions showing the highest percentages of professional workers and the Southwest (62%), San Luis Valley (71%), and Metro (71%) regions showing the lowest percentages of professional workers. The Southwest (42%) Northwest (45%) and San Luis Valley (52%) regions had proportionately fewer workers in Front Line Staff positions than did other regions.

Lowest average salaries were reported in the San Luis Valley ($30,731), Southeast ($34,647), and Southwest ($34,715) regions; highest average salaries were found in the Northeast ($41,194), Northwest ($44,972), and Metro ($45,223) regions. The abilities of workers to speak, read, and write in a non-English language varied markedly across regions. In the San Luis Valley, more than half of the respondents (54%) knew a non-English language. In the Metro region, just over one-third (33%) had some command of a non-English language. The regions with the lowest percentages of non-English language capacity were the Southeast and Southwest regions, each with 19%.

Differences in Core Competency proficiencies and educational needs across regions are summarized in Table 60. A statistically significant difference among public health regions was found for overall Core Competency Skills. The Northwest, West Central, and Northeast regions reported the highest proficiency levels; the Southwest and San Luis Valley regions reported the lowest proficiency levels. The Metro, Southeast, and Central regions were at similar midrange scores. In descending order, the means for Core Competency Skills (composite score) among the regions were: Northwest (4.84), West Central (4.65), Northeast (4.58), Metro (4.34), Southeast (4.33), Central (4.29), Southwest (3.94), and San Luis Valley (3.57). Among the eight regional groups, statistically significant differences ($p < .01$ to $p < .001$) were found in all eight of the Core Competency subscales. Across subscales, the pattern is similar to the overall competency ratings; workers in the

Northwest region consistently rated themselves highest and those in the San Luis Valley consistently rated themselves lowest in Core Competency proficiencies. These marked differences are graphically illustrated in Figure 65.

In overall educational need for Core Competency Skills, a significant difference ($p < .01$) was observed between regions. In descending order, the means for educational needs in Core Competency Skills (composite score) among the regions were: San Luis Valley (3.28) Northwest (3.23), Central (3.10), Northeast (3.10), Southwest (3.08), Southeast (3.03), West Central (2.98), and Metro (2.88). Differences were also found in five of the eight Core Competency educational need subscales: Assessment/Analytic Skills ($p < .01$), Policy Development/Program Planning Skills ($p < .001$), Community Dimensions of Practice Skills ($p < .001$), Basic Public Health Sciences Skills ($p < .05$), and Financial Planning/Management Skills ($p < .01$). These differences in learning needs are presented in Figure 66. It is interesting to note that the region with the highest proficiency (Northwest) and the region with the lowest proficiency (San Luis Valley) often rated their educational needs higher than the six other regions.

Differences in Bioterrorism/Emergency Preparedness proficiencies and educational needs by region are summarized in Table 61. A significant difference among regional groups ($p < .001$) was found in overall proficiency. In descending order, the means for Bioterrorism/Emergency Preparedness Competency Skills (composite score) among regions were: Northwest (3.73), Central (3.55), Northeast (3.24), San Luis Valley (3.21) Southeast (3.18), Metro (2.98), West Central (2.92), and Southwest (2.84). Among these regions, statistically significant differences were also found in all eight of the Bioterrorism/Emergency Preparedness Competency subscales. Proficiency varied by subscale and region. While the Northwest region reported highest proficiency in Disaster Planning Skills, Disaster Response Skills, Biological/Infectious Disease Skills, and Chemical and Environmental Hazard Skills, the Central region showed highest proficiency in Emergency Communication Skills. The San Luis Valley region was most proficient in Physical Injury Skills and Crisis Management Skills. Except for Physical Injury Skills and Crisis Management Skills, the West Central and Southwest regions reported the lowest levels of proficiencies across subscales. These differences are graphically illustrated in Figure 67.

Workers in the Southeast and Southwest regions rated their overall educational need for Bioterrorism/Emergency Preparedness (composite) lower than other regions; however, no statistical difference was observed, perhaps due to the small sample sizes in these two regions. Two Bioterrorism/Emergency Preparedness educational needs subscales were found to have statistically significant differences according to region. For Disaster Response Skills ($p < .01$), the Northwest, West Central, and San Luis Valley regions reported higher needs while the Southeast region reported lowest need. In Toxic Chemical/Environmental Hazards Skills ($p < .05$), the Northwest, West Central, Northeast, and Central regions reported higher educational needs, the Metro and San Luis Valley regions reported mid-range needs, and the Southeast and Southwest regions reported lower educational needs. These differences in educational need across regions are presented in Figure 68.

Table 62 summarizes educational preferences across the eight regions. No differences were observed in rankings for the most preferred educational format or time of course offering. While all regions preferred one-day workshops, the Southwest region preferred several-day workshops over 2-hour sessions. While most regions indicated a certificate as the most preferred type of educational recognition, respondents in the West Central and Southeast regions indicated continuing education units was their most preferred type of educational recognition. Except in the San Luis Valley region, workers preferred graduate credit to undergraduate credit.

Table 59. Characteristics of Colorado Public Health Workforce by Regional Designation (N=1,095)

	Northwest (n=39)				Northeast (n=165)				Metro (n=524)			
Variables and Values	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**
Age			47.21	10.30			43.36	10.51			43.62	11.30
Under 29 Years	3	7.7			19	11.6			74			
30-39 Years	3	7.7			40	24.4			102	19.8		
40-49 Years	16	41.0			51	31.1			160	31.1		
50-59 Years	13	33.3			45	27.4			146	28.3		
Over 60 Years	4	10.3			9	5.5			33	6.4		
Gender												
Male	2	5.1			22	13.9			110	22.1		
Female	37	94.9			136	86.1			387	77.9		
Race												
White	37	94.9			137	84.0			416	80.6		
Hispanic	2	5.1			23	14.1			71	13.8		
Black	0	.0			0	.0			9	1.7		
Asian	0	.0			0	.0			10	1.9		
Other or Multiracial	0	.0			3	1.8			10	1.9		
Highest Education												
High School Diploma	3	7.7			20	12.3			77	14.7		
Profess./Vocational Diploma	1	2.6			7	4.3			38	7.3		
Associate Degree	5	12.8			5	3.1			40	7.6		
Baccalaureate Degree	21	53.8			91	56.2			224	42.8		
Master's Degree	7	17.9			39	24.1			125	23.9		
Doctoral Degree	2	5.1			0	.0			19	3.6		
College Degree												
No	9	23.1			32	19.8			155	29.6		
Yes	30	76.9			130	80.2			368	70.4		
Years Since Last Degree			16.08	12.35			15.76	11.49			15.97	11.30
Less than 2 Years	1	2.6			7	4.5			26	5.2		
2-5 Years	9	23.1			22	14.3			64	12.8		
5-9 Years	6	15.4			33	21.4			94	18.8		
10-14 Years	5	12.8			19	12.3			79	15.8		
15-19 Years	2	5.1			16	10.4			58	11.6		
20 or More Years	16	41.0			57	37.0			180	35.9		
Years Experience in Discipline			17.39	10.34			13.99	10.85			14.42	10.69
Less than 2 Years	1	2.8			8	5.5			42	9.5		
2-5 Years	5	13.9			26	17.9			59	13.3		
5-9 Years	4	11.1			32	22.1			76	17.2		
10-14 Years	5	13.9			21	14.5			60	13.6		
15-19 Years	4	11.1			9	6.2			55	12.4		
20 or More Years	17	47.2			49	33.8			150	33.9		
Years Experience in Pub. Health			8.59	8.80			9.34	8.92			10.00	8.32
Less than 2 Years	9	24.3			27	16.6			73	14.3		

Table 59 (continued).

Variables and Values	Northwest (n=39)				Northeast (n=165)				Metro (n=524)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	6	16.2			45	27.6			91	17.9		
5-9 Years	10	27.0			30	18.4			120	23.6		
10-14 Years	5	13.5			20	12.3			97	19.1		
15-19 Years	1	2.7			13	8.0			41	8.1		
20 or More Years	6	16.2			28	17.2			87	17.1		
County Survey Response												
Very Small	9	23.1			1	36.0			1	.0		
Small	30	76.9			15	9.1			27	5.2		
Medium	0	.0			0	.0			0	.0		
Large	0	.0			149	90.3			496	94.7		
Organized Health Department												
No	39	100.0			16	9.7			14	2.7		
Yes	0	.0			149	90.3			510	97.3		
Position Category												
Officials & Administrators	2	5.1			4	2.4			10	1.9		
Professionals	34	87.2			128	77.6			360	68.7		
Technicians	1	2.6			6	3.6			25	4.8		
Protective Service	0	.0			0	.0			2	.4		
Paraprofessionals	1	2.6			8	4.8			46	8.8		
Administrative Support	1	2.6			19	11.5			81	15.5		
Professional Position												
No	3	7.7			3.3	20.0			154	29.4		
Yes	36	92.3			132	80.0			370	70.6		
Type of Position												
Front Line Staff	17	44.7			94	58.0			285	55.7		
Senior Level Staff	9	23.7			31	19.1			106	20.7		
Supervisory/Mgmt Staff	12	31.6			37	22.8			121	23.6		
Full-Time Employment												
No	13	33.3			50	30.9			85	16.4		
Yes	26	66.7			112	69.1			4.4	83.6		
Annual Salary (FTE)			$44,972	$12,607			$41,194	$13,801			$45,223	$19,903
Less Than $20,000	0	.0			8	5.4			11	2.7		
$20,000 to $29,999	3	10.7			20	13.4			75	18.1		
$30,000 to $39,999	6	21.4			37	24.8			96	23.1		
$40,000 to $49,999	9	32.1			45	30.2			84	20.2		
$50,000 to $59,999	7	25.0			21	14.1			71	17.1		
$60,000 to $69,999	2	7.1			13	8.7			29	7.0		
$70,000 to $79,999	1	3.6			2	1.3			19	4.6		
Over $80,000	0	.0			3	2.0			30	7.2		
Know Non-English Language												
No	28	71.8			129	78.2			342	66.2		

Table 59 (continued).

Variables and Values	Northwest (n=39)				Northeast (n=165)				Metro (n=524)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Yes	11	28.2			36	21.8			175	33.8		
Other Language Speaking												
Fair	5	45.5			5	13.9			60	34.7		
Good	3	27.3			10	27.8			54	31.2		
Excellent	3	27.3			21	58.3			59	34.1		
Other Language Reading												
Fair	4	40.0			7	19.4			58	34.7		
Good	4	40.0			9	25.0			59	35.3		
Excellent	2	20.0			20	55.6			50	29.9		
Other Language Writing												
Fair	7	70.0			10	27.8			76	46.6		
Good	2	20.0			11	30.6			44	27.0		
Excellent	1	10.0			15	41.7			43	26.4		

Table 59 (continued).

Variables and Values	West Central (n=77)				Central (n=182)				Southeast (n=58)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			45.29	9.92			43.51	11.02			45.14	9.80
Under 29 Years	8	10.7			24	13.6			5	8.6		
30-39 Years	10	13.3			39	22.0			9	15.5		
40-49 Years	29	38.7			55	31.1			22	37.9		
50-59 Years	24	32.0			50	28.2			16	27.6		
Over 60 Years	4	5.3			9	5.1			6	10.3		
Gender												
Male	9	12.2			22	12.6			4	7.1		
Female	65	87.8			152	87.4			52	92.9		
Race												
White	62	82.7			142	79.8			41	70.7		
Hispanic	9	12.0			19	10.7			14	24.1		
Black	0	.0			8	4.5			0	.0		
Asian	0	.0			3	1.7			1	1.7		
Other or Multiracial	4	5.3			6	3.4			2	3.4		
Highest Education												
High School Diploma	7	9.1			32	18.1			10	17.5		
Profess./Vocational Diploma	7	9.1			4	2.3			9	15.8		
Associate Degree	4	5.2			17	9.6			11	19.3		
Baccalaureate Degree	48	62.3			83	46.9			19	33.3		
Master's Degree	11	14.3			36	20.3			7	12.3		
Doctoral Degree	0	.0			5	2.8			1	1.8		
College Degree												
No	18	23.4			53	29.9			30	52.6		
Yes	59	76.6			124	70.1			27	47.4		
Years Since Last Degree			15.47	10.31			16.08	11.77			15.91	11.61
Less than 2 Years	3	4.1			11	6.8			1	1.9		
2-5 Years	10	13.5			31	19.1			6	11.1		
5-9 Years	12	16.2			18	11.1			16	29.6		
10-14 Years	15	20.3			19	11.7			6	11.1		
15-19 Years	6	8.1			23	14.2			6	11.1		
20 or More Years	28	37.8			60	37.0			19	35.2		
Years Experience in Discipline			14.74	10.20			13.52	10.78			15.17	11.41
Less than 2 Years	3	4.1			14	9.0			1	2.1		
2-5 Years	9	12.3			27	17.3			7	14.9		
5-9 Years	15	20.5			28	17.9			12	25.5		
10-14 Years	13	17.8			21	13.5			7	14.9		
15-19 Years	7	9.6			19	12.2			4	8.5		
20 or More Years	26	35.6			47	30.1			16	34.0		
Years Experience in Pub. Health			7.30	6.56			8.92	8.69			9.25	8.56
Less than 2 Years	14	18.2			38	21.5			11	19.3		

Table 59 (continued).

Variables and Values	West Central (n=77)				Central (n=182)				Southeast (n=58)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	18	23.4			34	19.2			11	19.3		
5-9 Years	21	27.3			31	17.5			12	21.1		
10-14 Years	14	18.2			37	20.9			10	17.5		
15-19 Years	6	7.8			15	8.5			3	5.3		
20 or More Years	4	5.2			22	12.4			10	17.5		
County Survey Response												
Very Small	2	2.6			13	7.1			2	3.4		
Small	8	10.4			5	2.7			16	27.6		
Medium	67	87.0			0	.0			40	69.0		
Large	0	.0			164	90.1			0	.0		
Organized Health Department												
No	34	44.2			18	9.9			33	56.9		
Yes	43	55.8			164	90.1			25	43.1		
Position Category												
Officials & Administrators	4	5.4			4	2.2			2	3.4		
Professionals	58	78.4			111	62.0			40	69.0		
Technicians	2	2.7			19	10.6			3	5.2		
Protective Service	0	.0			1	.6			0	.0		
Paraprofessionals	3	4.1			20	11.2			7	12.1		
Administrative Support	7	9.5			24	13.4			6	10.3		
Professional Position												
No	12	16.2			84	35.8			16	27.6		
Yes	62	83.8			115	84.2			42	72.4		
Type of Position												
Front Line Staff	4	58.1			106	60.2			33	57.9		
Senior Level Staff	17	23.0			20	11.4			6	10.5		
Supervisory/Mgmt Staff	14	18.9			50	28.4			18	31.6		
Full-Time Employment												
No	21	28.4			23	12.9			9	15.5		
Yes	53	71.6			155	87.1			49	84.5		
Annual Salary (FTE)			$38,948	$11,686			$37,530	$14,506			$34,647	$11,364
Less Than $20,000	4	6.3			5	3.3			4	8.5		
$20,000 to $29,999	7	10.9			38	24.8			13	27.7		
$30,000 to $39,999	24	37.5			54	35.3			18	38.3		
$40,000 to $49,999	17	26.6			34	22.2			8	17.0		
$50,000 to $59,999	9	14.1			11	7.2			2	4.3		
$60,000 to $69,999	2	3.1			5	3.3			2	4.3		
$70,000 to $79,999	1	1.6			4	2.6			0	.0		
Over $80,000	0	.0			2	1.3			0	.0		
Know Non-English Language												
No	56	75.7			132	74.6			47	81.0		

Table 59 (continued).

Variables and Values	West Central (n=77)				Central (n=182)				Southeast (n=58)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Yes	18	24.3			45	25.4			11	19.0		
Other Language Speaking												
Fair	8	40.0			17	37.8			1	9.1		
Good	7	35.0			15	33.3			4	36.4		
Excellent	5	25.0			13	28.9			6	54.5		
Other Language Reading												
Fair	6	33.3			19	39.6			3	27.3		
Good	9	50.0			14	29.2			4	36.4		
Excellent	3	16.7			15	31.3			4	36.4		
Other Language Writing												
Fair	9	52.9			21	46.7			4	40.0		
Good	6	35.3			15	33.3			3	30.0		
Excellent	2	11.8			9	20.0			3	30.0		

Table 59 (continued).

Variables and Values	Southwest (n=26)				San Luis Valley (n=24)			
	n	%	Mean	SD	n	%	Mean	SD
Age			46.54	9.56			42.29	9.39
Under 29 Years	1	3.8			3	12.5		
30-39 Years	6	23.1			6	25.0		
40-49 Years	8	30.8			10	41.7		
50-59 Years	9	34.6			4	16.7		
Over 60 Years	2	7.7			1	4.2		
Gender								
Male	1	4.3			1	5.0		
Female	22	95.7			19	95.0		
Race								
White	26	100.0			10	41.7		
Hispanic	0	.0			13	54.2		
Black	0	.0			0	.0		
Asian	0	.0			0	.0		
Other or Multiracial	0	.0			1	4.2		
Highest Education								
High School Diploma	5	19.2			5	21.7		
Profess./Vocational Diploma	4	15.4			1	4.3		
Associate Degree	5	19.2			10	43.5		
Baccalaureate Degree	8	30.8			7	30.4		
Master's Degree	4	15.4			0	.0		
Doctoral Degree	0	.0			0	.0		
College Degree								
No	14	53.8			16	69.6		
Yes	12	46.2			7	30.4		
Years Since Last Degree			22.33	11.79			15.14	10.17
Less than 2 Years	0	.0			1	4.5		
2-5 Years	1	4.2			1	4.5		
5-9 Years	4	16.7			6	27.3		
10-14 Years	3	12.5			4	18.2		
15-19 Years	0	.0			3	13.6		
20 or More Years	16	66.7			7	31.8		
Years Experience in Discipline			16.86	11.58			12.11	9.10
Less than 2 Years	1	4.8			2	11.1		
2-5 Years	2	9.5			3	16.7		
5-9 Years	5	23.8			1	5.6		
10-14 Years	2	9.5			6	33.3		
15-19 Years	1	4.8			2	11.1		
20 or More Years	10	47.6			4	22.2		
Years Experience in Pub. Health			10.52	8.56			7.83	7.67
Less than 2 Years	3	12.0			4	17.4		

Table 59 (continued).

Variables and Values	Southwest (n=26)				San Luis Valley (n=24)			
	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	4	16.0			6	26.1		
5-9 Years	6	24.0			6	26.1		
10-14 Years	5	20.0			4	17.4		
15-19 Years	2	8.0			1	4.3		
20 or More Years	5	20.0			2	8.7		
County Survey Response								
Very Small	4	15.4			12	50.0		
Small	5	19.2			12	50.0		
Medium	17	65.4			0	.0		
Large	0	.0			0	.0		
Organized Health Department								
No	24	92.3			24	100.0		
Yes	2	7.7			0	.0		
Position Category								
Officials & Administrators	0	.0			3	12.5		
Professionals	16	61.5			14	58.3		
Technicians	2	7.7			0	.0		
Protective Service	0	.0			0	.0		
Paraprofessionals	5	19.2			2	8.3		
Administrative Support	3	11.5			5	20.8		
Professional Position								
No	10	38.5			7	29.2		
Yes	16	61.5			17	70.8		
Type of Position								
Front Line Staff	11	42.3			11	52.4		
Senior Level Staff	4	15.4			1	4.8		
Supervisory/Mgmt Staff	11	42.3			9	42.9		
Full-Time Employment								
No	6	23.1			2	8.3		
Yes	20	76.9			22	91.7		
Annual Salary (FTE)			$34,715	$14,100			$30,731	$11,406
Less Than $20,000	2	8.0			4	21.1		
$20,000 to $29,999	6	24.0			3	15.8		
$30,000 to $39,999	12	48.0			8	42.1		
$40,000 to $49,999	2	8.0			3	15.8		
$50,000 to $59,999	1	4.0			1	5.3		
$60,000 to $69,999	1	4.0			0	.0		
$70,000 to $79,999	0	.0			0	.0		
Over $80,000	1	4.0			0	.0		
Know Non-English Language								
No	21	80.8			11	45.8		

Table 59 (continued).

Variables and Values	Southwest (n=26)				San Luis Valley (n=24)			
	n	%	Mean	SD	n	%	Mean	SD
Yes	5	19.2			13	54.2		
Other Language Speaking								
Fair	3	75.0			2	15.4		
Good	0	.0			9	69.2		
Excellent	1	25.0			2	15.4		
Other Language Reading								
Fair	3	75.0			4	30.8		
Good	0	.0			9	69.2		
Excellent	1	25.0			0	.0		
Other Language Writing								
Fair	3	75.0			7	53.8		
Good	1	25.0			6	46.2		
Excellent	0	.0			0	.0		

Table 60. Differences in Core Competency Proficiencies and Educational Needs by Regional Designation (N=1,095)

Core Competency Domains	Northwest (n=39)				Northeast (n=165)				Metro (n=524)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	4.90	1.30	5	5.00	4.50	1.32	5	4.75	4.32	1.48	4	4.50
Policy Development/Prog. Planning Skills	4.29	1.46	8	4.75	4.22	1.43	7	4.50	3.86	1.59	7	4.00
Communication Skills	5.07	1.20	2	5.40	4.85	1.20	2	5.00	4.65	1.28	2	4.83
Cultural Competency Skills	5.31	1.17	1	5.50	5.19	1.12	1	5.25	5.09	1.18	1	5.25
Community Dimensions of Practice Skills	5.03	1.34	3	5.25	4.58	1.28	4	4.75	4.31	1.37	5	4.50
Basic Public Health Sciences Skills	4.72	1.34	6	5.25	4.42	1.33	6	4.75	4.04	1.53	6	4.25
Financial Planning & Management Skills	4.39	1.45	7	4.60	4.11	1.37	8	4.20	3.80	1.44	8	3.80
Leadership & Systems Thinking Skills	4.98	1.38	4	5.50	4.73	1.30	3	5.00	4.61	1.41	3	4.75
Core Competencies Composite Skills	*4.84*	*1.19*		*5.11*	*4.58*	*1.15*		*4.74*	*4.34*	*1.21*		*4.51*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	3.21	1.15	5	3.00	3.25	1.03	2	3.00	2.93	1.20	4	3.00
Policy Devel./Prog. Planning Educ. Needs	3.85	1.14	1	4.00	3.25	1.21	2	3.00	2.94	1.26	3	3.00
Communication Educ. Needs	2.97	1.11	7	3.00	2.79	1.18	8	3.00	2.74	1.18	7	3.00
Cultural Competency Educ. Needs	2.90	1.17	8	3.00	2.82	1.09	7	3.00	2.74	1.16	7	3.00
Community Dimen. of Practice Educ. Needs	3.23	1.22	4	3.00	3.13	1.14	5	3.00	2.81	1.16	6	3.00
Basic Public Health Sciences Educ. Needs	3.00	1.21	6	3.00	3.14	1.18	3	3.00	2.95	1.28	2	3.00
Financial Planning & Mgmt. Educ. Needs	3.38	1.23	2	4.00	3.39	1.30	1	4.00	2.98	1.43	1	3.00
Leadership & Systems Thinking Educ. Needs	3.33	1.13	3	3.00	3.05	1.11	6	3.00	2.92	1.18	5	3.00
Core Competencies Composite Educ. Needs	*3.23*	*0.84*		*3.13*	*3.10*	*0.80*		*3.13*	*2.88*	*0.86*		*2.88*

Table 60 (continued).

Core Competency Domains	West Central (n=77)				Central (n=182)				Southeast (n=58)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	4.47	1.22	5	4.63	4.18	1.55	5	4.25	4.18	1.35	5	4.25
Policy Development/Prog. Planning Skills	4.19	1.39	8	4.25	3.85	1.54	8	4.00	3.99	1.39	7	4.00
Communication Skills	4.90	1.03	2	5.00	4.55	1.34	2	4.60	4.65	1.19	2	4.82
Cultural Competency Skills	5.35	1.05	1	5.63	5.18	1.28	1	5.38	4.94	1.12	1	5.00
Community Dimensions of Practice Skills	4.85	1.12	3	5.00	4.31	1.39	4	4.50	4.44	1.14	3	4.42
Basic Public Health Sciences Skills	4.33	1.31	6	4.50	3.89	1.63	6	4.25	4.14	1.44	6	4.00
Financial Planning & Management Skills	4.28	1.26	7	4.40	3.86	1.45	7	3.60	3.93	1.30	8	3.80
Leadership & Systems Thinking Skills	4.78	1.25	4	4.88	4.54	1.43	3	4.75	4.34	1.33	4	4.50
Core Competencies Composite Skills	*4.65*	*1.04*		*4.74*	*4.29*	*1.26*		*4.40*	*4.33*	*1.12*		*4.27*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	2.96	1.03	5	3.00	3.24	1.16	3	3.00	3.09	0.94	4	3.00
Policy Devel./Prog. Planning Educ. Needs	3.30	1.19	2	3.00	3.24	1.33	3	3.00	3.22	1.16	1	3.00
Communication Educ. Needs	2.62	1.21	7	2.00	2.78	1.23	7	3.00	2.76	1.05	8	3.00
Cultural Competency Educ. Needs	2.50	1.06	8	2.00	2.69	1.21	8	2.00	2.90	1.10	7	3.00
Community Dimen. of Practice Educ. Needs	2.72	1.01	6	3.00	3.11	1.21	5	3.00	3.05	1.05	5	3.00
Basic Public Health Sciences Educ. Needs	3.14	1.11	4	3.00	3.35	1.31	1	3.00	3.10	1.12	2	3.00
Financial Planning & Mgmt. Educ. Needs	3.44	1.25	1	4.00	3.32	1.47	2	3.00	3.10	1.31	2	3.00
Leadership & Systems Thinking Educ. Needs	3.16	1.18	3	3.00	3.09	1.15	6	3.00	3.05	1.07	5	3.00
Core Competencies Composite Educ. Needs	*2.98*	*0.76*		*3.00*	*3.10*	*0.86*		*3.00*	*3.03*	*0.74*		*3.06*

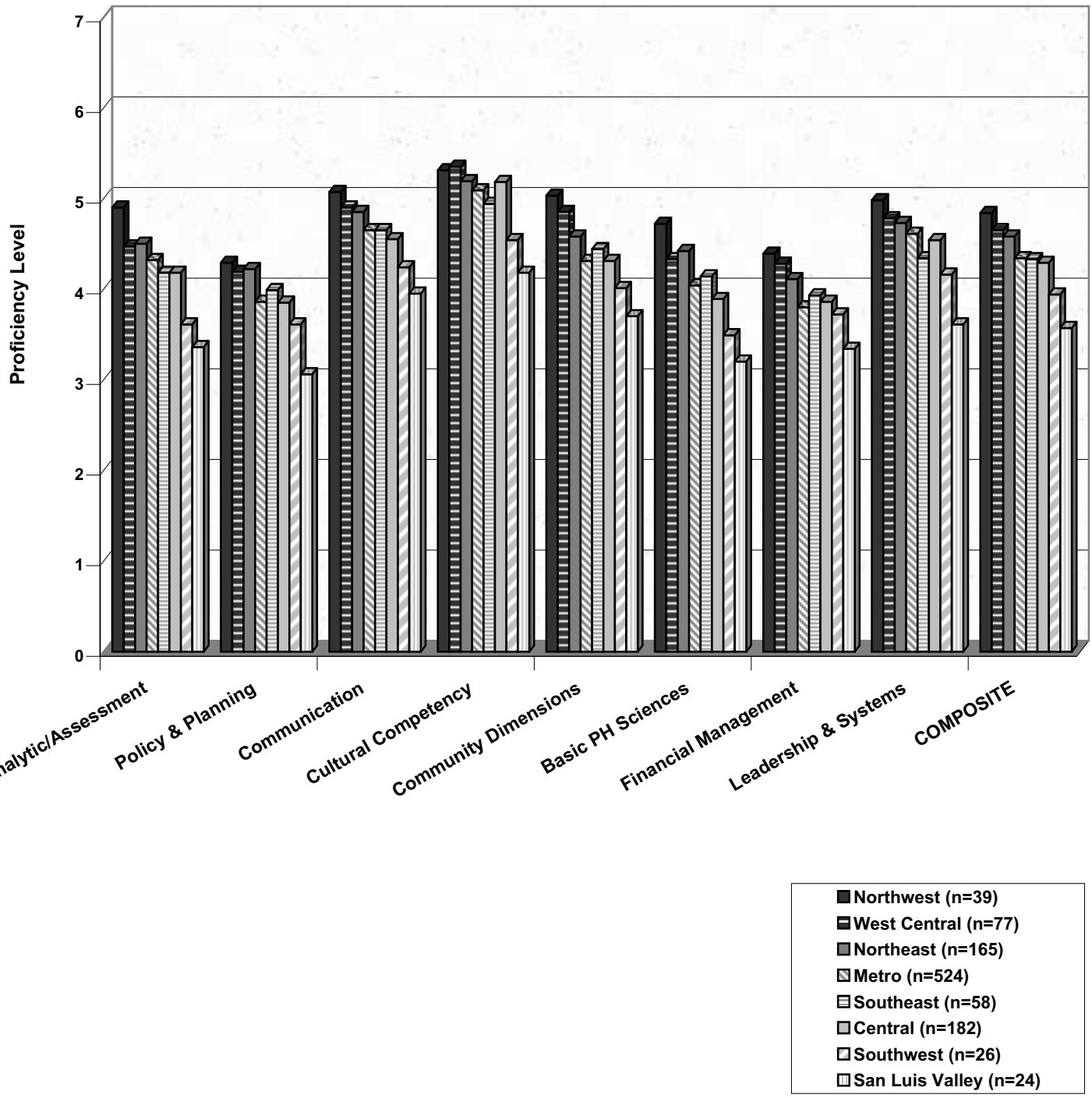
Table 60 (continued).

Core Competency Domains	Southwest (n=26)				San Luis Valley (n=24)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]									
Analytic/Assessment Skills	3.61	1.65	6	3.75	3.36	1.67	5	3.25	<.001
Policy Development/Prog. Planning Skills	3.61	1.55	6	3.38	3.06	1.40	8	2.88	<.01
Communication Skills	4.24	1.33	2	4.08	3.95	1.39	2	4.00	<.01
Cultural Competency Skills	4.54	1.52	1	4.75	4.18	1.36	1	4.38	<.001
Community Dimensions of Practice Skills	4.01	1.51	4	3.75	3.70	1.33	3	3.75	<.001
Basic Public Health Sciences Skills	3.49	1.74	8	3.88	3.20	1.47	7	3.00	<.001
Financial Planning & Management Skills	3.72	1.42	5	3.30	3.34	1.52	6	3.10	<.01
Leadership & Systems Thinking Skills	4.16	1.57	3	4.13	3.61	1.54	4	3.50	<.01
Core Competencies Composite Skills	*3.94*	*1.41*		*3.86*	*3.57*	*1.34*		*3.71*	*<.001*
Educ. Needs in Core Competency Domains[2]									
Analytic/Assessment Educ. Needs	3.27	1.04	3	3.00	3.42	1.18	2	3.00	<.01
Policy Devel./Prog. Planning Educ. Needs	3.46	0.95	1	4.00	3.79	1.32	1	4.00	<.001
Communication Educ. Needs	2.77	0.86	8	3.00	2.88	1.23	7	3.00	n.s.
Cultural Competency Educ. Needs	2.88	1.07	6	3.00	2.83	1.17	8	3.00	n.s.
Community Dimen. of Practice Educ. Needs	2.96	1.02	5	3.00	3.38	1.21	5	4.00	<.001
Basic Public Health Sciences Educ. Needs	3.00	1.06	4	3.00	3.42	1.32	2	3.50	<.05
Financial Planning & Mgmt. Educ. Needs	3.35	1.16	2	3.00	3.17	1.34	6	3.50	<.01
Leadership & Systems Thinking Educ. Needs	2.88	0.83	6	3.00	3.39	1.23	4	4.00	n.s.
Core Competencies Composite Educ. Needs	*3.08*	*0.76*		*2.88*	*3.28*	*0.95*		*3.44*	*<.01*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the eight groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.


Proficiency Level
0
1
2
3
4
5
6
7
Analytic/Assessment
Policy & Planning
Communication
Cultural Competency
Community Dimensions
Basic PH Sciences
Financial Management
Leadership & Systems
COMPOSITE
Northwest (n=39)
West Central (n=77)
Northeast (n=165)
Metro (n=524)
Southeast (n=58)
Central (n=182)
Southwest (n=26)
San Luis Valley (n=24)

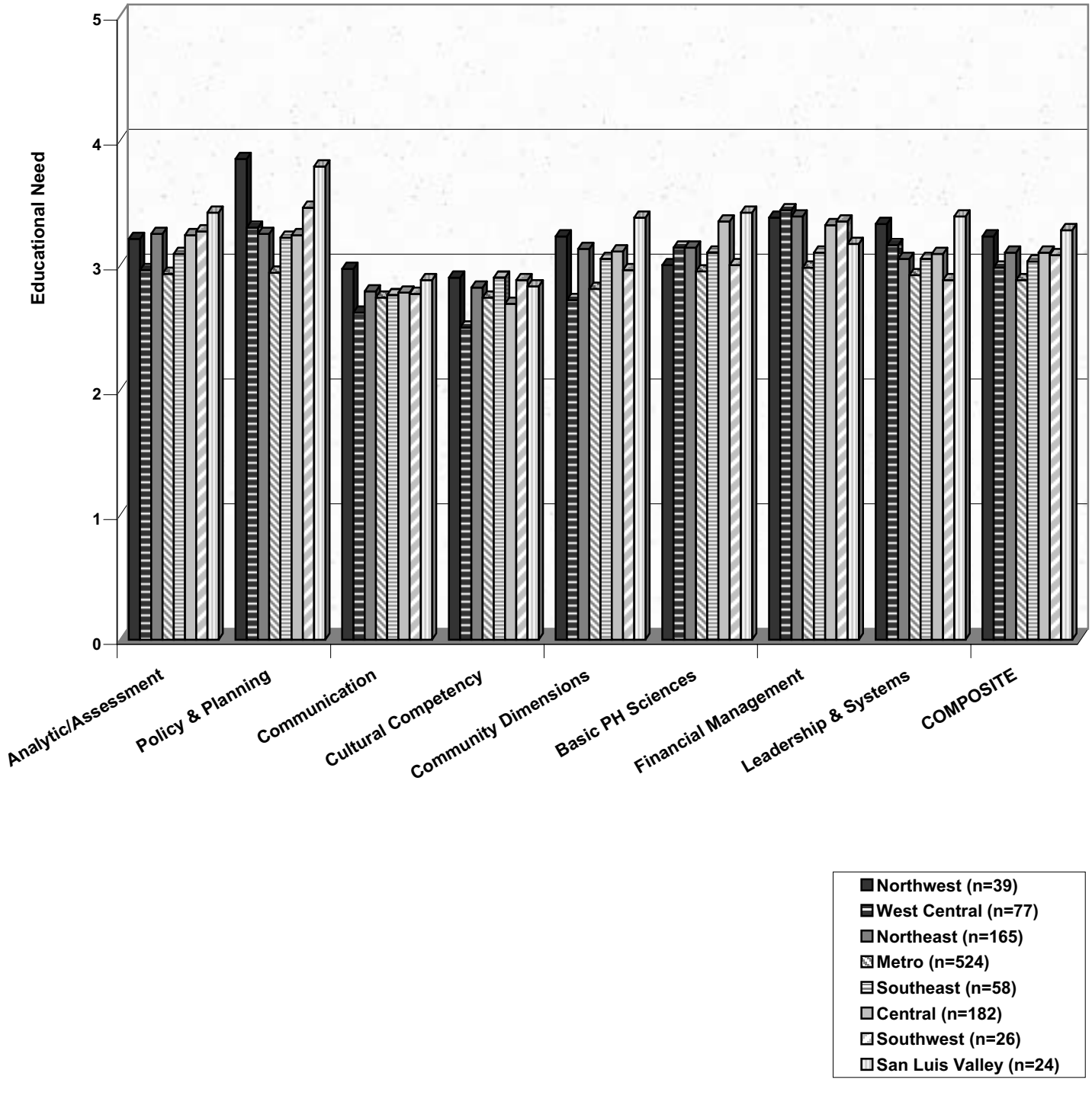

Educational Need
5
4
3
2
1
0
Analytic/Assessment
Policy & Planning
Communication
Cultural Competency
Community Dimensions
Basic PH Sciences
Financial Management
Leadership & Systems
COMPOSITE
Northwest (n=39)
West Central (n=77)
Northeast (n=165)
Metro (n=524)
Southeast (n=58)
Central (n=182)
Southwest (n=26)
San Luis Valley (n=24)

Table 61. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs by Regional Designation (N=1,095)

Bioterrorism/Emergency Preparedness Competency Domains	Northwest (n=39)				Northeast (n=165)				Metro (n=524)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	3.68	1.66	3	3.33	2.94	1.69	5	3.00	2.71	1.62	5	2.33
Disaster Response Skills	4.37	1.44	1	4.33	4.23	1.44	1	4.33	3.84	1.53	1	4.00
Emergency Communication Skills	3.79	1.72	2	4.00	3.33	1.65	3	3.00	3.12	1.63	2	3.00
Biological/Infectious Disease Skills	3.64	1.69	4	4.00	2.93	1.69	6	3.00	2.64	1.74	7	2.00
Toxic Chem. & Env. Hazard Skills	3.62	1.77	5	4.00	2.74	1.78	7	2.00	2.65	1.73	6	2.00
Physical Injury Skills	3.46	1.68	7	3.00	3.47	1.76	2	4.00	3.03	1.84	3	3.00
Crisis Management Skills	3.59	1.76	6	3.00	3.02	1.80	4	3.00	2.83	1.82	4	2.00
Bioterrorism/EP Composite Skills	*3.73*	*1.43*		*3.75*	*3.24*	*1.44*		*3.24*	*2.98*	*1.37*		*2.73*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.69	1.15	1	4.00	3.63	1.19	4	4.00	3.57	1.31	2	4.00
Disaster Response Educ. Needs	3.79	1.17	2	4.00	3.64	1.20	3	4.00	3.59	1.24	1	4.00
Emergency Communication Educ. Needs	3.23	1.35	7	3.00	3.15	1.26	7	3.00	3.09	1.22	7	3.00
Biological/Infectious Disease Educ. Needs	3.62	1.23	5	4.00	3.69	1.17	2	4.00	3.50	1.36	4	4.00
Toxic Chem. & Env. Hazard Educ. Needs	3.97	1.14	1	4.00	3.83	1.24	1	4.00	3.52	1.42	3	4.00
Physical Injury Educ. Needs	3.59	1.33	6	4.00	3.36	1.19	6	3.00	3.27	1.35	6	3.00
Crisis Management Educ. Needs	3.67	1.15	4	4.00	3.43	1.13	5	4.00	3.32	1.29	5	3.00
Bioterrorism/EP Composite Educ. Needs	*3.64*	*0.96*		*3.86*	*3.53*	*0.91*		*3.71*	*3.41*	*1.04*		*3.57*

Table 61 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	West Central (n=77)				Central (n=182)				Southeast (n=58)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	2.45	1.38	6	2.33	3.32	1.58	4	3.33	2.92	1.63	5	2.83
Disaster Response Skills	3.66	1.44	1	3.67	4.19	1.42	4	4.33	3.91	1.36	1	4.00
Emergency Communication Skills	2.84	1.54	4	2.50	4.21	1.56	1	4.50	3.42	1.59	3	3.50
Biological/Infectious Disease Skills	2.62	1.43	5	3.00	3.26	1.76	6	3.00	2.78	1.64	6	2.50
Toxic Chem. & Env. Hazard Skills	2.30	1.41	7	2.00	2.86	1.82	7	2.00	2.53	1.62	7	2.00
Physical Injury Skills	3.49	1.70	2	4.00	3.65	1.96	3	4.00	3.56	1.93	2	4.00
Crisis Management Skills	3.12	1.73	3	3.00	3.29	1.99	5	3.00	3.00	1.67	4	3.00
Bioterrorism/EP Composite Skills	*2.92*	*1.25*		*3.01*	*3.55*	*1.43*		*3.38*	*3.18*	*1.42*		*3.13*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.85	1.28	2	4.00	3.69	1.18	3	4.00	3.74	1.21	1	4.00
Disaster Response Educ. Needs	3.77	1.26	3	4.00	3.47	1.16	6	3.00	3.66	1.28	2	4.00
Emergency Communication Educ. Needs	3.18	1.22	6	3.00	3.02	1.28	7	3.00	2.98	1.15	7	3.00
Biological/Infectious Disease Educ. Needs	3.69	1.27	4	4.00	3.73	1.31	2	4.00	3.48	1.26	4	4.00
Toxic Chem. & Env. Hazard Educ. Needs	3.88	1.30	1	4.00	3.82	1.32	1	4.00	3.52	1.39	3	4.00
Physical Injury Educ. Needs	3.04	1.35	7	3.00	3.51	1.31	4	4.00	3.14	1.18	6	3.00
Crisis Management Educ. Needs	3.45	1.12	5	4.00	3.48	1.26	5	4.00	3.38	0.89	5	3.00
Bioterrorism/EP Composite Educ. Needs	*3.55*	*1.02*		*3.71*	*3.52*	*0.92*		*3.50*	*3.41*	*0.93*		*3.57*

Table 61 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	Southwest (n=26)				San Luis Valley (n=24)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]									
Disaster Planning Skills	2.62	1.47	6	2.50	3.04	2.04	4	2.33	<.001
Disaster Response Skills	3.55	1.42	1	3.50	3.75	1.81	2	3.83	<.01
Emergency Communication Skills	2.77	1.61	3	2.75	2.83	1.89	5	2.25	<.001
Biological/Infectious Disease Skills	2.65	1.57	5	2.50	2.52	1.90	6	2.00	<.001
Toxic Chem. & Env. Hazard Skills	2.31	1.54	7	2.00	2.43	2.00	7	2.00	<.01
Physical Injury Skills	3.27	2.13	2	3.00	4.22	2.00	1	4.00	<.001
Crisis Management Skills	2.73	1.71	4	3.00	3.74	2.32	3	3.00	<.05
Bioterrorism/EP Composite Skills	*2.84*	*1.43*		*2.77*	*3.21*	*1.76*		*2.67*	*<.001*
Educational Needs in Bioterrorism/EP[2]									
Disaster Planning Educ. Needs	4.19	0.94	2	4.00	3.88	1.45	2	5.00	n.s.
Disaster Response Educ. Needs	4.38	0.85	1	5.00	3.71	1.37	4	4.00	<.01
Emergency Communication Educ. Needs	3.65	1.09	5	4.00	3.25	1.36	7	4.00	n.s.
Biological/Infectious Disease Educ. Needs	3.96	1.18	4	4.00	3.79	1.28	3	4.00	n.s.
Toxic Chem. & Env. Hazard Educ. Needs	4.00	1.17	3	4.00	4.00	1.35	1	5.00	<.05
Physical Injury Educ. Needs	3.19	1.30	7	3.00	3.29	1.37	6	4.00	n.s.
Crisis Management Educ. Needs	3.54	1.07	6	4.00	3.38	1.44	2	3.50	n.s.
Bioterrorism/EP Composite Educ. Needs	*3.85*	*0.78*		*3.93*	*3.61*	*1.15*		*3.86*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the eight groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When the overall difference among groups was not significant, n.s. is noted. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 67. Proficiencies in Bioterrorism/Emergency Preparedness Skills by Regional Designation

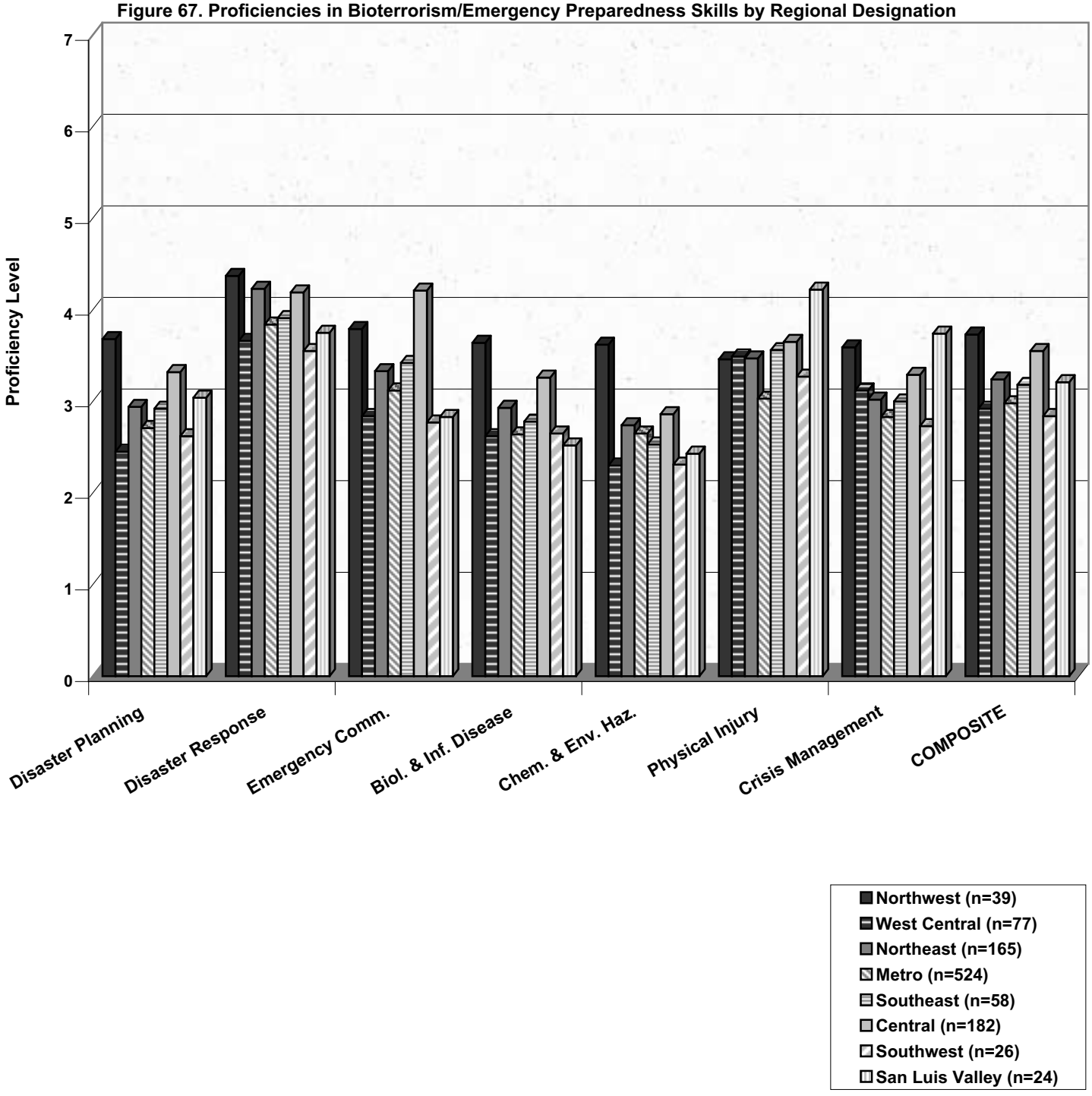


Figure 68. Educational Needs in Bioterrorism/Emergency Preparedness Skills by Regional Designation

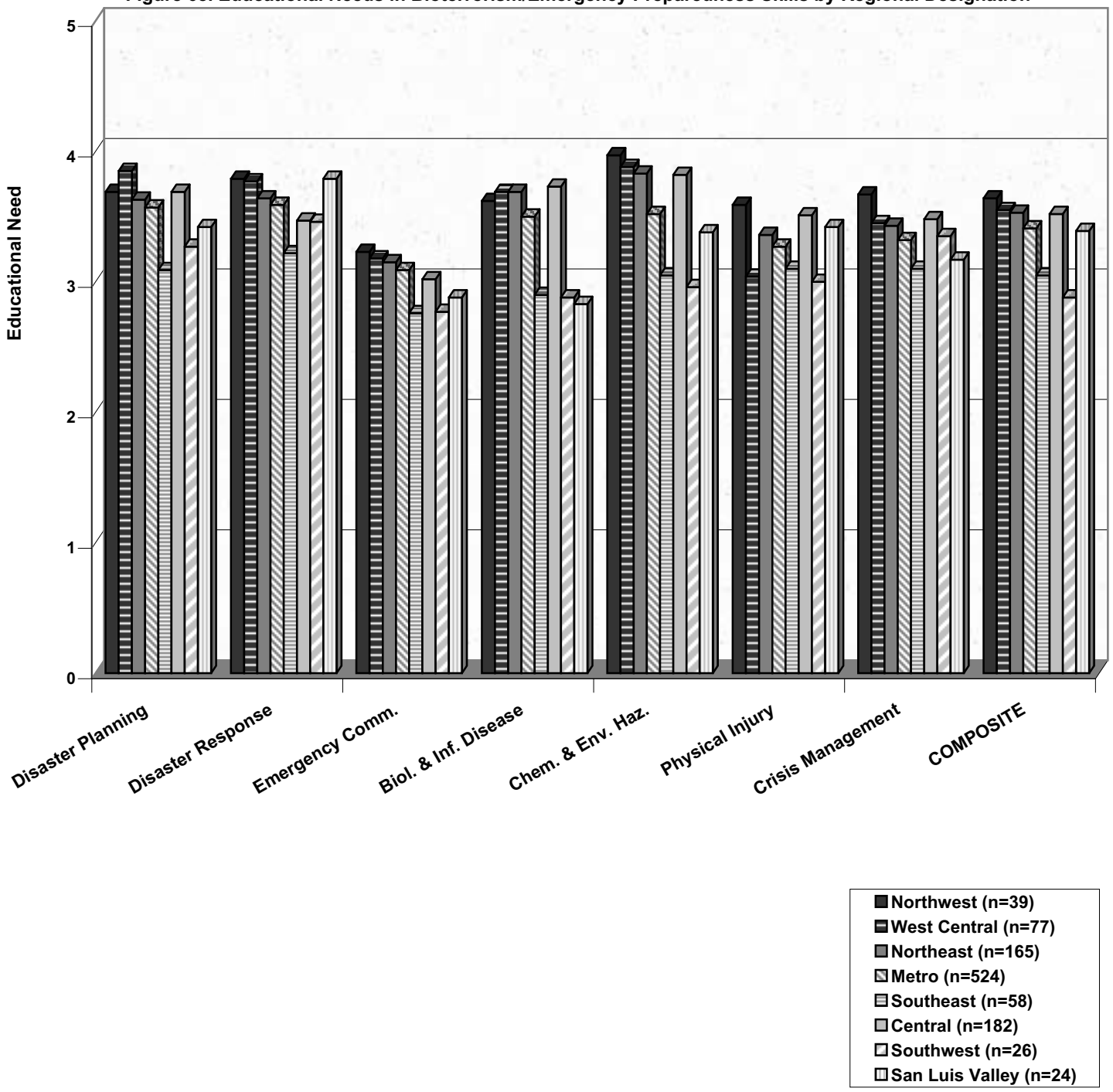


Table 62. Educational Preferences of Workers by Regional Designation (N=1,095)

Types of Preference	Northwest (n=39)				Northeast (n=165)				Metro (n=524)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	1.89	0.70	2	2.00	2.22	0.75	2	2.00	2.24	0.70	2	2.00
1-Day Workshops	2.84	0.37	1	3.00	2.46	0.61	1	3.00	2.45	0.62	1	3.00
Several-Day Workshops	1.78	0.68	3	2.00	1.69	0.71	3	2.00	1.68	0.75	3	2.00
Academic Semester Courses	1.33	0.68	4	1.00	1.44	0.65	4	1.00	1.39	0.66	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.89	0.31	1	3.00	2.77	0.45	1	3.00	2.74	0.52	1	3.00
Interactive Teleconferences	1.71	0.68	4	2.00	1.73	0.64	3	2.00	1.67	0.62	4	2.00
Internet, Web-Based Instruction	1.88	0.73	3	2.00	1.70	0.66	4	2.00	1.71	0.69	3	2.00
Combination Format	2.06	0.67	2	2.00	2.18	0.62	2	2.00	2.01	0.69	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.82	0.51	1	3.00	2.81	0.47	1	3.00	2.79	0.49	1	3.00
Weekend Classes	1.29	0.52	4	1.00	1.21	0.48	4	1.00	1.19	0.45	4	1.00
Evening Classes	1.40	0.55	3	1.00	1.40	0.60	3	1.00	1.41	0.64	3	1.00
Self-Determined Web-Based	1.97	0.79	2	2.00	1.82	0.68	2	2.00	1.77	0.71	2	2.00
Preferences for Educational Recognition												
Certificate	2.39	0.64	1	2.00	2.36	0.70	1	2.00	2.37	0.69	1	2.00
Continuing Education Units	2.11	0.87	2	2.00	2.21	0.74	2	2.00	2.14	0.81	2	2.00
Undergraduate Academic Credit	1.57	0.74	4	1.00	1.63	0.71	4	1.00	1.58	0.73	4	1.00
Graduate Academic Credit	1.97	0.86	3	2.00	2.03	0.83	3	2.00	1.86	0.83	3	2.00

Table 62 (continued).

Types of Preference	West Central (n=77)				Central (n=182)				Southeast (n=58)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.00	0.76	2	2.00	2.19	0.73	2	2.00	1.96	0.68	2	2.00
1-Day Workshops	2.54	0.56	1	3.00	2.50	0.65	1	3.00	2.57	0.57	1	3.00
Several-Day Workshops	1.73	0.73	3	2.00	1.67	0.74	3	2.00	1.68	0.78	3	1.00
Academic Semester Courses	1.43	0.68	4	1.00	1.39	0.71	4	1.00	1.52	0.66	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.77	0.45	1	3.00	2.68	0.56	1	3.00	2.76	0.43	1	3.00
Interactive Teleconferences	2.01	0.67	3	2.00	1.63	0.64	4	2.00	1.98	0.70	2	2.00
Internet, Web-Based Instruction	1.62	0.69	4	2.00	2.04	0.74	2	2.00	1.98	0.67	2	2.00
Combination Format	2.14	0.70	2	2.00	1.67	0.68	3	2.00	1.91	0.64	3	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.90	0.38	1	3.00	2.82	0.45	1	3.00	2.74	0.55	1	3.00
Weekend Classes	1.15	0.36	4	1.00	1.13	0.40	4	1.00	1.20	0.40	4	1.00
Evening Classes	1.35	0.54	3	1.00	1.32	0.54	3	1.00	1.34	0.58	3	1.00
Self-Determined Web-Based	1.82	0.72	2	2.00	1.78	0.74	2	2.00	1.88	0.74	2	2.00
Preferences for Educational Recognition												
Certificate	2.19	0.73	2	2.00	2.35	0.67	1	2.00	2.20	0.68	2	2.00
Continuing Education Units	2.38	0.67	1	2.00	2.31	0.76	2	2.00	2.25	0.72	1	2.00
Undergraduate Academic Credit	1.62	0.77	4	1.00	1.67	0.74	4	2.00	1.85	0.85	4	2.00
Graduate Academic Credit	1.97	0.85	3	2.00	1.99	0.84	3	2.00	1.98	0.91	3	2.00

Table 62 (continued).

Types of Preference	Southwest (n=26)				San Luis Valley (n=24)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length								
2-Hour Sessions	1.88	0.80	3	2.00	2.18	0.80	2	2.00
1-Day Workshops	2.52	0.51	1	3.00	2.64	0.58	1	3.00
Several-Day Workshops	1.92	0.81	2	2.00	1.82	0.91	3	1.50
Academic Semester Courses	1.32	0.56	4	1.00	1.33	0.58	4	1.00
Preferences for Educational Format								
Face-to-Face Classroom Setting	2.62	0.50	1	3.00	2.79	0.51	1	3.00
Interactive Teleconferences	1.83	0.70	4	2.00	1.95	0.59	4	2.00
Internet, Web-Based Instruction	1.88	0.80	3	2.00	2.00	0.71	3	2.00
Combination Format	2.17	0.64	2	2.00	2.14	0.85	2	2.00
Preferences for Time of Course Offering								
Weekday Classes	2.85	0.46	1	3.00	2.82	0.50	1	3.00
Weekend Classes	1.13	0.45	4	1.00	1.38	0.67	4	1.00
Evening Classes	1.25	0.53	3	1.00	1.74	0.75	3	2.00
Self-Determined Web-Based	2.00	0.78	2	2.00	1.85	0.67	2	2.00
Preferences for Educational Recognition								
Certificate	2.46	0.66	1	3.00	2.61	0.50	1	3.00
Continuing Education Units	2.25	0.74	2	2.00	2.50	0.51	2	2.50
Undergraduate Academic Credit	1.50	0.66	4	1.00	2.18	0.85	3	2.00
Graduate Academic Credit	1.79	0.83	3	2.00	1.95	0.89	4	2.00

6c. Differences by County Size

Counties were classified for size by the number of workers who responded to the survey; this indicator was used as a proxy for county size and an approximate size of the county's public health workforce. County size categories, definitions, and the number of participants in each group were: Very Small Counties, Less Than 5 Workers (n=44, 4%); Small Counties, 5 to 14 Workers (n=118, 11%); Medium Counties, 15 to 49 Workers (n=124, 11%); and Large Counties, 50 or More Workers (n=809, 74%). The characteristics of these four groups are summarized in Table 63.

Age ranged from 43.5 years for Large Counties to 48.2 years for Very Small Counties. Men were more represented in larger counties than smaller counties. Compared to the other three groups, the Very Small Counties group had a higher percentage of white workers (86%), fewer workers with a college degree (50%), workers with a longer length of time since last degree or diploma (19.3 years), a staff with more experience in the discipline (17.2 years), and a higher proportion of Supervisory/ Management Staff.

Average number of years of public health experience was similar across the four groups (range= 8.5 years to 9.7 years). Workers' average salaries varied across county size: Very Small Counties, $38,812; Small Counties, $38,843; Medium Counties, $36,380; and Large Counties, $43,013. Workers in the Large Counties group had the least percentage of workers with knowledge of a non-English language.

Table 64 summarizes the differences in Core Competency proficiencies and educational needs by county size. No overall difference was found among these four groups in Core Competency Skills proficiency (composite). Statistically significant differences were found in two Core Competency subscales: Community Dimensions of Practice Skills ($p < .01$) and Financial Planning/Management Skills ($p < .01$). In both cases, workers in Very Small, Small and Medium size counties were more proficient than workers in Large Counties. Differences and similarities in Core Competency proficiencies for the four county sizes are graphically presented in Figure 69.

Although there was no statistical difference found among the four county sizes for overall educational need in Core Competency Skills (composite score), workers in Very Small Counties identified greater overall educational need than did other county size groups. The lack of statistical difference may be due to the small sample size of this group (n=44). Statistical differences were found in two of the eight Core Competency Skill subscales: Policy Development/Program Planning Skills ($p < .01$) and Community Dimensions of Practice Skills ($p < .01$). In both subscales, the greatest need for education was in Very Small Counties. Educational needs across county sizes are graphically depicted in Figure 70.

Differences in Bioterrorism/Emergency Preparedness proficiencies and educational needs by county size are summarized in Table 65. A statistically significant difference among the four county size groups ($p < .01$) was found for overall Bioterrorism/Emergency Preparedness Skills. The two smaller county size groups had higher proficiency than the two larger county size groups. In descending order, the means for Bioterrorism/Emergency Preparedness Competency Skills (composite score) among the groups were: 5 to 14 Workers (3.48), Less Than 5 Workers (3.45), 50 or More Workers (3.12), and 15 to 49 Workers (2.91). Among these four groups, statistically significant differences were found in five of the seven Bioterrorism/Emergency Preparedness Competency subscales: Disaster Planning Skills ($p < .001$), Disaster Response Skills ($p < .05$), Biological/Infectious Disease Skills ($p < .05$), Toxic Chemical/Environmental Hazard Skills ($p < .05$), and Physical Injury Skills ($p < .001$). In every dimension, workers in the two smaller size counties were more proficient than

workers in the two larger size counties. In most dimensions, workers in Medium Counties were least proficient. This pattern is illustrated in Figure 71.

Although workers in the two smallest county size groups generally identified higher educational needs than their counterparts in the two larger size counties, the four groups did not statistically differ on overall educational need for Bioterrorism/Emergency Preparedness Competency Skills (composite score). When the seven subscales were examined individually, statistical differences were found in three subscales: Disaster Planning Skills ($p < .05$), Disaster Response Skills ($p < .01$), and Physical Injury Skills ($p < .01$). As seen in Figure 72, workers in the Very Small Counties, Small Counties and Medium Counties identified higher educational needs in Disaster Planning Skills and Disaster Response Skills than the Large Counties group. The pattern for Physical Injury Skills was somewhat different; while workers in the two smallest county size groups again indicated the highest needs, the Large Counties group identified greater educational needs in Physical Injury Skills than workers in the Medium Counties group.

Workers' educational preferences by county size are summarized in Table 66. No differences in rank orderings across categories were found in relation to time of course offering; all groups most preferred weekday classes and least preferred weekend and evening classes. Workers from the Very Small Counties showed more preference for several-day workshops, web-based instruction, and continuing education units than the other three groups. Workers in Medium Counties rated Internet instruction as their lowest preference for course format.

Table 63. Characteristics of Colorado Public Health Workforce by County Size (N=1,095)

Variables and Values	Less Than 5 Workers (n=44)				5 to 14 Workers (n=118)				15 to 49 Workers (n=124)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			48.20	9.57			44.68	10.32			45.04	9.79
Under 29 Years	1	2.3			12	10.2			12	9.8		
30-39 Years	7	15.9			19	16.1			20	16.4		
40-49 Years	14	31.8			50	42.4			45	36.9		
50-59 Years	16	36.4			29	24.6			37	30.3		
Over 60 Years	6	13.6			8	6.8			8	6.6		
Gender												
Male	2	5.1			10	8.7			11	9.2		
Female	37	94.9			105	91.3			108	90.8		
Race												
White	38	86.4			96	81.4			98	80.3		
Hispanic	4	9.1			19	16.1			19	15.6		
Black	0	0.0			1	0.8			0	0.0		
Asian	0	0.0			1	0.8			0	0.0		
Other or Multiracial	2	4.5			1	0.8			5	4.1		
Highest Education												
High School Diploma	6	13.6			13	11.4			19	15.3		
Profess./Vocational Diploma	4	9.1			9	7.9			15	12.1		
Associate Degree	12	27.3			15	13.2			11	8.9		
Baccalaureate Degree	19	43.2			55	48.2			61	49.2		
Master's Degree	3	6.8			19	16.7			17	13.7		
Doctoral Degree	0	0.0			3	2.6			1	0.8		
College Degree												
No	22	50.0			37	32.5			45	36.3		
Yes	22	50.0			77	67.5			79	63.7		
Years Since Last Degree			19.32	12.53			16.73	11.05			16.22	11.19
Less than 2 Years	0	0.0			6	5.3			3	2.6		
2-5 Years	6	13.6			12	10.6			15	12.8		
5-9 Years	8	18.2			18	15.9			25	21.4		
10-14 Years	3	6.8			19	16.8			19	16.2		
15-19 Years	7	15.9			12	10.6			9	7.7		
20 or More Years	20	45.5			46	40.7			46	39.3		
Years Experience in Discipline			17.17	11.38			16.51	10.89			14.88	10.46
Less than 2 Years	3	7.3			5	5.0			4	3.7		
2-5 Years	5	12.2			9	8.9			14	12.8		
5-9 Years	4	9.8			18	17.8			24	22.0		
10-14 Years	6	14.6			17	16.8			18	16.5		
15-19 Years	5	12.2			10	9.9			10	9.2		
20 or More Years	18	43.9			42	41.6			39	35.8		
Years Experience in Pub. Health			8.64	8.51			9.10	8.83			8.46	7.42
Less than 2 Years	8	18.2			27	23.5			20	16.4		

Table 63 (continued).

Variables and Values	Less Than 5 Workers (n=44)				5 to 14 Workers (n=118)				15 to 49 Workers (n=124)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	10	22.7			22	19.1			23	18.9		
5-9 Years	9	20.5			22	19.1			35	28.7		
10-14 Years	10	22.7			17	14.8			21	17.2		
15-19 Years	3	6.8			6	5.2			9	7.4		
20 or More Years	4	9.1			21	18.3			14	11.5		
County Survey Response												
Very Small	44	100.0			0	0.0			0	0.0		
Small	0	0.0			118	100.0			0	0.0		
Medium	0	0.0			0	0.0			124	100.0		
Large	0	0.0			0	0.0			0	0.0		
Organized Health Department												
No	43	97.7			94	79.7			65	52.4		
Yes	1	2.3			24	20.3			59	47.6		
Position Category												
Officials & Administrators	5	11.4			10	8.5			3	2.5		
Professionals	32	72.7			84	71.2			87	71.9		
Technicians	0	0.0			4	3.4			5	4.1		
Protective Service	0	0.0			0	0.0			0	0.0		
Paraprofessionals	1	2.3			11	9.3			14	11.6		
Administrative Support	6	13.6			9	7.6			12	9.9		
Skilled Craft	0	0.0			0	0.0			0	0.0		
Service/Maintenance	0	0.0			0	0.0			0	0.0		
Professional Position												
No	7	15.9			24	20.3			31	25.6		
Yes	37	84.1			94	79.7			90	74.4		
Type of Position												
Front Line Staff	18	42.9			57	49.1			70	58.3		
Senior Level Staff	3	7.1			18	15.5			22	18.3		
Supervisory/Mgmt Staff	21	50.0			41	35.3			28	23.3		
Full-Time Employment												
No	8	18.2			26	22.2			30	24.8		
Yes	36	81.8			91	77.8			91	75.2		
Annual Salary (FTE)			$38,812	$14,021			$38,843	$14,902			$36,380	$10,798
Less Than $20,000	2	5.7			9	9.2			5	4.9		
$20,000 to $29,999	6	17.1			19	19.4			20	19.6		
$30,000 to $39,999	15	42.9			26	26.5			42	41.2		
$40,000 to $49,999	6	17.1			20	20.4			24	23.5		
$50,000 to $59,999	3	8.6			15	15.3			8	7.8		
$60,000 to $69,999	1	2.9			6	6.1			2	2.0		
$70,000 to $79,999	1	2.9			2	2.0			1	1.0		

Table 63 (continued).

Variables and Values	Less Than 5 Workers (n=44)				5 to 14 Workers (n=118)				15 to 49 Workers (n=124)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Over $80,000	1	2.9			1	1.0			0	0.0		
Know Non-English Language												
No	36	81.8			83	70.3			97	80.2		
Yes	8	18.2			35	29.7			24	19.8		
Other Language Speaking												
Fair	5	62.5			9	27.3			9	34.6		
Good	2	25.0			13	39.4			9	34.6		
Excellent	1	12.5			11	33.3			8	30.8		
Other Language Reading												
Fair	4	50.0			11	34.4			8	33.3		
Good	3	37.5			14	43.8			11	45.8		
Excellent	1	12.5			7	21.9			5	20.8		
Other Language Writing												
Fair	5	62.5			18	58.1			11	47.8		
Good	3	37.5			10	32.3			8	34.8		
Excellent	0	0.0			3	9.7			4	17.4		

Table 63 (continued).

Variables and Values	50 or More Workers (n=809)			
	n	%	Mean	SD
Age			43.47	11.11
Under 29 Years	112	14.1		
30-39 Years	169	21.3		
40-49 Years	242	30.5		
50-59 Years	225	28.3		
Over 60 Years	46	5.8		
Gender				
Male	148	19.3		
Female	620	80.7		
Race				
White	693	80.4		
Hispanic	109	13.7		
Black	16	2.0		
Asian	13	1.6		
Other or Multiracial	18	2.3		
Highest Education				
High School Diploma	121	15.1		
Profess./Vocational Diploma	43	5.4		
Associate Degree	59	7.4		
Baccalaureate Degree	366	45.6		
Master's Degree	190	23.7		
Doctoral Degree	23	2.9		
College Degree				
No	223	27.8		
Yes	579	72.2		
Years Since Last Degree			15.73	11.39
Less than 2 Years	41	5.4		
2-5 Years	111	14.7		
5-9 Years	138	18.3		
10-14 Years	109	14.4		
15-19 Years	86	11.4		
20 or More Years	271	35.8		
Years Experience in Discipline			13.84	10.63
Less than 2 Years	60	8.7		
2-5 Years	110	16.0		
5-9 Years	127	18.5		
10-14 Years	94	13.7		
15-19 Years	76	11.1		
20 or More Years	220	32.0		
Years Experience in Pub. Health			9.63	8.47
Less than 2 Years	124	15.8		

Table 63 (continued).

Variables and Values	50 or More Workers (n=809)			
	n	%	Mean	SD
2-5 Years	160	20.3		
5-9 Years	170	21.6		
10-14 Years	144	18.3		
15-19 Years	64	8.1		
20 or More Years	125	15.9		
County Survey Response				
Very Small	0	0.0		
Small	0	0.0		
Medium	0	0.0		
Large	809	100.0		
Organized Health Department				
No	0	0.0		
Yes	809	100.0		
Position Category				
Officials & Administrators	11	1.4		
Professionals	558	69.2		
Technicians	49	6.1		
Protective Service	3	0.4		
Paraprofessionals	66	8.2		
Administrative Support	119	14.8		
Skilled Craft	0	0.0		
Service/Maintenance	0	0.0		
Professional Position				
No	237	29.4		
Yes	569	70.6		
Type of Position				
Front Line Staff	455	57.7		
Senior Level Staff	151	19.2		
Supervisory/Mgmt Staff	182	23.1		
Full-Time Employment				
No	145	18.2		
Yes	653	81.8		
Annual Salary (FTE)			$43,013	$18,181
Less Than $20,000	22	3.3		
$20,000 to $29,999	120	18.0		
$30,000 to $39,999	172	25.9		
$40,000 to $49,999	152	22.9		
$50,000 to $59,999	97	14.6		
$60,000 to $69,999	45	6.8		
$70,000 to $79,999	23	3.5		

Table 63 (continued).

Variables and Values	50 or More Workers (n=809)			
	n	%	Mean	SD
Over $80,000	34	5.1		
Know Non-English Language				
No	550	69.0		
Yes	247	31.0		
Other Language Speaking				
Fair	78	31.7		
Good	78	31.7		
Excellent	90	36.6		
Other Language Reading				
Fair	80	33.3		
Good	80	32.9		
Excellent	82	33.7		
Other Language Writing				
Fair	103	43.6		
Good	67	28.4		
Excellent	66	28.0		

Table 64. Differences in Core Competency Proficiencies and Educational Needs by County Size

Core Competency Domains	Less Than 5 Workers (n=44)				5 to 14 Workers (n=118)				15 to 49 Workers (n=124)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	4.23	1.60	5	4.38	4.46	1.36	5	4.75	4.25	1.36	5	4.25
Policy Development/Prog. Planning Skills	3.79	1.57	8	3.88	4.18	1.41	8	4.38	4.02	1.43	7	4.25
Communication Skills	4.62	1.36	2	4.80	4.90	1.19	2	5.17	4.72	1.20	2	4.83
Cultural Competency Skills	4.76	1.49	1	5.13	5.10	1.04	1	5.25	5.12	1.23	1	5.25
Community Dimensions of Practice Skills	4.50	1.49	3	4.75	4.70	1.28	4	4.75	4.63	1.23	3	4.75
Basic Public Health Sciences Skills	4.18	1.57	6	4.25	4.32	1.39	6	4.50	4.13	1.49	6	4.25
Financial Planning & Management Skills	4.03	1.60	7	4.00	4.32	1.33	6	4.50	4.02	1.36	7	4.00
Leadership & Systems Thinking Skills	4.50	1.73	3	4.88	4.72	1.37	3	5.00	4.52	1.35	4	4.50
Core Competencies Composite Skills	*4.33*	*1.45*		*4.44*	*4.60*	*1.16*		*4.77*	*4.43*	*1.18*		*4.54*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	3.43	1.07	3	3.00	3.13	1.08	1	3.00	3.06	0.99	1	3.00
Policy Devel./Prog. Planning Educ. Needs	3.91	1.15	1	4.00	3.19	1.27	2	3.00	3.37	1.13	2	3.00
Communication Educ. Needs	2.82	1.04	8	3.00	2.75	1.26	8	3.00	2.69	1.15	7	2.00
Cultural Competency Educ. Needs	2.88	1.18	7	3.00	2.76	1.10	7	3.00	2.65	1.13	8	3.00
Community Dimen. of Practice Educ. Needs	3.49	0.98	2	4.00	2.92	1.25	6	3.00	2.92	1.02	6	3.00
Basic Public Health Sciences Educ. Needs	3.23	1.17	6	3.00	3.05	1.19	4	3.00	3.07	1.11	5	3.00
Financial Planning & Mgmt. Educ. Needs	3.28	1.24	5	3.00	3.06	1.26	3	3.00	3.37	1.30	2	4.00
Leadership & Systems Thinking Educ. Needs	3.29	1.07	4	3.00	3.01	1.15	5	3.00	3.20	1.08	4	3.00
Core Competencies Composite Educ. Needs	*3.29*	*0.72*		*3.25*	*2.98*	*0.87*		*3.00*	*3.04*	*0.73*		*3.00*

Table 64 (continued).

Core Competency Domains	50 or More Workers (n=809)				Stat. Diff.[3]
	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]					
Analytic/Assessment Skills	4.30	1.49	5	4.50	n.s.
Policy Development/Prog. Planning Skills	3.90	1.57	7	4.00	n.s.
Communication Skills	4.63	1.28	2	4.83	n.s.
Cultural Competency Skills	5.12	1.20	1	5.25	n.s.
Community Dimensions of Practice Skills	4.31	1.37	4	4.50	<.01
Basic Public Health Sciences Skills	4.04	1.53	6	4.25	n.s.
Financial Planning & Management Skills	3.82	1.42	8	3.80	<.01
Leadership & Systems Thinking Skills	4.59	1.39	3	4.75	n.s.
Core Competencies Composite Skills	*4.34*	*1.21*		*4.51*	*n.s.*
Educ. Needs in Core Competency Domains[2]					
Analytic/Assessment Educ. Needs	3.04	1.18	4	3	n.s.
Policy Devel./Prog. Planning Educ. Needs	3.06	1.27	3	3	<.001
Communication Educ. Needs	2.77	1.18	7	3	n.s.
Cultural Competency Educ. Needs	2.76	1.16	8	3	n.s.
Community Dimen. of Practice Educ. Needs	2.93	1.17	6	3	<.05
Basic Public Health Sciences Educ. Needs	3.07	1.29	2	3	n.s.
Financial Planning & Mgmt. Educ. Needs	3.14	1.43	1	3	n.s.
Leadership & Systems Thinking Educ. Needs	2.98	1.17	5	3	n.s.
Core Competencies Composite Educ. Needs	*2.97*	*0.86*		*3*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the four groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 69. Proficiencies in Core Competency Skills by County Size

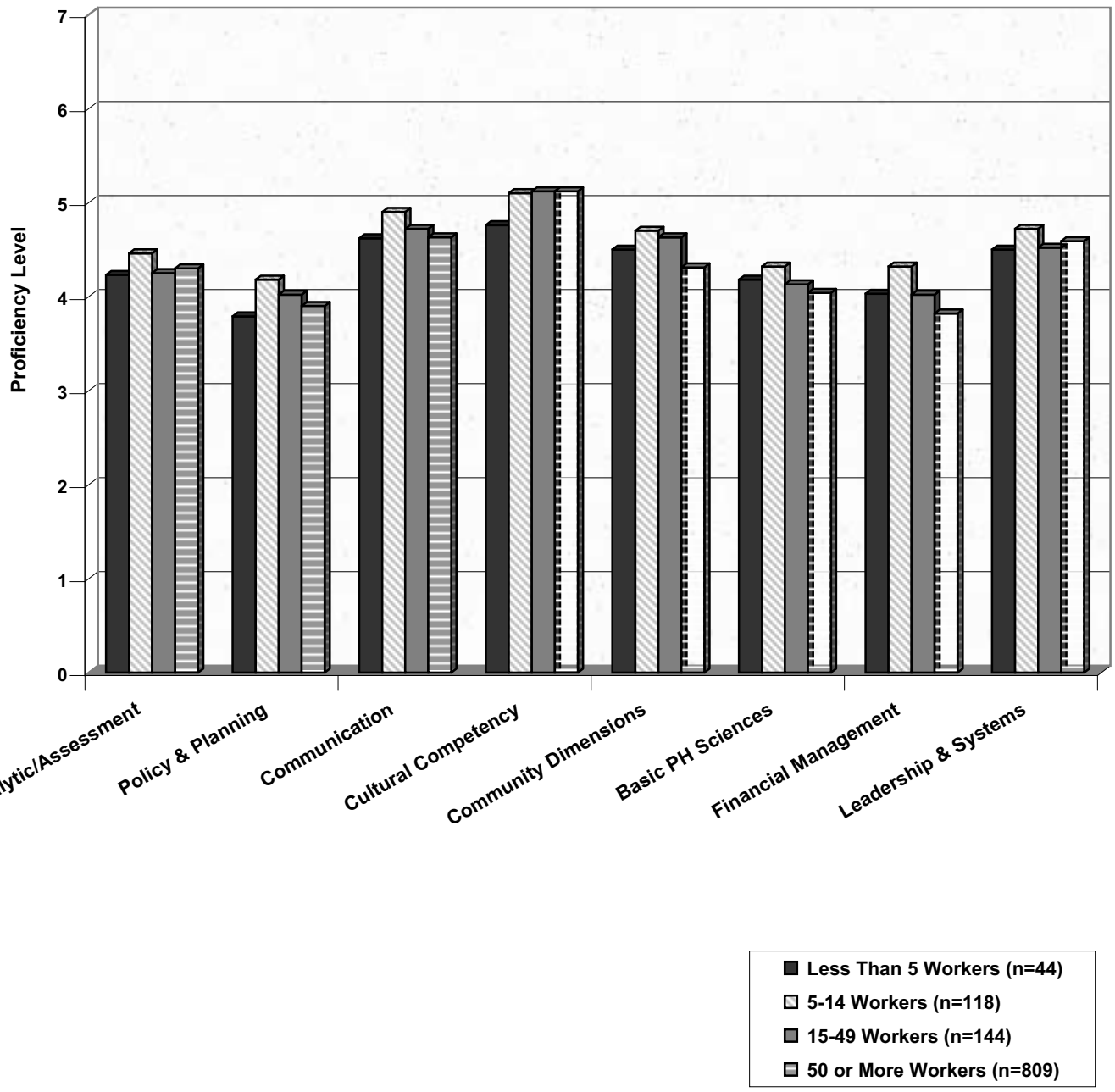


Figure 70. Educational Needs in Core Competency Skills by County Size

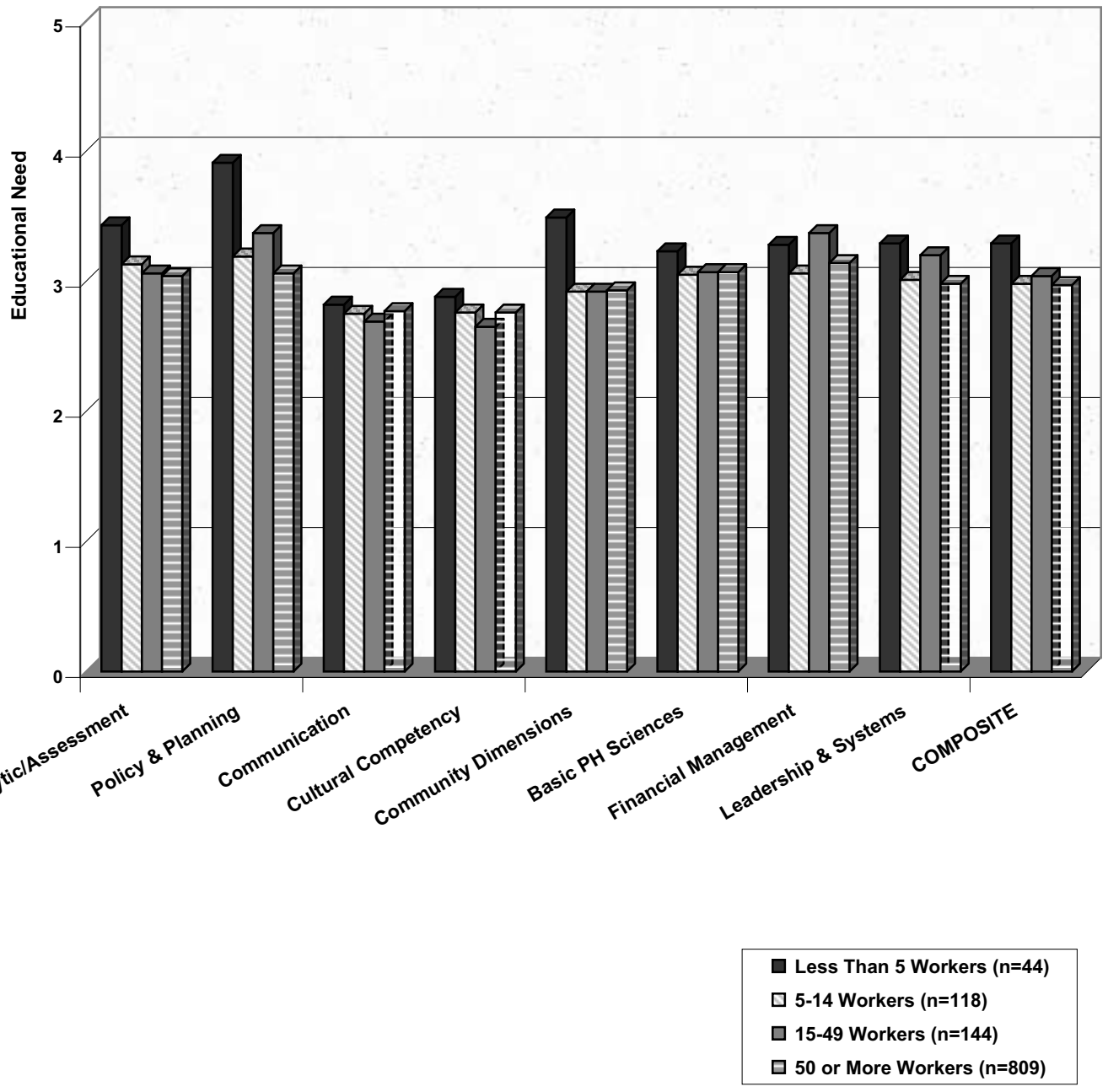


Table 65. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs by County Size (N=1,095)

Bioterrorism/Emergency Preparedness Competency Domains	Less Than 5 Workers (n=44)				5 to 14 Workers (n=118)				15 to 49 Workers (n=124)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	3.25	1.75	5	3.00	3.39	1.65	5	3.33x	2.51	1.49	6	2.33
Disaster Response Skills	4.04	1.66	2	4.00	4.23	1.44	1	4.33	3.65	1.41	1	3.67
Emergency Communication Skills	3.43	1.85	3	3.25	3.46	1.64	3	3.50	2.98	1.61	3	3.00
Biological/Infectious Disease Skills	3.05	1.76	6	2.50	3.17	1.69	6	3.00	2.60	1.54	5	2.00
Toxic Chem. & Env. Hazard Skills	2.91	1.91	7	2.00	2.97	1.74	7	3.00	2.33	1.49	7	2.00
Physical Injury Skills	4.23	1.94	1	4.00	3.57	1.88	2	3.00	3.43	1.82	2	4.00
Crisis Management Skills	3.27	2.05	4	3.00	3.43	1.89	4	3.00	2.91	1.65	4	3.00
Bioterrorism/EP Composite Skills	*3.45*	*1.63*		*3.12*	*3.48*	*1.43*		*3.23*	*2.91*	*1.35*		*3.00*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.84	1.29	1	4.00	3.80	1.25	2	4.00	3.85	1.26	1	4.00
Disaster Response Educ. Needs	3.80	1.29	3	4.00	3.79	1.29	3	4.00	3.82	1.26	2	4.00
Emergency Communication Educ. Needs	3.30	1.23	7	3.00	3.32	1.35	7	4.00	3.11	1.15	6	3.00
Biological/Infectious Disease Educ. Needs	3.80	1.05	3	4.00	3.68	1.31	4	4.00	3.60	1.29	4	4.00
Toxic Chem. & Env. Hazard Educ. Needs	3.82	1.35	2	4.00	3.86	1.31	1	4.00	3.77	1.33	3	4.00
Physical Injury Educ. Needs	3.41	1.09	6	4.00	3.50	1.31	5	4.00	2.97	1.26	3	3.00
Crisis Management Educ. Needs	3.63	1.11	5	4.00	3.49	1.21	6	4.00	3.40	1.05	5	4.00
Bioterrorism/EP Composite Educ. Needs	*3.66*	*0.94*		*3.86*	*3.64*	*1.04*		*3.86*	*3.50*	*0.98*		*3.71*

Table 65 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	50 or More Workers (n=809)				Stat. Diff.[3]
	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]					
Disaster Planning Skills	2.84	1.63	5	2.67	<.001
Disaster Response Skills	3.96	1.50	1	4.00	<.05
Emergency Communication Skills	3.37	1.68	2	3.00	n.s.
Biological/Infectious Disease Skills	2.80	1.75	6	2.00	<.05
Toxic Chem. & Env. Hazard Skills	2.69	1.76	7	2.00	<.05
Physical Injury Skills	3.20	1.85	3	3.00	<.001
Crisis Management Skills	2.95	1.85	4	2.00	n.s.
Bioterrorism/EP Composite Skills	*3.12*	*1.40*		*2.90*	*<.01*
Educational Needs in Bioterrorism/EP[2]					
Disaster Planning Educ. Needs	3.60	1.25	2	4	<.05
Disaster Response Educ. Needs	3.56	1.20	4	4.00	<.01
Emergency Communication Educ. Needs	3.07	1.23	7	3.00	n.s.
Biological/Infectious Disease Educ. Needs	3.58	1.32	3	4.00	n.s.
Toxic Chem. & Env. Hazard Educ. Needs	3.63	1.37	1	4.00	n.s.
Physical Injury Educ. Needs	3.33	1.32	6	3.00	<.01
Crisis Management Educ. Needs	3.36	1.26	5	3.00	n.s.
Bioterrorism/EP Composite Educ. Needs	*3.44*	*0.99*		*3.57*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the four groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When the overall difference among groups was not significant, n.s. is noted. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 71. Bioterrorism/Emergency Preparedness Skills by County Size

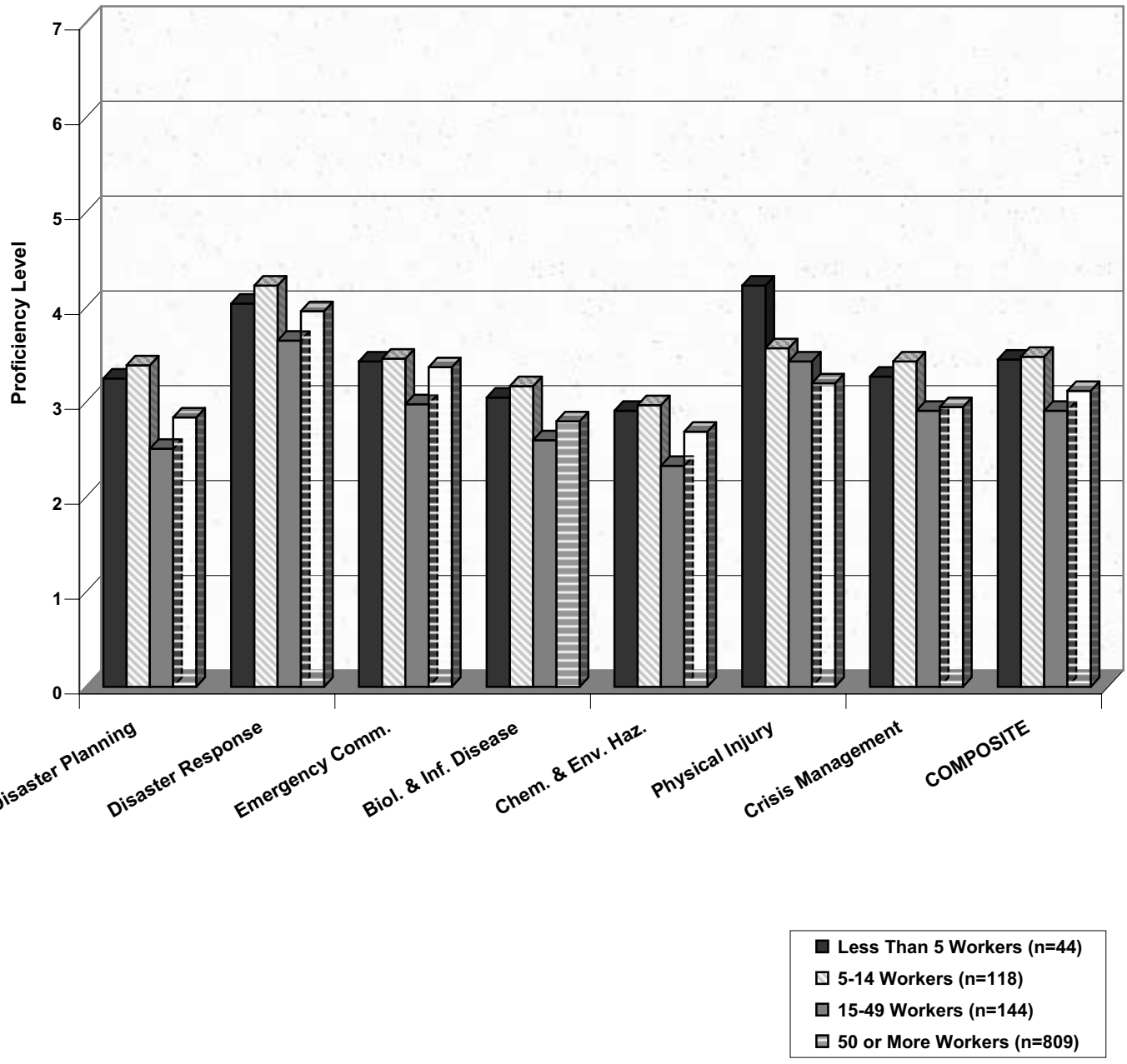


Figure 72. Educational Needs in Bioterrorism/Emergency Preparedness Skills by County Size

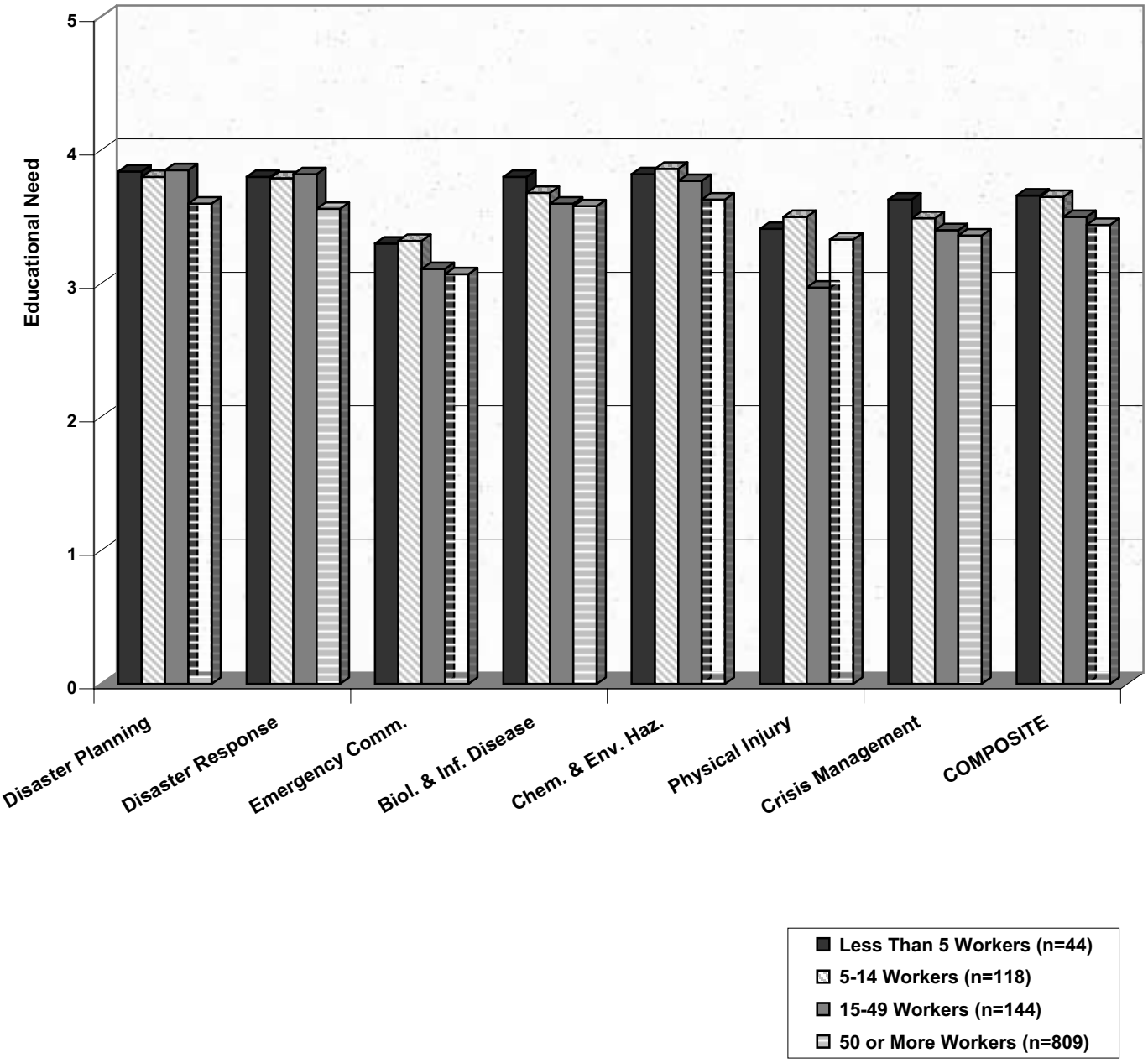


Table 66. Educational Preferences of Workers by County Size (N=1,095)

Types of Preference	Less Than 5 Workers (n=44)				5 to 14 Workers (n=118)				15 to 49 Workers (n=124)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	1.76	0.72	3	2.00	2.09	0.65	2	2.00	1.95	0.77	2	2.00
1-Day Workshops	2.88	0.33	1	3.00	2.65	0.53	1	3.00	2.56	0.56	1	3.00
Several-Day Workshops	1.93	0.76	2	2.00	1.70	0.77	3	2.00	1.68	0.74	3	2.00
Academic Semester Courses	1.43	0.71	4	1.00	1.27	0.54	4	1.00	1.46	0.67	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.83	0.38	1	3.00	2.80	0.44	1	3.00	2.75	0.44	1	3.00
Interactive Teleconferences	1.92	0.59	4	2.00	1.75	0.67	4	2.00	1.99	0.68	3	2.00
Internet, Web-Based Instruction	2.11	0.76	2	2.00	1.84	0.70	3	2.00	1.75	0.70	4	2.00
Combination Format	2.05	0.66	3	2.00	2.10	0.73	2	2.00	2.04	0.68	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.84	0.48	1	3.00	2.75	0.56	1	3.00	2.88	0.37	1	3.00
Weekend Classes	1.19	0.47	4	1.00	1.26	0.54	4	1.00	1.13	0.34	4	1.00
Evening Classes	1.31	0.47	3	1.00	1.39	0.64	3	1.00	1.33	0.54	3	1.00
Self-Determined Web-Based	2.05	0.73	2	2.00	1.96	0.74	2	2.00	1.81	0.71	2	2.00
Preferences for Educational Recognition												
Certificate	2.43	0.67	2	3.00	2.34	0.70	1	2.00	2.23	0.72	1	2.00
Continuing Education Units	2.47	0.60	1	3.00	2.20	0.77	2	2.00	2.31	0.71	2	2.00
Undergraduate Academic Credit	1.67	0.79	4	1.00	1.69	0.82	4	1.00	1.67	0.78	4	1.00
Graduate Academic Credit	1.78	0.87	3	1.50	1.96	0.86	3	2.00	1.96	0.86	3	2.00

Table 66 (continued).

Types of Preference	50 or More Workers (n=809)			
	Mean	SD	Rank	Median
Preferences for Course Length				
2-Hour Sessions	2.24	0.71	2	2.00
1-Day Workshops	2.44	0.62	1	3.00
Several-Day Workshops	1.69	0.74	3	2.00
Academic Semester Courses	1.41	0.67	4	1.00
Preferences for Educational Format				
Face-to-Face Classroom Setting	2.73	0.52	1	3.00
Interactive Teleconferences	1.67	0.63	4	2.00
Internet, Web-Based Instruction	1.77	0.70	3	2.00
Combination Format	1.97	0.69	2	2.00
Preferences for Time of Course Offering				
Weekday Classes	2.80	0.48	1	3.00
Weekend Classes	1.18	0.45	4	1.00
Evening Classes	1.40	0.62	3	1.00
Self-Determined Web-Based	1.77	0.71	2	2.00
Preferences for Educational Recognition				
Certificate	2.37	0.68	1	2.00
Continuing Education Units	2.18	0.79	2	2.00
Undergraduate Academic Credit	1.62	0.73	4	1.00
Graduate Academic Credit	1.92	0.84	3	2.00

6d. Differences Among Largest Counties

Additional comparisons were undertaken to determine whether there were differences in proficiencies and educational needs among the counties within a category of county size. Table 67 summarizes the characteristics of workers in Colorado's seven largest counties. These largest counties and their respective number of survey respondents were: Tri-County (n=201), El Paso County (n=164), Denver City and County (n=137), Boulder County (n=89), Weld County (n=83), Jefferson County (n=69), and Larimer County (n=66).

The average age across these counties ranged from 41.7 years to 45.7 years. Proportionately more men were employed with Denver City and County (38%) than with other large counties. The racial composition varied from a low of 68% white workers in Weld County to a high of 100% white workers in Larimer County. Boulder County and Tri-County employed lower percentages of college graduates (64% each) than other counties (range=71% to 91%). Experience in the discipline/major ranged from 12.0 years in Weld County to 16.8 years in Jefferson County. Public health experience ranged from a low of 6.4 years in Weld County to a high of 12.7 years in Larimer County.

Counties varied in the proportion of workers in the three types of positions. Jefferson County had the highest percentage of workers in Front Line Staff positions (64%), and Denver City and County had the lowest percentage (44%) of workers in this position. Jefferson County and Denver City and County had the highest proportion of full-time employees (91% each). In Larimer County and Boulder County, only 62% and 68%, respectively, were full-time employees.

Average full-time equivalent salaries varied across counties with the lowest average salary in Weld County and the highest average salary in Denver City and County. Mean salaries in increasing order were: Weld County ($35,375), El Paso County ($37,795), Tri-County ($38,916), Boulder County ($39,744), Jefferson County ($44,331), Larimer County ($49,522), and Denver City and County ($59,139). Counties with more than 30% of their workforce reporting they knew a non-English language included Boulder County, Tri-County, and Weld County. Larimer County had the lowest percentage of workers who reported they knew a non-English language (9%).

Table 68 summarizes the differences in Core Competency proficiencies and educational needs for the seven largest counties. No statistical difference was found in overall proficiency in Core Competency Skills (composite). However, statistical differences were found in five of the Core Competency subscales. These subscales were Analytic/Assessment Skills ($p < .01$), Policy Development/Program Planning Skills ($p < .01$), Communication Skills ($p < .05$), Basic Public Health Sciences ($p < .01$), and Financial Planning/Management Skills ($p < .01$). No differences were found in Cultural Competency Skills, Community Dimensions of Practice, and Leadership/Systems Thinking. Although some general patterns can be observed, the workforces in different counties had different strengths. Workers in Denver City and County had the highest proficiency in Analytic/Assessment Skills. Larimer County workers had the highest proficiency in Communication Skills, Policy Development/Program Planning Skills, and Basic Public Health Sciences Skills. Although Tri-County workers had one of the higher proficiencies in Cultural Competency Skills, they had the lowest proficiencies in Analytic/Assessment Skills, Policy Development/Program Planning Skills, and Financial Planning/Management Skills. Differences in Core Competency Skills across the largest counties are graphically presented in Figure 73.

A statistically significant difference ($p < .01$) was found in overall educational need for Core Competency Skills among these seven large Colorado counties. When the subscales were examined, significant differences were found for educational needs in Analytic/Assessment Skills ($p < .001$), Community Dimensions of Practice Skills ($p < .01$), Basic Public Health Sciences Skills

(p <.01), and Financial Planning/Management Skills (p <.01). Although educational needs in counties varied by subscale, several systematic patterns were discerned. Workers in Weld County and Boulder County reported the highest educational needs across most competencies. Jefferson County workers reported lower needs in Analytic/Assessment Skills than other counties, and Boulder County workers reported lower needs in Community Dimensions of Practice Skills than other counties. Denver City and County workers reported the least educational needs across most categories. Differences are visually presented in Figure 74.

Table 69 presents differences in Bioterrorism/Emergency Preparedness proficiencies and educational needs for the seven largest counties. A significant difference (p <.001) in overall competency was found among counties. Workers in El Paso County (mean=3.52), Boulder County (mean=3.24), and Weld County (mean=3.20) rated their overall proficiency higher than workers in Larimer County (mean=3.11) Jefferson County (mean=3.11), Denver City and County (mean=2.86), and Tri-County (mean=2.88).

When subscales of Bioterrorism/Emergency Preparedness Competency Skills were examined, differences were found in Disaster Planning Skills (p <.001), Emergency Communication Skills (p <.001), Biological/Infectious Disease Skills (p <.01), Physical Injury Skills (p <.01), and Crisis Management Skills (p <.001). As seen in Figure 75, workers from different counties vary by domain. El Paso County workers were highest in Disaster Planning Skills, Emergency Communication Skills, Biological/Infectious Disease Skills, and Physical Injury Skills. Boulder County excelled in Crisis Management Skills. Denver City and County and Tri-County workers were found to be least proficient in most dimensions.

No difference was found among the seven largest counties in overall educational need for Bioterrorism/Emergency Preparedness. Statistically significant differences were found on two subscales: Biological/Infectious Disease Skills (p <.05) and Toxic Chemical/Environmental Hazard Skills (p <.05). Boulder County and El Paso County identified highest needs in Biological/Infectious Disease Skills while Tri-County workers identified least needs. For Toxic Chemical/Environmental Hazard Skills, Weld County and El Paso County identified greatest needs; again Tri-County workers identified the least needs. Educational needs by county are graphically displayed in Figure 76.

As seen in Table 70, there was a consistent pattern of preferences across counties for course length, educational format, time of course offering, and educational recognition. Workers in Weld County demonstrated a greater preference for graduate academic credit than other workers from other large counties.

Table 67. Characteristics of Public Health Workforce in Colorado's Seven Largest Counties (N=809)

	Boulder County (n=89)				Denver City & County (n=137)				El Paso County (n=164)			
Variables and Values	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**
Age			45.36	11.82			44.58	9.95			42.84	10.74
Under 29 Years	8	9.0			12	8.9			24	15.1		
30-39 Years	23	25.8			29	21.5			36	22.6		
40-49 Years	21	23.6			48	35.6			49	30.8		
50-59 Years	26	29.2			38	28.1			45	28.3		
Over 60 Years	11	12.4			8	5.9			5	3.1		
Gender												
Male	15	18.1			50	38.2			20	12.8		
Female	68	81.9			81	61.8			136	87.2		
Race												
White	70	79.5			111	81.6			127	79.4		
Hispanic	12	13.6			17	12.5			17	10.6		
Black	0	0.0			3	2.2			8	5.0		
Asian	2	2.3			4	2.9			3	1.9		
Other or Multiracial	4	4.5			1	0.7			5	3.1		
Highest Education												
High School Diploma	8	9.0			9	6.6			30	18.9		
Profess./Vocational Diploma	8	9.0			7	5.1			0	0.0		
Associate Degree	16	18.0			10	7.3			17	10.7		
Baccalaureate Degree	36	40.4			64	46.7			74	46.5		
Master's Degree	20	22.5			36	26.3			33	20.8		
Doctoral Degree	1	1.1			11	8.0			5	3.1		
College Degree												
No	32	36.0			26	19.0			47	29.6		
Yes	57	64.0			111	81.0			112	70.4		
Years Since Last Degree			16.24	12.02			16.54	10.96			15.26	11.34
Less than 2 Years	8	9.2			3	2.3			11	7.6		
2-5 Years	8	9.2			19	14.7			28	19.4		
5-9 Years	18	20.7			18	14.0			17	11.8		
10-14 Years	11	12.6			22	17.1			18	12.5		
15-19 Years	14	16.1			17	13.2			20	13.9		
20 or More Years	28	32.2			50	38.8			50	34.7		
Years Experience in Discipline			15.52	10.90			14.16	10.55			12.47	10.04
Less than 2 Years	5	6.7			10	7.9			12	8.7		
2-5 Years	10	13.3			14	11.1			27	19.6		
5-9 Years	12	16.0			28	22.2			26	18.8		
10-14 Years	8	10.7			20	15.9			20	14.5		
15-19 Years	13	17.3			15	11.9			18	13.0		
20 or More Years	27	36.0			39	31.0			35	25.4		

Table 67 (continued)

Variables and Values	Boulder County (n=89)				Denver City & County (n=137)				El Paso County (n=164)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Years Experience in Pub. Health			9.07	7.39			9.42	7.93			8.70	8.48
Less than 2 Years	11	12.5			18	13.5			34	21.4		
2-5 Years	19	21.6			26	19.5			33	20.8		
5-9 Years	21	23.9			31	23.3			27	17.0		
10-14 Years	22	25.0			30	22.6			33	20.8		
15-19 Years	4	4.5			9	6.8			13	8.2		
20 or More Years	11	12.5			19	14.3			19	11.9		
County Survey Response												
Very Small	0	0.0			0	0.0			0	0.0		
Small	0	0.0			0	0.0			0	0.0		
Medium	0	0.0			0	0.0			0	0.0		
Large	89	100.0			137	100.0			164	100.0		
Organized Health Department												
No	0	0.0			0	0.0			0	0.0		
Yes	89	100.0			137	100.0			164	100.0		
Position Category												
Officials & Administrators	3	3.4			2	1.5			1	0.6		
Professionals	56	62.9			111	81.0			99	61.5		
Technicians	6	6.7			7	5.1			19	11.8		
Protective Service	0	0.0			2	1.5			1	0.6		
Paraprofessionals	11	12.4			1	0.7			19	11.8		
Administrative Support	13	14.6			14	10.2			22	13.7		
Professional Position												
No	30	33.7			24	17.5			61	37.9		
Yes	59	66.3			113	82.5			100	62.1		
Type of Position												
Front Line Staff	49	57.0			59	43.7			96	60.8		
Senior Level Staff	15	17.4			37	27.4			19	12.0		
Supervisory/Mgmt Staff	22	25.6			39	28.9			43	27.2		
Full-Time Employment												
No	28	31.8			12	8.8			19	11.9		
Yes	60	68.2			125	91.2			141	88.1		
Annual Salary (FTE)			$39,744	$16,648			$59,139	$21,234			$37,795	$14,852
Less Than $20,000	4	5.3			1	1.0			4	2.9		
$20,000 to $29,999	17	22.4			2	1.9			34	24.5		
$30,000 to $39,999	21	27.6			17	16.3			49	35.3		
$40,000 to $49,999	15	19.7			19	18.3			31	22.3		
$50,000 to $59,999	12	15.8			17	16.3			10	7.2		
$60,000 to $69,999	1	1.3			18	17.3			5	3.6		
$70,000 to $79,999	4	5.3			9	8.7			4	2.9		
Over $80,000	2	2.6			21	20.2			2	1.4		

Table 67 (continued)

Variables and Values	Boulder County (n=89)				Denver City & County (n=137)				El Paso County (n=164)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Know Non-English Language												
No	53	60.9			92	67.2			116	73.0		
Yes	34	39.1			45	32.8			43	27.0		
Other Language Speaking												
Fair	10	29.4			20	43.5			16	37.2		
Good	7	20.6			15	32.6			15	34.9		
Excellent	17	50.0			11	23.9			12	27.9		
Other Language Reading												
Fair	11	32.4			16	37.2			19	41.3		
Good	10	29.4			18	41.9			13	28.3		
Excellent	13	38.2			9	20.9			14	30.4		
Other Language Writing												
Fair	12	37.5			23	54.8			21	48.8		
Good	8	25.0			11	26.2			13	30.2		
Excellent	12	37.5			8	19.0			9	20.9		

Table 67 (continued).

Variables and Values	Jefferson County (n=69)				Larimer County (n=66)				Tri-County (n=201)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			45.37	9.58			45.68	11.32			41.72	12.26
Under 29 Years	6	9.0			10	15.2			43	21.9		
30-39 Years	9	13.4			9	13.6			36	18.4		
40-49 Years	26	38.8			15	22.7			54	27.6		
50-59 Years	25	37.3			27	40.9			51	26.0		
Over 60 Years	1	1.5			5	7.6			12	6.1		
Gender												
Male	12	19.0			11	17.7			29	15.1		
Female	51	81.0			51	82.3			163	84.9		
Race												
White	63	94.0			66	100.0			147	74.6		
Hispanic	1	1.5			0	.0			39	19.8		
Black	0	.0			0	.0			5	2.5		
Asian	3	4.5			0	.0			1	.5		
Other or Multiracial	0	.0			0	.0			5	2.5		
Highest Education												
High School Diploma	10	14.5			2	3.0			47	23.5		
Profess./Vocational Diploma	8	11.6			3	4.5			15	7.5		
Associate Degree	2	2.9			1	1.5			10	5.0		
Baccalaureate Degree	28	40.6			39	59.1			81	40.5		
Master's Degree	19	27.5			21	31.8			43	21.5		
Doctoral Degree	2	2.9			0	.0			4	2.0		
College Degree												
No	20	29.0			6	9.1			72	36.0		
Yes	49	71.0			60	90.9			128	64.0		
Years Since Last Degree			17.86	10.54			17.55	11.93			14.86	11.58
Less than 2 Years	1	1.5			2	3.2			12	6.3		
2-5 Years	5	7.7			7	11.3			29	15.1		
5-9 Years	12	18.5			13	21.0			43	22.4		
10-14 Years	11	16.9			6	9.7			30	15.6		
15-19 Years	9	13.8			6	9.7			12	6.3		
20 or More Years	27	41.5			28	45.2			66	34.4		
Years Experience in Discipline			16.75	10.68			15.75	11.34			12.91	10.63
Less than 2 Years	5	8.5			4	6.3			20	12.8		
2-5 Years	8	13.6			6	9.4			27	17.3		
5-9 Years	2	3.4			17	26.6			29	18.6		
10-14 Years	9	15.3			6	9.4			17	10.9		
15-19 Years	10	16.9			2	3.1			14	9.0		
20 or More Years	25	42.4			29	45.3			49	31.4		
Years Experience in Pub. Health			10.91	9.16			12.67	10.27			10.67	8.61
Less than 2 Years	6	8.7			6	9.1			30	15.7		

Table 67 (continued).

Variables and Values	Jefferson County (n=69)				Larimer County (n=66)				Tri-County (n=201)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	14	20.3			17	25.8			28	14.7		
5-9 Years	20	29.0			8	12.1			43	22.5		
10-14 Years	6	8.7			8	12.1			34	17.8		
15-19 Years	10	14.5			6	9.1			17	8.9		
20 or More Years	13	18.8			21	31.8			39	20.4		
County Survey Response												
Very Small	0	.0			0	.0			0	.0		
Small	0	.0			0	.0			0	.0		
Medium	0	.0			0	.0			0	.0		
Large	69	100.0			66	100.0			201			
Organized Health Department												
No	0	.0			0	.0			0	.0		
Yes	69	100.0			66	100.0			201	100.0		
Position Category												
Officials & Administrators	2	2.9			0	.0			1	.5		
Professionals	48	69.6			63	95.5			124	61.7		
Technicians	1	1.4			0	.0			10	5.0		
Protective Service	0	.0			0	.0			0	.0		
Paraprofessionals	1	1.4			1	1.5			30	14.9		
Administrative Support	17	24.6			2	3.0			36	17.9		
Professional Position												
No	19	27.5			3	4.5			76	37.8		
Yes	50	72.5			63	95.5			125	62.2		
Type of Position												
Front Line Staff	43	64.2			38	58.5			120	61.2		
Senior Level Staff	13	19.4			10	15.4			39	19.9		
Supervisory/Mgmt Staff	11	16.4			17	26.2			37	18.9		
Full-Time Employment												
No	6	9.0			25	37.9			32	16.1		
Yes	61	91.0			41	62.1			167	83.9		
Annual Salary (FTE)			$44,331	$20,604			$49,522	$12,178			$38,916	$16,167
Less Than $20,000	1	1.9			0	.0			5	3.2		
$20,000 to $29,999	12	22.6			0	.0			42	26.6		
$30,000 to $39,999	8	15.1			11	17.2			43	27.2		
$40,000 to $49,999	13	24.5			23	35.9			29	18.4		
$50,000 to $59,999	13	24.5			16	25.0			25	15.8		
$60,000 to $69,999	3	5.7			9	14.1			7	4.4		
$70,000 to $79,999	1	1.9			2	3.1			3	1.9		
Over $80,000	2	3.8			3	4.7			4	2.5		
Know Non-English Language												
No	52	78.8			60	90.9			123	61.8		

Table 67 (continued).

Variables and Values	Jefferson County (n=69)				Larimer County (n=66)				Tri-County (n=201)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Yes	14	21.2			6	9.1			76	32.8		
Other Language Speaking												
Fair	6	42.9			3	50.0			21	28.4		
Good	4	28.6			2	33.3			27	36.5		
Excellent	4	28.6			1	16.7			26	35.1		
Other Language Reading												
Fair	6	42.9			3	50.0			22	31.0		
Good	4	28.6			2	33.3			26	36.6		
Excellent	4	28.6			1	16.7			23	32.4		
Other Language Writing												
Fair	8	57.1			4	66.7			29	41.4		
Good	3	21.4			2	33.3			22	31.4		
Excellent	3	21.4			0	.0			19	27.1		

Table 67 (continued).

Variables and Values	Weld County (n=83)			
	n	%	Mean	SD
Age			41.67	10.19
Under 29 Years	9	11.0		
30-39 Years	27	32.9		
40-49 Years	29	35.4		
50-59 Years	13	15.9		
Over 60 Years	4	4.9		
Gender				
Male	11	13.6		
Female	70	86.4		
Race				
White	55	67.9		
Hispanic	23	28.4		
Black	0	.0		
Asian	0	.0		
Other or Multiracial	3	3.7		
Highest Education				
High School Diploma	15	18.3		
Profess./Vocational Diploma	2	2.4		
Associate Degree	3	3.7		
Baccalaureate Degree	44	53.7		
Master's Degree	18	22.0		
Doctoral Degree	0	.0		
College Degree				
No	20	24.4		
Yes	62	75.6		
Years Since Last Degree			13.58	10.98
Less than 2 Years	4	5.2		
2-5 Years	15	19.5		
5-9 Years	17	22.1		
10-14 Years	11	14.3		
15-19 Years	8	10.4		
20 or More Years	22	28.6		
Years Experience in Discipline			11.97	10.24
Less than 2 Years	4	5.8		
2-5 Years	18	26.1		
5-9 Years	13	18.8		
10-14 Years	14	20.3		
15-19 Years	4	5.8		
20 or More Years	16	23.2		
Years Experience in Pub. Health			6.43	6.55
Less than 2 Years	19	23.5		

Table 67 (continued).

Variables and Values	Weld County (n=83)			
	n	%	Mean	SD
2-5 Years	23	28.4		
5-9 Years	20	24.7		
10-14 Years	11	13.6		
15-19 Years	5	6.2		
20 or More Years	3	3.7		
County Survey Response				
Very Small	0	.0		
Small	0	.0		
Medium	0	.0		
Large	83	100.0		
Organized Health Department				
No	0	.0		
Yes	83	100.0		
Position Category				
Officials & Administrators	2	2.4		
Professionals	57	68.7		
Technicians	6	7.2		
Protective Service	0	.0		
Paraprofessionals	3	3.6		
Administrative Support	15	18.1		
Professional Position				
No	24	28.9		
Yes	59	71.1		
Type of Position				
Front Line Staff	50	61.7		
Senior Level Staff	18	22.2		
Supervisory/Mgmt Staff	13	16.0		
Full-Time Employment				
No	23	28.4		
Yes	58	71.6		
Annual Salary (FTE)			$35,375	$10,768
Less Than $20,000	7	9.9		
$20,000 to $29,999	13	18.3		
$30,000 to $39,999	23	32.4		
$40,000 to $49,999	22	31.0		
$50,000 to $59,999	4	5.6		
$60,000 to $69,999	2	2.8		
$70,000 to $79,999	0	.0		
Over $80,000	0	.0		
Know Non-English Language				
No	54	65.1		

Table 67 (continued).

Variables and Values	Weld County (n=83)			
	n	%	Mean	SD
Yes	29	34.9		
Other Language Speaking				
Fair	2	6.9		
Good	8	27.6		
Excellent	19	65.5		
Other Language Reading				
Fair	4	13.8		
Good	7	24.1		
Excellent	18	62.1		
Other Language Writing				
Fair	6	20.7		
Good	8	27.6		
Excellent	15	51.7		

Table 68. Differences in Core Competency Proficiencies and Educational Needs in Colorado's Seven Largest Counties (N=809)

Core Competency Domains	Boulder County (n=89)				Denver City & County (n=137)				El Paso County (n=164)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	4.35	1.43	5	4.50	4.67	1.47	3	5.00	4.11	1.57	5	4.25
Policy Development/Prog. Planning Skills	3.94	1.56	8	4.00	4.15	1.55	7	4.50	3.78	1.56	6	4.00
Communication Skills	4.81	1.17	2	5.00	4.78	1.19	2	5.00	4.48	1.36	2	4.60
Cultural Competency Skills	5.25	1.07	1	5.50	5.05	1.13	1	5.25	5.16	1.31	1	5.25
Community Dimensions of Practice Skills	4.43	1.34	4	4.50	4.21	1.33	5	4.25	4.21	1.40	4	4.50
Basic Public Health Sciences Skills	4.06	1.41	6	4.50	4.16	1.56	6	4.25	3.78	1.62	6	4.00
Financial Planning & Management Skills	4.00	1.33	7	4.20	4.01	1.38	8	4.20	3.78	1.42	6	3.60
Leadership & Systems Thinking Skills	4.79	1.26	3	5.00	4.60	1.41	4	5.00	4.47	1.40	3	4.63
Core Competencies Composite Skills	*4.46*	*1.13*		*4.59*	*4.46*	*1.16*		*4.63*	*4.22*	*1.25*		*4.31*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	3.16	1.14	1	3.00	2.90	1.21	3	3.00	3.21	1.18	3	3.00
Policy Devel./Prog. Planning Educ. Needs	3.02	1.31	3	3.00	2.89	1.21	4	3.00	3.18	1.33	4	3.00
Communication Educ. Needs	2.64	1.23	8	3.00	2.61	1.15	8	2.00	2.81	1.24	7	3.00
Cultural Competency Educ. Needs	2.65	1.24	7	2.00	2.70	1.06	7	2.00	2.74	1.23	8	3.00
Community Dimen. of Practice Educ. Needs	2.70	1.11	6	3.00	2.79	1.17	6	3.00	3.11	1.23	5	3.00
Basic Public Health Sciences Educ. Needs	3.03	1.21	2	3.00	2.92	1.32	2	3.00	3.36	1.31	1	3.00
Financial Planning & Mgmt. Educ. Needs	2.99	1.30	5	3.00	3.08	1.42	1	3.00	3.36	1.47	1	4.00
Leadership & Systems Thinking Educ. Needs	3.01	1.14	4	3.00	2.83	1.20	5	3.00	3.10	1.18	6	3.00
Core Competencies Composite Educ. Needs	*2.90*	*0.81*		*2.88*	*2.84*	*0.84*		*2.75*	*3.11*	*0.89*		*3.00*

Table 68 (continued).

Core Competency Domains	Jefferson County (n=69)				Larimer County (n=66)				Tri-County (n=201)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	4.21	1.56	4	4.50	4.55	1.36	5	4.75	4.08	1.48	5	4.38
Policy Development/Prog. Planning Skills	3.90	1.71	7	4.00	4.22	1.63	7	4.50	3.58	1.58	7	3.50
Communication Skills	4.51	1.51	3	4.83	4.98	1.20	2	5.17	4.48	1.29	3	4.67
Cultural Competency Skills	4.82	1.32	1	5.00	5.25	0.99	1	5.25	5.15	1.23	1	5.25
Community Dimensions of Practice Skills	4.20	1.58	5	4.50	4.56	1.32	4	4.63	4.30	1.36	4	4.50
Basic Public Health Sciences Skills	4.10	1.65	6	4.25	4.52	1.41	6	4.75	3.87	1.55	6	4.00
Financial Planning & Management Skills	3.88	1.56	8	4.00	3.97	1.44	8	4.10	3.48	1.46	8	3.33
Leadership & Systems Thinking Skills	4.54	1.54	2	4.75	4.75	1.37	3	5.00	4.53	1.44	2	4.75
Core Competencies Composite Skills	*4.27*	*1.43*		*4.57*	*4.60*	*1.18*		*4.63*	*4.18*	*1.21*		*4.21*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	2.67	1.08	8	3.00	3.00	0.98	3	3.00	2.94	1.28	5	3.00
Policy Devel./Prog. Planning Educ. Needs	3.01	1.31	1	3.00	3.14	1.18	2	3.00	2.95	1.27	3	3.00
Communication Educ. Needs	2.97	1.21	2	3.00	2.62	1.05	7	3.00	2.83	1.14	6	3.00
Cultural Competency Educ. Needs	2.90	1.21	6	3.00	2.62	0.96	7	3.00	2.76	1.18	8	3.00
Community Dimen. of Practice Educ. Needs	2.96	1.21	4	3.00	2.88	1.10	5	3.00	2.83	1.15	6	3.00
Basic Public Health Sciences Educ. Needs	2.94	1.24	5	3.00	2.79	1.06	6	3.00	2.98	1.34	1	3.00
Financial Planning & Mgmt. Educ. Needs	2.96	1.43	3	3.00	3.30	1.28	1	4.00	2.95	1.51	3	3.00
Leadership & Systems Thinking Educ. Needs	2.81	1.28	7	3.00	3.00	1.11	3	3.00	2.98	1.16	1	3.00
Core Competencies Composite Educ. Needs	*2.90*	*0.92*		*3.00*	*2.92*	*0.74*		*3.00*	*2.90*	*0.87*		*3.00*

Table 68 (continued).

Core Competency Domains	Weld County (n=83) Mean	SD	Rank	Median	Stat. Diff.[3]
Proficiencies in Core Competency Domains[1]					
Analytic/Assessment Skills	4.42	1.33	5	4.75	<.01
Policy Development/Prog. Planning Skills	4.15	1.26	7	4.50	<.01
Communication Skills	4.65	1.18	2	4.67	<.05
Cultural Competency Skills	5.14	1.21	1	5.25	n.s.
Community Dimensions of Practice Skills	4.47	1.23	4	4.50	n.s.
Basic Public Health Sciences Skills	4.32	1.28	6	4.50	<.01
Financial Planning & Management Skills	4.08	1.28	8	4.20	<.01
Leadership & Systems Thinking Skills	4.65	1.23	2	4.75	n.s.
Core Competencies Composite Skills	*4.48*	*1.11*		*4.74*	*n.s.*
Educ. Needs in Core Competency Domains[2]					
Analytic/Assessment Educ. Needs	3.45	1.02	2	4.00	<.001
Policy Devel./Prog. Planning Educ. Needs	3.37	1.22	4	3.00	n.s.
Communication Educ. Needs	2.90	1.19	8	3.00	n.s.
Cultural Competency Educ. Needs	2.96	1.12	7	3.00	n.s.
Community Dimen. of Practice Educ. Needs	3.30	1.10	5	3.00	<.01
Basic Public Health Sciences Educ. Needs	3.39	1.23	3	3.00	<.01
Financial Planning & Mgmt. Educ. Needs	3.52	1.32	1	4.00	<.01
Leadership & Systems Thinking Educ. Needs	3.05	1.09	6	3.00	n.s.
Core Competencies Composite Educ. Needs	*3.24*	*0.82*		*3.25*	*<.01*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the seven groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 73. Proficiencies in Core Competency Skills for Colorado's Seven Largest Counties

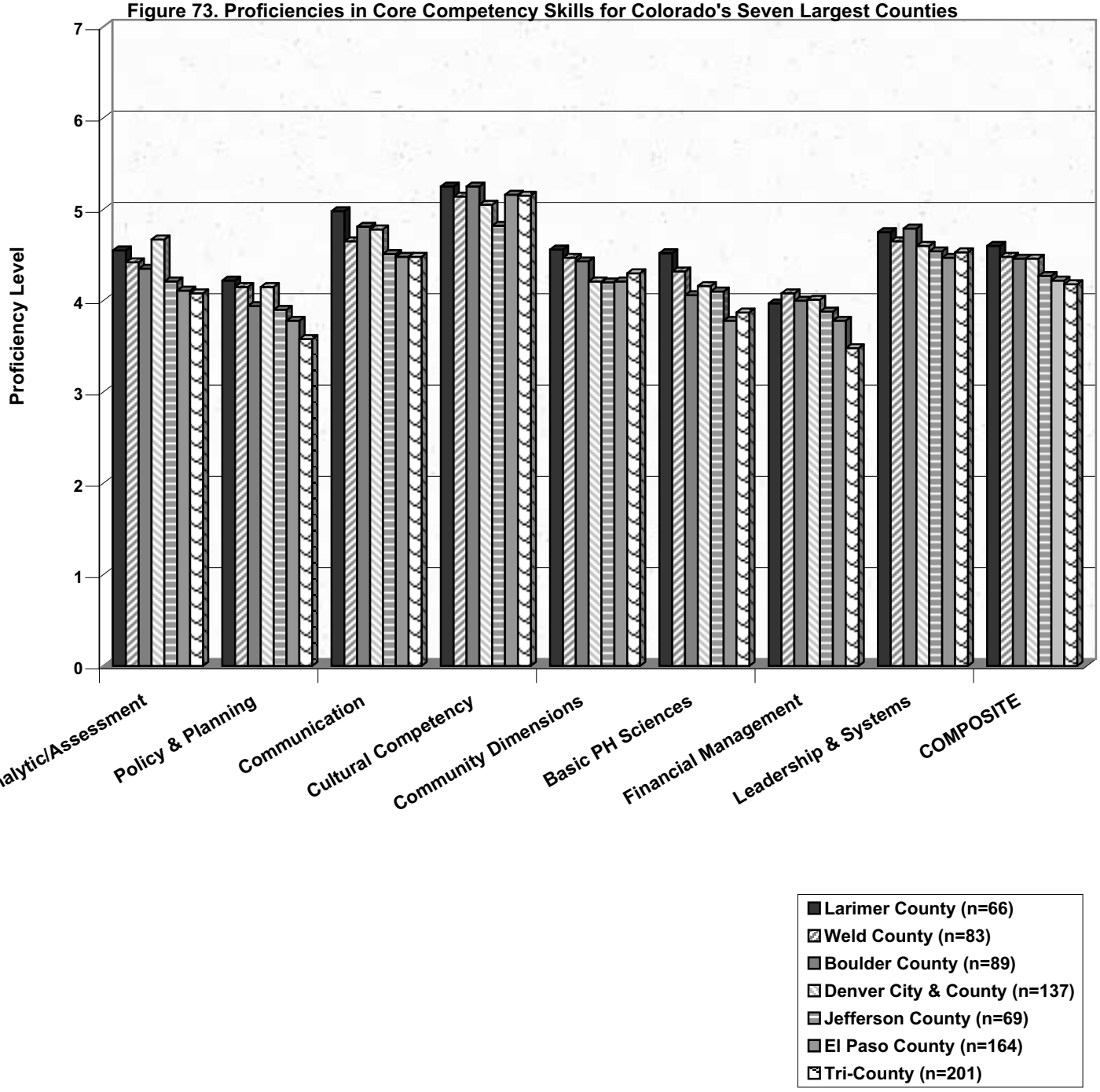


Figure 74. Educational Needs for Core Competency Skills for Colorado's Seven Largest Counties

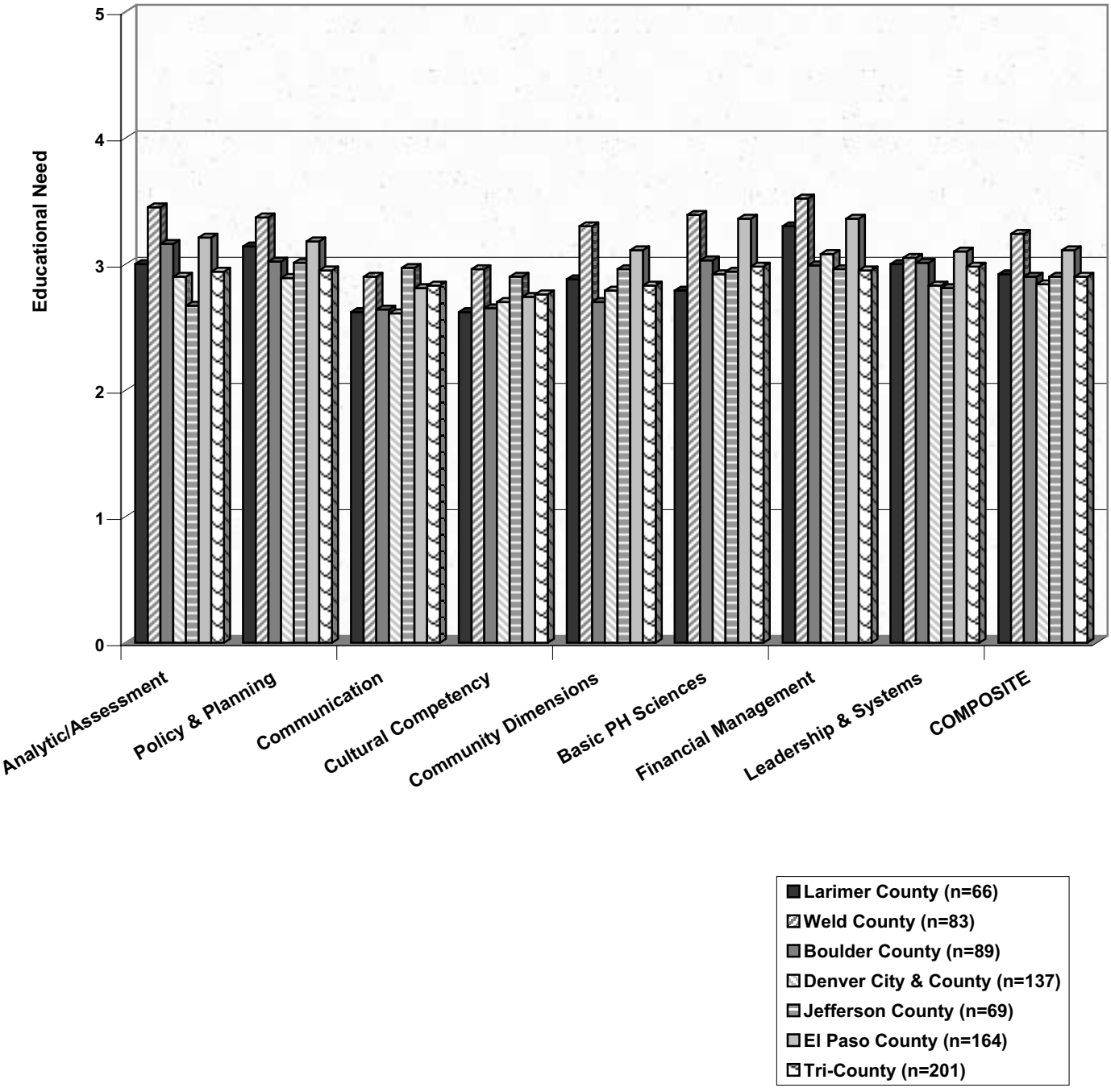


Table 69. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs in Colorado's Seven Largest Counties (N=809)

Bioterrorism/Emergency Preparedness Competency Domains	Boulder County (n=89)				Denver City & County (n=137)				El Paso County (n=164)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	2.84	1.54	5	2.67	2.58	1.53	4	2.00	3.27	1.56	5	3.17
Disaster Response Skills	4.01	1.59	1	4.00	3.75	1.42	1	3.67	4.14	1.40	2	4.33
Emergency Communication Skills	3.61	1.75	2	3.50	3.06	1.58	3	2.50	4.25	1.53	1	4.50
Biological/Infectious Disease Skills	2.74	1.67	6	2.00	2.42	1.63	7	2.00	3.23	1.75	6	3.00
Toxic Chem. & Env. Hazard Skills	2.66	1.69	7	2.00	2.56	1.60	5	2.00	2.83	1.80	7	2.00
Physical Injury Skills	3.19	1.77	4	3.00	3.08	1.85	2	3.00	3.54	1.90	3	4.00
Crisis Management Skills	3.57	2.02	3	3.00	2.55	1.69	6	2.00	3.32	1.99	4	3.00
Bioterrorism/EP Composite Skills	*3.24*	*1.33*		*3.02*	*2.86*	*1.25*		*2.62*	*3.52*	*1.39*		*3.33*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.63	1.31	3	4.00	3.58	1.29	2	4.00	3.72	1.14	3	4.00
Disaster Response Educ. Needs	3.63	1.16	3	4.00	3.59	1.18	1	4.00	3.45	1.13	6	3.00
Emergency Communication Educ. Needs	2.97	1.12	7	3.00	2.97	1.19	7	3.00	3.01	1.28	7	3.00
Biological/Infectious Disease Educ. Needs	3.76	1.22	1	4.00	3.49	1.43	4	4.00	3.74	1.33	2	4.00
Toxic Chem. & Env. Hazard Educ. Needs	3.64	1.42	2	4.00	3.52	1.39	3	4.00	3.86	1.28	1	4.00
Physical Injury Educ. Needs	3.38	1.27	5	4.00	3.20	1.36	6	3.00	3.52	1.34	4	4.00
Crisis Management Educ. Needs	3.17	1.31	6	3.00	3.36	1.22	5	3.00	3.50	1.28	5	4.00
Bioterrorism/EP Composite Educ. Needs	*3.45*	*0.92*		*3.57*	*3.38*	*0.96*		*3.43*	*3.53*	*0.91*		*3.57*

Table 69 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	Jefferson County (n=69)				Larimer County (n=66)				Tri-County (n=201)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	2.92	1.82	5	2.33	2.89	1.78	5	2.00	2.65	1.65	5	2.00
Disaster Response Skills	3.87	1.63	1	4.00	4.13	1.45	1	4.33	3.80	1.59	1	4.00
Emergency Communication Skills	3.12	1.70	3	3.00	3.05	1.65	4	2.50	2.96	1.60	2	2.50
Biological/Infectious Disease Skills	2.78	1.86	7	2.00	2.74	1.69	6	3.00	2.71	1.84	4	2.00
Toxic Chem. & Env. Hazard Skills	2.86	1.95	6	2.00	2.66	1.87	7	2.00	2.65	1.78	5	2.00
Physical Injury Skills	3.18	2.00	2	3.00	3.25	1.66	2	3.00	2.86	1.82	3	2.00
Crisis Management Skills	3.06	1.92	4	3.00	3.06	1.80	3	3.00	2.59	1.66	7	2.00
Bioterrorism/EP Composite Skills	*3.11*	*1.61*		*2.83*	*3.11*	*1.46*		*2.90*	*2.88*	*1.40*		*2.57*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.70	1.23	2	4.00	3.45	1.17	4	3.00	3.43	1.36	1	4.00
Disaster Response Educ. Needs	3.78	1.27	1	4.00	3.56	1.15	3	3.00	3.43	1.28	1	4.00
Emergency Communication Educ. Needs	3.38	1.16	6	3.00	2.94	1.16	7	3.00	3.06	1.29	7	3.00
Biological/Infectious Disease Educ. Needs	3.65	1.30	4	4.00	3.68	1.08	2	4.00	3.32	1.35	4	3.00
Toxic Chem. & Env. Hazard Educ. Needs	3.68	1.37	3	4.00	3.73	1.20	1	4.00	3.36	1.46	3	4.00
Physical Injury Educ. Needs	3.38	1.32	6	4.00	3.33	1.19	5	3.00	3.20	1.39	6	3.00
Crisis Management Educ. Needs	3.55	1.31	5	4.00	3.32	1.01	6	3.00	3.24	1.33	5	3.00
Bioterrorism/EP Composite Educ. Needs	*3.59*	*1.10*		*3.57*	*3.43*	*0.85*		*3.43*	*3.29*	*1.10*		*3.43*

Table 69 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	Weld County (n=83)				Stat. Diff.[3]
	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]					
Disaster Planning Skills	2.81	1.58	6	3.00	<.001
Disaster Response Skills	4.22	1.38	1	4.33	n.s.
Emergency Communication Skills	3.37	1.58	3	3.50	<.001
Biological/Infectious Disease Skills	2.91	1.63	4	3.00	<.01
Toxic Chem. & Env. Hazard Skills	2.69	1.70	7	2.00	n.s.
Physical Injury Skills	3.52	1.83	2	3.50	<.01
Crisis Management Skills	2.88	1.75	5	3.00	<.001
Bioterrorism/EP Composite Skills	*3.20*	*1.38*		*3.36*	*<.001*
Educational Needs in Bioterrorism/EP[2]					
Disaster Planning Educ. Needs	3.78	1.13	2	4.00	n.s.
Disaster Response Educ. Needs	3.78	1.15	2	4.00	n.s.
Emergency Communication Educ. Needs	3.32	1.28	7	4.00	n.s.
Biological/Infectious Disease Educ. Needs	3.68	1.24	4	4.00	<.05
Toxic Chem. & Env. Hazard Educ. Needs	3.89	1.26	1	4.00	<.05
Physical Injury Educ. Needs	3.39	1.18	6	3.00	n.s.
Crisis Management Educ. Needs	3.51	1.16	5	4.00	n.s.
Bioterrorism/EP Composite Educ. Needs	*3.62*	*0.92*		*3.86*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the seven groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 75. Proficiencies in Bioterrorism/Emergency Preparedness Skills for Colorado's Seven Largest Counties

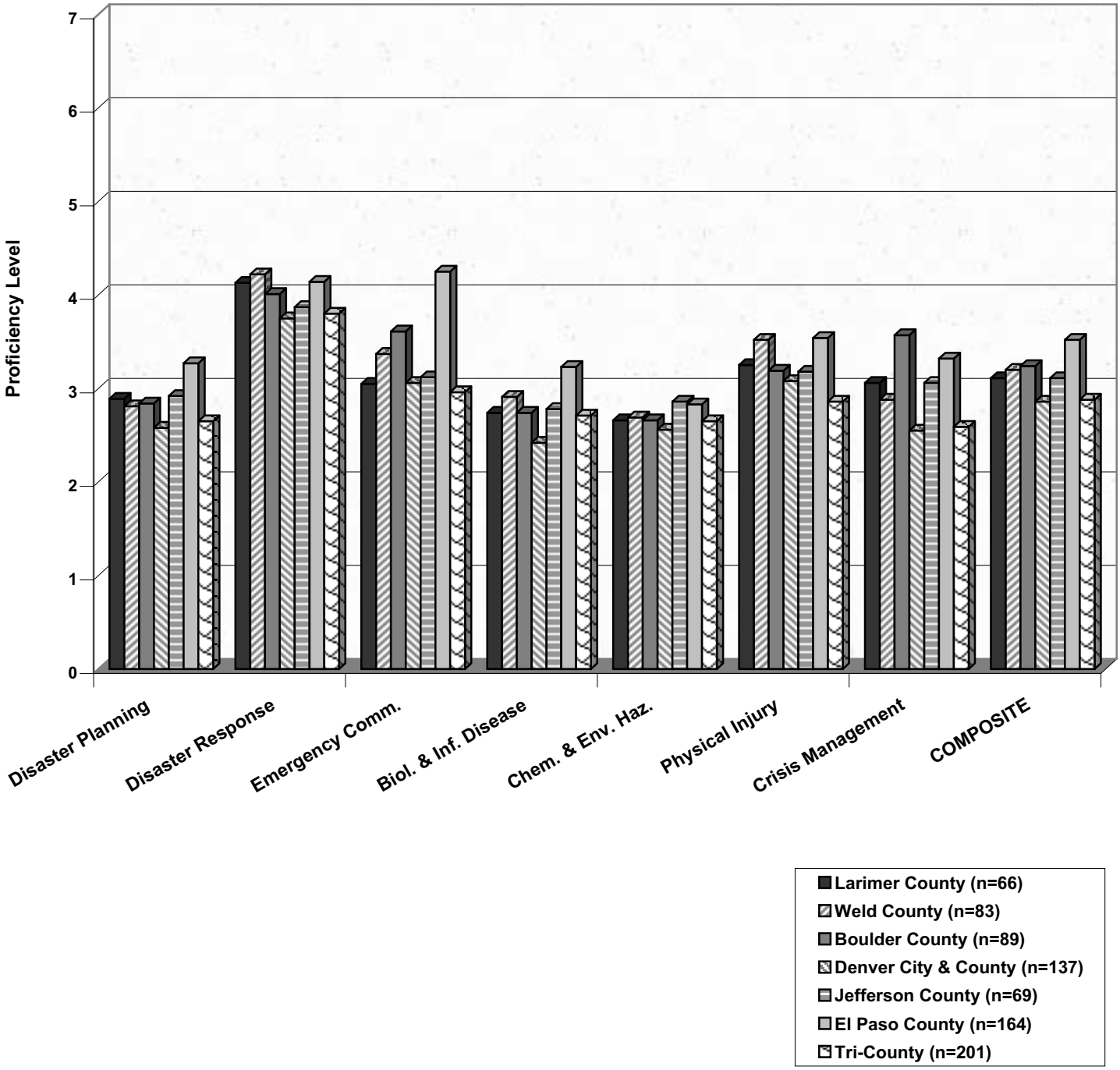


Figure 76. Educational Needs in Bioterrorism/Emergency Preparedness Skills in Colorado's Seven Largest Counties

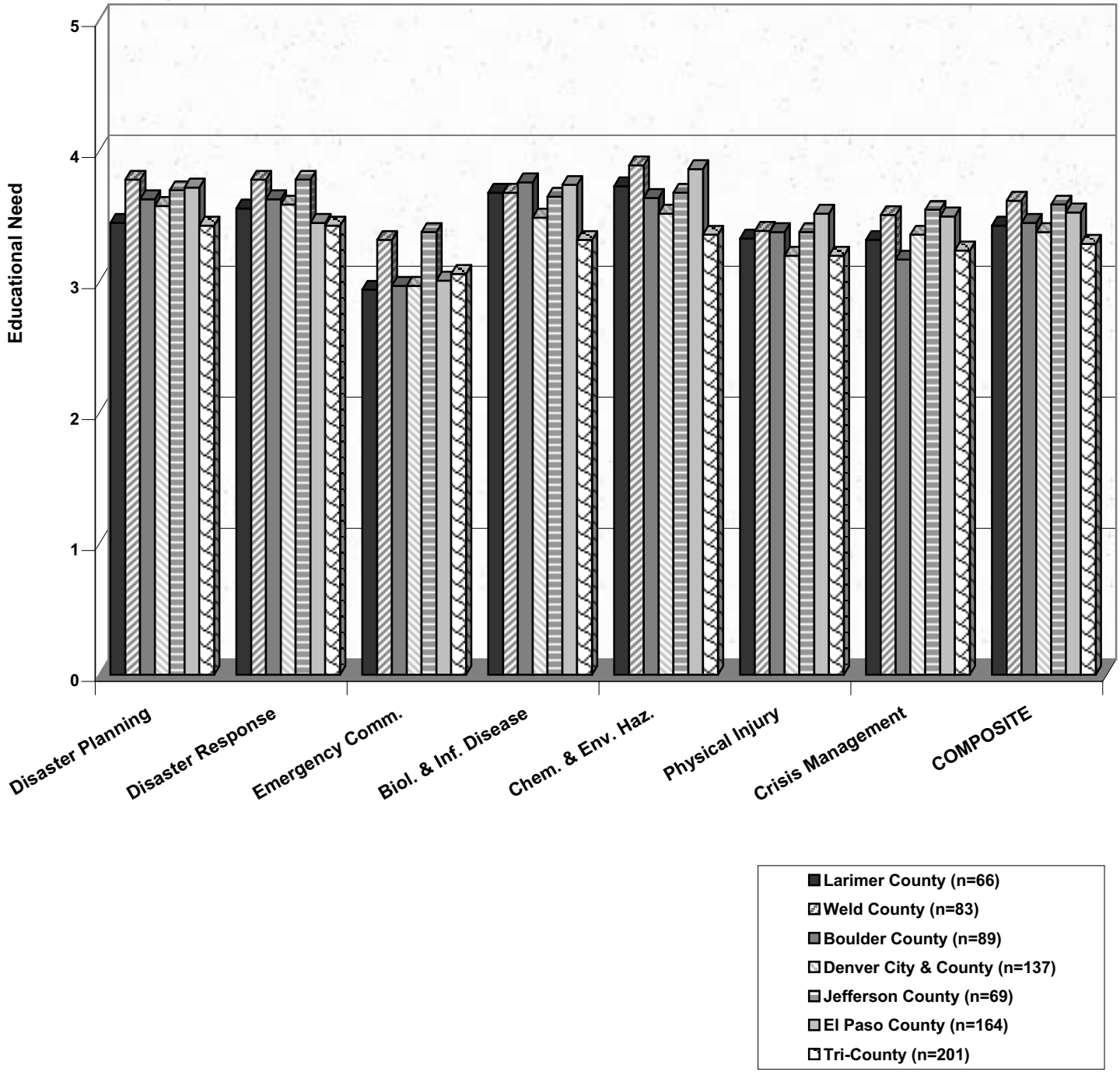


Table 70. Educational Preferences of Workers in Colorado's Seven Largest Counties (N=809)

Types of Preference	Boulder County (n=89)				Denver City & County (n=137)				El Paso County (n=164)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.34	0.70	2	2.00	2.21	0.69	2	2.00	2.22	0.73	2	2.00
1-Day Workshops	2.49	0.61	1	3.00	2.40	0.62	1	2.00	2.45	0.66	1	3.00
Several-Day Workshops	1.55	0.71	3	1.00	1.74	0.76	3	2.00	1.67	0.73	3	2.00
Academic Semester Courses	1.35	0.58	4	1.00	1.45	0.73	4	1.00	1.39	0.70	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.80	0.48	1	3.00	2.77	0.47	1	3.00	2.68	0.57	1	3.00
Interactive Teleconferences	1.59	0.61	4	2.00	1.67	0.62	4	2.00	1.59	0.62	4	2.00
Internet, Web-Based Instruction	1.74	0.69	3	2.00	1.86	0.67	3	2.00	2.02	0.73	2	2.00
Combination Format	1.99	0.72	2	2.00	2.02	0.62	2	2.00	1.63	0.68	3	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.85	0.44	1	3.00	2.77	0.47	1	3.00	2.82	0.46	1	3.00
Weekend Classes	1.16	0.40	4	1.00	1.19	0.45	4	1.00	1.14	0.42	4	1.00
Evening Classes	1.36	0.60	3	1.00	1.45	0.67	3	1.00	1.34	0.55	3	1.00
Self-Determined Web-Based	1.78	0.71	2	2.00	1.98	0.69	2	2.00	1.74	0.73	2	2.00
Preferences for Educational Recognition												
Certificate	2.39	0.74	1	3.00	2.45	0.67	1	3.00	2.35	0.65	1	2.00
Continuing Education Units	2.20	0.84	2	2.00	1.88	0.78	2	2.00	2.30	0.77	2	2.00
Undergraduate Academic Credit	1.55	0.71	4	1.00	1.53	0.73	4	1.00	1.69	0.74	4	2.00
Graduate Academic Credit	1.87	0.81	3	2.00	1.84	0.88	3	2.00	2.01	0.84	3	2.00

Table 70 (continued).

Types of Preference	Jefferson County (n=69)				Larimer County (n=66)				Tri-County (n=201)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.23	0.75	2	2.00	2.36	0.78	2	3.00	2.24	0.69	2	2.00
1-Day Workshops	2.51	0.56	1	3.00	2.43	0.56	1	2.00	2.42	0.64	1	2.50
Several-Day Workshops	1.77	0.77	3	2.00	1.54	0.69	3	1.00	1.67	0.76	3	1.50
Academic Semester Courses	1.47	0.72	4	1.00	1.33	0.57	4	1.00	1.39	0.64	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.71	0.55	1	3.00	2.67	0.51	1	3.00	2.68	0.57	1	3.00
Interactive Teleconferences	1.74	0.60	4	2.00	1.95	0.63	4	2.00	1.70	0.64	3	2.00
Internet, Web-Based Instruction	1.75	0.69	3	2.00	1.70	0.68	3	2.00	1.59	0.69	4	1.00
Combination Format	2.14	0.69	2	2.00	2.16	0.65	2	2.00	1.98	0.71	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.96	0.27	1	3.00	2.83	0.41	1	3.00	2.72	0.56	1	3.00
Weekend Classes	1.14	0.35	4	1.00	1.13	0.38	4	1.00	1.22	0.51	4	1.00
Evening Classes	1.39	0.58	3	1.00	1.46	0.59	3	1.00	1.42	0.66	3	1.00
Self-Determined Web-Based	1.69	0.69	2	2.00	1.91	0.71	2	2.00	1.65	0.71	2	2.00
Preferences for Educational Recognition												
Certificate	2.49	0.61	1	3.00	2.32	0.75	1	2.00	2.27	0.70	1	2.00
Continuing Education Units	2.44	0.69	2	3.00	2.30	0.73	2	2.00	2.18	0.82	2	2.00
Undergraduate Academic Credit	1.60	0.66	4	2.00	1.45	0.62	4	1.00	1.64	0.76	4	1.00
Graduate Academic Credit	1.92	0.85	3	2.00	1.81	0.84	3	2.00	1.83	0.81	3	2.00

Table 70 (continued).

Types of Preference	Weld County (n=83)			
	Mean	SD	Rank	Median
Preferences for Course Length				
2-Hour Sessions	2.12	0.73	2	2.00
1-Day Workshops	2.45	0.65	1	3.00
Several-Day Workshops	1.86	0.70	3	2.00
Academic Semester Courses	1.55	0.70	4	1.00
Preferences for Educational Format				
Face-to-Face Classroom Setting	2.83	0.41	1	3.00
Interactive Teleconferences	1.55	0.60	4	1.50
Internet, Web-Based Instruction	1.66	0.64	3	2.00
Combination Format	2.17	0.57	2	2.00
Preferences for Time of Course Offering				
Weekday Classes	2.80	0.49	1	3.00
Weekend Classes	1.28	0.53	4	1.00
Evening Classes	1.37	0.61	3	1.00
Self-Determined Web-Based	1.69	0.63	2	2.00
Preferences for Educational Recognition				
Certificate	2.42	0.61	1	2.00
Continuing Education Units	2.16	0.76	3	2.00
Undergraduate Academic Credit	1.79	0.75	4	2.00
Graduate Academic Credit	2.23	0.75	2	2.00

6e. Differences Among Medium-Sized Counties

Six counties were categorized as medium-sized counties and their respective number of survey respondents were: Mesa County (n=27), Montrose County (n=24), Prowers County (n=24), Montezuma County (n=17), Delta County (n=16), and Pueblo City and County (n=16). Characteristics of these six counties are reported in Table 71.

Average age ranged from 42.0 years to 47.4 years. Youngest workers were found in Delta County and the oldest workers were found in Mesa and Montezuma counties. A higher proportion of men (males=38%) were employed with Delta County than in other counties. The percentages of non-white workers ranged from 0% in Mesa and Montezuma counties to 50% in Pueblo City and County. The percent of the workforce with a college degree varied widely ranging from 29% in Montezuma County to 93% in Mesa County. Across counties, average years since last degree ranged from 13.0 years to 25.1 years, with Montezuma County workers reporting the longest average time since last degree. Experience in the discipline showed some variation across these counties (range=10.3 to 18.0 years) as did experience in public health (range=7.0 to 10.6 years).

Employment settings and positions differed across medium-sized counties. Delta County, Mesa County, and Pueblo City and County are organized health departments; the other three counties have local health agencies. The percentage of workers in professional positions varied across counties with the Mesa County (93%), Delta County (81%), and Pueblo County (81%) showing the highest percentages of professional workers; Montrose County (71%), Prowers County (67%), and Montezuma County (47%) showed the lowest percentages of professional workers. Pueblo City and County had proportionately more workers in Front Line Staff positions (67%).

Lowest average salaries were reported in Montezuma County ($30,075) and Pueblo City and County ($33,781). In the middle salary range were Delta County ($35,008) and Montrose County ($35,092). Highest average salaries were found in Prowers County ($36,808), and Mesa County ($43,406). The abilities of workers in a non-English language varied markedly across counties. In Montrose County, 38% knew a non-English language. The counties with the lowest percentages of non-English language capacity were Prowers County (13%) and Montezuma County (12%).

Differences in Core Competency proficiencies and educational needs among these medium-sized counties are summarized in Table 72. A statistically significant difference ($p < .001$) among the six counties was found for overall Core Competency Skills. In descending order, the means for Core Competency Skills (composite score) among the counties were: Mesa County (4.88), Delta County (4.78), Prowers County (4.36), Montrose County (4.34), Pueblo City and County (4.32), and Montezuma County (3.69). Significant differences were also found in all eight Core Competency subscales. Workers in Mesa County and Delta County were consistently most proficient across all domains; Workers in Montezuma County were least proficient in all subscales. Differences in proficiencies across medium-sized counties are visually displayed in Figure 77.

A significant difference ($p < .01$) was observed among these six counties for overall educational need for Core Competency Skills. In descending order, the means for educational need in Core Competency Skills (composite score) among the counties were: Montrose County (3.21), Montezuma County (3.14), Prowers County (3.10), Pueblo City and County (2.99), Mesa County (2.98), and Delta County (2.78). Differences were also found in seven of the eight Core Competency educational need subscales: Assessment/Analytic Skills ($p < .01$), Policy Development/ Program Planning Skills ($p < .01$), Cultural Competency Skills ($p < .05$), Community Dimensions of Practice ($p < .01$), Basic Public Health Sciences Skills ($p < .05$), Financial Planning/Management ($p < .01$), and Leadership/Systems Thinking Skills ($p < .01$). No differences were noted for

Communication Skills. In most areas, workers in Montezuma County, Prowers County, and Montrose County identified the highest needs. Figure 78 graphically presents these educational needs.

Table 73 summarizes differences in Bioterrorism/Emergency Preparedness for medium-sized counties. A significant difference among these counties (p. <.05) was found in overall Bioterrorism/ Emergency Preparedness Competency Skills. In descending order, the means for this composite score among counties were: Prowers County (3.25), Montrose County (2.97), Mesa County (2.88), Delta County (2.83), Pueblo City and County (2.70), and Montezuma County (2.70). Among these counties, statistically significant differences were also found in five of the seven Bioterrorism/ Emergency Preparedness Competency subscales: Disaster Planning Skills (p <.05), Disaster Response Skills (p <.01), Emergency Communication Skills (p <.01), Physical Injury Skills (p <.01), and Crisis Management Skills (p <.05). No differences were found for Biological/Infectious Disease Skills and Toxic Chemical/Environmental Hazard Skills. Except for Physical Injury Skills and Crisis Management Skills, workers in Prowers County were the most proficient in all domains. Workers from Montezuma County and Pueblo City and County were least proficient in most subscales. These differences are visually illustrated in Figure 79.

A significant difference (p. <.05) among these counties was found in overall educational need for Bioterrorism/Emergency Preparedness Competency Skills. In descending order, the means for this composite score among counties were: Montezuma County (3.80), Delta County (3.62), Prowers County (3.57), Montrose County (3.56), Mesa County (3.26), and Pueblo City and County (3.10). Among counties, statistically significant differences were also found in six of the seven Bioterrorism/Emergency Preparedness Competency subscales: Disaster Planning Skills (p <.05), Disaster Response Skills (p <.01), Emergency Communication Skills (p <.05), Biological/Infectious Disease Skills, (p <.01), Toxic Chemical/Environmental Hazard Skills (p <.01), and Physical Injury Skills (p <.05). No differences were found for Crisis Management Skills. The educational needs level fluctuated widely across these counties. Workers in Montezuma County expressed highest learning needs across many dimensions. Workers in Prowers County indicated high needs in Biological/Infectious Disease Skills and Toxic Chemical/Environmental Hazard Skills. Compared to other counties, Mesa County and Pueblo City and County reported less educational needs in most subscales. Pueblo City and County indicated the lowest need for education in Biological/Infectious Disease Skills and Toxic Chemical/Environmental Hazard Skills. Differences in medium-sized counties are graphically presented in Figure 80.

Educational preferences of workers in the six medium-sized counties are summarized in Table 74. A similar rank ordering of preferences were observed for course length and time of course offering. Workers in Prowers County indicted a higher preference for Internet, web-based courses that could be taken at their convenience. Mesa County workers expressed a higher preference for graduate academic credit. Across all counties graduate credit was preferred to undergraduate credit.

Table 71. Characteristics of Public Health Workforce in Six Medium-Sized Counties (N=124)

Variables and Values	Delta County (n=16)				Mesa County (n=27)				Montezuma County (n=17)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			42.00	9.00			46.96	10.84			47.35	9.77
Under 29 Years	2	12.5			2	8.0			1	5.9		
30-39 Years	3	18.8			4	16.0			3	17.6		
40-49 Years	8	50.0			8	32.0			5	29.4		
50-59 Years	3	18.8			8	32.0			6	35.3		
Over 60 Years	0	0.0			3	12.0			2	11.8		
Gender												
Male	6	37.5			1	3.8			0	0.0		
Female	10	62.5			25	96.2			17	100.0		
Race												
White	11	73.3			26	100.0			17	100.0		
Hispanic	1	6.7			0	0.0			0	0.0		
Black	0	0.0			0	0.0			0	0.0		
Asian	0	0.0			0	0.0			0	0.0		
Other or Multiracial	3	20.0			0	0.0			0	0.0		
Highest Education												
High School Diploma	0	0.0			1	3.7			4	23.5		
Profess./Vocational Diploma	2	12.5			1	3.7			4	23.5		
Associate Degree	1	6.3			0	0.0			4	23.5		
Baccalaureate Degree	11	68.8			20	74.1			3	17.6		
Master's Degree	2	12.5			5	18.5			2	11.8		
Doctoral Degree	0	0.0			0	0.0			0	0.0		
College Degree												
No	3	18.8			2	7.4			12	70.6		
Yes	13	81.3			25	92.6			5	29.4		
Years Since Last Degree			14.80	8.91			13.04	10.52			25.13	11.66
Less than 2 Years	1	6.7			2	7.4			0	0.0		
2-5 Years	1	6.7			6	22.2			0	0.0		
5-9 Years	2	13.3			3	11.1			2	13.3		
10-14 Years	5	33.3			6	22.2			2	13.3		
15-19 Years	1	6.7			3	11.1			0	0.0		
20 or More Years	5	33.3			7	25.9			11	73.3		
Years Experience in Discipline			10.31	7.53			14.46	10.61			17.31	11.36
Less than 2 Years	1	6.3			1	3.8			1	7.7		
2-5 Years	3	18.8			4	15.4			0	0.0		
5-9 Years	4	25.0			5	19.2			3	23.1		
10-14 Years	4	25.0			5	19.2			2	15.4		
15-19 Years	1	6.3			4	15.4			1	7.7		
20 or More Years	3	18.8			7	26.9			6	46.2		
Years Experience in Pub. Health			7.13	6.86			6.96	6.94			9.75	7.72
Less than 2 Years	4	25.0			3	11.1			1	6.3		

Table 71 (continued).

Variables and Values	Delta County (n=16)				Mesa County (n=27)				Montezuma County (n=17)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	2	12.5			9	33.3			3	18.8		
5-9 Years	5	31.3			8	29.6			5	31.3		
10-14 Years	3	18.8			4	14.8			3	18.8		
15-19 Years	1	6.3			1	3.7			1	6.3		
20 or More Years	1	6.3			2	7.4			3	18.8		
County Survey Response												
Very Small	0	0.0			0	0.0			0	0.0		
Small	0	0.0			0	0.0			0	0.0		
Medium	16	100.0			27	100.0			17	100.0		
Large	0	0.0			0	0.0			0	0.0		
Organized Health Department												
No	0	0.0			0	0.0			17	100.0		
Yes	16	100.0			27	100.0			0	0.0		
Position Category												
Officials & Administrators	2	12.5			0	0.0			0	0.0		
Professionals	11	68.8			25	92.6			8	47.1		
Technicians	1	6.3			0	0.0			2	11.8		
Protective Service	0	0.0			0	0.0			0	0.0		
Paraprofessionals	1	6.3			1	3.7			5	29.4		
Administrative Support	1	6.3			1	3.7			2	11.8		
Professional Position												
No	3	18.8			2	7.4			9	52.9		
Yes	13	81.3			25	92.6			8	47.1		
Type of Position												
Front Line Staff	9	56.3			16	59.3			9	52.9		
Senior Level Staff	2	12.5			8	29.6			3	17.6		
Supervisory/Mgmt Staff	5	31.3			3	11.1			5	29.4		
Full-Time Employment												
No	5	31.3			8	29.6			4	23.5		
Yes	11	68.8			19	70.4			13	76.5		
Annual Salary (FTE)			$35,008	$12,186			$43,406	$9,776			$30,075	$7,851
Less Than $20,000	2	14.3			0	0.0			2	12.5		
$20,000 to $29,999	2	14.3			1	4.3			4	25.0		
$30,000 to $39,999	6	42.9			7	30.4			8	50.0		
$40,000 to $49,999	2	14.3			9	39.1			2	12.5		
$50,000 to $59,999	2	14.3			5	21.7			0	0.0		
$60,000 to $69,999	0	0.0			0	0.0			0	0.0		
$70,000 to $79,999	0	0.0			1	4.3			0	0.0		
Over $80,000	0	0.0			0	0.0			0	0.0		
Know Non-English Language												
No	12	75.0			23	85.2			15	88.2		

Table 71 (continued).

Variables and Values	Delta County (n=16)				Mesa County (n=27)				Montezuma County (n=17)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Yes	4	25.0			4	14.8			2	11.8		
Other Language Speaking												
Fair	1	25.0			2	50.0			2	100.0		
Good	3	75.0			1	25.0			0	0.0		
Excellent	0	0.0			1	25.0			0	0.0		
Other Language Reading												
Fair	1	25.0			2	50.0			2	100.0		
Good	3	75.0			2	50.0			0	0.0		
Excellent	0	0.0			0	0.0			0	0.0		
Other Language Writing												
Fair	1	33.3			3	75.0			2	100.0		
Good	2	66.7			1	25.0			0	0.0		
Excellent	0	0.0			0	0.0			0	0.0		

Table 71 (continued).

Variables and Values	Montrose County (n=24)				Prowers County (n=24)				Pueblo City & County (n=16)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			43.92	10.45			45.79	8.81			43.19	9.37
Under 29 Years	4	16.7			1	4.2			2	12.5		
30-39 Years	3	12.5			4	16.7			3	18.8		
40-49 Years	9	37.5			8	33.3			7	43.8		
50-59 Years	7	29.2			10	41.7			3	18.8		
Over 60 Years	1	4.2			1	4.2			1	6.3		
Gender												
Male	1	4.5			3	12.5			0	0.0		
Female	21	95.5			21	87.5			14	100.0		
Race												
White	15	62.5			21	87.5			8	50.0		
Hispanic	8	33.3			3	12.5			7	43.8		
Black	0	0.0			0	0.0			0	0.0		
Asian	0	0.0			0	0.0			0	0.0		
Other or Multiracial	1	4.2			0	0.0			1	6.3		
Highest Education												
High School Diploma	6	25.0			7	29.2			1	6.3		
Profess./Vocational Diploma	3	12.5			3	12.5			2	12.5		
Associate Degree	1	4.2			2	8.3			3	18.8		
Baccalaureate Degree	11	45.8			7	29.2			9	56.3		
Master's Degree	3	12.5			4	16.7			1	6.3		
Doctoral Degree	0	0.0			1	4.2			0	0.0		
College Degree												
No	10	41.7			12	50.0			6	37.5		
Yes	14	58.3			12	50.0			10	62.5		
Years Since Last Degree			17.39	11.28			14.52	11.56			15.13	10.14
Less than 2 Years	0	0.0			0	0.0			0	0.0		
2-5 Years	3	13.0			4	19.0			1	6.3		
5-9 Years	6	26.1			7	33.3			5	31.3		
10-14 Years	2	8.7			1	4.8			3	18.8		
15-19 Years	0	0.0			3	14.3			2	12.5		
20 or More Years	12	52.2			6	28.6			5	31.3		
Years Experience in Discipline			18.00	11.44			13.53	9.93			15.33	10.74
Less than 2 Years	1	4.5			0	0.0			0	0.0		
2-5 Years	2	9.1			3	17.6			2	13.3		
5-9 Years	4	18.2			5	29.4			3	20.0		
10-14 Years	1	4.5			2	11.8			4	26.7		
15-19 Years	2	9.1			2	11.8			0	0.0		
20 or More Years	12	54.5			5	29.4			6	40.0		
Years Experience in Pub. Health			8.50	6.73			8.74	7.19			10.56	9.82
Less than 2 Years	6	25.0			4	17.4			2	12.5		

Table 71 (continued).

Variables and Values	Montrose County (n=24)				Prowers County (n=24)				Pueblo City & County (n=16)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	2	8.3			4	17.4			3	18.8		
5-9 Years	7	29.2			5	21.7			5	31.3		
10-14 Years	4	16.7			6	26.1			1	6.3		
15-19 Years	4	16.7			1	4.3			1	6.3		
20 or More Years	1	4.2			3	13.0			4	25.0		
County Survey Response												
Very Small	0	0.0			0	0.0			0	0.0		
Small	0	0.0			0	0.0			0	0.0		
Medium	24	100.0			24	100.0			16	100.0		
Large	0	0.0			0	0.0			0	0.0		
Organized Health Department												
No	24	100.0			24	100.0			0	0.0		
Yes	0	0.0			0	0.0			16	100.0		
Position Category												
Officials & Administrators	1	4.8			0	0.0			0	0.0		
Professionals	14	66.7			16	66.7			13	81.3		
Technicians	1	4.8			1	4.2			0	0.0		
Protective Service	0	0.0			0	0.0			0	0.0		
Paraprofessionals	1	4.8			4	16.7			2	12.5		
Administrative Support	4	19.0			3	12.5			1	6.3		
Professional Position												
No	6	28.6			8	33.3			3	18.8		
Yes	15	71.4			16	66.7			13	81.3		
Type of Position												
Front Line Staff	12	57.1			14	58.3			10	66.7		
Senior Level Staff	5	23.8			3	12.5			1	6.7		
Supervisory/Mgmt Staff	4	19.0			7	29.2			4	26.7		
Full-Time Employment												
No	4	19.0			4	16.7			5	31.3		
Yes	17	81.0			20	83.3			11	68.8		
Annual Salary (FTE)			$35,092	$11,289			$36,808	$10,965			$33,781	$6,860
Less Than $20,000	1	5.9			0	0.0			0	0.0		
$20,000 to $29,999	4	23.5			6	28.6			3	27.3		
$30,000 to $39,999	7	41.2			8	38.1			6	54.5		
$40,000 to $49,999	4	23.5			5	23.8			2	18.2		
$50,000 to $59,999	0	0.0			1	4.8			0	0.0		
$60,000 to $69,999	1	5.9			1	4.8			0	0.0		
$70,000 to $79,999	0	0.0			0	0.0			0	0.0		
Over $80,000	0	0.0			0	0.0			0	0.0		
Know Non-English Language												
No	13	61.9			21	87.5			13	81.3		

Table 71 (continued).

Variables and Values	Montrose County (n=24)				Prowers County (n=24)				Pueblo City & County (n=16)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Yes	8	38.1			3	12.5			3	18.8		
Other Language Speaking												
Fair	4	40.0			0	0.0			0	0.0		
Good	2	20.0			2	66.7			1	33.3		
Excellent	4	40.0			1	33.3			2	66.7		
Other Language Reading												
Fair	2	25.0			0	0.0			1	33.3		
Good	3	37.5			2	66.7			1	33.3		
Excellent	3	37.5			1	33.3			1	33.3		
Other Language Writing												
Fair	3	37.5			0	0.0			2	66.7		
Good	3	37.5			2	66.7			0	0.0		
Excellent	2	25.0			1	33.3			1	33.3		

Table 72. Differences in Core Competency Proficiencies and Educational Needs in Six Medium-Sized Counties (N=124)

Core Competency Domains	Delta County (n=16)				Mesa County (n=27)				Montezuma County (n=17)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	4.48	1.28	6	4.88	4.90	1.03	5	5.00	3.37	1.70	7	4.00
Policy Development/Prog. Planning Skills	4.35	1.39	7	4.50	4.45	1.49	7	4.75	3.49	1.46	5	3.75
Communication Skills	5.17	0.94	2	5.17	5.09	1.09	3	5.33	3.94	1.41	2	4.00
Cultural Competency Skills	5.39	1.12	1	5.75	5.55	0.91	1	5.75	4.31	1.70	1	4.75
Community Dimensions of Practice Skills	4.75	0.95	4	5.00	5.17	1.20	2	5.50	3.78	1.48	4	4.00
Basic Public Health Sciences Skills	4.33	1.40	8	4.75	4.46	1.32	6	4.50	3.21	1.80	8	4.00
Financial Planning & Management Skills	4.58	1.15	5	4.60	4.39	1.26	8	4.40	3.49	1.46	5	3.00
Leadership & Systems Thinking Skills	5.08	0.96	3	5.38	5.01	1.38	4	5.25	3.90	1.63	3	4.00
Core Competencies Composite Skills	*4.78*	*0.91*		*4.99*	*4.88*	*1.07*		*4.97*	*3.69*	*1.45*		*3.86*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	2.75	0.93	5	3.00	2.81	1.08	5	3.00	3.35	1.06	2	3.00
Policy Devel./Prog. Planning Educ. Needs	3.00	0.97	3	3.00	3.37	1.31	2	4.00	3.65	0.79	1	4.00
Communication Educ. Needs	2.63	1.31	6	2.50	2.59	1.37	7	2.00	2.88	0.93	7	3.00
Cultural Competency Educ. Needs	2.13	0.81	8	2.00	2.52	1.09	8	3.00	2.88	1.27	7	3.00
Community Dimen. of Practice Educ. Needs	2.44	0.96	7	2.50	2.63	1.11	6	2.00	3.13	1.09	4	3.00
Basic Public Health Sciences Educ. Needs	2.94	1.06	4	3.00	3.04	1.22	4	3.00	3.00	1.06	5	3.00
Financial Planning & Mgmt. Educ. Needs	3.31	1.25	1	3.50	3.35	1.38	3	4.00	3.29	1.26	3	3.00
Leadership & Systems Thinking Educ. Needs	3.06	1.24	2	3.00	3.56	1.28	1	4.00	2.94	0.83	6	3.00
Core Competencies Composite Educ. Needs	*2.78*	*0.78*		*2.75*	*2.98*	*0.81*		*2.88*	*3.14*	*0.79*		*3.00*

Table 72 (continued).

Core Competency Domains	Montrose County (n=24)				Prowers County (n=24)				Pueblo City/County (n=16)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]													
Analytic/Assessment Skills	4.02	1.17	6	4.25	4.22	1.45	5	4.00	4.19	1.21	5	4.38	<.001
Policy Development/Prog. Planning Skills	3.87	1.27	8	4.25	4.00	1.62	7	4.25	3.77	1.15	7	3.88	<.01
Communication Skills	4.61	0.99	3	4.67	4.76	1.34	2	5.00	4.56	1.06	2	4.67	<.001
Cultural Competency Skills	5.19	1.13	1	5.25	4.78	1.35	1	5.00	5.41	0.72	1	5.63	<.001
Community Dimensions of Practice Skills	4.61	1.07	3	4.75	4.60	1.39	3	4.63	4.56	0.73	2	4.63	<.001
Basic Public Health Sciences Skills	4.18	1.34	5	4.50	4.03	1.57	6	4.00	4.47	1.34	4	4.38	<.001
Financial Planning & Management Skills	3.99	1.32	7	4.00	3.96	1.53	8	3.20	3.55	1.18	8	3.60	<.001
Leadership & Systems Thinking Skills	4.25	1.11	4	4.50	4.52	1.51	4	4.50	4.14	0.96	6	4.25	<.001
Core Competencies Composite Skills	*4.34*	*1.01*		*4.66*	*4.36*	*1.36*		*4.16*	*4.32*	*0.84*		*4.43*	*<.001*
Educ. Needs in Core Competency Domains[2]													
Analytic/Assessment Educ. Needs	3.25	1.02	4	3.00	3.29	0.81	3	3.00	2.88	0.96	5	3.00	<.01
Policy Devel./Prog. Planning Educ. Needs	3.52	1.12	2	4.00	3.58	1.14	1	4.00	2.94	1.18	4	3.00	<.01
Communication Educ. Needs	2.76	1.18	7	3.00	2.71	1.00	8	2.00	2.63	1.09	7	2.50	n.s.
Cultural Competency Educ. Needs	2.71	1.23	8	3.00	2.92	0.97	6	3.00	2.69	1.35	6	2.00	<.05
Community Dimen. of Practice Educ. Needs	3.19	0.87	5	3.00	3.00	0.88	5	3.00	3.19	1.05	3	3.00	<.01
Basic Public Health Sciences Educ. Needs	3.29	1.15	3	3.00	3.38	1.06	2	3.50	2.63	1.02	7	2.00	<.05
Financial Planning & Mgmt. Educ. Needs	3.81	1.12	1	4.00	3.04	1.27	4	3.00	3.44	1.50	2	4.00	<.01
Leadership & Systems Thinking Educ. Needs	3.10	0.94	6	3.00	2.92	0.93	6	3.00	3.56	1.03	1	3.00	<.01
Core Competencies Composite Educ. Needs	*3.21*	*0.71*		*3.13*	*3.10*	*0.76*		*3.13*	*2.99*	*0.47*		*3.19*	*<.01*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the six groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 77. Proficiencies in Core Competency Skills for Six Medium-Sized Counties

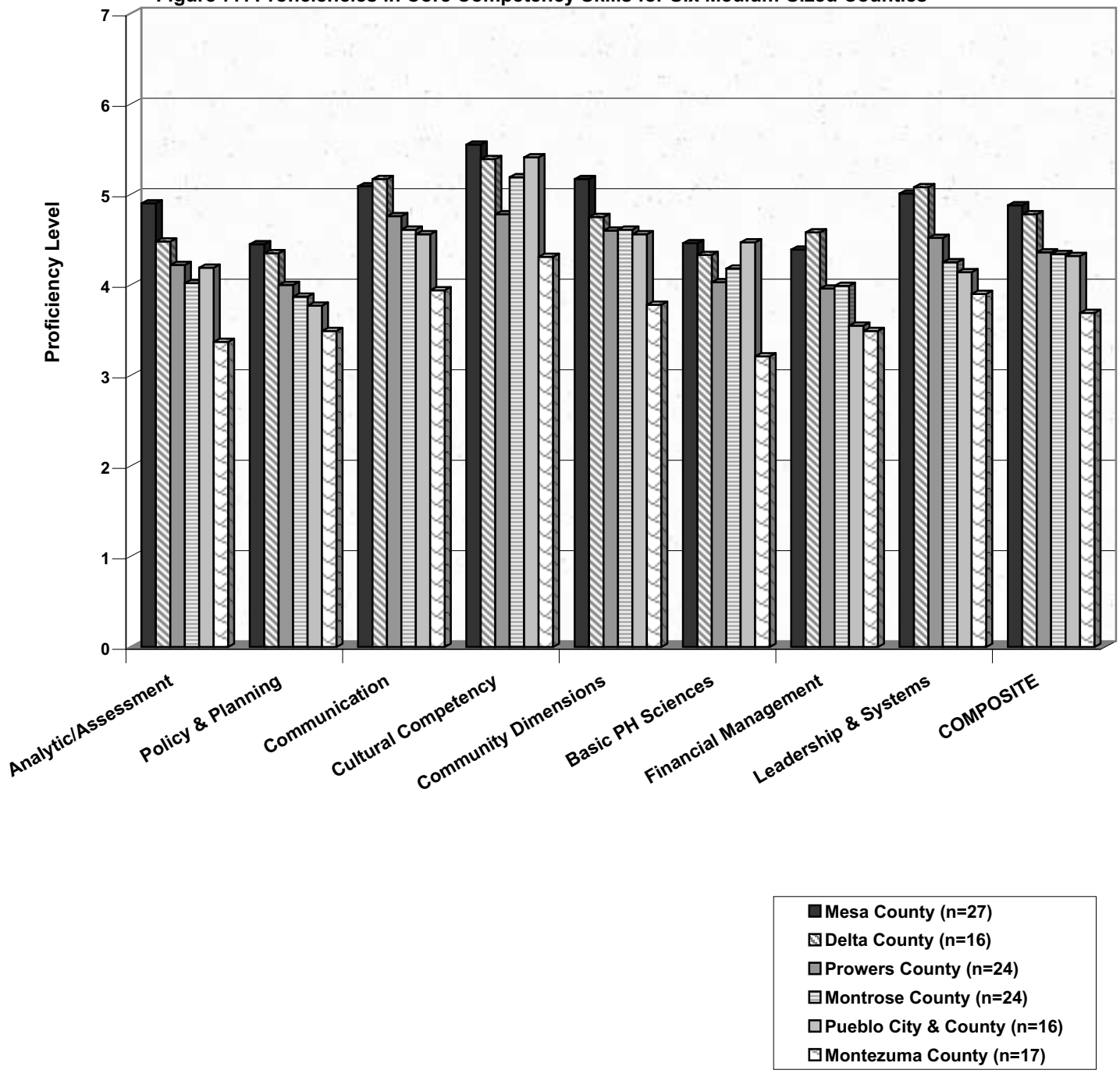


Figure 78. Educational Needs in Core Competency Skills for Six Medium-Sized Counties

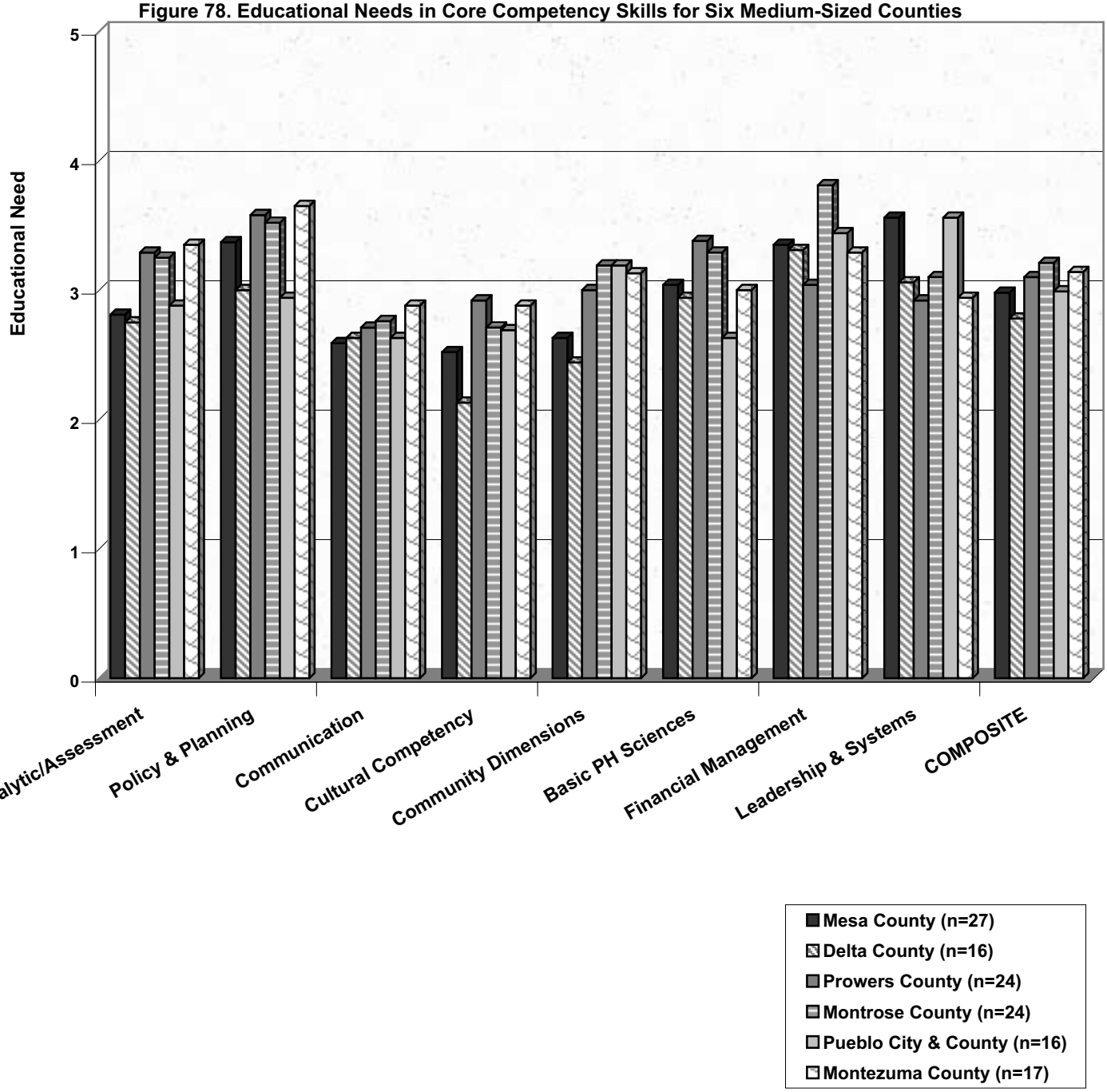


Table 73. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs in Six Medium-Sized Counties (N=124)

Bioterrorism/Emergency Preparedness Competency Domains	Delta County (n=16)				Mesa County (n=27)				Montezuma County (n=17)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	2.52	1.73	6	2.00	2.33	1.39	6	2.33	2.37	1.59	5	1.33
Disaster Response Skills	3.63	1.65	1	3.50	3.65	1.49	1	3.67	3.39	1.61	1	3.00
Emergency Communication Skills	3.03	1.95	2	2.25	2.93	1.50	4	3.00	2.62	1.86	4	1.50
Biological/Infectious Disease Skills	2.56	1.59	5	2.50	2.63	1.45	5	2.00	2.29	1.69	6	1.00
Toxic Chem. & Env. Hazard Skills	2.19	1.60	7	1.50	2.26	1.40	7	2.00	2.29	1.61	6	1.00
Physical Injury Skills	2.88	1.50	4	3.00	3.41	1.85	2	3.00	3.29	2.11	2	3.00
Crisis Management Skills	3.00	1.75	3	3.50	2.96	1.81	3	3.00	2.65	1.62	3	3.00
Bioterrorism/EP Composite Skills	*2.83*	*1.44*		*2.90*	*2.88*	*1.29*		*3.21*	*2.70*	*1.62*		*1.95*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.88	1.26	2	4.00	3.67	1.52	1	4.00	4.24	0.83	2	4.00
Disaster Response Educ. Needs	3.88	1.31	2	4.00	3.56	1.48	3	4.00	4.35	0.79	1	4.00
Emergency Communication Educ. Needs	3.00	1.26	7	3.00	2.70	1.07	7	3.00	3.59	1.00	5	4.00
Biological/Infectious Disease Educ. Needs	3.81	1.11	4	4.00	3.30	1.51	4	4.00	3.94	1.20	3	4.00
Toxic Chem. & Env. Hazard Educ. Needs	3.94	1.24	1	4.00	3.63	1.60	2	4.00	3.88	1.22	4	4.00
Physical Injury Educ. Needs	3.38	1.41	6	3.50	2.74	1.46	6	3.00	3.18	1.33	7	3.00
Crisis Management Educ. Needs	3.44	1.09	5	3.00	3.26	1.32	5	4.00	3.41	1.12	6	4.00
Bioterrorism/EP Composite Educ. Needs	*3.62*	*0.92*		*3.64*	*3.26*	*1.21*		*3.71*	*3.80*	*0.80*		*3.86*

Table 73 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	Montrose County (n=24)				Prowers County (n=24)				Pueblo City & County (n=16)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]													
Disaster Planning Skills	2.38	1.27	6	2.00	2.94	1.74	5	2.67	2.44	1.30	6	2.33	<.05
Disaster Response Skills	3.60	1.38	2	4.00	3.99	1.29	1	4.17	3.50	1.13	1	3.83	<.01
Emergency Communication Skills	2.64	1.56	4	2.50	3.77	1.50	2	4.00	2.63	1.13	3	2.50	<.01
Biological/Infectious Disease Skills	2.62	1.50	5	3.00	2.79	1.59	6	2.50	2.56	1.63	4	2.00	n.s
Toxic Chem. & Env. Hazard Skills	2.33	1.46	7	2.00	2.58	1.61	7	2.00	2.25	1.44	7	2.00	n.s.
Physical Injury Skills	4.00	1.67	1	4.00	3.75	1.85	3	4.00	2.94	1.84	2	2.00	<.01
Crisis Management Skills	3.19	1.66	3	3.00	2.96	1.63	4	2.00	2.56	1.46	4	2.50	<.05
Bioterrorism/EP Composite Skills	*2.97*	*1.29*		*3.19*	*3.25*	*1.36*		*2.95*	*2.70*	*1.19*		*3.12*	*<.05*
Educational Needs in Bioterrorism/EP[2]													
Disaster Planning Educ. Needs	3.76	1.18	3	4.00	4.00	1.32	3	5.00	3.63	1.20	1	4.00	<.05
Disaster Response Educ. Needs	3.86	1.11	2	4.00	3.88	1.33	4	4.00	3.50	1.26	2	4.00	<.01
Emergency Communication Educ. Needs	3.43	1.21	5	4.00	2.96	1.12	7	3.00	3.19	1.17	4	3.00	<.05
Biological/Infectious Disease Educ. Needs	3.76	1.14	3	4.00	4.04	1.08	2	4.00	2.69	1.20	6	3.00	<.01
Toxic Chem. & Env. Hazard Educ. Needs	3.90	1.14	1	4.00	4.21	1.14	1	5.00	2.88	1.31	5	3.00	<.01
Physical Injury Educ. Needs	2.81	1.17	7	3.00	3.25	1.19	6	3.00	2.50	0.73	7	2.50	<.05
Crisis Management Educ. Needs	3.43	0.93	5	3.00	3.58	0.97	5	4.00	3.31	0.79	3	3.00	n.s.
Bioterrorism/EP Composite Educ. Needs	*3.56*	*0.90*		*3.57*	*3.70*	*0.96*		*4.07*	*3.10*	*0.79*		*3.29*	<.05

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the six groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When the overall difference among groups was not significant, n.s. is noted. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 79. Proficiencies in Bioterrorism/Emergency Preparedness Skills for Six Medium-Sized Counties

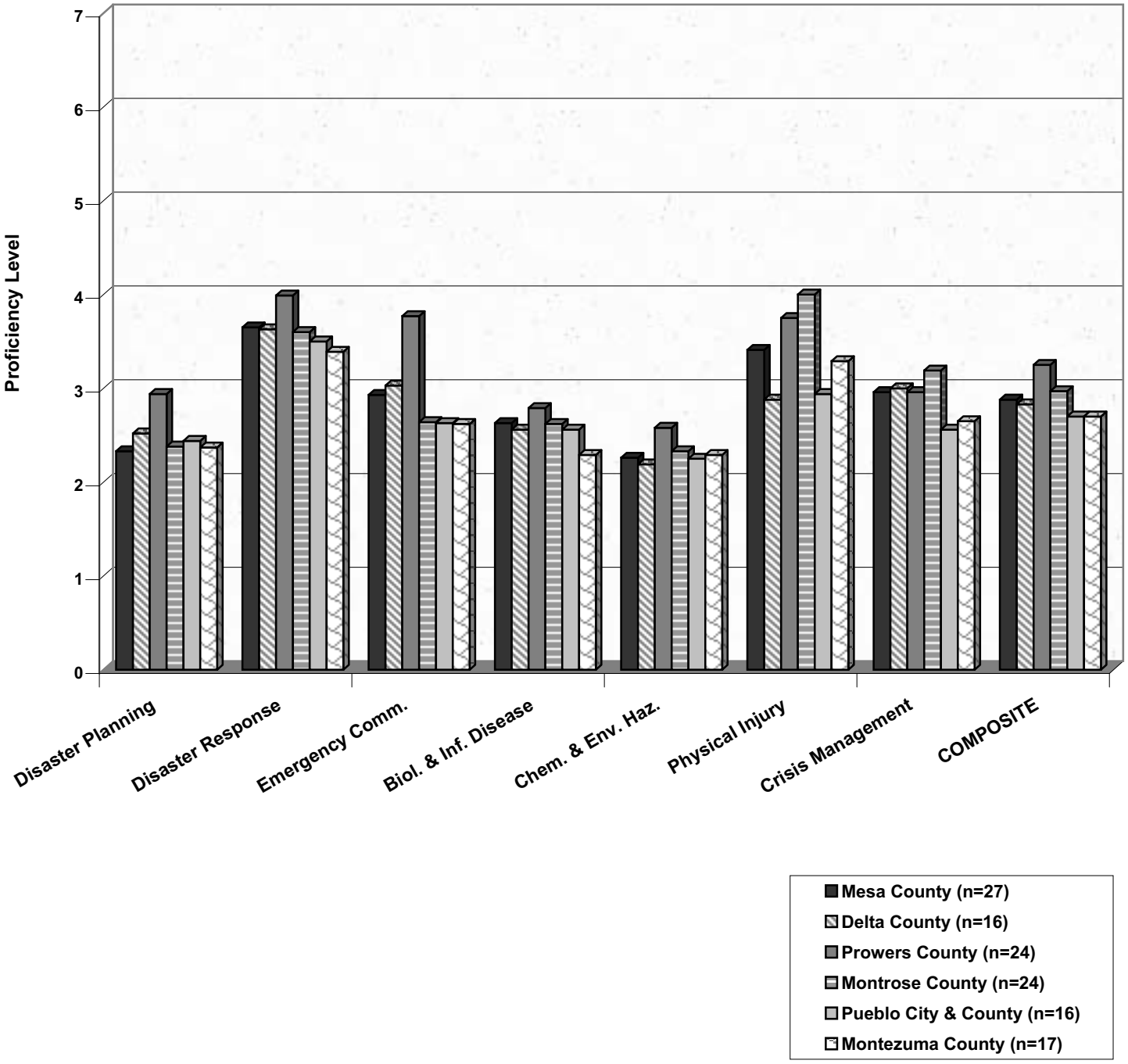


Figure 80. Educational Needs in Bioterrorism/Emergency Preparedness Skills for Six Medium-Sized

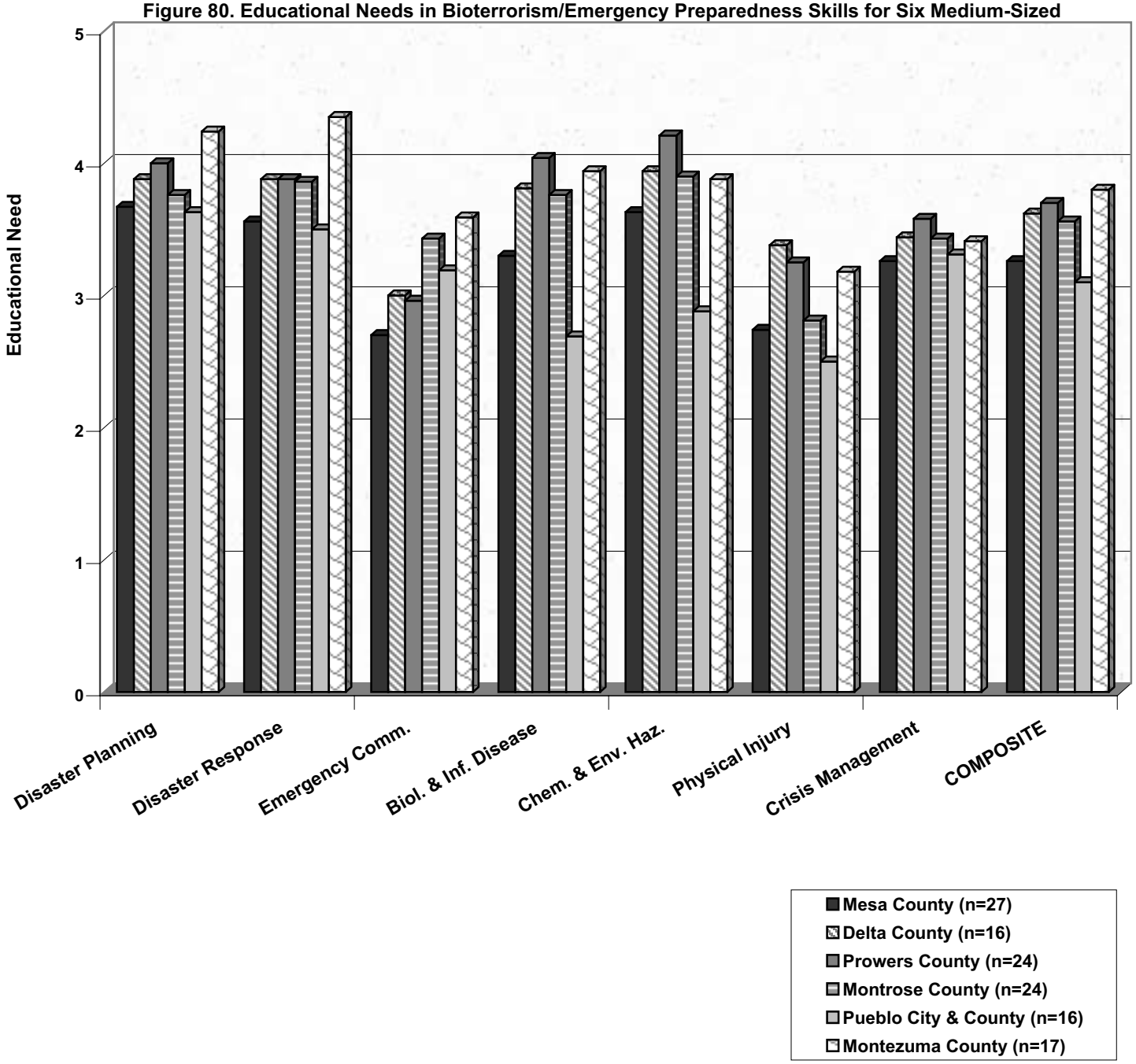


Table 74. Educational Preferences of Workers in the Six Medium-Sized Counties (N=124)

Types of Preference	Delta County (n=16)				Mesa County (n=27)				Montezuma County (n=17)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.06	0.68	2	2.00	2.05	0.84	2	2.00	1.75	0.77	2	2.00
1-Day Workshops	2.69	0.48	1	3.00	2.40	0.65	1	2.00	2.53	0.51	1	3.00
Several-Day Workshops	1.56	0.51	3	2.00	1.77	0.75	3	2.00	1.69	0.79	3	1.50
Academic Semester Courses	1.25	0.58	4	1.00	1.67	0.80	4	1.00	1.25	0.58	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.81	0.40	1	3.00	2.77	0.43	1	3.00	2.65	0.49	1	3.00
Interactive Teleconferences	1.94	0.57	3	2.00	2.12	0.78	2	2.00	1.81	0.75	3	2.00
Internet, Web-Based Instruction	1.63	0.50	4	2.00	1.84	0.75	3	2.00	1.81	0.75	3	2.00
Combination Format	2.19	0.66	2	2.00	2.12	0.71	2	2.00	2.13	0.72	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	3.00	0.00	1	3.00	2.89	0.42	1	3.00	2.88	0.33	1	3.00
Weekend Classes	1.06	0.25	4	1.00	1.21	0.41	4	1.00	1.06	0.25	4	1.00
Evening Classes	1.25	0.45	3	1.00	1.46	0.59	3	1.00	1.31	0.60	3	1.00
Self-Determined Web-Based	1.75	0.58	2	2.00	2.00	0.76	2	2.00	1.94	0.77	2	2.00
Preferences for Educational Recognition												
Certificate	2.38	0.72	1	2.50	2.13	0.76	3	2.00	2.44	0.73	1	3.00
Continuing Education Units	2.31	0.60	2	2.00	2.25	0.74	1	2.00	2.06	0.77	2	2.00
Undergraduate Academic Credit	1.88	0.81	4	2.00	1.60	0.82	4	1.00	1.59	0.71	4	1.00
Graduate Academic Credit	1.94	0.77	3	2.00	2.18	0.96	2	3.00	1.82	0.88	3	2.00

Table 74 (continued).

Types of Preference	Montrose County (n=24)				Prowers County (n=24)				Pueblo City & County (n=16)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	2.00	0.86	2	2.00	1.79	0.72	2	2.00	2.07	0.70	2	2.00
1-Day Workshops	2.53	0.51	1	3.00	2.65	0.57	1	3.00	2.60	0.63	1	3.00
Several-Day Workshops	1.80	0.77	3	2.00	1.65	0.78	3	1.00	1.56	0.81	4	1.00
Academic Semester Courses	1.37	0.60	4	1.00	1.57	0.66	4	1.00	1.60	0.74	3	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.79	0.42	1	3.00	2.67	0.48	1	3.00	2.81	0.40	1	3.00
Interactive Teleconferences	1.95	0.60	3	2.00	2.00	0.74	3	2.00	2.07	0.59	2	2.00
Internet, Web-Based Instruction	1.32	0.67	4	1.00	2.09	0.67	2	2.00	1.73	0.59	3	2.00
Combination Format	2.00	0.79	2	2.00	1.83	0.49	4	2.00	2.07	0.70	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.79	0.54	1	3.00	2.92	0.28	1	3.00	2.81	0.40	1	3.00
Weekend Classes	1.17	0.38	4	1.00	1.13	0.34	4	1.00	1.13	0.35	4	1.00
Evening Classes	1.39	0.61	3	1.00	1.26	0.45	3	1.00	1.27	0.59	3	1.00
Self-Determined Web-Based	1.61	0.78	2	1.00	1.74	0.62	2	2.00	1.73	0.70	2	2.00
Preferences for Educational Recognition												
Certificate	2.10	0.70	2	2.00	2.21	0.72	1	2.00	2.21	0.70	2	2.00
Continuing Education Units	2.63	0.60	1	3.00	2.09	0.67	2	2.00	2.56	0.73	1	3.00
Undergraduate Academic Credit	1.37	0.60	4	1.00	1.91	0.85	4	2.00	1.67	0.82	4	1.00
Graduate Academic Credit	1.79	0.79	3	2.00	2.05	0.84	3	2.00	1.93	0.96	3	2.00

6f. Differences Among Small County Regional Groups

As part of the comparisons to determine whether there were differences in proficiencies and educational needs within a category of county size, small counties were grouped by region. Because the sample sizes for the smallest counties were so small (range=1 to 14 respondents), data from these counties were aggregated using two principles: 1) respondents will be grouped by regional designation or geographical proximity; and 2) at least 15 respondents will be required in a group to preserve anonymity. Using these principles, seven small county regional groups were established. These groups and the number of respondents in each were:

1) Central Region: Chaffee, Custer, Fremont, Lake, Park, and Teller (n=18)
2) Metro Region: Broomfield, Clear Creek, Elbert, and Gilpin (n=28)
3) Northeast Region: Kit Carson, Lincoln, Logan, Morgan, Phillips, Sedgwick, Washington, and Yuma (n=16)
4) Northwest Region: Eagle, Garfield, Grand, Jackson, Moffat, Pitkin, Rio Blanco, Routt, and Summit (n=39)
5) San Luis Valley Region: Alamosa, Conejos, Costilla, Mineral, Rio Grande, and Saguache (n=24)
6) Southeast Region: Baca, Bent, Cheyenne, Crowley, Huerfano, Kiowa, Las Animas, and Otero (n=18)
7) Southwest/West Central Region: Archuleta, Delores, Gunnison, Hinsdale, LaPlata, Ouray, San Juan, and San Miguel (n=19)

Table 75 summarizes the characteristics of public health workers in Colorado's seven small county regional groups. The average age across these groups ranged from 42.3 years to 49.4 years. Proportionately more men were employed in small counties within the Metro Region (14%), Southwest/West Central Region (13%), and Central Region (11%), than in other regions (0% to 6%). The racial composition varied from a low of 42% white workers in the San Luis Valley Region to a high of 100% white workers in the Northeast and Southwest/West Central regional groups. Hispanics comprised 54% of workers in the San Luis Valley Region, 22% of workers in the Southeast Region, and 11% of workers in the Central Region.

The percentage of small county public health workers holding a baccalaureate degree or higher varied widely across regions. Less than one-third of the workers in the Southeast and San Luis Valley regions were college graduates (29% and 30%, respectively). In other regions, 57% to 82% of workers were college graduates. The Metro Region had the highest proportion of workers with a college degree. Similarly, the percentage of workers in professional positions varied across regional groups. While almost all respondents from the Northwest and Southwest/West Central regions were in professional positions (92% and 90%, respectively), a lower proportion of workers in the Northeast Region (68%), San Luis Valley Region (71%), and Southeast Region (72%) held professional positions. In between these groupings were the Metro and Central regions where 82% and 83%, respectively, held professional positions.

Average years of experience in the discipline or major ranged from a low of 12.1 years in San Luis Valley Region to a high of 21.6 years in the Central Region. Average public health experience was more similar across regions and ranged from 7.8 years in the San Luis Valley Region to 10.8 years in the Central Region.

Regional differences were noted in the proportion of workers classifying themselves in the three types of positions. In the Central, Metro, San Luis Valley, and Southeast regions, at least half of the

workers reported they were in Front Line Staff positions. The Northeast Region had the highest percentage of Senior Level Staff (24%). Percentages in Supervisory/Management Staff positions ranged from 32% to 43%. In the Southeast Region, 100% of the workers were full-time employees. In the Northwest and Southwest/West Central regions, only about two-thirds (67% and 68%, respectively) were full-time employees.

Average full-time equivalent salaries varied across regional groups, with the lowest average salaries found in the San Luis Valley and Southeast regions and the highest average salaries found in the Northwest and Metro regions. Mean salaries in ascending order were: San Luis Valley Region ($30,731), Southeast Region ($32,256), Northeast Region ($32,632), Central Region ($34,902), Southwest/West Central Region ($41,806), Northwest Region ($44,972), and Metro Region ($45,763).

More than half (54%) of the workers in small counties within the San Luis Valley Region reported they knew a non-English language; the vast majority identified Spanish as the language known. Workers in the Northeast and Central regions had the lowest percentage of workers (6% and 11%, respectively) reporting they knew a non-English language.

Table 76 summarizes the differences in Core Competency proficiencies and educational needs for the seven small county regional groups. Despite the small sample sizes in many of these groups, a statistically significant difference ($p < .001$) was found in overall proficiency in Core Competency Skills (composite). Statistical differences were also found in all eight subscales: Analytic/Assessment Skills ($p < .01$), Policy Development/Program Planning Skills ($p < .01$), Communication Skills ($p < .01$), Cultural Competency Skills ($p < .01$), Community Dimensions of Practice ($p < .001$), Basic Public Health Sciences ($p < .001$), Financial Planning/Management Skills ($p < .01$), and Leadership/ Systems Thinking Skills ($p < .01$). Small county workers in the Central, Northeast, Northwest, and Central regions had the highest scores across all categories. Small county workers in the San Luis Valley, Southeast, and Southwest/West Central regions had the lowest proficiencies across categories. The proficiency level of workers in the San Luis Valley was markedly lower than all other regions. Differences in Core Competency Skills across the small county regional groups are graphically presented in Figure 81.

No statistically significant difference was found in overall educational need for Core Competency Skills among these seven regional groups. When the subscales were examined, significant differences were found for educational needs in Policy Development/Program Planning Skills ($p < .01$) where workers in the Central, Northwest, and San Luis Valley region reported higher needs than workers in the other four regions. Although educational needs in other subscales were not statistically different (likely due to small sample sizes), other differences were noted. These differences in educational needs are visually displayed in Figure 82.

Table 77 presents differences in Bioterrorism/Emergency Preparedness proficiencies and educational needs for the seven small county regions. No significant difference in overall proficiency was found among regional groups, likely due to small sample sizes. In descending order, scores on this composite scale were: Northeast Region (3.96), Central Region (3.85), Northwest Region (3.73), Southeast Region (3.50), San Luis Valley Region (3.21), Southwest/West Central Region (3.11), and Metro Region (3.06).

Similarly when subscales of Bioterrorism/Emergency Preparedness Competency Skills were examined, no significant differences were found. As seen in Figure 83, workers from different regional groups varied in proficiency by domain. Small county workers in the Central, Northeast, and Northwest regions had the highest proficiencies in five of the seven subscales: Disaster Planning

Skills, Disaster Response Skills, Emergency Communication Skills, Biological/Infectious Disease Skills, and Toxic Chemical/Environmental Skills. Workers in the Metro, Southwest/West Central, and San Luis Valley regional groups were found to be least proficient in most dimensions. Workers from the Central, San Luis Valley and Northeast regions were highest in Physical Injury Skills. Workers in the San Luis Valley, Northeast, and Northwest regions were highest among regional groups in Crisis Management Skills.

No statistical differences were found among the seven regional groups in overall educational need for Bioterrorism/Emergency Preparedness or in any of the educational needs subscales (likely due to small sample sizes). However, differences in educational needs across regional groups were observed as graphically displayed in Figure 84. Except for Physical Injury Skills, workers in the Southwest/West Central Region reported the highest educational needs across all dimensions. The Metro and San Luis Valley regions also reported high needs across most dimensions. The three regional groups reporting the least educational needs across most subscales were the Southeast, Central, and Northeast regions.

As seen in Table 78, a fairly consistent pattern of preferences was reported across regional groups for course length, educational format, time of course offering, and educational recognition. Workers in the Southwest/West Central Region expressed a greater preference for several-day workshops than did other groups. While small county workers in the Central and Southeast regions showed more preference for Internet courses than did other groups, workers in the Southwest/West Central Region indicated they least preferred Internet courses to all other options. Workers in the Southwest/ West Central Region also distinguished themselves by preferring weekend classes to evening classes. Except for the San Luis Valley Region, workers across all regional groups preferred graduate academic credits to undergraduate academic credits.

Table 75. Characteristics of Public Health Workforce in Colorado's Seven Small County Regional Groups (N=164)

	Central Region (n=18)				Metro Region (n=28)				Northeast Region (n=16)			
Variables and Values	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**
Age			49.44	12.02			42.61	11.09			45.25	6.57
Under 29 Years	0	0.0			5	17.9			0	0.0		
30-39 Years	3	16.7			5	17.9			4	25.0		
40-49 Years	6	33.3			11	39.3			7	43.8		
50-59 Years	5	27.8			6	21.4			5	31.3		
Over 60 Years	4	22.2			1	3.6			0	0.0		
Gender												
Male	2	11.1			4	14.3			0	0.0		
Female	16	88.9			24	85.7			15	100.0		
Race												
White	15	83.3			25	89.3			16	100.0		
Hispanic	2	11.1			2	7.1			0	0.0		
Black	0	0.0			1	3.6			0	0.0		
Asian	0	0.0			0	0.0			0	0.0		
Other or Multiracial	1	5.6			0	0.0			0	0.0		
Highest Education												
High School Diploma	2	11.1			3	10.7			3	21.4		
Profess./Vocational Diploma	4	22.2			0	0.0			2	41.3		
Associate Degree	0	0.0			2	7.1			1	7.1		
Baccalaureate Degree	9	50.0			15	53.6			8	57.1		
Master's Degree	3	16.7			7	25.0			0	0.0		
Doctoral Degree	0	0.0			1	3.6			0	0.0		
College Degree												
No	6	33.3			5	17.9			6	42.9		
Yes	12	66.7			23	82.1			8	57.1		
Years Since Last Degree			22.61	13.37			15.64	10.21			19.53	10.67
Less than 2 Years	0	0.0			2	7.1			1	3.7		
2-5 Years	3	16.7			3	10.7			0	0.0		
5-9 Years	1	5.6			3	10.7			3	20.0		
10-14 Years	1	5.6			5	17.9			2	13.3		
15-19 Years	3	16.7			6	21.4			2	13.3		
20 or More Years	10	55.6			9	32.1			7	46.7		
Years Experience in Discipline			21.56	13.00			16.35	10.30			16.17	10.33
Less than 2 Years	2	11.1			2	7.7			0	0.0		
2-5 Years	0	0.0			0	0.0			2	16.7		
5-9 Years	2	11.1			5	19.2			2	16.7		
10-14 Years	1	5.6			6	23.1			1	8.3		
15-19 Years	1	5.6			3	11.5			3	25.0		
20 or More Years	12	66.7			10	38.5			4	33.3		

Table 75 (continued)

Variables and Values	Central Region (n=18)				Metro Region (n=28)				Northeast Region (n=16)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Years Experience in Pub. Health			10.83	10.51			8.86	8.68			10.31	8.84
Less than 2 Years	4	22.2			8	28.6			2	12.5		
2-5 Years	1	5.6			4	14.3			5	31.3		
5-9 Years	4	22.2			5	17.9			2	12.5		
10-14 Years	4	22.2			5	17.9			1	6.3		
15-19 Years	2	11.1			1	3.6			2	12.5		
20 or More Years	3	16.7			5	17.9			4	25.0		
County Survey Response												
Very Small	13	72.2			1	3.6			1	6.3		
Small	5	27.8			27	96.4			15	93.8		
Medium	0	0.0			0	0.0			0	0.0		
Large	0	0.0			0	0.0			0	0.0		
Organized Health Department												
No	18	100.0			14	50.0			16	100.0		
Yes	0	0.0			14	50.0			0	0.0		
Position Category												
Officials & Administrators	3	16.7			2	7.1			2	12.5		
Professionals	12	66.7			21	75.0			8	50.0		
Technicians	0	0.0			1	3.6			0	0.0		
Protective Service	0	0.0			0	0.0			0	0.0		
Paraprofessionals	1	5.6			3	10.7			4	25.0		
Administrative Support	2	11.1			1	3.6			2	12.5		
Professional Position												
No	3	16.7			5	17.9			6	37.5		
Yes	15	83.3			23	82.1			10	62.5		
Type of Position												
Front Line Staff	10	55.6			14	50.0			6	37.5		
Senior Level Staff	1	5.6			2	7.1			3	18.8		
Supervisory/Mgmt Staff	7	38.9			12	42.9			7	43.8		
Full-Time Employment												
No	4	22.2			7	25.0			2	13.3		
Yes	14	77.8			21	75.0			13	86.7		
Annual Salary (FTE)			$34,902	$10,519			$45,763	$14,607			$32,632	$14,835
Less Than $20,000	1	7.1			0	0.0			1	7.1		
$20,000 to $29,999	4	28.6			2	8.3			7	50.0		
$30,000 to $39,999	5	35.7			7	29.2			3	21.4		
$40,000 to $49,999	3	21.4			8	33.3			0	0.0		
$50,000 to $59,999	1	7.1			4	16.7			1	7.1		
$60,000 to $69,999	0	0.0			0	0.0			2	14.3		
$70,000 to $79,999	0	0.0			2	8.3			0	0.0		
Over $80,000	0	0.0			1	4.2			0	0.0		

Table 75 (continued)

Variables and Values	Central Region (n=18)				Metro Region (n=28)				Northeast Region (n=16)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Know Non-English Language												
No	16	88.9			22	78.6			15	93.8		
Yes	2	11.1			6	21.4			1	6.3		
Other Language Speaking												
Fair	1	50.0			3	60.0			0	0.0		
Good	0	0.0			1	20.0			0	0.0		
Excellent	1	50.0			1	20.0			1	100.0		
Other Language Reading												
Fair	0	0.0			3	60.0			0	0.0		
Good	1	50.0			1	20.0			0	0.0		
Excellent	1	50.0			1	20.0			1	100.0		
Other Language Writing												
Fair	0	0.0			4	80.0			0	0.0		
Good	2	100.0			0	0.0			1	100.0		
Excellent	0	0.0			1	20.0			0	0.0		

Table 75 (continued).

Variables and Values	Northwest Region (n=16)				San Luis Valley Region (n=24)				Southeast Region (n=18)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Age			47.21	10.30			42.29	9.39			46.00	11.60
Under 29 Years	3	7.7			3	12.5			2	11.1		
30-39 Years	3	7.7			6	25.0			2	11.1		
40-49 Years	16	41.0			10	41.7			7	38.9		
50-59 Years	13	33.3			4	16.7			3	16.7		
Over 60 Years	4	10.3			1	4.2			4	22.2		
Gender												
Male	2	5.1			1	5.0			1	5.6		
Female	37	94.9			19	95.0			17	94.4		
Race												
White	37	94.9			10	41.7			12	66.7		
Hispanic	2	5.1			13	54.2			4	22.2		
Black	0	0.0			0	0.0			0	0.0		
Asian	0	0.0			0	0.0			1	5.6		
Other or Multiracial	0	0.0			1	4.2			1	5.6		
Highest Education												
High School Diploma	3	7.7			5	21.7			2	11.8		
Profess./Vocational Diploma	1	2.6			1	4.3			4	23.5		
Associate Degree	5	12.8			10	43.5			6	35.3		
Baccalaureate Degree	21	53.8			7	30.4			3	17.6		
Master's Degree	7	17.9			0	0.0			2	11.8		
Doctoral Degree	2	5.1			0	0.0			0	0.0		
College Degree												
No	9	23.1			16	69.6			12	70.6		
Yes	30	76.9			7	30.4			5	29.4		
Years Since Last Degree			16.08	12.35			15.14	10.17			18.35	13.16
Less than 2 Years	1	2.6			1	4.5			1	5.9		
2-5 Years	9	23.1			1	4.5			1	5.9		
5-9 Years	6	15.4			6	27.3			4	23.5		
10-14 Years	5	12.8			4	18.2			2	11.8		
15-19 Years	2	5.1			3	13.6			1	5.9		
20 or More Years	16	41.0			7	31.8			8	47.1		
Years Experience in Discipline			17.39	10.34			12.11	9.10			16.87	13.89
Less than 2 Years	1	2.8			2	11.1			1	6.7		
2-5 Years	5	13.9			3	1637			2	13.3		
5-9 Years	4	11.1			1	5.6			4	26.7		
10-14 Years	5	13.9			6	33.3			1	6.7		
15-19 Years	4	11.1			2	11.1			2	13.3		
20 or More Years	17	47.2			4	22.2			5	33.3		
Years Experience in Pub. Health			8.59	8.80			7.83	7.67			8.72	9.32
Less than 2 Years	9	24.3			4	17.4			5	27.8		

Table 75 (continued).

Variables and Values	Northwest Region (n=39)				San Luis Valley Region (n=24)				Southeast Region (n=18)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	6	16.2			6	26.1			4	22.2		
5-9 Years	10	27.0			6	26.1			2	11.1		
10-14 Years	5	13.5			4	17.4			3	16.7		
15-19 Years	1	2.7			1	4.3			1	5.6		
20 or More Years	6	16.2			2	8.7			3	16.7		
County Survey Response												
Very Small	9	23.1			12	50.0			2	11.1		
Small	30	76.9			12	50.0			16	88.9		
Medium	0	0.0			0	0.0			0	0.0		
Large	0	0.0			0	0.0			0	0.0		
Organized Health Department												
No	39	100.0			24	100.0			9	50.0		
Yes	0	0.0			0	0.0			9	50.0		
Position Category												
Officials & Administrators	2	5.1			3	12.5			2	11.1		
Professionals	34	87.2			14	58.3			11	61.1		
Technicians	1	2.6			0	0.0			2	11.1		
Protective Service	0	0.0			0	0.0			0	0.0		
Paraprofessionals	1	2.6			2	8.3			1	5.6		
Administrative Support	1	2.6			5	20.8			2	11.1		
Professional Position												
No	3	7.7			7	29.2			5	27.8		
Yes	36	92.3			17	70.8			13	72.2		
Type of Position												
Front Line Staff	17	44.7			11	52.4			9	50.0		
Senior Level Staff	9	23.7			1	4.8			2	11.1		
Supervisory/Mgmt Staff	12	31.6			9	42.9			7	38.9		
Full-Time Employment												
No	13	33.3			2	8.3			0	0.0		
Yes	26	66.7			22	91.7			18	100.0		
Annual Salary (FTE)			$44,972	$12,607			$30,731	$11,406			$32,256	$14,326
Less Than $20,000	0	0.0			4	21.1			4	26.7		
$20,000 to $29,999	3	10.7			3	15.8			4	26.7		
$30,000 to $39,999	6	21.4			8	42.1			4	26.7		
$40,000 to $49,999	9	32.1			3	15.8			1	6.7		
$50,000 to $59,999	7	25.0			1	5.3			1	6.7		
$60,000 to $69,999	2	7.1			0	0.0			1	6.7		
$70,000 to $79,999	1	3.6			0	0.0			0	0.0		
Over $80,000	0	0.0			0	0.0			0	0.0		
Know Non-English Language												
No	28	71.8			11	45.8			13	72.2		

Table 75 (continued).

Variables and Values	Northwest Region (n=39)				San Luis Valley Region (n=24)				Southeast Region (n=18)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Yes	11	28.2			13	54.2			5	27.8		
Other Language Speaking												
Fair	5	45.5			2	15.4			1	20.0		
Good	3	27.3			9	69.2			1	20.0		
Excellent	3	27.3			2	15.4			3	60.0		
Other Language Reading												
Fair	4	40.0			4	30.8			2	40.0		
Good	4	40.0			9	69.2			1	20.0		
Excellent	2	20.0			0	0.0			2	40.0		
Other Language Writing												
Fair	7	70.0			7	53.8			2	50.0		
Good	2	20.0			6	46.2			1	25.0		
Excellent	1	10.0			0	0.0			1	25.0		

Table 75 (continued).

Variables and Values	Southwest/West Central Region (n=19)			
	n	%	Mean	SD
Age			47.47	7.76
Under 29 Years	0	0.0		
30-39 Years	3	15.8		
40-49 Years	7	36.8		
50-59 Years	9	47.4		
Over 60 Years	0	0.0		
Gender				
Male	2	12.5		
Female	14	87.5		
Race				
White	19	100.0		
Hispanic	0	0.0		
Black	0	0.0		
Asian	0	0.0		
Other or Multiracial	0	0.0		
Highest Education				
High School Diploma	1	5.3		
Profess./Vocational Diploma	1	5.3		
Associate Degree	3	15.8		
Baccalaureate Degree	11	57.9		
Master's Degree	3	15.8		
Doctoral Degree	0	0.0		
College Degree				
No	5	26.3		
Yes	14	73.7		
Years Since Last Degree			18.33	9.68
Less than 2 Years	0	0.0		
2-5 Years	1	5.6		
5-9 Years	3	16.7		
10-14 Years	3	16.7		
15-19 Years	2	11.1		
20 or More Years	9	50.0		
Years Experience in Discipline			15.76	10.17
Less than 2 Years	0	0.0		
2-5 Years	1	11.8		
5-9 Years	4	23.5		
10-14 Years	3	17.6		
15-19 Years	0	0.0		
20 or More Years	8	47.1		
Years Experience in Pub. Health			8.58	8.27
Less than 2 Years	3	15.8		

Table 75 (continued).

Variables and Values	Southwest/West Central Region (n=19)			
	n	%	Mean	SD
2-5 Years	6	31.6		
5-9 Years	2	10.5		
10-14 Years	5	26.3		
15-19 Years	1	5.3		
20 or More Years	2	10.5		
County Survey Response				
Very Small	6	31.6		
Small	13	68.4		
Medium	0	0.0		
Large	0	0.0		
Organized Health Department				
No	17	89.5		
Yes	2	10.5		
Position Category				
Officials & Administrators	1	5.3		
Professionals	16	84.2		
Technicians	0	0.0		
Protective Service	0	0.0		
Paraprofessionals	0	0.0		
Administrative Support	2	10.5		
Professional Position				
No	2	10.5		
Yes	17	89.5		
Type of Position				
Front Line Staff	8	42.1		
Senior Level Staff	3	15.8		
Supervisory/Mgmt Staff	8	42.1		
Full-Time Employment				
No	6	31.6		
Yes	13	68.4		
Annual Salary (FTE)			$41,806	$15,785
Less Than $20,000	1	5.3		
$20,000 to $29,999	2	10.5		
$30,000 to $39,999	8	42.1		
$40,000 to $49,999	2	10.5		
$50,000 to $59,999	3	15.8		
$60,000 to $69,999	2	10.5		
$70,000 to $79,999	0	0.0		
Over $80,000	1	5.3		
Know Non-English Language				
No	14	73.7		

Table 75 (continued).

Variables and Values	Southwest/West Central Region (n=19)			
	n	%	Mean	SD
Yes	5	26.3		
Other Language Speaking				
Fair	2	50.0		
Good	1	25.0		
Excellent	1	25.0		
Other Language Reading				
Fair	2	50.0		
Good	1	25.0		
Excellent	1	25.0		
Other Language Writing				
Fair	3	75.0		
Good	1	25.0		
Excellent	0	0.0		

Table 76. Differences in Core Competency Proficiencies and Educational Needs in Colorado's Seven Small County Regional Groups (N=164)

Core Competency Domains	Central Region (n=18)				Metro Region (n=28)				Northeast Region (n=16)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	4.82	1.21	6	5.00	4.51	1.18	5	4.75	4.72	1.20	6	4.88
Policy Development/Prog. Planning Skills	4.49	1.31	8	4.63	4.15	1.43	8	4.50	4.56	1.37	7	4.63
Communication Skills	5.14	1.01	3	5.00	4.98	1.21	2	5.25	5.35	1.20	1	5.50
Cultural Competency Skills	5.40	1.03	1	5.75	5.13	0.98	1	5.25	5.17	1.25	3	5.50
Community Dimensions of Practice Skills	5.19	1.02	2	5.38	4.65	1.22	4	4.75	5.19	1.31	2	5.25
Basic Public Health Sciences Skills	4.83	1.43	5	5.25	4.38	1.30	6	4.50	4.53	1.28	8	4.63
Financial Planning & Management Skills	4.62	1.54	7	5.20	4.25	1.27	7	4.20	4.88	1.31	5	5.30
Leadership & Systems Thinking Skills	5.08	1.58	4	5.63	4.82	1.28	3	5.00	5.05	1.39	4	5.13
Core Competencies Composite Skills	*4.95*	*1.15*		*5.29*	*4.62*	*1.10*		*4.86*	*4.95*	*1.17*		*5.01*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	3.56	0.98	2	4.00	3.00	0.96	1	3.00	3.25	1.13	3	3.00
Policy Devel./Prog. Planning Educ. Needs	3.76	1.20	1	4.00	2.75	1.29	5	3.00	3.13	1.29	5	3.00
Communication Educ. Needs	2.50	1.15	7	3.00	2.57	1.43	8	2.00	2.94	1.57	7	3.00
Cultural Competency Educ. Needs	2.24	0.97	8	2.00	2.74	1.13	6	3.00	2.94	1.39	7	2.50
Community Dimen. of Practice Educ. Needs	3.18	1.07	3	3.00	2.82	1.31	4	3.00	3.25	1.34	3	3.00
Basic Public Health Sciences Educ. Needs	3.18	1.29	3	3.00	2.67	1.07	7	3.00	3.31	1.14	1	3.50
Financial Planning & Mgmt. Educ. Needs	2.94	1.39	5	3.00	2.86	1.33	3	3.00	3.13	1.31	5	3.00
Leadership & Systems Thinking Educ. Needs	2.94	0.90	5	3.00	2.96	1.13	2	3.00	3.31	1.25	1	3.00
Core Competencies Composite Educ. Needs	*3.03*	*0.64*		*3.06*	*2.79*	*0.86*		*2.74*	*3.16*	*0.83*		*3.06*

Table 76 (continued).

Core Competency Domains	Northwest Region (n=39)				San Luis Valley Region (n=24)				Southeast Region (n=18)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Core Competency Domains[1]												
Analytic/Assessment Skills	4.90	1.30	5	5.00	3.36	1.67	5	3.25	4.13	1.41	6	4.38
Policy Development/Prog. Planning Skills	4.29	1.46	8	4.75	3.06	1.40	8	2.88	4.17	1.29	5	4.38
Communication Skills	5.07	1.20	2	5.40	3.95	1.39	2	4.00	4.58	1.16	2	4.92
Cultural Competency Skills	5.31	1.17	1	5.50	4.18	1.36	1	4.38	4.74	1.02	1	4.63
Community Dimensions of Practice Skills	5.03	1.34	3	5.25	3.70	1.33	3	3.75	4.10	1.04	7	4.00
Basic Public Health Sciences Skills	4.72	1.34	6	5.25	3.20	1.47	7	3.00	4.00	1.37	8	3.88
Financial Planning & Management Skills	4.39	1.45	7	4.60	3.34	1.52	6	3.10	4.23	1.03	4	4.10
Leadership & Systems Thinking Skills	4.98	1.38	4	5.50	3.61	1.54	4	3.50	4.26	1.40	3	4.63
Core Competencies Composite Skills	*4.84*	*1.19*		*5.11*	*3.57*	*1.34*		*3.71*	*4.29*	*1.04*		*4.26*
Educ. Needs in Core Competency Domains[2]												
Analytic/Assessment Educ. Needs	3.21	1.15	5	3.00	3.42	1.18	2	3.00	3.00	1.08	3	3.00
Policy Devel./Prog. Planning Educ. Needs	3.85	1.14	1	4.00	3.79	1.32	1	4.00	3.00	1.08	3	3.00
Communication Educ. Needs	2.97	1.11	7	3.00	2.88	1.23	7	3.00	2.94	1.11	6	3.00
Cultural Competency Educ. Needs	2.90	1.17	8	3.00	2.83	1.17	8	3.00	3.06	1.06	2	3.00
Community Dimen. of Practice Educ. Needs	3.23	1.22	4	3.00	3.38	1.21	5	4.00	3.00	1.28	3	3.00
Basic Public Health Sciences Educ. Needs	3.00	1.21	6	3.00	3.42	1.32	2	3.50	3.17	1.20	1	3.00
Financial Planning & Mgmt. Educ. Needs	3.38	1.23	2	4.00	3.17	1.34	6	3.50	2.89	1.18	7	3.00
Leadership & Systems Thinking Educ. Needs	3.33	1.163	3	3.00	3.39	1.23	4	4.00	2.78	1.17	8	3.00
Core Competencies Composite Educ. Needs	*3.23*	*0.84*		*3.13*	*3.28*	*0.95*		*3.44*	*2.98*	*0.93*		*2.94*

Table 76 (continued).

Core Competency Domains	Southwest/West Central Region (n=19)				Stat. Diff.[3]
	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]					
Analytic/Assessment Skills	4.13	1.48	7	3.75	<.01
Policy Development/Prog. Planning Skills	3.88	1.53	8	3.25	<.01
Communication Skills	4.70	0.98	3	4.33	<.01
Cultural Competency Skills	5.03	1.10	1	5.50	<.01
Community Dimensions of Practice Skills	4.57	1.37	4	3.75	<.001
Basic Public Health Sciences Skills	4.14	1.36	5	3.75	<.001
Financial Planning & Management Skills	4.14	1.30	5	4.00	<.01
Leadership & Systems Thinking Skills	4.74	1.36	2	4.50	<.01
Core Competencies Composite Skills	*4.42*	*1.19*		*4.17*	*<.001*
Educ. Needs in Core Competency Domains[2]					
Analytic/Assessment Educ. Needs	3.11	1.05	3	3.00	n.s.
Policy Devel./Prog. Planning Educ. Needs	3.11	1.24	3	3.00	<.01
Communication Educ. Needs	2.47	0.70	8	2.00	n.s.
Cultural Competency Educ. Needs	2.74	0.81	5	3.00	n.s.
Community Dimen. of Practice Educ. Needs	2.53	0.84	7	2.00	n.s.
Basic Public Health Sciences Educ. Needs	3.21	0.98	2	3.00	n.s.
Financial Planning & Mgmt. Educ. Needs	3.26	1.05	1	3.00	n.s.
Leadership & Systems Thinking Educ. Needs	2.56	0.92	6	2.50	n.s.
Core Competencies Composite Educ. Needs	*2.88*	*0.69*		*2.75*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the seven groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 81. Proficiencies in Core Competency Skills for Colorado's Seven Small County Regional Groups

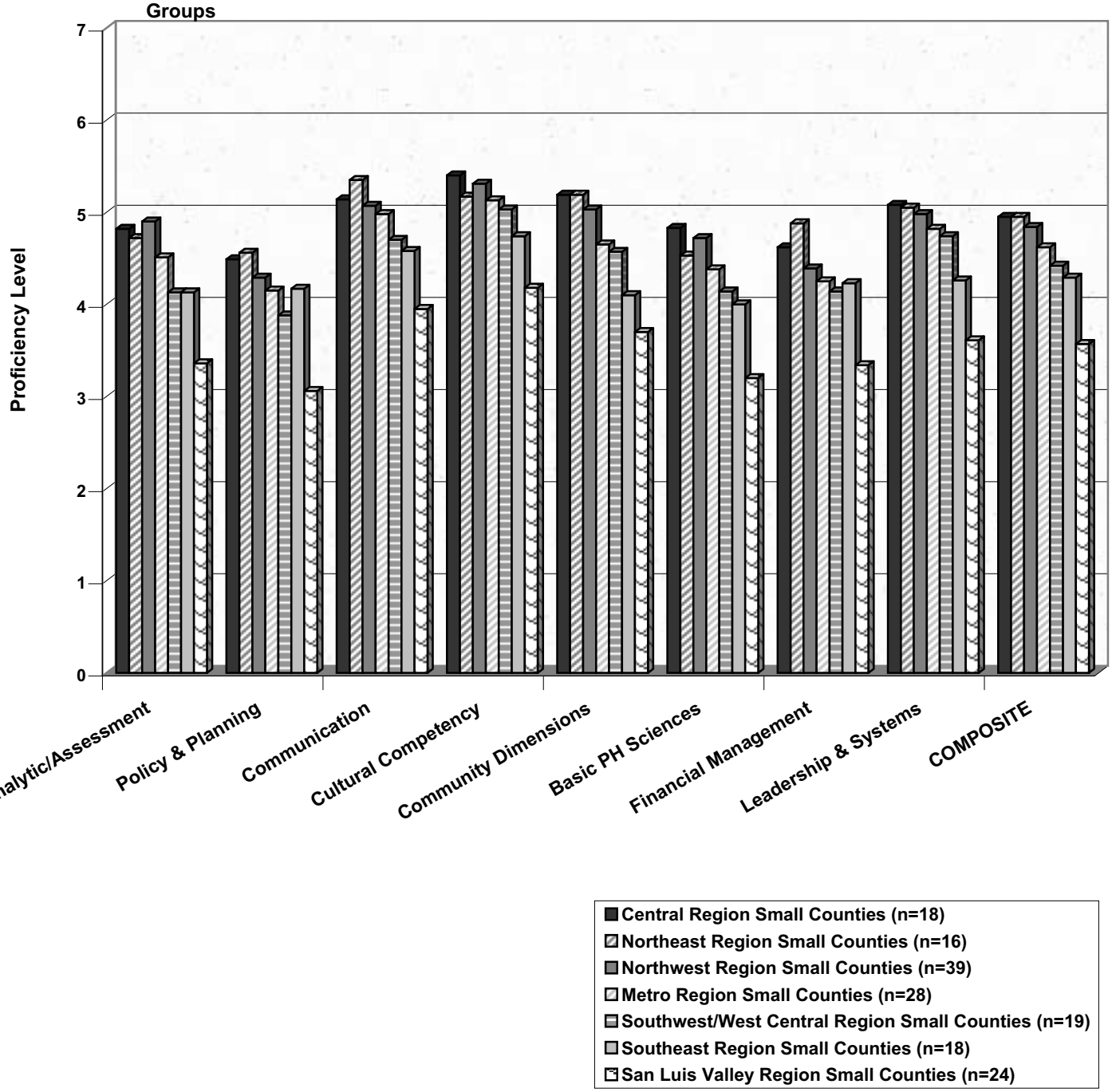


Figure 82. Educational Needs for Core Competency Skills for Colorado's Seven Small County Regional Groups

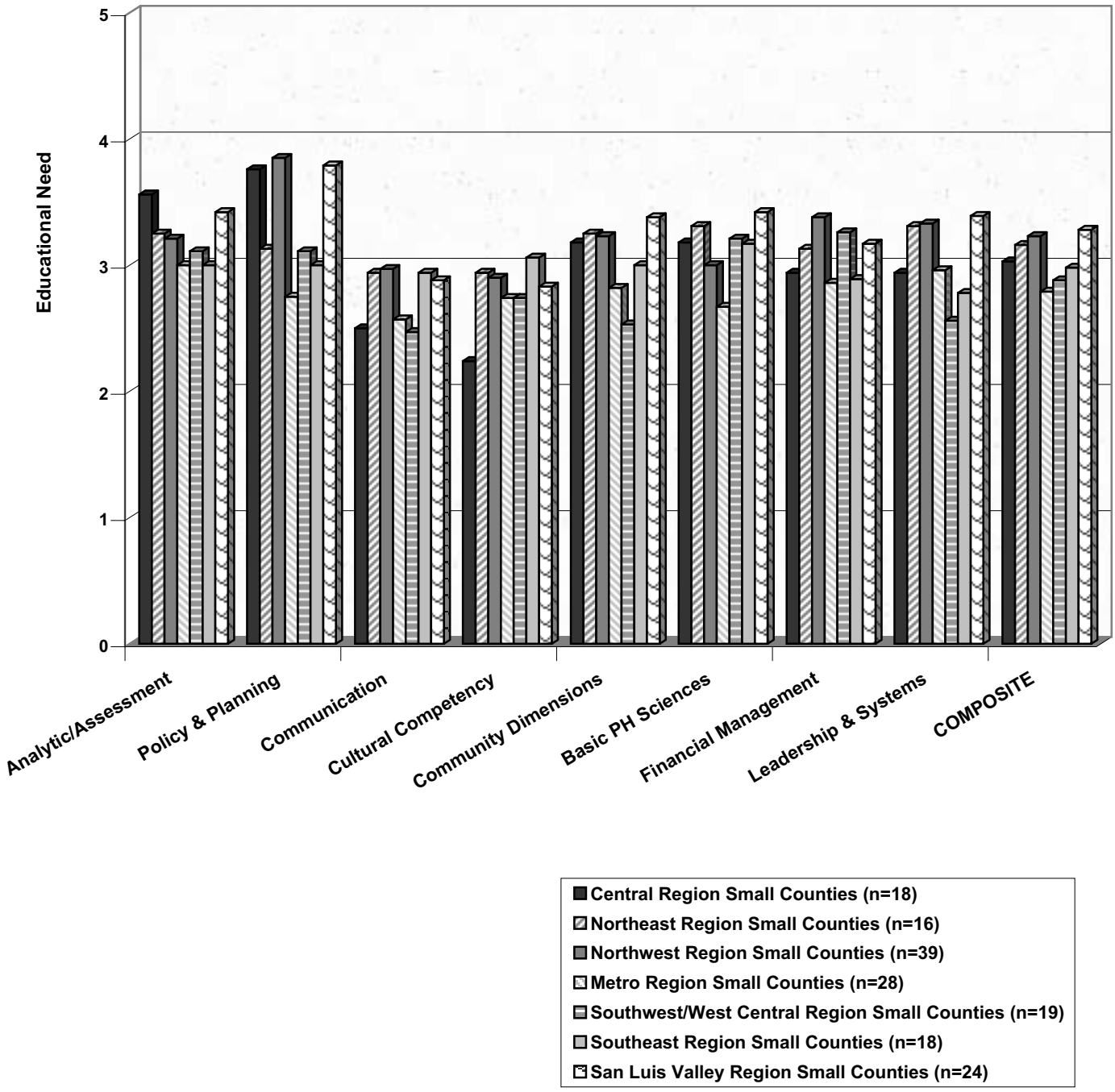


Table 77. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs in Colorado's Seven Small County Regional Groups (N=164)

Bioterrorism/Emergency Preparedness Competency Domains	Central Region (n=18)				Metro Region (n=28)				Northeast Region (n=16)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	3.70	1.76	4	3.67	2.90	1.50	5	2.83	3.93	1.72	4	4.33
Disaster Response Skills	4.61	1.51	1	4.67	3.94	1.31	1	4.17	4.65	1.67	1	5.00
Emergency Communication Skills	3.76	1.81	3	4.00	3.13	1.43	3	3.00	4.25	1.78	2	4.50
Biological/Infectious Disease Skills	3.47	1.84	5	3.00	2.57	1.40	7	2.00	3.81	1.80	5	4.00
Toxic Chem. & Env. Hazard Skills	3.12	2.00	6	2.00	2.64	1.52	6	2.00	3.31	1.85	7	3.50
Physical Injury Skills	4.56	2.28	2	5.00	3.18	1.81	2	3.00	4.13	1.75	3	4.50
Crisis Management Skills	2.94	2.01	7	2.00	3.04	1.90	4	3.00	3.56	2.03	6	4.00
Bioterrorism/EP Composite Skills	*3.85*	*1.76*		*3.75*	*3.06*	*1.18*		*3.07*	*3.96*	*1.59*		*4.44*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.50	1.50	3	4.00	4.07	1.21	2	4.50	3.63	1.50	3	4.00
Disaster Response Educ. Needs	3.61	1.46	2	3.50	4.18	1.22	1	5.00	3.25	1.57	6	3.50
Emergency Communication Educ. Needs	3.11	1.37	7	3.00	3.56	1.19	5	4.00	3.19	1.52	7	3.50
Biological/Infectious Disease Educ. Needs	3.67	1.14	1	4.00	3.63	1.50	4	4.00	3.75	1.24	2	4.00
Toxic Chem. & Env. Hazard Educ. Needs	3.44	1.62	4	3.50	3.89	1.40	3	4.00	3.94	1.34	1	4.50
Physical Injury Educ. Needs	3.39	1.04	5	3.00	3.52	1.28	7	4.00	3.31	1.25	5	4.00
Crisis Management Educ. Needs	3.35	1.06	6	3.00	3.56	1.25	5	4.00	3.50	1.41	4	4.00
Bioterrorism/EP Composite Educ. Needs	*3.45*	*1.07*		*3.29*	*3.80*	*1.04*		*4.00*	*3.51*	*1.12*		*3.71*

Table 77 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	Northwest Region (n=39)				San Luis Valley Region (n=24)				Southeast Region (n=18)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Proficiencies in Bioterrorism/EP[1]												
Disaster Planning Skills	3.68	1.66	3	3.33	3.04	2.04	4	2.33	3.31	1.73	5	3.33
Disaster Response Skills	4.37	1.44	1	4.33	3.75	1.81	2	3.83	4.19	1.59	1	4.50
Emergency Communication Skills	3.79	1.72	2	4.00	2.83	1.89	5	2.25	3.67	1.85	3	3.50
Biological/Infectious Disease Skills	3.64	1.69	4	4.00	2.52	1.90	6	2.00	2.94	1.80	6	3.00
Toxic Chem. & Env. Hazard Skills	3.62	1.77	5	4.00	2.43	2.00	7	2.00	2.71	1.83	7	3.00
Physical Injury Skills	3.46	1.68	7	3.00	4.22	2.00	1	4.00	3.88	2.09	2	4.00
Crisis Management Skills	3.59	1.76	6	3.00	3.74	2.32	3	3.00	3.47	1.87	4	4.00
Bioterrorism/EP Composite Skills	*3.73*	*1.43*		*3.75*	*3.21*	*1.76*		*2.67*	*3.50*	*1.62*		*3.29*
Educational Needs in Bioterrorism/EP[2]												
Disaster Planning Educ. Needs	3.69	1.15	3	4.00	3.88	1.45	2	5.00	3.50	1.04	2	3.50
Disaster Response Educ. Needs	3.79	1.17	2	4.00	3.71	1.37	4	4.00	3.50	1.25	2	4.00
Emergency Communication Educ. Needs	3.23	1.35	7	3.00	3.25	1.36	7	4.00	2.83	1.20	7	3.00
Biological/Infectious Disease Educ. Needs	3.62	1.23	5	4.00	3.79	1.28	3	4.00	3.44	1.20	4	4.00
Toxic Chem. & Env. Hazard Educ. Needs	3.97	1.14	1	4.00	4.00	1.35	1	5.00	3.17	1.42	5	3.00
Physical Injury Educ. Needs	3.59	1.33	6	4.00	3.29	1.37	6	4.00	3.56	1.29	1	4.00
Crisis Management Educ. Needs	3.67	1.15	4	4.00	3.38	1.44	5	3.50	3.17	0.86	5	3.00
Bioterrorism/EP Composite Educ. Needs	*3.64*	*0.96*		*3.86*	*3.61*	*1.15*		*3.86*	*3.31*	*0.95*		*3.50*

Table 77 (continued).

Bioterrorism/Emergency Preparedness Competency Domains	Southwest & West Central Region (n=19)				Stat. Diff.[3]
	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]					
Disaster Planning Skills	2.93	1.11	5	2.67	n.s.
Disaster Response Skills	3.84	1.12	1	4.00	n.s.
Emergency Communication Skills	2.87	0.96	6	3.00	n.s.
Biological/Infectious Disease Skills	3.00	1.15	4	3.00	<.05
Toxic Chem. & Env. Hazard Skills	2.42	1.30	7	2.00	<.05
Physical Injury Skills	3.42	1.87	2	3.00	n.s.
Crisis Management Skills	3.26	1.85	3	3.00	n.s.
Bioterrorism/EP Composite Skills	*3.11*	*0.91*		*2.98*	*n.s.*
Educational Needs in Bioterrorism/EP[2]					
Disaster Planning Educ. Needs	4.32	0.89	1	5.00	n.s.
Disaster Response Educ. Needs	4.21	0.92	3	4.00	n.s.
Emergency Communication Educ. Needs	4.00	1.11	5	4.00	n.s.
Biological/Infectious Disease Educ. Needs	4.21	0.98	3	4.00	*n.s.*
Toxic Chem. & Env. Hazard Educ. Needs	4.32	0.89	1	5.00	n.s.
Physical Injury Educ. Needs	3.53	1.17	7	4.00	n.s.
Crisis Management Educ. Needs	3.89	0.94	6	4.00	*n.s.*
Bioterrorism/EP Composite Educ. Needs	*4.07*	*0.66*		*4.00*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the seven groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 83. Proficiencies in Bioterrorism/Emergency Preparedness Skills for Colorado's Seven Small County Regional Groups

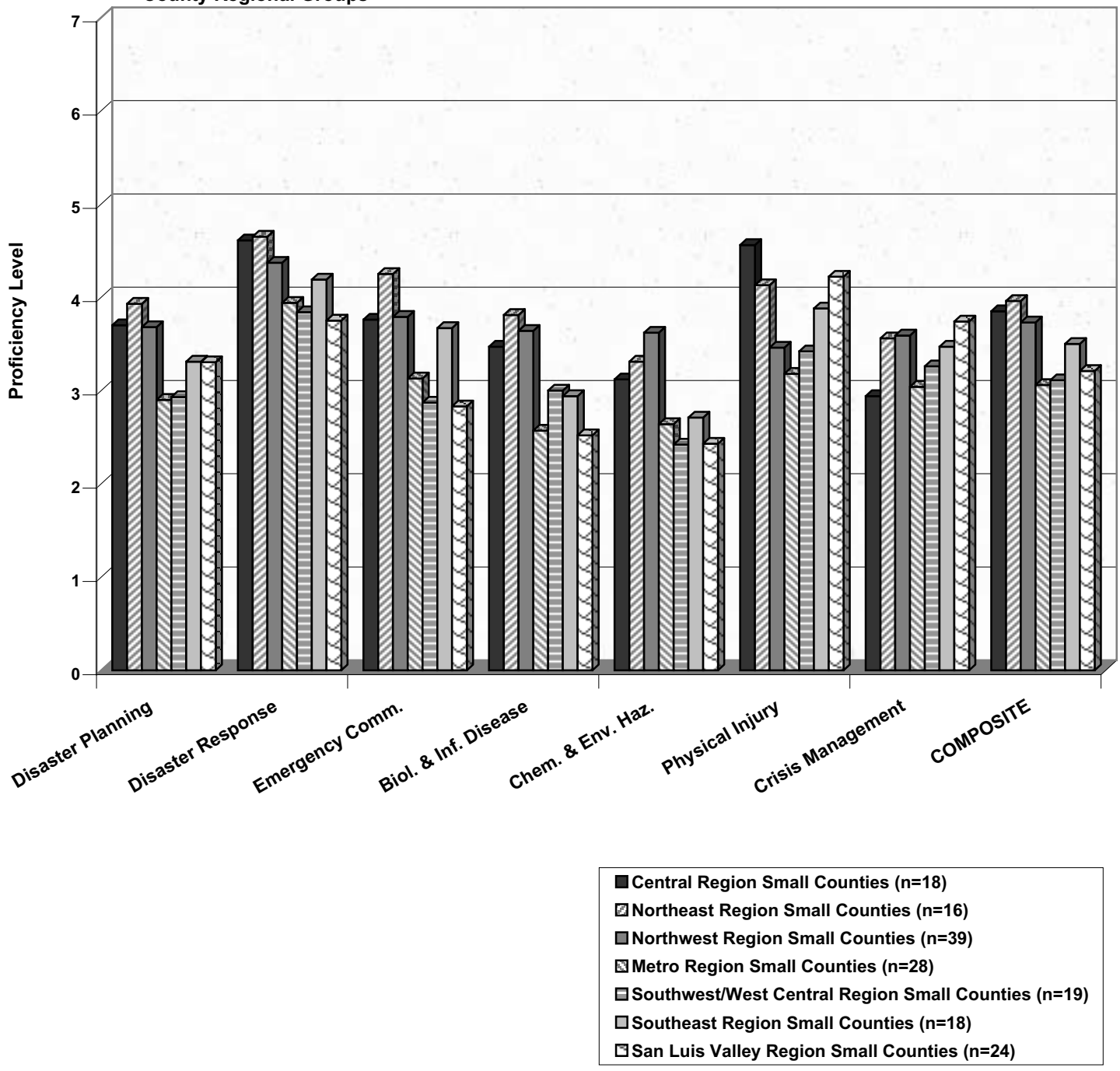


Figure 84. Educational Needs in Bioterrorism/Emergency Preparedness Skills in Colorado's Seven Small County Regional Groups

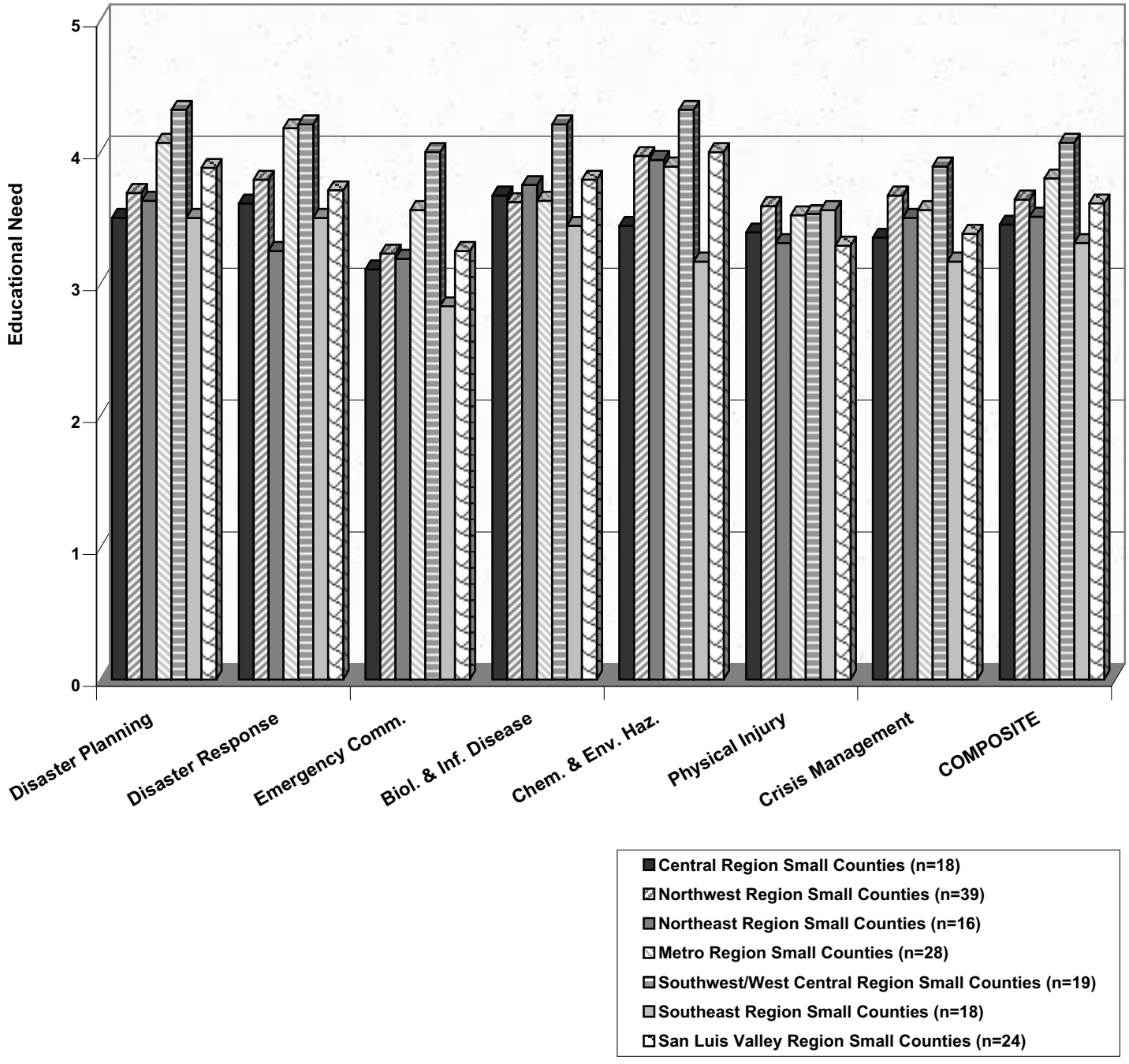


Table 78. Educational Preferences of Workers in Colorado's Seven Small County Regional Groups (N=164)

Types of Preference	Central Region (n=18)				Metro Region (n=28)				Northeast Region (n=16)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	1.77	0.73	2	2.00	2.04	0.66	2	2.00	2.13	0.64	2	2.00
1-Day Workshops	3.00	0.00	1	3.00	2.69	0.55	1	3.00	2.63	0.62	1	3.00
Several-Day Workshops	1.67	0.82	3	1.00	1.65	0.75	3	1.50	1.47	0.64	3	1.00
Academic Semester Courses	1.40	0.74	4	1.00	1.12	0.33	4	1.00	1.27	0.59	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.69	0.48	1	3.00	2.86	0.36	1	3.00	2.87	0.35	1	3.00
Interactive Teleconferences	2.14	0.66	3	2.00	1.50	0.51	4	1.50	1.67	0.62	4	2.00
Internet, Web-Based Instruction	2.21	0.80	2	2.00	1.69	0.68	3	2.00	1.88	0.62	3	2.00
Combination Format	2.14	0.53	3	2.00	1.93	0.78	2	2.00	2.29	0.73	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.83	0.38	1	3.00	2.81	.048	1	3.00	2.75	0.58	1	3.00
Weekend Classes	1.00	0.00	4	1.00	1.16	0.47	4	1.00	1.27	0.59	3	1.00
Evening Classes	1.15	0.38	3	1.00	1.24	0.52	3	1.00	1.27	0.59	3	1.00
Self-Determined Web-Based	2.21	0.80	2	2.00	1.77	0.65	2	2.00	2.13	0.64	2	2.00
Preferences for Educational Recognition												
Certificate	2.35	0.86	2	3.00	2.32	0.72	1	2.00	2.25	0.86	1	2.50
Continuing Education Units	2.50	0.65	1	3.00	2.19	0.80	2	2.00	2.07	0.73	2	2.00
Undergraduate Academic Credit	1.50	0.76	4	1.00	1.50	0.76	4	1.00	1.57	0.76	4	1.00
Graduate Academic Credit	1.71	0.83	3	1.50	1.96	0.87	3	2.00	1.93	0.92	3	2.00

Table 78 (continued).

Types of Preference	Northwest Region (n=39)				San Luis Valley Region (n=24)				Southeast Region (n=18)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	1.89	0.70	2	2.00	2.18	0.80	2	2.00	2.11	0.58	2	2.00
1-Day Workshops	2.84	0.63	1	3.00	2.64	0.58	1	3.00	2.44	0.51	1	2.00
Several-Day Workshops	1.78	0.68	3	2.00	1.82	0.91	3	1.50	1.83	0.79	3	2.00
Academic Semester Courses	1.33	0.68	4	1.00	1.33	0.58	4	1.00	1.39	0.61	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.89	0.31	1	3.00	2.79	0.51	1	3.00	2.83	0.38	1	3.00
Interactive Teleconferences	1.71	0.68	4	2.00	1.95	0.59	4	2.00	1.89	0.76	3	2.00
Internet, Web-Based Instruction	1.88	0.73	3	2.00	2.00	0.71	3	2.00	2.06	0.73	2	2.00
Combination Format	2.06	0.67	2	2.00	2.14	0.85	2	2.00	1.89	0.76	3	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.82	0.51	1	3.00	2.82	0.50	1	3.00	2.44	0.78	1	3.00
Weekend Classes	1.29	0.52	4	1.00	1.38	0.67	4	1.00	1.33	0.49	4	1.00
Evening Classes	1.40	0.55	3	1.00	1.74	0.75	3	2.00	1.50	0.71	3	1.00
Self-Determined Web-Based	1.97	0.79	2	2.00	1.85	0.67	2	2.00	2.17	0.86	2	2.00
Preferences for Educational Recognition												
Certificate	2.39	0.64	1	2.50	2.61	0.50	1	3.00	2.18	0.64	1	2.00
Continuing Education Units	2.11	0.87	2	2.00	2.50	0.51	2	2.50	2.18	0.73	1	2.00
Undergraduate Academic Credit	1.57	0.74	4	1.00	2.18	0.85	3	2.00	1.94	0.90	3	2.00
Graduate Academic Credit	1.97	0.86	3	2.00	1.95	0.89	4	2.00	1.94	1.00	3	1.50

Table 78 (continued).

Types of Preference	Southwest/West Central Region (n=19)			
	Mean	SD	Rank	Median
Preferences for Course Length				
2-Hour Sessions	1.94	0.66	3	2.00
1-Day Workshops	2.61	0.50	1	3.00
Several-Day Workshops	2.06	0.87	2	2.00
Academic Semester Courses	1.39	0.61	4	1.00
Preferences for Educational Format				
Face-to-Face Classroom Setting	2.63	0.60	1	3.00
Interactive Teleconferences	1.94	0.66	3	2.00
Internet, Web-Based Instruction	1.82	0.81	4	2.00
Combination Format	2.35	0.49	2	2.00
Preferences for Time of Course Offering				
Weekday Classes	2.89	0.47	1	3.00
Weekend Classes	1.19	0.54	3	1.00
Evening Classes	1.13	0.34	4	1.00
Self-Determined Web-Based	2.00	0.73	2	2.00
Preferences for Educational Recognition				
Certificate	2.33	0.69	2	2.00
Continuing Education Units	2.47	0.62	1	3.00
Undergraduate Academic Credit	1.53	0.74	4	1.00
Graduate Academic Credit	1.80	0.77	3	2.00

6g. Differences Between Organized vs. Local Health Departments

For another comparison between settings, workers were divided into two groups by the structure of their county public health service. These two groups and the number of respondents in each were: Organized Health Department (n=893) and Local Health Agency (n=202). Characteristics of Colorado public health workers in these two organizational models are presented in Table 79.

Workers in the Local Health Agency group were slightly older (45.9 years) than those in the Organized Health Department group (43.5 years). Men were disproportionately represented in the Organized Health Department group (male=19%) compared to the Local Health Agency group (male=6%). Racial composition was similar in both groups. A higher proportion of workers with a college degree were found in the Organized Health Department group (73%) as compared to the Local Health Agency group (57%).

The average (mean) years of experience in the discipline was higher for those in the Local Health Agency group (16.7 years) than in the Organized Health Department group (13.9 years). However, the average (mean) years of experience in public health was slightly higher for those in the Organized Health Department group (9.5 years) compared to those in the Local Health Agency group (8.8 years). The percentage of workers in professional positions was similar across settings (72% and 75%). Some differences by type of position were observed: a higher proportion of workers in the Organized Health Department group held Front Line Staff positions (58% to 50%); a higher percentage of workers in Supervisory/Management Staff positions were found in the Local Health Agency group (34% to 24%); and a higher percentage of workers in Senior Level Staff positions were found in the Organized Health Department group (19% to 16%).

The median annual salary for those in Organized Health Departments was $42,000 compared to $35,000 for those workers at Local Health Agencies. A greater percentage of workers employed at Organized Health Departments reported they knew a non-English language (30%) than those with Local Health Agencies (25%).

Differences in Core Competency proficiencies and educational needs between Organized Health Department and Local Health Agency workers are summarized in Table 80. No difference was observed between these two groups in overall Core Competency Skills. Means for the two groups were statistically different in three of the eight Core Competency Skill subscales: Organized Health Department workers reported a higher proficiency level in Cultural Competency Skills ($p < .05$), while Local Health Agency workers reported a higher proficiency level in Community Dimensions of Practice Skills ($p < .05$) and Financial Planning/Management Skills ($p < .05$). Differences and similarities between these two groups are graphically presented in Figure 85.

In the educational needs composite scale for Core Competency Skills, the Local Health Agency group reported significantly ($p < .01$) greater overall needs than the Organized Health Department group. When educational needs for the two groups were compared within the eight subscales, workers in the Local Health Agency group had a statistically higher need for education in three subscales: Assessment/Analytic Skills ($p < .01$), Policy Development/Program Planning Skills ($p < .001$), and Community Dimensions of Practice Skills ($p < .01$). Figure 86 graphically contrasts the two groups in Core Competency educational needs.

Table 81 presents differences in Bioterrorism/Emergency Preparedness proficiencies and educational need for these two groups. A statistical difference ($p < .01$) was found between the Organized Health Department group and the Local Health Agency group in overall proficiency in Bioterrorism/Emergency Preparedness Skills (composite scale): the Local Health Agency group had

a higher proficiency level (3.37) than the Organized Health Department group (3.10). When the subscales within this area were compared, the Local Health Agency group was also statistically more proficient than the Organized Health Department group in four of the subscales: Disaster Planning Skills ($p < .01$), Biological/Infectious Disease Skills ($p < .01$), Physical Injury Skills ($p < .001$), and Crisis Management Skills ($p < .05$). No differences were found in Disaster Response Skills, Emergency Communication Skills, and Toxic Chemical/Environmental Hazard Skills. The comparison between these two types of county health agencies is graphically illustrated in Figure 87.

When educational need for Bioterrorism/Emergency Preparedness Competency Skills (composite) was compared for these two groups, the Local Health Agency group reported higher overall educational needs (3.66) than the Organized Health Department group (3.44). When comparisons were made on the seven subscales, workers in the Local Health Agency group identified statistically greater educational need in four subscales: Disaster Planning Skills ($p < .01$), Disaster Response Skills ($p < .01$), Emergency Communication Skills ($p < .01$), and Toxic Chemical/Environmental Hazard Skills ($p < .01$). These differences are graphically displayed in Figure 88.

Table 82 summarizes educational preferences of workers from Organized Health Departments and Local Health Agencies. No differences in rank ordering of preferences for course length, educational format, time of course offering, or educational recognition were found.

Table 79. Characteristics of Colorado Public Health Workers in Organized Health Departments and Local Health Agencies (N=1,095)

	Organized Health Department (n=893)					Local Health Agency (n=202)				
Variables and Values	**n**	**%**	**Mean**	**SD**	**Median**	**n**	**%**	**Mean**	**SD**	**Median**
Age			43.54	11.05	45			45.87	9.80	47
Under 29	122	13.9				15	7.4			
30-39	184	21.0				31	15.3			
40-49	275	31.4				76	37.6			
50-59	241	27.5				66	32.7			
Over 60	54	6.2				14	6.9			
Gender										
Male	159	18.7				12	6.3			
Female	690	81.3				180	93.8			
Race										
White	703	80.2				168	83.2			
Hispanic	121	13.8				30	14.9			
Black	17	1.9				0	0.0			
Asian	13	1.5				1	0.5			
Other and Multiracial	23	2.6				3	1.5			
Highest Education										
High School Diploma	124	14.0				35	17.6			
Profess./Vocational Diploma	51	5.8				20	10.1			
Associate Degree	67	7.6				30	15.1			
Baccalaureate Degree	416	47.0				85	42.7			
Master's Degree	204	23.1				25	12.6			
Doctoral Degree	23	2.6				4	2.0			
College Degree										
No	242	27.3				85	42.7			
Yes	643	72.7				114	57.3			
Years Since Last Degree			15.57	11.27	14			18.16	11.66	17
Less than 2 Years	47	5.6				3	1.6			
2-5 Years	122	14.6				22	11.5			
5-9 Years	152	18.1				37	19.3			
10-14 Years	127	15.2				23	12.0			
15-19 Years	95	11.3				19	9.9			
20 or More Years	295	35.2				88	45.8			
Years Experience in Discipline			13.86	10.60	12			16.74	10.85	18
Less than 2 Years	64	8.4				8	4.7			
2-5 Years	120	15.7				18	10.5			
5-9 Years	146	19.1				27	15.7			
10-14 Years	110	14.4				25	14.5			
15-19 Years	83	10.8				18	10.5			
20 or More Years	243	31.7				76	44.2			

Table 79 (continued).

Variables and Values	Organized Health Department (n=893)					Local Health Agency (n=202)				
	n	%	Mean	SD	Median	n	%	Mean	SD	Median
Years Experience in Public Health			9.54	8.45	7			8.77	8.15	6
Less than 2 Years	139	16.0				40	20.3			
2-5 Years	178	20.4				37	18.8			
5-9 Years	190	21.8				46	23.4			
10-14 Years	158	18.1				34	17.3			
15-19 Years	69	7.9				13	6.6			
20 or More Years	137	15.7				27	13.7			
Country Survey Response										
Very Small	1	0.1				43	21.3			
Small	24	2.7				94	46.5			
Medium	59	6.6				65	32.2			
Large	809	90.6				0	0.0			
Organized Health Department										
No	0	0.0				202	100.0			
Yes	893	100.0				0	0.0			
Position Category										
Officials & Administrators	15	1.7				14	7.0			
Professionals	626	70.3				135	67.8			
Technicians	51	5.7				7	3.5			
Protective Service	3	0.3				0	0.0			
Paraprofessionals	72	8.1				20	10.1			
Administrative Support	123	13.8				23	11.6			
Skilled Craft	0	0.0				0	0.0			
Service/Maintenance	0	0.0				0	0.0			
Professional Position										
No	249	28.0				50	25.1			
Yes	641	72.0				149	74.9			
Type of Position										
Front Line Staff	502	57.6				98	50.3			
Senior Level Staff	163	18.7				31	15.9			
Supervisory/Mgmt Staff	206	23.7				66	33.8			
Organized Health Department										
No	166	18.8				43	21.7			
Yes	716	81.2				155	78.3			
Annual Salary (FTE)			$42,710	$17,775	$40,000			$36,898	$13,102	$35,000
Less Than $20,000	25	3.4				13	7.9			
$20,000 to $29,999	13	17.8				34	20.6			
$30,000 to $39,999	196	26.7				59	35.8			
$40,000 to $49,999	170	23.1				32	19.4			
$50,000 to $59,999	107	14.6				16	9.7			
$60,000 to $69,999	46	6.3				8	4.8			

Table 79 (continued).

Variables and Values	Organized Health Department (n=893)					Local Health Agency (n=202)				
	n	%	Mean	SD	Median	n	%	Mean	SD	Median
$70,000 to $79,999	25	3.4				2	1.2			
Over $80,000	35	4.8				1	0.6			
Know Non-English Language										
No	616	69.9				150	75.4			
Yes	265	30.1				49	24.6			
Other Language Speaking										
Fair	84	31.9				17	34.0			
Good	84	31.9				18	36.0			
Excellent	95	36.1				15	30.0			
Other Language Reading										
Fair	89	34.2				15	31.9			
Good	86	33.1				22	46.8			
Excellent	85	32.7				10	21.3			
Other Language Writing										
Fair	112	44.6				25	53.2			
Good	71	28.3				17	36.2			
Excellent	68	27.1				5	10.6			

Table 80. Differences in Core Competency Proficiencies and Educational Needs Between Organized Health Department and Local Health Agency Workers (N=1,095)

Core Competency Domains	Organized Health Dept. (n=893)				Local Health Agency (n=202)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]									
Analytic/Assessment Skills	4.32	1.46	5	4.50	4.25	1.50	5	4.25	n.s.
Policy Development/Program Planning Skills	3.92	1.55	7	4.00	3.98	1.48	8	4.25	n.s.
Communication Skills	4.66	1.27	2	4.83	4.71	1.28	2	4.83	n.s.
Cultural Competency Skills	5.14	1.18	1	5.25	4.94	1.29	1	5.00	<.05
Community Dimensions of Practice Skills	4.36	1.35	4	4.50	4.58	1.37	3	4.75	<.05
Basic Public Health Sciences Skills	4.07	1.52	6	4.25	4.18	1.51	6	4.50	n.s.
Financial Planning & Management Skills	3.86	1.41	8	3.80	4.11	1.46	7	4.00	<.05
Leadership & Systems Thinking Skills	4.61	1.37	3	4.75	4.51	1.50	4	4.75	n.s.
Core Competencies Composite Skills	*4.37*	*1.20*		*4.53*	*4.41*	*1.30*		*4.51*	*n.s.*
Educ. Needs in Core Competency Domains[2]									
Analytic/Assessment Educ. Needs	3.03	1.16	4	3.00	3.26	1.04	2	3.00	<.01
Policy Development/Prog. Planning Educ. Needs	3.05	1.27	3	3.00	3.54	1.16	1	4.00	<.001
Communication Educ. Needs	2.76	1.19	7	3.00	2.77	1.13	8	3.00	n.s.
Cultural Competency Educ. Needs	2.74	1.15	8	3.00	2.79	1.13	7	3.00	n.s.
Community Dimensions of Practice Educ. Needs	2.91	1.17	6	3.00	3.13	1.10	5	3.00	<.01
Basic Public Health Sciences Educ. Needs	3.05	1.28	3	3.00	3.19	1.13	4	3.00	n.s.
Financial Planning & Management Educ. Needs	3.15	1.43	1	3.00	3.25	1.24	3	3.00	n.s.
Leadership & Systems Thinking Educ. Needs	3.00	1.18	5	3.00	3.10	1.05	6	3.00	n.s.
Core Competencies Composite Educ. Needs	*2.96*	*0.85*		*3.00*	*3.13*	*0.80*		*3.13*	*<.01*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]Independent t-tests were used to test for differences in means between the two groups. Prior to these analyses, all variables met or were transformed to meet the assumption of normal distribution. Levene's test for equality of variances was used to assess the homogeneity of variance assumption and make required adjustments. Although directionality could have been hypothesized, conservative 2-tailed significance tests were employed. The probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When differences between groups were non-significant, n.s. is noted.

Figure 85. Proficiencies in Core Competency Skills by Organized Health Department and Local Health Agency Workers

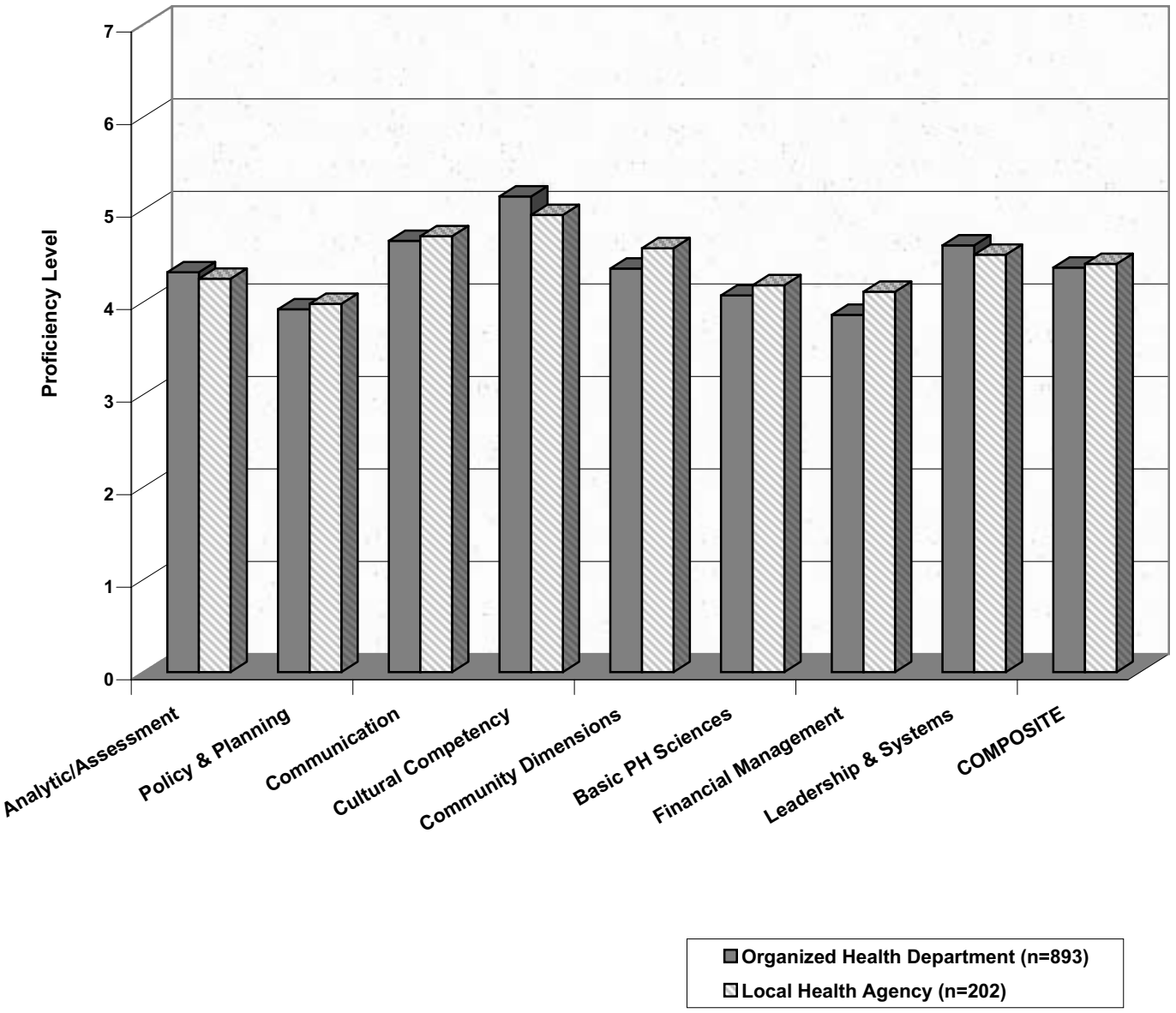


Figure 86. Educational Needs in Core Competency Skills by Organized Health Department and Local Health Agency Workers

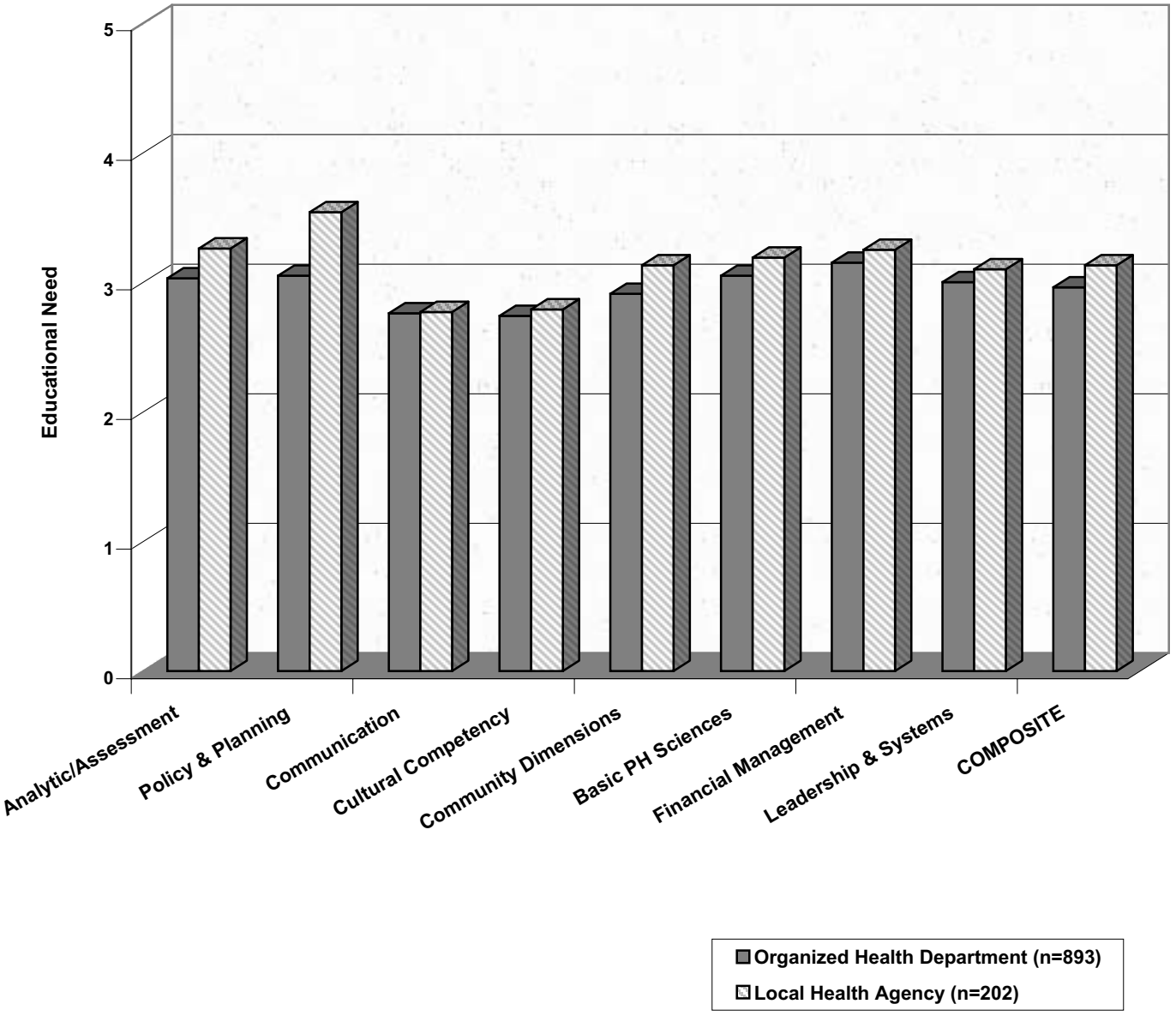


Table 81. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs Between Organized Health Departments and Local Health Agency Workers (N=1,095)

Bioterrorism/Emergency Preparedness Competency Domains	Organized Health Dept. (n=893)				Local Health Agency Workers (n=202)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]									
Disaster Planning Skills	2.81	1.62	5	2.67	3.17	1.71	5	3.00	<.01
Disaster Response Skills	3.94	1.49	1	4.00	4.06	1.52	1	4.00	n.s.
Emergency Communication Skills	3.33	1.67	2	3.00	3.36	1.71	3	3.00	n.s.
Biological/Infectious Disease Skills	2.78	1.73	6	2.00	3.03	1.71	6	3.00	<.05
Toxic Chem & Env Hazard Skills	2.65	1.73	7	2.00	2.87	1.76	7	2.00	n.s.
Physical Injury Skills	3.20	1.84	3	3.00	3.78	1.90	2	4.00	<.001
Crisis Management Skills	2.95	1.83	4	3.00	3.28	1.88	4	3.00	<.05
Bioterrorism Composite Skills	*3.10*	*1.39*		*2.95*	*3.37*	*1.51*		*3.21*	*<.01*
Educational Needs in Bioterrorism/EP[2]									
Disaster Planning Educ Needs	3.61	1.26	2	4.00	3.86	1.22	2	4.00	<.01
Disaster Response Educ Needs	3.58	1.21	3	4.00	3.82	1.25	3	4.00	<.01
Emergency Communication Educ Needs	3.06	1.23	7	3.00	3.31	1.25	7	3.00	<.01
Biological/Infectious Disease Educ Needs	3.56	1.33	4	4.00	3.80	1.16	4	4.00	n.s.
Toxic Chem & Env Hazard Educ Needs	3.62	1.38	1	4.00	3.92	1.24	1	4.00	<.01
Physical Injury Educ Needs	3.30	1.33	6	3.00	3.34	1.24	6	3.00	n.s.
Crisis Management Educ Needs	3.36	1.25	5	3.00	3.53	1.13	5	4.00	n.s.
Bioterrorism Composite Educ Needs	*3.44*	*0.99*		*3.57*	*3.66*	*0.97*		*3.86*	*<.01*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]Independent t-tests were used to test for differences in means between the two groups. Prior to these analyses, all variables met or were transformed to meet the assumption of normal distribution. Levene's test for equality of variances was used to assess the homogeneity of variance assumption and make required adjustments. Although directionality could have been hypothesized, conservative 2-tailed significance tests were employed. The probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When differences between groups were non-significant, n.s. is noted.

Figure 87. Proficiencies in Bioterrorism/Emergency Preparedness Skills for Organized Health Department and Local Health Agency Workers

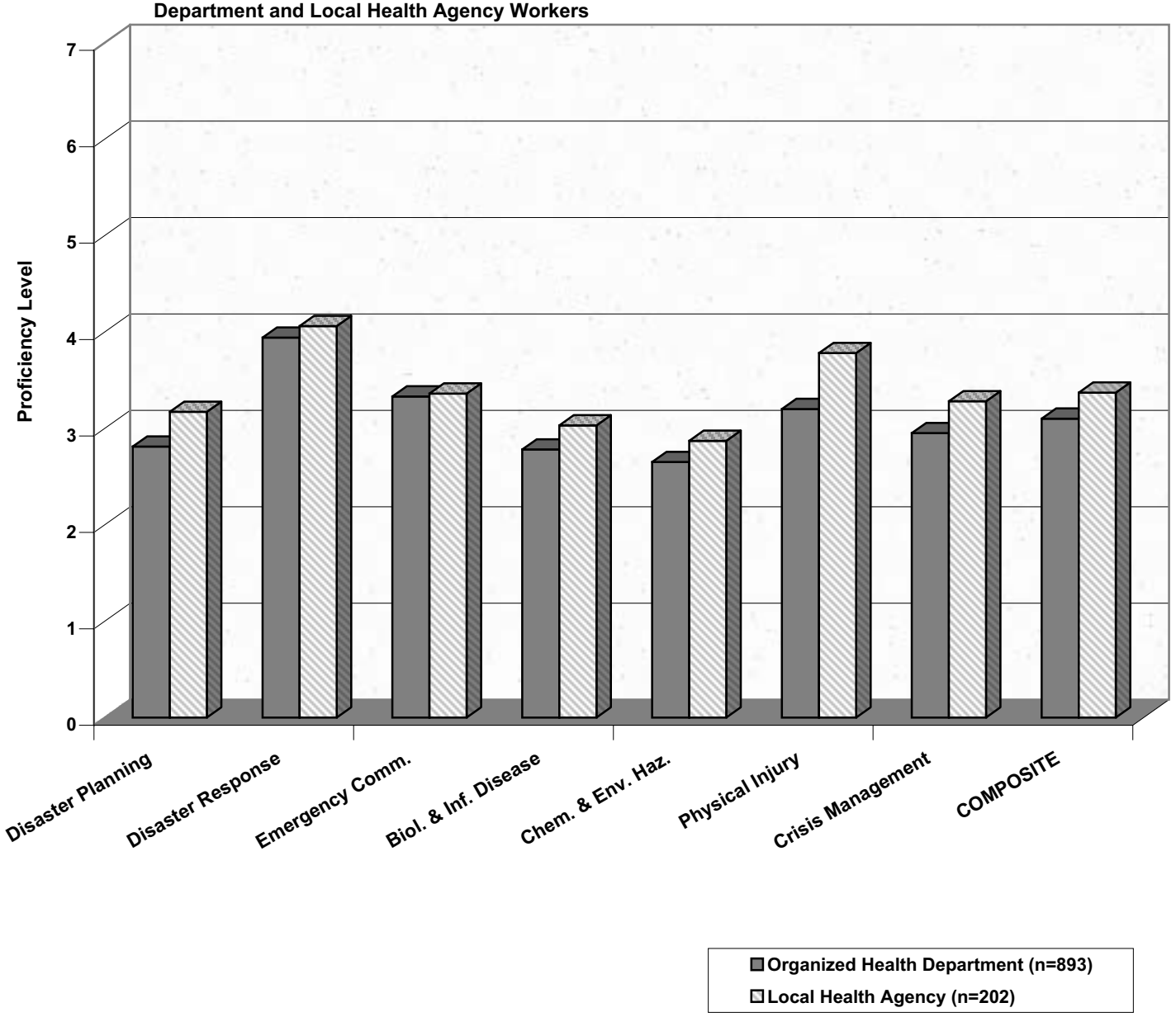


Figure 88. Educational Needs in Bioterrorism/Emergency Preparedness Skills by Organized Health Department and Local Health Agency Workers

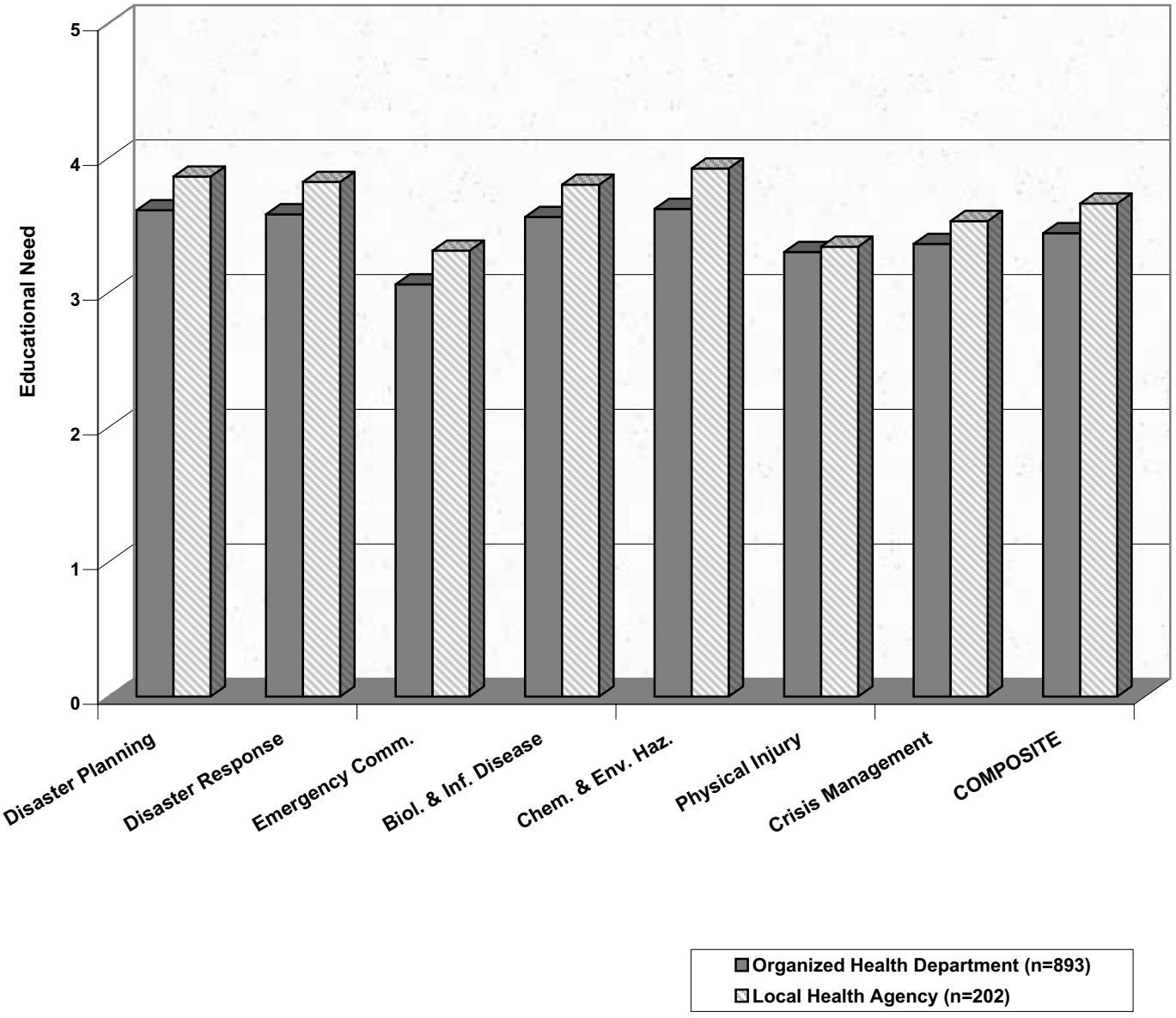


Table 82. Educational Preferences of Workers from Organized Health Departments and Local Health Agency Workers (N=1,095)

Types of Preference	Organized Health Departments (n=893)				Local Health Agency Workers (n=202)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length								
2-Hour Sessions	2.23	0.72	2	2.00	1.93	0.71	2	2.00
1-Day Workshops	2.45	0.62	1	3.00	2.69	0.50	1	3.00
Several-Day Workshops	1.69	0.74	3	2.00	1.72	0.77	3	2.00
Academic Semester Courses	1.41	0.67	4	1.00	1.36	0.62	4	1.00
Preferences for Educational Format								
Face-to-Face Classroom Setting	2.73	0.52	1	3.00	2.78	0.44	1	3.00
Interactive Teleconferences	1.70	0.64	4	2.00	1.83	0.66	4	2.00
Internet, Web-Based Instruction	1.77	0.70	3	2.00	1.86	0.74	3	2.00
Combination Format	1.98	0.69	2	2.00	2.07	0.70	2	2.00
Preferences for Time of Course Offering								
Weekday Classes	2.80	0.48	1	3.00	2.83	0.45	1	3.00
Weekend Classes	1.18	0.44	4	1.00	1.21	0.49	4	1.00
Evening Classes	1.39	0.61	3	1.00	1.36	0.59	3	1.00
Self-Determined Web-Based	1.78	0.71	2	2.00	1.89	0.73	2	2.00
Preferences for Educational Recognition								
Certificate	2.36	0.68	1	2.00	2.34	0.70	1	2.00
Continuing Education Units	2.19	0.79	2	2.00	2.29	0.71	2	2.00
Undergraduate Academic Credit	1.63	0.74	4	1.00	1.67	0.78	4	1.00
Graduate Academic Credit	1.93	0.84	3	2.00	1.87	0.83	3	2.00

6h. Differences by Type of County

In another comparison by work setting, workers were divided into three groups by their county of employment. Using US Census definitions for population density, the groups and the number of participants were: Urban (n=864), Rural (n=171), and Frontier (n=57). Characteristics of these three groups are summarized in Table 83.

Workers in Rural and Frontier counties were slightly older (45.5 years; 45.6 years, respectively), than workers in Urban counties (43.6 years). The Urban group had a larger percentage of men (males=19%) than did the Rural (males=10%) or Frontier (males=4%) groups. The Rural group was composed of the highest percentage of white respondents (84%), followed by the Urban group (80%) and Frontier group (75%).

Workers in Urban counties were more educated than those in the Rural and Frontier counties. With respect to highest level of education achieved, 73% of the Urban group, 62% of the Rural group, and 47% of the Frontier group reported they had earned a college degree.

Workers in Rural and Frontier counties had more work experience in their discipline than did those from the Urban counties. However, experience in public health was more balanced with workers in the Urban group having slightly more experience (9.6 years) than those in the Rural and Frontier groups (9.0 years, 8.3 years, respectively).

As expected, workers in the Rural and Frontier groups were more likely to work in small counties and local health agencies. All Urban workers were employed in organized health departments. All workers in the Frontier group and the majority of workers in the Rural group were employed in local health agencies.

A higher proportion of Urban workers were employed in professional positions (72%), compared to Rural and Frontier counterparts (62%, 47%, respectively). The proportion of Front Line Staff was higher in Urban counties (58%) than in Rural counties (52%) and Frontier counties (47%). More workers in Frontier counties (25%) and Rural counties (22%) were in part-time positions compared workers in Urban counties (19%).

Annual average (mean) full-time equivalent salaries varied across groups: in ascending order were salaries in Frontier counties ($33,820), Rural counties ($37,410), and Urban counties ($42,854). A lower proportion of Rural county workers (23%) indicated that they knew a non-English language when compared to workers in Urban counties (30%) or Frontier counties (32%).

Table 84 presents a summary of differences in Core Competency proficiencies and educational needs by type of county. No differences among the groups were found in Core Competency Skills proficiency levels. Means for the three groups were statistically different ($p < .05$) in only one of the eight Core Competency Skill subscales; in Financial Planning/Management Skills, Rural and Frontier groups rated themselves more proficient than the Urban group. Figure 89 visually presents these comparisons.

Similarly, in the educational needs composite scale for Core Competency Skills, no difference was observed. When educational needs for the three groups were compared within the eight subscales, means on one subscale were significantly different ($p < .001$); respondents in the Rural and Frontier groups reported a higher proficiency in Policy Development/Program Planning Skills than respondents in the Urban group. Differences among county types are portrayed in Figure 90.

Differences in Bioterrorism/Emergency Preparedness proficiencies and educational needs by type of county are summarized in Table 85. No differences were found between the three groups in Bioterrorism/Emergency Preparedness Competency Skills (composite scale). When the subscales within this area were compared, a statistical difference ($p < .001$) was noted in one subscale; for Physical Injury Skills, the Frontier and Rural groups rated themselves as more proficient than the Urban group. Similarities and differences are graphically displayed in Figure 91.

When educational need for overall Bioterrorism/Emergency Preparedness Competency Skills (composite) was compared for these three groups, a statistical difference ($p < .05$) was found. The Rural and Frontier groups identified a higher need for this education than did the Urban group. When comparisons were made on the seven subscales, differences were found in four subscales: Disaster Planning Skills ($p < .05$), Disaster Response Skills ($p < .01$), Emergency Communication Skills ($p < .05$), and Toxic Chemical /Environmental Hazard Skills ($p < .05$). The pattern was the same in all subscales; workers in the Rural and Frontier counties rated their educational needs lower than those in the Urban counties. Figure 92 visually presents these differences in educational needs across types of county.

Educational preferences of workers by type of county are summarized in Table 86. The groups expressed similar preferences in course length, educational format, and time of course offering. While workers in Rural and Urban counties preferred graduate to undergraduate credit, workers in the Frontier counties preferred undergraduate to graduate credit.

Table 83. Characteristics of Colorado Public Health Workforce in Three Types of Counties (N=1,092)

	Rural (n=171)				Frontier (n=57)				Urban (n=864)			
Variables and Values	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**	**n**	**%**	**Mean**	**SD**
Age			45.54	10.13			45.63	9.16			43.57	11.80
Under 29 Years	14	8.2			4	7.0			116	13.9		
30-39 Years	27	15.9			8	14.0			176	21.1		
40-49 Years	65	38.2			24	42.1			256	30.7		
50-59 Years	50	19.4			18	31.6			236	18.3		
Over 60 Years	14	8.2			3	5.3			50	6.0		
Gender												
Male	17	10.3			2	3.8			149	18.5		
Female	148	89.7			50	96.2			658	81.5		
Race												
White	142	84.0			43	75.4			672	80.4		
Hispanic	20	11.8			13	22.8			116	13.9		
Black	0	0.0			0	0.0			16	1.9		
Asian	0	0.0			1	1.8			13	1.6		
Other or Multiracial	7	4.1			0	0.0			19	2.3		
Highest Education												
High School Diploma	25	14.8			10	18.2			123	14.6		
Profess./Vocational Diploma	21	12.4			4	7.3			46	5.5		
Associate Degree	18	10.7			15	27.3			62	7.4		
Baccalaureate Degree	78	46.2			21	38.2			395	46.9		
Master's Degree	23	13.6			5	9.1			194	23.0		
Doctoral Degree	4	2.4			0	0.0			23	2.7		
College Degree												
No	64	37.9			29	52.7			231	27.4		
Yes	105	62.1			26	47.3			612	72.6		
Years Since Last Degree			17.67	11.71			18.68	11.12			15.66	11.33
Less than 2 Years	2	1.2			3	5.7			43	5.4		
2-5 Years	23	14.1			1	1.9			116	14.6		
5-9 Years	30	18.4			10	18.9			146	18.3		
10-14 Years	20	12.3			9	17.0			118	14.8		
15-19 Years	18	11.0			3	5.7			91	11.4		
20 or More Years	70	42.9			27	50.9			283	35.5		
Years Experience in Discipline			15.95	11.00			16.69	10.44			13.87	10.62
Less than 2 Years	9	5.8			1	2.4			61	8.4		
2-5 Years	18	11.7			4	9.5			116	16.0		
5-9 Years	28	18.2			6	14.3			135	18.6		
10-14 Years	21	13.6			9	21.4			102	14.0		
15-19 Years	15	9.7			4	9.5			80	11.0		
20 or More Years	63	40.9			18	42.9			232	32.0		
Years Experience in Pub. Health			8.95	8.38			8.27	7.76			9.56	8.46
Less than 2 Years	36	21.4			11	20.0			129	15.6		

Table 83 (continued).

Variables and Values	Rural (n=171)				Frontier (n=57)				Urban (n=864)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
2-5 Years	25	14.9			15	27.3			171	20.7		
5-9 Years	44	26.2			7	12.7			183	22.1		
10-14 Years	27	16.1			12	21.8			149	18.0		
15-19 Years	12	7.1			3	5.5			66	8.0		
20 or More Years	24	14.3			7	12.7			130	15.7		
County Survey Response												
Very Small	31	18.1			13	22.8			0	0.0		
Small	58	33.9			44	77.2			14	1.6		
Medium	81	47.4			0	0.0			43	5.0		
Large	1	0.6			0	0.0			807	93.4		
Organized Health Department												
No	144	84.2			57	100.0			0	0.0		
Yes	27	15.8			0	0.0			850	100.0		
Position Category												
Officials & Administrators	13	7.7			4	7.0			11	1.3		
Professionals	119	70.8			35	61.4			594	70.1		
Technicians	7	4.2			2	3.5			49	5.8		
Protective Service	0	0.0			0	0.0			3	0.4		
Paraprofessionals	15	8.9			6	10.5			69	8.1		
Administrative Support	14	8.3			10	17.5			121	14.3		
Professional Position												
No	64	37.9			29	52.7			231	27.4		
Yes	105	62.1			26	47.3			612	72.6		
Type of Position												
Front Line Staff	86	51.8			26	47.3			480	58.0		
Senior Level Staff	25	15.1			9	16.4			160	19.3		
Supervisory/Mgmt Staff	55	33.1			20	36.4			188	22.7		
Full-Time Employment												
No	36	21.6			14	24.6			158	18.8		
Yes	131	78.4			43	75.4			681	81.2		
Annual Salary (FTE)			$37,410	$12,361			$33,820	$14,447			$42,854	$17,872
Less Than $20,000	8	5.8			8	16.3			22	3.2		
$20,000 to $29,999	29	20.9			11	22.4			124	17.8		
$30,000 to $39,999	52	37.4			16	32.7			185	26.5		
$40,000 to $49,999	28	20.1			7	14.3			163	23.4		
$50,000 to $59,999	13	9.4			4	8.2			102	14.6		
$60,000 to $69,999	7	5.0			2	4.1			44	6.3		
$70,000 to $79,999	2	1.4			0	0.0			24	3.4		
Over $80,000	0	0.0			1	2.0			34	4.9		
Know Non-English Language												
No	130	77.4			39	68.4			584	69.7		

Table 83 (continued).

Variables and Values	Rural (n=171)				Frontier (n=57)				Urban (n=864)			
	n	%	Mean	SD	n	%	Mean	SD	n	%	Mean	SD
Yes	38	22.6			18	31.6			254	30.3		
Other Language Speaking												
Fair	17	43.6			2	11.1			80	31.6		
Good	12	30.8			10	55.6			80	31.6		
Excellent	10	25.6			6	33.3			93	36.8		
Other Language Reading												
Fair	15	41.7			3	16.7			84	33.6		
Good	13	36.1			12	66.7			83	33.2		
Excellent	8	22.2			3	16.7			83	33.2		
Other Language Writing												
Fair	19	55.9			8	44.4			108	44.4		
Good	11	32.4			9	50.0			68	28.0		
Excellent	4	11.8			1	5.6			67	27.6		

Table 84. Differences in Core Competency Proficiencies and Educational Needs by Type of County (N=1,092)

Core Competency Domains	Rural (n=171)				Frontier (n=57)				Urban (n=864)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Core Competency Domains[1]													
Analytic/Assessment Skills	4.32	1.37	5	4.50	4.04	1.71	6	4.00	4.31	1.47	5	4.50	n.s.
Policy Development/Prog. Planning Skills	4.02	1.39	8	4.25	3.95	1.65	8	4.25	3.91	1.56	7	4.00	n.s.
Communication Skills	4.80	1.18	2	5.00	4.53	1.40	2	4.83	4.64	1.28	2	4.83	n.s.
Cultural Competency Skills	5.01	1.22	1	5.25	4.81	1.55	1	5.00	5.14	1.19	1	5.25	n.s.
Community Dimensions of Practice Skills	4.60	1.24	4	4.75	4.44	1.58	3	4.50	4.34	1.36	4	4.50	n.s.
Basic Public Health Sciences Skills	4.21	1.46	6	4.50	4.00	1.61	7	4.00	4.06	1.53	6	4.25	n.s.
Financial Planning & Management Skills	4.14	1.38	7	4.20	4.11	1.70	5	4.00	3.83	1.41	8	3.80	<.05
Leadership & Systems Thinking Skills	4.61	1.37	3	4.75	4.34	1.47	4	4.75	4.59	1.39	3	4.75	n.s.
Core Competencies Composite Skills	*4.47*	*1.18*		*4.54*	*4.28*	*1.14*		*4.26*	*4.35*	*1.21*		*4.51*	*n.s.*
Educ. Needs in Core Competency Domains[2]													
Analytic/Assessment Educ. Needs	3.22	1.01	3	3.00	3.18	1.14	4	3.00	3.03	1.17	4	3.00	n.s.
Policy Devel./Prog. Planning Educ. Needs	3.50	1.16	1	4.00	3.40	1.18	1	3.00	3.07	1.27	3	3.00	<.001
Communication Educ. Needs	2.70	1.10	8	3.00	2.88	1.20	8	3.00	2.76	1.18	7	3.00	n.s.
Cultural Competency Educ. Needs	2.70	1.11	7	3.00	2.89	1.13	7	3.00	2.75	1.16	8	3.00	n.s.
Community Dimen. of Practice Educ. Needs	3.06	1.07	6	3.00	3.04	1.24	5	3.00	2.92	1.17	6	3.00	n.s.
Basic Public Health Sciences Educ. Needs	3.15	1.13	4	3.00	3.23	1.15	2	3.00	3.07	1.28	2	3.00	n.s.
Financial Planning & Mgmt. Educ. Needs	3.25	1.23	2	3.00	3.21	1.28	3	3.00	3.16	1.43	1	3.00	n.s.
Leadership & Systems Thinking Educ. Needs	3.10	1.04	5	3.00	2.95	1.15	6	3.00	3.01	1.18	5	3.00	n.s.
Core Competencies Composite Educ. Needs	*3.08*	*0.78*		*3.00*	*3.10*	*0.89*		*3.00*	*2.97*	*0.85*		*3.00*	*n.s.*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the three groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. NS is noted when the overall difference among groups was non-significant. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 89. Proficiencies in Core Competency Skills by Type of County

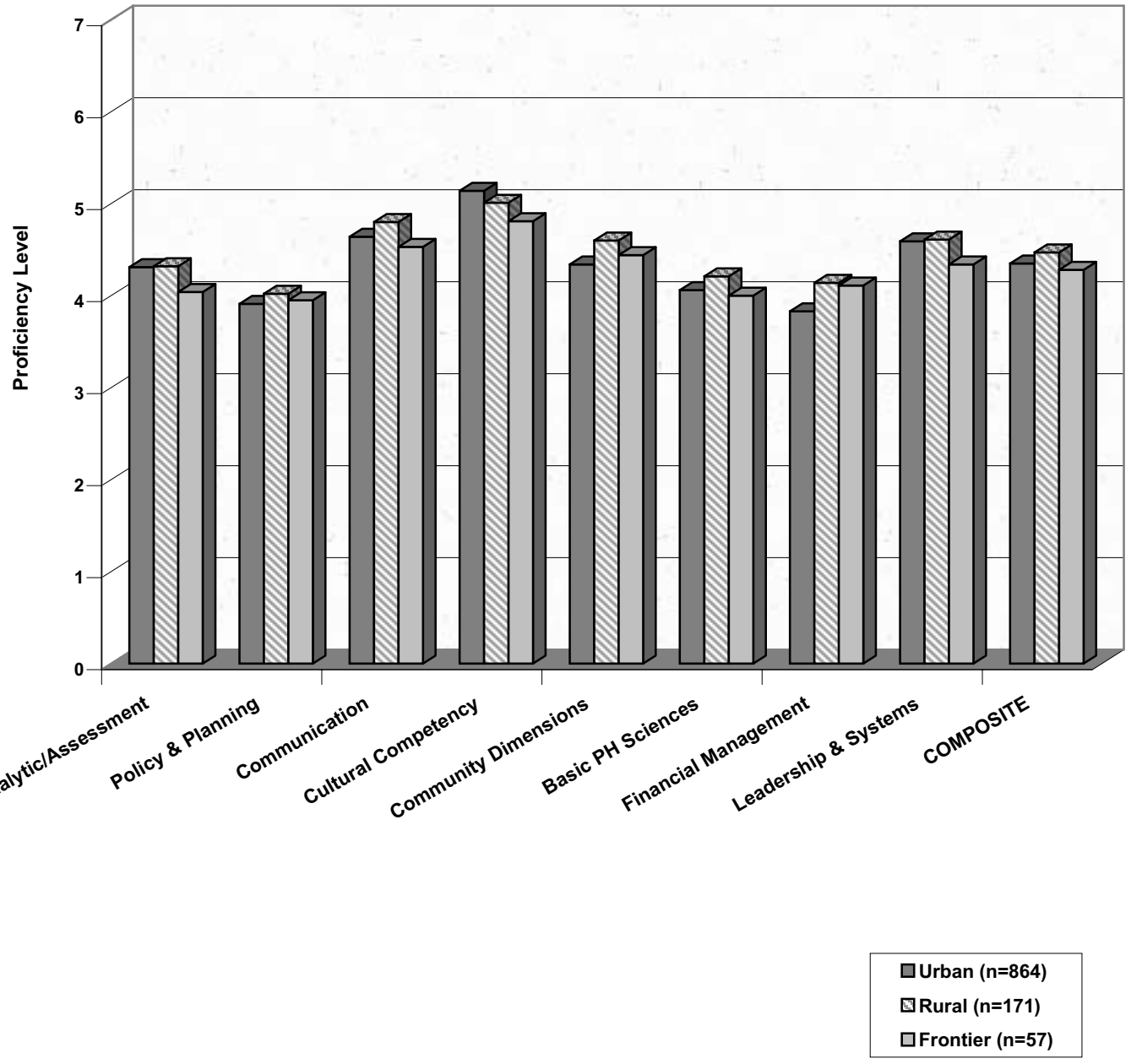


Figure 90. Educational Needs in Core Competency Skills by Type of County

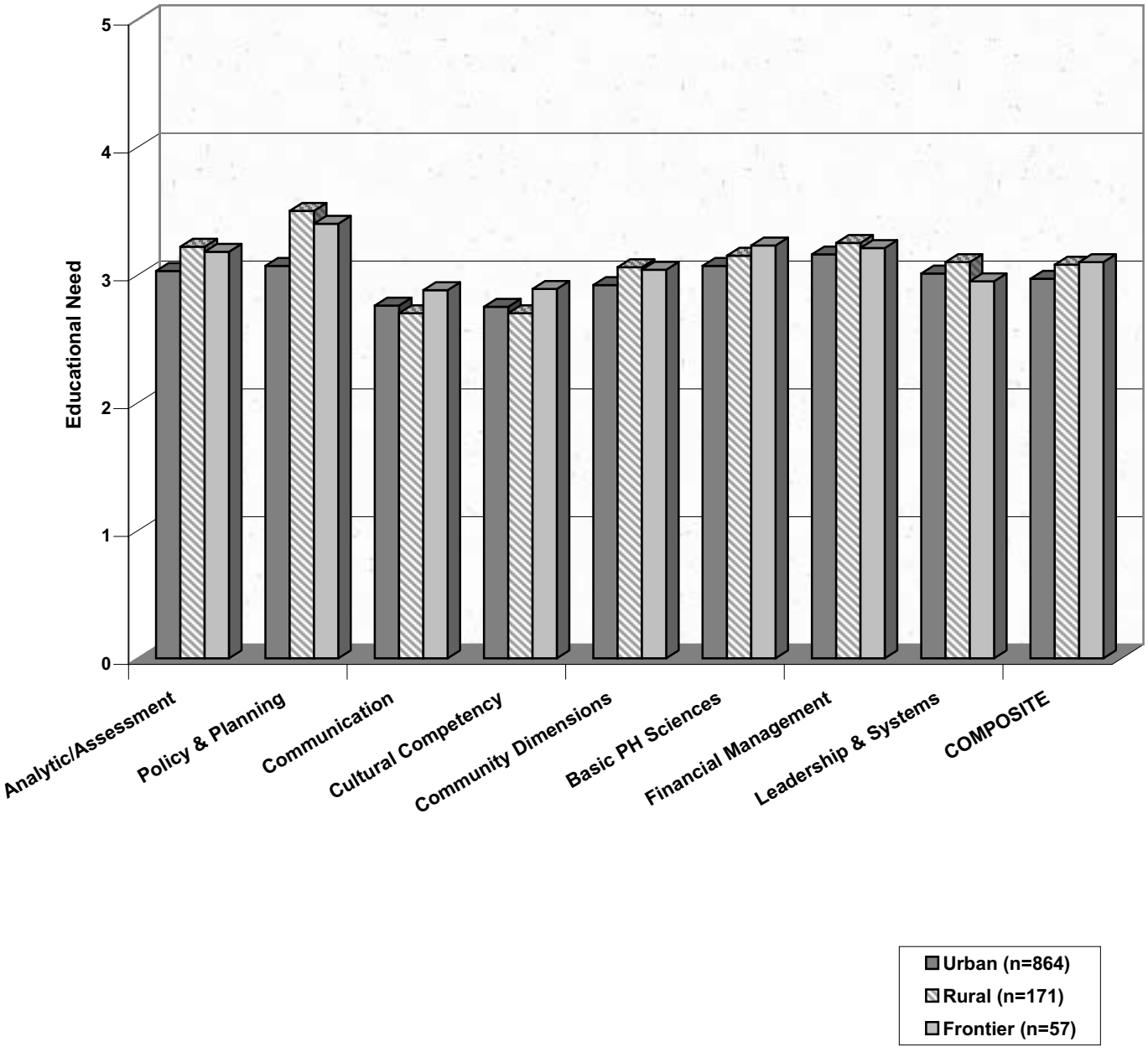


Table 85. Differences in Bioterrorism/Emergency Preparedness Proficiencies and Educational Needs by Type of County (N=1,092)

Bioterrorism/Emergency Preparedness Competency Domains	Rural (n=171)				Frontier (n=57)				Urban (n=864)				Stat. Diff.[3]
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median	
Proficiencies in Bioterrorism/EP[1]													
Disaster Planning Skills	3.06	1.65	5	3.00	3.28	1.84	4	3.00	2.82	1.62	5	2.67	n.s.
Disaster Response Skills	3.99	1.44	1	4.00	4.03	1.74	1	4.33	3.94	1.49	1	4.00	n.s.
Emergency Communication Skills	3.36	1.72	3	3.00	3.21	1.77	5	3.00	3.34	1.67	2	3.00	n.s.
Biological/Infectious Disease Skills	2.99	1.64	6	3.00	2.88	1.80	6	2.50	2.79	1.74	6	2.00	n.s.
Toxic Chem. & Env. Hazard Skills	2.80	1.69	7	2.00	2.82	1.94	7	2.00	2.67	1.74	7	2.00	n.s.
Physical Injury Skills	3.59	1.86	2	4.00	4.02	1.98	2	4.00	3.19	1.85	3	3.00	<.001
Crisis Management Skills	3.09	1.75	4	3.00	3.64	2.16	3	4.00	2.94	1.84	4	2.00	n.s.
Bioterrorism/EP Composite Skills	*3.29*	*1.45*		*3.19*	*3.41*	*1.65*		*3.05*	*3.10*	*1.40*		*2.93*	*n.s.*
Educational Needs in Bioterrorism/EP[2]													
Disaster Planning Educ. Needs	3.83	1.20	3	4.00	3.88	1.30	2	4.00	3.60	1.26	2	4.00	<.05
Disaster Response Educ. Needs	3.87	1.21	2	4.00	3.67	1.34	4	4.00	3.56	1.21	3	4.00	<.01
Emergency Communication Educ. Needs	3.20	1.23	7	3.00	3.47	1.34	5	4.00	3.06	1.23	7	3.00	<.05
Biological/Infectious Disease Educ. Needs	3.81	1.14	4	4.00	3.75	1.27	3	4.00	3.55	1.33	4	4.00	n.s.
Toxic Chem. & Env. Hazard Educ. Needs	3.90	1.23	1	4.00	3.89	1.36	1	4.00	3.61	1.38	1	4.00	<.05
Physical Injury Educ. Needs	3.35	1.22	6	3.00	3.35	1.34	6	4.00	3.29	1.33	6	3.00	n.s.
Crisis Management Educ. Needs	3.54	1.05	5	4.00	3.35	1.27	7	4.00	3.36	1.25	5	3.00	n.s.
Bioterrorism/EP Composite Educ. Needs	*3.65*	*0.92*		*3.86*	*3.62*	*1.10*		*3.86*	*3.43*	*0.99*		*3.57*	*<.05*

[1]Proficiency ratings were made on 7-point Likert scales where 1=Not Proficient at this Time and 7=Highly Proficient at this Time.

[2]Educational need ratings were made on 5-point Likert scales where 1=No Need and 5=Highest Need.

[3]The statistical technique of analysis of variance was used to test whether the differences among means of the three groups were greater than would be expected by chance alone. Prior to this analysis, all variables met or were transformed to meet the assumption of normal distribution; tests for homogeneity of variances were conducted. An overall F-ratio statistic was calculated; the probability (p) levels reported in this column include less than or equal to .001, .01, and .05, respectively. When the overall difference among groups was not significant, n.s. is noted. When the overall F ratio was statistically significant, post-hoc comparisons between all pairs of groups were made using Scheffe and Tukey methods. Differences among groups are too numerous to report here; statistical results of post-hoc comparison may be obtained from the author.

Figure 91. Proficiencies in Bioterrorism/Emergency Preparedness Skills by Type of County

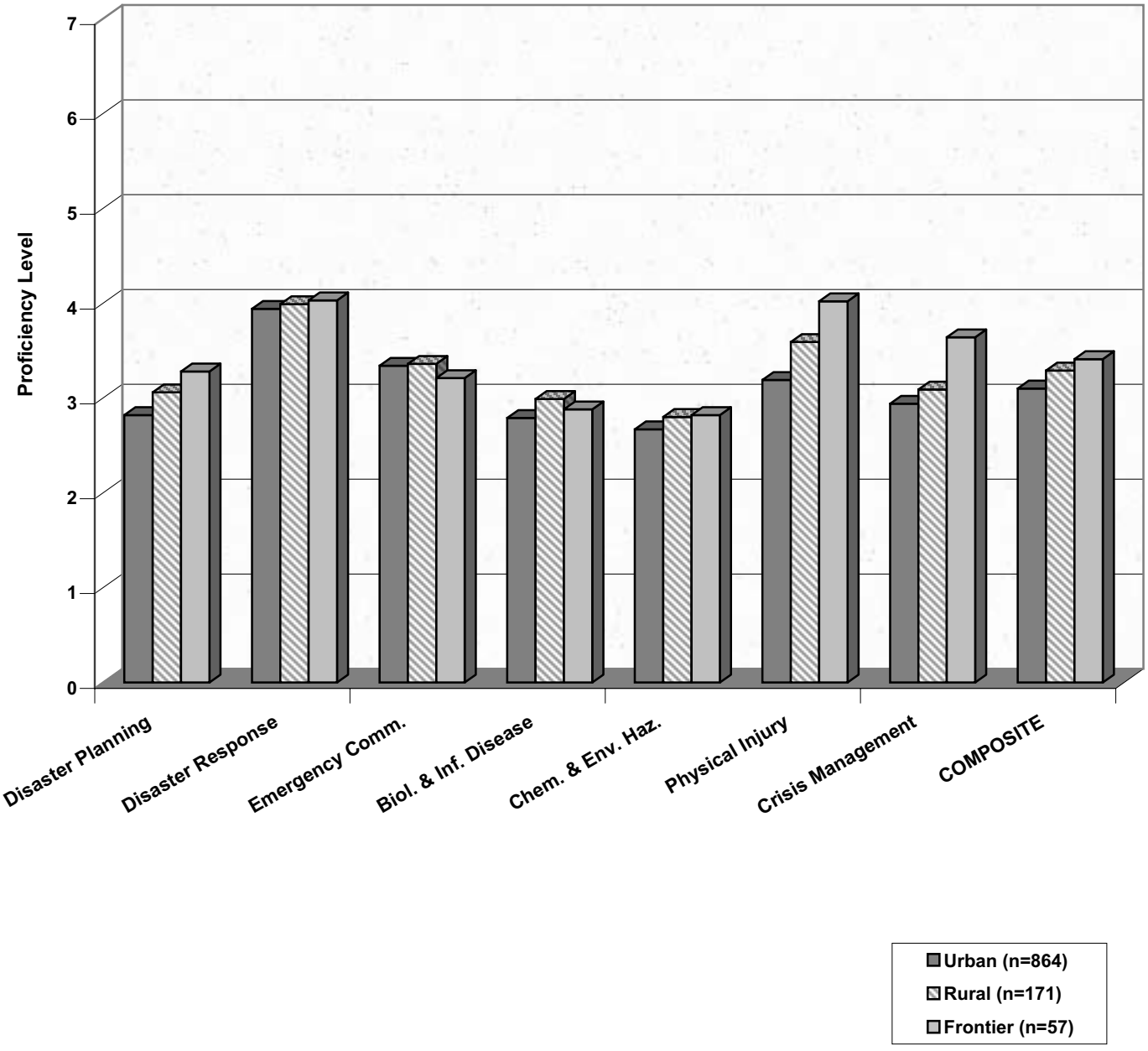


Figure 92. Educational Needs in Bioterrorism/Emergency Preparedness Skills by Type of County

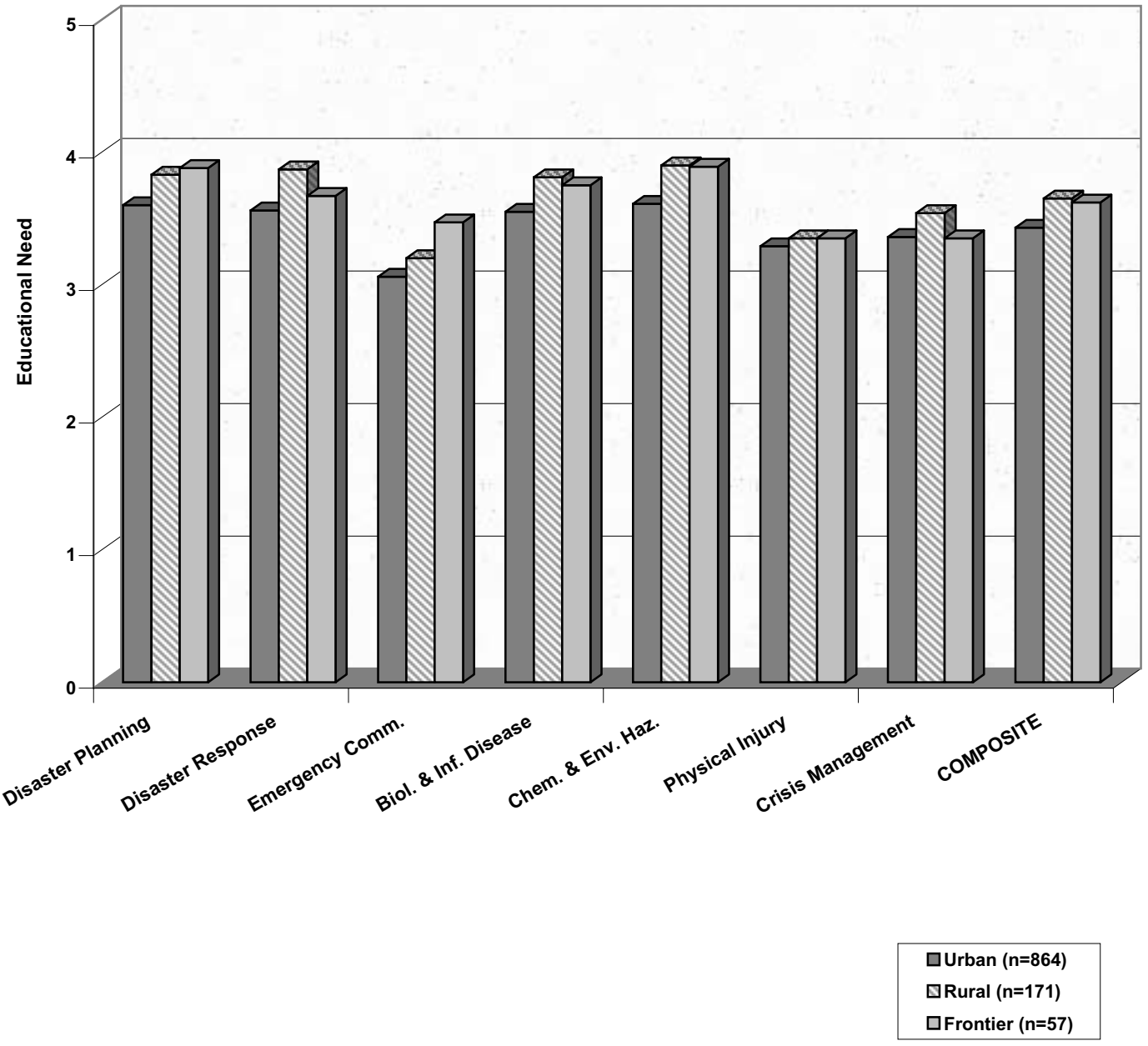


Table 86. Educational Preferences of Workers by Type of County (N=1,092)

Types of Preference	Rural (n=171)				Frontier (n=57)				Urban (n=850)			
	Mean	SD	Rank	Median	Mean	SD	Rank	Median	Mean	SD	Rank	Median
Preferences for Course Length												
2-Hour Sessions	1.92	0.70	2	2.00	2.06	0.72	2	2.00	2.23	0.72	2	2.00
1-Day Workshops	2.70	0.49	1	3.00	2.60	0.53	1	3.00	2.44	0.62	1	3.00
Several-Day Workshops	1.70	0.73	3	2.00	1.79	0.84	3	2.00	1.69	0.74	3	2.00
Academic Semester Courses	1.35	0.62	4	1.00	1.33	0.58	4	1.00	1.42	0.68	4	1.00
Preferences for Educational Format												
Face-to-Face Classroom Setting	2.77	0.43	1	3.00	2.82	0.47	1	3.00	2.73	0.52	1	3.00
Interactive Teleconferences	1.87	0.68	3	2.00	1.82	0.62	4	2.00	1.69	0.64	4	2.00
Internet, Web-Based Instruction	1.86	0.76	4	2.00	1.84	0.64	3	2.00	1.77	0.70	3	2.00
Combination Format	1.98	0.68	2	2.00	2.29	0.67	2	2.00	1.97	0.69	2	2.00
Preferences for Time of Course Offering												
Weekday Classes	2.84	0.45	1	3.00	2.72	0.60	1	3.00	2.81	0.47	1	3.00
Weekend Classes	1.15	0.39	4	1.00	1.38	0.64	4	1.00	1.18	0.45	4	1.00
Evening Classes	1.30	0.50	3	1.00	1.50	0.73	3	1.00	1.40	0.62	3	1.00
Self-Determined Web-Based	1.90	0.76	2	2.00	1.94	0.69	2	2.00	1.77	0.71	2	2.00
Preferences for Educational Recognition												
Certificate	2.28	0.70	1	2.00	2.50	0.64	1	3.00	2.36	0.68	1	2.00
Continuing Education Units	2.25	0.72	2	2.00	2.40	0.67	2	2.50	2.19	0.79	2	2.00
Undergraduate Academic Credit	1.64	0.75	4	1.00	1.83	0.88	3	2.00	1.62	0.73	4	1.00
Graduate Academic Credit	1.91	0.83	3	2.00	1.80	0.84	4	2.00	1.93	0.84	3	2.00

7. Other Observations

7a. Correlations Among Core Competency Domains

The correlations among proficiencies in the eight Core Competency domains are shown in Table 87. The correlations among all pairs were all statistically significant ($p < .001$) and demonstrated a moderate to high relationship (Pearson's *r* ranged from .46 to .82). While many correlations were high, the highest correlations were between these sets of domain proficiencies: Financial Planning/Management Skills with Policy Development/Program Planning Skills (*r*=.82); Basic Public Health Sciences Skills with Analytic/Assessment Skills (*r*=.81); Community Dimensions of Practice Skills with Leadership/Systems Thinking Skills (*r*=.81); and Leadership/Systems Thinking Skills with Policy Development/Program Planning Skills (*r*=.80). The Core Competency domain that demonstrated the lowest correlations with all other domains was Cultural Competency Skills (*r*=.46 to .67). This pattern is also seen when examining correlations of the eight subscales proficiencies with the Core Competency composite; Cultural Competency Skills was the lowest (*r*=.71). The range for the correlation coefficients for the other seven domains with the composite score was .86 to .90. These moderate to high correlations suggest that Core Competency proficiencies are interrelated with each other. If workers were proficient in one dimension, they were also likely to be proficient in all other dimensions. Similarly if workers were weak in one area, they were likely to be weak in all other areas.

Table 88 presents the correlation matrix of educational needs in each of the Core Competency domains. The correlations among educational needs were all statistically significant but lower in magnitude than the proficiencies (*r* ranged from .11 to .62). The highest correlations among educational needs were between these domain sets: Leadership/Systems Thinking Skills with Community Dimensions of Practice Skills (*r*=.62); Financial Planning/Management Skills with Policy Development/Program Planning Skills (*r*=.61), Basic Public Health Sciences Skills with Analytic/ Assessment Skills (*r*=.60), and Policy Development/Program Planning Skills with Analytic/ Assessment Skills (*r*=.57). Cultural Competency Skills was again the domain that had the lowest correlation with other educational need domains; Cultural Competency Skills educational needs correlated least with Financial Planning/Management Skills educational needs (*r*=.11) and correlated highest with Communication Skills educational needs (*r*=.52). With the exception of Cultural Competency Skills, workers who have educational needs in one dimension were likely to have educational needs in other dimensions.

Table 87. Correlation Matrix of Proficiency in Core Competency Skill Domains

Proficiency in Core Competency Domains[1]	Proficiency in Core Competency Domains[1]								
	Analytic/ Assessmnt	**Policy & Planning**	**Communi-cation**	**Cultural Comptncy**	**Community Dimensions**	**Basic PH Sciences**	**Financial Mgmt.**	**Ldrshp & Systems**	***Core Composite***
Analytic/Assessment	1.000								
Policy & Planning	.718**	1.000							
Communication	.781**	.739**	1.000						
Cultural Competency	.589**	.458**	.616**	1.000					
Community Dimensions	.727**	.739**	.787**	.671**	1.000				
Basic PH Sciences	.810**	.676**	.743**	.577**	.758**	1.000			
Financial Management	.754**	.818**	.785**	.514**	.752**	.691**	1.000		
Leadership & Systems	.757**	.796**	.782**	.671**	.808**	.693**	.786**	1.000	
Core Composite	*.884***	*.867***	*.904***	*.711***	*.898***	*.859***	*.893***	*.903***	*1.000*

[1]All measures met criteria for normality (transformed, if required)

*p<.01, **p<.001; All correlations in matrix significant at p <.001

Table 88. Correlation Matrix of Educational Needs in Core Competency Skill Domains

Educational Needs in Core Skill Domains[1]	Educational Needs in Core Competency Skill Domains[1]								
	Analytic/ Assessmnt	**Policy & Planning**	**Communi-cation**	**Cultural Competency**	**Community Dimensions**	**Basic PH Sciences**	**Financial Mgmt.**	**Leadership & Systems**	***Core Composite***
Analytic/Assessment	1.000								
Policy & Planning	.572**	1.000							
Communication	.326**	.346**	1.000						
Cultural Competency	.267**	.207**	.516**	1.000					
Community Dimensions	.433**	.453**	.543**	.510**	1.000				
Basic PH Sciences	.598**	.444**	.259**	.248**	.419**	1.000			
Financial Management	.469**	.611**	.193**	.112**	.356**	.405**	1.000		
Leadership & Systems	.388**	.485**	.499**	.368**	.619**	.364**	.468**	1.000	
Core Composite	.729**	.750**	.650**	.565**	.769**	.679**	.668**	.748**	1.000

[1]All measures met criteria for normality (transformed, if required)

*p<.01, **p<.001; All correlations in matrix significant at p <.001

7b. Correlations Among Bioterrorism/Emergency Preparedness Domains

A correlations matrix of proficiencies in Bioterrorism/Emergency Preparedness Skill domains is presented in Table 89. All correlations were significant ($p < .001$) and moderate to high (r ranged from .50 to .76). The highest correlations were for Disaster Planning Skills proficiencies with four other proficiencies: Biological/Infectious Disease Skills (r=.76), Emergency Communication Skills (r=.75), Disaster Response Skills (r=.74), and Toxic Chemical/Environmental Hazard Skills (r=.74). Although Physical Injury Skills and Crisis Management Skills showed a fairly high correlation between themselves (r=.63), these two dimensions showed the lowest correlations with other dimensions. An analysis of this correlation matrix suggests workers who were proficient in one domain were likely to be proficient in all others. Similarly, workers who were not prepared in some domains were likely to not be prepared in others.

Table 90 is a correlation matrix of educational needs in Bioterrorism/Emergency Preparedness domains. The highest correlations were between educational needs in these subscales: Disaster Planning Skills and Disaster Response Skills (r=.79), Toxic Chemical/Environmental Hazard Skills and Biological/Infectious Disease Skills (r=.72), Physical Injury Skills and Crisis Management Skills (r=.68), and Physical Injury Skills and Biological/Infectious Disease Skills. Educational needs in Emergency Communication Skills was the least correlated with all other educational need dimensions (r=.34 to .49). Workers who had educational needs in one dimension of Bioterrorism/ Emergency Preparedness were likely to have educational needs in all other dimensions.

Table 89. Correlation Matrix of Proficiencies in Bioterrorism/Emergency Preparedness Skill Domains

Proficiency in BT/EP Skill Domains[1]	Proficiency in Bioterrorism/Emergency Preparedness Skill Domains[1]							
	Disaster Planning	**Disaster Response**	**Emergency Commun.**	**Biol. & Inf. Disease**	**Chem. & Env. Haz.**	**Physical Injury**	**Crisis Mgmt.**	***BT/EP Composite***
Disaster Planning	1.000							
Disaster Response	.744**	1.000						
Emergency Communication	.750**	.709**	1.000					
Biological & Infectious Disease	.756**	.709**	.715**	1.000				
Chemical & Env. Hazards	.743**	.670**	.602**	.692**	1.000			
Physical Injury	.610**	.616**	.522**	.551**	.534**	1.000		
Crisis Management	.637**	.591**	.496**	.560**	.552**	.633**	1.000	
BT/EP Composite	*.883***	*.856***	*.818***	*.838***	*.814***	*.767***	*.761***	*1.000*

[1]All measures met criteria for normality (transformed, if required)

*p<.01, **p<.001; All correlations in matrix significant at p <.001

Table 90. Correlation Matrix of Educational Needs in Bioterrorism/Emergency Preparedness Skill Domains

Educational Needs in BT/EP Skill Domains	Educational Needs in Bioterrorism/Emergency Preparedness Skill Domains[1]							
	Disaster Planning	**Disaster Response**	**Emergency Commun.**	**Biol. & Inf. Disease**	**Chem. & Env. Hazard**	**Physical Injury**	**Crisis Mgmt.**	***BT/EP Composite***
Disaster Planning	1.000							
Disaster Response	.787**	1.000						
Emergency Communication	.417**	.492**	1.000					
Biological & Infectious Disease	.603**	.569**	.370**	1.000				
Chemical & Environmental Hazards	.641**	.560**	.342**	.721**	1.000			
Physical Injury	.475**	.475**	.340**	.620**	.598**	1.000		
Crisis Management	.484**	.491**	.385**	.507**	.518**	.675**	1.000	
BT/EP Educ. Needs Composite	*.802***	*.795***	*.628***	*.810***	*.808***	*.781***	*.750***	*1.000*

[1]All measures met criteria for normality (transformed, if required)

*p<.01, **p<.001; All correlations in matrix significant at p <.001

7c. Correlations Among Proficiencies and Educational Needs

Educational assessment theory suggests that personal and institutional priorities are congruent, proficiency level should be strongly and inversely related to educational need (Alspach, 1995; Tobin, Wise, & Hull, 1979). The more proficient an individual is in a given area, the less the learning needs in that area. Conversely, learning needs should be highest in areas where the competency level is lowest. Many student or employee assessments examine either competency/proficiency level or they measure perceived learning needs. In this study, both types of assessment were employed.

Table 91 presents a correlation matrix of proficiency level with level of educational need in each Core Competency Skill domain. Across all Core Competency dimensions, the correlations between proficiency level and educational need were inverse but low (r=-.05 to -.25). The correlation coefficients were highest for Cultural Competency Skills (r=-.25), Communication Skills (r=-.23), and Community Dimensions of Practice (r=-.21). The correlation between proficiency level and educational need was lowest for Financial Planning/Management Skills (r=-.05), Policy Development/Planning Skills (r=-.11), and Analytic/Assessment Skills (r=-.13).

A correlation matrix of proficiency level with level of educational need in each Bioterrorism/Emergency Preparedness Skill domain is presented in Table 92. Across all seven domains, the correlations were inverse but low (r=-.12 to -.20). The correlations were highest for Crisis Management Skills (r=-.20) and Physical Injury Skills (r=-.20). The correlation between proficiency and educational need was lowest for Biological/Infectious Disease Skills (r=-.12) and Toxic Chemical/Environmental Hazard Skills (r=-.13).

The low correlation between proficiency level and educational need in each dimension of Core Competency and Bioterrorism/Emergency Preparedness suggests that even when workers acknowledge a very low level of proficiency in some dimension, they may not see a proportionately greater need for more education in that area. Some workers may view some dimensions as less relevant to their position, professional responsibilities, or setting. Similarly, some may not believe having the full range of Bioterrorism/Emergency Preparedness competencies is a high priority--perhaps because of where they are located, their professional responsibilities, or the low likelihood of an emergency event.

Table 91. Correlation Matrix of Proficiencies and Educational Needs in Core Competency Skill Domains

Proficiency in Core Competency Domains[1]	Educational Need in Core Competency Domains[1]								
	Analytic/ Assessmnt	**Policy & Planning**	**Communi-cation**	**Cultural Competency**	**Community Dimensions**	**Basic PH Sciences**	**Financial Mgmt.**	**Leadership & Systems**	***Core Composite***
Analytic/Assessment	-.130**								
Policy & Planning		-.107**							
Communication			-.229**						
Cultural Competency				-.246**					
Community Dimensions					-.205**				
Basic PH Sciences						-.179**			
Financial Management							-.048		
Leadership & Systems								-.172**	
Core Composite									*-.150***

[1]All measures met criteria for normality (transformed, if required)

*p<.01, **p<.001;

Table 92. Correlation Matrix of Proficiency and Educational Need in Bioterrorism/Emergency Preparedness Skill Domains

Proficiency in BT/EP Skill Domains	Educational Needs in Bioterrorism/Emergency Preparedness Skill Domains[1]							
	Disaster Planning	**Disaster Response**	**Emergency Commun.**	**Biol. & Inf. Disease**	**Chem. & Env. Hazard**	**Physical Injury**	**Crisis Mgmt.**	***BT/EP Composite***
Disaster Planning	-.171**							
Disaster Response		-.163**						
Emergency Communication			-.169**					
Biological & Infectious Disease				-.115**				
Chemical & Environmental Hazards					-.133**			
Physical Injury						-.197**		
Crisis Management							-.204**	
BT/EP Composite								*-.160***

[1]All measures met criteria for normality (transformed, if required)

*p<.01, **p<.001

8. Limitations and Strengths of the Study

8a. Methodology

One limitation of this study is that public health workers reported on their own level of proficiency and their own perceived educational needs. No independent external evaluations of competencies were done (e.g., supervisor ratings, standardized test scores). However, research demonstrates that self-reports of perceived ability are positively related to effort, persistence, and perseverance (Bandura, 1994). Social psychologists suggest that individuals use the processes of self-reflection and self-efficacy to evaluate their own experiences and thought processes. Self-efficacy has been defined as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (p. 1). In a recent publication, Pajares (2002) noted that "self-efficacy is the confidence that one has in one's ability to do the things that one tries to do," and he claimed that behavior could often be better predicted by one's own beliefs about one's capabilities than by what others would objectively judge one to be capable of accomplishing. From this perspective, the self-reported assessment of competency is a strength representing a valid approach to assessing proficiency levels. Combined with other sources of data available about the workforce, a more thorough understanding of workforce competencies is possible.

A related criticism could be the use of Likert scales where the anchoring terms may not have the same meaning across workers. Because individuals do have different frames of reference based on their personal and professional experience, expectations and absolute standards are likely to vary across workers. However, because individuals made these self-assessments across a number of competencies, the study findings still illuminate the areas workers believe are their stronger and weaker areas, making the exact proficiency level or precise educational need level less important. These response scales will also work well in measuring change over time; workers are likely to continue to rate themselves from a similar framework. Thus the self-report method using Likert scales is suitable for re-measuring competencies in the longitudinal phase of this study designed to evaluate outcomes of projected educational initiatives.

The self-evaluation of educational need is of less concern. Many social scientists and educators (e.g., Cameron, 1988; Knowles, 1985) have argued that self-report is the most valid method of assessment for this phenomenon. However, Alspach (1995) recognized that not all workers are equally proficient at identifying educational needs. Experienced workers are more likely to be adept at identifying the precise nature of their educational needs; recent graduates or less educated workers may be less able to specify the true nature and scope of their educational needs. Another argument for using a self-evaluation of need is related to expected participation in education. Because enrolling in educational opportunities is voluntary, a self-report of educational needs may be a better indicator of which educational offerings would be attended (Swansburg & Swansburg, 1995). Although self-reported ratings can be challenged, they provide one important source of data for planning. Triangulation with other formal or informal knowledge sources would be most appropriate in developing action plans for improving the workforce.

The survey methodology was an efficient cost-effective way to collect information from a large number of geographically dispersed public health workers. A greater diversity of workers across the state was achieved using this methodology than anticipated employing other strategies. However, as Roussel (1995) noted, surveys may fall short in that they fail to discriminate among needs, wants, and interest. Surveys also may not be adequate to consider motivational and attitudinal factors relative to educational need.

The use of online technology was not as productive or efficient as anticipated. Using TELEForms™ was expected to be less costly as data would come in electronically and be stored in a database suitable for statistical analysis. No data entry would be needed and any unintentional introduction of errors in data handling would be precluded. A large majority of workers were either unable or unwilling to complete the survey on the Internet. The readily available paper and pencil versions at all local health agencies may have discouraged the online method of data collection, but many reported they were unable to submit their completed surveys because of firewalls and other barriers at local agencies. Other workers reported that they did not have access to computers and did not know how to use the Internet. The problems with Internet usage elucidates another need that public health leaders must address—workers need appropriate equipment and training to communicate effectively and to obtain the most current information via Internet.

8b. Measurement

One of the strengths of the study was that the new instrument developed for this purpose--*Towards 21st Century Public Health Practice* (Stember, 2002)--was found to be psychometrically sound. Content validity was established *a priori* using the interdisciplinary Council on Linkages' work and having a panel of public health experts select the most important questions within each domain. The Core Competencies have not changed, although they are scheduled to be reviewed again in 2004. Although the Bioterrorism/Emergency Preparedness area is rapidly being refined and extended, the seven domains appear to be central to current discussions and expectations. (Buck, 2002; Landesman, 2001; Levy & Sidel, 2003). This instrument demonstrated excellent internal consistency reliability for all scales and subscales in this sample. Given the range of responses in both competencies and educational needs, the instrument appears to be sensitive and is likely to be able to detect changes over time.

Another strength is that both proficiency levels against a standard and perceived educational needs were measured—most assessments only do one or the other. The study findings document that one rating does not substitute for the other rating. Self-assessed proficiency ratings were expected to be highly inversely correlated with self-rated educational need. The low correlations in this study suggest that other factors appear to be modulating this relationship, such as the relevance of the competency for their position or the likelihood of being called upon to use particular skills. Thus, even though workers rated themselves very low on a given proficiency, a correspondingly high educational need was not identified. This may also reflect a basic incongruence in what the worker wants and what the profession or agency expects.

8c. Sample

Although a precise response rate could not be calculated, the high participation among workers in local public health agencies was gratifying. These findings can be considered representative of that segment. However the very low participation from workers at the state health department was very disappointing. It is unclear why the participation was so different in these two segments. The strategies for inviting participation and doing follow-ups were similar. One difference was that incentives (e.g., agencies were reimbursed for time their workers spent in participating in the survey) and specific strategies (e.g., individual crossed name off master list after they completed the survey) were used to increase participation at local health agencies. Perhaps workers at the local health agencies considered the study to be more relevant. Perhaps state workers were more concerned about such issues as confidentiality. The sample clearly overrepresented local workers and

underrepresented state workers. Thus the findings are more generalizable to workers in local agency settings.

The large numbers of respondents permitted a large number of comparisons. The sample sizes within groups were large enough for meaningful comparisons and statistical analyses. Thus a strength of the study was that it permitted a comprehensive understanding of the whole as well as multiple groups. Information to aid in tailoring educational offerings is abundant. On the other hand, the sheer volume of comparisons may be overwhelming. Readers are encouraged to focus their attention on the findings for the entire workforce and then to specific areas or groups of workers of greatest interest.

8d. Analyses

The use of parametric vs. nonparametric statistics could be questioned. Parametric statistics were used when the level of measurement was at least ordinal scaling. While some argue that parametric statistics require at least interval scaling, a large body of research suggests that the statistical procedures used in this study are robust when violations in scaling are present. Further, assumptions underlying statistical procedures were tested before parametric statistics were calculated. To meet the assumption of normal distribution, square root and logarithmic transformations were done prior to statistical analyses. Adjustments were also made when violations to homogeneity of variance between groups was apparent (Hopkins & Glass, 1978; Tabachnick, 1996).

Despite the extensive analyses that were performed, more complex relationships were not addressed. For the most part, the analyses were comparative and bivariate, examining the differences within groups (e.g., age groups, professional discipline groups) on one competency or educational need dimension. The relationships are clearly more complex. Inappropriate conclusions or inaccurate inferences may be drawn from these simple comparisons. One clear example relates to the differences by type of county (i.e., urban, rural, and frontier). One could conclude from that analysis that working in a rural or frontier county is related to public health workers being more skilled at Physical Injury and Crisis Management. However, it is known that workers in small local agencies in rural or frontier counties are most often public health nurses who have this knowledge and skill from their basic professional education/expertise. In this example, it is more likely that the professional discipline influence rather than the rural or frontier nature of the county explains the higher level of competency in these two Bioterrorism/Emergency Preparedness domains. While additional analyses may have been instructive, the unending potential combinations of variables were prohibitive. Readers are encouraged to balance their focus on both the specifics of their interest area as well as the whole of the report.

Some may question the value of going beyond simple descriptive summary statistics to the more complicated task of calculating and specifying statistical differences between or among groups. First, descriptive summary statistics are foundational to understanding the phenomena and were presented in detail. Additional descriptive information such as medians and the rank order among various dimensions have also been added to ease reading and understanding. Those who wish to only use this descriptive level of information may focus their attention to these data. However, the question of which differences are statistically significant addresses the matter of chance occurrences. For example, when differences are examined with a t-test, statistics aid in understanding whether these two means are in fact different from each other and how often we might make an erroneous conclusion. For many of the comparisons, the chance of a Type I error (concluding there was a difference when in fact there was no difference) ranged from 1 in 100

($p < .01$) to 1 in 1,000 ($p < .001$). Even when some differences appeared small, the use of inferential statistics permits the reader to have confidence that the differences are not due to chance.

A related issue is whether differences that are statistically significant have practical significance. Even though probability levels provide confidence that there is in fact a real difference, the practical significance addresses whether or not it really matters. For example, the same educational offerings may be highly appropriate for two groups that have small but significant differences. The large numbers in some group comparisons made it easier to find statistically significant differences when in fact the differences are so small as to not make a practical difference.

8e. Baseline for Subsequent Evaluation

Another strength of the study is that it established individual worker baselines for a longitudinal study of Colorado workforce development. Individual baseline levels of competencies and educational needs were obtained by using a personal identifier that will be linked to subsequent studies. A surprising 1,211 of the 1,249 participants (97%) complied with the request to enter the last six digits of their Social Security Number as their Identification Code. This high rate of identification was likely related to the assurance of strict confidentiality. Surveys were returned directly to the university with the promise that individual data would not be accessible to anyone outside the research team and that only aggregated data would be reported. This identifying method permits both individual and aggregate changes to be tracked over time. Baseline data are critical for evaluating the effectiveness of future educational initiatives in Colorado's workforce development.

8f. Collaborative Approach

A major strength of the study was the collaboration among public health academic, research, and practice leaders in Colorado. Although lead by the research team, the development of the instrument was a shared endeavor: the research team at the university developed the conceptual and methodological framework; practice and education leaders selected the specific items. Colleagues at the state health department took the lead in providing information about the survey to the Colorado workforce, inviting workers to participate, and following up with all counties and the state health department. The university research group was responsible for data management, coding data, constructing new variables, and data analyses. As needed, colleagues at the state health department were consulted during this data analytic process. Report writing was done by the principle investigator, but other public health educators, researchers and practice leaders offered valuable suggestions on draft segments of the document. This collaborative project demonstrated a successful cooperative, collegial statewide approach in workforce assessment.

9. Conclusions and Recommendations

1. *Public health workforce proficiencies need improvement.*

   Only a small percentage of the workforce was found to be well prepared in both Core Competencies and Bioterrorism/Emergency Preparedness. Workers were better prepared in the Core Competencies. The public health workforce's self-assessment of its overall proficiency in the Core Competencies indicated that 13% rated themselves in the two lowest levels of proficiency, 52% rated themselves in the two mid-range levels of proficiency, and 35% were in the two higher levels of proficiency. When the eight Core Competency dimensions were individually rated, workers were found to be most proficient in Cultural Competency Skills (1st), Communication Skills (2nd), and Leadership/Systems Thinking Skills (3rd). They were found to be least proficient in Basic Public Health Sciences Skills (6th), Policy Development/Program Planning Skills (7th) and Financial Planning/Management Skills (8th). Rated in the middle were Community Dimensions of Practice Skills (4th) and Analytic/Assessment Skills (5th). Access to and participation in courses to improve Core Competencies is warranted with particular attention to Basic Public Health Sciences, Policy Development/Program Planning, and Financial Planning and Management.

   The Colorado public health workforce is ill prepared in Bioterrorism/Emergency Preparedness. More than half (53%) of the workforce rated their overall proficiency in the two lowest levels. About a third (35%) rated themselves in the moderate proficiency categories and only 12% rated themselves in the two highest proficiency groups. When the seven dimensions were assessed, respondents reported they were most proficient in Disaster Response Skills (1st) and Emergency Communication Skills (2nd). They reported least proficiencies in Biological/Infectious Disease Skills (6th) and Toxic Chemical/Environmental Hazard Skills (7th). Dimensions rated in the middle of these two groupings were Physical Injury Skills (3rd), Crisis Management Skills (4th), and Disaster Planning Skills (5th). Access to and participation in courses to improve proficiency in Bioterrorism and Emergency Preparedness are urgently needed in all areas, but special attention should be given to assisting workers to become more knowledgeable about Biological and Infectious Diseases, as well as Toxic Chemical and Environmental Hazards. Protecting the health of populations in the event of bioterrorism or other emergencies will require extensive substantive learning of new knowledge and skills to facilitate workers being better prepared to protect communities and minimize consequences in the event of natural or man-made disasters.

   While the serious lack of preparedness in Bioterrorism/Emergency Preparedness must be addressed, it would be inappropriate and unwise for Colorado public health educator and practice leaders to focus on Bioterrorism/Emergency Preparedness to the exclusion of Core Competencies. Proficiencies in the Core Competencies are highly useful in specific Bioterrorism/ Emergency Preparedness situations. Further, Core Competencies are a prerequisite for the public health workforce's effectiveness in meeting established goals for the health of our state and nation as reflected in documents such as *Healthy People 2010*. Creating an excellent public health workforce to meet the demands of today and tomorrow will require additional education and training in both Core Competencies and in Bioterrorism/Emergency Preparedness.

2. *Workers acknowledge learning needs and appear ready to participate in educational programs to improve their skills.*

   The results of the educational needs assessment indicate that only 11% of the workforce saw little or no need for additional education in Core Competencies. Approximately 35% indicated

some need, 40% indicated a moderate need and 13% expressed a high educational need. Thus, more than half (53%) rated themselves as having moderate or high educational needs in Core Competencies. In descending order, statewide workers identified their educational needs to be Financial Planning and Management Skills (1st), Policy Development/Program Planning Skills (2nd), Basic Public Health Sciences Skills (3rd), Analytic/Assessment Skills (4th), Leadership and System Thinking Skills (5th), Community Dimensions of Practice Skills (6th), Cultural Competency Skills (7th), and Communication Skills (8th). Nearly every group identified Financial Planning/ Management Skills and Policy Development/Program Planning Skills as the areas of highest learning need. Needs in other areas were more dependent on other factors such as discipline, experience, and position.

In Bioterrorism/Emergency Preparedness, many educational needs were acknowledged: 36% indicated a high need, 38% indicated a moderate need, 17% indicated some need, and only 9% indicated little or no need. Thus, almost three-fourths (74%) of all public health workers rated themselves as having moderate or high educational needs in this area. When the seven dimensions were examined, two skills tied for highest educational need: Disaster Planning Skills (1st) and Toxic Chemical/Environmental Hazard Skills (1st). These two educational needs were followed in descending order by Disaster Response Skills (3rd), Biological/Infectious Disease Skills (4th), Crisis Management Skills (5th), Physical Injury Skills (6th), and Emergency Communication Skills (7th). While workers identified greatest educational needs in Disaster Planning Skills, Toxic Chemical/Environmental Hazard Skills, and Disaster Response Skills, the educational need ratings across all seven dimensions indicate that Colorado public health workers have an acute awareness and a readiness to participate in educational programs in all aspects of Bioterrorism/Emergency Preparedness.

3. *Worker preferences for educational offerings may not be realistic or feasible.*

Workers clearly indicated a strong preference for traditional face-to-face learning in a classroom setting. This preference is inconsistent with Colorado's Lifelong Learning System that incorporates innovative web-based, Internet, and distance learning opportunities to strategically link the public and environmental health workforce with needed educational resources. While worker preferences cannot be ignored, traditional classroom settings may be unrealistic given the uneven statewide distribution of workers resulting in few public health workers in many geographic areas of the state. Geological barriers and unpredictable weather make travel to central locations difficult. Further, traditional classes are often more resource-intensive and may not be financially feasible. Although some support for combined strategies was expressed in this study, many workers may need assistance in learning how to access and participate in innovative educational technologies.

Another issue that will need addressing is whether educational programs will be held during the workweek, or whether workers will be expected to use some of their weekend and evening time for these educational endeavors. The overwhelming majority of the workforce expressed strong preference for weekday classes. Most prefer courses to be daylong or 2-hour sessions; some expressed preference for semester academic courses.

Preferences for type of educational recognition were more varied. While most noted a greater preference for receiving certificates or continuing education units, others expressed preference for academic credit. Not surprising, workers without a bachelor's degree indicated interest in earning undergraduate credit and those holding a baccalaureate or higher degree expressed interest in graduate credit.

4. *Education on workforce expectations may need to precede educational offerings.*

   The low correlation between proficiency level and educational need in each dimension of Core Competency and Bioterrorism/Emergency Preparedness suggests that even when workers acknowledge a very low level of proficiency in some dimension, they may not see a proportionately greater need for more education in that area. This may reflect a discrepancy between learner and organizational expectation. Some workers may view some dimensions as less relevant to their position, professional responsibilities, or setting. Public health workers may not have had sufficient exposure to the work of the Council on Linkages whose premise is that regardless of discipline, these core skills are prerequisite to optimally carrying out today's public health agenda. Similarly, some may not be familiar with the *Bioterrorism & Emergency Readiness: Competencies for All Public Health Workers.* Others may not believe having the full range of Bioterrorism/Emergency Preparedness competencies is a high priority--perhaps because of where they are located, their professional responsibilities, or the low likelihood of such an event. Attention to clarifying the expectations of the public health workforce may lead to a greater correspondence between proficiency level and educational need assessments.

5. *Knowing worker characteristics is very helpful in tailoring Core Competency education, but less helpful in tailoring Bioterrorism/Emergency Preparedness education.*

   In the Core Competencies, more diversity of knowledge/skill exists and varies with characteristics of the individual worker such as academic preparation, discipline, and experience. This diversity also varies by position and setting. For increasing proficiency in Core Competencies, educational planning must recognize existing knowledge/skill and build on those foundations.

   On the contrary, the great majority of public health workers have little proficiency in Bioterrorism/Emergency Preparedness competencies, and proficiency does not closely correlate with many demographic characteristics of the worker, position, or setting. While some differences were noted across levels of education and professional disciplines, it appears that most public health workers need similar basic knowledge and skills in Bioterrorism/Emergency Preparedness. Public health workers may benefit from participating in the same foundational courses. Once this basic understanding is achieved, courses might then be tailored toward the individual's educational needs and professional responsibilities.

6. *The findings provide a baseline for evaluating the effectiveness of future educational offerings.*

   The findings of this study provide a baseline of proficiencies and educational needs in Core Competencies and Bioterrorism/Emergency Preparedness Competencies for the Colorado public health workforce and for different groups of public health workers. Not only can this competency assessment and learning needs identification serve as the basis for offering future educational initiatives, it serves to document baseline competencies for a longitudinal study to evaluate the effectiveness of future educational initiatives in workforce development.

7. *Public health educators in all disciplines must re-evaluate their curricula to include content on core competencies and bioterrorism/emergency preparedness.*

The findings suggest that some disciplines are historically better prepared across all core competencies than other disciplines. If the widely agreed premise is accepted that these eight core competencies are expected across all disciplines, faculty in various public health disciplines must be engaged in curricular reform. The finding that workers who most recently received their highest degree show no better proficiencies than those who graduated longer ago is somewhat disturbing. Although these core competencies were only officially adopted a short time ago, discussion of the core competencies has extended over a decade. Public health faculty do not seem to have changed their curriculum to address these foundational areas of public health. On the other hand, it was not surprising to see that recent graduates had no better competencies in the Bioterrorism/Emergency Preparedness arena for this has only received priority attention since the tragic events of September 11, 2001. Faculty offering degree programs in public health must make refinements or dramatic changes to assure that students graduating in all public health disciplines exhibit an acceptable proficiency in all core competencies and bioterrorism/emergency preparedness areas.

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Appendix A

Instrument

Appendix B

Glossary

Glossary of Variables, Values, and Level of Measurement

Variables	Values	Level of Measurement
Year of Birth	(Year as Written in by Respondent)	Scale[1]
Age	(2002 minus Year of Birth)	Scale
Age Category	Under 29 Years	Nominal[2]
	30-39 Years	
	40-49 Years	
	50-59 Years	
	Over 60 Years	
Gender	Male	Nominal
	Female	
Racial Identification	American Indian or Alaska Native	Nominal
	Asian	
	Black or African American	
	Hispanic	
	Native Hawaiian or Other Pacific Islander	
	White or Caucasian	
	Other or Multiracial	
Highest Level of Education Completed	High School Diploma	Nominal
	Professional or Vocational Diploma	
	Associate Degree	
	Baccalaureate Degree	
	Master's Degree	
	Doctoral Degree	
Earned Baccalaureate Degree	No	Nominal
	Yes	
Year Earned Highest Degree or Diploma	(Year as Written in by Respondent)	Scale
Years Since Received Degree or Diploma	(2002 minus Year Earned Highest Degree)	Scale
Years Since Last Degree/Diploma Categorized	Less than 2 Years	Nominal
	2-5 Years	
	5-9 Years	
	10-14 Years	
	15-19 Years	
	20 or More Years	
Discipline or Major	(Discipline/Major as Written in by Respondent)	Nominal
Number Years of Experience in Discipline or Major	(Number of Years as Written in by Respondent)	Scale
Years of Experience in Discipline or Major Categorized	1 Year or Less	Nominal
	2-4 Years	
	5-9 Years	
	10-14 Years	
	15-19 Years	
	20 or More Years	
Number of Years of Experience in Public Health	(Number of Years as Written in by Respondent)	Scale
Years of Experience in Public Health Categorized	1 Year or Less	Nominal
	2-4 Years	
	5-9 Years	
	10-14 Years	

Glossary of Variables, Values, and Level of Measurement (continued).

Variables	Values	Level of Measurement
Years of Experience in Public Health Categorized (continued).	15-19 Years	
	20 or More Years	
County or Health Department Where Employed	(County Name or CDPHE as Written in by Respondent)	Nominal
Type of County (Using County Classification Code[4])	Rural	Nominal
	Frontier	
	Urban	
Regional Designation (Using Regional Classification Code[5])	Northwest	Nominal
	Northeast	
	Metro	
	West Central	
	Central	
	Southeast	
	Southwest	
	San Luis Valley	
Size of County's Respondents	Very Small (Less than 5 Workers)	Nominal
	Small (5 to 14 Workers)	
	Medium (15 to 49 Workers)	
	Large (50 or More Workers)	
Type of Health Department	Local Health Department	Nominal
	Organized Health Department	
	State Health Department	
Current Position Title	(Position Title As Written in by Respondent)	Nominal
Enumeration Code Categorized[5]	Officials & Administrators	Nominal
	Professionals	
	Technicians	
	Protective Service	
	Paraprofessionals	
	Administrative Support	
	Skilled Craft	
	Maintenance	
Professional Enumeration Code[5]	No	Nominal
	Yes	
Enumeration Code for Current Position[6]	(Coded from CHP/BHPr PH (n=56) Occupational Titles[6])	Nominal
Type of Position (Definitions provided to respondents)[5]	Front Line Staff	Nominal
	Senior Level Staff	
	Supervisory/Management Staff	
Current Work Status	Part-Time	Nominal
	Full-Time	
If Part-Time Number of Hours Per Week	(Number of Hours as Written in by Respondent)	Scale
Current Annual Salary Before Taxed	(Salary as Written in by Respondent)	Scale
Annual Salary Full-Time Equivalent	(Calculated from Work Status & Salary)	Scale
Annual Salary Full-Time Equivalent Categorized	Less than $20,000	Nominal
	$20,000 to $29,999	
	$30,000 to $39,999	
	$40,000 to $49,999	

Glossary of Variables, Values, and Level of Measurement (continued).

Variables	Values	Level of Measurement
Annual Salary Full-Time Equivalent Categorized (continued).	$50,000 to $59,999	
	$60,000 to $69,999	
	$70,000 to $79,999	
	Over $80,000	
Know Non-English Language	No	Nominal
	Yes	
Non-English Language Known	(Name of Language as Written in by Respondent)	Nominal
Other Language Speaking Ability	Fair	Nominal
	Good	
	Excellent	
Other Language Reading Skills	Fair	Nominal
	Good	
	Excellent	
Other Language Written Expression	Fair	Nominal
	Good	
	Excellent	
Proficiency in Analytic/Assessment Skills	(Calculated; See Appendix B)	Scale
Proficiency in Policy Development & Program Planning Skills	(Calculated; See Appendix B)	Scale
Proficiency in Communication Skills	(Calculated; See Appendix B)	Scale
Proficiency in Cultural Competency Skills	(Calculated; See Appendix B)	Scale
Proficiency in Community Dimension of Practice Skills	(Calculated; See Appendix B)	Scale
Proficiency in Basic Public Health Sciences Skills	(Calculated; See Appendix B)	Scale
Proficiency in Financial Planning & Management Skills	(Calculated; See Appendix B)	Scale
Proficiency in Leadership & Systems Thinking Skills	(Calculated; See Appendix B)	Scale
Proficiency in Core Competency Skills: Composite Score	(Calculated; See Appendix B)	Scale
Proficiency in Disaster Planning Skills	(Calculated; See Appendix B)	Scale
Proficiency in Disaster Response Skills	(Calculated; See Appendix B)	Scale
Proficiency in Emergency Communication Skills	(Calculated; See Appendix B)	Scale
Proficiency in Biological & Infectious Diseases Skills	(Calculated; See Appendix B)	Scale
Proficiency in Toxic Chemical & Environmental Hazard Skills	(Calculated; See Appendix B)	Scale
Proficiency in Physical Injury Skills	(Calculated; See Appendix B)	Scale
Proficiency in Crisis Management Skills	(Calculated; See Appendix B)	Scale
Proficiency in Bioterrorism & Emergency Prep.: Composite Score	(Calculated; See Appendix B)	Scale
Educational Need for Analytic/Assessment Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale
Educational Need for Policy Development/Program Planning Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale
Educational Need for Communication Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale
Educational Need for Cultural Competency Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale
Educational Need for Community Dimension of Practice Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale
Educational Need for Basic Public Health Science Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale
Educational Need for Financial Planning & Management Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale
Educational Need for Leadership & System Thinking Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale
Educational Need for Core Competency: Composite Score	(Calculated; See Appendix B)	Scale
Educational Need for Disaster Planning Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale
Educational Need for Disaster Response Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale
Educational Need for Emergency Communication Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale

Glossary of Variables, Values, and Level of Measurement (continued).

Variables	Values	Level of Measurement
Educational Need for Biological & Infectious Disease Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale
Educational Need for Toxic Chemical & Environment Hazard Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale
Educational Need for Physical Injury Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale
Educational Need for Crisis Management Skills	(As Rated by Respondent on Likert Scale 1 to 5)	Scale
Educational Need for BT/EP: Composite Score	(Calculated; See Appendix B)	Scale
Preference for Weekday Classes	Not Preferred	Nominal
	Somewhat Preferred	
	Most Preferred	
Preference for Weekend Classes	Not Preferred	Nominal
	Somewhat Preferred	
	Most Preferred	
Preference for Evening Classes	Not Preferred	Nominal
	Somewhat Preferred	
	Most Preferred	
Preference for Self-Determined Web-Based Participation.	Not Preferred	Nominal
	Somewhat Preferred	
	Most Preferred	
Preference for Recognition with Certificate	Not Preferred	Nominal
	Somewhat Preferred	
	Most Preferred	
Preference for Recognition with CEUs	Not Preferred	Nominal
	Somewhat Preferred	
	Most Preferred	
Preference for Recognition with Undergrad Credit	Not Preferred	Nominal
	Somewhat Preferred	
	Most Preferred	
Preference for Recognition with Graduate Credit	Not Preferred	Nominal
	Somewhat Preferred	
	Most Preferred	

[1]Scale includes ratio or interval level of measurement

[2]Nominal includes ordinal or categorical level of measurement

[3]Source: Colorado Rural, Frontier, and Urban Counties, 2000 Census

[4]Source: Planning and Management Regions, 1977

[5]Source: US Equal Opportunity Commission, EEO-4 Description of Occupational Categories

[6]Source: Center for Health Policy/Bureau of Health Professions, Definition of Occupational Titles and Decision Rules

Appendix C

Technical Notes

Tests for Normality and Transformations for Core Competency Proficiency and Educational Need Variables (N = 1,249)

Variable (Scale, Subscale or Item)	Met Criteria for Normality[1]	Transformation Required for Normality[2]
Core Competency Proficiencies		
Analytic/Assessment Skills	No	NEWX=SQRT(K-X)[3]
Policy Development and Program Planning Skills	No	NEWX=SQRT(K-X)
Communication Skills	No	NEWX=SQRT(K-X)
Cultural Competency Skills	No	NEWX=SQRT(K-X)
Community Dimensions of Practice Skills	No	NEWX=SQRT(K-X)
Basic Public Health Sciences Skills	No	NEWX=SQRT(K-X)
Financial Planning & Management Skills	Yes	n.a.[4]
Leadership & Systems Thinking Skills	No	NEWX=SQRT(K-X)
Core Competencies Skills (Composite Scale)	No	NEWX=SQRT(K-X)
Core Competency Educational Needs		
Analytic/Assessment Educational Needs	Yes	n.a.
Policy Development/Prog. Planning Educational Needs	Yes	n.a.
Communication Educational Needs	Yes	n.a.
Cultural Competency Educational Needs	Yes	n.a.
Community Dimensions of Practice Educational Needs	Yes	n.a.
Basic Public Health Sciences Educational Needs	Yes	n.a.
Financial Planning & Management Educational Needs	Yes	n.a.
Leadership & Systems Thinking Educational Needs	Yes	n.a.
Core Competencies Educational Needs (Composite Scale)	Yes	n.a.

[1]Criteria for normality was Skewness Index between -1.96 and +1.96. Source: B. Tabachnick & L. Fidell (1996) *Using Multivariate Statistics*, 3rd Edition. Northridge, CA: HarperCollins College Publishers. pp. 71-78.

[2]Source for transformation formulas: B. Tabachnick & L. Fidell (1996), pp. 81-85.

[3]K=Constant from which each score is subtracted so that the smallest score is 1 (Tabachnick & Fidell, 1996, p. 85)

[4]n.a.=Not Applicable. Meets criteria for normality without transformation

Tests for Normality and Transformations for Bioterrorism/Emergency Preparedness Proficiency and Educational Need Variables (N = 1,249)

Variable (Scale, Subscale or Item)	Met Criteria for Normality[1]	Transformation Required for Normality[2]
Bioterrorism/Emergency Preparedness Proficiency		
Disaster Planning Skills	No	NEWX=LG10(X)
Disaster Response Skills	Yes	n.a.[3]
Emergency Communication Skills	No	NEWX=SQRT(X)
Biological and Infectious Disease Skills	No	NEWX=LG10(X)
Toxic Chemical & Environmental Hazard Skills	No	NEWX=LG10(X)
Physical Injury Skills	No	NEWX=SQRT(X)
Crisis Management Skills	No	NEWX=LG10(X)
Bioterrorism/Emergency Prep. Skills (Composite Scale)	Yes	n.a.
Bioterrorism/Emergency Preparedness Educational Needs		
Disaster Planning Educational Needs	No	NEWX=LG10(K-X)[4]
Disaster Response Educational Needs	No	NEWX=LG10(K-X)
Emergency Communication Educational Needs	Yes	n.a.
Biological/Infectious Disease Educational Needs	No	NEWX=LG10(K-X)
Toxic Chemical & Environmental Hazard Educational Needs	No	NEWX=LG10(K-X)
Physical Injury Educational Needs	No	NEWX=SQRT(K-X)
Crisis Management Educational Needs	No	NEWX=SQRT(K-X)
Bioterrorism/Emergency Prep, Educ. (Composite Scale)	No	NEWX=SQRT(K-X)

[1]Criteria for normality was Skewness Index between -1.96 and +1.96. Source: B.Tabachnick & L. Fidell (1996) *Using Multivariate Statistics*, 3rd Edition. Northridge, CA: HarperCollins College Publishers. pp. 71-78.

[2]Source for transformation formulas: B.Tabachnick & L. Fidell (1996), pp. 81-85.

[3]n.a.=Not Applicable. Meets criteria for normality without transformation

[4]K=Constant from which each score is subtracted so that the smallest score is 1 (Tabachnick & Fidell, 1996, p. 85)