Colorado Department of Public Health and Environment

CITIZEN'S SUMMARY - July 2004

UPDATE: TUMOR INCIDENCE IN RESIDENTS ADJACENT TO THE LOOKOUT MOUNTAIN ANTENNA FARM 1979-2002 GOLDEN, COLORADO

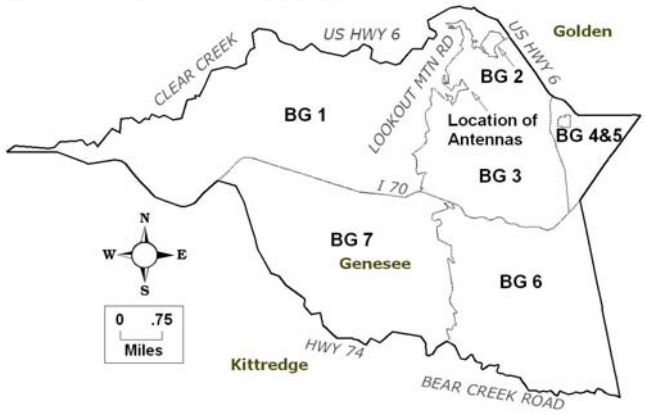
BACKGROUND

This study updates two previous reports of cancer incidence among residents living near the Lookout Mountain broadcast towers that were completed by the Colorado Department of Public Health and Environment (CDPHE) in 1998 and 1999. The 2004 update evaluates the incidence of a variety of cancers, including brain and other central nervous system (CNS) tumors in census tract 98.10, by including cases diagnosed during 1998-2002. These studies were done in response to community concerns about radiofrequency (RF) exposure from the Lookout Mountain broadcast antennas and cancer rates in the Lookout Mountain community. The study area is shown on the map below.

The study relied on existing cancer surveillance data available from the Colorado Central Cancer Registry. All cancers diagnosed in Colorado are reported to the Cancer Registry with the exception of non-melanoma skin cancers. Over 17,000 new cases of cancer are registered annually in Colorado, and, on average, approximately one in three Coloradans will develop cancer in their lifetime. Cancer surveillance allows public health officials to investigate whether cancer is occurring in numbers that are significantly higher than typically seen in the general population.

In 1999, CDPHE reported a statistically elevated number of brain and other CNS tumors in the two block group areas closest to the Lookout Mountain antenna farm, where residents were likely to have the highest exposure to radiofrequency (RF) radiation from the towers. The study concluded, however, that the likelihood of a common cause among these cancer cases is weakened because gender and tumor cell type differed between block groups. The 1999 study recommended that cancer statistics be updated when the 2000 U.S. Census data were available. The study also recommended providing an update of the state of the science because of the uncertainty regarding a plausible link between RF exposure and cancer at the time the 1999 study was released.

Figure 1. Map of Block Group Areas within Census Tract 98.10



STUDY DESIGN

As was done in the earlier studies, a scientific advisory panel was convened to help guide the 2004 update. The panel included representatives from Colorado State University, University of Colorado Health Science Center, and CDPHE.

The updated study evaluated cancer statistics reported to the Cancer Registry for individuals living in census tract 98.10 and seven smaller areas, called block group areas, and who were

diagnosed during the period 1979 to 2002. Cancer rates for census tracts in the Denver metropolitan area with similar incomes as the study area were used as a standard for comparison, because socioeconomic status (SES) has been shown in the epidemiologic literature to be an important risk factor for brain/CNS cancer.

This study presents an update of all tumor types evaluated in the two previous studies -- leukemia, brain and central nervous system (CNS), non-Hodgkin lymphoma, female breast, eye melanoma, and all cancers combined. The 2004 update also assessed pineal and pituitary tumors. Benign, in addition to malignant brain and CNS tumors were investigated for all block groups, because these tumors were the only types of tumors that were consistently elevated in the census tract as a whole, although still within expected statistical variation.

As in the 1999 study, follow-up telephone interviews were conducted with individuals diagnosed with a brain/CNS tumor, or surviving family member, for cases reported as residing in block groups where statistical elevations were observed. The purpose of the interviews was to collect information about an individual's length of residence near the antennas, approximate distance of the home from the antenna towers, whether there was an unobstructed view of the antenna towers from the residence, occupational history that may have included electromagnetic radiation (EMR) exposure, and whether there were close blood relatives who had a brain tumor.

RESULTS

The 2004 update includes five additional years of tumor data for residential areas in the vicinity of the Lookout Mountain towers, and uses more precise population estimates made available with the release of the U.S. Census 2000 data.

The updated findings are consistent with those reported in the 1999 study. For the period 1979-2002, the number of cancer cases diagnosed in census tract 98.10 compared to the expected number of cases, for each of the different cancer types evaluated, were within expected statistical variation or were statistically lower than expected. With the exceptions noted below, the number of cancer cases diagnosed in each of the seven block group areas compared to the expected number of cases for each of the different cancer types evaluated were also within expected statistical variation.

As with the 1999 study, a statistically significant elevation of brain and CNS tumors was observed in residents living in the two geographic areas closest to the towers, that is, block groups 2 and 3. Numbers of benign brain/CNS tumors in women in block group 2 and numbers of malignant brain/CNS tumors in men in block group 3 remain statistically elevated. Since the 1999 report, there has been one new case diagnosed in women in block group 2 and one additional case reported in men in block group 3. These additional cases do not meaningfully alter the results or strength of association reported for either of these block groups in the 1999 study.

The histologic pattern of the new cases resembles that of the original cases diagnosed from 1985-1997 reported in the 1999 study. Cell types were not the same for block group 2 and 3 cases, and men and women were not similarly affected in each block group. There is no indication in the scientific literature that residential exposure to RF would selectively affect one gender differently than another, therefore these findings tend to weaken the hypothesis of a common etiology of elevated brain/CNS tumors in block groups 2 and 3. However the scientific knowledge of RF exposure and the potential for interactive effects with other individual exposures is not adequate to draw firm conclusions about this disparity between genders.

There was no indication of an increase in risk in block group 2 or 3 for leukemia or lymphoma, the cancer types most frequently

associated with exposure to RF from broadcast towers in previous epidemiologic studies.

Telephone interviews of brain/CNS cases from block groups 2 and 3 indicated that all residences had direct line of sight to the antennas from their residence at the time of diagnosis. RF exposure can be effectively blocked by hillsides, trees or other structures. Therefore, having an unobstructed line of site to the towers indicates the potential for RF exposure at these residences. Differences in residency time were reported, with all of the cases from block group 2 having lived at the residence listed at the time of their diagnosis for more than 10 years, while 3 of the 5 cases from block group 3 reported living at that residence for less than 5 years. The latency, or time between exposure and clinical recognition of a disease, is believed to be at least 5 years and usually more than 10 years for a genotoxic environmental exposure and cancer, however tumor promoters may shorten latency periods for disease already initiated. In light of the uncertainties related to potential biological mechanisms by which RF might act, it is not yet possible to assign a scientifically based estimate of latency for RF exposure and tumor growth.

In block group 2, one of five cases reported a history of brain tumor in a close relative, and one of five reported work in an occupation with an increased risk of developing a brain tumor. The importance of these factors in the development of brain and CNS tumors, and what if any additive or synergistic effect with RF exposure they may have, is unknown.

In block group 3, the occupational history, i.e. an alternate exposure source, was positive in three of the five block group 3 cases for whom an interview was completed, although the precise length of occupational exposure to EMR is unknown, as is the potential for interactive effects with RF exposure in the home.

CONCLUSIONS AND RECOMMENDATIONS

The goal of the scientific advisory panel, convened to help guide the 2004 update, was to determine if there are data that support an association between the observed elevated risk ratios for brain and CNS tumors and radiofrequency exposure from the broadcast towers.

The conclusions and recommendations of the scientific advisory panel are as follows:

1. Findings from the 2004 update are consistent with the 1999 study and confirm a persistent elevation of brain/CNS tumors in block groups 2 and 3.

2. The results of this type of study cannot produce conclusive information about the cause of cancers. Nor does this study allow conclusions to be drawn about possible health risks related to the towers. The study does not provide an adequate basis to make additional public health recommendations to the community at this time.

3. The panel stressed the need for better information about individual RF exposure levels to allow testing of the hypothesis of an association between RF exposure and increased risk of developing a brain/CNS tumor. The panel concluded that additional health statistics reviews are not likely to provide a conclusive answer about risk from the towers in this community without better exposure information.

4. The panel recommended a review of any well-designed RF exposure surveys for the Lookout Mountain area, should such data become available. The panel also recommended consideration of linking RF exposure data with available Cancer Registry statistics.

The biological mechanism by which RF exposure could cause long-term chronic health effects, such as cancer, has not been established. Epidemiological studies in populations living near RF-emitting towers have been inconsistent regarding specific types of cancers reported or the strength of association found. These studies have also been limited by how well they assessed exposure. Each of these factors further prevents definite conclusions to be drawn from the 2004 update of tumor incidence in areas near the Lookout Mountain towers.

The World Health Organization and many other national and international health agencies have identified the need for a better scientific understanding of possible health effects associated with RF exposure and are currently recommending consideration of a precautionary approach until this uncertainty can be addressed by further scientific study.

FOR MORE INFORMATION

A copy of the full technical report may be viewed and printed at:
http://www.cdphe.state.co.us/dc/envtox/envtoxhom.asp

For more information or to have a copy of the full technical report mailed to you, contact:

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GLOSSARY

Epidemiology – The study of the distribution and controlling factors of diseases in human populations.

Genotoxic - Causing damage to the DNA or hereditary material of a living cell by physical or chemical agents.

Histology – The microscopic structure, composition and function of human and animal tissues.

Malignant tumor – Cancer. Uncontrolled tissue growth that may invade surrounding tissues or spread to distant areas of the body.

Benign tumor – A tumor that is not cancerous. The severity of this condition generally depends on the location of the tumor.

Risk factors – Aspects of personal behavior or life-style, an environmental exposure, or an inborn or inherited characteristic whose presence, based on epidemiological evidence, is associated with an increased likelihood that a disease will develop at a later time.

Statistically significant elevation – An increase in the occurrence of a type or group of cancers that is unlikely, with 95 percent certainty, to be due to chance or expected variation alone.