

Questions & Answers

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The words "hazardous waste" can strike fear into those who live or work near it.

It's for good reason. The hundreds of materials classed as hazardous can cause health problems ranging from general aches and pains to fatal cancer cases.

Indeed, some people who formerly worked at the Cotter Corp. later developed such diseases, including longtime company chemist Lynn Boughton, who died in 2001.

Boughton fought for years to prove his lymphoma was related to exposure to radiation at work, finally prevailing in a lawsuit in 1998.

But workers were not the only ones who were exposed to hazardous substances.

As uranium and molybdenum migrated through groundwater into the Lincoln Park neighborhood north of the Cotter facility and the area was declared a Superfund cleanup site, residents there came to believe pollutants from the groundwater and blown through the air had caused their health problems.

In 2001 a judge agreed, awarding a \$43 million judgment to a group of 30 Lincoln Park residents, who claimed exposure to hazardous substances had caused their individual cases of cancer, arthritic problems, tooth problems, abnormal bone growth, gout, and general aches and pains.

The decision is currently under appeal by Cotter.

But lawsuits and legal responsibility aside, studies of cancer in Lincoln Park are largely inconclusive. The incidence of some cancers are higher than what researchers expected to find, but because the population of cancer victims is small, conclusions are difficult to draw based upon statistics alone.

Cancer risk

The radiation-caused health impact most feared is cancer.

According to statistics compiled by the Colorado Central Cancer Registry, it is likely 46 percent of Coloradans will develop cancer at some time in their lives. Daily exposure to natural background radiation accounts for part of the risk. The state's high altitude, and higher-than-average levels of indoor radon and radiation from rocks and soil, contribute to the risk, according to the Colorado

Don Lee gets into a pickup truck after checking an air monitor at the Cotter site in Cañon City Friday, Sept. 27.
Times-Call/Jeff Haller

Department of Public Health and Environment.

Radiation can cause cancer by altering the structure of cells. Different hazardous substances react differently in the body, and where they migrate can affect what kinds of cancer or other health problems they cause.

Some, like uranium, deposit in the lungs, kidneys, bones and soft tissues, causing cancers or other diseases in those organs.

Molybdenum increases uric acid and can cause gout-like symptoms.

Thorium, the substance of most concern in the soil at the Maywood Superfund Site in New Jersey, deposits in the lungs and bones and can lead to cancer in those sites.

Radium, a decay product of uranium, is carried throughout the body, but most commonly deposited in the bones.

Radon, a decay product of thorium and uranium, is most commonly breathed in, so it also can lead to lung problems.

Statistics compiled in Colorado and studies done specifically in Lincoln Park do not point to what are termed "statistically significant" variances in cancer rates, although they do point to a higher than average level of lung cancer cases.

The Colorado Department of Public Health and Environment conducted three cancer studies in the Lincoln Park area during the 1990s, trying to calm residents' fears that exposure to uranium and molybdenum had increased their chances of getting the disease.

The first two studies showed slightly elevated numbers of lung cancer, enough to warrant continued watch, according to Jane Mitchell of the CDPHE epidemiology department and Jack Finch, who coordinates statistics in the Colorado Central Cancer Registry for the Health Department.

The first study, issued in 1991, showed 30 lung cancer cases among men, where just 21.5 were expected, and 13 among women, where 10.1 were expected.

The 1991 study examined the 30 male lung cancer cases found then for evidence of an occupational influence accounting for the disease, but said none was found.

The 1993 study showed 41 cases of lung cancer among men, where just 30.12 cases were expected. If two additional cases had been found it would have been enough variation to make it statistically significant, Mitchell said.

The 1998 study found 48 cases of lung cancer in men, where 42.87 were expected.

Overall, the researchers found 74 lung cancer cases

involving both men and women had occurred in the 17-year-period from 1979 to 1995 in Lincoln Park. They had expected to find 66.

Finch said the studies focused on cancer diagnoses that occurred in 1979 to 1995 among residents of the census tract that most closely corresponds with Lincoln Park.

The studies looked at cancer of the lungs, bones, liver, breast and thyroid, leukemia and lymphoma because radiation exposure has been linked to those cancers. They also examined brain and prostate cancer rates because of concerns expressed in the community.

Nine cases of brain cancer during the 17-year study period, five of thyroid cancer and 24 of lymphoma also were higher than the rates expected for those diseases, but not statistically significantly so. None of the other cancers studied reached the levels that researchers would have expected based upon statewide cancer rates.

Other cancer contributors considered

By coordinating with census figures, the researchers can compare cancer cases to other demographic factors. An aging population or unusual gender balance can influence the rate at which cancers occur, Finch said.

"It's not so much looking to see if there's cancer at all," he explained. The studies instead compared the number of cases found to the number that would be expected in a population with the age and gender breakdown of Lincoln Park.

The cancer cases documented in the studies were those of people whose addresses were within the Lincoln Park census tract, even if they died at hospitals elsewhere, Finch said.

But the studies could not take into consideration how long those people had lived in the area - whether they were longtime residents or relative newcomers to the community that attracts many retirees. The studies also could not count people who formerly lived in the area but moved away prior to diagnosis.

The health scientists conducting the study also had no way to know the levels of uranium or other chemicals each person was exposed to from the soils.

And the first study did not take into consideration the number of people who smoked. Smoking is a major risk factor for lung cancer, which is the most common form of cancer found in Lincoln Park.

Another study, "Cancer in Central Colorado, 1997-1999," conducted by the Colorado Comprehensive Cancer Prevention and Control Program, found people in an eight-county region that included Fremont County were more likely to smoke. Twenty-nine percent were current smokers,

compared with 20.2 percent statewide. In the 18-34 age group, 43.4 percent smoked, compared with 24.4 percent statewide.

Mitchell, the CDPHE epidemiologist, said the third Lincoln Park study eased researchers' concerns that there might be an undue number of lung cancer cases there.

And with work to clean the Lincoln Park Superfund site progressing, the researchers felt comfortable that cancer rates would not rise. "You wouldn't expect to see rates go up," Mitchell said.

She said she hoped that the work done to clean up the Superfund site and work at the Cotter property would contain the contaminants on site so there wouldn't be any exposure in the neighborhood.

But if there was an increase in exposures, it would be five to 10 years before related lung cancer cases would begin to show up. "It takes quite awhile to see that," she noted.

Mitchell added that the small size of the population - Lincoln Park had 3,904 residents according to the 2000 census - means there is less opportunity to detect a significant statistical difference in the rate of cancer cases.

She said the Health Department would be willing to take another look at Lincoln Park cancer rates if members of the community request it.

Fremont County statistics

Other broader studies also seem to indicate that Fremont County residents do not experience an unusual rate of cancer.

CDPHE death statistics for 1990-2000 show there were 4,934 deaths of Fremont County residents in that time period. Cancer deaths accounted for 19.8 percent of the total.

Within the 81212 ZIP code specific to Canon City, there were 3,544 deaths and again 19.8 percent were due to cancer.

Elsewhere in the region, 20.7 percent of deaths in Pueblo County were due to cancer, 23.1 percent in El Paso County, and statewide the rate was 22.1 percent.

The main area where Fremont County stood out among the death statistics was in cardiovascular disease deaths, which accounted for 42 percent of deaths in the county, compared with 35 percent in Pueblo County, 34 percent in El Paso County and 35.4 percent statewide.

Another report, "Cancer in Colorado 1993-1998" done by the Colorado Central Cancer Registry, compared cancer rates of the state's counties. It found the highest mortality rates for all types of cancers among men in 1995-96 were

in Fremont, Adams, Denver and Mesa counties.

Other areas where Fremont County stood out included:

- A higher rate of colon cancer among women.
- A higher rate of colon cancer deaths among both men and women.
- A higher rate of skin cancer among women.
- A lower rate of lung cancer among women during the
- 1997-98 study period. With that exception, Fremont
- County did not stand out among the other counties in its rates of lung cancer.

Coroner's perspective

Dr. Dorothy Twellman, Fremont County coroner, is charged with investigating "deaths by poison, suspected poisoning, chemical or bacteria, industrial hazardous material, or radiation."

But in her 10 years as coroner, she can recall issuing only one death certificate citing radiation exposure as the cause of death, the one for former Cotter chemist Lynn Boughton.

Fremont County has many cancer deaths, but she hasn't had time to look into which were radiation-related, she said.

Twellman said she only sees deaths, but there are people who are still living who may have been exposed to radiation and could be affected in the future.

"I think the reality is a lot of people who have been exposed haven't died yet," she said.

Hazardous substances identified

Between the Lincoln Park and Maywood Superfund sites, as many as 19 hazardous substances have been detected.

An ecological risk assessment of the Lincoln Park area conducted for Cotter by Stoller Corp., released in 1998, identified several chemicals of concern, including radioactive elements: uranium, radium-226 and thorium-230, and metals: arsenic, cadmium, copper, lead, mercury, molybdenum, selenium and zinc.

The Colorado Department of Public Health and Environment released information from that report in 1999. The report concluded: "Overall, potential risks at the site are low and not of health concern."

The Maywood site's 2001 annual environmental monitoring report identified several chemicals of concern there, including aluminum, arsenic, beryllium, cadmium, chromium, iron, lead, manganese, nickel, radium, radon, tetrachloroethene, thorium and uranium. The beryllium, cadmium, chromium, lead or nickel measurements were within state or federal limits.

A 1997 report by the Agency for Toxic Substances and Disease Registry on "Cancer Incidence in Three Communities Near the Maywood Area Superfund Sites (Bergen County), New Jersey: A Site-Specific Follow-up Health Study," said the only unusual finding there was a twofold increase in cancer of the brain/central nervous system among women, but because the study sample was so small the increase might not be statistically significant.

It found incidence rates for all cancers and for other specific types of cancers were not significantly different than expected in comparison with average New Jersey incidence rates.

Superfund risks

The Colorado Department of Public Health and Environment acknowledges that some risks in life are acceptable, while others are not.

"We tend to ignore everyday risks like driving to the grocery store or riding a bike. Risks imposed upon us are less acceptable," according to a report the Health Department did analyzing the risks the Rocky Flats Superfund site posed.

The Agency for Toxic Substances and Disease Registry cites the lack of control residents near a Superfund site have over their situations as a contributor to another common health problem - stress.

The agency initiated a study in 1999 on psychological responses to hazardous substances, looking at adverse effects on psychological health that might result from living near a hazardous waste site or being exposed to a hazardous substance.

An expert panel put together by ATSDR said most of the responses people have to toxic substances are normal.

"Sociologists and psychologists performing field research in communities near hazardous waste sites have pointed out that unlike a natural disaster - which has a discernible low point followed by a recovery phase when life begins to return to normal - life near a hazardous waste site is a more nebulous and uncertain situation," the report stated.

The researchers said life near a hazardous waste site "can breed uncertainty about exposures and subsequent and latent health effects and spark social and political turmoil, all of which serve as additional stressors."

Chronic stress can lead to long-lasting elevations in blood pressure, changes in immune-system function, and symptoms of post-traumatic stress disorder, the report said.

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