FACT SHEET

INVESTIGATION OF CANCER INCIDENCE IN THE AREA SURROUNDING THE NIAGARA FALLS STORAGE SITE AND THE FORMER LAKE ONTARIO ORDNANCE WORKS, TOWNS OF LEWISTON AND PORTER, NIAGARA COUNTY, NEW YORK, 1991-2000

The New York State Department of Health conducted an investigation into newly diagnosed cases of cancer among people living near the Niagara Falls Storage Site (NFSS) and the former Lake Ontario Ordnance Works (LOOW) in the Towns of Lewiston and Porter. This investigation was conducted due to concerns over radioactive materials stored at the NFSS, and chemical contaminants, including hazardous wastes, associated with other current and former occupants of the former LOOW. The Lewiston-Porter school campus, which is located on the undeveloped portion of the former LOOW near the NFSS, was of particular concern.

METHODS

- Based on input from community members, we defined **three study areas**. Study area #1 approximates the Lewiston-Porter Central School District (Census Tracts 244.01, 244.04, 244.05, 245.01 and 245.02). Study area #2 includes the entire former LOOW and areas downstream (ZIP Codes 14174 [Youngstown] and 14131 [Ransomville]). Study area #3 is downwind of the former LOOW (ZIP Code 14131 alone). We defined these areas independently of any information on whether contaminants from the sites were actually ever present in the soil, water, or air.

- We counted the actual number of people of all ages in each study area who were diagnosed with cancer between 1991 and 2000 from the files of the New York State Cancer Registry. We called this the **observed number**.

- We calculated the number of people of all ages in each study area that we would expect to have been diagnosed with cancer between 1991 and 2000 based on the number of people of different ages living there. We called this the **expected number**.

- We also looked at the data for **children** separately in each study area.

FINDINGS

Study area #1 (Lewiston-Porter school district)

- A **total** of 702 cancers was diagnosed in **males** living in this study area, while we would have expected to find 614. This difference was statistically significant, meaning that it was

unlikely to occur by chance. A total of 590 cancers was diagnosed in **females**, with 565 expected; this difference was not statistically significant, meaning that it could be the result of random variation.

- Looking at **specific types of cancer**, the numbers of males diagnosed with prostate cancer and with testicular cancer were statistically greater than expected. The numbers of females diagnosed with breast cancer and with bladder cancer were statistically greater than expected. All other types of cancer in males and females were within the range we would expect to find.

- A total of 15 cancers were diagnosed among **children** living in this study area, compared with eight expected. This difference was statistically significant. Looking at 12 different groups of cancers found in children, there was a statistically greater than expected number of cancers in the group "germ cell, trophoblastic and other gonadal neoplasms." This group includes cancers of the testes and ovaries, and cancers of germ cells (cells giving rise to sperm or eggs) found outside the testes or ovaries. There were also children with leukemias, lymphomas and other cancers, but the numbers of these were within the range we would expect to find.

Study area #2 (Youngstown and Ransomville ZIP Codes)

- A **total** of 334 cancers was diagnosed in **males** living in this study area, while 311 cancers were expected. A total of 277 cancers was diagnosed in **females**, with 270 expected. Neither of these totals was statistically different from the number expected.

- Looking at **specific types of cancer**, the number of males diagnosed with prostate cancer was statistically greater than the number expected. All other cancer types in males and all cancer types in females were within the range we would expect to find.

- A total of six cancers were diagnosed among **children** living in this study area, compared with five expected. This difference was not statistically significant. Looking at 12 different groups of cancers found in children, no single group had numbers that were statistically different from the numbers expected.

Study area # 3 (Ransomville ZIP Code)

- A **total** of 160 cancers was diagnosed in **males** living in this study area, while 155 cancers were expected. A total of 118 cancers was diagnosed in **females**, with 135 expected. Neither of these totals was statistically different from the number expected.

- Looking at **specific types of cancer**, the number of males diagnosed with lymphomas was statistically lower than the number expected. All other cancer types in males and all types of cancer in females were within the expected range.

- Fewer than six total cancers were diagnosed among **children** living in this study area. The actual number of total cancers was not significantly different from the number expected. All groups of childhood cancers were within the expected range.

    - We previously studied cancer in this area (Ransomville) for a 5-year period (1995-1999). In that study, when all types of cancer were combined, the number of cancers diagnosed in males was significantly greater than the number expected; the number of cancers diagnosed in females was close to the number expected. Several types of cancer in males, including bladder cancer, had higher than expected numbers, although all the numbers were within the range of chance variation. In the present study, we did not confirm the statistically higher number of total cancers in males, and the number of bladder cancers was closer to the number expected.

DISCUSSION

For anything in the environment to have an effect on human health, people have to come into contact with it. This is what is known as **exposure**. People may be exposed to a chemical contaminant by breathing it in, consuming it in food or water, or getting it on their skin.

We defined **study area #1** so that we could look at cancers in children who might be attending Lewiston-Porter schools, or in former students who might still be living in the area. Not all the people living in this study area live in the areas where contaminants from the NFSS or the former LOOW would most likely be found. Many study area #1 residents live in or near the Village of Lewiston, which is upwind, upstream and at a higher elevation than the sites. The greatest exposures, if any, that these residents might have received would have occurred while they attended Lewiston-Porter schools, or if they regularly came to the area of the former LOOW for other reasons, such as work.

We defined **study area #2** so that we could look at cancers in people living in the area where they would be most likely to be exposed to any substances from the former LOOW in the soil, or that might have been carried away in surface water such as streams.

We defined **study area #3** so that we could look at cancers in people living in the area where they would be most likely to be exposed to any substances from the former LOOW that might have been carried away in the air.

- This study found statistically higher numbers of men in study area # 1 and study area #2 who were diagnosed with **prostate cancer.** Prostate cancer is the most frequently diagnosed cancer among men in the United States. Most men with prostate cancer are elderly. Screening of the prostate, by tests such as the PSA exam, is done to detect cancer at an early stage, when it is more treatable. High levels of screening in a community usually lead to high diagnosis rates, especially for early-stage cancers. The prostate cancers identified in the present study were on average diagnosed at an earlier stage than prostate cancers in New

York State as a whole (outside of New York City). The greater than expected number of men with prostate cancer was only for men ages 65 and older, who would have attended school before the Lewiston-Porter schools were built.

- This study found a statistically greater number of males in study area #1, but not any other study area, who were diagnosed with **cancer of the testis.** Overall, testicular cancer is rare, but it is one of the most frequently diagnosed cancers in young men. This cancer has been linked with certain medical conditions, with white-collar or professional occupations, and with working in certain industries. The excess in testicular cancer in the present study was mainly in young men, who could have attended schools on the Lewiston-Porter campus. We attempted to interview the men to learn more about the schools they attended and any other risk factors they might have, but we were able to complete interviews with only a small number. Of the men we interviewed, not all had attended schools in the Lewiston-Porter school district. Because the number of men we interviewed was so small, it is difficult to draw any conclusions.

- This study found statistically greater than expected numbers of women with **breast and bladder cancers** in study area #1, but not any other study area. Breast cancer is the most frequently diagnosed cancer among women in the United States. Most of the known risk factors for breast cancer are individual factors, including genetics and childbearing history. The only widely accepted environmental risk factor is exposure to ionizing radiation, such as X rays, although much research on potential environmental risk factors is now under way. Cigarette smoking is the most important known risk factor for bladder cancer, although the disease has been linked with a number of occupational exposures. The greater than expected numbers of women with breast and bladder cancers were mostly for women over age 65, who would have completed school before the Lewiston-Porter school campus was built.

- This study found a statistically significant excess in total **childhood cancers** in study area #1, but not in any other study area. When we looked at groups of cancers found in children, we found a statistically greater than expected number of children with gonadal and germ cell cancers. The types of cancers that children develop differ from those seen in adults. The most frequently diagnosed childhood cancers are leukemia, cancers of the brain and other parts of the nervous system, and lymphomas, including Hodgkin's disease. Gonadal and germ cell cancers are rare, and little is known about what might cause them. In the present study, the number of children ages 10-14 years who were diagnosed with cancer was also significantly greater than expected, although these children had a variety of cancer types. Children ages 10-14 would have had the opportunity to attend Lewiston-Porter schools prior to their diagnosis. We attempted to interview all the children with cancer identified in this study (or their parents) to learn more about the schools they attended and other possible risk factors, but interviews were obtained for only about half. These interviews showed that some of the children who were of school age at the time of their diagnosis, including some of the children ages 10-14 years, did not attend Lewiston-Porter schools.

- We also looked at more recent data on childhood cancers. We identified five children living in study area #1 who were diagnosed with cancer since 2000, compared with about five expected between 2001 and 2006. The types of cancer these children had included the types most often found in children. There were no additional cases of gonadal and germ cell cancers.

CONCLUSIONS

We conducted this study to learn more about the occurrence of cancer in the area of the NFSS and the former LOOW. We found no unusual cancer patterns in study areas #2 and #3, where people would have been most likely to have been exposed to any contaminants that might have been in the soil or might have been carried away in surface water or in the air. The only exception was a high number of prostate cancers in study area #2. A high number of prostate cancers was also found in study area #1. The high numbers of prostate cancers in these areas may be related to medical care practices such as prostate screening.

We found statistically high numbers of several other cancers in study area #1. We chose this study area due to concerns over children attending schools on the Lewiston-Porter campus. The greater than expected numbers of women with breast and bladder cancers are not likely to be due to exposures received while the women were attending schools on the campus, since most of the excesses were in older women who went to school before the campus was built. There was an excess in cancers in children in general, and in children ages 10-14 living in this area. These children could have attended schools on the Lewiston-Porter campus, although interviews showed that not all of them had. We also found unusual numbers of testicular cancers in young men, and gonadal and germ cell tumors in children. We can not, however, conclude that these higher numbers were related to exposures to any contaminants from the sites because we do not know enough about where these individuals went to school or other possible risk factors they may have had. More recent data shows that the unusual numbers of childhood cancers in general, and childhood gonadal and germ cell tumors in particular, did not continue after 2000. The possibility that the occurrence of the cancers was the result of chance can not be ruled out.

For more information on this investigation or on cancer in general, please contact Ms. Aura Weinstein, Director, Cancer Surveillance Program, New York State Department of Health, at (518) 474-2354. *09/08*