



New York State Department of Health  
Center for Environmental Health

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Information Sheet

May 30, 2006

**Public Health Consultation**

**Health Statistics Review:**

**Cancer and Birth Outcome Analysis,  
Endicott Area, Town of Union,  
Broome County, New York**

Prepared by:

The New York State Department of Health  
Center for Environmental Health  
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under a cooperative agreement with

The U.S. Department of Health & Human Services  
Agency for Toxic Substances and Disease Registry  
Public Health Service  
Atlanta, Georgia

This information sheet was partially supported by funds from the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) provided to the New York State Department of Health under a cooperative agreement from the Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services.

## What is a health statistics review?

A health statistics review uses existing health data from data sources like birth certificates and health registries to determine whether health outcomes in a particular community are occurring at higher, lower, or about the same level compared to statewide or national levels after taking into account the gender and age of individuals in the community. A health statistics review does not tell us why elevations or deficits in health outcomes exist and can not prove whether there is a cause and effect relationship between exposure to chemicals and health outcomes. While a health statistics review can take risk factors commonly found on health records into account such as age, race and sex, a health statistics review may not be able to take into account certain individual risk factors for health outcomes such as medical history, smoking, genetics and occupational exposures which may explain the elevations or deficits. Rather a health statistics review can generate hypotheses and may indicate whether a more rigorous study should be considered. This health statistics review is the first step in a step-wise approach to addressing health outcome concerns related to environmental contamination in Endicott, NY.

## Why was a health statistics review conducted?

A health statistics review was conducted because of concerns about possible exposures to chemicals known as **volatile organic compounds (VOCs)**. Groundwater in the Endicott area is contaminated with VOCs from leaks and spills associated with local industry and commercial businesses. Trichloroethene (TCE) and tetrachloroethene (PCE) are two main VOCs of concern in the area. The VOCs have moved from the contaminated groundwater into air spaces around soil particles and then into indoor air through cracks in foundations in some buildings, a process known as soil vapor intrusion. Because of possible health concerns, the New York State Department of Health conducted a health statistics review. The health statistics review is part of the overall Public Health Response Plan to address community health concerns about environmental contamination in the Village of Endicott.

**Volatile organic compounds** – chemicals which contain carbon and evaporate readily. Common sources which may emit VOCs include gasoline, dry-cleaning solvents, and paint strippers.

## How were the study areas decided?

Study areas were based on the potential for soil vapor intrusion exposures as defined by the extent of likely soil vapor contamination. In general, the area of contamination runs from the former International Business Machines facility southward to the Susquehanna River. Two study areas were developed based on the primary vapor intrusion-related chemical in each area. The Eastern study area, about 50 blocks to the east of Jefferson Avenue with about 2,500 residents, is primarily contaminated with TCE. The Western study area, an 11 block area to the west of Jefferson Avenue with about 600 residents, is primarily contaminated with PCE. Study area boundaries were presented to members of the community and input was solicited to address community concerns. Please see the attached map of study areas for more information.

## What health outcomes were studied?

We studied the following health conditions among people residing in the study areas at the time of diagnosis (for cancer) or birth (for birth outcomes). Due to differences in data availability and quality, the time frames studied for each health condition vary.

Health Condition	Data Source	Time Frame Studied
Cancers (all ages)	Cancer Registry	1980 – 2001
Childhood cancers (age 0-19)	Cancer Registry	1980 – 2001
Birth defects	Congenital Malformations Registry	1983 – 2000
Low birth weight, prematurity, small for gestational age and sex ratio	Birth Certificates	1978 – 2002

The numbers of cancers and birth outcomes in the study areas were compared with the numbers of cancers and birth outcomes that we would expect to see in a population of this size and age. For the birth outcomes, the analyses also considered characteristics of the mother including her educational level at time of birth, her race/ethnicity, her total number of previous live births and the amount of prenatal care she received. Some birth outcomes, particularly low birth weight, are related to these factors.

## What were the findings?

The total numbers of all types of cancers within each of the two study areas were similar to what was expected for a community this size. Testicular cancer was elevated (higher) in the Western study area and kidney cancer in males was elevated in the Eastern study area. For the two study areas combined, testicular cancer among males and kidney cancer among males and females combined were elevated. Statistical testing showed that these elevations in cancer are significant, meaning unlikely due to chance alone.

Birth outcome analyses used individual information from birth certificates to take into account each mother's age, race/ethnicity, education, number of previous live births and the amount of prenatal care received. Results show a slightly higher than expected occurrence of birth defects in both study areas; however, statistical testing showed that these elevations could be due to chance alone. When the birth outcome data were grouped by type of birth defect, total heart defects and major heart defects were significantly higher than expected in both study areas combined. Total heart defects were also significantly higher than expected in the Eastern study area.

The number of low birth weight births, defined as births where the infant weighs less than 2500 grams or about 5.5 pounds, was significantly higher than expected in the combined study area and the Eastern study area. Both moderately low birth weight (infants weighing between 1500 grams and 2499 grams) and very low birth weight (infants weighing less than 1500 grams) were elevated in these areas. Two other measures of low birth weight, **term low birth weight** births (low weight births that are not premature) and **small for gestational age births** (underweight births taking into consideration the length of pregnancy), were also evaluated and found to be higher than expected in the combined area and the Eastern area. Statistical testing showed these

**Term low birth weight-**  
when an infant is born at full term, (defined as 37 weeks of gestation or greater), yet weighs less than 2500 grams (about 5.5 pounds)  
**Small for gestational age** – birth weight below the 10<sup>th</sup> percentile of weight distribution taking into consideration the length of pregnancy

elevations were unlikely due to chance. In the Western area, almost all measures of low birth weight and prematurity examined were slightly lower than expected, but these differences from the expected numbers were not significant, and could be due to chance.

### **What do the findings mean?**

This type of study can not determine whether or not there is a cause and effect relationship between VOC exposure and the elevations of testicular cancer, kidney cancer, heart defects, and low birth weight. While these elevations are not likely due to chance alone, other individual factors that were not taken into account in this study, such as medical history, occupational exposures to chemicals, smoking, genetics, and obesity may play a role in the elevations seen. Several risk factors have been associated with some of the health outcomes elevated in this study. For example, smoking is associated with an increased risk of kidney cancer and lower socio-economic status is associated with increased risk for low birth weight. In this study, mother's educational level and the amount of prenatal care received were used to try to account for differences that may play a role in the low birth weight findings. More study is needed to evaluate these risk factors. The health statistics review serves as a first step in providing guidance and focus for further health studies.

### **What are the limitations of this type of study?**

This type of study can not establish a cause and effect relationship between an exposure and a health outcome. Many personal factors, such as an individual's smoking, residential or occupational history, are not typically reviewed in this type of study. Further study of these factors may explain the elevations. Additionally, while this study was conducted for a geographical area with some documented exposures, current exposure data were not available at every residence and historical exposure data were not available. Therefore, we can not be sure that all residents who were diagnosed with cancer or gave birth to a child with an adverse birth outcome lived in the area for a substantial duration and were exposed to vapor intrusion-related VOCs prior to the occurrence of their health outcome. Likewise, this study does not capture long-time residents who were potentially exposed to vapor intrusion-related VOCs and moved away prior to a cancer diagnosis or giving birth to a child with an adverse birth outcome. The small population size of the study area also limited the ability to detect meaningful elevations or deficits in disease rates, especially for certain rare cancers and birth outcomes.

### **An excess of childhood leukemia in 1993 – 1994 was reported in the Town of Union. Did this health statistics review find a significant elevation in leukemia among children?**

The current study examined the number of new cases of cancers, including leukemia, among children (age 0 – 19) in the study areas between 1980 and 2001. No significant elevation in leukemia was noted in these areas, nor was there any significant elevation in overall cancers among children in the study areas during this time period. The number of cases of cancer among children in the combined study area was similar to that expected in this population. Because this number is very small (less than six cases), it is not revealed to protect confidentiality. The cases of childhood cancer were different types of cancer and occurred in different years. All of the childhood cancers observed in this study were among the most common childhood cancers.

## **What steps have been taken to reduce indoor air exposures to subsurface VOCs in the area of Endicott potentially affected by soil vapor intrusion?**

To address exposures related to soil vapor intrusion, ventilation systems have been installed in many buildings. These systems capture soil vapor below the basement floor and vent it into the air above the roof, minimizing the indoor exposure to subsurface VOCs. It is important to note that the likelihood of acute health effects associated with exposure to TCE and PCE at the measured levels in local buildings is low. Nonetheless, additional sampling of soil vapor and indoor air in and around homes in the area is ongoing.

## **What are the next steps?**

This study represents the steps in a step-wise approach to addressing health concerns related to environmental contamination in Endicott, NY. Follow-up steps may help researchers to understand why we are seeing some elevations. Further plans for follow-up include:

- 1) Investigate cancer incidence taking account of race:** Because the population of the study area was predominantly white throughout the study period, and because the incidence of several cancers found to be elevated differs by race, we will control for race by comparing the incidence of cancer among whites in the study area to that of whites in New York State, excluding New York City. These results will be compared and contrasted to results of the analysis of cancer among individuals of all races in the study area which was conducted in the current Health Statistics Review.
- 2) Spontaneous fetal deaths:** As previously planned, we will investigate of the risk of spontaneous fetal deaths in the study area.
- 3) Assess feasibility of follow-up epidemiologic study:** We will review individual case records of kidney and testicular cancers, heart defects, and low birth weight to see if there are any unusual factors which may have contributed to these conditions. We will continue obtaining historical exposure information. We will estimate the ability of further study to detect an effect. These steps, along with information from the Health Statistics Review and the other next steps, will help determine if additional investigation is feasible.

Depending on how much additional follow-up is necessary and the follow-up approach chosen, additional resources may be needed to conduct an appropriate study. As in the past, the New York State Department of Health will solicit input from the community and present options for conducting health studies.

For more information, please contact Karolina Schabbes or Steven Forand, New York State Department of Health, Center for Environmental Health, 1-800-458-1158, ext 27950 or via email at [beoe@health.state.ny.us](mailto:beoe@health.state.ny.us)

Map of Study Areas, Endicott Area, Town of Union, Broome County, NY

