

July 1998

Dover Township

Childhood Cancer Investigation

Childhood Cancer Epidemiologic Study Overview

The New Jersey Department of Health and Senior Services (NJDHSS) and the federal Agency for Toxic Substances and Disease Registry (ATSDR) have begun an epidemiologic study to examine the possible risk factors, including environmental exposures, for childhood cancers in Dover Township, Ocean County. This Update describes the protocol for this study.

Background

In December 1997 the NJDHSS released its final report containing an analysis of childhood cancer incidence statistics for Dover Township (Ocean County) for the period 1979 - 1995. This report confirmed that rates for certain cancers were elevated in children under twenty years of age in Dover Township and the Toms River area of the Township when compared with State rates.

The study's aim is to identify possible risk factors that could result in an increase in leukemia and nervous system cancers in Dover Township children.

Residents had expressed concerns that environmental contamination might be linked to the increase in childhood cancers. The

NJDHSS and the ATSDR have begun an epidemiologic study to examine the relationship between childhood cancers and possible risk factors, including environmental exposures.

Study Objectives

The overall goal of this study is to learn more about possible causes of leukemias and nervous system cancers among Dover Township children. Childhood cancers are rare. In New Jersey, about

15 per 100,000 children under the age of 15 years are diagnosed with cancer annually, a rate that is similar to national statistics. Leukemias are the most common forms of childhood cancer, and account for about 30% of new cases. Brain and central nervous system cancers constitute about 20 percent of new cases.

There are few known risk factors for childhood cancers. Some of the risk factors suggested by previous studies that will be examined in this study include:

- ! **Familial or genetic predisposition.** Known heritable factors seem to play a role in only a small proportion of the more common cancers.
- ! **Parental occupational exposures.** Previous studies show mixed results, but employment in certain industries may be associated with increased cancer risk among children of employees. These industries include petroleum

Chemical exposures among these industries can include petroleum hydrocarbons, halogenated solvents, pesticides, and N-nitroso compounds.

refining and petrochemical production; aerospace; painting, printing and graphic arts; agriculture; and electronics.

! ***In utero and childhood exposures.*** These include a variety of exposures such as:

- *N-nitroso compounds.* Found in cigarette smoke, some medications and cosmetics, and cured meats, these chemicals induce brain cancer in experimental animals. Maternal ingestion of these compounds during pregnancy can increase the risk of childhood brain cancer and leukemia.
- *Ionizing radiation.* A past probable risk factor for central nervous system cancer and leukemia, this is less likely now due to decreased dosage and use of x-rays.
- *Electromagnetic fields.* Studies present mixed and inconclusive results on whether EMF exposure increases the risk of childhood cancers.
- *Pesticides.* Exposure to some of these chemicals are reported to increase the risk of childhood brain tumors and leukemia.
- *Infectious agents.* Certain cancers may be caused by exposure to viruses; however, no specific organisms have been associated with childhood cancers.
- *Drinking water contamination.* In Woburn, Mass., an increase in leukemia among children was associated with use of water contaminated with trichloroethylene, tetrachloroethylene, and other chemicals. In northern New Jersey the NJDHSS found an association between trichloroethylene in drinking water and an increase in lymphocytic leukemia in females.

Study Design

The study has two separate elements, each of which is a case-control study. One element uses interviews to gather information on the subjects; the second uses birth records. These are described below.

A case-control study compares individuals with a disease or condition (“study cases”) with individuals that are free of the disease or condition (“study controls”). Both cases and controls are selected from the same population.

Interview study

Cases for the interview study include children who were diagnosed with nervous system cancers or leukemia from 1979 through 1996, were under the age of twenty years, and were residents of Dover Township at the time of diagnosis. Parents of cases will be interviewed regarding the risk factors described above. Part of the analysis will include a detailed exposure assessment to several environmental factors (described below).

Controls for this study are Dover Township residents who were the same age and sex as a case at the time of diagnosis. Four controls are matched to each case. Control families are interviewed in the same manner as the case families, and the same methods of exposure assessments are employed.

Initial contact with both case and control families is being made through letters describing the study and requesting participation. The voluntary nature of participation and confidentiality of responses is stressed. If the family chooses to participate, an interview is scheduled. Both case and control families are interviewed by NJDHSS staff over the telephone, unless this presents a hardship. In those instances, an in-person interview would be scheduled.

Birth records study

Residents noted that there were children who moved out of Dover Township and were later diagnosed with cancer. They were concerned that these children may have had exposures while living in Dover Township that contributed to their cancers. For the birth records study, State Cancer Registry and Vital Statistics data will be used to identify all children (birth through age 19 years) in the State who were diagnosed with any cancer from 1979 through 1996 who were residents of

Dover Township at the time of birth. The NJDHSS is also working with several out-of-state cancer registries to identify children diagnosed with cancer who were born

in Dover Township. For each case born in Dover Township, ten controls will be selected from all Dover Township births, matched on year of birth and sex.

Exposure assessment

An exposure assessment on several of the risk factors previously discussed is included in this study. For the interview study, some of the risk factors include:

- ***Parental occupational exposures.*** Occupational histories of both parents during the mother's pregnancy and through the child's cancer diagnosis (or through the same time period for controls) will be obtained. A certified industrial hygienist will review job titles, descriptions, chemical exposures and other activities and categorize the nature of these exposures.
- ***Electromagnetic field exposure.*** Maternal and child use of electric blankets and heated water beds will be assessed.
- ***Exposure to N-nitroso compounds.*** Maternal (during pregnancy) and child dietary intake of cured meats (e.g., bacon, hot dogs, ham or sausage) will be assessed.
- ***Parental smoking.*** An assessment of both maternal smoking during pregnancy and total household smoking during pregnancy through time of diagnosis will be made through the questionnaire.
- ***Exposure to household and garden chemicals,*** for mother during pregnancy and child after birth.
- ***Maternal and childhood exposure to infectious agents.*** Mother's exposure to specific infectious agents, and signs of serious infections with unidentified agents during pregnancy will be assessed. The child's exposure from birth through the relevant time period will also be collected.

- ***Proximity to hazardous waste sites*** will be assessed through residential, school, and workplace histories. Sites are selected based on documentation of off-site exposures. Environmental data, including groundwater, surface water, soil and sediment, have been collected by State, county and federal agencies, and will be utilized in the exposure assessment.
- ***Source of drinking water.*** Computer modeling of the public water supply is underway at ATSDR, to assist in estimating the specific sources of drinking water for study subjects (e.g., well or wellfield in the public water supply). Separate seasonal models for the system will be developed for each year back to the 1960s, to account for changes in the system operation, water sources, and seasonal use patterns. Exposure to specific sources will be based on the residential histories of the subjects collected by questionnaire.
- ***Exposure to air emissions.*** Computer models of historic air emissions from selected sites in the township will be prepared by the University of Medicine and Dentistry of New Jersey, Environmental and Occupational Health Sciences Institute, for use in the study. Based on residential history, assessments of exposure to air emissions from specific sources will be evaluated.

Because limited information on risk factors is available on birth certificates used as the basis for the birth records study, only drinking water source, proximity to hazardous sites, and exposure to air emissions (based on the mother's residence at the time of the child's birth) will be assessed.

Time Frame for Completion

The interviews began in March 1998 and are expected to be completed by October 1998. Work on the exposure assessments will be concurrent and continue into 1999. The NJDHSS and the ATSDR will continue to provide periodic progress reports on the study to the community.

Additional information is available on the NJDHSS/ATSDR investigations in Dover Township. Please call the New Jersey Department of Health and Senior Services at (609) 984-2193 for any of the resources listed below.

Information on Dover Township childhood cancer incidence:

- Childhood Cancer Incidence Health Consultation: A Review and Analysis of Cancer Registry Data, 1979 - 1995 for Dover Township (Ocean County) Technical Report (December 1997)
- Childhood Cancer Incidence Health Consultation Citizen's Guide: September 1997 (fact sheet on the Technical Report)

Previous Health Care Provider Updates in this series:

- Health Care Provider Update #1: Public Health Response Plan (describing the activities that are to occur in this investigation)
- Health Care Provider Update #2, November 1996 (describing the planned health consultation on the Ciba-Geigy Superfund Site)
- Health Care Provider Update #3, November 1996 (describing the planned health consultation on the Reich Farm Superfund Site)

- Health Care Provider Update #4, January 1997 (describing the public water supply health consultation, including preliminary results)
- Health Care Provider Update #5, December 1997 (describing the results of the December 1997 childhood cancer incidence health consultation)

General information on the status of the investigation:

- Dover Township Childhood Cancer Investigation Progress Report: September 1997

General environmental health materials for health care providers and the public are also available from the NJDHSS, or on our web page at:

<http://www.state.nj.us/health>

Dover Township Childhood Cancer Investigation

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