



## Hazardous Site Health Evaluation Program

*Public Health Services*

### Dover Township Childhood Cancer Investigation

Beginning in 1995, the New Jersey Department of Health and Senior Services (NJDHSS) and the Agency for Toxic Substances and Disease Registry (ATSDR) examined childhood cancer incidence in Dover Township, Ocean County, and its relationship to environmental contamination. Most of the documents prepared during the course of that investigation are available below. For hard copies of any of these documents, please contact the Hazardous Site Health Evaluation Program at (609) 584-5367, or write to:

New Jersey Department of Health and Senior Services  
Consumer and Environmental Health Services  
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## Summary of the investigation and findings

### **Background**

The occurrence of childhood cancer has been a concern in the Dover Township/Toms River area of Ocean County for many years. In 1995, the NJDHSS released an analysis of childhood cancer using State Cancer Registry data for the period 1979 through 1991. The finding of a statistically significant elevation in overall childhood cancer heightened community concerns about cancer in children, and its possible relationship to environmental pollution issues in and around the township.

### **Public Health Response Plan**

The NJDHSS has worked closely with the federal Agency for Toxic Substances and Disease Registry (ATSDR) to evaluate possible risk factors (including environmental exposures), that may be related to the elevated incidence of childhood cancer in Dover Township. The NJDHSS and ATSDR, with community-based input from the Citizens Action Committee on Childhood Cancer Cluster (CACCCC) and the Ocean County Health Department, developed a **Public Health Response Plan**. The Plan included an update and re-evaluation of childhood cancer rates, public health evaluations of potential environmental exposures to hazardous chemicals in the environment, and public health education efforts. Public health activities were later expanded to include a case-control epidemiologic study.

*For more information, please go to the full Public Health Response Plan, or to Health Care Provider Update #1.*

### **Expanded evaluation of childhood cancer: 1979 - 1995**

The NJDHSS conducted an expanded evaluation of childhood cancer statistics for the period 1979 through 1995, for Ocean County and Dover Township. The report of this analysis was completed and released in December 1997. Dover Township was found to be the only municipality in Ocean County with a statistically significant elevation in overall childhood cancer rates. In

the township as a whole, as well as in the Toms River section of the town, both leukemias and brain cancers were elevated, particularly among female children under age 5 years.

*For more information, please go to the Summary Document of the consultation, the associated Citizen's Guide, or the Health Care Provider Update.*

### **Drinking water quality**

One issue that residents voiced was concern over the quality of drinking water from the community water supply. In response, the New Jersey Department of Health and Senior Services and the New Jersey Department of Environmental Protection launched an extensive analysis of the community water supply, beginning with schools in the Toms River area in March 1996. The **Drinking Water Quality Analyses March 1996 - June 1999; United Water Toms River Public Health Consultation** summarized three years of chemical and radiological analyses of the community drinking water supply. A previously unknown chemical contaminant related to the Reich Farm site – styrene-acrylonitrile trimer -- was identified in the Parkway well field (one of the supply's eight well fields), resulting in the closure of two wells and an expanded water treatment system. Also, the testing program led to the development of a new sampling and analysis method to measure radiological activity in water. Long-term toxicologic testing of the new chemical contaminant is in progress, under the direction of the USEPA.

*For more information, please go to the Drinking Water Quality Analyses March 1996 - June 1999; United Water Toms River Public Health Consultation or the associated Citizen's Guide. Also available are Health Care Provider Update #4 which describes sampling methods and early results, or Health Care Provider Update #8 for the final results and conclusions.*

### **Public Health Assessments:**

**Ciba Geigy,  
Reich Farm and  
the Dover**

Public Health Assessments to evaluate potential human exposures to the Ciba-Geigy and Reich Farm Superfund sites and the Dover Township Municipal Landfill were conducted, beginning in 1996. Their purpose was to evaluate past and present environmental exposures in

Dover Township.

**Ciba-Geigy**

Beginning in 1952, the Ciba-Geigy Corporation site (formerly Toms River Chemical) was used for the production of organic dyes and intermediate products, epoxy resins, and specialty chemicals. Manufacturing ceased during the years between 1990 and 1996. Solid and liquid wastes from the manufacturing processes were disposed of in about 20 areas on the site's property, causing soil and groundwater contamination. Between 1952 and 1966, treated wastewater was discharged directly into the Toms River. For the next 25 years, until 1991, treated wastewater was pumped into the Atlantic Ocean by way of a ten-mile long pipeline.

**The Ciba-Geigy Corporation Site Public Health Assessment** concluded that the site posed a public health hazard because of past exposures to chemical contaminants in the community drinking water supply and in private wells. Because of measures to interrupt exposure, the site was considered to pose no apparent public health hazard under present conditions, but that ongoing and planned efforts to clean the groundwater and contaminated soils on site are necessary to prevent future exposure.

*For more information, please see the Ciba-Geigy Health Assessment, its Citizen's Guide, or Health Care Provider Update #8.*

**Reich Farm**

In 1971, over 4,500 drums of chemical waste were illegally dumped at the Reich Farm. This led to the contamination of local groundwater, the source of drinking water for the area. In 1974, organic chemicals were found in private wells in Pleasant Plains near the Reich Farm site. Most chemical testing at that time was not specific enough to identify individual organic compounds. Phenolic compounds were also found in nearby private wells two years later.

In 1986, additional private wells in Pleasant Plains and certain community wells at the Parkway well field were found to be contaminated with volatile and/or semi-volatile organic compounds. Contaminants included trichloroethylene, tetrachloroethylene, and others.

Finally, in 1996, styrene-acrylonitrile trimer was discovered in several of the wells in the Parkway well field. This compound, which was present but unidentified in earlier water quality tests, was one of the chemicals dumped at the Reich Farm site in 1971.

The **Reich Farm site Public Health Assessment** concluded that the site was a public health hazard because of past exposures to chemical contaminants in the community water supply and in private wells. Because of measures to interrupt exposure, the site was considered to pose no apparent public health hazard under present conditions.

*For more information, please see the Reich Farm Public Health Assessment, the associated Citizen's Guide, or Health Care Provider Update #8.*

#### **Dover Township Municipal Landfill**

Private wells on roads adjacent to the Dover Township Municipal Landfill were found to be contaminated with volatile organic compounds and lead. The contaminants found in the private wells were similar to those found in monitoring wells on the landfill, although sources other than the landfill may have contributed to the lead levels. Wells in the Silverton section of Dover Township, located more than one mile east of the landfill, were also contaminated with volatile organic compounds. The source of contamination has not been established by the New Jersey Department of Environmental Protection.

The **Dover Township Municipal Landfill Public Health Assessment** concluded that the site was a public health hazard because of past exposures to chemical contaminants in private wells. Because of measures to

interrupt exposure, the site was considered to pose no apparent public health hazard at present.

*For more information, please see the Dover Township Municipal Landfill Public Health Assessment, the associated Citizen's Guide, or Health Care Provider Update #8.*

#### **Case-control studies**

Based on findings from the previously discussed sections of the Public Health Response Plan, an epidemiologic study was launched in 1998.

In 1998 and 1999, the NJDHSS and the ATSDR collected data for an epidemiologic case-control study of childhood cancer in Dover Township. The purpose of the study was to identify risk factors (including environmental exposures) that may be associated with the elevated cancer incidence. As part of the epidemiologic study, the ATSDR developed complex computer models of the community water supply to evaluate risk associated with access to specific water sources. Similarly, the University of Medicine and Dentistry of New Jersey/Rutgers Environmental and Occupational Health Sciences Institute developed computer models of dispersion of air contaminants from emission sources in the township. These models were used in the epidemiologic study to estimate exposures to air pollution and drinking water sources to study subjects.

The report of the epidemiologic study was released for public comment in December 2001, and the final version was released in January 2003. The study found that prenatal exposure to two environmental factors in the past were associated with increased risk of leukemia in female children. These exposures were: 1) access to drinking water from the Parkway well field after the time that the well field was most likely to be contaminated, and 2) air pollutant emissions from the Ciba-Geigy chemical manufacturing plant. These exposures are no longer occurring, due to closure of the Ciba-Geigy plant and remedial actions by state and federal environmental agencies.

*For more information on the case-control study:*

*The study report was released in five volumes:  
Volume I: Summary of the Final Technical Report;  
Volume II: Final Technical Report;  
Volume III: Technical Report Tables and Figures;  
Volume IV: Technical Report Appendices; and  
Volume V: Response to Public Comment.  
 There is also a citizen's guide.*

**Evaluation of  
 childhood  
 cancer: 1979 -  
 2000**

One of the recommendations in the final report of the epidemiologic study was to continue surveillance of childhood cancer in Dover Township. The NJDHSS completed an analysis of childhood cancer incidence including five additional years of data (1996-2000), and released a report to the public in January 2003. The analysis found that overall childhood incidence remained elevated in the latest five year period, but that incidence among children under age five years was below expected, indicating that cancer incidence rates may be decreasing.

*For more information, please see the Childhood Cancer Incidence Update: A Review and Analysis of Cancer Registry Data, 1979-2000, for Dover Township (Ocean County), New Jersey Final Technical Report. Also available are a citizen's guide and a Health Care Provider Update.*

**Current status  
 and future  
 plans**

Environmental exposures related to hazardous waste sites that were identified through the activities of the Public Health Response Plan are no longer occurring. The Ciba-Geigy chemical manufacturing plant was closed in 1996. State and federal environmental agencies have undertaken or overseen remedial actions at the Reich Farm and Ciba-Geigy sites.

The NJDHSS plans to continue its surveillance of childhood cancers in Dover Township, and will report statistical analyses when an additional five years of data are available (2001 - 2005).

**Chronology of activities**

**1995**

The NJDHSS responded to a request for information from the Agency for Toxic Substances and Disease

Registry on Toms River childhood cancer rates. NJDHSS reported that children under the age of five years who lived in Ocean County, and in the Toms River area of Dover Township had higher rates of brain and central nervous system cancers than other children in New Jersey.

1996 A Public Health Response Plan was completed in June 1996 to define the series of actions planned to investigate childhood cancer in Dover Township. The Plan was developed jointly by the NJDHSS and the ATSDR, with input from the Citizens Action Committee on Childhood Cancer Cluster.

A newsletter for health care providers was initiated in August 1996. Health Care Provider Update #1 summarized the purpose of and activities that were included in the Public Health Response Plan. Two additional newsletters were published in November 1996 that provided site history, contaminants found, and expected time frame for completing the Ciba-Geigy and Reich Farm Public Health Consultations.

1997 Health Care Provider Update #4, The Public Water Supply Health Consultation, summarized the ongoing analysis of the public water supply.

A second analysis of childhood cancer incidence in Dover Township and the Toms River area of the Township was conducted to include four additional years of cancer data. Childhood cancer rates remained elevated. The Summary Document is available here. The full **Dover Township Childhood Cancer Health Consultation** is available from the NJDHSS. A 2 page Citizen's Guide, as well as a Health Care Provider Update, describe the findings of the consultation.

Based on this childhood cancer incidence health consultation, as well as preliminary findings of the Ciba-Geigy and Reich Farm health assessments, planning began for a case-control epidemiologic study. Its purpose is to evaluate the relationship between specific environmental exposures and childhood cancers.



- The first Dover Township Childhood Cancer Investigation Progress Report was released in September 1997.
- 1998** Health Care Provider Update #6 summarized the planned childhood cancer epidemiologic study.
- The ATSDR released its progress report, Public Health Concerns in Dover Township.
- 1999** During the development of the Reich Farm Public Health Assessment, a high level of community concern regarding the Dover Township Municipal Landfill was raised to NJDHSS and ATSDR. As a result, a health assessment was also conducted for the landfill. Public Comment drafts of both the Reich Farm and the Dover Township Municipal Landfill Public Health Assessments were released, as well as their respective citizen's guides. Also released was the Public Comment draft of the Drinking Water Quality Analysis Public Health Consultation.
- An Interim Report of the Case-control Study of Childhood Cancers in Dover Township (Ocean County), New Jersey was released to the community in December, with its Citizen's Guide summarizing the study methods and the observations to date.
- 2000** Information from the Interim Report was the topic of Health Care Provider Update #7, Childhood Cancer Epidemiologic Study Interim Report and Next Steps.
- The Public Comment draft of the Ciba-Geigy Public Health Assessment was released.
- 2001** Three final Public Health Assessments and one Health Consultation evaluating human exposures to environmental contamination were released. These are:
- Ciba-Geigy Public Health Assessment and Citizen's Guide
- Reich Farm Public Health Assessment and Citizen's Guide
- Dover Township Municipal Landfill Public Health

Assessment and Citizen's Guide

Drinking Water Quality Analyses March 1996 - June 1999: United Water Toms River Public Health Consultation and Citizen's Guide.

Health Care Provider Update #8 summarized the above four documents in the Environmental Health Investigations in Dover Township newsletter.

The Environmental and Occupational Health Sciences Institute completed the report "Atmospheric Dispersion Modeling Analyses to Support the Dover Township Childhood Cancer Epidemiologic Study." Its purpose was to estimate the relative concentrations of air contaminants in specific houses from 1962 through 1996 (the study time period) for use in the epidemiologic study.

The ATSDR released its report describing the community's water supply for the years 1962 through 1996 in "Historical Reconstruction of the Water Distribution System Serving the Dover Township Area, New Jersey: January 1962 - December 1996." This report is available in a PDF version and an HTML version. A summary of the report is also available.

The draft Case-Control Study of Childhood Cancers in Dover Township (Ocean County), New Jersey, was released for public comment.

Dover Township Childhood Cancer Investigation Progress Report #3 was published.

2003

**The Case-control Study of Childhood Cancers in Dover Township (Ocean County), New Jersey,** was finalized and released in five volumes:

Volume I: Summary of the Final Technical Report PDF  
134KB

Volume II: Final Technical Report PDF 177KB

Volume III: Technical Report Tables and Figures PDF

1.207KB

[Volume IV: Technical Report Appendices](#) PDF 451KB

[Volume V: Response to Public Comment](#) PDF 189KB

Also published was a [citizen's guide](#).

One of the recommendations of the case-control study was to re-evaluate and update childhood cancer incidence. The report [Childhood Cancer Incidence Update: A Review and Analysis of Cancer Registry Data, 1979-2000, for Dover Township \(Ocean County\), New Jersey Final Technical Report](#) provides this information. Also available is a [citizen's guide](#).

The results of both the childhood cancer incidence update report and the case-control study of childhood cancer were summarized in [Health Care Provider Update #9](#).



Last Updated: 08/09/2004 08:41:42