

Health Consultation

Synthesis Report of a Community Health Profile and Household Health Survey

Pompton Lakes, New Jersey

March 21, 2014

New Jersey Department of Health



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1. Background and Statement of Purpose

The New Jersey Department of Health (NJDOH) and the federal Agency for Toxic Substances and Disease Registry (ATSDR) have been working with members of the Pompton Lakes (Passaic County), New Jersey community since March 2010, when a Community Advisory Group for Health (Health CAG) was first convened. The Health CAG serves as an open forum with the Pompton Lakes community to discuss and address health concerns. Based on concerns that the community is experiencing a disproportionate number of health problems, NJDOH and ATSDR were asked by Health CAG members to provide an understanding of whether there are health outcomes that are occurring more frequently in the Pompton Lakes population (and in particular those living above an area of groundwater contamination) than would be expected.

In response, the State and federal health agencies have pursued two complementary approaches:

- development by NJDOH and ATSDR of a *Community Health Profile* based on existing public health and demographic data sets, including births, deaths, hospitalizations and emergency department usage, cancer registry, birth defects registry, and childhood lead exposure; and
- development by NJDOH of a *Household Health Survey* of current and former residents of current households above the groundwater plume, gathering information on chronic diseases, demographic factors, and length of residence.

There are separate reports containing the detailed methods, findings and conclusions of the Community Health Profile (ATSDR and NJDOH, 2012) and the Household Health Survey (NJDOH 2012). These documents also contain relevant background information on environmental and health concerns of the community.

The purpose of this report is to synthesize the findings of the Community Health Profile and the Household Health Survey, to answer whether there are health outcomes that appear to be occurring (or have occurred) in higher frequencies than would be expected in Pompton Lakes as a whole or in the groundwater contamination area. This synthesis report should be read and understood in the context of these other two reports. For the synthesis of cancer incidence information, the findings of an earlier analysis presented to the community are also noted (ATSDR and NJDHSS 2009).

This report will also make recommendations to the Health CAG regarding the need and feasibility of conducting further investigations of health outcomes in relation to environmental and other factors. In general, there may be a need for further investigation if there are health outcomes that are in excess and there is a suspected exposure that might explain it. If there appears to be a need for further investigation, feasibility is assessed based on the number of cases necessary to conduct meaningful statistical analysis, and whether past exposures of interest can be reliably estimated.

2. Synthesis of Findings

The Community Health Profile (ATSDR and NJDOH 2012) examined existing health-related data sets maintained by NJDOH. In the Community Health Profile, rates of many health conditions in Pompton Lakes as a whole and/or in the area of the town above the groundwater contamination plume were compared to rates in the State of New Jersey and in the six surrounding towns. The time periods examined varied depending on the availability of data from each data source.

The Household Health Survey (NJDOH 2012) gathered information on chronic health conditions from current and former residents of current households above the groundwater contamination plume area of Pompton Lakes. For most health conditions, participants were asked in the Spring of 2012 whether they or members of their household were ever told by a doctor or other health care provider whether they had the health condition; for some conditions they were also asked if they still had the condition or if they experienced the condition in the past twelve months. Rates of surveyed health conditions were compared to national rates from the National Health Interview Survey (NHIS) or State rates from the Behavioral Risk Factor Surveillance System (BRFSS) in the year 2010; for some conditions, rates were also examined by duration of residence.

The results from the Community Health Profile and the Household Health Survey are synthesized below, according to major categories of health conditions. Note that although the Household Health Survey asked about several childhood health conditions, the number of positive respondents was too small for meaningful analysis, with the exception of childhood asthma which will be discussed below.

Birth Outcomes

Finding	<i>Adverse birth-related health outcomes, including low birth weight, prematurity and a variety of birth defects, have not occurred with unusual frequency in Pompton Lakes.</i>
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Basis	As described in the Community Health Profile, the proportions of babies born prematurely or with low birth weight in Pompton Lakes as a whole during the time period examined (2000-2007) were similar to proportions for the State or surrounding towns. Rates of several types of birth defects were also similar between Pompton Lakes, surrounding towns and the State.
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Mortality and Causes of Death

Finding	<i>The leading causes of death were similar in Pompton Lakes compared to the State, with mortality due to heart disease and cancer being most frequent. The overall mortality rate among</i>
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Pompton Lakes residents was similar to the State. Mortality rates among Pompton Lakes residents under age 80 years were also similar to the State, but mortality rates among those 80 years of age and over were somewhat higher than the State.

Basis

From the Community Health Profile, the leading causes of death in Pompton Lakes were similar to the leading causes of death in the comparison populations. Deaths due to heart diseases and cancers were by far the most common. Overall, the mortality rate in Pompton Lakes was similar to the State. Mortality rates among adults in Pompton Lakes under age 80 years of age were similar to the State and surrounding towns, but were somewhat higher for all causes, heart disease and cancers for those 80 years of age or more. This finding indicates that mortality rates are not elevated among younger persons in Pompton Lakes, which was one of the concerns of the community.

Though the Household Health Survey collected information on health conditions experienced by all former residents of current households, including those who are now deceased, there are no comparable statistics for these data. However, the most prevalent conditions reported in the survey for those now deceased were heart diseases and cancers.

Heart and Cerebrovascular Diseases

Finding

There was no evidence that heart disease or cerebrovascular disease occurred more frequently in Pompton Lakes or in the area of the town with contaminated groundwater.

Basis

Findings regarding heart and cerebrovascular diseases were similar in the Community Health Profile and the Household Health Survey.

From the Community Health Profile, hospitalization and emergency department visits among Pompton Lakes residents for heart diseases were lower than State rates in the time period 2006-2010. Overall, age-specific mortality rates for heart disease among male and female residents of Pompton Lakes less than age 80 years at the time of death were similar to the State and the six surrounding towns.

There were no statistically significant differences in rates of cerebrovascular disease among Pompton Lakes males or females compared to the State of New Jersey, for mortality, in-patient hospitalization, or ED visits, during the period 2006-2010.

The age-adjusted percentage of heart disease among Household Health Survey members was similar to the national value from the NHIS. Reported “angina or coronary heart disease” and “heart attack” were examined separately against the percentages reported from the BRFSS. Reported history of heart attacks among the current and former combined survey member population was statistically significantly lower than the BRFSS State percentage, while the percentages of reported angina or coronary heart disease among the survey population and the BRFSS State population were the same.

The age-adjusted percentage for stroke among Household Health Survey participants was smaller than the national value from NHIS, among both males and females. Similarly, the age-adjusted percentage of reported stroke among survey members was lower than that from the New Jersey BRFSS. None of these differences were statistically significant.

Cancers

Finding *Cancer incidence (all types combined) in Pompton Lakes was elevated in females but not in males, though no specific cancer type was statistically high. In the groundwater contamination area, kidney cancer in females and non-Hodgkin lymphoma in males was elevated.*

Basis From the Community Health Profile, overall cancer incidence in Pompton Lakes was 8% higher in females during 1990-2008 compared to the State, but no specific cancer sites analyzed were statistically significantly elevated. In the groundwater contamination plume area of Pompton Lakes during this time period, there were no statistically significant elevated rates of cancer incidence compared to the State.

In an earlier analysis over different time frames (ATSDR and NJDHSS 2009), the incidence of kidney cancer in females (1979-2006) and non-Hodgkin lymphoma in males (1994-2006) had been found to be statistically significantly elevated. These cancers were also elevated to a similar degree in the analysis presented in the Community Health Profile over the period 1990-2008, but the rates were not statistically different from the State.

Similarly, in the Household Health Survey, age-adjusted percentages for having had any cancer were larger than the national value for males and females, but differences were not statistically significant.

There did not appear to be a consistent increase in age-adjusted percentage with increasing duration of residence. In the Household Health Survey, there was a relatively high proportion of kidney cancer and lymphoma among all reported cancers, consistent with the cancer incidence data reported in the Community Health Profile.

The number of deaths due to malignant neoplasms in Pompton Lakes was higher than expected in both males and females (though not statistically significant), compared to the State. The proportion of specific types of cancer deaths in Pompton Lakes was very similar to the State.

Respiratory Diseases

Finding *Respiratory disease as a broad category did not appear to be elevated among adults in Pompton Lakes. However, the percentage of adult males reporting chronic bronchitis was higher among Household Health Survey participants when compared to national rates. This did not appear to be related to length of residence. The occurrence of asthma among adults was similar to national and State comparison figures, though asthma among children appeared elevated.*

Basis From the Community Health Profile, both male and female residents of Pompton Lakes had lower rates of hospitalization and emergency department visits in the period 2006-2010, for the broad grouping of diseases of the respiratory system, in comparison to the State. For asthma, one of the diseases in this broad grouping, hospitalization rates were lower in females but not males, while emergency department visits were lower in both males and females. The rates of death due to chronic lower respiratory diseases in the time period 2004-2007 were based on relatively small numbers; observed rates were slightly higher than, but were not statistically different from, the State.

In the Household Health Survey, the age-adjusted percentage of chronic bronchitis among survey members was larger than the national value, in particular among males, but the difference was not statistically significant. There did not appear to be a consistent increase in the age-adjusted percentage of chronic bronchitis with increasing duration of residence.

In adults, age-adjusted percentages of ever having had asthma were similar to the national NHIS value. Age-adjusted percentages of still having asthma were lower among adult survey members in

comparison to the national value for males and females, but none of the differences were statistically significant. In comparison to the New Jersey BRFSS population, the age-adjusted percentage of ever having asthma was lower in the Pompton Lakes survey member population; the age-adjusted percentage of still having asthma was statistically significantly smaller than the State BRFSS value.

The age-adjusted percentages of ever having had asthma and still having asthma among survey members under 18 years of age were larger than the national value, but the differences were not statistically significant. Findings were similar for males and females. The crude (not age-adjusted) percentage of still having asthma among children was statistically significantly larger than the national crude percentage.

Nervous System Diseases

Finding *Hospitalizations for nervous system and sense organ diseases were generally similar among Pompton Lakes and comparison areas, but emergency department visits for these diseases were higher in Pompton Lakes.*

Basis From the Community Health Profile data, in-patient hospitalization rates for nervous system and sense organ diseases were similar in Pompton Lakes in comparison to the State and surrounding towns. However, emergency department visits for diseases of the nervous system and sense organs (2006-2010) were higher in Pompton Lakes males and females than in the State. The most frequent types of emergency department visits among this group of diseases were generally consistent between Pompton Lakes and comparison areas, with the exception of migraine headaches accounting for a relatively higher proportion of visits among Pompton Lakes females.

Liver Diseases

Finding *There was no evidence that liver diseases were more common in Pompton Lakes.*

Basis From the Household Health Survey, national age-adjusted percentages of liver disease were similar to values of liver disease among the survey participants.

Kidney Diseases

Finding *Kidney diseases showed an inconsistent pattern of increased frequency in Pompton Lakes. Hospitalization due to chronic renal failure was elevated among females, based on small numbers.*

Basis From the Community Health Profile, the numbers of in-patient hospitalizations due to acute renal failure were lower than in the State in both males and females. The rates of in-patient hospitalizations and emergency department visits for chronic renal failure in females (but not males) in Pompton Lakes were statistically significantly higher than the State in the period 2006-2010, but the elevation is based on small numbers, so are subject to wide variability from time to time.

From the Household Health Survey, the age-adjusted percentages of kidney disease among male and female Pompton Lakes survey members were higher than in the NHIS, but the differences were not statistically significant. For male former residents, the percentage of kidney disease was statistically significantly higher compared to males in NHIS, but this difference is also based on a small number of cases.

Diabetes

Finding *Diabetes was less prevalent in Pompton Lakes compared to the State.*

Basis From the Community Health Profile, in-patient hospitalization and emergency department visits due to diabetes were lower among Pompton Lakes residents in comparison to the State. From the Household Health Survey, age-adjusted percentages of diabetes among adults reported from NHIS and BRFSS were larger than the percentages among survey participants, but the differences were not statistically significant. The findings were similar for both males and females.

Childhood Lead Exposure

Finding *Exposure to lead among children in Pompton Lakes was generally comparable to exposure among children in surrounding towns, and was lower than childhood lead exposure statewide.*

Basis Based on the Community Health Profile data presentation, children aged six to 29 months in Pompton Lakes had a lower percentage of children with blood lead concentrations above 5 or 10 micrograms per deciliter ($\mu\text{g}/\text{dL}$) compared to the State, in the period 2000 through 2010. The percentage above 5 $\mu\text{g}/\text{dL}$ was somewhat higher in Pompton Lakes compared to surrounding towns, but the percentage above 10 $\mu\text{g}/\text{dL}$ was similar.

3. Conclusions

Conclusion 1 *While most health conditions in Pompton Lakes and the groundwater plume area appeared to occur at rates similar to other comparison areas, the following specific health outcomes showed evidence of being elevated in the groundwater contamination plume area:*

- *kidney cancer in females*
- *non-Hodgkin lymphoma in males*
- *asthma in children.*

Of these outcomes, kidney cancer and non-Hodgkin lymphoma may be related to exposure pathways of concern in Pompton Lakes, in particular inhalation exposures to trichloroethylene (TCE) and perchloroethylene (PCE) in the groundwater contamination plume area. Therefore there is reason to consider the feasibility of an epidemiologic study to examine whether there is an association between these cancers and these exposures.

Basis TCE is classified as “carcinogenic to humans” by the U.S. Environmental Protection Agency (USEPA 2011), based on “convincing evidence of a causal association between TCE exposure in humans and kidney cancer.” This evidence is based on occupational studies of workers exposed to TCE, and supported by consistent findings from experimental animal studies. There is also evidence that TCE exposure may increase the risk of non-Hodgkin lymphoma and possibly other cancer types.

Similarly, PCE is classified as “likely to be carcinogenic in humans” (USEPA 2012), based on a “pattern of evidence” that PCE exposure is associated with increased risk of bladder cancer, non-Hodgkin lymphoma and multiple myeloma, and possibly other cancers.

There is only limited evidence that TCE or PCE exposure can cause or trigger asthma symptoms (ATSDR 1997a; ATSDR 1997b). The Association of Occupational and Environmental Clinics does not list either of these volatile organic compounds as asthmagenic (AOEC 2012).

Conclusion 2 *It may be feasible to attempt to reconstruct past exposures of Pompton Lakes residents in the context of an epidemiologic study. However, the number of cases of kidney cancer and non-Hodgkin lymphoma, as determined by data from the Community Health Profile and Household Health Survey, is not sufficient for a meaningful epidemiologic study. Therefore, NJDOH does not believe that a community-specific epidemiologic investigation is feasible in Pompton Lakes.*

Basis While there are no systematically collected measurements of human exposure in the past to contaminants of concern in the groundwater contamination plume, it is possible to attempt to reconstruct exposure histories of participants in an epidemiologic study, using residence histories, past groundwater measurements and environmental models for the movement of contaminants. However, there may be no means to validate the accuracy of these past exposure estimates.

Importantly, since kidney cancers and non-Hodgkin lymphoma are relatively rare diseases, there are an insufficient number of cases of these cancers in the Pompton Lakes community to conduct a meaningful epidemiologic study. Using standard study size formulas, NJDOH estimates that 30 to 35 cases would be needed to detect a tripling in risk due to an exposure, while 80 to 85 cases would be needed to detect a doubling in risk (Dean et al. 2012). Since the number of cases of kidney cancer and non-Hodgkin lymphoma do not approach these levels, an epidemiologic study of the association between the exposures of concern and these cancers is not feasible.

4. Public Health Action Plan

The purpose of a Public Health Action Plan is to ensure that a Health Consultation provides a plan of action for necessary follow-up activities. Included is a commitment to follow up on this plan to ensure that it is implemented.

Public Health Actions Undertaken by NJDOH and/or ATSDR

1. NJDOH and ATSDR have evaluated the public health implications of potential human exposure pathways related to the DuPont Pompton Lakes Works Site, resulting in Public Health Assessment and Health Consultation documents. NJDOH maintains a web site with links to reports and informational materials related to the site: <http://www.state.nj.us/health/eohs/dupontpomptonlakes.shtml>.
2. NJDOH and ATSDR established and held periodic meetings with a Community Advisory Group for Health (Health CAG) to provide a forum for community representatives in Pompton Lakes to express concerns about health and environmental exposures, define questions regarding exposure and health, discuss solutions, and give advice to ATSDR and NJDOH on health investigation priorities.
3. The Health CAG expressed a need to develop an understanding of whether there are specific health outcomes that are occurring more frequently in the Pompton Lakes population than comparable areas. Toward this end, NJDOH and ATSDR completed a Community Health Profile, containing analyses of data from existing NJDOH health-related data sets. NJDOH also designed and conducted a Household Health Survey to gather data on chronic diseases among current and former members of current households in the groundwater contamination plume area. Results of these efforts are synthesized in the Health Consultation.
4. ATSDR conducted health care provider education through grand rounds seminars at two area hospitals. NJDOH also surveyed local physicians regarding the frequency and nature of health complaints potentially related or attributed to environmental factors in Pompton Lakes. NJDOH and ATSDR arranged an “availability session” as an opportunity for community residents to seek answers to health questions from independent, specialist health care providers and scientists from the Environmental and Occupational Health Sciences Institute and the Mt. Sinai Pediatric Environmental Health Specialty Unit.

Public Health Actions Planned by NJDOH and/or ATSDR

1. NJDOH and ATSDR will provide the findings of the Community Health Profile, the Household Health Survey, and this synthesis report to the Health CAG and the public in Pompton Lakes. The health agencies will continue dialogue with the Health CAG as needed to address health questions and concerns of the community.

References

Association of Occupational and Environmental Clinics, 2012. Comprehensive Occupational and Environmental Database. Accessible online at: <http://www.aoec.org/tools.htm>

[ATSDR] Agency for Toxic Substances and Disease Registry, 1997a. Toxicological Profile for Tetrachloroethylene. ATSDR, U.S. Department of Health and Human Services, Atlanta, GA. Accessible online at: <http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=265&tid=48>

[ATSDR] Agency for Toxic Substances and Disease Registry, 1997b. Toxicological Profile for Tetrachloroethylene. ATSDR, U.S. Department of Health and Human Services, Atlanta, GA. Accessible online at <http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=173&tid=30>

[ATSDR and NJDHSS] Agency for Toxic Substances and Disease Registry, and New Jersey Department of Health and Senior Services, 2009. Health Consultation, DuPont Pompton Lakes Works Site: Analysis of Cancer Incidence in the Pompton Lakes Neighborhood Impacted by the DuPont Groundwater Contamination. Atlanta: U.S. Department of Health and Human Services.

[ATSDR and NJDOH] Agency for Toxic Substances and Disease Registry, and New Jersey Department of Health, 2012. Health Consultation, Community Health Profile, Pompton Lakes, New Jersey. Atlanta: U.S. Department of Health and Human Services.

Dean AG, Sullivan KM, Soe MM, 2012. OpenEpi: Open Source Epidemiologic Statistics for Public Health. Module: Sample Size for Unmatched Case-Control Study Available online at: <http://www.openepi.com/v37/SampleSize/SSCC.htm>.

[NJDOH] New Jersey Department of Health, 2012. Health Consultation, Report of a Household Health Survey, Groundwater Contamination Area, Pompton Lakes, New Jersey. New Jersey Department of Health, Trenton, NJ.

[USEPA] U.S. Environmental Protection Agency, 2012. Integrated Risk Information System: Tetrachloroethylene. USEPA, Washington, DC. Accessible online at: <http://www.epa.gov/iris/subst/0106.htm>

[USEPA] U.S. Environmental Protection Agency, 2011. Integrated Risk Information System: Trichloroethylene. USEPA, Washington, DC. Accessible online at: <http://www.epa.gov/iris/subst/0199.htm>

Report Preparation

This Health Consultation, “Synthesis Report of a Community Health Profile and Household Health Survey, Pompton Lakes, New Jersey” was prepared by the New Jersey Department of Health.

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