

# Water Gremlin

## HEALTH ASSESSMENT SERIES | PUBLIC HEALTH DATA

The Minnesota Department of Health (MDH) collects public health data on various diseases and conditions in order to provide Minnesotans with meaningful statistics on rates and trends across the state. This data can also inform health professionals and citizens about risks and, when warranted, provide a more complete and accurate profile of health outcomes for communities having questions or concerns about disease rates in their area. Collecting this data is mandated by state law.

Certain cancers, birth defects, and blood lead tests collected by MDH are diseases and conditions of particular interest following the discovery of a history of airborne release of trichloroethylene (TCE). The TCE was released by the Water Gremlin facility located at 4400 Otter Lake Road in White Bear Township. Several MDH programs have responded to inquiries and concerns about various health outcomes in people who live near the facility.

Findings from the Minnesota Cancer Reporting System, the Birth Defects Information System, and the Blood Lead Information System are summarized below along with the limitations of each data analysis. More information on these health statistics, and many others, can be found on the [Minnesota Public Health Data Access](https://data.web.health.state.mn.us/web/mndata/) website. (<https://data.web.health.state.mn.us/web/mndata/>)

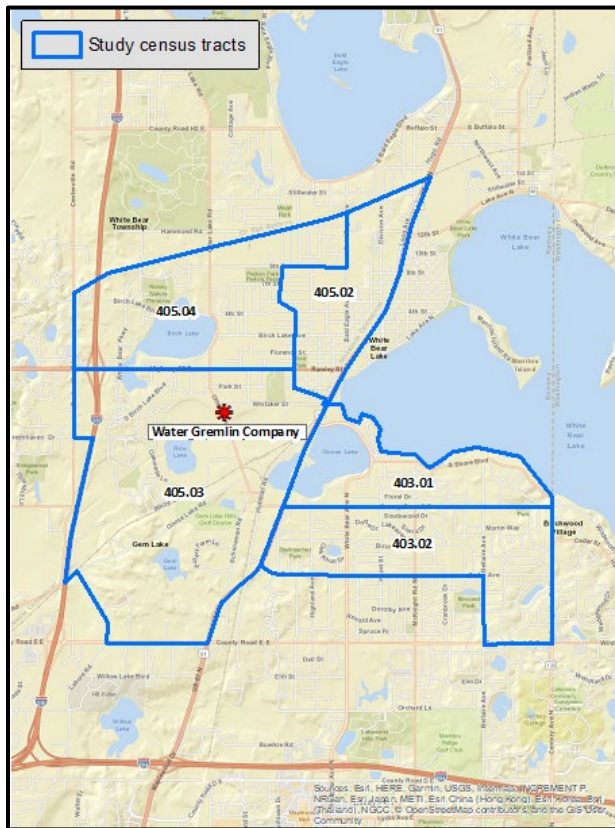
## Cancer Occurrence

**Summary:** The Minnesota Cancer Reporting System (MCRS) completed a cancer occurrence report in March 2019 analyzing cancer occurrence for the most recent 10-year period for which complete data were available (2006-2017).

The study area (see map below) was comprised of five census tracts surrounding the Water Gremlin facility. The geography represented by the tracts is larger than the area where annual average TCE concentrations in outdoor air (based on reported total TCE emissions in 2018) were predicted to be above the MDH health-based value (HBV) of 2  $\mu\text{g}/\text{m}^3$ , but smaller groupings of cancer occurrence and population were not available for use in the analysis.

**Key Findings:** Overall cancer rates in the study area were virtually identical to cancer rates in the seven-county Twin Cities Metro area. For both genders combined, 970 cancers were diagnosed in residents living in the study area over the 10-year period (2006-2017), compared to the expected number of 978 cancers.

Additionally, none of the cancers specifically analyzed for in male or female residents of the five-census-tract study area showed significantly greater cancer rates in the 10-year assessment period compared to expected rates. This includes the three types of cancers (kidney, liver, and non-Hodgkin lymphoma) most believed to be associated with TCE exposures.



Levels of TCE in the air near the facility appear to have been higher than the  $2 \mu\text{g}/\text{m}^3$  HBV, likely over many years. MDH's HBVs incorporate multiple safety factors intended to protect against human health effects. The HBVs are based on the assumption that one is breathing the air 24 hours a day, 7 days a week, for up to a lifetime. Actual exposures are most likely less due to the movement of people in and out of areas and changes in weather/wind direction.

A map of estimated airborne TCE, as predicted by Minnesota Pollution Control Agency (MPCA) modeling, can be found on the MPCA Water Gremlin website: [www.pca.state.mn.us/air/water-gremlin-trichloroethylene-tce-area-concern](http://www.pca.state.mn.us/air/water-gremlin-trichloroethylene-tce-area-concern).

**Limitations:** While the conclusions drawn from this data analysis provides some assurance that cancer rates in the study area are not unusual for the study period, it is important to know that the MCRS data have limitations. In addition to those described below, the full report linked above acknowledges several key limitations.

- This analysis of cancer rates does not specifically address potential health risks from environmental exposures to TCE. Because TCE is commonly used, it is not unusual for people to frequently encounter small amounts of TCE in air from many sources. Cancer surveillance data by itself is not enough to establish the extent that an environmental exposure may be contributing to cancer occurrence.
- The estimates of expected cases are based only on age and gender distribution of the study area population. The rates do not account for the many other risk factors – family history, smoking history, occupation and diet among them – that affect whether cancer rates are high or low in a given community at a given point in time.
- The MCRS only collects information on residence at the time of diagnosis. The location recorded for place of residence does not necessarily indicate an exposure causing the illness also occurred at or near that location. For example, a person diagnosed with cancer who previously lived near the Water Gremlin facility and left, would not be identified in the selected geographies if they moved outside the study area. Likewise, a person who moved into the area before a diagnosis, may be counted as living in the study area. This would contribute to the observed cancer rates, even though potential exposures to many cancer risk factors likely occurred before living in the study area.

Cancer Occurrence Report for White Bear Township, White Bear Lake and Gem Lake Area Five Census Tracts, 2007-2016 can be found on the MDH website at <https://www.health.state.mn.us/data/mcrs/docs/rptwblgemlake.pdf>.

## Birth Defects

**Summary:** TCE was released in the southern part of zip code 55110 from the Water Gremlin facility. Because of potential exposures to residents in this area and the potential link to cardiac birth defects in animal studies, MDH reviewed available data from the Minnesota Birth Defects Information System (BDIS). Monitoring birth defects among babies born in Minnesota began in May 2005; the earliest available population-based data on congenital heart defects is for babies born in 2006.

For the purposes of this evaluation, the mother’s residence in zip code 55110 at the time she delivered her baby was chosen as a proxy for possible exposure to TCE in air. This geography most closely corresponds to the area where people most likely to be exposed regularly to TCE dispersed in outdoor air from the Water Gremlin facility would live. This geography is pictured in the map on page 5 of this summary. Smaller geographical units were not available for this analysis.

The frequency of congenital heart defects diagnosed and reported for births to mothers living in zip code 55110 were compared to the frequency of the same defects which occurred in other parts of the state.

**Key Findings:** Based on the timeline of reported TCE emissions from the Water Gremlin facility, about 400 infants were born annually to women living in this area at the time of delivery for the 2006 to 2017 birth cohorts (recall that congenital heart defects data were not recorded before 2006). Of these, about 3 infants per yearly cohort (range: 0-7) were diagnosed with congenital heart defects. These observed numbers do not appear different from expected numbers (range: 2-5) based on prevalence estimates available in Minnesota.

The numbers of septal defects (affecting atria or ventricles) – the most common congenital heart defects in Minnesota – were consistent in babies born to residents in zip code 55110 over the 12 birth cohorts as compared to other parts of the state.

MDH will continue to review congenital heart defects diagnosed in the first year of life in this area until the 2018 and 2019 birth cohorts are completed in mid-2021. This encompasses the period when pregnant women were potentially exposed to TCE from the Water Gremlin facility.

**Limitations:** While the conclusions drawn from this data analysis should provide some assurance that the number of congenital heart defects is not unusual for the 2006 to 2017 birth cohorts in the 55110 zip code, it is important to know that the BDIS data also have limitations.

- Minnesota’s birth defects surveillance program is in its early stages of development. It takes many years to collect enough data to be able to identify trends in the occurrence of birth defects because they are relatively rare, and small, random changes can appear to have a significant effect on such rates in the short term.
- Unless the differences were large, it would be difficult to discern differences in occurrence given the low numbers of congenital heart defects and the small population potentially affected (in the lower portion of zip code 55110).

- There are many possible sources of environmental exposures that could contribute to birth defects risk and are unknown and unaccounted for in a population group as large as the zip code 55110.
- Residence within a zip code is an imprecise proxy for potential TCE exposure from Water Gremlin and variability in exposures among pregnant women who lived there would likely be considerable.
- The origin of congenital heart defects is complex or unknown.

## Blood Lead Levels

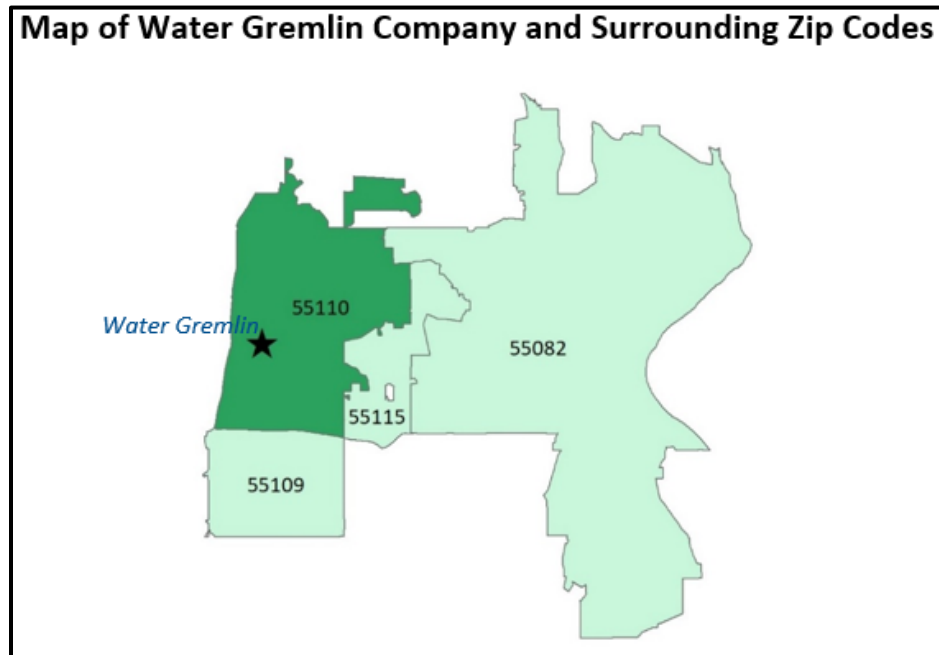
**Summary:** In addition to working with TCE, the Water Gremlin facility also manufactures lead products. Community members expressed concern that lead could have been mishandled (including allegations of illegal dumping on or off site) and asked whether the public may have been exposed to harmful amounts of lead from the facility. MDH's lead surveillance program was asked whether lead testing results compiled in the Blood Lead Information System (BLIS) database could help address these concerns.

MDH evaluated BLIS data for the 55110 zip code (see map on page 5). Because most lead exposure in Minnesota can be traced back to lead-based paint in older homes, MDH used the bordering zip codes of 55082, 55109, and 55115 for comparison because housing ages and median household incomes were similar to 55110.

MDH obtained data from BLIS for blood specimens drawn between January 1, 2000 and March 18, 2019 for residents of these four zip codes. An elevated blood lead level (EBLL) was defined as 5 micrograms per deciliter ( $\mu\text{g}/\text{dL}$ ) or greater – the value currently used by the U.S. Centers for Disease Control and Prevention to identify children who have higher levels of exposure to lead than most children.

**Key Findings:** EBLL rates decreased in all four zip codes over time. For adults, the 55110 zip code showed higher EBLL rates than the comparison zip codes. However, when known employees of Water Gremlin were excluded from the analysis, there were no significant differences in EBLL between 55110 and the comparison zip codes. Known employees of Water Gremlin were twice as likely to live in 55110 as the comparison area, which accounts for this trend.

Of the data analyzed for this report, children under six years represented the majority of individuals tested. There was no significant difference in children's EBLL rates between zip code 55110 and the comparison area. However, addresses of 3.6% of children with an EBLL were matched to the address of a known Water Gremlin employee who also was tested for lead and had their place of work reported to the BLIS database. MDH is currently working with St. Paul-Ramsey County Public Health to address exposures to these children from take-home lead from the Water Gremlin facility.



**Limitations:** Interpretation of these results are limited for several reasons.

- EBLL rates for an area are a non-specific measure. They must be combined with additional information, such as case manager interviews and environmental sampling, to be able to determine the most likely source(s) of lead for the individuals with EBLLs.
- Adult blood lead data are very limited as most adults are not routinely tested for lead and those who are do not represent the general adult population.
- Known employees of a company who have received a blood lead test are not necessarily representative of all employees of that company.
- MDH receives test results but does not receive a roster of company employees who work with lead, so matching employee addresses to children’s addresses is a rough approximation of children who might be exposed to take-home lead.
- The reference level for EBLLs was lowered from 10 µg/dL to 5 µg/dL in 2012. This implies that tests in 5 – 9.9 µg/dL range would likely have gone unconfirmed prior to 2012.

Minnesota Department of Health | Site Assessment and Consultation Unit  
625 Robert Street N. | PO Box 64975 | St. Paul, MN 55164-0975  
Phone: 651-201-4897 or toll-free 1-800-657-3908  
Email: [health.hazard@state.mn.us](mailto:health.hazard@state.mn.us) | [www.health.state.mn.us](http://www.health.state.mn.us)

04/24/19

*To obtain this information in a different format, call: 651-201-4897.*