OVERVIEW OF CHILDHOOD LEUKEMIA AND ENVIRONMENTAL QUALITY ON THE TYENDINAGA MOHAWK TERRITORY

The Chief and Council of the Mohawks of the Bay of Quinte (MBQ) requested that Intrinsik Environmental Sciences Inc. (Intrinsik) complete a review of environmental conditions in the Tyendinaga Mohawk Territory (TMT). The literature and data review were requested based on concerns raised by some members of the MBQ community surrounding three cases of acute lymphoblastic leukemia (ALL) diagnosed in children who live on the reserve. The three cases of childhood ALL were all diagnosed within the same 6-month period which is higher than expected for a population of 2,500.

Some in the MBQ community have expressed concerns about the quality of their local drinking water and questions have been raised about the potential link between childhood leukemia and environmental contamination. Although regional health authorities have largely discounted the link between environmental contaminants and ALL, Intrinsik has conducted an independent scientific review and assessment to further explore this issue and address community concerns.

SCIENTIFIC LITERATURE REVIEW OF CHILDHOOD CANCER

Intrinsik conducted a literature review of childhood cancers with a particular focus on ALL, cancer clusters and possible causes. The review included sources from the scientific literature (*e.g.,* peer-reviewed scientific journal articles) and grey literature (*e.g.,* government agency reports, non-government organization information and online publications).

What is Acute Lymphoblastic Leukemia?

Leukemia is a type of cancer that can occur in children and adults. Leukemia starts in the bone marrow (the soft material inside of most bones) where blood cells are made. Over time, the abnormal leukemia cells crowd out the normal blood cells and prevent them from functioning properly in the body. Acute lymphoblastic leukemia (ALL) is the most common form of leukemia diagnosed in children and teens.

What Causes ALL?

There is no definitive cause of ALL; however, the Canadian Cancer Society has a list of potential risk factors for the development of ALL including certain genetic syndromes (e.g., Down Syndrome), exposure to high-levels of radiation, and a certain viral infection (called HTLV-1). Cancers can be caused by a combination of risk factors; however, most children who develop ALL have no risk factors at all.

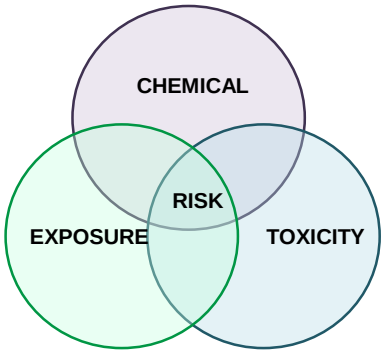
Findings of the Scientific Literature Review

Scientific articles were found by searching in a large online database called PubMed that contains over 22 million articles from scientific journals and books. A number of different studies were reviewed that looked at whether various factors (including environmental contamination) were related to childhood ALL. Overall, the weight of scientific evidence has not found that exposure to environmental contaminants causes an increased risk of childhood ALL. Many health authorities have noted that despite the identification of a few risk factors the majority of childhood leukemia cases are diagnosed with no known risk factors or causes.

"There are very few known lifestyle-related or environmental causes of childhood leukemia, so it is important to know that in most cases there is nothing these children or their parents could have done to prevent these cancers."

American Cancer Society

DATA REVIEW AND SCREENING LEVEL RISK ASSESSMENT



Intrinsik was provided with environmental data (*e.g.,* soil, water, air) that were used to evaluate potential chemical exposure and toxicity as part of a screening level risk assessment (SLRA) in an effort to address community health concerns in general. Four main areas of interest for assessing risk were identified within the TMT; findings are discussed below.

The Former Tyendinaga Landfill

The former Tyendinaga Mohawk Landfill was used as a garbage disposal area for the TMT from about 1968 to 2005. After the landfill was closed, a cap was built to cover the landfill area and keep the contents from escaping. A number of environmental reports were reviewed that indicate that the landfill does not appear to be impacting soil and groundwater in the surrounding area. Therefore, it was concluded that the former landfill does not pose unacceptable human health risk to the MBQ community.

Tyendinaga Mohawk Airfield

The Tyendinaga Mohawk Airfield was originally constructed in 1916 and was used as a military training facility during World War I and World War II. A number of environmental investigations completed at the airfield found that there were chemicals in the airfield's soil and groundwater that may exist above applicable human health screening benchmarks. It was suggested that further environmental sampling and investigation should be completed at the airfield to provide more current data. Although there is a large amount of uncertainty surrounding the environmental quality of the airfield, it is encouraging that recent tests show that the water is safe for drinking.

Quinte Mohawk School

The school was selected as part of the assessment because children are present on a regular basis, and the location is of great interest to the community. Although there were no soil or groundwater data available, results from indoor air testing and drinking water samples indicate that the school is a safe place for kids to drink the water and breathe the air.

Community Drinking Water

In 2012, water samples were collected at 32 different locations (households and community buildings) at the TMT. The water samples were tested for environmental chemicals and the results were compared to the Ontario Drinking Water Standards. Overall, the results of the water testing suggest that, from a chemical perspective, the water on the TMT is safe to drink.

OVERALL, ENVIRONMENTAL CONDITIONS REVIEWED FOR THE TYENDINAGA MOHAWK TERRITORY DID NOT SUGGEST A POTENTIAL LINK TO ALL OR OTHER HEALTH RISKS TO COMMUNITY MEMBERS.

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