

# CHLORINATION DISINFECTION BY-PRODUCTS IN CANADIAN DRINKING WATER AND BRAIN CANCER RISK

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**Background and Aims:** The etiology of brain cancers remains poorly understood. The study of brain cancer and chlorination disinfection by-products (CDBPs) in drinking water with the best exposure assessment suggested increased risk of brain cancer associated with long-term exposure to CDBPs. Our aim was to replicate this high-quality study in Canada.

**Methods:** We conducted a population-based case-control study of 1009 incident cases of primary brain cancer and 5039 controls in eight Canadian provinces to assess the impact of chlorination disinfection by-products in Canadian drinking water on brain cancer risk. Mailed questionnaires were used to collect a lifetime residential history, source of drinking water, and other risk factors. We estimated the exposure to chlorination byproducts in drinking water by combining questionnaire data with historical data on by-products levels for more than 600 water treatment plants. We included 684 cases and 3805 controls in the analysis who had exposure information for at least 70% of the period 5 to 45 years period prior to interview.

**Results:** Risk was not related to lifetime average trihalomethane (THM) levels or years of exposure to THMs or to higher levels or longer duration of exposure to bromodichloromethane (BDCM). We observed no association with more years of exposure to THM at 3 levels: THM >20, >40 and >60 µg/l. The results for women and men were similar to that for both genders combined. Stratified analyses by histology subtype of brain cancer did not demonstrate any consistent relationship of brain cancer risk with either exposure to higher levels of THM or DBCM, or longer years of exposure to THM or DBCM, although increased risk was observed for some categories of exposure years for glioblastoma and astrocytoma tumors.

**Conclusions:** Our study does not support the hypothesis that chlorination disinfection by-products play a significant role in the etiology of brain cancer.