

Environmental Health

LDodds and WDKing. Occupational and Environmental Medicine. July (2001) Vol.58 #7 p 443.

A study of a proposed association between exposure to trihalomethanes in water and birth defects.

Four forms of trihalomethane (THM) are used to disinfect drinking water supplies. They are: Chloroform (CLF), bromodichloromethane (BDCM), bromoform, chlorodibromomethane. The exact composition of additive is not generally known as it is subject to variation at manufacture. The presence of impurities cannot be ruled out.

Concentrations of THM in drinking water are regulated and limited to a total of 48 µg/l. In practice it is found that the concentration of BDCM correlates well with total THM.

Maximum detected concentration of BDCM in northwest England = 19.7 µg/l, mean = 7 to 8 µg/l (SD = 4) measured between 1992 and 1996.

The study took advantage of routine water monitoring and a comprehensive perinatal database located in Nova Scotia. Concentrations of BDCM and CLF were determined for specific periods prior to and during pregnancy for each birth.

The study focussed on singleton births between 1988 – 1995.

Maternal age, parity, maternal smoking and income were recorded as potential confounders.

The referent for chloroform was; less than 50 µg/l, further exposure bands were defined as; 50-74, 75-99 and ≥100 µg/l.

The referent for BDCM was <5 µg/l for BDCM. Further exposure bands were defined as 5-9, 10-19, ≥20 µg/l.

49,842 residents had a child in said period.

There was no dose response relationship between neural tube defects and BDCM but the adjusted RR for the higher exposure category (≥20 µg/l BDCM) = 2.5 (95% CI = 1.2 to 5.1) measured 1 month either side of conception.

Chloroform showed no association with birth defects.

Cardiac defects were reduced with increasing exposure to BDCM (a protective effect) but the statistical significance of this observation was doubtful, until highest dose.

Cleft defects and chromosomal abnormalities were not associated with exposure.

The authors dismiss the protective effect against cardiac defects as an anomaly but are encouraged to find an association with neural tube defects. It is not clear why they apply such differing interpretations to such similar findings.

Comment

Concentrations of BDCM are higher in Canada than they have been in the test area of England.

The association of high exposure to BDCM and neural tube defects is of concern, though the precision of the outcome and the lack of dose-response relationship provide a measure of comfort with regard to causation.

