



Safer Water, North Texas would like to call your attention to an important matter. The NTMWD consulted with a toxicologist in Colorado to make some videos they have displayed on their website this year to reassure consumers about water quality in North Texas. Dr. Phillips makes several very broad, sweeping statements that may not be completely true or show the whole picture, especially involving susceptible populations. For instance, Dr. Phillips makes the statement, "...The scientific literature is firm that there is no association between disinfection by-products and miscarriage at the concentrations found in drinking water."¹ This conclusive statement does not reflect the relevant scientific literature available, and is even contradicted by a recent TCEQ publication regarding chlorine burns.² In fact, several studies specifically cited in EPA documents point to a positive correlation between disinfection by-products (DBPs) and miscarriage.³ The overall conclusions from many of these studies indicate a need for further research, not a conclusive answer.

We know from history that as health concerns arise from a certain chemical or product, research starts by making correlations, which then allows for further, more specifically guided research. History also shows it often takes decades before conclusive answers are found, and before scientific consensus is established. We certainly don't know the answers to these questions any better than Dr. Phillips does, but it is clear that the research isn't as "firm" or conclusive as Dr. Phillips and NTMWD would have you believe.

It is important to understand how the government decides what is safe (and what isn't) in regard to water disinfection. They look at available scientific literature to determine if a chemical, by-product, or a class of either one is carcinogenic (cancer-causing) or may harm reproduction. Each one is assigned an MCL and an MCLG: Maximum Contaminant Level (MCL) and Maximum Contaminant Level Goal (MCLG). Only the MCL is enforceable via regulations, but many substances have an MCLG (i.e. goal) of zero because they are known to be harmful to humans. MCLs are set by the government with a risk/benefit ratio.

"MCLGs and MCLs are established with the best of intentions: to keep you safe and healthy. However, the frequent discrepancy between the guideline (MCLG) and the enforceable standard (MCL) indicates that other factors play a significant role. The legal limits are frequently determined by economic and political factors in order to reduce costs. The available technology plays into the disparity as well. Science tends to improve our understanding of the health effects, so contaminant level standards may evolve; but the timeline of implementing regulations can be painfully slow."⁴

Studies to set these regulations are typically conducted on healthy adults (not babies, not pregnant mothers, not susceptible populations like those with cancer, autoimmune issues, kidney or bladder issues, conditions that involve increased water intake, or any number of other diagnoses).

As a group that seeks to provide education and errs on the side of caution, we want to empower each and every one of you to read these studies for yourselves. Specifically, we strongly encourage pregnant members, or those trying to get pregnant, to dig into the studies and ask yourselves if you believe there is "no association" based

on what you read. We had multiple members who experienced miscarriages during the burn last year, and our hearts go out to them.

Pregnant members may consider being cautious about bathing/showering/breathing in unfiltered tap water during the chlorine burn period. Consider having filtered water to drink; adding filters on your shower/bath; taking cold, short showers; and other cautious means. We believe in empowering you with information so that you can make your own choices based on knowledge.

For our members in susceptible populations with a variety of diagnoses, especially those currently battling cancer, we also encourage you to dig deeper into studies and data rather than trusting blindly in a doctor paid by the NTMWD to make sweeping statements regarding “public” health; those recommendations and opinions may or may not be protective of your personal health needs and/or goals.

1. “Interview with Medical Toxicologist: Health Questions about Disinfection By-Products”
<https://www.ntmwd.com/interviews-with-dr-scott-phillips/>
2. TCEQ’s “Facts about Drinking Water Disinfection and the Free Chlorine Conversion Process” (January 2019), p. 3-4
https://www.tceq.texas.gov/assets/public/comm_exec/pubs/gi/gi-466.pdf
“There have been a number of other studies that investigated maternal exposure to disinfection by-products and birth outcomes (such as small-for-gestational age infants) following shorter-term exposure to disinfection by-products². Evidence in epidemiological studies looking at exposures to disinfection by-products above 80 ppb and pregnancy outcomes is mixed and limited by study shortcomings. Regulatory agencies worldwide continue to evaluate possible associations between disinfection by-products exposure and pregnancy outcomes.”
3. Environmental Protection Agency’s “Six-Year Review 3 Technical Support Document for Disinfectants/Disinfection Byproducts Rules” (2016)
<https://www.epa.gov/sites/production/files/2016-12/documents/810r16012.pdf>
 - See epidemiology studies on fetal loss, p. 4-42
 - “Based on 10 primary studies . . . there was inconsistent, but suggestive, evidence of an association between maternal DBP exposure and pregnancy loss.”
 - “Based on 1 new primary study . . . some evidence is provided of increased risk of fetal loss and exposure to THMs.”
 - Fetal Loss Conclusions, p. 4-47 - 4-48
“The weight of evidence from epidemiology studies continues to support a potential health concern for an increased risk of fetal loss/stillbirth”
 - Information Available During Development of Stage 1 and Stage 2 D/DBPRs, p. A-48 - A-50
“The results from this collection of studies provided relatively consistent evidence of an association between exposure to chlorinated water or DBP and pregnancy loss.” (p. A-49)
4. “What Is The Difference Between MCLG and MCL: The Different Ways the EPA Regulates Drinking Water Contaminants” (2018)
<https://medium.com/@SimpleWater/what-is-the-difference-between-mclg-and-mcl-48893af9973c>

Environmental Protection Agency's "Six-Year Review 3 Technical Support Document for Disinfectants/Disinfection Byproducts Rules" (2016)

(<https://www.epa.gov/sites/production/files/2016-12/documents/810r16012.pdf>)

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This partial table of contents will enable you easily locate what the EPA has to say about the relationships between certain medical conditions/outcomes and disinfection by-products.

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Female Reproductive Effects, p. 4-49

9 References (p. 9-1 - 9-62)

Complete list of studies referenced in this document

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Environmental Protection Agency's "Six-Year Review 3 Technical Support Document for Disinfectants/Disinfection Byproducts Rules" (2016)

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Appendix A. Additional Information for Health Effects of Regulated Organic Disinfection Byproducts (DBPs), Regulated Inorganic DBPs and Regulated Disinfectants (Appendix to Chapter 4)

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Environmental Protection Agency's "Six-Year Review 3 Technical Support Document for Disinfectants/Disinfection Byproducts Rules" (2016)

(<https://www.epa.gov/sites/production/files/2016-12/documents/810r16012.pdf>)

Fetal Loss Studies

We were able to locate many of these studies online. Links are provided below.

Primary Papers

Aschengrau, A., S. Zierler, and A. Cohen. 1989. Quality of Community Drinking Water and the Occurrence of Spontaneous Abortions. *Archives of Environmental Health*. 44: 283–290.

Aschengrau, A., S. Zierler, and A. Cohen. 1993. Quality of community drinking water and the occurrence of late adverse pregnancy outcomes. *Archives of Environmental Health*. 48: 105–113.

Bove, F.J., M.C. Fulcomer, J.B. Klotz, J. Esmart, E.M. Dufficy, and J.E. Savrin. 1995. Public drinking water contamination and birth outcomes. *American Journal of Epidemiology*. 141(9): 850-862.

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Dodds, L., W. King, C. Woolcott, and J. Pole. 1999. Trihalomethanes in public water supplies and adverse birth outcomes. *Epidemiology*. 10(3): 233-7.

Dodds L., W. King, A.C. Allen, A. Armson, D.B. Fell, and C. Nimrod. 2004. Trihalomethanes in public water supplies and risk of stillbirth. *Epidemiology*. 15: 179-186.

https://journals.lww.com/epidem/fulltext/2004/03000/Trihalomethanes_in_Public_Water_Supplies_and_Risk.10.aspx

Hwang, B.-F., and J.J.K. Jaakkola. 2012. Risk of stillbirth in the relation to water disinfection by-products: A population-based case-control study in Taiwan. *PLoS ONE* 7(3):e33949.

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Savitz, D.A., K.W. Andrews, and L.M. Pastore. 1995. Drinking water and pregnancy outcome in central North Carolina: Source, amount, and trihalomethane levels. *Environmental Health Perspectives*. 103(6): 592-596.

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Savitz, D.A., P.C. Singer, K.E. Hartmann, A.H. Herring, H.S. Weinberg, C. Makarushka, C. Hoffman, R. Chan, and R. Maclehose. 2005. Drinking Water Disinfection By-Products and Pregnancy Outcome. Denver, CO: AWWA Research Foundation.

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Swan, S.H., K. Waller, B. Hopkins, G. Windham, L. Fenster, C. Schaefer, and R.R. Beutra. 1998. A prospective study of spontaneous abortion: Relation to amount and source of drinking water consumed in early pregnancy. *Epidemiology*. 9(2): 126-33.

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Toledano, M.B., M.J. Nieuwenhuijsen, N. Best, H. Whitaker, P. Hambly, C. de Hoogh, L. Jarup, and P. Elliott. 2005. Relation of trihalomethane concentrations in public water supplies to stillbirth and birth weight in three water regions in England. *Environmental Health Perspective*. 113: 225–232.

<https://drive.google.com/open?id=1TBrhz1RbzhED1YpWIEeg3fXlrcLVVqgh>

Environmental Protection Agency's "Six-Year Review 3 Technical Support Document for Disinfectants/Disinfection Byproducts Rules" (2016)

(<https://www.epa.gov/sites/production/files/2016-12/documents/810r16012.pdf>)

Fetal Loss Studies (cont'd)

Waller, K., S.H. Swan, G. Delorenze, and B. Hopkins. 1998. Trihalomethanes in drinking water and spontaneous abortion. *Epidemiology*. 9(2).

<https://drive.google.com/open?id=1QORG6I8AUPnKjvGx6qXHUaZzSIIYEzo6>

Review Papers

Bove F.J., Y. Shim, and P. Zeitz. 2002. Drinking Water Contaminants and Adverse Pregnancy Outcomes: A Review. *Environmental Health Perspectives*. 110(Suppl.1): 61-74.

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Craun, G.C. (eds.). 1998. EPA panel report and recommendations for conducting epidemiological research on possible reproductive and developmental effects of exposure to disinfected drinking water. Research Triangle Park, NC: U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory.

Graves, C.G., G.M. Matanoski, and R.G. Tarfdiff. 2001. Weight of evidence for an association between adverse reproductive and developmental effects and exposure to disinfection by-products: a critical review. *Regulatory Toxicology Pharmacology*. 34: 103–124.

Mills, C.J., R.J. Bull, K.P. Cantor, J. Reif, S.E. Hrudey, and P. Huston. 1998. Workshop report. Health risks of drinking water chlorination by-products: report of an expert working group. *Chronic Disease in Canada*. 19(3): 91-102.

Nieuwenhuijsen, M.J., M.B. Toledano, N.E. Eaton, J. Fawell, and P. Elliott. 2000. Chlorination disinfection byproducts in water and their association with adverse reproductive outcomes: a review. *Occupational and Environmental Medicine*. 57: 73-85.

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Reif, J., M. Hatch, M. Bracken, L.B. Holmes, B.A. Schwetz, and P.C. Singer. 1996. Reproductive and developmental effects of disinfection by-products in drinking water. *Environ Health Perspect*. 104(10): 1056–1061.

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Reif, J. S., A. Bachand, et al. 2000. Reproductive and developmental effects of disinfection by-products. Fort Collins, CO: Department of Environmental Health, Colorado State University.

Villanueva, C.M., M. Kogevinas, and J.O. Grimalt. 2001. Drinking water chlorination and adverse health effects: a review of epidemiological studies. *Medicina Clinica*. 117(1): 27-35. [Spanish]

World Health Organization (WHO). 2000. Disinfectants and disinfectant by-products. Available online at: http://apps.who.int/iris/bitstream/10665/42274/1/WHO_EHC_216.pdf