

Largest-ever study to look at maternal nitrate consumption and birth outcomes

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Nitrate is the most common contaminant in aquifers and tap water throughout the world, but its effects on human health remain largely unknown.

A group of international researchers led by Leslie Stayner, professor of epidemiology in the University of Illinois at Chicago School of Public Health, will conduct the largest-ever study of the effects of maternal consumption of nitrate-contaminated [drinking water](#) on birth outcomes among approximately one million babies born in Denmark.

"There are several animal studies that show high levels of nitrate consumption are linked to adverse birth outcomes, but there are only a handful of studies in humans, and those have relatively low numbers of participants and numerous design limitations," Stayner said. "We very much need large and well-designed population-based studies to determine what the impact of this very common chemical is on [human health](#)."

Nitrate comes from nitrogen, a plant nutrient supplied by fertilizers and animal manure, both of which are used extensively in farming. While [water](#) filtration facilities can remove many contaminants before water reaches homes, most county facilities in the U.S. cannot remove nitrates because the process-called reverse osmosis-is too expensive.

Stayner says Denmark provides "a practical treasure trove for epidemiological research" because its national health care system

maintains a high quality database of patient medical records that is made available to qualified researchers. Stayner and his colleagues from Aarhus University in Denmark, the University of Copenhagen, the Geological Survey of Denmark and Iceland, and the Staten Serum Institut of Copenhagen, will examine the medical records of babies born in Denmark between 1997 and 2013, and will look for specific adverse outcomes, such as pre-term delivery, low birth weight, reduced head circumference and body length, and birth defects. Pre-term delivery is defined as birth prior to 37 weeks of gestation, which typically takes 40 weeks for normal birth weight babies.

Stayner will link this data with estimates of household concentrations of nitrate in drinking water and maternal consumption using data from the Danish National Birth Cohort, a database of maternal and child health information that includes data on maternal diet and water consumption habits. The database also has records on prescription and non-prescription medication use that will be examined to determine whether certain drugs boost the effects of nitrate.

"We will have information on the homes where these mothers lived during their pregnancies, and can derive an estimate of nitrate levels in their drinking water," Stayner said.

"This will be the largest-ever comprehensive study on the effects of nitrate in drinking water and the risk of adverse [birth](#) outcomes," Stayner said. "Our findings will have important implications for the development of policies on acceptable levels of [nitrate](#) in water to protect children."

Provided by University of Illinois at Chicago

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