

### Title

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Infant Infections and Respiratory Symptoms in Relation to *in Utero* Arsenic Exposure in a U.S. Cohort

### Author(s)

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### Abstract

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#### *Background*

Arsenic is a toxic chemical element that occurs naturally in the environment. It is colorless, tasteless and odorless and is readily absorbed in the body following inhalation or ingestion. Human exposure is primarily through ingestion of contaminated food and water. Long term, repeated arsenic exposure can lead to irritation of the stomach and intestines, birth or developmental effects, skin cancer, lung cancer, bladder cancer, and infertility.

Exposure to arsenic is a particular concern for pregnant mothers, children, and infants since they are especially vulnerable to the effects of environmental toxicants. Arsenic can be passed from mother to fetus, and exposure to arsenic in pregnant women can lead to adverse pregnancy and birth outcomes, such as miscarriage and infant mortality. Infections are a major cause of mortality among infants in the first year of life, and recent research indicates that exposure to arsenic during pregnancy may impact infants' susceptibility to infections. Previous research has shown that arsenic exposure in pregnant mothers is associated with respiratory symptoms and infections in infants during the first 4 months of life.

#### *Objective*

To determine whether maternal arsenic exposure during pregnancy is related to the prevalence of infections and respiratory symptoms in infants throughout the first year of life.

#### *Methods*

Maternal arsenic exposure was assessed by measuring urinary arsenic levels during pregnancy. Infant infection and respiratory symptoms were assessed at 4, 8, and 12 months using a parental telephone survey.

#### *Results*

Higher levels of urinary arsenic in pregnant mothers was associated with an increase in infant infections and respiratory symptoms (difficulty breathing, wheezing and cough), and a greater incidence of diarrhea and fever throughout the entire first year of life. These effects were most apparent during the first 4 months.

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## Conclusion

This study is among the first to examine the effects of maternal arsenic exposure at common environmental levels, and to find an association between higher urinary arsenic levels and the prevalence of infant infections and respiratory symptoms throughout the first year of life. These results extend upon previous studies by indicating that adverse health effects due to maternal arsenic exposure extend beyond the first 4 months of life. Thus, it is possible that arsenic exposure in pregnant women has a long-term impact on children's health, potentially leading to further complications later in life.

## Policy Implications

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The U.S. Environmental Protection Agency (EPA) currently limits the amount of arsenic allowed in drinking water. However, recent studies suggest that even low levels of arsenic (including levels at or below the EPA limit) can cause adverse health effects, particularly in pregnant women and children. Moreover, very few food products are regulated for arsenic content. This lack of regulation for food products is particularly worrisome given that some foods, such as rice, are known to absorb arsenic from soil and water more readily than other crops. As a result, rice tends to contain more arsenic than other grains, and is a particular concern among individuals who consume large quantities of rice in their diet. Rice products, such as rice syrups, are also common ingredients in many modern food products, including some infant formulas, and rice cereal is a common first food for American infants. Fortunately, though, some policy-makers do appear to be taking steps in the right direction. In May of 2015, for example, a bill was introduced in Congress that would limit the amount of arsenic permitted in rice and rice-based foods. If this bill (known as the Reducing food-based Inorganic Compounds Exposure, or R.I.C.E., Act) is passed, the Food and Drug Administration will be required to set a maximum allowable level of arsenic in rice and in foods containing rice.

Despite this positive step, however, the current allowable level of arsenic in food and water may still be inadequate to prevent adverse health effects due to low-level arsenic exposure. Thus, the EPA should continue to use emerging research on low-level arsenic exposure to guide arsenic regulations in the future. In addition, about 15% of Americans rely on private, unregulated wells for their drinking water. Continued support is needed for targeted education and outreach campaigns to those communities about monitoring and treatment options for their drinking water supply.

## Reference

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[Article](#) available in [Environmental Health Perspectives](#)

## Keyword(s)

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[Arsenic](#), [Respiratory illness](#)