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## Perchlorate Linked to Thyroid Deficiency in Women

Many of those exposed to the rocket fuel chemical have weakened function, a study finds. The contaminant is a threat, the California health department says.

By Marla Cone

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Many women exposed to perchlorate, the rocket fuel chemical that has contaminated hundreds of Southern California water wells, have suppressed thyroid function, which can lead to health problems in them and abnormal brain development in their offspring, according to a study by the Centers for Disease Control and Prevention published Wednesday.

The study is the first research that links reduced thyroid hormones in people with the low amounts of perchlorate routinely found in the bodies of Americans nationwide. Women with low iodine levels — more than one-third of U.S. women — were most at risk from the chemical, according to the report.

Perchlorate is particularly a pervasive threat in California, where more than 450 wells and other water sources operated by more than 100 agencies are contaminated, primarily in Los Angeles, Orange, Riverside, San Bernardino and Sacramento counties, according to the state health department. The chemical also is found in milk, cheese, lettuce and other food, as well as human breast milk and baby formula.

Much of the contamination comes from military bases and aerospace plants, where perchlorate was used as the explosive component of solid rocket fuels.

The findings could provide major evidence for the U.S. Environmental Protection Agency, which for years has been reviewing whether it should set a national standard for perchlorate in drinking water.

The CDC team analyzed thyroid hormones and perchlorate levels of 1,111 women and found a relationship between them, particularly in those with low iodine levels. Women with moderate to high perchlorate exposure had fewer T4, or thyroxine, hormones — on average, a reduction equivalent to 8% to 33% of the normal range for the hormone.

"For women overall, perchlorate was a significant predictor" of two important thyroid hormones, T4 and TSH, or thyroid-stimulating hormone, according to the study, published Wednesday in the online version of the journal *Environmental Health Perspectives*. The research was led by Benjamin C. Blount of the CDC's National Center for Environmental Health in Atlanta.

Prolonged reductions in thyroid hormones, often caused by insufficient iodine intake, can lead to hypothyroidism, a metabolic disorder, in adults, and mental impairment in fetuses and infants.

The most pronounced reductions in the thyroid hormones were in women with iodine levels of less than 100 micrograms per liter, the minimum level suggested by the World Health Organization.

No drops in the hormones were seen in men, possibly because women are more at risk due to the thyroid effects of estrogen and pregnancy.

Last year, a panel of the National Academy of Sciences concluded that perchlorate can affect the thyroid's ability to absorb iodine and suppress its hormones. But it also determined, based on the science at the time, that effects would occur at high levels of exposure.

In the new study, the reductions in thyroid hormones were seen "at perchlorate exposure levels unanticipated based on previous studies."

Based on the average perchlorate levels in their urine — 2.9 parts per billion — the women were ingesting almost 10 times less than the dose the EPA has considered safe based on the national academy panel's recommendations.

In a report accompanying the new study, Environmental Health Perspectives called the reductions in thyroid hormones "significant" and said they "indicate that even small increases in perchlorate exposure may inhibit the thyroid's ability to absorb iodine."

The CDC researchers reported that nearly all of the previous studies that found no thyroid effects analyzed men, not women. Only two previous studies included women, and they had normal iodine levels so they were less vulnerable to effects. "Our study is the first to target and separately analyze results for women with lower levels of urinary iodine, a potentially susceptible population," they said.

While the EPA reviews whether to impose a drinking water standard, it has set an interim goal — not an enforceable limit — for industrial cleanups.

The Pentagon and its contractors, including Aerojet and Lockheed Martin, have been lobbying against a stringent drinking water standard, saying there are no proven health effects and that cleaning up perchlorate could cost billions of dollars.

In August, California proposed its own drinking water standard of 6 parts per billion. The state health agency will hold a hearing on its proposed regulation Oct. 30 in Sacramento. Comments from the public will be accepted until Nov. 3.

Massachusetts is the only state with a mandatory limit in place: 2 parts per billion.

Perchlorate has been detected in the public drinking water supplies of more than 11 million people in 26 states at concentrations of at least 4 ppb, according to the 2005 National Academies of Science report.

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