

Proposal Summary

Analytic Epidemiologic Study of Volatile Organic Compounds in Drinking Water and Adverse Pregnancy Outcomes

US Marine Corps Base Camp LeJeune, North Carolina

One of the many duties of the Agency for Toxic Substances and Disease Registry (ATSDR), is to conduct health studies around toxic waste sites. These studies are conducted to determine if people exposed to toxic substances experienced any adverse health effects. Recently, ATSDR learned that tetrachloroethylene (PCE), trichloroethylene (TCE), and 1,2-Dichloroethylene (DCE) were present in some of the drinking water supplies at the US Marine Corps Base at Camp LeJeune, in North Carolina from 1982 through 1985. Based upon the geology of the area, we believe that the drinking water may actually have been contaminated since the late 1950s. Among those who received this contaminated water were approximately 6,000 residents in family base housing. Because family base housing residents include a large proportion of young married women, concern was raised about potential toxic effects on the developing fetus. This concern is important to those who have already been exposed. It also should be of particular importance to the US Marine Corps Base at Camp LeJeune; because of the base's geology, the water supply at the base is vulnerable to future contamination.

Experience with toxic substances suggests the developing embryo and fetus may be particularly sensitive to toxic agents.¹ For some chemical exposures, women may experience adverse pregnancy outcomes even when their own health is not threatened.¹ Studies conducted around two different hazardous waste sites have reported increased rates of low birth weight infants delivered to women living near the sites during pregnancy.^{2,3,4} In addition, low-level drinking water exposure to trihalomethanes, volatile organic compounds (VOCs) which are similar to those found at the US Marine Corps Base at Camp LeJeune, has been associated with an approximately 30 percent increase in term low birth weight.^{5,6} However, very little is known about the effects on pregnancy outcome of the VOCs found at this Marine Corps base.

The primary goal of the proposed study is to determine whether maternal residence in housing supplied with contaminated drinking water is associated with increases in the rate of (1) term low birth weight, (2) preterm births, and (3) fetal deaths. We propose to study North Carolina birth and fetal death certificates for all women who lived at the US Marine Corps Base at Camp LeJeune between 1968 and 1985. The study period will include the years of known contamination (1982-1985), and a period of suspected contamination (1968-1982). Base residents who were supplied with uncontaminated water will serve as a comparison group. We plan to study approximately 6,100 births and fetal deaths, including 2,500 births and fetal deaths to exposed residents and 3,600 births and fetal deaths to unexposed residents from 1968 through 1985.

Birth weight, gestational age, fetal death and important health factors such as maternal age, race, and medical history will be obtained from the birth and fetal death certificates.

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The mother's address at the time she gave birth will be taken from the birth and death certificates. We also will examine housing records to find out if a woman moved to a new housing area during her pregnancy; this is important because the fetus reacts differently to toxic chemicals at different points during the pregnancy. Finally, we will look at the hospital records for a small number of pregnant women in the study. If the hospital records provide useful information, we may consider examining hospital records for a larger sample of study subjects.

References

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