

Woburn survey may become a model for low-cost epidemiology

In 1979, residents in Woburn, Mass., learned of extensive chemical contamination in two of the wells supplying city drinking water. Suddenly residents began asking whether this might not explain an apparent abundance of serious health problems in their town. But when attempts to probe the link failed for lack of money and data, the residents did more than complain, they volunteered their labor to help researchers at the Harvard University School of Public Health in Boston. Now the Harvard scientists have confirmed a statistically significant association between the two wells and elevated rates of both leukemia and birth defects between 1969 and 1983.

Using more than 300 volunteers, the Harvard study surveyed 3,257 households—54 percent of the target population—for data on a wide range of fetal- and child-health problems, including leukemia incidence. (An earlier state-funded survey had shown the town's childhood-leukemia rate was far higher than the national average.) The goal was to learn whether homes receiving a significant proportion of their water from the town wells "G" and "H" had a higher rate of health problems. These wells had been shut down in 1979 when it was learned they contained chlorinated

organic chemicals, including both chloroform and trichloroethylene, known carcinogens.

The Harvard study confirmed that Woburn's leukemia rate was 2.4 times the national average. "If you look at where the cases have occurred and when they occurred relative to exposure to the water [from wells G and H], there's an excess that can be attributed to the wells," says Stephen Lagakos, the biostatistician who headed the study. In fact, the average proportion of water supplied by the contaminated wells was twice as high—21 percent—for those households in which leukemia occurred as for the town in general. However, Lagakos added, there was a small percentage of leukemia cases that could not be attributed to the well water and that researchers cannot explain.

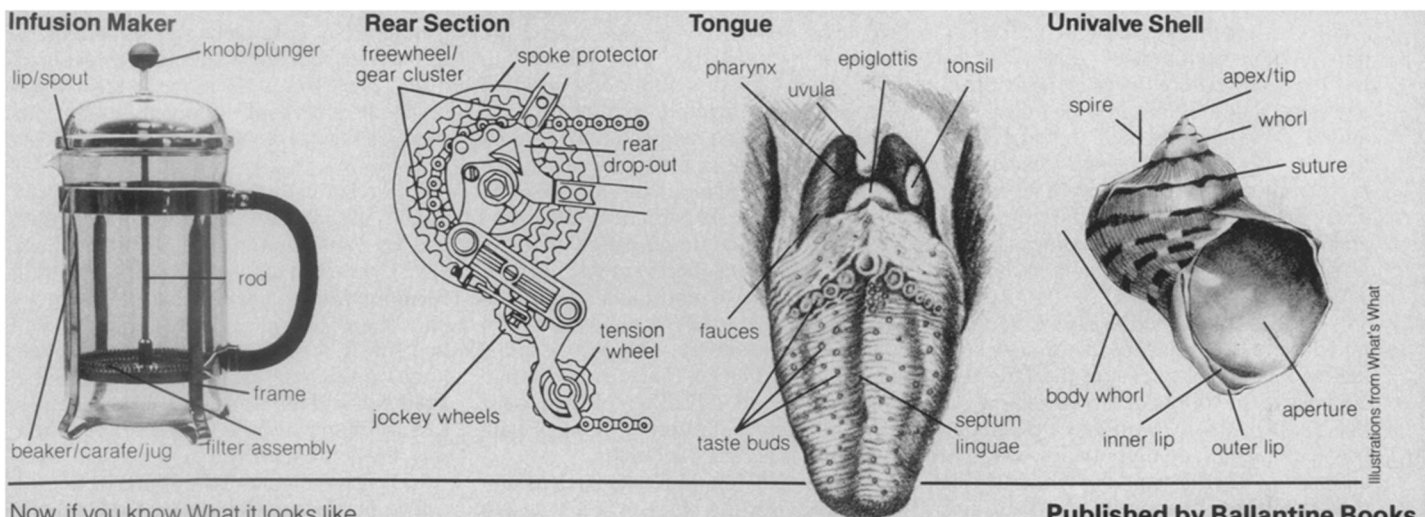
The study also showed a tripling in the rate of eye and ear birth defects and elevated rates of other birth defects where more than 20 percent of the water came from G and H.

For these findings to be explained by something other than exposure to wells G and H, Lagakos told SCIENCE NEWS, "it would have had to vary in both space and time the same way the water did." Even in those neighborhoods that received the

highest proportions of water from those wells, rates of leukemia and birth defects dropped in years when city records show the pumping of water from those wells also dropped. Rates in the town increased again when pumping from the wells sprang back up.

If the Woburn study had been fully funded, it would likely have cost between \$500,000 and \$750,000, notes Lagakos. "In Massachusetts alone there are lots of towns that think they have similar problems," he says, "but there's not enough money in the state budget to do this kind of study for each one. What we're hoping is that if a town can get volunteers to do the interviewing, then maybe a state can provide some small additional funds to finance the technical assistance needed to analyze collected data. That would be a way of servicing these small towns economically."

A 160-page report of the Woburn study, published last week, documents how the researchers set up their survey, instructed volunteers and analyzed the data. Lagakos says that he hopes this report can be used as a model by which other cities can launch low-cost yet comprehensive and thorough analyses of potential community hazards. —J. Raloff



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