



## The Oregonian

### Water treatment's big-picture value subject to debate

An epidemiologist says eliminating a parasite may hurt immunity, risking more lives than it protects

Monday, April 25, 2005

**SCOTT LEARN**  
The Oregonian

Is the federal government about to force Portland to make its drinking water too clean for the population's own good?

After years of studying the parasite being targeted by pending federal rules, researcher Floyd Frost thinks so.

Frost's notion -- warning: this may come as a bit of a shock for clean freaks -- is that low doses of assorted microbes may actually be good for you.

"It's too early to say conclusively," Frost, a researcher at New Mexico's Lovelace Clinic Foundation, says of the pending federal rules, "but it may well be that if you put this protection in, you'll increase the community's risk of illness."

Frost lines up with a small but growing group of researchers who worry about what they see as a rush to ever-greater treatment of protected water supplies. While the prevailing public policy is against them, their work dovetails with an emerging "hygiene hypothesis," which holds that an overly sanitary lifestyle can actually weaken biological defenses, long evolved to handle regular doses of allergens and microbes.

It also ties into environmentalists' concerns about over-engineering. "It's really hard to muck up water treatment when the treatment is a bunch of trees and shrubbery," Frost said.

The Environmental Protection Agency's proposed rule, which the city is trying to alter, would require Portland's Water Bureau to spend at least \$60 million to kill cryptosporidium, a chlorine-resistant and potentially lethal parasite found rarely in the city's protected Bull Run watershed near Mount Hood.

The rule would affect Portland and suburbs that get their water from the city, including Gresham, Tigard and areas served by Rockwood and Tualatin Valley suppliers.

Last month, Frost, a former Washington state epidemiologist, and four colleagues published research in the Journal of Infectious Diseases that tested the "protective immunity" provided by low doses of cryptosporidium in surface water supplies. The research focused partly on Seattle, which, like Portland, taps protected reserves.

Their conclusion: low doses of the parasite in reservoirs could actually help residents fend off full-blown gastrointestinal sickness when they encounter much higher doses from swimming pools, lakes and infected toddlers, among other common sources.

The study was partly funded by the EPA. But chances are Frost's line of argument won't have much success within the agency.

In a statement, Ephraim King, director of the division handling the new regulations, said the EPA considered protective immunity in drafting the rule.

But removing cryptosporidium would reduce risk to "the millions of Americans who travel for business, recreational or family reasons and do not have any immunity to a particular pathogen," King said. It will also cut risks for sensitive populations, he said, including infants, the elderly and people with AIDS.

The drive for the new regulations came after the nation's worst waterborne cryptosporidiosis outbreak in 1993, when a filtration plant that treated contaminant-laced Lake Michigan water malfunctioned. Of the 54 people who had cryptosporidiosis listed on death certificates, 46 also listed AIDS as an underlying cause of death.

### **Parasite not found in Bull Run**

Portland's sheltered system, with restricted human access and no livestock upstream, is far less susceptible to such an outbreak. Cryptosporidium is difficult to detect, but Water Bureau testing hasn't found a single one of the microbes in its 10 billion gallons of Bull Run water for two years.

Jeffrey Griffiths, an associate professor of public health and family medicine for the Tufts University School of Medicine in Boston, served on an advisory committee for the pending rule.

In an e-mail, Griffiths said the argument that social good can come from exposure to potentially harmful pathogens "is a Nietzschean one: The survivors have the immunity, not the ones who really get sick and die."

"One could argue that we should let sewage into our water because exposure to these pathogens will provoke immunity in those who survive the illness," Griffiths said, adding that a waterborne epidemic in Portland would "destroy the trust people have in their public water system for years to come."

Frost countered that cryptosporidium is prevalent in the environment and will never go away and that research may indicate that AIDS patients get protective immunity as well.

Griffiths' comments exaggerate the danger in a protected watershed such as Bull Run, Frost said: "Only an airplane full of sewage crashing near one of the streams could cause such contamination." And "the resulting fire would sterilize the contents."

### **The Portland situation**

The pending federal rule would force Portland and the nation's handful of other large, unfiltered water systems to deactivate cryptosporidium with an ultraviolet light plant (\$60 million) or a filtration plant (\$200 million).

Portland officials are trying to persuade the EPA to let the city skip building a plant, citing the extremely low occurrence of the microbe. Failing that, they plan to appeal to Congress for help if, as expected, the agency finalizes the rule late this summer.

A second study, issued by the federal Centers for Disease Control and Prevention last year, also found a possible protective effect from eating raw fruits and vegetables, likely to have low doses of the parasite as well.

Gary Oxman, Multnomah County's health officer, said that the logic of the protective immunity argument is compelling and that the Frost and CDC studies are sound. Oxman also questions the health value of treating Bull Run water. But as of now, it's a few studies against "hundreds if not thousands of studies that say exposure is not good," he said.

"Over the next 20 years or so it won't surprise me if good, quality science shows the hygiene hypothesis is correct to some significant extent," Oxman said. "But where I sit right now, I think the state of the science is not ready for policymaking."

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