A Mundane Menace Emerges

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No one thinks twice about the health hazard of drinking tap water. But when water is contaminated, no one is safe. Over the past 31 years, dirty drinking water has been blamed for more than 12,000 cases of illness. Few, if any, insurers have policies covering contaminated tap water. Over the past few years, insurers have paid more than $20 million to settle with victims sickened by backflow.

For most of us, drinking water comes cheap. But when contaminated, drinking water can cost you your life. The problem is not the municipal water systems. Generally, public water is safe and clean. Contaminants infect municipal water inside a building when contractors connect drinking water pipes to other pipes and clean water mixes with contaminated water. The result can lead to illness or death. Either way, it has cost insurers millions of dollars in liability and worker's compensation.

The U.S. Environmental Protection Agency calls cross-connection and backflow a "significant public health risk." The potential for contaminating drinking water can happen in almost every business, home, hospital or restaurant.

"When it happens, it is a major problem," says Jay Tarara with the Pennsylvania Department of Environmental Protection's water supply management. "Is it a problem all the time? No," adds Tarara, but he says many companies don't know a problem exists until someone gets sick.

"Nobody's protected," says Jon Gilmore, senior engineer for Cross Connection Control Management in New Stanton, PA. "Our field research shows us that. Most companies have manuals [for preventing backflow], but they're not following it."

"Backflow" occurs when water flows in the wrong direction in a pipe. That, in itself, is not a problem if it is properly controlled. The problem occurs when pipes carrying drinking water are connected by mistake to pipes that hold water that is unsafe to drink. When the water flows in reverse, the contaminated water mixes with the drinking water.

Backflow can occur because of a drop in pressure in the distribution system, such as when firefighters use the hydrant. Backflow can also happen when water pressure increases in a pipe. This can happen, for example, when water in the top floors of a 25-story building forces water in the wrong direction into pipes on the lower floors.

The most basic illustration is a garden hose attached to an outside faucet. A homeowner attaches to the hose a bottle that mixes the water with pesticide to spray on the lawn. While spraying, the water pressure drops when the fire department uses water from the public water mains. This creates a vacuum in the hose, drawing the pesticide into the water mains and contaminating the drinking water with chemicals.

Incidents Underreported

The EPA counted 459 incidents of backflow from 1970 to 2001, resulting in 12,093 illnesses. The number of incidents, however, is believed to be much higher. The EPA reports that one state water official suspects the actual number of backflow incidents may be 10 times those reported.

Gilmore, with Cross Connection Control Management, says the number is dramatically higher. He says the American Backflow Prevention Association estimates more than 100,000 incidents happen every day in the United States. Not every incident results in illness. But every incident poses a threat.

The cross-connection problem can result from improperly installed pipes or when a hose is connected to a non-potable water supply. Cross-connection can be avoided with piping that does not join drinking water with contaminated water.

Backflow can be prevented with valves that stop the water from flowing in the wrong direction. Backflow problems can happen anywhere that has drinking water- whether it is a water fountain, a sink or a beverage machine that mixes water with soda.

For example, copper contamination is most common in restaurants where carbonated water can dissolve soft drink dispenser piping made of copper. The EPA reports that a Minnesota child became extremely ill in 1987 after drinking at a restaurant where the soda machine with copper contamination flowed in reverse and dirtied the restaurant's potable water.

In another incident, in March 1990, a 52-year-old woman fell into a coma and died after receiving dialysis treatment that was supposed to save her life. The antifreeze seeped into water feeding into the dialysis machines at Memorial Medical Center in New York where the air-conditioning and potable water pipes were cross-connected without a backflow prevention device. Within an

hour after the treatment, three patients became comatose and two become incoherent. Elsewhere in the hospital, an employee noticed the water had an unusual taste and color- later attributed to the same antifreeze that mixed with the dialysis fluid.

Insurers Settle

In one of the largest backflow insurance settlements, 21 homeowners in Hawthorne, NJ, received 21 million dollars from insurance companies after they sued a pest control company for contaminating drinking water in June 1987.

The incident occurred when a construction crew inadvertently ruptured a water main. Shortly after the break, in a matter unrelated to the water main break, a pest control employee was rinsing a tank that contained pesticides.

The water main break created a siphon for the pesticide-laden water, which spread to 63 homes. The $21 million settlement covered medical expenses, mental distress and inconvenience, repairs to the plumbing system and a health surveillance program for affected residents.

In one of the most serious incidents, 49 children fell ill in 1992, when water used in their soup at a school in New Jersey was contaminated due to poorly connected pipes. The Centers for Disease Control blamed a faulty valve, and water from the boiler mixed with drinking water. There is no known lawsuit or insurance payment in this case.

More recently, insurance companies agreed to pay 110 residents of Pineville, LA, 1.2 million after their drinking water was contaminated with sewage. The problem occurred in May of 2000 when a city employee inadvertently connected a business sewerage pipe to a water main.

A Question of Liability

Municipal water companies are responsible for the water and piping only up to the private property, according to the DEP's Tarara. Once the pipes and water reach the private property, the owner of that property is responsible for the piping and the water

Of the EPA's 459 documented cases of backflow, 87 occurred in residential areas. The other 372 occurred in business settings: 40 at industrial sites, 31 in schools or universities, 28 in restaurants, 27 in medical sites, 24 in governmental or public buildings, 18 in office buildings, 15 in public water systems, 10 in recreational sites, 6 in agricultural sites and the other 174 in other undefined sites.

All 50 states require control of cross- connections and/or backflow prevention; however, the requirements beyond that vary, according to the EPA. Most state laws follow standard plumbing code language. The Pennsylvania code, for example, says customers are charged with eliminating cross-connections or providing valves to prevent contamination.

Federal regulations, under the U.S. Department of Labor and the Occupational Safety and Health Administration, also state that at places of employment, "there shall be no cross-connection, open or potential, between a system furnishing potable water and a system furnishing nonpotable water."

Though federal, state and local regulations exist, usually no public officials are responsible for enforcing them. It is up to the property owner to police himself or herself.

"The insurance companies may think it's being monitored by public agencies, so they don't worry about it," says Gilmore, but "OSHA... only checks what it's called on to check."

"This is serious," says John Schwartz, president of Cross Connection Control. "The insurance industry needs to be sure any company they insure follows the codes."

Louis Robare, a consultant for Cross Connection Control, says that of the 43,000 taps he has inspected over the years, only half of one percent had a program in place to prevent cross-connection and backflow problems.

Last year, Cross Connection Control surveyed a major hospital in Western Pennsylvania at the request of the Allegheny County Health Department. They discovered more than 40 cases of cross-connection. One case even involved a hose lying in the fluids from a morgue table. The system lacked any valve to stop morgue fluids from mixing with the drinking water at the hospital. "That's what's scary to me. In hospitals, they're not even testing the water," says Gilmore.

"People lose because they're the ones who get sick," says Louise Shilobod, logistics director for Cross Connection Control Management. "But the only one who loses monetarily is the insurance company, because the people go to a lawyer, and the lawyer sues the company, and the insurance company pays."

Three major insurance companies contacted for this article, Liberty Mutual, Lexington Insurance and Chubb were not familiar with the cross-connection and backflow issue.

All of them said that the people in their liability, property and workers' compensation departments had not heard of this problem or had any specific requests or complaints regarding backflow or cross-connection water problems within a building.

Coverage Excluded

A spokesperson for Chubb Insurance says water, land and air are not usually covered in a standard policy for a business. Thus, water flowing inside the pipes of a private company would not normally be checked because it is not part of the insurance coverage.

If the pipes are damaged, a policy will usually cover replacement or repair if there is a contamination problem, but that is only after the problem occurs.

Some companies, soda or juice manufacturers for example, will ask for insurance coverage of their water. In that case, loss control may look at the plumbing and whether cross-connection and backflow problems exist inside the plant.

"Insurance companies check for fire safety, stair rail regulations, protective glasses. How can they walk past the water system? They have a large risk and exposure, and they don't even see it," says Gilmore.

Backflow can percolate for years without anyone realizing it. Suddenly people start getting sick or dying, as happened at a Detroit Edison plant. Hydrazine, considered a carcinogen in humans, leaked into one of the Michigan plant's drinking water between 1984 and 1989, after employees connected a hose between the heating and water systems to cool a hot locker room.

At least four employees have died of colon cancer, according to the workers' union. The National Institute for Occupational Safety and Health is still working on a report and lawsuits are pending.

"Insurance companies may look at a backflow problem as an isolated situation, but they need to look at the big picture," says Gilmore. "That's just where the time bomb went off on cross-connection." L