

Ryan Massey, 7, shows his caps at his home in Prenter, West Virginia. Dentists say pollutants in drinking water have damaged residents' teeth. Nationwide, polluters have violated the Clean Water Act over 500,000 times.

Jennifer Hall-Massey knows not to drink the tap water in her home near Charleston, W.Va.

In fact, her entire family tries to avoid any contact with the water. Her youngest son has scabs on his arms, legs and chest where the bathwater - polluted with lead, nickel and other heavy metals - caused painful rashes. Many of his brother's teeth were capped to replace enamel that had been eaten away.

Neighbors apply special lotions after showering because their skin burns. Tests show that their tap water contains arsenic, barium, lead, manganese and other chemicals at concentrations federal regulators say could contribute to cancer and damage the kidneys and nervous system.

"How can we get digital cable and Internet in our homes, but not clean water?" said Hall-Massey, a senior accountant at one of the state's largest banks.

She and her husband, Charles, do not live in some remote corner of Appalachia. Charleston, the state capital, is less than 17 miles from her home.

"How is this still happening today?" she asked.

When Hall-Massey and 264 neighbors sued nine nearby coal companies, accusing them of putting dangerous waste into local water supplies, their lawyer did not have to look far for evidence. As required by state law, some of the companies had disclosed in reports to regulators that they were pumping into the ground illegal concentrations of chemicals - the same pollutants that flowed from residents' taps.

But state regulators never fined or punished those companies for breaking those pollution laws.

widespread violations

This pattern is not limited to West Virginia. Almost four decades ago, Congress passed the Clean Water Act to force polluters to disclose the toxins they dump into waterways and to give regulators the power to fine or jail offenders. States have passed pollution statutes of their own. But in recent years, violations of the Clean Water Act have risen steadily across the nation, an extensive review of water pollution records by The New York Times found.

In the last five years alone, chemical factories, manufacturing plants and other workplaces have violated water pollution laws more than half a million times. The violations range from failing to report emissions to dumping toxins at concentrations regulators say might contribute to cancer, birth defects and other illnesses.

However, the vast majority of those polluters have escaped punishment. State officials have repeatedly ignored obvious illegal dumping, and the Environmental Protection Agency, which can prosecute polluters when states fail to act, has often declined to intervene.

Because it is difficult to determine what causes diseases like cancer, it is impossible to know how many illnesses are the result of water pollution, or contaminants' role in the health problems of specific individuals.

But concerns over these toxins are great enough that Congress and the EPA regulate more than 100 pollutants through the Clean Water Act and strictly limit 91 chemicals or contaminants in tap water through the Safe Drinking Water Act.

Regulators themselves acknowledge lapses. The new EPA administrator, Lisa P. Jackson, said in an interview that despite many successes since the Clean Water Act was passed in 1972, today the nation's water does not meet public health goals, and enforcement of water pollution laws is unacceptably low. She added that strengthening water protections is among her top priorities. State regulators say they are doing their best with insufficient resources.

COMPREHENSIVE DATABASE

The Times obtained hundreds of thousands of water pollution records through Freedom of Information Act requests to every state and the EPA, and compiled a national database of water pollution violations that is more comprehensive than those maintained by states or the EPA. (For an interactive version, which can show violations in any community, visit www.nytimes.com/toxicwaters.)

In addition, The Times interviewed more than 250 state and federal regulators, water-system managers, environmental advocates and scientists.

That research shows that an estimated one in 10 Americans have been exposed to drinking water that contains dangerous chemicals or fails to meet a federal health benchmark in other ways.

Those exposures include carcinogens in the tap water of major American cities and unsafe chemicals in drinking-water wells. In general,

wells, which are not typically regulated by the Safe Drinking Water Act, are more likely to contain contaminants than municipal water systems.

Because most of today's water pollution has no scent or taste, many people who consume dangerous chemicals do not realize it, even after they become sick, researchers say.

But an estimated 19.5 million Americans fall ill each year from drinking water contaminated with parasites, bacteria or viruses, according to a study published last year in the scientific journal *Reviews of Environmental Contamination and Toxicology*.

In the nation's largest dairy states, like Wisconsin and California, farmers have sprayed liquefied animal feces onto fields, where it has seeped into wells, causing severe infections. Tap water in parts of the Farm Belt, including cities in Illinois, Kansas, Missouri and Indiana, has contained pesticides at concentrations that some scientists have linked to birth defects and fertility problems.

In parts of New York, Rhode Island, Ohio, California and other states where sewer systems cannot accommodate heavy rains, untreated human waste has flowed into rivers and washed onto beaches. Drinking water in parts of New Jersey, New York, Arizona and Massachusetts shows some of the highest concentrations of tetrachloroethylene, a dry cleaning solvent that has been linked to kidney damage and cancer.

The Times' research also shows that last year, 40 percent of the nation's community water systems violated the Safe Drinking Water Act at least once, according to an analysis of EPA data. Those violations ranged from failing to maintain proper paperwork to allowing carcinogens into tap water. More than 23 million people received drinking water from municipal systems that violated a health-based standard.

In some cases, people got sick right away. In other situations, pollutants like chemicals, inorganic toxins and heavy metals can accumulate in the body for years or decades before they cause problems. Some of the most frequently detected contaminants have been linked to cancer, birth defects and neurological disorders.

Records analyzed by The Times indicate that the Clean Water Act has been violated more than 506,000 times since 2004, by more than 23,000 companies and other facilities, according to reports submitted by polluters themselves. Companies sometimes test what they are dumping only once a quarter, so the actual number of days when they broke the law is often far higher. And some companies illegally avoid reporting their emissions.

on the rise

Environmental groups say the number of Clean Water Act violations has increased significantly in the last decade. Comprehensive data go back only five years but show that the number of facilities violating the Clean Water Act grew more than 16 percent from 2004 to 2007, the most recent year with complete data.

Polluters include small companies, like gas stations, dry cleaners, shopping malls and the Friendly Acres Mobile Home Park in Laporte, Ind., which acknowledged to regulators that it had dumped human waste into a nearby river for three years.

They also include large operations, like chemical factories, power plants, sewage treatment centers and one of the biggest zinc smelters, the Horsehead Corp. of Pennsylvania, which has dumped illegal concentrations of copper, lead, zinc, chlorine and selenium into the Ohio River. Those chemicals can contribute to mental retardation and cancer.

Some violations are relatively minor. But about 60 percent of the polluters were deemed in "significant noncompliance" - meaning their violations were the most serious kind, like dumping cancer-causing chemicals or failing to measure or report when they pollute.

Finally, the Times' research shows that fewer than 3 percent of Clean Water Act violations resulted in fines or other significant punishments by state officials.