

# Hurricane Katrina: a public health and environmental disaster

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Besides the devastation Hurricane Katrina has caused directly along the coast of Louisiana and Mississippi, the long-term environmental and health impact of the storm will be severe. Particularly in the city of New Orleans, the immediate destruction is compounded by the effects of pollution and disease.

Nearly 90 percent of New Orleans has been cleared of water, but the task of measuring the full extent of the damage has only begun. According to a report entitled “Environmental Health Needs and Habitability Assessment” released September 17 by the Centers for Disease Control (CDC) and the Environmental Protection Agency (EPA), approximately 90 percent of the tap water in New Orleans is not drinkable.

Numerous leaks have developed from broken water pipes and mains. The whole system and every house will need to be flushed out to remove contamination. Much of New Orleans’ water system was antiquated before the hurricane, so much of it will have to be replaced rather than repaired. This will likely take months to accomplish, according to the report.

The water that inundated New Orleans contains sewage, the bodies of humans and animals, oil, gasoline, and various industrial and toxic household chemicals. Wherever flooding occurred, a putrid smell remains behind.

The EPA’s initial tests of the floodwater revealed extremely high levels of dangerous *E. Coli* bacteria and *fecal coliform* bacteria, as well as high concentrations of the toxic metal lead. Later tests revealed the presence of hexavalent chromium, a chemical used in metal plating, as well as arsenic, used for wood treatment. The samples likely underestimate the danger, having been taken only in residential areas. In addition, many pollutants sink to the bottom, where they are more densely concentrated.

A September 15 article in the *Houston Chronicle* pointed out that more than 5,000 containers have been

collected from the water, “containing everything from gas to medical waste.” There were also at least six large oil spills, releasing an estimated 6 millions gallons of sludge, and over 300 smaller spills.

In the area hit by Katrina there were 466 facilities that handled one of 143 hazardous chemicals, as well as 31 hazardous waste “Superfund” sites. One such waste site in New Orleans itself was completely submerged by the flooding, posing the risk that the long-buried chemicals could be released.

In New Orleans, floodwaters left behind both large debris and a chemical and bacterial residue. The high levels of contamination in the dirt and mud may be harmful to returning evacuees’ health. Preliminary tests caused the EPA to recommend against all contact with sediment, due to the presence of *E. Coli* and fuels.

The flood and hurricane damage to homes has rendered them dangerous, due to structural damage as well as contamination. *The New York Times*, describing a neighborhood in New Orleans, wrote, “Left behind are battered walls, mud-caked rooms, warped wood floors and mold climbing toward the ceilings. The grounds, still swampy, smell like a fetid barnyard.”

Electrical systems may need rewiring, posing the potential of fires. Gas leaks have been reported, which can poison through inhalation or suddenly explode with a spark.

The CDC warned that buildings constructed before 1970 likely contained asbestos, and those built before 1978 likely contained lead-based paint. Asbestos dust when released into the air causes various types of cancer. Lead, a highly toxic metal, has a range of detrimental health effects, especially for children.

Mold not only threatens the physical structure of the homes, but also poses its own health risks. Mold can cause lung infections, skin irritations, and other health dangers, especially for those with asthma, allergies, or

suppressed immune systems.

According to the EPA/CDC report, 80 percent of dwellings will have sustained damage rendering them at risk. "If this proportion is correct," the report states, "about 100,000 structures may require assessment for viability."

The report estimates that "demolition and debris treatment, disposal, and containment could be ongoing for greater than 1 year." The estimate includes the likelihood that entire neighborhoods will be deemed uninhabitable and bulldozed.

A less reported, but perhaps more chronic problem, will be the environmental impact on the water bodies surrounding the city. Local officials dumped New Orleans' raw sewage into the Mississippi River untreated, while pumping the toxic floodwaters, also untreated, into Lake Pontchartrain.

Karl Linden, a Duke University professor of environmental engineering, has written of "long-term, harmful implications for the lake ecosystem and future human use." He notes that "Affected areas of Lake Pontchartrain will likely experience an extended period of low oxygen levels, elevated nutrients and high microbial loads, all leading to fish kills, algae blooms and the need to prevent human contact with the water."

Initially, medical experts worked to contain the spread of contagious diseases. They especially feared an outbreak of cholera or typhus. However, because these diseases are not endemic to the region, these fears were not realized. Some still that fear hepatitis may have spread through open-wound contact with the water, but the prevalence is not yet clear.

A bacterium called *Vibrio Vulnificus*, which is similar in effect to cholera although not contagious, killed at least five people. This agent, which is fatal in 20 percent or more of infections, can be spread from the water into open wounds or through the consumption of infected food or water.

Hundreds of people suffered some type of gastro-intestinal illness. The ideal breeding ground for such diseases could be found in the Superdome and Convention Center, where crowds of people were packed for days with no sanitation. Influenza and other respiratory illnesses will likely spread quickly in other shelters as autumn approaches.

Another major worry is West-Nile virus, a disease spread through mosquito bites. Last year, West Nile killed over 200 people in the United States. Experts now expect this number to rise dramatically, as the floodwaters

provide a wide nesting ground for the insects to lay their eggs.

Many evacuees lacked access to their regular medications. The region suffers a high incidence of chronic disease, including diabetes, hypertension, and cardiovascular illness. Caring for these conditions in the aftermath of the disaster created immense problems.

In a few hospitals, officials ordered a lockdown of pharmaceutical supplies. When evacuation plans failed, hospital staff could not access patients' medicines, forcing them to make life and death decisions while rationing out what little medication they had.

The CDC listed the top ten conditions affecting residents in evacuation centers. Out of every 1,000 residents, the number affected was as follows: hypertension or cardiovascular disease, 108.2; diabetes, 65.3; new psychiatric condition, 59.0; preexisting psychiatric condition, 50.0; rash, 27.6; asthma/chronic obstructive pulmonary disease, 27.5; flu-like illness or pneumonia, 26.3; toxic exposure 16.0; other infections, 15.6; diarrhea, 12.8.

There are also many often-ignored effects of stress caused by displacement. Professor Sandy Cairncross of the London School of Hygiene and Tropical Medicine told the British newspaper the *Guardian*, "After an incident like this people get run down, their immune systems are compromised, they get gastric and respiratory infections, and particularly old people can go into a terminal decline." He continued, "A large number of the elderly people who have been bussed out of New Orleans after this storm will die of pneumonia in the coming year, but that won't get counted in the official disaster statistics."

A 1998 paper in the *New England Journal of Medicine* revealed that flooding leads to a 14 percent increase in the suicide rate and hurricanes lead to a 19 percent increase. Such increases can be explained only within the context of a society that provides no safety net to its most vulnerable members. The health crisis will only be compounded by the poverty of evacuees and the lack of a universal health care system to treat their illnesses.

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