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Gut Infections Are Growing More Lethal

By **DENISE GRADY**

Gastrointestinal infections are killing more and more people in the United States and have become a particular threat to the elderly, according to new data released last week.

Deaths from the infections more than doubled from 1999 to 2007, to more than 17,000 a year from 7,000 a year, the [Centers for Disease Control and Prevention](#) reported. Of those who died, 83 percent were over age 65.

Two thirds of the deaths were caused by a bacterium, *Clostridium difficile*, which people often contract in hospitals and [nursing homes](#), particularly when they have been taking [antibiotics](#). The bacteria have grown increasingly virulent and resistant to treatment in recent years.

But researchers were surprised to discover that the second leading cause of death from this type of illness was the norovirus. It causes a highly contagious infection, sometimes called winter [vomiting](#) illness, that can spread rapidly on cruise ships and in prisons, dormitories and hospitals.

“I think there is perhaps a misperception that norovirus causes a mild illness,” said Aron Hall, an epidemiologist at the disease centers. “But this suggests a major problem that requires some attention.”

Both diseases are spread by the fecal-oral route, meaning that people swallow germs found in feces, often spread by people who did not wash their hands after using the toilet.

Problems with *C. difficile* are not new: Health officials first began warning in 2004 that a more virulent and drug-resistant strain had emerged. It produces high amounts of two potent toxins that can wreak havoc in cells lining the intestine.

But few people anticipated what gains the bacteria would make. Among hospitalized patients, cases rose to 336,000 in 2009 from 139,000 in 2000. Deaths from the infection seem to have leveled off in the past few years, but researchers say they are still far too high and should be

dropping, as other hospital-related infections are.

Estimates of cases occurring outside hospitals run as high as three million annually. Overall, C. difficile infections cost \$1 billion a year, according to the disease centers.

Two factors typically lead to the infection: taking antibiotics, which make the intestine vulnerable, followed by exposure to the bacteria or their spores in a hospital, clinic or nursing home that has not been properly disinfected. Spores can survive for weeks or maybe even months outside the body, and it takes [bleach](#) or other strong disinfectants to kill them.

Many people recover once they stop taking antibiotics, but some become severely ill and require treatment with different antibiotics to get rid of C. difficile. Even then, 20 percent relapse, and some suffer intestinal damage that can be fatal or can require surgery to remove part of the intestine.

In recent years, some people have received fecal transplants, in which stool from a healthy person is placed into the patient's intestine. The idea is to restore the normal balance of bacteria in the gut, which may include 25,000 to 30,000 different species. There is simply no better way to replace them. Awful as they may sound, the transplants can cure cases that were otherwise intractable.

"The microbes have been at this a lot longer than us," said Dr. L. Clifford McDonald, a medical epidemiologist at the disease centers. He added, "Our bodies have learned over eons how to keep harmful bacteria out."

Health officials expressed frustration at a news conference this month, stating that many cases are preventable or at least treatable, and yet death and infection rates have continued at "historically high and unacceptable levels."

Because nearly all C. difficile infections — 94 percent — come from hospitals or other health care settings, experts say doctors, nurses, other health workers and hospitals should take much of the responsibility for trying to fight them.

A quarter of the infections start in the hospital, and the rest occur in nursing home patients or people recently treated in doctors' offices or clinics. Patients often carry the germs from one institution to another.

Simple hygiene measures are highly effective, like cleaning surfaces with bleach and wearing

gowns and gloves when treating infected people to avoid spreading germs to other patients. One of the disturbing and more disgusting facts about *C. difficile* is that it is very hard to remove from bare hands: neither soap and water nor alcohol-based hand sanitizers work very well. For health workers, it is much better to wear gloves, to avoid contaminating their hands in the first place, Dr. McDonald said.

He also said that a recent study of hospitals in the United States that set up programs to fight *C. difficile* found that they were able to lower infection rates by 20 percent in two years. Similar efforts in Britain have cut infection rates by half.

It is also important to use antibiotics only when they are really needed, because people taking them have 7 to 10 times the usual risk of contracting *C. difficile* while using the drugs and for a month after, and triple the risk for the next two months, according to the disease centers.

For those with serious illnesses that require antibiotics, the risk is unavoidable. But half the antibiotics prescribed in the United States are unnecessary, experts say, so people are being put at risk for no reason.

But why have the bacteria become more virulent? A likely reason, Dr. McDonald said, is that virulence can sometimes be an asset when it comes to evolution. Nice germs finish last, but nasty ones that cause a lot of [diarrhea](#) will spread around more, infect more people and beat out the competition — a trait that evolution will tend to favor.

“The strain that is more successful is selected for,” he said.

The finding on norovirus came as a surprise, said Dr. Hall, the C.D.C. epidemiologist, whose report is the first to find that the virus has become the second leading cause of death from gastroenteritis.

The virus causes about 800 deaths a year in the United States, he said, but about 50 percent more in years when new strains emerge.

About 20 million people a year in the United States get sick from norovirus, most often in the winter. It can quickly sweep through a nursing home or dormitory. Just a small dose of the virus, a few particles, is enough to cause illness.

“Someone sick is shedding billions of viruses in every gram of stool,” Dr. Hall said. “One person can expose a lot of people rapidly.”

The incubation period is short, and the virus can persist on surfaces for days or even weeks. Cold and moisture help it last.

Older people are most likely to become severely ill and die from the virus, either from [dehydration](#) or [aspiration pneumonia](#), caused by inhaling vomit.

“The second highest death rate is in kids under 5,” Dr. Hall said.

When children die from the infection, the culprit is often dehydration, which can lead to shock and heart problems.

Dr. Hall said that he and his colleagues estimated that 27 children a year die from norovirus, similar to the number killed by another gastrointestinal infection, rotavirus, for which there is now a vaccine.

Researchers are trying to develop a norovirus vaccine, he said. But scientists say vaccines for intestinal infections are among the most difficult to create.