Ice in six out of ten restaurants has more bacteria than water from toilets.

Experts said the samples from McDonald’s, KFC, and Nando’s showed that contamination was likely to have been caused by ‘environmental issues’, such as a dirty ice machine.

The Burger King result suggested the cause was human contamination, likely to be from a staff member failing to wash their hands. The results have prompted some of the chains to review their cleaning procedures, although two companies disputed the findings.

Dr Melody Greenwood, a former laboratory director for the Health Protection Agency, said the results show restaurants need to ensure staff are properly trained to handle ice. ‘This is a warning,’ she said. ‘It is easy to forget ice can carry bacteria because they think it is too cold for germs, but that is far from the truth. Nasty bugs such as E.coli can lurk in ice machines. In some cases, such as Nando’s, we found double the amount of bacteria we would expect to find [in drinking water]. This is caused by things such as a failure to clean machines and scoops used by staff.’ The samples were tested for pathogens and their total bacteria counts at 22°C and 37°C. Higher counts at 37°C are often associated with contamination by human or animal contact, such as meat in the kitchen. Raised 22°C counts are usually due to environmental organisms and can indicate a failure to clean ice machines.

### How they compared

**NANDO’S**

- More bacteria in ice than toilets.
- Tests on ice water at 22°C: 2,100 organisms.
- Toilet water: 1,300 organisms.

**BURGER KING**


**MCDONALD’S**

- More bacteria in ice than toilets. Ice bacteria at 22°C: 1,400 organisms. Toilet water at 37°C: 260 organisms.

**KFC**

- More bacteria in ice than toilets. Tests on ice water at 22°C: 1,100 organisms. Toilet water: Less than 1.

**CAFE ROUGE**

- More bacteria in ice than toilets, but not above laboratory’s hygiene guidelines. Toilet water: Less than 1.

**STARBUCKS**

- More bacteria in ice than toilets but within laboratory hygiene guidelines.

**PIZZA HUT**

- Bacteria in ice at 22°C: 430 organisms. Toilet water exceeded drinking water standards.

**PIZZA EXPRESS**

- Bacteria in ice insignificant. Toilet water: 3,200 organisms at 22°C, highest in study.

**GOURMET BURGER KITCHEN**

- Bacteria in ice insignificant. Toilet water: Within bacteria count guidelines.

**WAGAMAMA**

- Ice bacteria at both temperatures less than 10 organisms. Toilet water at 37°C: 160 organisms.

*All per ML.*
Legionella bacteria found in hospital ice machines at UPMC Presbyterian

Legionella bacteria in ice machines at UPMC Presbyterian contributed to one patient’s death and sickened two others, hospital officials disclosed on Thursday, calling it an unusual episode uncovered because a patient aspirated ice chips.

The deadly bacteria in ice machines prompted a huge overhaul and sterilization of about 500 machines in UPMC’s 20 hospitals, including flagship Presby in Oakland. Machines that tested positive for Legionella were removed. Those remaining are being sterilized and fitted with filters, officials said.

Hospital workers discovered the problem when a patient tested positive for Legionnaires’ disease and workers tested the water system. They were stunned to find negative tests results for the bacteria, which thrive in warm water and can cause the severe form of pneumonia.

Medical records disclosed the patient had been restricted to eating ice chips and aspirated a chip, allowing bacteria into the lungs, officials said. “When we realized that clinical connection, we said, ‘Ahh, the ice machines!’ and we went and tested the ice machines, and we found Legionella,” Tami Minnier, UPMC’s chief quality officer, told the Tribune-Review. UPMC officials declined to identify the person who died or the other victims, saying only that the cases occurred in late 2013.

Testing revealed Legionella in less than 20 percent of ice machines at Presby, officials said. “We discovered that Legionella can grow in ice machines to a degree that we previously hadn’t thought of,” Minnier said. UPMC officials notified state and Allegheny County health departments and the federal Centers for Disease Control and Prevention. The CDC did not comment on the matter, though a spokesman confirmed the agency knew that Legionella can contaminate hospital ice machines. “I believe a revision of CDC guidelines is long overdue for this,” said Dr. Joseph S. Cervia, a Legionnaires’ expert and clinical professor of medicine at Hofstra North Shore-LIJ School of Medicine in Hempstead, N.Y. He said isolated cases of Legionnaires’ linked to hospital ice machines have happened for two decades but generate little scrutiny.

Cervia knows of no uniform standards to prevent Legionella in the machines. Only a fraction of hospitals nationwide use special ice machine filters to strain out the bacteria, he said. Others rely on building-wide treatment systems to safeguard water.

Cases of Legionnaires’ disease are not entirely rare in the nation’s hospitals, especially in units housing very ill and highly susceptible patients. An outbreak disclosed in November 2012 at the VA Pittsburgh Healthcare System killed at least six veterans and sickened at least 22 people. The CDC blamed that outbreak, from February 2011 to November 2012, on Legionella-tainted tap water at VA campuses in Oakland and O’Hara. Minnier said the problem at UPMC is not at all similar to what happened at the VA campuses, and she expressed confidence in UPMC’s water supply. “We know our water is in good shape. We’ve been ahead of that curve for a long time,” she said. The patient who died was hospitalized for some time, had multiple diseases and was described as “severely immunocompromised.” Minnier said officials notified the victim’s family about the ice machine problem.

In addition to the three hospital-acquired Legionnaires’ cases, four patients diagnosed with Legionnaires’ at Presby in 2013 picked up the infection outside the hospital, officials said. The task of sterilizing ice machines is complicated, because different manufacturers made them, said John Innocenti, president and CEO of Presby. He declined to release the company names but said they had been notified about the problem. The way we disinfect one machine might not work in another,” Innocenti said. He said UPMC engineers were stumped by Legionella in ice machines because the machines function with a cold water line. The bacteria grow best in warm water, according to the CDC. But Innocenti said UPMC’s inspection found a reservoir within the ice machines that holds water. “That alone would be fine, but in the ice machine, you have compressors that get warm, and in essence, they heat the water that’s in the ice machines, allowing Legionella colonies to form,” he said. Workers sampled all the machines, and microbiologists, infection control experts and engineers decided to install filters to prevent the bacteria from entering.

When positive samples surfaced despite the fix, that led to a second, ongoing remedy of sterilizing the machines, Innocenti said. “We found that if you sterilize the machine first, then put on the filter, the probability of minimizing any Legionella colony would be significantly improved,” he said.

Dr. Karen Hacker, director of the county health department, praised UPMC for disclosing the problem. “(An ice machine) is not something others may consider,” Hacker said. “Whenever you have an outbreak in an unusual scenario, you really want to get that information out so other institutions can learn from it. They went above and beyond to get at the source of the problem.” Hacker said health care facilities should ensure that ice machines are properly cleaned. Those machines differ from equipment that restaurants use, she said.

Healthy people exposed to Legionella don’t necessarily become ill, said Dr. Margaret Reidy, senior vice president of medical affairs at Presby. “The danger is when a patient takes some water into their lungs,” she said. Doctors warn that people with weak immune systems are at highest risk of infection when they breathe in Legionella-tainted water, which can happen when they cough up contaminated beverages or ice. Minnier said UPMC will share its findings with researchers and regulatory agencies to help other hospital systems prevent the bacteria from growing in ice machines. “We feel a very strong ethical, organizational and patient-driven responsibility to start to share this,” she said.

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