

## Beach Bacteria Warning: That Sand May Be Contaminated

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Building sand castles and playing beach volleyball may be grittier vacation pastimes than you think, according to a new report.

Sand at many U.S. beaches contains bacteria that indicate potentially unhealthy levels of fecal material, the report states. The Clean Beaches Council, a Washington, D.C.-based advocacy group, issued the report earlier this month.

The so-called indicator bacteria, including a benign form of *E. coli*, pose little health risk to humans. But such microbes serve as warning signs that harmful fecal microorganisms may also be present, according to Walter McLeod, president of the Clean Beaches Council.

"It's sort of like the canary-in-the-coal-mine situation," he said. "If the canary dies, it's not the canary we're concerned about, it's what the canary was exposed to."

Scientists have only recently become aware of indicator bacteria in beach sand, said Elizabeth Alm, a microbiologist at Central Michigan University at Mount Pleasant and author of one of the studies included in the report.

The consequences for human health are uncertain.

"We know [that in] water, if fecal indicators exceed specific levels, then the risk of intestinal illness in swimmers increases," Alm said. "The same kinds of studies have not been done for the sand. We don't know what levels are safe or dangerous."

She added that lots of people play in the sand, but few seem to get sick from it.

Nevertheless, McLeod said it's important "to err on the side of safety." He encourages people to wash themselves thoroughly after a day at the beach.

"We can't say conclusively one way or another that there is a risk," he said. "It would be wrong to say, Don't touch the sand, or, There's a high risk for playing in contaminated sand. But it's also wrong to say there's no risk."

### Sand Attraction

The tell-tale bacteria often occur at higher levels in the sand than in the water, according to the report. Studies also show that the microbes survive in sand longer than they do in water.

Alm speculated that contaminated sand may therefore be the source of bacteria that cause beach closings.

"Often a beach is closed because of high counts of fecal indicators in the water, but we often can't identify

a source for it—no sewage overflow or storms, just unexplained high levels of bacteria in the water," she said.

Research now suggests that these waters may become contaminated as they lap up on shores rich with sand bacteria.

But since the bacteria themselves are not harmful to humans, Alm added, many of these beach closings may be unnecessary.

"Another possibility that hasn't been explored yet is, if fecal indicators can persist in the sand, could other fecal microorganisms, ones that are disease-causing, persist also? We don't have any information on that yet," she said.

### **Beachgoers Beware**

According to McLeod, researchers are also uncertain about the sources of sand contamination, although humans are at least partly to blame. For example, he said, scientists have confirmed a link between fecal contamination from animals and human food waste.

"When people eat at the beach and leave food litter or leave food unattended, and you see a seagull or other birds eat the food, they tend to defecate right into the sand, and that contaminates the sand immediately," he said.

Alm noted that the sand is also full of naturally occurring microorganisms. Studies show these bacteria are efficient at exchanging genetic information with each other.

She is interested in finding out if this genetic exchange carries over to foreign bacteria. If so, this could potentially lead to antibiotic resistance among disease-causing bacteria.

"It gets kind of tricky when you start thinking about all the possibilities," she said.

McLeod said the report is meant to raise awareness of beachgoers, prompting them to "leave no trace" when visiting the beach and to wash after playing in the sand.

"People generally tend to go to the beach to flop out and have a good time," he said. "We want them to do that, but we want them to be aware and be smart. We think smart, educated beachgoers will be healthy beachgoers."

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