Honolulu

Flesh-Eating Bacteria In The Ala Wai Canal May Triple Due To Climate Change

UH researchers said infections are rare, but officials and residents should start now trying to mitigate contamination in the canal to keep it that way.

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By Joel Lau / April 4, 2022

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Populations of flesh-eating bacteria in the Ala Wai Canal could triple by the end of the century, University of Hawaii researchers predict, as rising temperatures and urban runoff create an ideal environment for the pathogen to flourish.

While infections of the Vibrio vulnificus bacteria are uncommon, with only around 100 cases reported in the U.S. every year, 8 in 10 victims end up in the hospital. It kills 30% of people it infects – a figure that rises to over 50% if the pathogen poisons the bloodstream.

“It’s not something we should be super worried about, infection is pretty rare,” said lead researcher Jessica Bullington. “But it does have a really high fatality rate, and if we’re looking at an increase in the pathogen, we need to do something to mitigate that now before higher infections become a reality.”

Cory Lum/Civil Beat/2018

Levels of flesh-eating bacteria in the Ala Wai Canal may triple due to rising temperatures, University of Hawaii researchers say.

The Ala Wai Canal forms the perfect set of conditions for V. vulnificus to thrive, Bullington said, with year-round warm temperatures, brackish water as the urban watershed meets the ocean and abundant organic material for the bacteria to snack on.

Bullington's team of researchers sought to develop a reliable model to predict levels of the flesh-eating bacteria in the Honolulu waterway based on only a few, readily available metrics: average rainfall, water temperature, air temperature and dissolved inorganic and organic nutrients, the last of which is continuously monitored by a set of oceanographic sensors at the mouth of the canal.

Their study, announced Monday, found that changes in rainfall and temperature dictated the prevalence of V. vulnificus in the Ala Wai Canal. When the team plugged in data from long-term climate change models, they found no significant difference in expected rainfall in the year 2100.

Average temperatures, however, were expected to rise 2 to 4 degrees Celsius (3.6 to 7.2 degrees Fahrenheit) by the turn of the century, correlating to a two-to-three-fold increase of V. vulnificus populations inhabiting the Ala Wai, according to the model.

“It’s easier to see more of the physical impacts of climate change, like coastal erosion and sea level rise,” Bullington said. “But people are just starting to do this research and think about the indirect effects of climate change in coastal pathogens.”

And not just V. vulnificus; Bullington also expects to see other bacteria flourish as temperatures rise and the Ala Wai Canal continues to suck up toxic, urban runoff.

“There are things like heavy metals that accumulate in the sediment … the canal is a slow water body, so a lot of things are depositing there,” she said. “And then it’s just sitting in the sun, so it’s warm. I think of it as like an incubator for bacteria.”

Bacterial blooms are not limited to the waterway – periods of rainfall regularly push clouds of microorganisms out of the canal into Ala Wai Boat Harbor and surrounding beaches, making it no coincidence that Hawaii is home to the highest rate of non-cholera Vibrio infections in the nation, according to the CDC.

And while rare, infections of the pathogen can be gruesome. V. vulnificus is a necrotizing bacteria, meaning that it can invade the body through

open wounds, rotting away the surrounding flesh.

In one high-profile case, 34-year-old Oliver Johnson was either pushed or fell into the Ala Wai Boat Harbor in April 2006, his body cut up after emerging from an early morning bar fight.

Just a few days later, Johnson was fighting for his life, his body swollen beyond recognition, blisters covering his skin, ending just above his left knee, where doctors had amputated his leg. He would die, a victim of an unrelenting V. vulnificus infection.

It was Johnson's case that gave new life to calls to clean up the Ala Wai and first prompted Hawaii researchers to study the levels of V. vulnificus in the waterway. Bullington hopes rising levels of the flesh-eating bacteria can help push policymakers and the public to pay attention to their canal once more.

"I don't know that we can (prevent) the global warming aspect of climate change altogether, so I think we have to operate with the assumption that the temperature is going to rise," she said.

There are several ways locals and officials can work to mitigate contamination in the Ala Wai, Bullington said, such as managing polluted run-off and planting oyster beds and special plants to help filter muck from the water. One interesting example of public involvement is the "Genki Ball" project, in which residents throw spheres of beneficial bacteria into the waterway to help digest canal sludge.

"I don't think it's been fully tested ... but I think it's cool that people are coming up with these really interesting and novel ideas on how to mitigate high levels of harmful bacteria in waterways," she said.

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