Greetings,

Brazil’s battling bugs.

Scorpions are swarming Sao Paulo.

Scorpions are found throughout Brazil. They’re endemic. Now, they’re finding the urban and densely populated Sao Paulo the perfect home. Brazil’s cities provide an excellent habitat for scorpions. They offer shelter in sewage networks, plenty of water and food in the garbage that goes uncollected, and no natural predators. Warming climate and deforestation have made the city appealing and their natural predators (owls, lizards, squirrel, racoon, skunk, and even frogs) just aren’t found in the city of nearly 20 million people.

The scorpion is making itself at home and making itself known. The number of people stung by scorpions across Brazil has risen from 12,000 in 2000 to 156,000 last year. The stings can cause seizures, vomiting, and excruciating pain. Treatment may require antitoxin, and children are especially vulnerable. In Brazil, scorpions are credited with causing the highest incidence of human envenomation when compared to those caused by all other venomous animals, including snakes and spiders, combined. Fatality rates are 1-2% for children and elderly.

{*Tityus serrulatus*, the deadly yellow scorpion}

Not only are they benefiting from a lack of predators and a feast of cockroaches, they have another advantage. These scorpions are parthenogenetic, females can clone themselves asexually. Twice a year each female can brood a couple dozen offspring without help.

Brazil's urban scorpion infestation is the result of poor garbage management, inadequate sanitation, rapid urbanization and a changing climate. It’s too late to stop the scorpion incursion in Brazilian cities.
What does this have to do with the price of a petri plate in Panguitch? Plenty when compared to an emerging pathogen.

*C. difficile* bacteria are found throughout the environment — in soil, air, water, human and animal feces, and food products. Spores from *C. difficile* bacteria are passed in feces and spread to food, surfaces and objects when people who are infected don't wash their hands thoroughly. These spores can persist in a room for weeks or months.

![Image of C. difficile bacteria](image)

Many healthy people naturally carry the bacteria in their large intestines and don't have ill effects from the infection. Illness from *C. difficile* tends to affect older adults in hospitals or in long-term care facilities and typically occurs after use of antibiotic medications. However, studies show increasing rates of *C. difficile* infection among people traditionally not considered to be at high risk, such as young and healthy individuals who haven't used antibiotics and who haven't been in a health care facility.

An aggressive strain of *C. difficile* has emerged that produces far more toxins than other strains do. The new strain may be more resistant to antibiotics and has shown up in people who haven't been in the hospital or taken antibiotics. This strain of *C. difficile* has caused several outbreaks of illness since 2000.

Once established, *C. difficile* can produce toxins that attack the lining of the intestine. The toxins destroy cells, produce patches (plaques) of inflammatory cells and decaying cellular debris inside the colon, and cause watery diarrhea.

*C. diff* is a major health threat. In 2017, there were an estimated 223,900 cases in hospitalized patients and 12,800 deaths in the United States. In hospitals, and certainly labs, antibiotic resistance is a concern and *C. diff* is an “urgent threat”, according to the CDC.
So, here are two ubiquitous, toxic, bugs that have found a wonderful place to settle in with plenty of food and no predators. In two short decades, these bugs have found niche environments where they not only survive but thrive. Certain groups are more susceptible, but the problem is spreading to whole populations. They reproduce easily and asexually, taking over the neighborhood with little we can do to prevent or stop the invasion. The yellow scorpion swarming Sao Paulo is a metaphor for the toxic *C. difficile* swarming our gut biomes.

Antibiotic resistance is becoming a bigger and bigger part of our laboratory profile. Your Utah Public Health Laboratory has been selected as a regional component of the Antibiotic Resistance Laboratory Network (ARLN), and we’re scaling up our efforts to help guide patient treatment, detect emerging threats, and prevent the spread of antibiotic resistance, like *C. diff* and others.

{The ARLN includes labs in 50 states, four cities, and Puerto Rico, including seven regional labs}

Have a great week and be safe,

Bryan