

Winter brings flu, summer brings bacterial infections

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In the same way that winter is commonly known to be the "flu season," a new study suggests that the dog days of summer may well be the "bacterial infection" season.

Researchers have discovered that serious infections caused by gram-negative bacteria can go up as much as 17 percent with every 10 degree increase in seasonal temperature. The findings, which were based on seven years of data from infections in a Baltimore hospital, suggest that the incidence there of some of these illnesses might be up to 46 percent higher in summer than in winter.

The cause is not known, scientists said, but the seasonal variation is clear.

"Gram-negative bacteria are a frequent cause of urinary tract, gastrointestinal and respiratory infections, as well as more serious things like pneumonia, wound or blood infections," said Jessina McGregor, an assistant professor in the College of Pharmacy at Oregon State University. "Everyone knows there is a seasonality to some viral infections such as influenza or the common cold, but we're now finding that some of these bacterial infections peak in the heat of summer."

Recognition of these seasonal trends, the researchers said, may improve disease diagnosis, prompt treatments and better interventions to prevent the infections in the first place.

The findings were made by scientists from OSU; Dr. Eli N. Perencevich,

associate professor of epidemiology and preventive medicine at the University of Maryland School of Medicine; and researchers from the University of Florida and the Research Institute of the Hospital for Sick Children in Toronto. They were just published in *Infection Control and Hospital Epidemiology*, a professional journal.

The study examined infections caused by several gram-negative bacteria, including *E. coli*, *Pseudomonas aeruginosa*, *E. cloacae*, and *Acinetobacter baumannii*. The greatest increases in infection due to higher temperatures were found with *P. aeruginosa*, a common cause of burn, external ear, urinary tract and lung infections; and *A. baumannii*, an opportunistic pathogen that can cause death and serious illnesses, particularly in people with compromised immune systems.

The study also found that there was no apparent seasonal increase in gram-positive bacterial infections, which have a slightly different cell structure and are the source of fewer pathogenic infections in humans.

"Bacterial infections in general have been rising for some time, probably due at least in part to increased antibiotic resistance," McGregor said. "The more we can learn about what is causing them and when they are most likely to occur, the better we can treat or prevent them."

There are several possible causes for the summertime increase in gram-negative bacterial infections, the researchers said, but none are proven. *P. aeruginosa* is an aquatic organism, and infections caused by it could be linked to more people swimming in lakes or pools during the summer. Cattle have higher bacterial shedding rates in the summer, and the peak of *E. coli* infections could be connected to higher consumption of ground beef or other factors during the "outdoor grill" season.

Several of these gram-negative bacteria cause urinary tract infections, and a known risk factor for that is recent sexual intercourse – the

frequency of which also peaks in the summer, when there is more sunlight.

"Regardless of the mechanisms responsible for infections, recognition of the link between the physical environment and the incidences of pathogenic infection could aid in infection prevention interventions or the selection of optimal empirical antimicrobial therapy," the researchers wrote in their report.

The link between this type of bacterial infections and heat, the study suggested, should also be considered along with the many other possible impacts of global climate change.

Source: Oregon State University

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