Researchers Assess How One Hospital's VRE Affects Neighboring Hospitals

A moderate increase in vancomycin-resistant *enterococci* (VRE) at one hospital can lead to a nearly 3 percent increase in VRE in every other hospital in that county, according to a study in the August issue of the *American Journal of Infection Control*, the official publication of the Association for Professionals in Infection Control and Epidemiology (APIC).

VRE is one of the most common bacteria that cause infections in healthcare facilities.

Researchers from the Johns Hopkins Bloomberg School of Public Health, Pittsburgh Supercomputing Center (PSC), University of Pittsburgh, and University of California, Irvine created the Regional Healthcare Ecosystem Analyst (RHEA), a mathematical and computational model, to track the movement between hospitals of VRE-colonized patients (patients carrying the organism but not yet infected) over the course of a year in Orange County, Calif. Using this model, they were able to assess how increases or decreases in one hospital's VRE affected neighboring hospitals.

Not only did the investigators find that a moderate increase in VRE at any one hospital caused an average 2.8 percent increase throughout the county (range: 0 percent to 61 percent), they also discovered that hospitals in the most populated area of the county had an even greater likelihood of spreading VRE throughout the network. Additional modeling identified a potential for "free-riders"—hospitals that will experience decreases in VRE incidence due to other hospitals' infection control efforts without initiating any infection prevention measures of their own.

The study points to the underutilization of patient-sharing data between regional hospitals, the importance of inter-hospital communication and collaboration in decreasing VRE rates, and the scope of variables that must be considered in analyzing the outcome of any one infection prevention initiative.

"Our study demonstrates how extensive patient sharing among different hospitals in a single region substantially influences VRE burden in those hospitals," states Bruce Y. Lee, MD, MBA, lead author and Associate Professor of International Health and Director of Operations Research, International Vaccine Access Center, at the Johns Hopkins Bloomberg School of Public Health. "Lowering barriers to cooperation and collaboration among hospitals, for example, developing regional control programs, coordinating VRE control campaigns, and performing regional research studies, could favorably influence regional VRE prevalence."

Vancomycin-resistant *enterococci* are resistant to vancomycin, the drug often used to treat serious infections for which other medicines may not work. VRE can live in the human intestines and female genital tract without causing disease. However,

sometimes they can cause infections of the urinary tract, the bloodstream, or of wounds associated with catheters or surgical procedures. There are an estimated 20-85,000 cases of VRE each year in U.S. hospitals.

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