Hospitals That Cooperate On Infection Control Fare Better

An individual hospital's infection control efforts have a ripple effect on the prevalence of a deadly and highly infectious bacterium in hospitals throughout its surrounding region, a multi-center research group led by the University of Pittsburgh demonstrated in a computer simulation-based study.

Methicillin-resistant *Staphylococcus aureus*, or MRSA, infections are better prevented when hospitals cooperate and coordinate their infection control procedures. Hospitals working alone do not achieve the same level of infection control, according to the results of the study published in the October issue of the journal *Health Affairs*.

"Unless they are associated financially or legally, hospitals often have their own separate infection control programs and procedures," said Bruce Lee, M.D., M.B.A., director of Pitt's Public Health and Infectious Diseases Computational and Operations Research (PHICOR) group. "However, hospitals are rarely isolated islands and instead share patients extensively with other hospitals in their area, which can facilitate the spread of MRSA infections."

Lee and his colleagues obtained real-world data from all 29 hospitals in Orange County, Calif., and developed a computer simulation to assess a procedure called "contact isolation" to limit MRSA transmission. The procedure involves testing all patients for MRSA upon admission to a hospital. When a patient tests positive, hospital staff must wear gloves and gowns whenever entering that patient's room or interacting with that person.

The simulation explored scenarios in which different combinations of hospitals implemented contact isolation to varying degrees.

"The more that hospitals work together and coordinate infection control efforts, the more they all benefit," said Dr. Lee, also an associate professor of medicine, epidemiology and biomedical informatics at Pitt's School of Medicine and Graduate School of Public Health. "For example, doubling the number of hospitals that adopt contact isolation can more than double their improvement in infection control."

The simulation also found that requiring contact isolation at one hospital not only decreased MRSA at that hospital as expected, but also did so in other nearby hospitals that had not implemented the intervention.

When the simulation was run with all the hospitals in Orange County implementing contact isolation simultaneously with a 75 percent compliance rate, MRSA

prevalence decreased an additional 3.85 percent over what the hospitals could have achieved on their own. Long-term acute care facilities fared even better, with a 12.13 percent additional decrease.

The simulation relies extensively on data regarding infection rates, annual admissions, average patient length-of-stay, hospital transfers, readmissions, number of intensive care units and bed capacity at the Orange County hospitals.

MRSA is widely prevalent in U.S. hospitals. In 2006, the MRSA colonization rate, or detection of the bacteria on a patient's skin or soft tissue, was 12 per 1,000 inpatients. In 2010, the rate nearly quadrupled to 41 per 1,000 inpatients despite an overall decrease in the rates of MRSA infection.

The researchers had shown previously that hospitals in Orange County, which has a population of 3 million, are highly interconnected through patient transfers and readmission of patients to different hospitals after an intervening stay at home or elsewhere.

Some hospitals have started cooperating to control hospital-acquired infections. In California, the Safety Net Initiative is building a learning collaborative among California public hospitals to reduce such infections. The Pittsburgh Regional Health Initiative has successfully created a culture of change to improve overall patient safety. Similar programs in Iowa, Michigan, Nebraska, New York, South Dakota and Wisconsin also have successfully reduced hospital-acquired infections.

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