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Coordinated effort by health care facilities can prevent many hospital-acquired infections

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By coordinating with state health departments and communicating with each other about patients with *C. difficile* and antibiotic-resistant infections, hospitals, long-term acute-care facilities and nursing homes could reduce the number of such hospital-acquired infections (HAIs) by an estimated 619,000 cases in the next five years, a new Centers for Disease Control 9 (CDC)-led report has found.

As highlighted in the CDC's monthly Vital Signs monthly report, published on Tuesday, Aug. 4, 2015, mathematical modeling was used to project the number of infections due to carbapenem-resistant Enterobacteriaceae (CRE) when hospital and skilled nursing facilities act independently to enhance infection controls and when they work together in a coordinated response in mathematical models of a generic 10-facility health care network and a 102-facility network in Orange County, Calif. Compared with the independent approach, the coordinated 10-facility model showed CRE infections could be reduced by 74 percent over five years. The 102-facility network model showed CREs could be reduced by 55 percent compared to the independent approach.

"Antibiotic-resistant infections in health care settings are a growing threat in the U.S., killing tens of thousands of people each year," says CDC Director Tom Frieden, M.D., MPH. "New CDC modeling shows that we can dramatically reduce these infections if health care facilities,

nursing homes and public health departments work together to improve antibiotic use and infection control so patients are protected."

Two-Part Approach

The report recommends a coordinated, two-part approach to turn this data into action that prevents illness and saves lives:

1. Public health departments track and alert health care facilities to drug-resistant germs outbreaks in their area and the threat of germs from other facilities

2. Health care facilities work together and with public health authorities to implement shared infection control actions to stop the spread of antibiotic-resistant germs and *C. difficile* between facilities

C. difficile is a bacterium that grows in the gut. In individuals exposed to antibiotics, it can cause an illness that ranges from mild to life threatening, with symptoms that include diarrhea, abdominal pain, fever and blood or pus in stool. The most dangerous antibiotic resistant bacteria acquired in hospitals include CRE, MRSA (methicillin-resistant *Staphylococcus aureus*), and resistant *Pseudomonas aeruginosa*. These bacteria can cause sepsis, pneumonia, and other types of life-threatening infections.

C. diff and antibiotic-resistant bacteria are spread from patient to patient within hospitals or nursing homes and when patients are transferred from one health care facility to another. For this study, the CDC used a mathematical model developed by physicians and researchers from the University of Utah School of Medicine and the Veterans Affairs Salt Lake City Health Care System.

The researchers developed a model that shows how coordination among

facilities could reduce CRE infections over the course of five years after the drug-resistant bacteria enters a network of 10 generic health care facilities. The model projected the spread of CRE infections based on different intervention scenarios run thousands of times, according to Matthew H. Samore, M.D., University of Utah professor and chief of the Division of Epidemiology, director of the Center of Innovation (IDEAS Center) at the VA Salt Lake City Health Care System and a senior co-author on the study.

"This modeling shows the advantages of a coordinated strategy to prevent the spread of antibiotic-resistant infections," Samore says. "The actual effectiveness of any intervention is going to depend on a number of factors. But the modeling shows that communication and sharing of information among facilities is much more effective than the standard approach of hospitals and nursing facilities acting independently to stop spread of resistant bacteria."

The 10-facility model showed that the coordinated strategy resulted in an estimated 400 CRE acquisitions over five years. This compares with 2,100 CRE acquisitions under the current approach to reducing those infections, and 1,600 cases of CRE when health care facilities acted independently to enhance infection control.

Forward-Looking

Beth Bell, M.D., MPH, director of the CDC's National Center for Emerging and Zoonotic Infectious Diseases, says this Vital Signs report is forward-looking in its coordinated response. "We must transform our public health to turn the tide," she says. "The President's FY 2016 budget would accelerate efforts to strengthen our response and improve antibiotic stewardship in health care facilities."

University of Utah epidemiologists are working with the Utah

Department of Health to control the spread of HAIs and CREs. Jeanmarie Mayer, M.D., U associate professor of internal medicine and chief epidemiologist for University of Utah Health Care Hospital and Clinics, serves as chair of the Utah Healthcare Infection Prevention Governance Committee, which works with the state health department on a number of avenues regarding HAIs and CREs. These include recommending ways to improve communications between health care facilities regarding patients with CREs and surveillance of the infections.

Utah State Epidemiologist Allyn Nakashima, M.D., says documented cases of CREs must be reported to the Utah Department of Health, and this year the state will begin collecting data from medical laboratories regarding CREs. In a pilot program, the state developed a patient transfer form facilities can use to alert each other regarding patients with CREs. The pilot study found that when individual health care facilities take time to use it, the form is effective.

Provided by University of Utah Health Sciences

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