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Study examines incidence of serious, highly drug-resistant group of bacteria

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The overall incidence in 2012-2013 was relatively low of a serious, highly drug-resistant group of bacteria (Carbapenem-resistant *Enterobacteriaceae* [CRE]) that are an important cause for health-care associated infections, according to a study published online by *JAMA*. Most CRE cases were associated with prior hospitalizations and discharge to long-term care settings.

Carbapenem-resistant *Enterobacteriaceae* are a worldwide clinical and public health problem. These multidrug-resistant organisms cause infections associated with high mortality and limited treatment options. Assessment of the U.S. epidemiology of CRE is needed to inform national prevention efforts, according to background information in the article.

Alexander J. Kallen, M.D., M.P.H., of the U.S. Centers for Disease Control and Prevention, Atlanta, and colleagues conducted a population- and laboratory-based active surveillance of CRE in 2012-2013 among individuals living in 1 of 7 U.S. metropolitan areas in Colorado, Georgia, Maryland, Minnesota, New Mexico, New York, and Oregon. Cases of CRE were defined as carbapenem-nonsusceptible (excluding ertapenem) and extended-spectrum cephalosporin-resistant Escherichia coli, Enterobacter aerogenes, Enterobocter cloacae complex, Klebsiella pneumoniae, or Klebsiella oxytoca that were recovered from sterile-site or urine cultures during 2012-2013.

Among 599 CRE cases in 481 individuals, 520 (87 percent) were

isolated from urine and 68 (11 percent) from blood. The median age was 66 years. The overall annual CRE incidence rate per 100,000 population was 2.93. The authors note that this estimate is substantially lower than the incidence of infections due to other pathogens traditionally associated with health care exposures, including methicillin-resistant Staphylococcus aureus (25.1 per 100,000 population), invasive candidiasis (13.3-26.2 per 100,000), and Clostridium difficile (147.2 per 100,000).

Most cases occurred in individuals with prior hospitalizations (75 percent) or indwelling devices (73 percent; such as urinary catheter, central venous catheter); 56 percent of admitted cases resulted in a discharge to a long-term care setting. Death occurred in 51 cases (9 percent), including in 27.5 percent of cases with CRE isolated from normally sterile sites.

The CRE standardized incidence ratio was significantly higher than predicted for the sites in Georgia (1.65), Maryland (1.44), and New York (1.42), and significantly lower than predicted for the sites in Colorado (0.53), New Mexico (0.41), and Oregon (0.28).

"The fact that heterogeneity exists (with respect to the incidence and the types of CRE found in these different surveillance areas) further highlights the need to understand the local epidemiology to tailor prevention efforts in individual regions of the United States. The frequency with which individuals with CRE are transferred between facilities emphasizes the need for regional control efforts in all the facilities," the authors write.

"In summary, the results of this investigation further inform local efforts to prevent CRE transmission. The low CRE incidence in the catchment areas, compared with other more established resistant organisms, highlights that CRE are emerging and suggests that control interventions

implemented now could have a substantial effect."

"The study by Guh et al represents an important step forward for CRE control in the United States," writes Mary K. Hayden, M.D., of Rush University Medical Center, Chicago.

"Expansion of surveillance to more geographic regions, including rural settings and metropolitan areas known to have high prevalence of CRE, would provide a more complete picture of the U.S. burden. Molecular characterization of isolates would also inform prevention efforts. Whether the resources needed for this work will be made available is unclear."

"In the meantime, physicians, infection control practitioners, and public health workers will continue to rely on the Multi-site Gram-negative Surveillance Initiative [used for this study] and other surveillance networks to measure the extent of CRE and estimate the effects of prevention efforts."

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