

Carbapenem-Resistant *Enterobacteriaceae* (CRE) Surveillance in Michigan

Carbapenem-Resistant *Enterobacteriaceae* (CRE) are a group of gram-negative bacteria, commonly found in the gut. CRE are primarily responsible for urinary tract infections, bacteremia (bacteria in the blood), pneumonia (lung infection), and meningitis (infections of the brain/spinal cord). *Enterobacteriaceae* are a family of more than 70 bacteria including *Klebsiella pneumoniae* and *Escherichia coli* (*E. coli*). Over time, some of these bacteria have become resistant to a group of antibiotics known as carbapenems, often referred to as last-resort antibiotics. Examples of carbapenems include: Ertapenem, Doripenem, Imipenem, and Meropenem. CRE kill up to half of patients who get bloodstream infections from them.

Although CRE bacteria are not yet common nationally, the percentage of *Enterobacteriaceae* that are CRE increased by fourfold in the past decade. One type of CRE, a resistant form of *Klebsiella pneumoniae*, has shown a sevenfold increase in that same time frame. During just the first half of 2012, almost 200 healthcare facilities, 4% of hospitals and 18% of long-term acute care facilities nationwide, treated at least one patient infected with CRE. In the U.S., northeastern states report the most cases of CRE.

Because patients can carry CRE from one healthcare setting to another, facilities are encouraged to work together regionally to implement CRE prevention programs.

Michigan CRE Surveillance and Prevention Initiative

Healthcare-associated infections (HAIs), e.g., CRE, are not mandated to be reported in the state of Michigan. However, per the Michigan Communicable Disease Rules (R 325.171-3, 333.5111) an initial case of CRE in a facility or laboratory is reportable as an 'unusual occurrence' and all outbreaks or epidemics are reportable, but subsequent individual cases are not reportable. As such, the true burden of CRE in Michigan was unknown until 2013. Recognizing the need for action, the Michigan Department of Health and Human Services (MDHHS) Surveillance for Healthcare-Associated and Resistant Pathogens (SHARP) Unit began a CRE Surveillance and Prevention Initiative in September 2012. Twenty facilities (17 acute care and 4 long-term acute care facilities (LTACs)) enrolled into the initiative in 2012 and 9 facilities (7 acute care and 2 LTACs) joined them in 2014. These 30 facilities are distributed across the state with the greatest concentration is in SE and West Michigan. Facilities voluntarily report cases of CRE (per MDHHS surveillance definition). The overall goal of the initiative is to build a regional, public health model to reduce the spread of CRE in Michigan. Our model has proven to be successful. In the first 2 years, Michigan was able to decrease CRE incidence from 0.93 cases per 10,000 patient-days to 0.70 cases per 10,000 patient-days. This is a statistically significant decrease. Michigan facilities were able to prevent 86 infections of CRE. Twenty-six of those infections were prevented at LTACs.

The CRE Surveillance and Prevention Initiative continues to collect and report data as well as implement prevention measures in participating facilities. MDHHS SHARP will be recruiting additional facilities in fall 2015.



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