

## Carbapenem-Nonsusceptible *Acinetobacter baumannii*

[Announcer] This program is presented by the Centers for Disease Control and Prevention.

[Sarah Gregory] Today I'm talking with Sandra Bulens, a CDC epidemiologist. We'll be talking about carbapenem-resistant bacteria. Welcome, Sandra.

[Sandra Bulens] Thank you for having me, Sarah. It's a pleasure to be here.

[Sarah Gregory] What does it mean to be infected with a carbapenem-resistant bacteria?

[Sandra Bulens] So, carbapenems are broad-spectrum antibiotics that are often used to treat infections caused by some of the most resistant bacteria. When a bacteria becomes resistant to a carbapenem class of antibiotics, treatment options become more limited and, usually, clinicians are forced to rely on older antibiotics that are often less effective or are associated with substantial toxicities.

[Sarah Gregory] There are various types of carbapenem-resistant bacteria that cause infections. Tell us about the bacteria your study investigates.

[Sandra Bulens] *Acinetobacter baumannii*, or *A baumannii*, is one of the types of bacteria for which resistance has become a problem. *Acinetobacter* at baseline often possesses a large amount of intrinsic resistance, so carbapenem antibiotics are often required for treatment. If these bacteria are resistant to carbapenems, treating the infection becomes much more complicated. Carbapenem-resistant *Acinetobacter baumannii*, or CRAB, primarily causes infections in people who have frequent exposure to health care—so, for example, people who frequently go to the hospital, or people who live in nursing homes, or people who are undergoing regular dialysis treatments. Infections that are a result of healthcare exposure are called healthcare-associated infections. Most commonly, this resistant bacteria causes pneumonia, infections in your blood, or urinary tract infections. Some people can also carry this bacteria on their body without the bacteria causing any symptoms, and this is called “colonization” and it's important for two reasons. First, people who are colonized with this resistant bacteria are at higher risk for getting a true infection themselves, and second, they can serve as a source of transmission of CRAB to other people.

[Sarah Gregory] And where are most of these infections occurring?

[Sandra Bulens] So, most people acquire an infection with CRAB as a result of exposure to healthcare. We found that 99 percent of our patients had some sort of healthcare exposure in the year before developing their infection. The most common type of healthcare exposure was inpatient hospitalization, and this was found in 78 percent of the people in our evaluation. Other common healthcare exposures included the presence of an in-dwelling device, such as a catheter, and an overnight stay in a long-term care facility, such as a nursing home. In addition, almost all of the people in the evaluation from which this resistant bacteria was isolated, they had underlying conditions, the most common being neurological problems and decubitus ulcers, or pressure ulcers. Healthcare exposure could not be identified in only one percent of people, and this suggests that transmission of this resistant bacteria is generally not occurring among otherwise healthy people in the community.

[Sarah Gregory] Tell us about your project—what were you looking for, and how you structured it, and what you found.

[Sandra Bulens] So, we conducted an active laboratory- and population-based surveillance evaluation through the CDC's Emerging Infection Programs' Multi-site Gram-negative Surveillance Initiative, or what I like to call "MuGSI." MuGSI is a collaboration between CDC and, in this case, eight state health departments and their academic partners. During the time period of this analysis, our surveillance was conducted in a defined population in the states of Colorado, Georgia, Maryland, Minnesota, New Mexico, New York, Oregon, and Tennessee. Active surveillance means that our local partners are working with laboratories that served their defined population to make sure that each case of CRAB is reported by the laboratories, and investigated by conducting a medical record review. We defined a "case" for our surveillance as a patient that had CRAB isolated from a normally sterile site, such as blood or urine, and who lives in our defined population, or catchment, area. The goal was to describe the epidemiology of CRAB and to estimate the crude population-based incidence during the first four years of surveillance.

So, what did we find? The overall case rate was low, about 1.2 cases per 100,000 people. And what this means is that, in our population, every 100,000 people, only about one person will get this infection, which is pretty good news. Also, if you compare it to another healthcare-associated infection that we're doing surveillance for in the same catchment area, it was much lower, which is also good news. We found that the rates of disease vary greatly across the eight participating sites; the highest rates were found in Maryland and the lowest were found in Oregon. The overall death rate was 18 percent and the, it was as high as 41 percent among people who had this resistant bacteria isolated from a normally sterile site.

As I've already mentioned, we found that 99 percent of our patients had some sorta healthcare exposure in the year prior, before their positive culture. We also wanted to get an idea of whether the number of people infected with this resistant bacteria was changing over time. To do this, we looked at yearly rates of disease that were adjusted, and we found that these rates did not change significantly during the time period of the study, which we were able to look at, which was 2013 to 2015. However, you know, to better understand if things are really changing, additional years of data are needed.

And then, lastly, we found that antimicrobial susceptibility testing results from the laboratories that identified these bacteria, demonstrated high levels of resistance to other antimicrobial drugs, in addition to carbapenem antibiotics. However, most isolates remain susceptible to at least one other antibiotic, most often an aminoglycoside.

[Sarah Gregory] What's the long-term prognosis for these resistant bacteria? Are they becoming more or less common?

[Sandra Bulens] So, based on our data, we did not detect a change in the rate of CRAB in our surveillance population, over the three year time period that we evaluated. So, again, as I mentioned, more years of data are needed to have a clearer understanding of how the incidence of this bacteria is changing in our population. However, data from other surveillance systems have suggest that the rates are falling in the United States, although the reason for this finding is not know(n), but it's certainly very encouraging. Slowing the spread of antibiotic resistance is a

public health priority and the CDC continues to work with state and local health departments and healthcare facilities to aggressively stop transmission of resistant bacteria.

[Sarah Gregory] Would you like to tell us about your job at CDC? What's your job and what's your involvement in antimicrobial-resistant infections?

[Sandra Bulens] So, I work in CDC's Division of Healthcare Quality and Promotion and I've been in the division for 11 years. My primary responsibility is working on the surveillance of healthcare-associated antibiotic-resistant infections, including acting as the principle investigator for the part of MuGSI that conducts surveillance on CRAB. While working in DHQP, I've had the opportunity not only to work on MuGSI, which conducts surveillance for this resistant bacteria, but also on carbapenem-resistant enterobacteriaceae, or CRE, and carbapenem-resistant pseudomonas aeruginosa. I have also worked on surveillance for Methicillin-resistant Staph aureus, or MRSA, another healthcare-associated infection, and it's another surveillance program that's run through the Emerging Infections Program. My goal is to help to better understand the epidemiology of these resistant bacteria, in order to help target and improve prevention efforts and, ultimately, protect patients from infections caused by these bacteria.

[Sarah Gregory] Thank you, Sandra, for taking the time to talk to us today. I've been talking to Sandra Bulens about her April 2018 article, Carbapenem-Nonsusceptible *A. baumannii*, 8 US Metropolitan Areas, 2012–2015. Listeners can read the article online at [cdc.gov/eid](http://cdc.gov/eid).

I'm Sarah Gregory for *Emerging Infectious Diseases*.

[Announcer] For the most accurate health information, visit [cdc.gov](http://cdc.gov) or call 1-800-CDC-INFO.