Quarterly Update on Carbapenem-Resistant Enterobacteriaceae and Other Carbapenemase-Producing Organisms for Washington State

Isolates reported to the Department of Health and tested at the
Public Health Laboratories, by date of collection, January-September 2016

Washington State Department of Health has performed surveillance and testing for CRE since October 2012. This update summarizes reports of carbapenem-resistant Enterobacteriaceae (CRE) isolates and other carbapenemase-producing organisms (CPO) collected from January through September, 2016. We include all CRE isolates diagnosed in-state and isolates from Washington residents diagnosed out-of-state and reported to the department. Isolates were included if they were the first unique genus/species/carbapenemase profile reported from an individual patient since surveillance began in 2012. If an isolate produced more than one carbapenemase, it was counted once for each novel carbapenemase.

The CRE case definition since May 2015, is:
E. coli, Klebsiella spp., and *Enterobacter* spp. resistant to any carbapenem (according to Clinical Laboratory Standards Institute breakpoints: minimum inhibitory concentrations of ≥4 mcg/ml for meropenem, imipenem, and doripenem or ≥ 2 mcg/ml for ertapenem).

See the 2010-2015 CRE Surveillance Summary (http://www.doh.wa.gov/portals/1/Documents/Pubs/420-163-CRE-Summary2015.pdf) for details about the case definitions prior to May 2015.

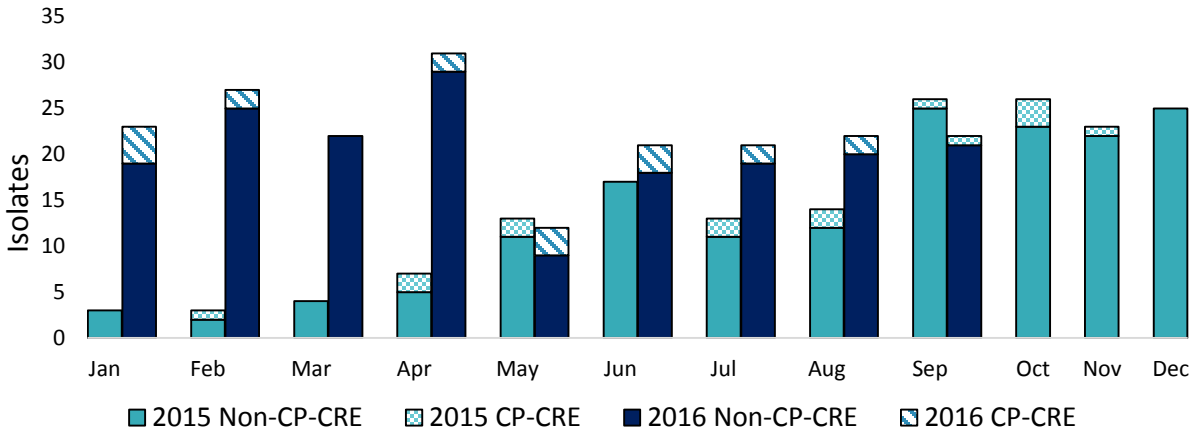
The Washington State Public Health Laboratories (PHL) test CRE isolates for the following carbapenemase genes:

- *Klebsiella pneumoniae* carbapenemase (KPC)
- New Delhi metallo-β-lactamase (NDM)
- Oxacillin-hydrolyzing β-lactamase-48 (OXA-48)
- Verona integron-encoded metallo-β-lactamase (VIM)
- Imipenem-hydrolyzing β-lactamase (IMP)

In addition, PHL tests other Gram-negative organisms (such as other Enterobacteriaceae, and *Pseudomonas* spp. and *Acinetobacter* spp.) suspicious for carbapenemase on special request.

The bar graph shows CRE and carbapenemase-producing Enterobacteriaceae isolates collected January through September 2016, compared to those submitted and tested January through September 2015 (Figure 1). The new case definition was implemented in May 2015 which may explain some of the difference between total case counts in 2015 and 2016.

Figure 1. Carbapenem-Resistant Enterobacteriaceae Isolates, Washington, 2015 and January through September 2016



Quarter 3

- Sixty-five CRE isolates were reported statewide in the third quarter of 2016, and 201 in the first three quarters of 2016. The contrasting color at the top of each bar represents the number of CRE isolates that were confirmed by PCR testing to carry a carbapenemase gene (Figure 1).
- Of 65 CRE isolates, 37 (57%) were *Enterobacter* spp., 18 (28%) *E. coli*, 7 (11%) *Klebsiella* spp., and 3 (5%) *Serratia* spp. (Figure 2)
- Of 65 CRE isolates, 5 (8%) isolates from 5 individual patients tested positive for carbapenemase: 2 NDM, 1 OXA-48 and 2 SME. (Figure 2)
- Zero of 7 (0%) *Klebsiella* isolates was carbapenemase-positive, whereas 1 of 37 (3%) *Enterobacter* isolates, and 2 of 18 (11%) *E. coli* isolates tested positive for carbapenemase.
- Two out of three *Serratia* isolates tested were SME-positive in quarter three of 2016. Since we do not routinely solicit carbapenem-resistant (CR) *Serratia*, the proportion of CR-*Serratia* isolates that produce a carbapenemase is not reported.
- Of the three patients with NDM or OXA-48 detected, only the OXA-48 patient had known international travel. Both NDM cases had healthcare exposures in Washington. Case follow up is not performed on SME cases at this time.

Table 1. Carbapenemase and likely source

Carbapenemase	Number of cases	Likely Source
NDM	**2**	**Healthcare in Washington**
OXA-48	**1**	**Travel in Africa**
SME	**2**	**Unknown**

- Carbapenemases were diagnosed in four Washington counties in quarter three of 2016 (Figure 3). We offer this breakdown of cases by county to inform local health, facilities and providers of recent carbapenemase activity in their region. The quarter three map is shown in Figure 3 below.

Figure 2. Submitted CRE isolates by genus and carbapenemases, Washington, July through September 2016

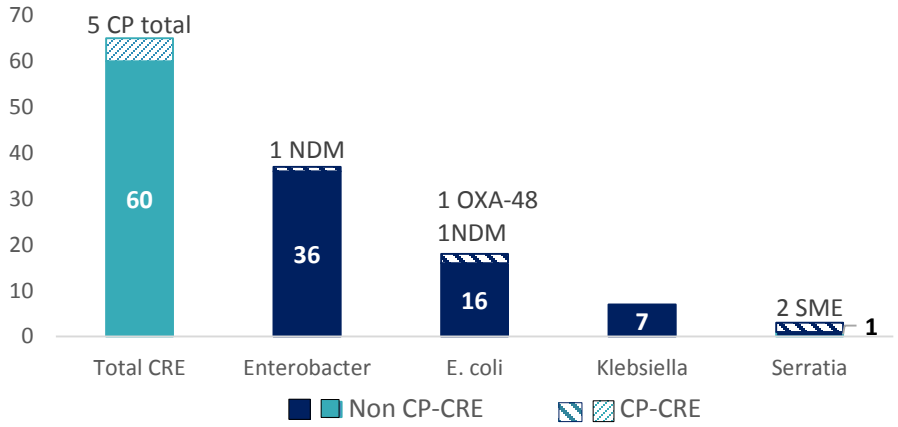
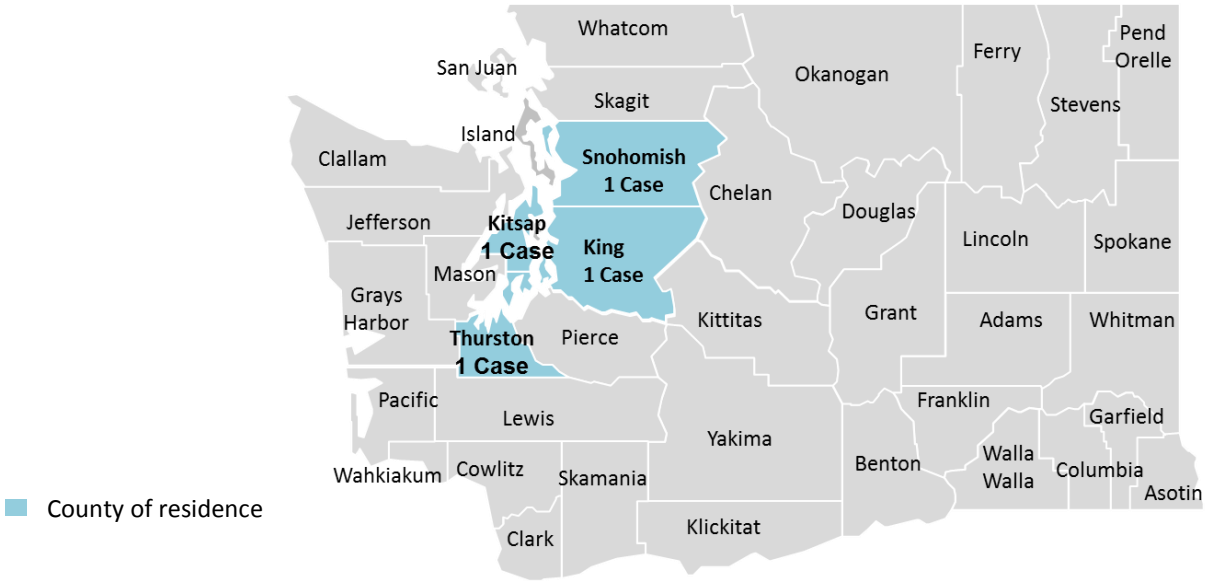


Figure 3. Number of Patients with Carbapenemase-producing Organism(s) Reported in Washington, by Location of Residence, July through September 2016 (Quarter Three)



The Public Health Laboratories accepts and tests other carbapenem-resistant Gram negative organisms, such as other genera in the family Enterobacteriaceae, as well as *Acinetobacter* and *Pseudomonas* species, upon request, or if specialized screening tests (e.g.; RAPIDEC® Carba-NP or Rosco Diagnostica Neo-Sensitabs) indicate suspicion for carbapenemase production.

Since our surveillance has recently identified several carbapenemases in *Pseudomonas* isolates, we plan to adopt voluntary surveillance for carbapenem-resistant *Pseudomonas* and *Acinetobacter spp*. Please consider submitting any carbapenem-resistant *Pseudomonas* or *Acinetobacter* isolates to PHL for carbapenemase testing.

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