

Community-wide Surveillance for Carbapenemase Producing Organisms (CPO) Statistical Report for 2020

Surveillance Definitions (year updated):

REPORT DATE (2020)

For this report, the date of specimen collection is used for case counts by months.

Carbapenem Resistant Enterobacteriaceae (CRE) (2017)

- CRE are *Enterobacteriaceae* that are:
 - Resistant to ANY carbapenem antimicrobial (i.e., MIC of ≥ 4 mcg/ml for doripenem, meropenem, or imipenem OR ≥ 2 mcg/ml for ertapenem) OR
 - Documented to produce carbapenemase
- In addition:
 - For bacteria that have intrinsic imipenem nonsusceptibility (i.e., *Morganella morganii*, *Proteus spp.*, *Providencia spp.*), resistant to carbapenems other than imipenem is required.

Carbapenem Resistant *Pseudomonas aeruginosa* (CRPA) (2017)

- *Pseudomonas aeruginosa* isolated from any body site* that meets the following criteria:
 - Resistant to imipenem, meropenem, or doripenem based on current Clinical and Laboratory Standards Institutes Standards (CLSI) M100 standards (≥ 8 mcg/mL); AND/OR
 - Demonstrates production of a carbapenemase by a recognized method (e.g., CarbaNP or Polymerase chain reaction (PCR) or other methods).

*Excluding isolates from patients with cystic fibrosis (CF).

Carbapenem Resistant *Acinetobacter* (CRA) (2017)

- *Acinetobacter* isolated from any body site that meets the following criteria:
 - Resistant to imipenem, meropenem, or doripenem based on current Clinical and Laboratory Standards Institutes Standards (CLSI) M100 standards; AND/OR
 - Demonstrates production of a carbapenemase by a recognized method (e.g., CarbaNP or PCR or other methods).

Carbapenem Resistant Organisms (CRO) (2017)

Any organisms meeting the above definitions for CRE, CRPA, and CRA are considered CRO.

Carbapenemase Producing Organisms (CPO) (2017)

Any organisms producing carbapenemase which is laboratory-confirmed are defined as CPO.

Multi-Drug Resistant Bacilli – Carbapenem Resistant (MDRB-CR) (SINCE 2010)

A case is defined as an infection with an MDRB-CR organism of one patient per hospitalization per year regardless of resident status. Infection with a second species of MDRB-CR organism in the same patient is counted as a separate case. Infections with those Gram-negative bacilli that are constitutively resistant to carbapenems, specifically *Stenotrophomonas*, *Aeromonas* & *Chryseobacterium*, are not counted as cases.

MDRB-CR organisms refer to Gram negative bacilli that are resistant to three or more classes of antibiotics, one of which must be Carbapenem.

DUPLICATES (SINCE 2010)

Duplicates are defined isolates from same patient, same organism, and same source within same year.

PATIENT'S RESIDENCY (SINCE 2010)

Patients from out of jurisdiction (OOJ) are included in the surveillance report as long as isolates meet the above surveillance definitions.

Major Findings:

Table 1: Reported CRO by Month, Washoe County, 2020

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|--------------|----------|----------|----------|----------|----------|----------|-----------|-----------|----------|----------|-----------|----------|-----------|
| CRE | 1 | 3 | 4 | 2 | 1 | 2 | 5 | 7 | 0 | 6 | 12 | 6 | 48 |
| CRPA | 6 | 5 | 2 | 2 | 3 | 6 | 5 | 4 | 1 | 2 | 4 | 1 | 41 |
| CRA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other CROs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 7 | 8 | 6 | 4 | 4 | 8 | 10 | 11 | 1 | 8 | 16 | 7 | 89 |

Table 1-1: Descriptive Statistics for Reported CRO Cases, Washoe County, 2020

| Characteristics | | No. | Percent (%) |
|------------------------|---|-----------|-------------|
| Age | Median | 65 years | NA |
| | Minimum | 0 years | NA |
| | Maximum | 96 years | NA |
| Gender | Male | 49 | 55.0% |
| | Female | 40 | 45.0% |
| Race/Ethnicity | White, non-Hispanic | 63 | 71.5% |
| | White, Hispanic | 8 | 9.1% |
| | Asian | 2 | 2.3% |
| | Black | 2 | 2.3% |
| | American Indian/Alaskan Native | 3 | 3.4% |
| | Other | 2 | 2.3% |
| | Unknown | 8 | 9.1% |
| Washoe County Resident | Yes | 65 | 73.0% |
| | No | 24 | 27.0% |
| | Unknown | 0 | 0.0% |
| Specimen Type | Urine | 37 | 42.0% |
| | Respiratory | 18 | 20.2% |
| | Wound | 15 | 17.0% |
| | Rectal | 6 | 7.0% |
| | Invasive (e.g., blood, cerebrospinal fluid) | 0 | 0.0% |
| | Other | 3 | 3.4% |
| | Surgical | 6 | 7.0% |
| | Unknown* | 3 | 3.4% |
| Facility Type | Inpatient | 56 | 64.0% |
| | Outpatient | 14 | 16.0% |
| | Long Term Acute Care | 0 | 0.0% |
| | Intensive Care Unit | 18 | 20.0% |
| | Skilled Nursing Facility | 0 | 0% |
| Total** | | 89 | 100% |

*Initial result not received from testing hospital.

**Represents number of testing events. A single person may count more than once if not considered a duplicate isolate (see definition of "Duplicates")

Carbapenemase Producing Organisms (CPO)

Table 2: Characteristics of Reported CPO Cases, Washoe County, 2020

| Month | Resistance Mechanism | Organism | Active Infection or Colonization | Source of Detection | # of Contacts Identified for Screening | Case notes |
|--------|----------------------|-----------------------------|----------------------------------|---------------------|--|---|
| March | NDM | <i>Escherichia coli</i> | active infection | Active Screening | 0 | Case has history of foreign surgical procedure. |
| May | KPC | <i>Klebsiella pneumonia</i> | active infection | Routine Reporting | 0 | Case has history of homelessness. |
| June | NDM | <i>Klebsiella pneumonia</i> | active infection | Active Screening | 0 | Case has history of foreign travel and hospitalization. |
| July | KPC | <i>Klebsiella pneumonia</i> | colonization | Routine Reporting | 0 | Case has history of MRSA and ESBL. |
| August | KPC | <i>Klebsiella pneumonia</i> | colonization | Active Screening | 0 | Case has history of foreign hospitalization. |

KPC-*Klebsiella pneumonia* carbapenemase, NDM-New Delhi Metallo-β-lactamase, VIM-Verona Integron-encoded Metallo-β-lactamase

CPO cases reported 2020 = 5; Contacts identified 2020 = 0; Case-contact ratio = 0

Cumulative CPO case counts (2017-2020) =35; Contacts identified (2017-2020) = 105; Case-contact ratio = 3.0

Carbapenem Resistant Enterobacteriaceae (CRE)

Table3: Carbapenem Resistant Enterobacteriaceae, Washoe County, 2020

| Year | Total N CRO | No. CRE | Proportion (%) | CRE Organisms | | | | | | | | | | | |
|------|-------------|---------|----------------|---------------|----|----|----|---------|----|----|----|----|----|-----------|--|
| | | | | EC | EA | EH | KP | E. coli | PM | CF | SM | CB | KO | Citro sp. | |
| 2017 | 137 | 36 | 26.3 | 15 | 7 | 0 | 6 | 4 | 2 | 1 | 1 | 0 | 0 | 0 | |
| 2018 | 135 | 43 | 31.9 | 17 | 4 | 0 | 9 | 7 | 2 | 1 | 0 | 2 | 1 | 0 | |
| 2019 | 94 | 27 | 28.7 | 13 | 1 | 0 | 9 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 2020 | 89 | 48 | 53.9 | 28 | 2 | 1 | 7 | 6 | 0 | 2 | 0 | 0 | 1 | 1 | |

EC-*Enterobacter cloacae*, EA-*Enterobacter aerogenes*, EH-*Enterobacter hormaechei*, KP-*Klebsiella pneumonia*, PM-*Proteus mirabilis*, CF-*Citrobacter freundii*, SM-*Serratia marcescens*, CB-*Citrobacter braakii*, KO-*Klebsiella oxytoca*, Citro sp.-*Citrobacter* species

Reported Incidence of MDRB-CR (2020):

The reported incidence for 2020 was 3.8 cases per 10,000 patient days. Figure 1 illustrates the reported incidence rate of MDRB-CR from 2011 through 2020.

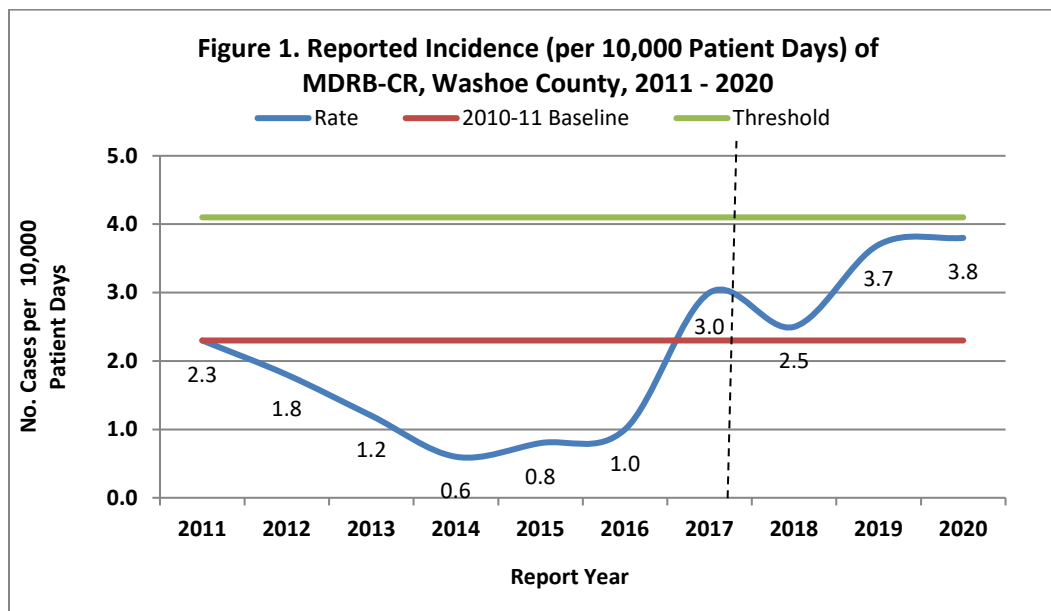


Table 4: Reported MDRB-CR Cases by Month, Washoe County, 2010-2020

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 2010 | 6 | 2 | 2 | 3 | 1 | 7 | 7 | 4 | 4 | 6 | 7 | 5 | 54 |
| 2011 | 9 | 8 | 9 | 13 | 5 | 5 | 4 | 3 | 4 | 6 | 2 | 9 | 77 |
| 2012 | 3 | 2 | 4 | 5 | 3 | 4 | 3 | 5 | 3 | 8 | 3 | 7 | 50 |
| 2013 | 8 | 3 | 5 | 5 | 4 | 3 | 2 | 0 | 1 | 0 | 2 | 0 | 33 |
| 2014 | 2 | 5 | 3 | 1 | 0 | 0 | 1 | 3 | 2 | 0 | 1 | 0 | 18 |
| 2015 | 0 | 0 | 2 | 4 | 2 | 2 | 3 | 0 | 2 | 4 | 2 | 4 | 25 |
| 2016 | 2 | 2 | 3 | 0 | 3 | 2 | 2 | 7 | 5 | 2 | 1 | 3 | 32 |
| 2017* | 4 | 8 | 8 | 7 | 12 | 15 | 8 | 6 | 9 | 8 | 8 | 10 | 103 |
| 2018 | 7 | 5 | 7 | 3 | 5 | 8 | 9 | 6 | 7 | 13 | 6 | 10 | 86 |
| 2019 | 10 | 8 | 10 | 7 | 10 | 8 | 11 | 14 | 4 | 9 | 3 | 6 | 100 |
| 2020 | 5 | 8 | 6 | 4 | 4 | 8 | 9 | 9 | 1 | 8 | 15 | 7 | 84 |
| Total | 56 | 51 | 59 | 52 | 49 | 62 | 59 | 57 | 42 | 64 | 50 | 61 | 662 |

*Beginning 2017, reporting criteria changed

(Beginning 2017, reporting criteria expanded from MDRB-CR to CRO. Cases for previous years might be under-reported)

Severity of Drug-Resistance among CRO (2020):

- Proportion of resistance to three classes of antibiotics: 94% (84/89)
 - Proportion of resistance to four or more classes of antibiotics: 84% (75/89)
 - Proportion pan-resistance*: 1.1% (1/89) – *Klebsiella pneumonia* (1).
- *Pan-resistance is defined as non-susceptible to all tested drugs at the clinical lab.

CPO Testing

Table 5: Pan-resistance Rate, Washoe County, 2010-2020

| Year | Total N Cases | No. Pan-resistance | Proportion (%) | Organisms (No. pan-resistant) |
|-------|---------------|--------------------|----------------|--|
| 2010* | 54 | 1 | 1.9 | Acinetobacter (1) |
| 2011 | 76 | 11 | 14.5 | Acinetobacter (7), Pseudomonas aeruginosa (4) |
| 2012 | 50 | 14 | 28.0 | Acinetobacter (14) |
| 2013 | 28 | 8 | 28.6 | Acinetobacter (8) |
| 2014 | 17 | 1 | 5.9 | Pseudomonas aeruginosa (1) |
| 2015 | 0 | 0 | undefined | |
| 2016 | 32 | 1 | 3.1 | K. pneumoniae (1)** |
| 2017 | 137 | 14 | 10.2 | Pseudomonas fluorescens (1), Pseudomonas aeruginosa (2), Acinetobacter (11) |
| 2018 | 130 | 5 | 3.8 | Acinetobacter (2), Pseudomonas aeruginosa (2), K. pneumoniae (1) |
| 2019 | 91 | 3 | 3.3 | Pseudomonas aeruginosa (1), K. pneumoniae (2) |
| 2020 | 89 | 1 | 1.1 | K. pneumoniae (1) |

* may be under-reported retrospectively during January-May 2010

** Pan-resistance reported by CDC

Table 6: Modified Hodge Test (MHT), Washoe County, 2010-2017

| Year | Total N Tested** | No. Positive | | | | | | | Positivity (%) |
|-----------------|------------------|--------------|-----------|----------|----------|----------|----------|----------|----------------|
| | | Total | A | EC | EA | KP | PA | SM | |
| 2010* | 53 | 4 | 1 | 2 | | | | 1 | 7.5 |
| 2011 | 65 | 4 | | 4 | | | | | 6.2 |
| 2012 | 39 | 18 | 13 | 1 | | 3 | 1 | | 46.2 |
| 2013 | 14 | 6 | 3 | 2 | | | 1 | | 42.9 |
| 2014 | 7 | 5 | 2 | | | 3 | | | 71.4 |
| 2015 | 3 | 1 | | | | | | 1 | 33.3 |
| 2016 | 6 | 3 | | | 1 | 2 | | | 50.0 |
| 2017 (As of Q2) | 37 | 0 | | | | | | | 0.0 |
| Total | 224 | 41 | 19 | 9 | 1 | 8 | 2 | 2 | 18.3 |

* May be under-reported retrospectively during January-May 2010

** Including those isolates which did not meet case definition

A=*Acinetobacter*

EC=*Enterobacter Cloacae*

EA=*Enterobacter aerogenens*

KP=*Klebsiella pneumoniae*

PA=*Pseudomonas aeruginosa*

SM=*Serratia marcescens*

MHT was discontinued as of May 24, 2017 by NSPHL; therefore, the above table was kept in this report for reviewing historical data only and will no longer be updated.

Due to carbapenemase in *Serratia* spp. being common and posing a low public health risk, it is not investigated as a CPO case. Some CRO isolates were not submitted to NSPHL for a carbapenemase screening test; therefore, the total N tested is smaller than total N reported (Tables 7 and 8).

Table 7: Modified Carbapenem Inactivation Method (mCIM) Testing, Washoe County, 2017-2020

| Year | Total N Tested | No. Positive | | | | | | | | Positivity (%) |
|--------------|----------------|--------------|-----------|----------|-----------|----------|----------|----------|-----------------------|----------------|
| | | Total | KP | PA | E. coli | EC | KO | SM | Organism not isolated | |
| 2017 * | 67 | 7 | 2 | 1 | 3 | 0 | 0 | 1 | 0 | 10.4 |
| 2018 | 114 | 17 | 6 | 1 | 7 | 1 | 1 | 0 | 1 | 14.9 |
| 2019 | 90 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 7.8 |
| 2020 | 81 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 6.2 |
| Total | 352 | 36 | 17 | 2 | 10 | 1 | 1 | 1 | 1 | 10.2 |

* PCR testing by NSPHL started May 24, 2017

KP-*Klebsiella pneumoniae*, PA-*Pseudomonas aeruginosa*, KO-*Klebsiella oxytoca*, SM-*Serratia marcescens*, EC-*Enterobacter cloacae*

Table 8: Polymerase Chain Reaction (PCR) Testing, Washoe County, 2017-2020

| Year | Total N Tested | No. Positive | | | | | | | Positivity (%) |
|--------------|----------------|--------------|-----------|----------|-----------|----------|----------|-----------------------|----------------|
| | | Total | KP | PA | E. coli | KO | EC | Organism not isolated | |
| 2017* | 15 | 6 | 2 | 1 | 3 | 0 | 0 | 0 | 40.0 |
| 2018 | 20 | 17 | 6 | 1 | 7 | 1 | 1 | 1 | 85.0 |
| 2019 | 12 | 7 | 6 | 3 | 0 | 1 | 2 | 0 | 58.3 |
| 2020 | 6 | 5 | 4 | 0 | 1 | 0 | 0 | 0 | 83.3 |
| Total | 53 | 35 | 18 | 5 | 11 | 2 | 3 | 1 | 66.0 |

* PCR testing by NSPHL started May 24, 2017

KP-*Klebsiella pneumoniae*, PA-*Pseudomonas aeruginosa*, EC-*Enterobacter cloacae*, KO-*Klebsiella oxytoca*

Antibiotic Susceptibility

Table 9. Antibiotic Susceptibility for CRE, CRPA and CRGNB 2020

| Antimicrobial Class or Subclass | CRE | CRE # Tested | CRE # Susceptible | CRE % Susceptible | CRPA ¹ | CRPA # Tested | CRPA # Susceptible | CRPA % Susceptible | CRGNB ¹ | CRGNB # Tested | CRGNB # Susceptible | CRGNB % Susceptible |
|--|-----------|--------------|-------------------|-------------------|-------------------|---------------|--------------------|--------------------|--------------------|----------------|---------------------|---------------------|
| Total N. Identified | 48 | | | | 41 | | | | 0 | | | |
| Penicillins | | | | | | | | | | | | |
| Ampicillin | | 85 | 0 | 0% | | 7 | 0 | 0% | | 0 | 0 | 0% |
| Piperacillin | | 0 | 0 | 0% | | 2 | 2 | 100% | | 0 | 0 | 0% |
| Cephems | | | | | | | | | | | | |
| Cefazolin | | 92 | 0 | 0% | | 12 | 0 | 0% | | 0 | 0 | 0% |
| Cefepime | | 88 | 33 | 38% | | 73 | 27 | 37% | | 0 | 0 | 0% |
| Cefotaxime | | 37 | 2 | 5% | | 8 | 0 | 0% | | 0 | 0 | 0% |
| Cefotetan | | 38 | 2 | 5% | | 7 | 0 | 0% | | 0 | 0 | 0% |
| Cefoxitin | | 2 | 0 | 0% | | 0 | 0 | 0% | | 0 | 0 | 0% |
| Ceftazidime | | 90 | 6 | 7% | | 75 | 31 | 41% | | 0 | 0 | 0% |
| Ceftriaxone | | 93 | 4 | 4% | | 42 | 0 | 0% | | 0 | 0 | 0% |
| Cefuroxime | | 0 | 0 | 0% | | 2 | 0 | 0% | | 0 | 0 | 0% |
| Cephalothin | | 0 | 0 | 0% | | 2 | 0 | 0% | | 0 | 0 | 0% |
| β-Lactam/β-lactamase inhibitor combinations | | | | | | | | | | | | |
| Amoxicillin-clavulanic acid | | 10 | 0 | 0% | | 5 | 0 | 0% | | 0 | 0 | 0% |
| Ampicillin-sulbactam | | 81 | 0 | 0% | | 6 | 0 | 0% | | 0 | 0 | 0% |
| Piperacillin-tazobactam | | 91 | 7 | 8% | | 73 | 35 | 48% | | 0 | 0 | 0% |
| Ticarcillin-clavulanic acid | | 0 | 0 | 0% | | 0 | 0 | 0% | | 0 | 0 | 0% |
| Fluoroquinolones | | | | | | | | | | | | |
| Ciprofloxacin | | 44 | 33 | 75% | | 75 | 42 | 56% | | 0 | 0 | 0% |
| Levofloxacin | | 23 | 17 | 74% | | 61 | 32 | 52% | | 0 | 0 | 0% |
| Moxifloxacin | | 0 | 0 | 0% | | 0 | 0 | 0% | | 0 | 0 | 0% |
| Aminoglycosides | | | | | | | | | | | | |
| Amikacin | | 58 | 55 | 95% | | 70 | 66 | 94% | | 0 | 0 | 0% |
| Gentamicin | | 92 | 84 | 91% | | 75 | 64 | 85% | | 0 | 0 | 0% |
| Tobramycin | | 91 | 76 | 84% | | 71 | 67 | 94% | | 0 | 0 | 0% |
| Sulfonamides | | | | | | | | | | | | |
| Trimethoprim | | 0 | 0 | 0% | | 0 | 0 | 0% | | 0 | 0 | 0% |
| Trimethoprim-sulfamethoxazole | | 89 | 68 | 76% | | 41 | 0 | 0% | | 0 | 0 | 0% |
| Monobactams | | | | | | | | | | | | |
| Aztreonam | | 61 | 6 | 10% | | 43 | 6 | 14% | | 0 | 0 | 0% |
| Tetracyclines | | | | | | | | | | | | |
| Tetracycline | | 56 | 37 | 66% | | 41 | 1 | 2% | | 0 | 0 | 0% |
| Tigecycline | | 1 | 1 | 100% | | 1 | 0 | 0% | | 0 | 0 | 0% |
| Nitrofurans | | | | | | | | | | | | |
| Nitrofurantoin | | 67 | 29 | 43% | | 1 | 0 | 0% | | 0 | 0 | 0% |
| Carbapenems | | | | | | | | | | | | |
| Imipenem | | 1 | 0 | 0% | | 2 | 0 | 0% | | 0 | 0 | 0% |
| Meropenem | | 69 | 52 | 75% | | 75 | 3 | 4% | | 0 | 0 | 0% |
| Doripenem | | 0 | 0 | 0% | | 0 | 0 | 0% | | 0 | 0 | 0% |
| Ertapenem | | 79 | 1 | 1% | | 38 | 0 | 0% | | 0 | 0 | 0% |

¹ *Pseudomonas aeruginosa* and *Acinetobacter* have intrinsic resistance to Ertapenem.

Surveillance changes in 2013

Beginning in 2013, there are several changes for this surveillance.

1. The Nevada Public Health State Lab does not perform MHT on *Pseudomonas aeruginosa*.
2. The Nevada Public Health State Lab will ship isolates positive for MBL E-test to CDC for a further confirmation.
3. WCHD will contact hospital labs to obtain original reports for those isolates which are reported by the Nevada Public Health but missed reporting from hospital labs.
4. Began reporting case count on pan-resistant cases.
5. Began reporting case count for drug-resistant Acinetobacter for clinician's information.
6. Statistical report will be distributed to the working group on a quarterly basis.

Surveillance changes in 2014

None.

Surveillance changes in 2015

1. Infection preventionists (IP) only need to report monthly denominator data every quarter. The report due date will be the 20th of the month following the end of every quarter. For example, January 20th is the due date to report denominator data for October, November, and December.
2. Anecdotal feedback from local IPs report the utility of this surveillance project in their respective hospital's infection control plan.

Surveillance changes in 2016

1. Report quality has been improved. Table and figure number are added in the report. Two new trend graphs (Figure 2 and 4) on the reported incidence rate of MDRB-CR by year are also added in the report.
2. Reporting criteria for hospitals is now added in the report on page 1.
3. In May 2016, WCHD collaborated with the Nevada State Public Health Laboratory (NSPHL) and Nevada Division of Public and Behavioral Health (NDPBH) to apply for a CDC's grant to increase the laboratory tests among carbapenem resistant *Pseudomonas aeruginosa* isolates to find out more about emerging resistance mechanism per CDC's grant guideline. CDC funded Nevada State on August 1, 2016. The laboratory testing for the resistance mechanism of CRE and CRPA is expected to start in 2017.
4. Effective September 23, 2016, WCHD requests local hospitals to report cases meeting CRE definition to WCHD and ship isolates meeting CRE definition to NSPHL for further testing due to one rare case of New Delhi Metallo-beta-lactamase CRE identified the community. The case acquired the infection in a foreign country. CRE definition is described on page 1.

Surveillance changes in 2017

1. Surveillance is expanded from MDRB-CR to CRO surveillance. CRO is a reportable condition in Washoe County effective in 2017. WCHD begins investigating CPO cases.
2. The quarterly report contents are modified.
3. NSPHL starts implementing modified carbapenem inactivation method (mCIM) for screening carbapenemase and PCR testing for resistance mechanism among CRO. Details are described in surveillance protocol.
4. Washington state lab will be the regional lab for advanced testing and/or colonization screening if needed.
5. This surveillance is funded by CDC ELC grant and an epidemiologist has been assigned for this surveillance project in Washoe County.

Surveillance changes in 2018

1. There were no changes made to surveillance methods, but the report was improved by adding more tables.

Surveillance changes in 2019 and 2020

1. Updated definition for duplicate sample to be more clear on the timeframe of "year" to reflect this means calendar year.

The 2019 Washoe County Community Antibigram is now available. There are three formats of the antibiogram available: online, pocket size, and wall chart. They can be downloaded from www.tinyurl.com/WCAntibiogram. If you need hard copies, please send your request to EpiCenter@washoecounty.gov with your name, agency, and mailing address.

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