



NHSN Antimicrobial Resistance (AR) Option: Analysis

Annual NHSN Training – March 24, 2022

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Healthcare Quality Promotion, CDC

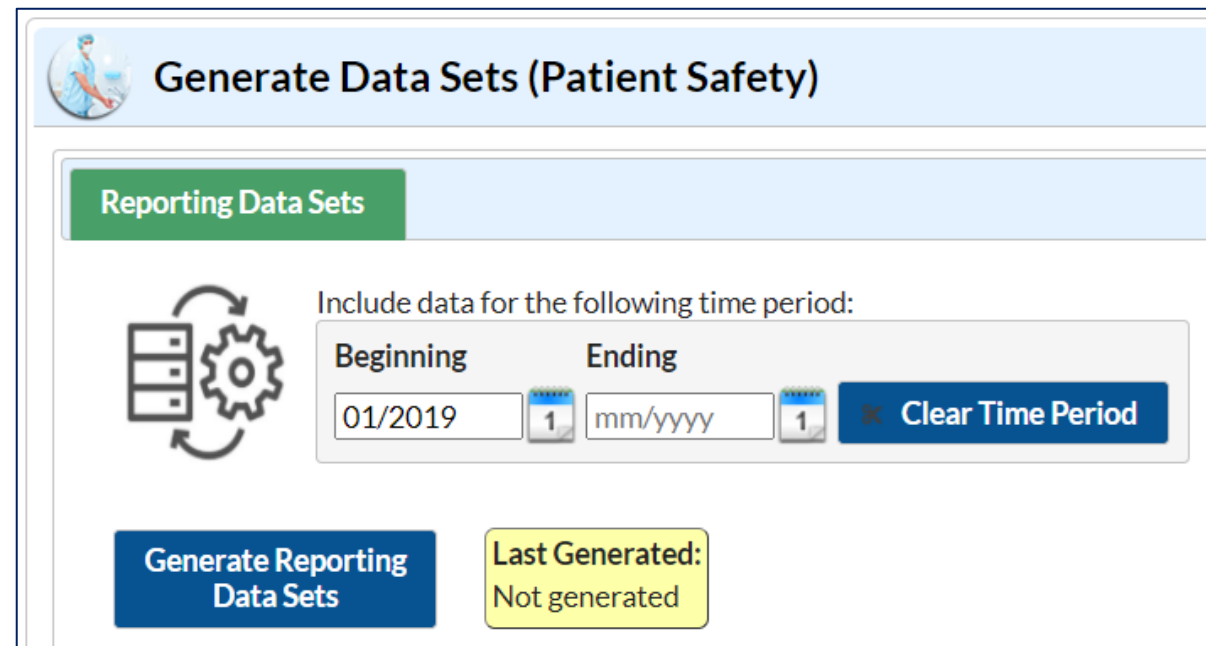
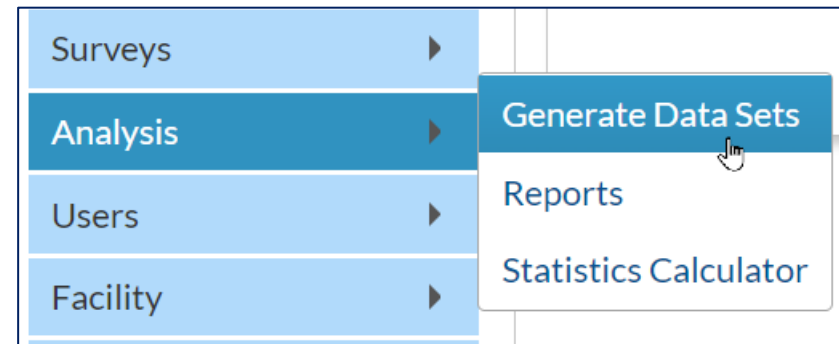
Objectives

- Describe the analysis reports currently available within the NHSN AR Option
- Explain the utility of each report
- Interpret the output produced in each report

AR Option Analysis

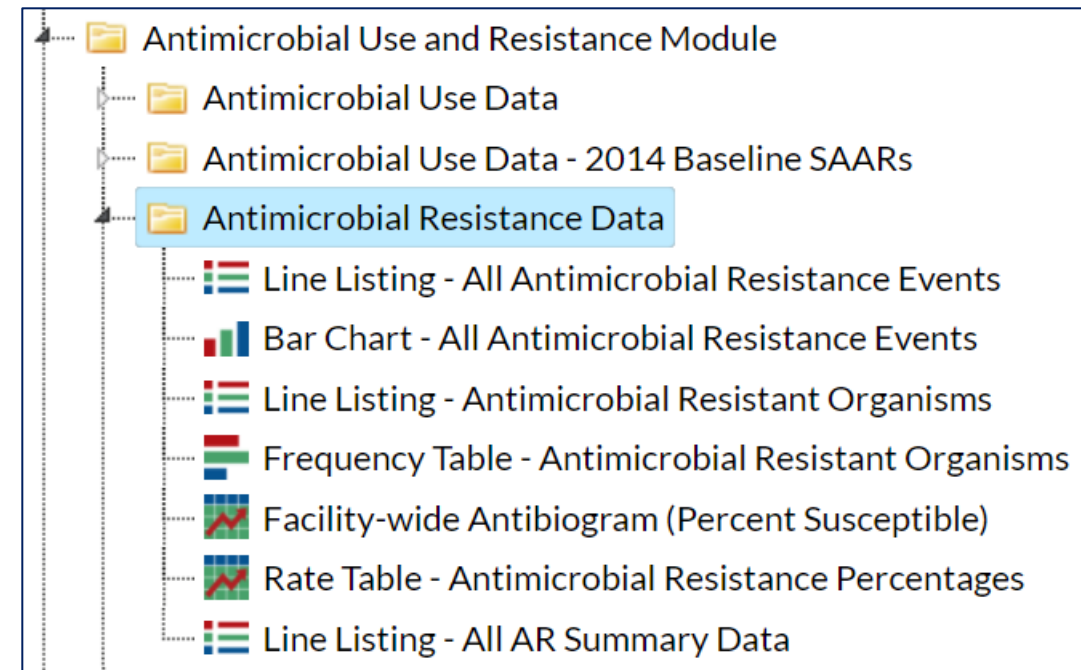
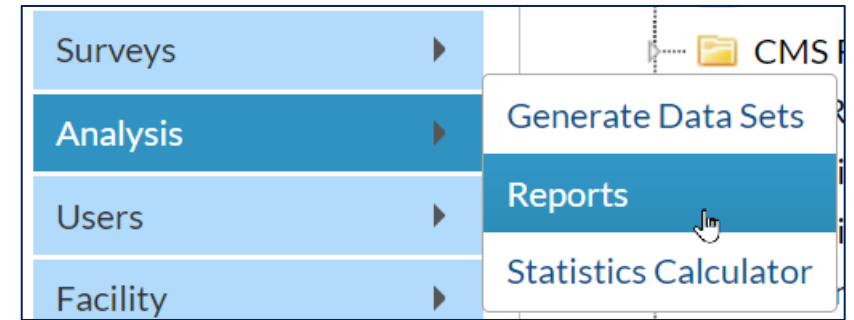
Remember: Always Generate Data Sets!

- When new data have been uploaded, generate new data sets within NHSN
- Click Analysis then Generate Data Sets
- Specify the beginning & ending dates or leave blank to include all data ever entered into NHSN
- Click Generate Reporting Data Sets

A screenshot of a web application form titled 'Generate Data Sets (Patient Safety)'. The form has a light blue header with a circular icon of a person in a lab coat. Below the header is a green tab labeled 'Reporting Data Sets'. To the left of the date selection area is an icon of a server rack with a gear and circular arrows. The text 'Include data for the following time period:' is followed by two date pickers. The first date picker is labeled 'Beginning' and has the value '01/2019'. The second date picker is labeled 'Ending' and has the value 'mm/yyyy'. To the right of the date pickers is a blue button with a white 'x' icon and the text 'Clear Time Period'. At the bottom left of the form is a large blue button labeled 'Generate Reporting Data Sets'. At the bottom right is a yellow box labeled 'Last Generated:' with the text 'Not generated' below it.

AR Option Reports

- Once data sets are finished generating, click Analysis then Reports
- Various reports within the AR Data folder
 - AR Event reports
 - Line list, bar chart, antibiogram
 - AR Organism reports
 - Line list, frequency table, rate table
 - AR Summary (aka Denominator)
 - Line list



Run/Modify/Export

- Three options exist for viewing data that's been uploaded to NHSN:

1. Run Report

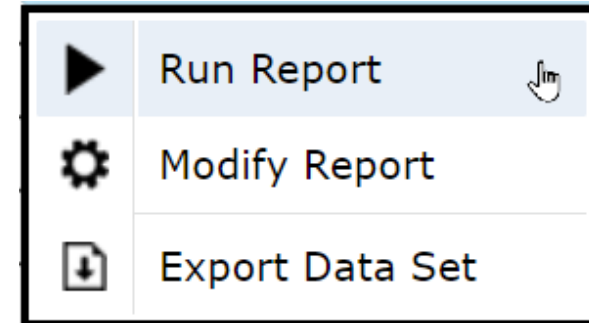
- Generates the report using default settings

2. Modify Report

- Allows user to make changes to the default settings

3. Export Data Set

- Allows user to take AR data out of NHSN and analyze in a different software (e.g., Excel, SAS)



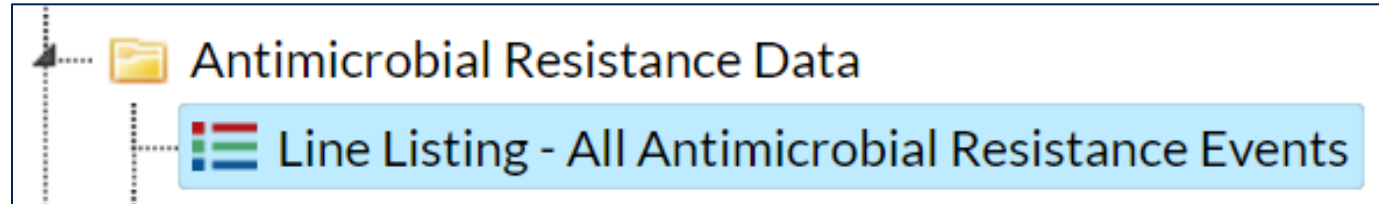
Run/Modify/Export continued

- This presentation covers mostly default output.
- Modifying reports:
 - How to Modify a Report: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/howtomodifyreport.pdf>
 - Analysis Quick Reference Guides: <https://www.cdc.gov/nhsn/ps-analysis-resources/reference-guides.html#accordion-1-collapse-5>
- Exporting data:
 - How to Export data from NHSN: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/exportdata.pdf>

AR Event Reports

Line List, Bar Chart, & Antibiogram

AR Event Line List



- A detailed list of all AR Events uploaded into your NHSN facility
 - Includes patient, specimen, organism, & susceptibility testing variables
 - One row per drug for each event
- Due to the number of AR Events, you'll likely reach the maximum number of rows for a line list within a few months of reporting. Workarounds include:
 - Make modifications to narrow selections
 - Export data

AR Event Line List – Example of Default Report

- 1 AR Event with susceptibility results for 6 drugs

National Healthcare Safety Network

Line Listing - Antimicrobial Resistance Events by Pathogen

As of: February 10, 2022 at 12:47 PM

Date Range: AUR_DETAIL SpecimenDateYr After and Including 2022

Pathogen Description=CA

| Facility Org ID | Event ID | Patient ID | Fac Admission Date | Date Specimen Collected | Location | Isolate ID | Specimen Group | Pathogen Description | Drug Description | Final interpretation Description |
|-----------------|----------|--------------|--------------------|-------------------------|----------|----------------------|----------------|-----------------------|----------------------|----------------------------------|
| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAlbicans_Blood_2022 | Blood | Candida albicans - CA | ANID - Anidulafungin | R - Resistant |
| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAlbicans_Blood_2022 | Blood | Candida albicans - CA | CASPO - Caspofungin | R - Resistant |
| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAlbicans_Blood_2022 | Blood | Candida albicans - CA | FLUCO - Fluconazole | R - Resistant |
| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAlbicans_Blood_2022 | Blood | Candida albicans - CA | MICA - Micafungin | R - Resistant |
| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAlbicans_Blood_2022 | Blood | Candida albicans - CA | POSAC - Posaconazole | R - Resistant |
| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAlbicans_Blood_2022 | Blood | Candida albicans - CA | VORI - Voriconazole | N - Not Tested |

This line list shows a limited number of variables by default. To expand the number of variables shown, export the data out of NHSN or use the "modify" option to edit the line list.

Sorted by PathogenDesc specimenDate

Data contained in this report were last generated on February 9, 2022 at 3:22 PM to include data beginning January 2018 .

AR Event Line List – Example Modifications

- Line lists can be modified to show additional variables included in the AR Event
 - Examples: individual lab test sign, value and interpretation

National Healthcare Safety Network

Line Listing - Antimicrobial Resistance Events by Pathogen

As of: February 10, 2022 at 12:51 PM

Date Range: AUR_DETAIL SpecimenDateYr After and Including 2022

Pathogen Description=CA

| Facility Org ID | Event ID | Date Specimen Collected | Location | Specimen Group | Pathogen Description | Drug Description | MIC sign | MIC value | Interpretation of MIC test | Final interpretation Description |
|-----------------|----------|-------------------------|----------|----------------|-----------------------|----------------------|----------|-----------|----------------------------|----------------------------------|
| 33617 | 50199744 | 01/02/2022 | ED | Blood | Candida albicans - CA | ANID - Anidulafungin | > | 2.000 | R | R - Resistant |
| 33617 | 50199744 | 01/02/2022 | ED | Blood | Candida albicans - CA | CASPO - Caspofungin | > | 2.000 | R | R - Resistant |
| 33617 | 50199744 | 01/02/2022 | ED | Blood | Candida albicans - CA | FLUCO - Fluconazole | > | 4.000 | R | R - Resistant |
| 33617 | 50199744 | 01/02/2022 | ED | Blood | Candida albicans - CA | MICA - Micafungin | > | 2.000 | R | R - Resistant |
| 33617 | 50199744 | 01/02/2022 | ED | Blood | Candida albicans - CA | POSAC - Posaconazole | > | 2.000 | R | R - Resistant |
| 33617 | 50199744 | 01/02/2022 | ED | Blood | Candida albicans - CA | VORI - Voriconazole | . | | N | N - Not Tested |

This line list shows a limited number of variables by default. To expand the number of variables shown, export the data out of NHSN or use the "modify" option to edit the line list.

Sorted by PathogenDesc specimenDate

Data contained in this report were last generated on February 9, 2022 at 3:22 PM to include data beginning January 2018 .

AR Event Line List – Interpreting the Output

- *Candida albicans* was isolated from a blood specimen collected in the ED

National Healthcare Safety Network

Line Listing - Antimicrobial Resistance Events by Pathogen

As of: February 10, 2022 at 12:47 PM

Date Range: AUR_DETAIL SpecimenDateYr After and Including 2022

Pathogen Description=CA

| Facility Org ID | Event ID | Patient ID | Fac Admission Date | Date Specimen Collected | Location | Isolate ID | Specimen Group | Pathogen Description | Drug Description | Final interpretation Description |
|-----------------|----------|--------------|--------------------|-------------------------|----------|----------------------|----------------|-----------------------|----------------------|----------------------------------|
| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAIbicans_Blood_2022 | Blood | Candida albicans - CA | ANID - Anidulafungin | R - Resistant |
| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAIbicans_Blood_2022 | Blood | Candida albicans - CA | CASPO - Caspofungin | R - Resistant |
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| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAIbicans_Blood_2022 | Blood | Candida albicans - CA | VORI - Voriconazole | N - Not Tested |

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Sorted by PathogenDesc specimenDate

Data contained in this report were last generated on February 9, 2022 at 3:22 PM to include data beginning January 2018 .

AR Event Line List – Interpreting the Output

- *Candida albicans* was isolated from a blood specimen collected in the ED
- This isolate was resistant to anidulafungin, caspofungin, fluconazole, micafungin, and posaconazole; the isolate was not tested against voriconazole

National Healthcare Safety Network

Line Listing - Antimicrobial Resistance Events by Pathogen

As of: February 10, 2022 at 12:47 PM

Date Range: AUR_DETAIL SpecimenDateYr After and Including 2022

Pathogen Description=CA

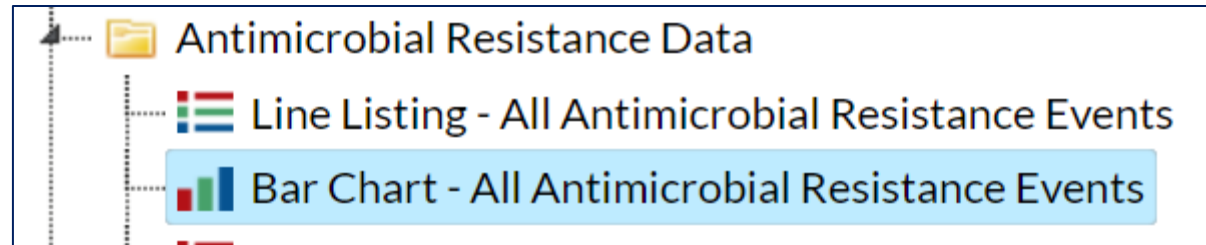
| Facility Org ID | Event ID | Patient ID | Fac Admission Date | Date Specimen Collected | Location | Isolate ID | Specimen Group | Pathogen Description | Drug Description | Final interpretation Description |
|-----------------|----------|--------------|--------------------|-------------------------|----------|----------------------|----------------|-----------------------|----------------------|----------------------------------|
| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAIbicans_Blood_2022 | Blood | Candida albicans - CA | ANID - Anidulafungin | R - Resistant |
| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAIbicans_Blood_2022 | Blood | Candida albicans - CA | CASPO - Caspofungin | R - Resistant |
| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAIbicans_Blood_2022 | Blood | Candida albicans - CA | FLUCO - Fluconazole | R - Resistant |
| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAIbicans_Blood_2022 | Blood | Candida albicans - CA | MICA - Micafungin | R - Resistant |
| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAIbicans_Blood_2022 | Blood | Candida albicans - CA | POSAC - Posaconazole | R - Resistant |
| 33617 | 50199744 | CA_BLOOD_IMP | 11/18/2021 | 01/02/2022 | ED | CAIbicans_Blood_2022 | Blood | Candida albicans - CA | VORI - Voriconazole | N - Not Tested |

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Sorted by PathogenDesc specimenDate

Data contained in this report were last generated on February 9, 2022 at 3:22 PM to include data beginning January 2018 .

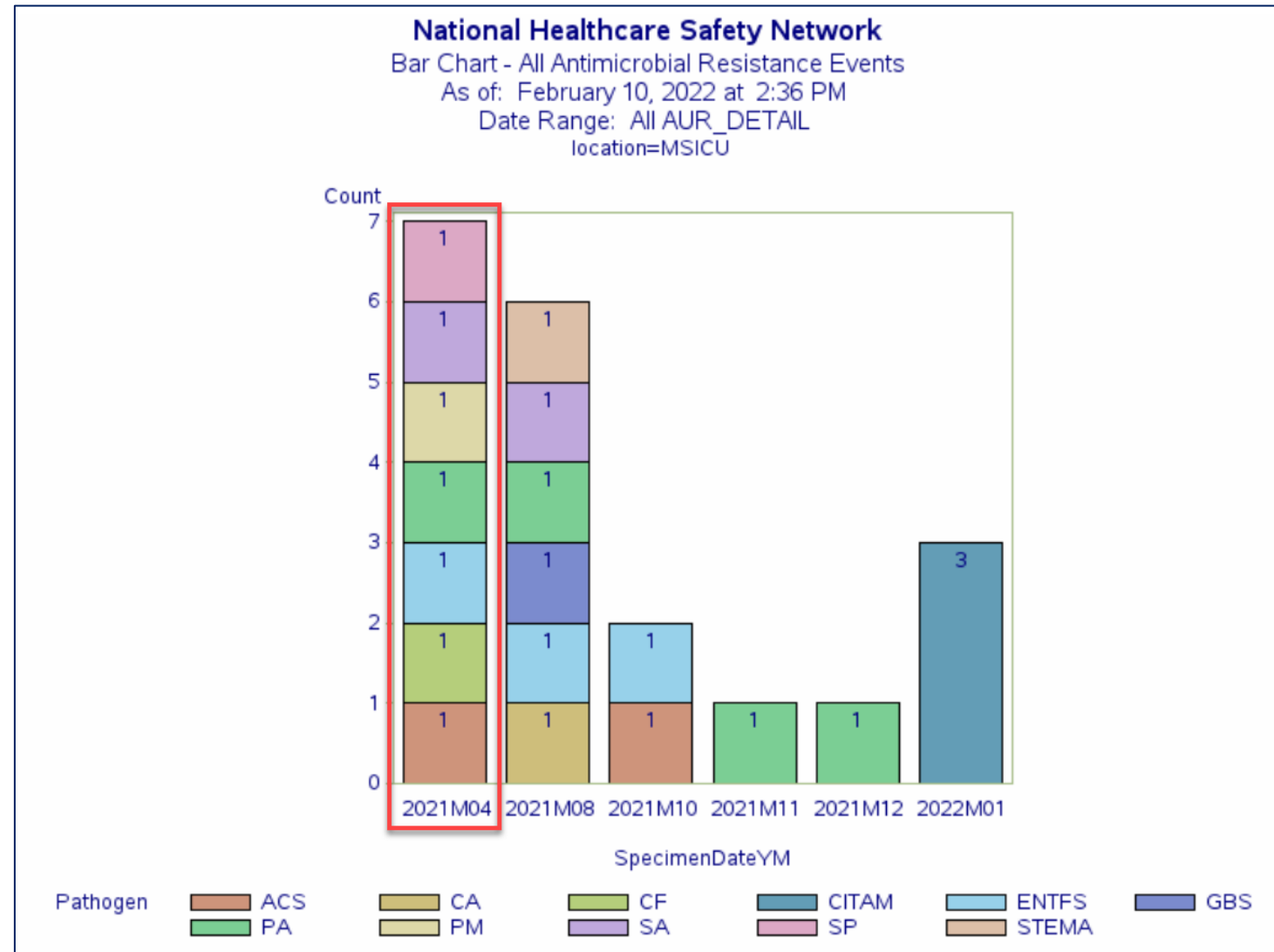
AR Event Bar Chart



- Graphically displays the number of AR Events submitted by location over time
- Defaults to display monthly AR Events by pathogen & location
- Shows a maximum of 12 bars

AR Event Bar Chart – Interpreting the Output

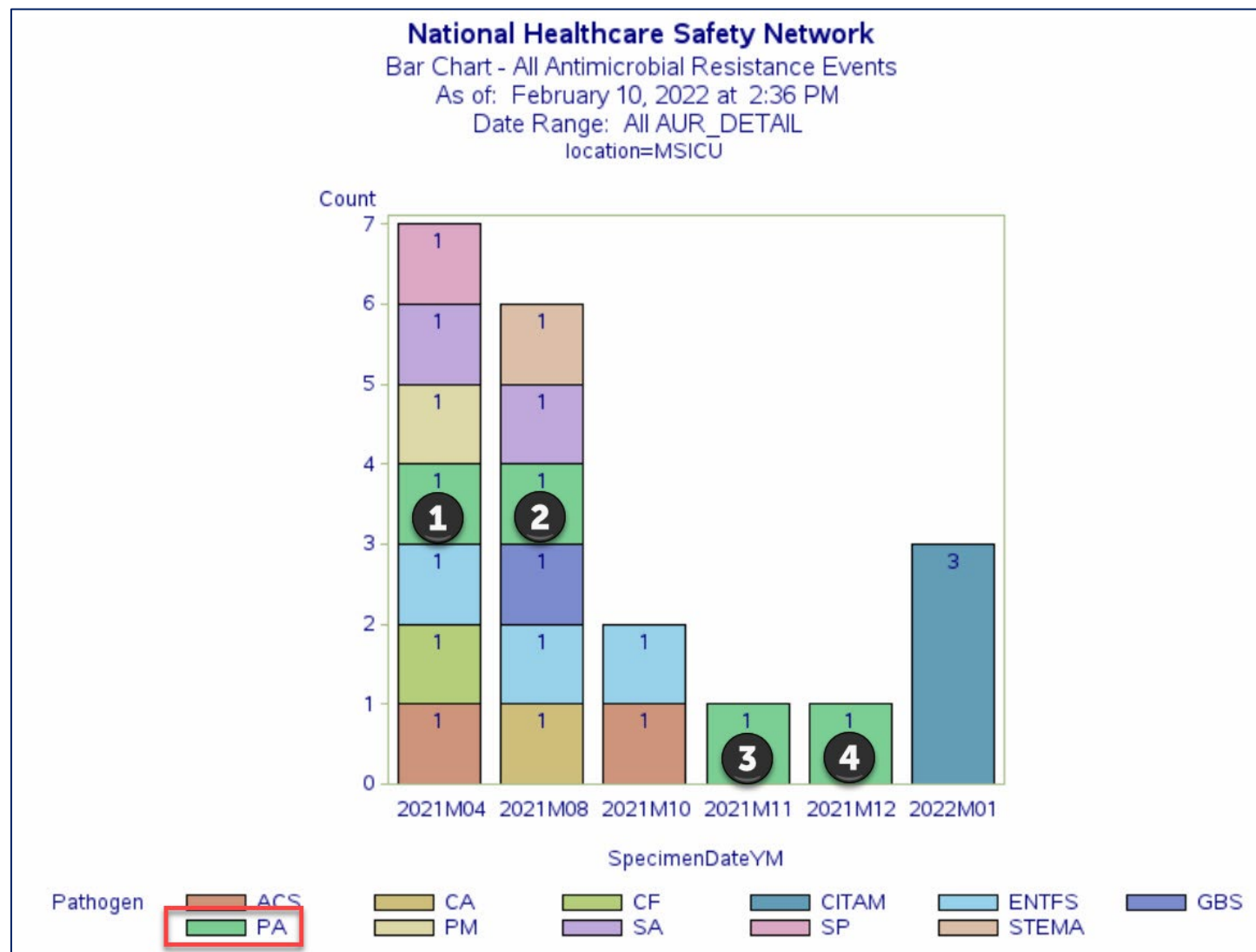
- In April 2021, 7 AR Events were reported from the MSICU



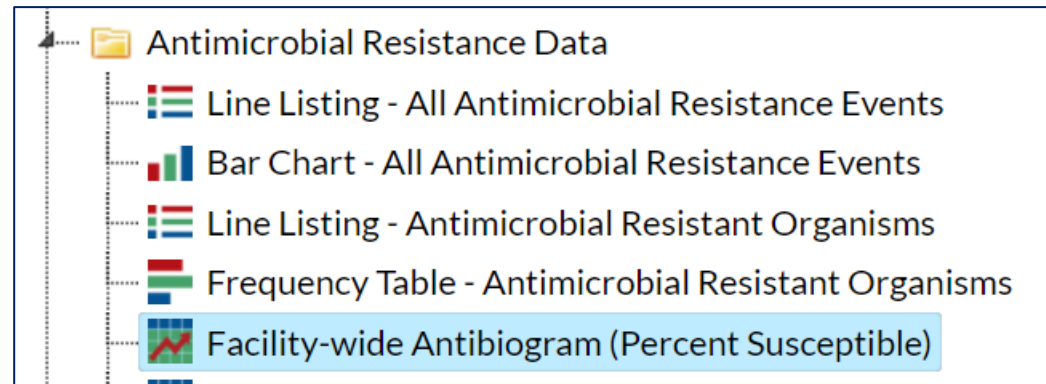
15 *All data presented are fictitious and used for illustrative purposes only

AR Event Bar Chart – Interpreting the Output

- In April 2021, 7 AR Events were reported from the MSICU
- 4 total *Pseudomonas aeruginosa* events were reported from this location
 - April 2021
 - August 2021
 - November 2021
 - December 2021



AR Facility-wide Antibigram



- Provides a table based on AR Events reported in NHSN
- Displays the calculated percent susceptible (%S) for each organism-antimicrobial combination reported from all locations (inpatient and outpatient)
- Defaults to show by month but can roll up to additional time groupings
- Available to both facilities and groups
- Filters allow for customization of the output

AR Facility-wide Antibigram – Percent Susceptible

- The %S is calculated for each organism-antimicrobial pairing using the following formula:

$$\frac{\textit{Number isolates tested susceptible}}{\textit{Number of isolates tested}} = \%S$$

- %S only calculated if at least 30 isolates are tested for the specific antimicrobial

AR Facility-wide Antibigram – Default Settings

- Tables by month
- Isolates from:
 - all specimen types (blood, cerebrospinal fluid, urine, and lower respiratory)
 - all patient ages
 - all locations
- All isolates regardless of organism category (gram negative, gram positive, or fungal)
- Both healthcare facility and community onset

AR Facility-wide Antibigram – Table Details

- Percent susceptible shown for January 2022

**National Healthcare Safety Network
Facility-wide Antibigram (Percent Susceptible)
Rate per 100 Isolates**

As of: February 11, 2022 at 9:02 AM
Date Range: All AUR_SUMMARY
if (((Pathogen IN ("ACS", "ESP", "EC")))

orgID=13860 CCN=999999 SpecimenDateYM=2022M01

| | | Pathogen | | |
|---|----------|------------------------|-----------------------|--------------------------|
| | | Gram-Negative | | |
| Drug Class | Drug | Acinetobacter - ACS | Enterobacter - ESP | Escherichia coli - EC |
| Aminoglycosides | AMK | 54.0 | 64.0 | 88.0 |
| | GENTA | 86.0 | 76.0 | 88.0 |
| | TOBRA | 96.0 | . | . |
| B-lactam/ B-lactamase inhibitor combination | AMOXWC | | 93.0 | 88.0 |
| | AMPIWS | 24.0 | 2.0 | 1.0 |
| | CEFTAVI | | 98.0 | 87.0 |
| | CEFTOTAZ | | 98.0 | 87.0 |
| | IMICILRE | | . | . |
| | MEROVAB | | . | . |
| | PIPERWT | 88.0 | 98.0 | 88.0 |
| | TICARWC | | . | . |

*All data presented are fictitious and used for illustrative purposes only

AR Facility-wide Antibigram – Organism category

- Organisms are grouped by category:
 - Gram-negative
 - Gram-positive
 - Fungal

National Healthcare Safety Network Facility-wide Antibigram (Percent Susceptible) Rate per 100 Isolates

As of: February 11, 2022 at 9:02 AM
Date Range: All AUR_SUMMARY
if (((Pathogen IN ("ACS", "ESP", "EC")))

orgID=13860 CCN=999999 SpecimenDateYM=2022M01

| | | Pathogen | | |
|---|----------|------------------------|-----------------------|--------------------------|
| | | Gram-Negative | | |
| Drug Class | Drug | Acinetobacter - ACS | Enterobacter - ESP | Escherichia coli - EC |
| Aminoglycosides | AMK | 54.0 | 64.0 | 88.0 |
| | GENTA | 86.0 | 76.0 | 88.0 |
| | TOBRA | 96.0 | . | . |
| B-lactam/ B-lactamase inhibitor combination | AMOXWC | | 93.0 | 88.0 |
| | AMPIWS | 24.0 | 2.0 | 1.0 |
| | CEFTAVI | | 98.0 | 87.0 |
| | CEFTOTAZ | | 98.0 | 87.0 |
| | IMICILRE | | . | . |
| | MEROVAB | | . | . |
| | PIPERWT | 88.0 | 98.0 | 88.0 |
| | TICARWC | | . | . |

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AR Facility-wide Antibigram – Drug Class

- Drugs are sorted into drug classes organized alphabetically

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**Full drug names can be found here:

<https://www.cdc.gov/nhsn/xls/aur/aur-eligible-antimicrobial-agents.xlsx>

National Healthcare Safety Network Facility-wide Antibigram (Percent Susceptible) Rate per 100 Isolates

As of: February 11, 2022 at 9:02 AM

Date Range: All AUR_SUMMARY

if (((Pathogen IN ("ACS", "ESP", "EC")))))

orgID=13860 CCN=999999 SpecimenDateYM=2022M01

| | | Pathogen | | |
|---|----------|------------------------|-----------------------|--------------------------|
| | | Gram-Negative | | |
| Drug Class | Drug | Acinetobacter - ACS | Enterobacter - ESP | Escherichia coli - EC |
| Aminoglycosides | AMK | 54.0 | 64.0 | 88.0 |
| | GENTA | 86.0 | 76.0 | 88.0 |
| | TOBRA | 96.0 | . | . |
| B-lactam/ B-lactamase inhibitor combination | AMOXWC | | 93.0 | 88.0 |
| | AMPIWS | 24.0 | 2.0 | 1.0 |
| | CEFTAVI | | 98.0 | 87.0 |
| | CEFTOTAZ | | 98.0 | 87.0 |
| | IMICILRE | | . | . |
| | MEROVAB | | . | . |
| | PIPERWT | 88.0 | 98.0 | 88.0 |
| TICARWC | | | | |

AR Facility-wide Antibiogram – Non-valid Combinations

- Cells shaded in grey represent non-valid pathogen/drug combinations – susceptibility tests for those drugs are not reported for those pathogens
- Refer to the AUR Module protocol for all valid pathogen/drug combinations.

National Healthcare Safety Network Facility-wide Antibiogram (Percent Susceptible) Rate per 100 Isolates

As of: February 11, 2022 at 9:02 AM

Date Range: All AUR_SUMMARY

if (((Pathogen IN ("ACS", "ESP", "EC")))

orgID=13860 CCN=999999 SpecimenDateYM=2022M01

| | | Pathogen | | |
|---|----------|------------------------|-----------------------|--------------------------|
| | | Gram-Negative | | |
| Drug Class | Drug | Acinetobacter - ACS | Enterobacter - ESP | Escherichia coli - EC |
| Aminoglycosides | AMK | 54.0 | 64.0 | 88.0 |
| | GENTA | 86.0 | 76.0 | 88.0 |
| | TOBRA | 96.0 | . | . |
| B-lactam/ B-lactamase inhibitor combination | AMOXWC | | 93.0 | 88.0 |
| | AMPIWS | 24.0 | 2.0 | 1.0 |
| | CEFTAVI | | 98.0 | 87.0 |
| | CEFTOTAZ | | 98.0 | 87.0 |
| | IMICILRE | | . | . |
| | MEROVAB | | . | . |
| | PIPERWT | 88.0 | 98.0 | 88.0 |
| TICARWC | | . | . | |

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AR Facility-wide Antibiogram – Interpretation

- Of *Acinetobacter* spp. isolates tested, 54% were susceptible to amikacin (AMK) and 96% were susceptible to tobramycin (TOBRA)

National Healthcare Safety Network Facility-wide Antibiogram (Percent Susceptible) Rate per 100 Isolates

As of: February 11, 2022 at 9:02 AM
Date Range: All AUR_SUMMARY
if (((Pathogen IN ("ACS", "ESP", "EC")))

orgID=13860 CCN=999999 SpecimenDateYM=2022M01

| | | Pathogen | | |
|---|----------|------------------------|-----------------------|--------------------------|
| | | Gram-Negative | | |
| Drug Class | Drug | Acinetobacter - ACS | Enterobacter - ESP | Escherichia coli - EC |
| Aminoglycosides | AMK | 54.0 | 64.0 | 88.0 |
| | GENTA | 86.0 | 76.0 | 88.0 |
| | TOBRA | 96.0 | . | . |
| B-lactam/ B-lactamase inhibitor combination | AMOXWC | | 93.0 | 88.0 |
| | AMPIWS | 24.0 | 2.0 | 1.0 |
| | CEFTAVI | | 98.0 | 87.0 |
| | CEFTOTAZ | | 98.0 | 87.0 |
| | IMICILRE | | . | . |
| | MEROVAB | | . | . |
| | PIPERWT | 88.0 | 98.0 | 88.0 |
| | TICARWC | | | |

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AR Facility-wide Antibiogram – Interpretation

- Of *Acinetobacter* spp. isolates tested, 54% were susceptible to amikacin (AMK) and 96% were susceptible to tobramycin (TOBRA)
- Of *Enterobacter* spp. isolates tested, 64% were susceptible to amikacin (AMK)
 - Less than 30 isolates were tested for tobramycin (TOBRA) susceptibility so %S is not calculated

National Healthcare Safety Network Facility-wide Antibiogram (Percent Susceptible) Rate per 100 Isolates

As of: February 11, 2022 at 9:02 AM
Date Range: All AUR_SUMMARY
if (((Pathogen IN ("ACS", "ESP", "EC")))

orgID=13860 CCN=999999 SpecimenDateYM=2022M01

| | | Pathogen | | |
|---|----------|---------------------|--------------------|-----------------------|
| | | Gram-Negative | | |
| Drug Class | Drug | Acinetobacter - ACS | Enterobacter - ESP | Escherichia coli - EC |
| Aminoglycosides | AMK | 54.0 | 64.0 | 88.0 |
| | GENTA | 86.0 | 76.0 | 88.0 |
| | TOBRA | 96.0 | . | . |
| B-lactam/ B-lactamase inhibitor combination | AMOXWC | | 93.0 | 88.0 |
| | AMPIWS | 24.0 | 2.0 | 1.0 |
| | CEFTAVI | | 98.0 | 87.0 |
| | CEFTOTAZ | | 98.0 | 87.0 |
| | IMICILRE | | . | . |
| | MEROVAB | | . | . |
| | PIPERWT | 88.0 | 98.0 | 88.0 |
| | TICARWC | | . | . |

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AR Organism Reports

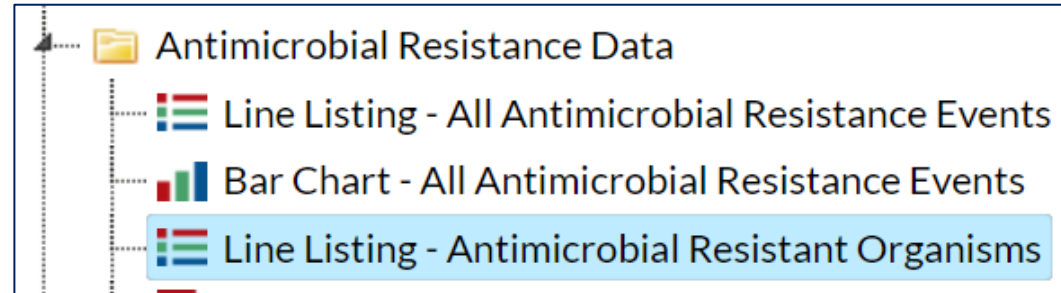
Line List, Frequency Table, Rate Table

Antimicrobial Resistant Phenotype Definitions

- Reported AR Events are assigned a phenotype if they meet the NHSN-defined susceptibility testing criteria
 - <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/aur/ar-phenotype-definitions-508.pdf>

| Phenotype Name | Phenotype Code | Phenotype Definition ^a |
|--|----------------|--|
| Methicillin-resistant <i>Staphylococcus aureus</i> | MRSA_AR | <i>Staphylococcus aureus</i> that has tested Resistant (R) to at least one of the following: oxacillin or ceftazidime |
| Carbapenem-resistant Enterobacterales (expanded) | CREexpanded_AR | <p>Any <i>Citrobacter amalonaticus</i>, <i>Citrobacter freundii</i>, <i>Citrobacter koseri</i>, <i>Enterobacter</i> spp., <i>E. coli</i>, <i>Klebsiella aerogenes</i>, <i>Klebsiella oxytoca</i>, <i>Klebsiella pneumoniae</i>, and <i>Serratia marcescens</i> that has tested Resistant (R) to at least one of the following: imipenem, meropenem, doripenem, ertapenem, meropenem/vaborbactam, or imipenem/relebactam</p> <p>OR</p> <p>Any <i>Proteus mirabilis</i>, <i>Proteus penneri</i>, <i>Proteus vulgaris</i>, and <i>Morganella morganii</i> that has tested Resistant (R) to at least one of the following: meropenem, doripenem, ertapenem, or meropenem/vaborbactam</p> |

AR Organisms Line List



- Lists all AR Events that meet an AR Organism phenotype definition
- Includes patient & specimen information

AR Organisms Line List – Interpretation

- 4 AR Events met the NHSN AR Option definition for CRE
- 2 specimens were *E.coli* and 2 were *K.oxytoca*

National Healthcare Safety Network

Line Listing - Antimicrobial Resistant Organisms

CREall_AR - Carbapenem-resistant Enterobacterales (E. coli, Klebsiella, or Enterobacter)

As of: February 10, 2022 at 2:39 PM

Date Range: ANTIBIOGRAM_AR specDateYr After and Including 2022

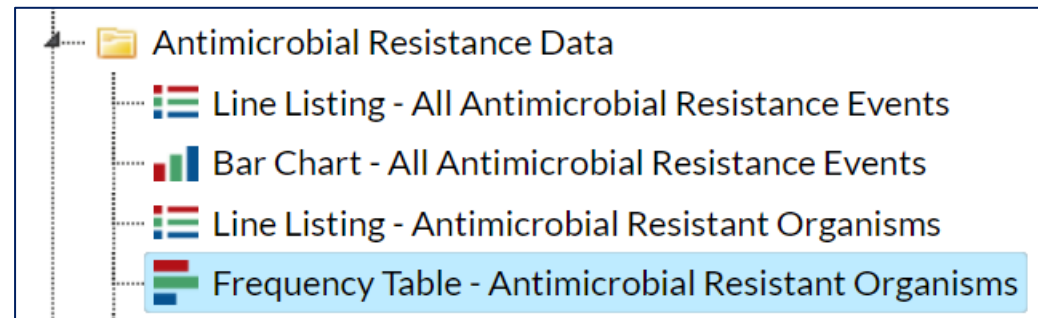
if (((phenotype_AR IN ("MRSA_AR", "ESCecoli_AR", "ESCklebsiella_AR", "carbNS_Acine_AR", "carbNS_PA_AR", "MDR_Acine_AR", "MDR_PA_AR", "VREfaecium_AR", "VREfaecalis_AR", "CREexpanded_AR", "FR_Candi_AR", "DR_SP_AR", "CREall_AR")))

| Facility Org ID | Patient ID | Date of Birth | Gender | Fac Admission Date | Event ID | Date Specimen Collected | Event Type | Location | Pathogen Description |
|-----------------|---------------|---------------|--------|--------------------|----------|-------------------------|------------|----------|-------------------------|
| 13860 | ECOLI_10067 | 01/25/1969 | M | 01/01/2022 | 104365 | 01/01/2022 | AR | MSICU | Escherichia coli - EC |
| 13860 | KLEBOXY_10067 | 07/25/1998 | M | 01/01/2022 | 104366 | 01/02/2022 | AR | MSICU | Klebsiella oxytoca - KO |
| 13860 | ECOLI_2022B | 01/25/1974 | M | 10/23/2021 | 104569 | 01/13/2022 | AR | MSICU | Escherichia coli - EC |
| 13860 | KLEBOXY_2022B | 07/25/1989 | M | 10/20/2021 | 104570 | 01/14/2022 | AR | MSICU | Klebsiella oxytoca - KO |

1. Please find the document containing Phenotype_AR definitions at <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/aur/ar-phenotype-definitions-508.pdf>

Sorted by orgID specimenDate

AR Organisms Frequency Table



- Table displaying counts of AR Events meeting NHSN-defined phenotype definitions
- Defaults to show totals by month

AR Organisms Frequency Table – Interpretation

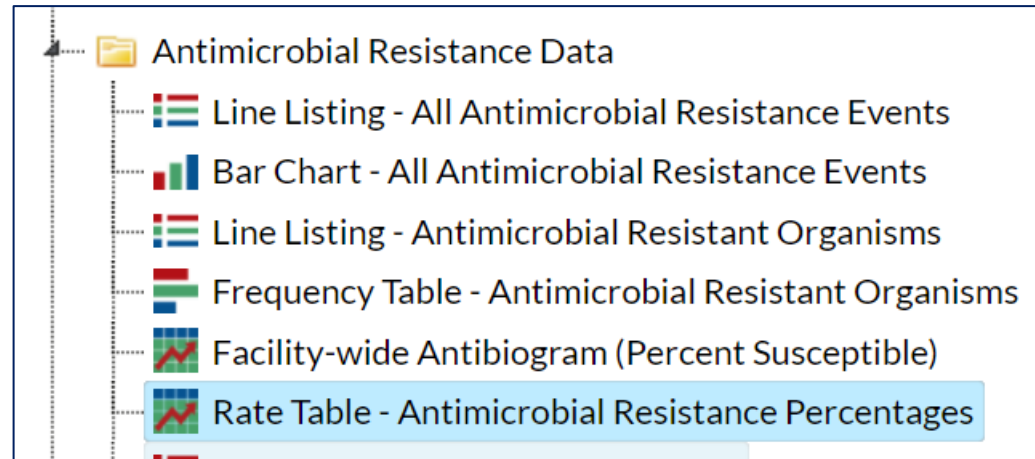
- From Oct 2021-Jan 2022, 11 AR Events met the definition of multidrug-resistant Acinetobacter.
 - 7 events met the criteria in Oct 2021
 - 4 events met the criteria in Jan 2022

National Healthcare Safety Network
Frequency Table - Antimicrobial Resistant Organisms
As of: February 10, 2022 at 2:41 PM
Date Range: ANTIBIOGRAM_AR specDateYM After and Including 2021M10
 if (((phenotype_AR IN ("MRSA_AR", "ESCecoli_AR", "ESCKlebsiella_AR", "carbNS_Acine_AR", "carbNS_PA_AR", "MDR_Acine_AR", "MDR_PA_AR", "VREfaecium_AR", "VREfaecalis_AR", "CREexpanded_AR", "FR_Candi_AR", "DR_SP_AR")))

| Frequency | Table of phenotype_AR by specDateYM | | | | |
|----------------------------------|-------------------------------------|----------|----------|-----------|-----------|
| | specDateYM(Spec Collected~Yr/Mon) | | | | |
| phenotype_AR(Resistant Organism) | 2021M10 | 2021M11 | 2021M12 | 2022M01 | Total |
| CREexpanded_AR | 19 | 0 | 1 | 4 | 24 |
| DR_SP_AR | 0 | 2 | 0 | 0 | 2 |
| ESCecoli_AR | 3 | 0 | 0 | 2 | 5 |
| ESCKlebsiella_AR | 6 | 0 | 0 | 2 | 8 |
| FR_Candi_AR | 2 | 1 | 1 | 1 | 5 |
| MDR_Acine_AR | 7 | 0 | 0 | 4 | 11 |
| MDR_PA_AR | 3 | 0 | 0 | 1 | 4 |
| MRSA_AR | 3 | 1 | 0 | 0 | 4 |
| carbNS_Acine_AR | 7 | 0 | 1 | 4 | 12 |
| carbNS_PA_AR | 3 | 0 | 0 | 1 | 4 |
| Total | 53 | 4 | 3 | 19 | 79 |

1. Please find the document containing Phenotype_AR definitions at <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/aur/ar-phenotype-definitions-508.pdf>

AR Organism Percentages



- Displays # isolated, # tested, and # resistant by month
- Displays % of organisms that tested non-susceptible or resistant to certain antimicrobials for each defined phenotype
 - If at least 30 isolates were tested

$$\frac{\# \text{ organisms NS or R to specific antimicrobials}}{\# \text{ organisms tested for susceptibilty to specific antimicrobials}} \times 100$$

AR Organism Percentages – Interpretation

- In October 2021: 44 *Staphylococcus aureus* AR Events were reported

National Healthcare Safety Network
Rate Table - Antimicrobial Resistance Percentages
 As of: February 10, 2022 at 2:42 PM
 Date Range: All ANTIBIOGRAM_RATESAR

Facility Org ID=13860 Phenotype Description=Methicillin-resistant *Staphylococcus aureus*

| Facility Org ID | Resistant Organism | Spec Collected Yr/Mon | Number Isolated | Number Tested | Number Resistant | Percent Resistant | 95% confidence interval |
|-----------------|--------------------|-----------------------|-----------------|---------------|------------------|-------------------|-------------------------|
| 13860 | MRSA_AR | 2021M10 | 44 | 39 | 36 | 92.3 | 80.5,98.0 |
| 13860 | MRSA_AR | 2021M11 | 146 | 146 | 97 | 66.4 | 58.5,73.7 |

- MRSA includes any *Staphylococcus aureus* that has tested Resistant (R) to oxacillin or ceftazidime.
- Percent resistant is only calculated when at least 30 isolates have been tested.
- If the percent of isolates tested is less than 70%, caution should be used when interpreting the percent resistant.

*All data presented are fictitious and used for illustrative purposes only

AR Organism Percentages – Interpretation

- In October 2021: 44 *Staphylococcus aureus* AR Events were reported
- 39 of those were tested and 36 were resistant to oxacillin or ceftazidime

National Healthcare Safety Network
Rate Table - Antimicrobial Resistance Percentages
 As of: February 10, 2022 at 2:42 PM
 Date Range: All ANTIBIOGRAM_RATESAR

Facility Org ID=13860 Phenotype Description=Methicillin-resistant *Staphylococcus aureus*

| Facility Org ID | Resistant Organism | Spec Collected Yr/Mon | Number Isolated | Number Tested | Number Resistant | Percent Resistant | 95% confidence interval |
|-----------------|--------------------|-----------------------|-----------------|---------------|------------------|-------------------|-------------------------|
| 13860 | MRSA_AR | 2021M10 | 44 | 39 | 36 | 92.3 | 80.5,98.0 |
| 13860 | MRSA_AR | 2021M11 | 146 | 146 | 97 | 66.4 | 58.5,73.7 |

1. MRSA includes any *Staphylococcus aureus* that has tested Resistant (R) to oxacillin or ceftazidime.
2. Percent resistant is only calculated when at least 30 isolates have been tested.
3. If the percent of isolates tested is less than 70%, caution should be used when interpreting the percent resistant.

*All data presented are fictitious and used for illustrative purposes only

AR Organism Percentages – Interpretation

- In October 2021: 44 *Staphylococcus aureus* AR Events were reported
- 39 of those were tested and 36 were resistant to oxacillin or ceftazidime
- 92.3% (36 resistant/39 tested) of the SA events reported met the NHSN AR Option definition for MRSA

National Healthcare Safety Network
Rate Table - Antimicrobial Resistance Percentages
 As of: February 10, 2022 at 2:42 PM
 Date Range: All ANTIBIOGRAM_RATESAR
 Facility Org ID=13860 Phenotype Description=Methicillin-resistant Staphylococcus aureus

| Facility Org ID | Resistant Organism | Spec Collected Yr/Mon | Number Isolated | Number Tested | Number Resistant | Percent Resistant | 95% confidence interval |
|-----------------|--------------------|-----------------------|-----------------|---------------|------------------|-------------------|-------------------------|
| 13860 | MRSA_AR | 2021M10 | 44 | 39 | 36 | 92.3 | 80.5,98.0 |
| 13860 | MRSA_AR | 2021M11 | 146 | 146 | 97 | 66.4 | 58.5,73.7 |

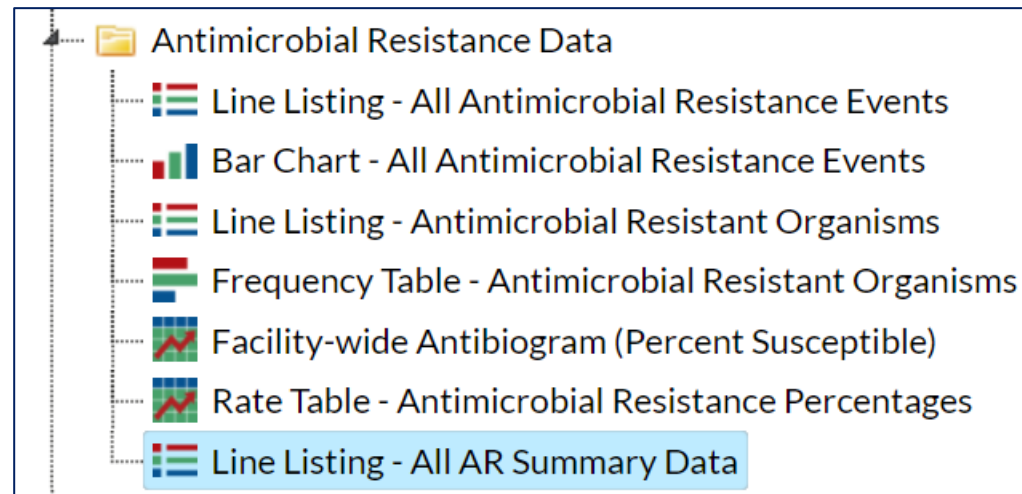
1. MRSA includes any *Staphylococcus aureus* that has tested Resistant (R) to oxacillin or ceftazidime.
2. Percent resistant is only calculated when at least 30 isolates have been tested.
3. If the percent of isolates tested is less than 70%, caution should be used when interpreting the percent resistant.

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AR Denominator Report

Line List

AR Denominator Line List



- Lists the summary AR data by month & location
 - FacWideIN: Patient Days & Admissions
 - Outpatient locations: Encounters
- Includes the “Report No Events” variable

AR Denominator Line List – Interpretation

- In Oct 2021, there were 5,350 total patient days and 368 admissions for FacWideIN (all inpatient locations combined) and AR Events were reported (No AR Events = N)

National Healthcare Safety Network Line Listing for All AR Summary Data

As of: February 10, 2022 at 2:45 PM

Date Range: AR_SUMMARY summaryYr After and Including 2021

| Facility Org ID | Summary Year/Month | Location | Patient Days | Admissions | Total Facility Encounters | No AR Events |
|-----------------|--------------------|-----------|--------------|------------|---------------------------|--------------|
| 13860 | 2021M09 | FACWIDEIN | 5400 | 325 | . | . |
| 13860 | 2021M10 | FACWIDEIN | 5350 | 368 | . | N |
| 13860 | 2021M11 | ED | . | . | 507 | N |
| 13860 | 2021M12 | ED | . | . | 422 | Y |
| 13860 | 2021M12 | FACWIDEIN | 2200 | 475 | . | N |

Sorted by orgID summaryYM location

*All data presented are fictitious and used for illustrative purposes only

AR Denominator Line List – Interpretation

- In Oct 2021, there were 5,350 total patient days and 368 admissions for FacWideIN (all inpatient locations combined) and AR Events were reported (No AR Events = N)
- In Dec 2021, there were 422 total encounters in ED and the “Report No Events” box was clicked (No AR Events = Y)

National Healthcare Safety Network Line Listing for All AR Summary Data

As of: February 10, 2022 at 2:45 PM

Date Range: AR_SUMMARY summaryYr After and Including 2021

| Facility Org ID | Summary Year/Month | Location | Patient Days | Admissions | Total Facility Encounters | No AR Events |
|-----------------|--------------------|-----------|--------------|------------|---------------------------|--------------|
| 13860 | 2021M09 | FACWIDEIN | 5400 | 325 | . | |
| 13860 | 2021M10 | FACWIDEIN | 5350 | 368 | . | N |
| 13860 | 2021M11 | ED | . | . | 507 | N |
| 13860 | 2021M12 | ED | . | . | 422 | Y |
| 13860 | 2021M12 | FACWIDEIN | 2200 | 475 | . | N |

Sorted by orgID summaryYM location

*All data presented are fictitious and used for illustrative purposes only

AR Denominator Line List – Interpretation

- The facility has not yet reported AR Events for Sept 2021 and has not clicked the “Report No Events” box for that month (No AR Events = (blank))

National Healthcare Safety Network
Line Listing for All AR Summary Data
 As of: February 10, 2022 at 2:45 PM
 Date Range: AR_SUMMARY summaryYr After and Including 2021

| Facility Org ID | Summary Year/Month | Location | Patient Days | Admissions | Total Facility Encounters | No AR Events |
|-----------------|--------------------|-----------|--------------|------------|---------------------------|--------------|
| 13860 | 2021M09 | FACWIDEIN | 5400 | 325 | . | |
| 13860 | 2021M10 | FACWIDEIN | 5350 | 368 | . | N |
| 13860 | 2021M11 | ED | . | . | 507 | N |
| 13860 | 2021M12 | ED | . | . | 422 | Y |
| 13860 | 2021M12 | FACWIDEIN | 2200 | 475 | . | N |

Sorted by orgID summaryYM location

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AR Option Reporting Resources

AUR Module Webpage

- Direct link: <https://www.cdc.gov/nhsn/psc/aur/index.html>
- One-stop shop for:
 - Protocol
 - Validation material
 - Link to training resources
 - Link to Analysis Quick Reference Guides
 - Link to FAQs
 - Link to CDA Toolkits

AR Option Analysis Resources

- NHSN AUR Protocol:
 - <http://www.cdc.gov/nhsn/PDFs/pscManual/11pscAURcurrent.pdf>
- NHSN Analysis Quick Reference Guides:
 - <http://www.cdc.gov/nhsn/PS-Analysis-resources/reference-guides.html>
- NHSN AUR Training (recordings and Quick Learns):
 - <https://www.cdc.gov/nhsn/training/patient-safety-component/aur.html>
- NHSN Helpdesk:
 - NHSN@cdc.gov

Thank you!

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

