NHSN Antimicrobial Use Option

Amy Webb, MPH CHES
Senior Public Health Analyst
Lantana Consulting Group | Contractor for the Division of Healthcare Quality Promotion, CDC

February 2020
Objectives

- Outline the requirements for participation in the NHSN AU Option
- Discuss the data elements collected in the NHSN AU Option
- Describe the analysis reports currently available within the NHSN AU Option
NHSN Structure
Antimicrobial Use (AU) Option Reporting
AU Option

- Released in 2011

- Purpose:
  - Provide a mechanism for facilities to report and analyze antimicrobial usage as part of antimicrobial stewardship efforts at their facility

- Voluntary reporting
  - Not part of CMS Quality Reporting Programs
  - *Included as one option for Public Health Registry reporting for Promoting Interoperability (formerly called Meaningful Use Stage 3)


*NHSN MU3 page: https://www.cdc.gov/nhsn/cdaportal/meaningfuluse.html
CMS Promoting Interoperability Program

- Data for both AU and AR Options required
- Steps for participation
  - Prerequisite – have a certified vendor: https://chpl.healthit.gov/#/search
  - Step 1: Register intent to submit within NHSN application
  - Step 2: Testing and validation of CDA files
  - Step 3: Reporting production data
- **Important note**: AUR Module is the only part of NHSN that qualifies
Requirements for AU Data Submission
Who Can Participate?

- Hospitals* that have:
  - Electronic Medication Administration Record (eMAR), or
  - Bar Coding Medication Administration (BCMA) systems and
  - Admission Discharge Transfer (ADT) System

AND

- Ability to collect and package data using HL7 standardized format: Clinical Document Architecture
  - Commercial software vendors: http://www.sidp.org/aurvendors
  - “Homegrown” vendors (facility’s internal IT/Informatics resources)

*General acute care hospitals, long-term acute care hospitals (LTAC), inpatient rehabilitation facilities (IRF), oncology hospitals, critical access hospitals enrolled in NHSN & participating in the Patient Safety Component
AU Option Data Elements – Numerator

- Numerator: Antimicrobial days (Days of Therapy) – sum of days for which any amount of specific agent was administered to a patient
  - 91 antimicrobials – includes antibacterial, antifungal, and anti-influenza agents
    - Sub-stratified by route of administration:
      - Intravenous (IV)
      - Intramuscular (IM)
      - Digestive (oral → rectal)
      - Respiratory (inhaled)
  - Only administration data (eMAR/BCMA)
Counting Antimicrobial Days

- 1 antimicrobial day per: 1 patient, 1 drug, 1 location, 1 calendar day
  - Regardless of how many administrations patient receives
Counting Antimicrobial Days

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- Example: Patient admitted to 1 South (Medical Ward) Monday 2200 & discharged Wednesday 1200

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meropenem</strong></td>
<td>1 gram IV every 8 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Amikacin</strong></td>
<td>1000mg IV every 24 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Antimicrobial Days</strong></td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Day</th>
<th>Drug</th>
<th>Dosage</th>
<th>Administration</th>
<th>Given</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>Meropenem 1 gram</td>
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<td></td>
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<tr>
<td></td>
<td>Amikacin 1000mg</td>
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<td>Given:2300</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>Total Antimicrobial Days</td>
<td></td>
<td>Meropenem = 1</td>
<td></td>
</tr>
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<tr>
<td><strong>Meropenem</strong></td>
<td>Given: 2300</td>
<td>Given: 0700</td>
<td>Meropenem = 1</td>
</tr>
<tr>
<td>1 gram IV every 8 hours</td>
<td></td>
<td>Given: 1500</td>
<td>Amikacin = 1</td>
</tr>
<tr>
<td><strong>Amikacin</strong></td>
<td>Given: 0700</td>
<td>Given: 2300</td>
<td>Amikacin = 1</td>
</tr>
<tr>
<td>1000mg IV every 24 hours</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Antimicrobial Days**

Meropenem = 1
Amikacin = 1
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</tr>
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</tr>
</tbody>
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Antimicrobial Days – Total vs Sub-Stratified Routes

- 1 antimicrobial day per: 1 patient, 1 drug, 1 route, 1 location, 1 calendar day
  - 1 total antimicrobial day per drug & 1 antimicrobial day for each route per drug
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**Antimicrobial Days – Total vs Sub-Stratified Routes**

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<table>
<thead>
<tr>
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<th>Tuesday</th>
<th>Wednesday</th>
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</table>
| Ciprofloxacin twice daily | Admitted 1200  
Given IV: 2300 | Cipro Total: 1  
Cipro IV: 1  
Cipro Digestive: 0 |
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<tbody>
<tr>
<td><strong>Antimicrobial</strong></td>
<td><strong>Day Counts</strong></td>
<td><strong>Counts</strong></td>
<td><strong>Counts</strong></td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>Admitted 1200</td>
<td>Given IV: 1100</td>
<td>Given oral: 2300</td>
</tr>
<tr>
<td>twice daily</td>
<td>Given IV: 2300</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cipro Total: 1</td>
<td>Cipro Total: 1</td>
<td>Cipro Digestive: 1</td>
</tr>
<tr>
<td></td>
<td>Cipro IV: 1</td>
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<tr>
<td>Ciprofloxacin twice daily</td>
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</tr>
<tr>
<td></td>
<td>Given IV: 2300</td>
<td></td>
<td><strong>Discharged</strong> 1500</td>
</tr>
<tr>
<td>Antimicrobial Day Counts</td>
<td><strong>Cipro Total:</strong> 1</td>
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</tr>
<tr>
<td></td>
<td>Cipro IV: 1</td>
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</tr>
<tr>
<td></td>
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</table>
Antimicrobial Days – Sum of the Routes

- 1 patient can attribute 1 antimicrobial day to **multiple** routes in the same calendar day.
- Routes **cannot** be summed to come up with the total antimicrobial days.
- For drugs given more than once daily via multiple routes: **Total antimicrobial days ≤ Sum of the routes**

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**Antimicrobial Day Counts**

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</tr>
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</table>
AU Option Data Elements – Denominators

- **Denominators:**
  - **Days Present** – number of days in which a patient spent *any* time in specific unit or facility
    - Reported for all individual locations & FacWideIN
    - Days present ≠ Patient days
    - Used for AU data only
      - Patient days throughout rest of NHSN (including HAI & AR)
  - **Admissions** – number of patients admitted to an inpatient location in the facility
    - Reported for FacWideIN only
    - Same definition used throughout NHSN
## Counting Days Present

<table>
<thead>
<tr>
<th>Patient Movement</th>
<th>Days Present</th>
<th>Patient Days (Midnight count)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient A Medical Ward: 00:01-24:00</td>
<td>Medical Ward = 1</td>
<td>Medical Ward = 1</td>
</tr>
<tr>
<td>Patient B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient D</td>
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<td>Medical ICU: 00:01-24:00</td>
<td>Medical ICU = 1</td>
</tr>
<tr>
<td>Patient C</td>
<td>Medical ICU: 00:01-08:30, Medical Ward: 08:31-24:00</td>
<td>Medical ICU = 1, Medical Ward = 1</td>
</tr>
<tr>
<td>Patient D</td>
<td></td>
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</table>
| Patient C Medical ICU: 00:01-08:30  
Medical Ward: 08:31-24:00 | Medical ICU = 1  
Medical Ward = 1 | Medical ICU = 0  
Medical Ward = 1 |
| Patient D Medical ICU: 00:01-10:00  
Step Down: 10:01-15:00  
Medical Ward: 15:01-24:00 | Medical ICU = 1  
Step Down = 1  
Medical Ward = 1 | Medical ICU = 0  
Step Down = 0  
Medical Ward = 1 |
| **Totals:**               |              |                               |
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<td>Medical ICU = 1</td>
</tr>
<tr>
<td></td>
<td>Step Down: 10:01-15:00</td>
<td>Step Down = 1</td>
</tr>
<tr>
<td></td>
<td>Medical Ward: 15:01-24:00</td>
<td>Medical Ward = 1</td>
</tr>
<tr>
<td><strong>Totals:</strong></td>
<td>Medical Ward = 3</td>
<td>Medical Ward = 3</td>
</tr>
<tr>
<td></td>
<td>Medical ICU = 3</td>
<td>Medical ICU = 1</td>
</tr>
<tr>
<td></td>
<td>Step Down = 1</td>
<td>Step Down = 0</td>
</tr>
</tbody>
</table>
AU Option: Summary Data

- Monthly aggregate, summary-level data
  - By location
    - All inpatient locations individually
    - All inpatient locations combined (Facility-wide Inpatient - aka FacWideIN)
    - 3 outpatient locations (ED, pediatric ED, 24 hour observation)
    - **Use same mapped locations throughout all of NHSN**
    - **Important:** Requires accurate/complete electronic capture of both the numerator and denominator for the given location

- Data are aggregated prior to sending to NHSN
- No patient-level data shared with NHSN for AU Option
Submitting AU Data into NHSN
Clinical Document Architecture (CDA)

- Data must be uploaded via CDA
  - Too much data to enter by hand!
- Health Level 7 (HL7) standard
- Provides facilities with standardized way to package & upload data
  - AU, AR, & HAI
- CDA ≠ CSV (Excel)
  - CDA uses XML
From eMAR/BCMA to CDA

1. eMAR/BCMA captures drug administration
2. Vendor or “Homegrown” system extracts & aggregates data elements
   a) Numerator – eMAR/BCMA
   b) Denominator – ADT (admission, discharge, transfer) system
3. Vendor or “Homegrown” system packages AU data into CDA files
   a) 1 file per month per patient care location (unit)
Monthly AU Data Submission

- Recommend: Upload within 30 days following the completion of the month
- 1 CDA file per location & 1 CDA file for FacWideIN
  - Each single CDA file contains numerator and denominator(s) for given location
  - All CDA files can be uploaded within 1 Zip file
    - Maximum: 1000 CDAs or file size of 2 MB per zip file
- Encourage reporting data from **ALL** applicable inpatient and select outpatient locations
Example Monthly AU Data Submission

- Remember: 1 CDA file per location & 1 CDA file for FacWideIN

- Example for a facility with 4 patient care locations
  - 1 CDA for 1 North - Adult Medical/Surgical ICU
  - 1 CDA for 1 South - Adult Medical/Surgical Ward
  - 1 CDA for 2 North - Pediatric Medical/Surgical Ward
  - 1 CDA for Emergency Department
  - 1 CDA for FacWideIN (combination of all 3 NHSN-defined inpatient locations above)
Monthly Reporting Plans

- Add locations to monthly reporting plan prior to uploading data
  - Along with FacWideIN, each inpatient and outpatient location is listed separately
- Same monthly reporting plan used for HAI reporting
Importing CDA Files into NHSN

- Manual upload
- Automatic upload from vendor/IT solution using DIRECT CDA Automation

Quick Learn Video - Uploading CDA Files into NHSN: [https://youtu.be/T4DLtmpB5M](https://youtu.be/T4DLtmpB5M)
Flow of AU Data: From Bedside to NHSN

eMAR/BCMA & ADT

Vendor/Homegrown System
- Monthly summary
- Location specific & FacWideIN
  - 91 antimicrobials
  - Days present & admissions

Report in standard format

Local access of data: NHSN Analysis & data sharing via NHSN Group

Stewards can compare:
- Internally by months/locations
- Externally using Standardized Antimicrobial Administration Ratios (SAARs)
Steps for Facility Participation

- Prerequisite: eMAR/BCMA system for inpatient locations
- Identify facility lead(s)/champion(s) for AU Option
- Gain support!
- Gather information on current CDA submission capabilities
  - Activate, obtain, or develop system for aggregating and packaging data into CDA files
- Validation - [https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/aur/AU-Option-Implementation-Data-Validation-P.pdf](https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/aur/AU-Option-Implementation-Data-Validation-P.pdf)
- Monthly submission
AU Option Analysis Reports
AU Option Report Types

- **Line Lists & Rate Tables**
  - Most recent month or All months
  - By individual location or FacWideIN
  - Rate table only: category/class or selected drugs

- **Pie Charts & Bar Charts**
  - Most recent month or All months
  - Specific categories/classes

- **SAARs**
  - All SAAR locations combined or individual SAAR locations
### Line List – Example

- Default report: Line List – Most recent month of AU Data by Location
  - Default reports show NHSN variable names as column headers

#### National Healthcare Safety Network

**Line Listing - Most Recent Month of AU Data by Location**

As of: February 14, 2018 at 12:47 PM

Data Range: All SUMMARYAU/MONTH

<table>
<thead>
<tr>
<th>orgID</th>
<th>summaryYM</th>
<th>drug/ingredientDesc</th>
<th>location</th>
<th>antimicrobial/Days</th>
<th>numDaysPresent</th>
<th>numAdmissions</th>
<th>IM_Count</th>
<th>IV_Count</th>
<th>digestive_Count</th>
<th>respiratory_Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>13360</td>
<td>2018M09</td>
<td>AMAN - Amantadine</td>
<td>PEDSURG</td>
<td>0</td>
<td>379</td>
<td>.</td>
<td>0</td>
<td>0</td>
<td>.</td>
<td>0</td>
</tr>
<tr>
<td>13360</td>
<td>2018M09</td>
<td>AMK - Amikacin</td>
<td>PEDSURG</td>
<td>25</td>
<td>379</td>
<td>.</td>
<td>0</td>
<td>20</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>13360</td>
<td>2018M09</td>
<td>AMOX - Ampicillin</td>
<td>PEDSURG</td>
<td>19</td>
<td>379</td>
<td>.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>13360</td>
<td>2018M09</td>
<td>AMOX/VC - Amoxicillin with Clavulanate</td>
<td>PEDSURG</td>
<td>7</td>
<td>379</td>
<td>.</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13360</td>
<td>2018M09</td>
<td>AMP - Ampicillin</td>
<td>PEDSURG</td>
<td>20</td>
<td>379</td>
<td>.</td>
<td>3</td>
<td>17</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13360</td>
<td>2018M09</td>
<td>AMPH - Amphicillin</td>
<td>PEDSURG</td>
<td>0</td>
<td>379</td>
<td>.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Location: Pedsurg (pediatric surgical ward)
### Line List – Example

<table>
<thead>
<tr>
<th>orgID</th>
<th>summaryYM</th>
<th>drugIngredientDesc</th>
<th>location</th>
<th>antimicrobialDays</th>
<th>numDaysPresent</th>
<th>numAdmissions</th>
<th>IM_Counter</th>
<th>IV_Counter</th>
<th>digestive_Counter</th>
<th>respiratory_Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMAN - Amantadine</td>
<td>PEDSURG</td>
<td>0</td>
<td>379</td>
<td>.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMK - Amikacin</td>
<td>PEDSURG</td>
<td>25</td>
<td>379</td>
<td>.</td>
<td>0</td>
<td>20</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMOX - Amoxicillin</td>
<td>PEDSURG</td>
<td>19</td>
<td>379</td>
<td>.</td>
<td>0</td>
<td>0</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMOXWC - Amoxicillin with Clavulanate</td>
<td>PEDSURG</td>
<td>7</td>
<td>379</td>
<td>.</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMP - Ampicillin</td>
<td>PEDSURG</td>
<td>20</td>
<td>379</td>
<td>.</td>
<td>3</td>
<td>17</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMPH - Amphotericin B</td>
<td>PEDSURG</td>
<td>0</td>
<td>379</td>
<td>.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Showing September 2018: summaryYM = 2018M09
- One row per drug: drugIngredientDesc
### National Healthcare Safety Network

**Line Listing - Most Recent Month of AU Data by Location**

As of: February 14, 2019 at 12:47 PM  
Data Range: All SUMMARYAU/MONTH  
If (location = 'FACNURSEIN')

Data for example only

---

#### Line List – Example

<table>
<thead>
<tr>
<th>orgID</th>
<th>summaryYM</th>
<th>ingredientDesc</th>
<th>location</th>
<th>antibacterialDays</th>
<th>numDaysPresent</th>
<th>numAdmissions</th>
<th>IM_Count</th>
<th>IV_Count</th>
<th>digestive_Count</th>
<th>respiratory_Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMAN - Amantadine</td>
<td>PEDSURG</td>
<td>0</td>
<td>379</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMK - Amikacin</td>
<td>PEDSURG</td>
<td>25</td>
<td>379</td>
<td></td>
<td>0</td>
<td>20</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMOX - Amoxicillin</td>
<td>PEDSURG</td>
<td>19</td>
<td>379</td>
<td></td>
<td>0</td>
<td>0</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMOX/IC - Amoxicillin with Clavulanate</td>
<td>PEDSURG</td>
<td>7</td>
<td>379</td>
<td></td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMP - Ampicillin</td>
<td>PEDSURG</td>
<td>20</td>
<td>379</td>
<td></td>
<td>3</td>
<td>17</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMPH - Amphotericin B</td>
<td>PEDSURG</td>
<td>0</td>
<td>379</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- **Total antimicrobial days for the drug**: antibacterialDays
- **Routes of administration**: IM_Count, IV_Count, digestive_Count, respiratory_Count
## Line List – Example

### National Healthcare Safety Network
**Line Listing - Most Recent Month of AU Data by Location**

As of: February 14, 2019 at 12:47 PM  
**Data Range:** AU SUMMARY/1 MONTH  

if ([location = "FACWIDEIN"])

### Data for example only

<table>
<thead>
<tr>
<th>orgID</th>
<th>summaryYM</th>
<th>drugingredientDesc</th>
<th>location</th>
<th>antimicrobialDays</th>
<th>numDaysPresent</th>
<th>numAdmissions</th>
<th>IM_Count</th>
<th>IV_Count</th>
<th>digestive_Count</th>
<th>respiratory_Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMAN - Amantadine</td>
<td>PEDSURG</td>
<td>0</td>
<td>379</td>
<td></td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMK - Amikacin</td>
<td>PEDSURG</td>
<td>25</td>
<td>379</td>
<td></td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMOX - Amoxicillin</td>
<td>PEDSURG</td>
<td>19</td>
<td>379</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMOX/WC - Amoxicillin with Clavulanate</td>
<td>PEDSURG</td>
<td>7</td>
<td>379</td>
<td></td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMP - Ampicillin</td>
<td>PEDSURG</td>
<td>20</td>
<td>379</td>
<td></td>
<td>3</td>
<td>17</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13860</td>
<td>2018M09</td>
<td>AMPH - Amphotericin B</td>
<td>PEDSURG</td>
<td>0</td>
<td>379</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Total days present for the location: numDaysPresent
- Total admissions: numAdmissions
  - Value only populated on FacWideIN record
In September 2018, in the PEDSURG unit, Amikacin was used for a total of 25 antimicrobial days
- 20 days via IV route
- 5 days via respiratory route
### AU Rate Tables

- Show the rate of utilization per 1,000 days present or 100 admissions

- Three types:
  1. Rates for SAAR-like agent groupings
  2. Rates by antimicrobial category & class by location & time period
  3. Rates by specific agent
     - Single drug, drugs within the same class, drugs in multiple classes

<table>
<thead>
<tr>
<th>Antimicrobial Use Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAAR Report - All Adult and Ped SAARs (2017 Baseline)</td>
</tr>
<tr>
<td>SAAR Report - All Adult and Ped SAARs by Location (2017 Baseline)</td>
</tr>
<tr>
<td>SAAR Report - All Neonatal SAARs (2018 Baseline)</td>
</tr>
<tr>
<td>SAAR Report - All Neonatal SAARs by Location (2018 Baseline)</td>
</tr>
<tr>
<td>Rate Table - Drugs Predominantly Used for Extensively AR Bacteria (2017 Baseline)</td>
</tr>
<tr>
<td>Rate Table - Select Antimicrobial Groupings for Neonatal Units (2018 Baseline)</td>
</tr>
<tr>
<td>Line Listing - Most Recent Month of AU Data for FACWIDEIN</td>
</tr>
<tr>
<td>Line Listing - Most Recent Month of AU Data by Location</td>
</tr>
<tr>
<td>Line Listing - All Submitted AU Data for FACWIDEIN</td>
</tr>
<tr>
<td>Line Listing - All Submitted AU Data by Location</td>
</tr>
<tr>
<td>Rate Table - Most Recent Month of AU Data - Antimicrobial Utilization Rates for FACWIDEIN</td>
</tr>
<tr>
<td>Rate Table - All Submitted AU Data - Antimicrobial Utilization Rates for FACWIDEIN</td>
</tr>
<tr>
<td>Rate Table - Most Recent Month of AU Data - Antimicrobial Utilization Rates by Location</td>
</tr>
<tr>
<td>Rate Table - All Submitted AU Data - Antimicrobial Utilization Rates by Location</td>
</tr>
<tr>
<td>Rate Table - Selected Drugs - FACWIDEIN - Most Recent Month</td>
</tr>
<tr>
<td>Rate Table - Selected Drugs - FACWIDEIN - All Months</td>
</tr>
<tr>
<td>Rate Table - Selected Drugs - by Location - Most Recent Month</td>
</tr>
<tr>
<td>Rate Table - Selected Drugs - by Location - All Months</td>
</tr>
</tbody>
</table>
### Rate Tables

**National Healthcare Safety Network**

**Rate Table - All Submitted AU Data - Antimicrobial Utilization Rates for FACWIDEIN**

**Rate per 1,000 Days Present**

As of: December 15, 2019 at 4:40 PM  
Date Range: AU_RATESFACWIDEIN summaryYM 2015M05 to 2015M06

Facility Org ID=13860

<table>
<thead>
<tr>
<th>Summary Year/Month</th>
<th>Antimicrobial Category</th>
<th>Antimicrobial Class</th>
<th>Antimicrobial Days</th>
<th>Days Present</th>
<th>Rate per 1,000 Days Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019M06</td>
<td>Antibacterial</td>
<td>-- All --</td>
<td>923</td>
<td>700</td>
<td>1318.571</td>
</tr>
<tr>
<td>2019M06</td>
<td>Antibacterial</td>
<td>Aminoglycosides</td>
<td>15</td>
<td>700</td>
<td>21.429</td>
</tr>
<tr>
<td>2019M06</td>
<td>Antibacterial</td>
<td>B-lactam/ B-lactamase inhibitor combination</td>
<td>18</td>
<td>700</td>
<td>25.714</td>
</tr>
<tr>
<td>2019M06</td>
<td>Antibacterial</td>
<td>Carbapenems</td>
<td>12</td>
<td>700</td>
<td>17.143</td>
</tr>
<tr>
<td>2019M06</td>
<td>Antibacterial</td>
<td>Cephalosporins</td>
<td>48</td>
<td>700</td>
<td>68.571</td>
</tr>
<tr>
<td>2019M06</td>
<td>Antibacterial</td>
<td>Fluoroquinolones</td>
<td>15</td>
<td>700</td>
<td>21.429</td>
</tr>
<tr>
<td>2019M06</td>
<td>Antibacterial</td>
<td>Folate pathway inhibitors</td>
<td>6</td>
<td>700</td>
<td>8.571</td>
</tr>
</tbody>
</table>

- In June 2019, in all the inpatient locations combined (FacWideIN) all antibacterial agents were used at a rate of 1318.571 days per 1,000 days present

*Data for example only*
Rate Tables

<table>
<thead>
<tr>
<th>Facility Org ID</th>
<th>Antimicrobial Category</th>
<th>Antimicrobial Class</th>
<th>Days Present</th>
<th>Rate per 1000 Days Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>13860</td>
<td>Antibacterial</td>
<td>Carbapenems</td>
<td>12</td>
<td>17.143</td>
</tr>
</tbody>
</table>

- Carbapenems were used in all the inpatient locations combined at a rate of 17.143 days per 1,000 days present
Standardized Antimicrobial Administration Ratio (SAAR)
What is a SAAR?

- SAAR Definition
  - Standardized risk-adjusted metric of antimicrobial use
  - Available to facilities reporting to the AU Option in NHSN
  - Compares observed to predicted days of antimicrobial use

\[
\frac{\text{Observed}}{\text{Predicted}} = \frac{100 \text{ antimicrobial days observed}}{85 \text{ antimicrobial days predicted}} = 1.176
\]
Where can I find the SAAR details?

  - Training videos
  - Protocol
  - Analysis resources
SAAR Baselines

- 2014 adult and pediatric SAAR models
- 2017 adult and pediatric SAAR models
- 2018 neonatal SAAR models
Generating SAAR Reports

- After clicking Analysis then Reports:
  - Select “All SAARs” to see SAARs rolled up to location group level
    - For example: BSHO SAAR for all adult SAAR ICUs combined
  - Select “All SAARs by Location” to see SAARs at location level
    - For example: BSHO SAAR for Med ICU, Surg ICU, and MS ICU separated
**Basic SAAR Report**

National Healthcare Safety Network  
SAARs Table - All Adult and Pediatric Standardized Antimicrobial Administration Ratios (SAARs) High-Level Indicators and High-Value Targets by Location (2017 Baseline)  
As of: January 3, 2020 at 10:10 AM  
Data Range: All AU_SAAR_2017

Broad spectrum antibacterial agents predominantly used for hospital-onset infections used in adult SAAR wards

| Facility Org ID | SAAR Type 2017 Baseline | Location | Summary Year/Month | CDC Location | Antimicrobial Days | Predicted Antimicrobial Days | Days Present | SAAR | p- value | 95% CI
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>13860</td>
<td>Adult_BSHO_Ward_2017</td>
<td>5GNORTH</td>
<td>2019M03</td>
<td>IN:ACUTE:WARD MS</td>
<td>144</td>
<td>131.744</td>
<td>1145</td>
<td>1.093</td>
<td>0.3056</td>
<td>0.925, 1.283</td>
</tr>
<tr>
<td>13860</td>
<td>Adult_BSHO_Ward_2017</td>
<td>5GNORTH</td>
<td>2019M04</td>
<td>IN:ACUTE:WARD MS</td>
<td>158</td>
<td>62.248</td>
<td>541</td>
<td>2.538</td>
<td>0.0000</td>
<td>2.165, 2.958</td>
</tr>
<tr>
<td>13860</td>
<td>Adult_BSHO_Ward_2017</td>
<td>700</td>
<td>2019M03</td>
<td>IN:ACUTE:WARD S</td>
<td>146</td>
<td>129.213</td>
<td>1123</td>
<td>1.130</td>
<td>0.1560</td>
<td>0.958, 1.325</td>
</tr>
<tr>
<td>13860</td>
<td>Adult_BSHO_Ward_2017</td>
<td>700</td>
<td>2019M04</td>
<td>IN:ACUTE:WARD S</td>
<td>134</td>
<td>129.213</td>
<td>1123</td>
<td>1.037</td>
<td>0.5967</td>
<td>0.872, 1.224</td>
</tr>
<tr>
<td>13860</td>
<td>Adult_BSHO_Ward_2017</td>
<td>MEDWARD</td>
<td>2019M03</td>
<td>IN:ACUTE:WARD M</td>
<td>131</td>
<td>87.085</td>
<td>700</td>
<td>1.504</td>
<td>0.0000</td>
<td>1.263, 1.779</td>
</tr>
<tr>
<td>13860</td>
<td>Adult_BSHO_Ward_2017</td>
<td>MEDWARD</td>
<td>2019M04</td>
<td>IN:ACUTE:WARD M</td>
<td>33</td>
<td>87.085</td>
<td>700</td>
<td>0.379</td>
<td>0.0000</td>
<td>0.265, 0.526</td>
</tr>
</tbody>
</table>

Any reported use of Colistin will be combined with and reported as Colistimethate. Any reported use of Amikacin Liposomal will be combined with and reported as Amikacin.

Includes data for January 2017 and forward.

The SAAR is only calculated if the number of predicted antimicrobial days (numAUDaysPredicted) is >=1.

If antimicrobial days exceed days present for any SAAR categories except the All Antibacterial SAAR, a SAAR will not be calculated and data should be validated for accuracy.

Data restricted to medical, medical-surgical, surgical, step down and oncology locations.

Source of aggregate data: 2017 NHSEN AU Data

Data contained in this report were last generated on December 11, 2019 at 3:13 PM, to include data beginning January 2016

Data for example only
Reading the SAAR Report

5GNorth reported 158 antimicrobial days in the BSHO category
Reading the SAAR Report

5GNorth reported 158 antimicrobial days in the BSHO category

Based on the SAAR model, 62.248 antimicrobial days were predicted
5GNorth reported 158 antimicrobial days in the BSHO category.

Based on the SAAR model, 62.248 antimicrobial days were predicted.

5GNorth SAAR = \( \frac{158 \text{ Reported Antimicrobial Days}}{62.248 \text{ Predicted Antimicrobial Days}} \) = 2.538
Reading the SAAR Report

5GNorth reported 158 antimicrobial days in the BSHO category.

Based on the SAAR model, 62.248 antimicrobial days were predicted.

$$5GNorth\ SAAR = \frac{158\ Reported\ Antimicrobial\ Days}{62.248\ Predicted\ Antimicrobial\ Days} = 2.538$$

Based on the p-value (0.0000) & 95% CI (2.165, 2.958), the SAAR is statistically different than 1.

Data for example only
Additional Options for Analysis – Modifications

- Modify default NHSN reports
Additional Options for Analysis – Export

- Export data from NHSN
  - Excel, SAS, Access, etc.
Reporting Metrics
Submission Metrics

- 1560 facilities submitted at least one month of data
  - From 49 states (+AE & DC)
  - Bed size
    - Average = 211
    - Median = 157
    - Min/Max = 3, 1455
  - Teaching status
    - Teaching: 70%
      - (of all Teaching) Major teaching: 53%

*As of Jan 1, 2020*
Percentage of facilities reporting at least one month of data to NHSN's AU Option

*As of 1/1/2020
AUR Module Reporting Resources
NHSN AUR Module Resources


Surveillance for Antimicrobial Use and Antimicrobial Resistance Options

Resources for NHSN Users Already Enrolled

- Training
- Protocols
- Frequently Asked Questions
- Data Validation
- Data Collection Forms
- Supporting Material
- Analysis Resources

Resources to Help Prevent Infections

- HAI Prevention in Long-term Care Settings
- Resources for Patients and Healthcare Providers
- HHS Action Plan to Prevent Healthcare-associated Infections
- Management of Multidrug-Resistant Organisms In Healthcare Settings, 2006
- Guideline for Environmental Infection Control in Healthcare Facilities, 2003
  - See: C. difficile Excerpt
NHSN AUR Module Resources

- NHSN AUR Protocol:

- NHSN Analysis Quick Reference Guides:

- NHSN CDA Submission Support Portal
  - [https://www.cdc.gov/nhsn/cdaportal/index.html](https://www.cdc.gov/nhsn/cdaportal/index.html)
Thank you!

NHSN Helpdesk
(protocol & submission questions)
NHSN@cdc.gov

NHSN CDA Helpdesk
(technical CDA related questions)
NHSNCDA@cdc.gov

For more information, contact CDC
1-800-CDC-INFO (232-4636)

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.