# **Antimicrobial Resistance (AR) Option Helpful Hints**

## Important URLs

* NHSN AR Option Protocol: <http://www.cdc.gov/nhsn/acute-care-hospital/aur/index.html>
* [NHSN CDA Submission Support Portal (CSSP)](http://www.cdc.gov/nhsn/cdaportal/index.html)
* For validation of CDAs without all the business rules of NHSN, use the Lantana CDA validator: <https://www.lantanagroup.com/validator/>
* AR Synthetic Data Set Validation: <https://www.cdc.gov/nhsn/cdaportal/sds/index.html>
* IMPORTANT NOTE: Synthetic Data Set validation is required for all AR CDA vendors. Please review the information provided at the website above.

## Implementation Guide (IG) Notes

* AR Events
  + AR Events with specimen collection dates of December 31, 2021 and prior must use the R1 Normative IG
  + AR Events with specimen collection dates of January 1, 2022 and forward must use the R3 Normative IG
* AR Summary records
  + AR Summary records for December 2020 and prior must use R1 Normative IG
  + AR Summary records for January-December 2021 can use either the R1 Normative or the R3-D4 IG
  + AR Summary records for January 2022 and forward must use R3-D4 IG

## Helpful Hints

### Data Import/Deletion

* Facilities cannot enter or modify AR Option Summary data by hand through the web interface. Facilities can only enter and modify AR data through the CDA Import Function or import via DIRECT CDA Automation.
* For an AR import to occur for a facility, the facility must have the Patient Safety Component activated.
* NHSN requires you to include AR in the Monthly Reporting Plan for the month in which you are reporting.
  + A facility cannot enter AR data “off-plan.”
* Application business rule for monthly reporting plan:
  + The Facility must list FacWideIN in the plan with the AR Option box checked.
  + **Note:** The NHSN application does not allow facilities to list individual inpatient locations for the AR Option monthly reporting plan. Listing FacWideIN is all that’s required to submit AR data collected in inpatient locations.
  + List all individual outpatient locations (Emergency Department, Pediatric Emergency Department, and 24-hour Observation Area) as separate rows in the monthly reporting plan with the AR Option box checked.
* AR Option reporting includes two CDA types: AR Event & AR Summary
  + Each CDA event represents a specific AR Event with 1 specimen, 1 organism, and susceptibility data for all drugs required for the given organism.
  + Each CDA summary represents a specific month/year for FacWideIN, Emergency Department, Pediatric Emergency Department, or 24-hour Observation Area.
* NHSN will allow CDA summary import for a completed month.
  + Example: Upload October AR summary data beginning November 1.
* NHSN will allow CDA event import within a current calendar month.
  + Example: October 4 specimen can be uploaded October 24. Note that NHSN does not expect facilities to upload more often than once per month by the end of the subsequent month.
* NHSN recommends that facilities upload data into NHSN for a given calendar month by the end of the subsequent calendar month.
* For manual CDA upload, users can include multiple CDAs from one facility in ONE zip file.
  + Example:
    - 50 CDAs representing 50 AR Events that met the NHSN AR Option protocol definitions
    - 1 CDA reporting summary data for FacWideIN (includes patient days and admissions)
    - 1 CDA reporting summary data for Emergency Department (includes encounters)
    - 1 CDA reporting summary data for 24-hour Observation Area (includes encounters)
    - One zip file containing all AR CDAs
* For DIRECT upload, users can include multiple CDAs from multiple facilities in one zip file using the same DIRECT address.
* The NHSN User Interface includes a delete capability for AR.
  + Summary Data > Delete AUR Data
    - Select Summary Data Type = Antimicrobial Resistance Data
    - Location = (FacWideIN, ED, Pediatric ED, or 24-hour Observation Area)
    - Select the relevant Month and Year
    - Click the Delete button
  + Event > Find
    - Select the Event Type (AR – Antimicrobial Resistance) then click Find.
    - Locate the selected AR Event on the Event List.
    - Click the box in the Delete column next to the selected AR Event.
    - Click the Delete button at the top of the column to delete the event.
* Facilities can update an existing record using succession management as defined in the HAI CDA Implementation Guide. Specifics found at <http://www.cdc.gov/nhsn/cdaportal/faqs.html>.

### Patient Information

* The patientID can be a maximum 15 alphanumeric characters long.
* Admission status: Was the patient admitted during this encounter?
  + Report True (Yes) if the specimen was collected in an inpatient location.
  + Report True (Yes) if the specimen was collected in an outpatient location (for example, ED) and the patient was transferred to an inpatient location.
  + Report True (Yes) if the specimen was collected in an outpatient location and the facility discharges from the ED or 24hr observation area, then admits to inpatient (instead of transferring), when less than 24 hours between ED or 24hr observation area discharge and inpatient admit (at the same hospital).
  + Report False (No) if the specimen was collected in an outpatient location and the patient transferred to another facility or was discharged and did not return within 24 hours.
* Admission date
  + The date admitted to the facility is the calendar date that the patient physically locates to an inpatient location.
  + If the specimen was collected in an inpatient location, use the date of admission for this field
  + If the specimen was collected in an outpatient location, use the admissions status variable as a guide:
    - If the admission status variable is True (Yes), then use the date the patient was admitted to the inpatient location for this field
    - If the admission status variable is False (No), then use the encounter date (the date the patient arrived in the first outpatient location) for this field
      * If the specimen was collected on day 2 in an outpatient location, report the date of the first day in the outpatient location
      * If patient is transferred to a subsequent outpatient location and specimen is collected in the second outpatient location, report the date the patient entered the first outpatient location
  + If patient was discharged from the ED then later admitted to an inpatient location beyond 24 hours after the ED discharge, any specimens collected during the first ED visit should use the original encounter date for this field in the AR Event.

### Locations

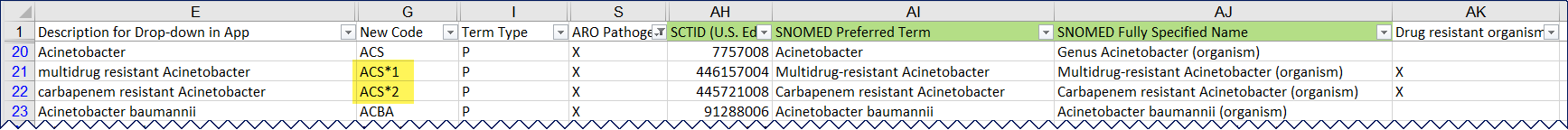
* NHSN strongly encourages reporting specimens from all NHSN defined inpatient locations and three select outpatient locations: Emergency Department (ED), Pediatric Emergency Department, and 24-hour Observation Area at each facility.
* FacWideIN is the only “location” necessary for a facility to include in the monthly reporting plan to submit AR Option data for inpatient locations.
* Facilities can submit AR Option event data from select outpatient locations: Emergency Department, Pediatric Emergency Department, and 24-hour Observation Area.
  + Facilities can submit AR event data from the above listed outpatient locations retrospectively back to January 2012.
  + Facilities must list the outpatient locations as separate lines in the monthly reporting plan.
  + Facilities can submit AR Summary data from outpatient locations for January 2021 forward using the R3-D4 IG.
    - AR Summary data from outpatient locations cannot be submitted using the R1 IG.

### SNOMED – Specimen Sources

* Isolates with a specimen collection date/time after the discharge date/time should not be reported.
* Submitters can report all specimen sources included in the Specimen Source tab of the IDM with an “X” in the “Valueset: ARSpecimenSource” column to the AR Option.
  + Use Specimen Source 2025 tab for specimens collected 1/1/2025 and after.
* The Specimen Source tab in the IDM provides further a breakdown of the specimen sources into the specific categories outlined in the AR Option Protocol:
  + Specimen category = Non-invasive
    - AR\_LRI Specimen = Lower Respiratory
    - AR\_Urine Specimen = Urine
    - NEW for 2025: AR\_Skin, Soft Tissue, Wound, Musculoskeletal Specimen = Skin, Soft Tissue, Wound, Musculoskeletal
  + Specimen category = Invasive
    - AR Blood Specimen = Blood
    - AR\_CSF Specimen = Cerebrospinal Fluid
* Do not include SNOMED children codes unless specifically listed in the “ARSpecimenSource” column of the Specimen Source tab in the IDM.

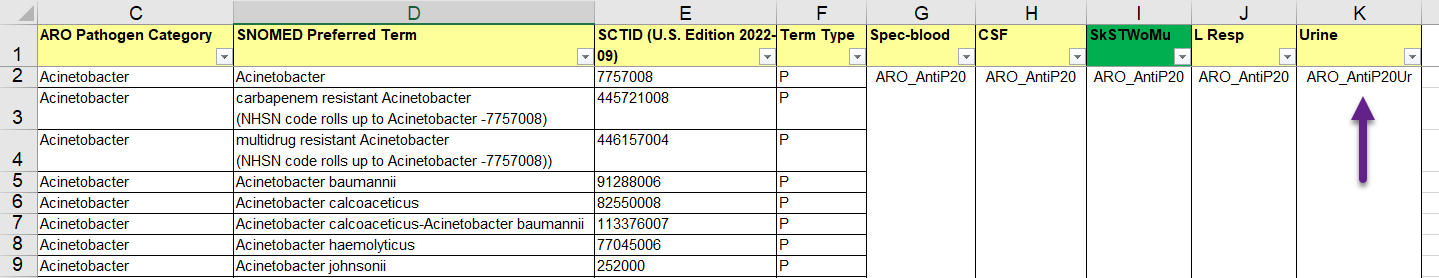
### SNOMED – Pathogen Codes

* For 2025 reporting, please refer to the AR Option Pathogen Roll-up\_2025.xlsx (in the AR CDA Toolkit) for the complete list of eligible SNOMED codes for 2025.
  + The AR Option Pathogen Roll-up Workbook must be used by all submitters to determine if a pathogen is eligible for submission into the AR Option and whether that pathogen needs to be rolled up to (or mapped-to) a higher-level concept to be accepted into NHSN.
  + Facilities/vendors should first perform the roll-up of organisms before applying subsequent reporting rules.
  + When genus level codes are eligible for reporting, remember to report the species level code, if provided by the lab, to prevent over de-duplication of AR Events.
* All pathogens/organisms in the Pathogen Codes tabs of the IDM with an “X” in the “ARO Pathogen” column are reportable. Please refer to the guidance below when determining which Pathogen Codes tab to review:
  + Use Pathogen Codes 2025 for AR Events = 2025
  + Use Pathogen Codes 2024 for AR events = 2024
  + Use Pathogen Codes 2023-Preferred for AR events = 2023
  + Use Pathogen Codes 2021 for AR events = 2022
    - Note: There is not a tab for 2022 pathogens so please use the Pathogen Codes 2021 for 2022 AR events.
  + Use Pathogen Codes 2021 for AR events = 2021
  + Use Pathogen Codes 2020 for AR events = 2020
  + Use Pathogen Codes 2019 for AR events = 2019
  + Use Pathogen Codes 2018 for AR events = 2018
* NEW for specimens collected 1/1/2025 and forward:
  + Add: genus and all species level terms for *Candida*, *Citrobacter*, *Klebsiella*, and *Proteus*
    - Important: Report the species level code if provided by the lab to prevent over de-duplication of AR Events.
  + Add: *Streptococcus pyogenes* (Group A *Streptococcus*)
* Facilities can report pathogens with susceptibility information in the description (for example: multidrug resistant Acinetobacter) to NHSN with the specific SNOMED code for that pathogen (446157004). However, upon upload NHSN will automatically roll this pathogen up to the pathogen description and SNOMED code without the susceptibility information (for example: Acinetobacter – 7757008). The IDM indicates these instances by the asterisk attached to the pathogen code.

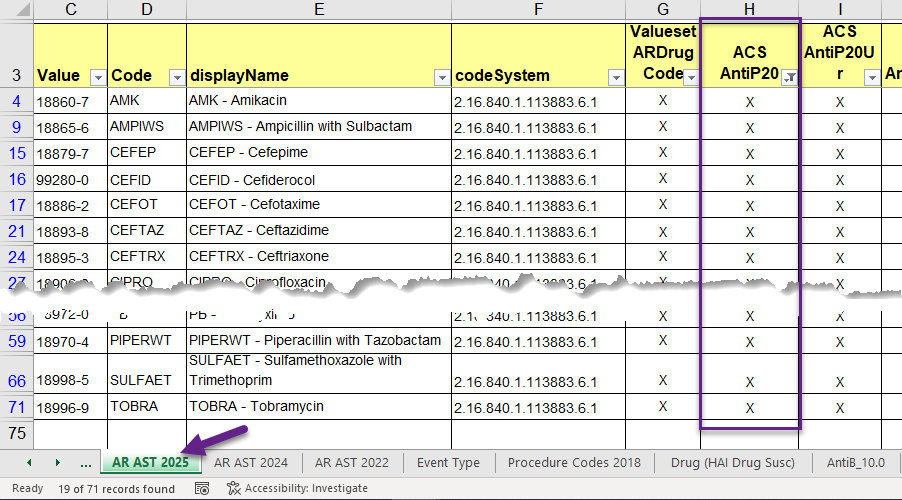


### Drug Panels

* The antimicrobials required in the AR CDA event file for a given pathogen are denoted in the NHSN drug panels.
  + If the laboratory result includes susceptibility testing results for a specific drug that is not on the panel for that organism, the AR Event CDA file cannot include the susceptibility results. Any extra drugs in the CDA file will cause the file to error on import.
* For reportable pathogens, use the AntiP tab of the IDM to determine the required drug panel for the given pathogen.
  + Use AntiP 2025 tab for specimens collected 1/1/2025 and after.
* NEW: Skin, Soft Tissue, Wound, Musculoskeletal Specimen will use the non-urine panel as noted in the AntiP 2025 IDM tab.
* Please note that some pathogens require using a specific drug panel for urine specimens.
  + For example: *Acinetobacter* requires using the panel “ARO\_AntiP20” for blood, CSF, lower respiratory, skin, soft tissue, wound, musculoskeletal specimens and the panel “ARO\_AntiP20Ur” for urine specimens.



* After confirming the drug panel, use the AR AST 2025 tab of the IDM to determine which drugs are in that panel.
* NHSN requires the AR Event CDA file includes all drugs with an “X” in the column for that specific panel regardless of whether the laboratory tested them.



* **Note:** For 2022 AR Event reporting forward, LOINC codes should be used in the XML files.

### 14-day (Blood & CSF) & one per month (Urine & Lower Respiratory) Duplicate Rules

* The NHSN application will check patient ID, specimen collection date, specimen source group and organism SNOMED code for the 14-day duplicate rule for invasive sources and the one per month duplicate rule for non-invasive sources.
* The 14-day rule applies regardless of whether the patient transfers locations *within* the facility.
* Day one is the date of specimen collection.
* There should be 14 days (even if spread across calendar months) with no positive culture result from the laboratory for the patient and specific organism SNOMED code before the facility enters another invasive source (blood or CSF) AR Event into NHSN for the patient and specific organism SNOMED code.
* Based on the 14-day rule, at a maximum, there would be no more than three invasive isolates per specific organism SNOMED code reported per patient per month.

**Below are two examples of these rules:**

Example 1: 14-day rule for a specific organism from a single patient in an inpatient location

| **Date** | **Laboratory Result** | **Reported to NHSN?** | **Justification** |
| --- | --- | --- | --- |
| January 1 | *Staphylococcus aureus* isolated from blood culture | Yes | Patient’s first blood culture of inpatient admission; *Staphylococcus aureus* is isolated; Report AR Event into NHSN. |
| January 4 | *Staphylococcus aureus* isolated from blood culture | No | It has been less than 14 days since the last positive culture (January 1) from the patient isolating *Staphylococcus aureus.* |
| January 16 | *Staphylococcus aureus* isolated from CSF culture | No | It has been less than 14 days since the last positive culture (January 4) from the patient isolating *Staphylococcus aureus*. |
| January 31 | *Staphylococcus aureus* isolated from blood culture | Yes | It has more than 14 days since the last positive culture (January 16) from the patient isolating *Staphylococcus aureus*; Report AR event into NHSN. |

Example 2: 14-day rule for a specific organism from a single patient across admissions

| **Date** | **Laboratory Result** | **Reported to NHSN?** | **Justification** |
| --- | --- | --- | --- |
| July 1 | *Escherichia coli* isolated from blood culture in Medical Ward | Yes | Patient’s first blood culture of inpatient admission; *Escherichia coli* is isolated; Report AR event into NHSN. |
| July 4 | Patient discharged from facility | | |
| July 7 | *Escherichia coli* isolated from blood culture in Emergency Department | No | It has been less than 14 days since the last positive culture (July 1) from the patient isolating *Escherichia coli*. |
| July 17 | *Escherichia coli* isolated from blood culture in Medical Ward | No | It has been less than 14 days since the last positive culture (July 7) from the patient isolating *Escherichia coli*. |

* The 14-day rule starts with day of specimen collection.
  + NHSN allows reporting from select outpatient locations: Emergency Department, Pediatric Emergency Department, and 24-hour Observation Area. Do not consider specimens collected in any outpatient location not mapped in NHSN as one of the above location types (for example, wound clinic) for the 14-day rule calculations.
* The 14-day rule applies only to those cultures collected in the reporting facility. Do not include cultures obtained while the patient was at another healthcare facility in the 14-day calculations.

### Testing Methods

* NEW: Candida isolates without antimicrobial susceptibility testing are eligible for AR Option reporting.
* Only report final or corrected susceptibility testing results to NHSN. Do not report preliminary laboratory results for NHSN AR Option reporting.
* The NHSN application requires PBP2a and PCR mec-gene variables for *Staph aureus* isolates, but if these data are not available from the electronic data source, use the SNOMED code for 'Unknown' in the CDA.
* The application requires the specific test result (specifically, E-Test, MIC, KB) interpretations in the CDA.
  + If not available, then use a nullFlavor ="NA" in the CDA. NHSN recommends using 'NA' instead of omitting these values from the CDA.
  + Report the unit of measure with the value of the individual test results if available.
    - If the unit of measure is not available, then omit from the CDA.
  + Reportable signs for each specific test (specifically, E-Test, MIC, KB) are: >, <, =, >=, <=.
    - If the laboratory does not provide the sign for a specific test, do not report data for the sign and value of that specific test; use the nullFlavor="NA" and populate the interpretation of that specific test only.
  + If the data for the sign and value are not available, use 'NA' within the CDA.
    - Example: <value xsi:type="IVL\_PQ" nullFlavor="NA" />
  + If the result includes the sign, then also include the value.
    - Example: <high value="0.1" unit="ug/ml"/>
  + The NHSN application always requires interpretation for each specific method. This value may be a nullFlavor="NA".
* The NHSN application requires a “Final interpretation” for each antimicrobial. If the laboratory report contains no result from any of the three specific test methods, then use a nullFlavor="NASK".
* If two isolates from the same day have conflicting susceptibilities to the panel of antimicrobials tested, report the isolate with the most resistant final interpretation (NS > R > I > S-DD > S > NA).
  + If the lab validated susceptibility results of both isolates but did not provide a final interpretation, report the isolate with the higher amount of drug resistance based on the number of antimicrobials testing first “NS”, if equal amount of “NS” then move to the amount of “R”, then the amount of “I”, then “S-DD” then “S”.
    - For example, the laboratory isolated *Candida albicans* from two blood specimens collected from the same patient on the same calendar day and the lab validated susceptibility results from both isolates. The first isolate tested “R” to three of the seven antimicrobials tested and the second isolate tested “R” to four of the seven antimicrobials tested. Report the second isolate to NHSN since it showed the higher amount of resistance.
  + If two or more isolates have the same number of antimicrobials testing “NS”, “R”, “I”, “S-DD” and “S” and it cannot be determined which is most resistant, then report the isolate that was the first entered into the LIS.
  + Do not consider results from drugs that are outside of the NHSN specified drug panels when determining which isolate to report.
* If the lab performs the same test on the same isolate but the two tests produce conflicting results, report the final interpretation provided by the lab.
  + If the lab did not provide a final interpretation, then report the most resistant interpretation (NS > R > I > S-DD > S > NA) for that specific antimicrobial.
    - For example, if a facility performs two E-tests for the same drug on the same isolate and one produces “Intermediate” and the other produces “Susceptible”, report “Intermediate” as the final interpretation for that specific drug susceptibility.
* If the lab performs specific antimicrobial tests on the same isolate and the tests produce conflicting susceptibility interpretations, and the laboratory did not provide a final summary interpretation, report the most resistant specific test interpretation as the final interpretation (NS > R > I > S-DD > S > NA) for that specific antimicrobial.
  + For example, if drug susceptibility results produced MIC = Resistant and E-Test = Intermediate but the laboratory did not provide a final interpretation, report “Resistant” as the final interpretation for that specific antimicrobial susceptibility.
* To determine which isolate was first entered into the LIS, we recommend using the timestamp of the susceptibility test result.
* Currently, AR Option reporting requirements do not include additional laboratory testing methods (for example, D-test).
* If the laboratory reports additional information, beyond drugs required in the NHSN AntiP drug panels, do not include that information in the CDA file or report these data to NHSN. NHSN will only accept the drugs listed in the specific AntiP drug panel for that organism.

### Denominators

* As a reminder, all patients should be included in relevant denominators regardless of whether they had a specimen collected during their visit.
* FacWideIN
  + Code patient days and admissions in the CDA file in accordance with the R1 Norm or R3-D4 IG.
    - Patient days:
      * <value xsi:type=”PQ” unit=”d” value=”235”/>
    - Admissions:
      * <value xsi:type=”INT” value=”46”/>
  + Please see the AUR Module protocol for the AUR definitions of patient days and admissions as they are different from the NHSN MDRO & CDI Module definitions.
    - A patient is counted as an admission when they arrive in an NHSN designated inpatient location regardless of patient status (for example, inpatient, observation).
    - A patient admitted to an inpatient unit would be counted as an admission even if they were discharged that same calendar day.
    - A patient transfer from an inpatient to an ED, pediatric ED or 24-hour observation outpatient location then back to an inpatient location is counted as two separate admissions.
  + How to count patient days when admit and/or discharge time is the same as the census count:
    - If the patient is present in the facility at the time of the daily census, they should be counted in the patient day count.

|  |  |  |
| --- | --- | --- |
|  |  | Census count taken at 12:00am |
| 1/1 | Mr Y admit at 12:00am | 1 |
| 1/2 |  | 2 |
| 1/3 | Mr Y discharge at 12:00am | 3 |
|  | **Total patient days:** | **3** |

* + How to count patient admissions for AUR calculations when a patient’s stay extends from one month to another:
    - The time at which a patient enters the door to a facility or a location, is the time of their admission to that facility or specific location. If they do not leave, then that stay is all part of that same admission, no matter how long. So, a stay that continues across multiple months is still only one admission.
    - If the facility discharges or transfers the patient and the patient returns later, then the vendor system should count that patient as a new admission with a new admission date at that time.
  + Do not include outpatient locations (Emergency Department, Pediatric Emergency Department and 24-hour observation area) in the FacWideIN patient day and admission counts.
    - Do not report patient days and admissions for outpatient locations for the AR Option.
* Outpatient locations (ED, Pediatric ED, 24-hour Observation Area)
  + Code encounters in the CDA file in accordance with the R3-D4 IG.
    - <value xsi:type="INT" value="375" />
  + Encounters: A visit to an eligible outpatient location counts as a single encounter.
    - The patient can contribute an encounter as soon as they have had an initial interaction with a medical professional (for example, the beginning of triage). The patient can contribute an encounter regardless of whether the patient is placed in a bed.
    - If the patient’s stay in any eligible outpatient location continues into subsequent calendar days, that patient should still be counted as 1 encounter. For example:
      * If the patient arrives in the ED on Monday and remains in the ED until Wednesday, that patient should be counted as 1 encounter within the ED.
    - If the patient transfers from one outpatient location to another within the same facility, that patient should be counted as 1 encounter for the first outpatient location and should not be counted as an encounter for the receiving location (specifically, a patient should not contribute two encounters when transferring between outpatient locations in the same facility). For example:
      * If the patient arrives in the ED on Monday then is transferred to the 24hr Observation Area on Tuesday, the patient should be counted only as 1 encounter within the ED and zero encounters within the 24hr Observation Area.
    - If the patient is discharged, or leaves, then returns to that outpatient unit during the same calendar day, that patient should be counted as 2 encounters. For example:
      * If the patient arrives in the ED at 07:00 on Monday, is discharged at 11:00 on Monday then returns to the ED at 18:00 on Monday, that patient counts as two separate encounters for the ED.
    - If the patient transfers from outpatient to inpatient, then to outpatient, the second outpatient stay (assuming it’s in an eligible location) would be considered a new encounter because there was time spent in an inpatient location. For example:
      * If the patient arrives in the ED on Monday, is admitted or transferred to the medical ICU on Monday then is transferred to the 24hr Observation Unit on Tuesday and admitted or transferred back to the medical ward on Tuesday, the patient would contribute 2 encounters to the ED location since there was time spent in an inpatient location (medical ward) in between the outpatient stays.
    - If the patient’s stay in the facility crosses calendar months, the patient will contribute an encounter to the first month the patient was in an outpatient location. For example:
      * If patient is in outpatient location on January 31 and February 1 then count as 1 encounter to January and zero to February.
    - Please note, the encounters count will not be a direct match to the AU Option days present count for these location types.
  + Outpatient encounter data can only be reported for outpatient location types: ED (OUT:ACUTE:ED), Pediatric ED (OUT:ACUTE:ED:PED), and 24-hour Observation Area (OUT:ACUTE:WARD)
  + The outpatient encounters are reported at the individual location level. There is no FacWideIN equivalent (i.e., FacWideOUT) for AR Option reporting.
* In the R3-D4 “Report no AR Events” can be included in the AR summary record.
  + If there are no AR Events to be reported for FacWideIN, ED, Pediatric ED, or 24-hour Observation Area, include that snippet of code in the AR summary record.
  + If there are events to be reported, exclude that snippet of code in the AR summary record
  + The R1 IG does not support reporting of this field.
* The R1 Norm has a field for ‘Number of blood cultures performed’ in a given month. NHSN removed this variable from the NHSN AR Option protocol. The application still requires this field in the CDA file for valid import, but the NHSN application will not save data in this field.
  + Note: This information does not need to be included in the R3-D4 files.

### AR Synthetic Data Set (SDS) Validation

* NHSN requires synthetic data set validation for all AR CDA vendors as of May 2023.
* The AR SDS is test data that NHSN AR Option Implementers can use to validate their AR data compilation and aggregation methods comply with the NHSN AR Option protocol’s requirements.
* The AR SDS is intended for use in testing AR Event numerator compilation and AR Summary denominator data aggregation, not conformance to the AR CDA file structure.
* Be sure to review the AR SDS Validation website: <https://www.cdc.gov/nhsn/cdaportal/sds/index.html>.

### AR Option Analysis Reports

* Users can review AR Option data using the NHSN Analysis function. Users can find specific details on the AR Option analysis in the [protocol](http://www.cdc.gov/nhsn/pdfs/pscmanual/11pscaurcurrent.pdf) or in the AUR section of the [Analysis Quick Reference Guide webpage](https://www.cdc.gov/nhsn/ps-analysis-resources/reference-guides.html#accordion-1-collapse-5).
  + NHSN developed specific analysis quick reference guides to assist with viewing, modifying, and interpreting the AR Option data. Users can access these quick reference guides here: <https://www.cdc.gov/nhsn/ps-analysis-resources/reference-guides.html#accordion-1-collapse-5>

### Change Log

* January 2025
  + SNOMED – Pathogen Codes
    - Add: genus and all species level terms for *Candida*, *Citrobacter*, *Klebsiella*, and *Proteus*
    - Add: *Streptococcus pyogenes* (Group A *Streptococcus*)
  + SNOMED – Specimen Sources
    - Add: skin, soft tissue, wound and musculoskeletal as non-invasive specimens
    - Add: indwelling catheter specimen as non-invasive specimen
  + LOINC – Drug panels
    - *Acinetobacter* panels (AntiP20 and AntiP20Ur [Ur indicates panel to be used for urine specimens]): remove Doripenem
    - *Candida* panel (AntiP21): add Amphotericin B
    - *Enterobacterales* panels (AntiP22 and AntiP22Ur):
      * AntiP22: add Plazomicin, remove Chloramphenicol, Doripenem, Doxycycline, Minocycline, Polymyxin B
      * AntiP22Ur: add Ceftibuten, Plazomicin, remove Chloramphenicol, Doripenem, Doxycycline, Minocycline, Polymyxin B, Sulfisoxazole, Trimethoprim
    - *Enterococcus* panels (AntiP23 and AntiP23Ur): remove Quinupristin-dalfopristin
    - *Pseudomonas aeruginosa* panels (AntiP24 and AntiP24Ur):
      * AntiP24: remove Amikacin, Doripenem, Gentamicin
      * (New panel) AntiP24Ur: add Amikacin, Aztreonam, Cefepime, Cefiderocol, Ceftazidime/Avibactam, Ceftazidime, Ceftolozane/Tazobactam, Ciprofloxacin, Colistin, Imipenem, Imipenem-relebactam, Levofloxacin, Meropenem, Polymyxin B, Piperacillin with Tazobactam and Tobramycin
    - *Staphylococcus aureus* panels (AntiP25 and AntiP25Ur)
      * AntiP25: remove Chloramphenicol
      * AntiP25Ur: remove Chloramphenicol, Sulfisoxazole, Trimethoprim
    - *Stenotrophomonas maltophilia* panel (AntiP26): remove Ceftazidime, Chloramphenicol
    - *Streptococcus pneumoniae* panel (AntiP27): remove Chloramphenicol, Gemifloxacin
    - *Streptococcus agalactiae* and *Streptococcus pyogenes* panel (AntiP28): add Tetracycline, remove Chloramphenicol
  + Candida isolates without antimicrobial susceptibility testing are eligible for AR Option reporting.
  + Admission status definition clarified for the scenario referencing transfer to another facility.
  + Admission definition updated to match AU Option. Specifically, transfer from an inpatient to an outpatient ED, pediatric ED, or 24hr observation location then back to an inpatient location is counted as two separate admissions.
  + Encounter definition updated to state the patient can contribute an encounter as soon as they have had an initial interaction with a medical professional (for example, the beginning of triage).
* January 2024
  + SNOMED – Pathogen Codes
    - Adding three new accepted Snomed codes: *Citrobacter braakii*, *Citrobacter freundii* complex and *Citrobacter youngae.*
    - Removed one Snomed code due to reclassification by Snomed: *Enterobacter amnigenus*.
    - See additional updates in the 2024 AR Option Pathogen Roll-up Workbook.
  + LOINC – Drug panels
    - Added two new LOINC codes to the AntiP23 panel: Gentamicin high potency and Streptomycin high potency.
  + Added clarification for the start of an encounter.
* January 2023
  + Patient Information
    - Provided clarification on when to report “true” or “false” for the new required field: Was the patient admitted during this encounter?
    - Provided clarification and an example scenario for reporting admission date.
  + SNOMED – Specimen Sources
    - Isolates with a specimen collection date/time after discharge date/time should not be reported.
  + SNOMED – Pathogen Codes
    - Facilities/vendors should first perform the roll-up of organisms before applying subsequent reporting rules.
  + Testing Methods
    - Provided clarification on which isolate to select in the case of same day duplicates.
    - To determine which isolate was first entered into the LIS, we recommend using the timestamp of the susceptibility test result.
  + Denominators
    - Included a reminder that all patients should be included in relevant denominators regardless of whether they had a specimen collected during their visit.
    - Provided clarification and an example scenario for counting patient days when admit and/or discharge time is the same as the census count.
    - Provided clarification for counting admissions.
    - Provided clarification for counting encounters.
    - Included a reminder that outpatient encounters are reported at the individual location level and there is no FacWideIN equivalent (i.e., FacWideOUT) for AR Option reporting.
  + AR SDS
    - Update to requirement date from January to May 2023