



Mastering AU Option Data Quality Validation: Tools & Best Practices

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March 26, 2026



NHSN·AU

NATIONAL HEALTHCARE SAFETY NETWORK
ANTIMICROBIAL USE OPTION

Objectives

By the end of this session, users will be able to:

- Describe the importance of validating Antimicrobial Use (AU) Option data for reliable reporting.
- Interpret results from the AU Option Data Quality Line List to identify potential sources of error.
- Apply best practices for AU data validation to ensure data accuracy and completeness.

Why and When to Validate AU Data

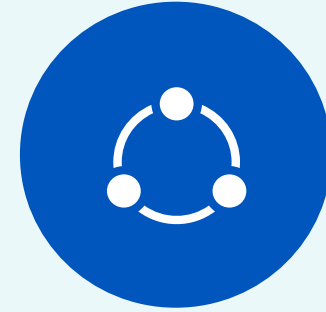
AU Data Validation Basics

Importance of Data Quality Validation

- **AU reporting is fully electronic**
 - Automated data capture, aggregation, and Clinical Document Architecture (CDA) submission
 - No manual data entry due to the amount of data submitted each month
 - Multiple system interfaces and mappings must align
- **Data quality drives metrics**
 - Accurate, complete data mean more reliable metrics (e.g. Standardized Antimicrobial Administration Ratio (SAARs)) and meaningful insights
- **Validation protects data integrity**
 - Confirms alignment with AU Option protocol definitions and CDA requirements
 - Identifies common data errors and mapping issues
 - Helps guide discussions with your vendors when discrepancies arise

When to Validate AU Option Data

- **Implementation Phase**
 - Incorporate validation into onboarding or vendor changes.
- **Ongoing Monitoring**
 - Review data after software updates or system changes.
 - Investigate extreme high or low SAAR values.
- **Annual Review**
 - Conduct annual data quality checks.
 - If low on resources or time, prioritize the activities most relevant to your facility's data.



Validation efforts are voluntary — results are for internal use only and do not need to be sent to NHSN.

AU Module Data Quality Validation Resources

- Located in “Data Validation” section on [AUR Module webpage](#)
 - [AU Option Implementation Data Validation](#)
 - [AU Option Annual Data Validation](#)
 - [AU Option Data Quality Line List](#) (aka AU Data to Review Line List)

Knowledge Check - 1

Which of the following best describes why and when AU Option data should be validated?

- A. Validation is required annually by NHSN and results must be submitted to CDC.
- B. Validation supports accurate electronic reporting, reliable metrics, and data integrity, and should occur during implementation, on an ongoing basis, and at least annually.
- C. Validation is only necessary when extreme SAAR values are identified.
- D. Validation is optional and should only be performed if errors are suspected.



Chat and Q & A features are limited to only 1000 participants. Please refer to email Centers for Disease Control and Prevention no-reply@emailupdates.cdc.gov with subject line, "NHSN 2026 Annual Training - Day 2" for additional instructions and links.

Knowledge Check – 1 Answer

Which of the following best describes why and when AU Option data should be validated?

A. Validation is required annually by NHSN and results must be submitted to CDC.

B. Validation supports accurate electronic reporting, reliable metrics, and data integrity, and should occur during implementation, on an ongoing basis, and at least annually.

C. Validation is only necessary when extreme SAAR values are identified.

D. Validation is optional and should only be performed if errors are suspected.



Validation is voluntary, and results do not need to be submitted to CDC. However, validation should not be limited to situations where extreme SAAR values are observed or errors suspected. Because AU reporting is fully electronic, routine validation helps ensure reliable metrics, protect data integrity, and maintain accurate reporting over time.

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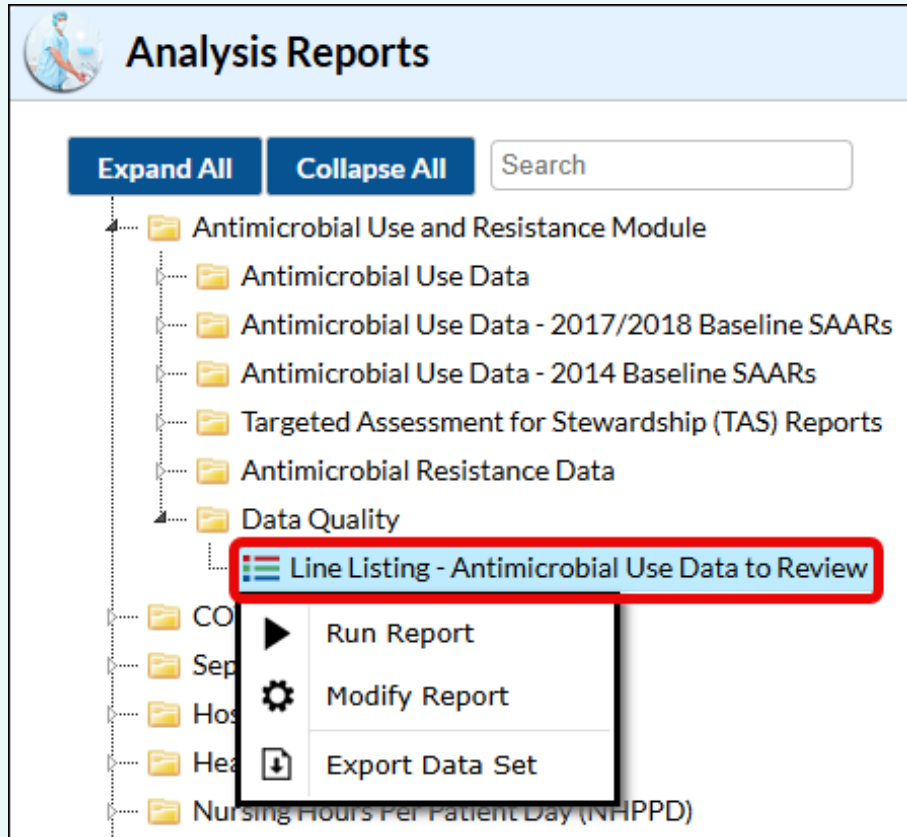
AU Option Data Quality Line List

A tool to identify validation issues

Overview of AU Data Quality Line List

- Report available within NHSN to both facilities and groups
- Supports ongoing AU data quality monitoring
 - Targets validation efforts when time or resources are limited
- Provides six tables showing potential data quality issues:
 1. Zero or missing antimicrobial days
 2. Antimicrobial days reported when patients were not present
 3. Antimicrobial days greater than or equal to days present
 4. Sum of routes of administration less than total antimicrobial days
 5. Antimicrobial days for facility-wide inpatient (FacWideIN) greater than sum of antimicrobial days for all inpatient locations
 6. Days present for FacWideIN greater than sum of days present for all inpatient locations

How to Run the AU Data Quality Line List



- Be sure to have uploaded at least one month's worth of AU data into NHSN for all patient care locations.
- [Generate data sets](#) to ensure data are up to date before running the report.
- Navigate to the report → Located under the Analysis > Reports > Antimicrobial Use and Resistance Module > Data Quality.
- [Modify](#) date range, filters, or display options as needed.
- Run or export results for review.
- Resource: [AU Data Quality Line List Quick Reference Guide](#)

Table 1: Zero or Missing Antimicrobial Days

- Identifies months where all antimicrobial days for every drug are reported as zero or missing (“.”)
 - Does not always indicate an error (e.g. Well Newborn Nursery), but it is unlikely that no antimicrobials were administered if patients were present during a calendar month

National Healthcare Safety Network
Line Listing for Antimicrobial Use Data to Review
Zero and/or “.” antimicrobial days for all drugs in a specific location or FacWideIN
As of: February 28, 2026 at 5:54 PM UTC
Date Range: AU_DATAQUALITY summaryYM 2025M01 to 2025M12

Locations appearing in this table have reported zero or N/A antimicrobial days for all antimicrobials in the given month. Please review these records to ensure data accuracy.
In the event that no patients were present in this unit during this month, these data are accurate.

orgID=33617

orgID	summaryYM	Location
33617	2025M04	MSICU
33617	2025M08	FACWIDEIN

Note: Data are fictitious and for example only.

Table 1: Next Steps for Review

- Use the source Admission, Discharge, and Transfer (ADT) system to verify whether patients were present in the location during that month.
 - If no patients were present (e.g., unit under construction), reporting zero antimicrobial days would be accurate.
 - If patients were present, review your source eMAR or BCMA system to confirm no eligible antimicrobial administrations occurred in that location during the month.
- Discuss next steps with your vendor if discrepancies are identified.

Table 2: Antimicrobial Days Reported when Patients were Not Present

- Identifies months where antimicrobial days were reported for any drug, but with zero days present
 - Reporting zero days present indicates no patients were present in that location for the entire calendar month.
 - If no patients were present, no antimicrobials should be reported.

National Healthcare Safety Network
Line Listing for Antimicrobial Use Data to Review
Antimicrobial days reported for any drug when days present are zero for any location or FacWideIN

As of: March 2, 2026 at 1:59 AM UTC
Date Range: AU_DATAQUALITY summaryYM 2026M01 to 2026M01
if (((drugIngredientDesc = "PENG")))

Carefully review this list which includes locations for which zero days are present, meaning zero patients, were reported in the location during the given month; however, antimicrobial days were reported for one or more drugs. If no patients were present in the location, no antimicrobial days should be reported. This is a data quality error that should be addressed.

orgID=33617

orgID	summaryYM	Location	drugIngredientDesc	antimicrobialDays	numDaysPresent
33617	2026M01	NICU IV	PENG - Penicillin G	16	0

Note: Data are fictitious and for example only.

Table 2: Next Steps for Review

- Use the source ADT system to verify whether patients were present in the location during that month.
 - If patients were present, work with your vendor to determine why the vendor system is not accurately reporting days present for that location.
 - If no patients were present, work with your vendor to determine why the vendor system is incorrectly attributing antimicrobial days to the location.

Table 3: Antimicrobial Days ≥ Days Present

- Identifies location/month/drug combinations where total antimicrobial days exceeds days present
 - Patient can only contribute one antimicrobial day per drug per calendar day.
 - Total antimicrobial days for a single drug should never be greater than days present.
 - **Note:** Values can be equal in rare cases of extremely high use.

National Healthcare Safety Network

Line Listing for Antimicrobial Use Data to Review

Antimicrobial days for a single drug greater than or equal to days present for given location or FacWideIN

As of: February 28, 2026 at 6:05 PM UTC

Date Range: AU_DATAQUALITY summaryYM 2025M09 to 2025M09

if (((location = "MICU") AND (drugIngredientDesc = "REMDES")))

Carefully review this list which includes individual drugs for which the total number of antimicrobial days are greater than or equal to the number of days present in the given location and month.

Since a patient can contribute only one antimicrobial day per drug per location, the total antimicrobial days should never be greater than or equal to days present. This is a data quality error that should be addressed.

orgID=33617

orgID	summaryYM	Location	drugIngredientDesc	antimicrobialDays	numDaysPresent
33617	2025M09	MICU	REMDES - Remdesivir	300	3

Note: Data are fictitious and for example only.

Table 3: Next Steps for Review 🔍

- Review antimicrobial administration data in eMAR/BCMA system.
 - Ensure vendor system attributes only **one total antimicrobial day per drug per patient per calendar day**, regardless of how many doses administered to the patient during that day.
- Review days present in ADT system.
 - Ensure vendor system attributes **one day present per patient per calendar day** if the patient is in the location for any portion of the day.
- Check with your vendor for how to resolve this data quality issue.

Table 4: Sum of Routes of Administration < Total Antimicrobial Days

- Identifies location/month/drug combinations where the sum of routes of administration (IV, IM, digestive, and respiratory) is less than total antimicrobial days
- Sum of routes should either be:
 - Equal to total antimicrobial days (single-route use), or
 - Greater than total antimicrobial days (multiple routes/day)

National Healthcare Safety Network
Line Listing for Antimicrobial Use Data to Review
Sum of routes (IM_Count, IV_Count, Digestive_Count, Respiratory_Count) less than total antimicrobial days for a single drug in any location or FacWideIN

As of: March 3, 2026 at 3:20 PM UTC
Date Range: AU_DATAQUALITY summaryYM 2025M11 to 2025M11
if (((location = "MEDWARD") AND (drugIngredientDesc = "AMK")))

Carefully review this list which includes drugs for which the sum of the routes of administration are less than the total number of antimicrobial days for a given drug. The total antimicrobial day count should only include IV, IM, digestive, and respiratory administrations as outlined in the AU Option protocol. Therefore, the total antimicrobial days should always be less than or equal to the sum of the routes. This is a data quality error that should be addressed.

orgID=33617

orgID	summaryYM	Location	drugIngredientDesc	antimicrobialDays	sumRoutesAdmin
33617	2025M11	MEDWARD	AMK - Amikacin	181	24

Note: Data are fictitious and for example only.

Table 4: Next Steps for Review

- Review antimicrobial administration data in eMAR/BCMA system.
 - Confirm the vendor system is not including additional routes of administration (e.g., intrapleural, irrigation, topical) in total antimicrobial day counts.
 - Ensure vendor system attributes only **one antimicrobial day per drug per route per patient per calendar day**, regardless of how many doses were administered to the patient during the day.
 - Verify total antimicrobial days are not simply calculated as the sum of routes.
- Work with your vendor to address any aggregation issues.

Table 5: Antimicrobial Days for FacWideIN* > Sum of Antimicrobial Days for All Inpatient Locations

- Identifies month/drug combinations where antimicrobial days for FacWideIN exceed the sum of antimicrobial days for all inpatient locations
- For **FacWideIN**, a patient can contribute only **one antimicrobial day per drug per calendar day**.
- For **location-level** data, a patient may contribute **more than one antimicrobial day** if an antimicrobial was administered in more than one location during the calendar day.
 - Ex: Patient transferred from one inpatient unit to another in the same calendar day and was administered antimicrobials in both units
- Antimicrobial day counts for FacWideIN should always be less than the sum of the inpatient locations.
 - This assumes all inpatient locations are appropriately included in FacWideIN reporting.
- Suggests a potential issue with aggregation or location-level mapping.

***Outpatient locations (ED, pediatric ED, and 24-hour observation) are not included in FacWideIN.**

Table 5: Report Output

National Healthcare Safety Network Line Listing for Antimicrobial Use Data to Review Antimicrobial day counts for FacWideIN greater than antimicrobial day counts for the sum of the locations

As of: March 2, 2026 at 3:40 AM UTC

Date Range: AU_DATAQUALITY summaryYM 2025M11 to 2025M11

if (((drugIngredientDesc = "AMK")))

Carefully review this list which includes individual drugs where the antimicrobial day count reported in the FacWideIN record is greater than the antimicrobial day count reported for the sum of the location-specific records. Since a patient can contribute only one antimicrobial day per drug for FacWideIN but more than one antimicrobial day per drug to the sum of location-specific records if in more than one location in a given calendar day, the FacWideIN antimicrobial day count should be less than the count for the sum of locations. This is a data quality error that should be addressed.

orgID=33617

Facility OrgID	Summary Year/Month	Antimicrobial Agent Description	FacWideIN Antimicrobial Days	Sum of Locations Antimicrobial Days
33617	2025M11	AMK - Amikacin	212	181

Note: Data are fictitious and for example only.

Table 6: Days Present for FacWideIN* > Sum of Days Present for All Inpatient Locations

- Identifies months where days present for FacWideIN exceed the sum of days present for all inpatient locations
- For **FacWideIN**, a patient can contribute only **one day present per calendar day**.
- For **location-level** data, a patient may contribute **more than one day present** if present in multiple inpatient locations.
 - Ex: Patient transfers between two inpatient units in the same calendar day.
- Days present counts for FacWideIN should always be less than the sum of the inpatient locations.
 - This assumes all inpatient locations are appropriately included in FacWideIN reporting.
- Suggests a potential issue with aggregation or location-level mapping.

*Outpatient locations (ED, pediatric ED, and 24-hour observation) are not included in FacWideIN.

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Table 6: Report Output

National Healthcare Safety Network Line Listing for Antimicrobial Use Data to Review Days present counts for FacWideIN greater than days present counts for the sum of the locations

As of: February 28, 2026 at 6:15 PM UTC
Date Range: AU_DATAQUALITY summaryYM 2025M12 to 2025M12

Carefully review this list which includes months in which the days present count reported in the FacWideIN record is greater than the days present count reported for the sum of the location-specific records. Since a patient can contribute only one day present per calendar day for FacWideIN but more than one present if in more than one location in a given calendar day, the FacWideIN days present count should be less than the count for the sum of locations. This is a data quality error that should be addressed.

orgID=33617

Facility OrgID	Summary Year/Month	FacWideIN Days Present	Sum of Locations Days Present
33617	2025M12	2400	2386

Note: Data are fictitious and for example only.

Tables 5 & 6: Next Steps for Review 🔍

- Review locations included in FacWideIN reporting with your vendor.
 - Confirm only eligible inpatient locations are included.
 - Ensure outpatient locations (ED, pediatric ED, and 24-hour observation area) are excluded.
- Compare list of locations with the inpatient locations selected in monthly reporting plan
 - Verify that your facility is reporting AU data for all inpatient locations included in FacWideIN.
- Partner with your vendor to investigate and resolve any discrepancies.

When No Data Quality Issues Are Found

- If no rows appear in the report, NHSN did not detect any of the six potential data quality issues.
- A “no records” message means no flagged concerns were identified for the selected time period.

The image displays two screenshots of the National Healthcare Safety Network (NHSN) interface. The left screenshot shows a report titled "National Healthcare Safety Network Line Listing for Antimicrobial Use Data to Review" with a date range of "AU_DATAQUALITY summaryYM 2021M01 to 2023M08". A message box states "No Records Met Your Criteria. Please check your time period and/or filter criteria." The right screenshot shows a similar report titled "National Healthcare Safety Network Line Listing for Antimicrobial Use Data to Review" with a date of "February 12, 2024 at 3:05 PM". A message box states "No Records in Analysis Dataset: AU_DataQuality. Please check the date that Analysis Datasets were last generated and generate new ones if necessary."

Knowledge Check - 2

The AU Option Data Quality Line List identifies six potential data quality issues. Which of the following is not one of the issues flagged in the report?

- A. Zero or missing antimicrobial days
- B. Antimicrobial days reported when patients were not present
- C. Antimicrobial days for FacWideIN greater than sum of antimicrobial days for all inpatient locations
- D. Unusually high or low SAAR values



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Knowledge Check – 2 Answer

The AU Option Data Quality Line List identifies six potential data quality issues. Which of the following is not one of the issues flagged in the report?

- A. Zero or missing antimicrobial days
- B. Antimicrobial days reported when patients were not present
- C. Antimicrobial days for FacWideIN greater than sum of antimicrobial days for all inpatient locations
- D. Unusually high or low SAAR values**



The AU Option Data Quality Line List does not identify unusually high or low SAAR values, which should be reviewed separately during validation efforts. Please see the [AU Option Annual Data Validation](#) protocol for more details.

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Validation Best Practices

Best Practices for AU Data Validation

- Start with the AU Option Data Quality Line List to spot check the data submitted to NHSN and focus validation efforts.
- **Review your mappings**
 - Ensure locations are correctly mapped in NHSN and to your vendor system.
 - Add new locations, inactivate closed locations, and review patient mix changes.
 - Confirm appropriate use of N/A versus zero (use “N/A” only when data can’t be electronically captured).
- **Validate data aggregations and calculations**
 - Review how antimicrobial days and days present are aggregated in your system prior to submission.
 - Compare denominator counts across modules (e.g., AU, HAI, and AR) to check for inconsistencies.
- **Review less common routes of administration and expected patterns** by location or drug.
- Perform manual checks or run targeted reports to **verify that the data submitted to NHSN reflect the source records.**

Best Practices for AU Data Validation (continued)

- **Review Monthly Reporting Plans**
 - Confirm completeness and remove inactive locations.
- **Confirm AU Option user coverage**
 - Maintain at least two active AU users.
 - Deactivate former users as needed.
- **Review AU Option data for potential issues**
 - Check location-specific SAARs.
 - Spot-check submitted data.

Additional Resources

- [AUR Module webpage](#)
- [AUR Module Protocol](#)
- [CDC Locations and Descriptions and Instructions for Mapping Patient Care Locations](#)
- [Patient Safety Component Data Quality webpage](#)

Questions

Thank you.

For any questions or concerns, contact the NHSN Helpdesk

- **NHSN-ServiceNow** to submit questions to the NHSN Help Desk.
- Access new portal at <https://servicedesk.cdc.gov/nhsncsp>.
- If you do not have a SAMS login, or are unable to access ServiceNow, you can still email the NHSN Help Desk at nhsn@cdc.gov.

For more information, contact CDC

1-800-CDC-INFO (232-4636)

TTY: 1-888-232-6348 <https://www.cdc.gov/>

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