TheraDoc Antimicrobial Use and Resistance (AUR) Real World Test Results, 2023

General Information

Product Name	TheraDoc
Version Numbers and Certified Health IT Product List (CPL) Product Numbers	5.3.0 - CHPL ID 15.07.04.3033.TH03.05.12.0.221224 (certified 12/24/22) 5.3.1 – CHPL ID 15.99.04.3033.TH03.05.13.0.230511 (certified 5/11/23) 5.4.0 – CHPL ID 15.99.04.3033.TH03.05.14.0.230707 (certified 7/7/2023) 5.4.1 – CHPL ID 15.99.04.3033.TH03.05.15.0.231121 (certified 11/21/2023)
TheraDoc Real World Testing Plan and Results Page URL	https://www.theradoc.com/certifications/2023-real-world-testing-plan-and-results/

Withdrawn Product Versions

The following TheraDoc product versions were withdrawn during 2023 after being replaced by updated versions. Because AUR data was captured while these versions were in use, the data from these versions is included in the results report. Because TheraDoc uses both on-premises and cloud-based installation models, it is not feasible to differentiate the version used to report specific data in the results.

Withdrawn Version	Date Withdrawn
5.3.0 - CHPL ID 15.07.04.3033.TH03.05.12.0.221224	5/11/2023
5.3.1 – CHPL ID 15.99.04.3033.TH03.05.13.0.230511	11/21/2023

Summary of Testing Methods and Key Findings

The objective of ONC certification criterion 170.315(f)(6) is electronic transmission of Antimicrobial Use and Resistance (AUR) data to NHSN. For 2023, Premier evaluated this objective using the following metrics and care settings for TheraDoc customers who report AUR data to NHSN:

Metric	Description	Care Settings
AR numerator submissions to NHSN	Monthly counts of successful and failed AR numerator submissions to NHSN	NHSN-defined locations and acute care settings as specified in the NHSN AUR protocol
AR denominator submissions to NHSN	Monthly counts of successful and failed AR denominator submissions to NHSN	NHSN-defined locations and acute care settings as specified in the NHSN AUR protocol
AU summary submissions to NHSN	Monthly counts of successful and failed AU summary submissions to NHSN	NHSN-defined locations and acute care settings as specified in the NHSN AUR protocol

NOTE: The above metrics were stated in the original 2023 AUR Real World Testing (RWT) plan; no changes were made during the testing period.

Each metric provides de-duplicated aggregate counts of AUR submissions for the eligible NHSN-defined locations and acute care settings defined at customer facilities. De-duplication accounts for submission failures that were unrelated to document content, such as DirectCDA outages. For example, if a given numerator or denominator record was unsuccessfully submitted 2 times before being accepted, it was counted as 1 successful submission for the relevant reporting period. Similarly, if a given numerator or denominator record was unsuccessfully submitted 2 times and never successfully submitted, it was counted as 1 failed submission for the relevant reporting period. It was expected that NHSN would accept all TheraDoc AUR submissions that complied with the AUR protocol in accordance with a facility's monthly NHSN AUR reporting plan.

The 2023 AUR RWT results demonstrate real-world interoperability in that they reflect predictable volumes of reporting activity, such as lower numbers for December in advance of many states' Q4 reporting deadlines, as well as natural variances in pass/fail submission counts and percentages across months. Past RWT has shown that submission counts do not stabilize for several months, as different states have different submission deadlines, so success/failure numbers may be in flux for some time.

As expected, the top reasons for submission failures included AU/AR reporting not being properly included in a facility's monthly NHSN reporting plan and attempts to report data for locations not mapped as eligible NHSN AUR location types. Failures due to attempts to submit the same data multiple times likely occurred as customers were re-reporting data in response to non-conformities that were addressed during the testing period.

For details on monthly record counts and averages, plus a breakdown of submission failure reasons, see "Metric and Outcome Details" beginning on page 6 of this report.

AUR Non-Conformities Addressed During the 2023 Real World Testing Period

Six non-conformities affecting TheraDoc AUR reporting were discovered and reported to TheraDoc's ONC-ACB (Drummond Group) during the 2023 Real World Testing period. They were resolved as indicated.

Non-Conformity	Description	Resolution
1	• An incorrect database value was being used to determine the patient admission status for AR reporting. • For *Streptococcus pneumoniae,* meningitis vs. non-meningitis breakpoints were not properly differentiated for Cefepime, Cefotaxime, Ceftriaxone, and Penicillin. • When two isolates from the same day had conflicting susceptibilities per final interpretations provided by the lab, TheraDoc reported the isolate with the higher amount of drug resistance based on the number of antimicrobials testing "NS" or "R" instead of reporting the isolate with the most resistant final interpretation.	Fixes were provided in a Service Pack for TheraDoc v5.3.1 (May 2023). Customers were notified to resubmit AR data to NHSN for affected months.
2	Certain patients with multiple movements between different location types were shown with an incorrect admission date for AR reporting. This issue was traced to a change made in TheraDoc v5.3.1 to handle the 2023 business rules for AR "date admitted to facility"; specifically, when a patient moves between outpatient and inpatient locations and specimen collection occurs in an outpatient location.	Fixes were provided in a Hot Fix for TheraDoc v5.3.1 (July 2023) and in the new v5.4.0 release (November 2023). Customers were notified to resubmit AR data to NHSN for affected months.
3	TheraDoc's AR logic was found to consider the generic/parent-level LOINC concepts, but not the related child-level concepts, for the following antimicrobial agents: • Cefepime • Cefuroxime • Clindamycin • Gentamicin • Oxacillin • Penicillin G • Streptomycin As a result, TheraDoc correctly reported the specific susceptibility result in the AR numerator CDA when an antimicrobial agent was identified with the parent-level LOINC concept, but it incorrectly reported "not tested" when an antimicrobial agent was identified with a child-level LOINC concept.	Fixes were provided in a Service Pack for TheraDoc v5.4.0 (November 2023). Customers were notified to resubmit AR data to NHSN for affected months.
4	The fix for Non-Conformity 2 above was found not to work for a small number of customers. An investigation found that the fix used an obsolete location type field as part of the logic to determine the inpatient admission date. This was not an issue for customers with TheraDoc database installations more recent than 2012, as the obsolete field is not populated at that level. For the few customers with older databases, the obsolete field could contain invalid values that prevented the AR logic from identifying the correct AR admission date.	Data repair was done to remove the obsolete location type data from customer databases; no product changes were needed. Affected customers were notified to resume AR data resubmission to NHSN.

Non-Conformity	Description	Resolution
5	A small number of TheraDoc AR records (fewer than 30 across 5+ years of AR data) were found to involve patients who had an AR-eligible specimen collection in an inpatient location, followed by an ADT record update indicating the inpatient admission was cancelled. The NHSN AR protocol did not address how a cancelled admission should be considered when determining "admission status" and "date admitted to facility" values for AR numerator records, so NHSN was contacted for guidance. Given the small number of affected records, NHSN determined this was an edge case and indicated that, going forward, both numerator and denominator counts should be excluded for both AU and AR when an admission has been cancelled.	Change was made in TheraDoc v5.4.1 (December 2023). Customers did not need to resubmit AUR data for this issue, as it was a new rule enacted by NHSN for future reporting.
6	Some patients were found to have an incorrect AR admission date due to the logic that identified the type of location in which a specimen was collected. Rather than using the assigned NHSN HL7 location type to determine where an AR specimen was collected, TheraDoc used the value from a “location class” field that depends on customers properly classifying a location type as inpatient (I), outpatient (O), or emergency/24-hour observation (E). Analysis showed the I/O/E “location class” field value is frequently incorrect, so when it was used to determine patient AR admission status per NHSN business rules, patients were not always correctly identified as inpatient or an outpatient when the specimen was collected. The incorrect admission status then caused an incorrect date to be used as the date the patient was admitted to the facility. To correct this issue, the code that determines the AR collect location class was modified to use the assigned NHSN HL7 location type, which provides a more accurate way to determine the patient’s AR admission status and date admitted to facility.	Fix was made in TheraDoc v5.4.1 (December 2023). Customers were notified to resubmit AR data to NHSN for affected months.

Standards Updates

TheraDoc is not certified with voluntary Standards Version Advancement Process (SVAP) standards; United States Core Data for Interoperability (USCDI) standards do not apply to AUR reporting.

Key Milestones

The following key milestones were met during the 2023 Real World Testing process for AUR:

Key Milestone	Care Setting	Date/Timeframe
Begin collection of data as specified in plan	AUR-eligible inpatient locations and select outpatient acute care settings as available per facility-specific location definitions.	January 1, 2023
Data collection and review	AUR-eligible inpatient locations and select outpatient acute care settings as available per facility-specific location definitions.	Monthly, 2023
End of Real World Testing period and final collection of all data for analysis	AUR-eligible inpatient locations and select outpatient acute care settings as available per facility-specific location definitions.	January 2024

Metric and Outcome Details

The metrics measured include the number (count) and percentage of successful and failed AU, AR numerator, and AR denominator CDA submissions for each reporting month in 2023. The total number of unique facilities from which data was reported is included for each month.

Reporting Year-Mon	Antimicrobial Utilization (AU)					Antimicrobial Resistance (AR) Numerator					Antimicrobial Resistance (AR) Denominator					Facility Count
	Successful	Failed	Total	% Success	% Fail	Successful	Failed	Total	% Success	% Fail	Successful	Failed	Total	% Success	% Fail	
2023-Jan	2,931	485	3,416	86	14	46,575	3,316	49,891	93	7	700	99	799	88	12	235
2023-Feb	2,655	252	2,907	91	9	28,980	5,281	34,261	85	15	530	110	640	83	17	232
2023-Mar	2,656	242	2,898	92	8	32,732	3,399	36,131	91	9	553	90	643	86	14	220
2023-Apr	3,002	283	3,285	91	9	41,584	2,574	44,158	94	6	723	96	819	88	12	221
2023-May	3,232	562	3,794	85	15	23,318	2,280	25,598	91	9	438	56	494	89	11	218
2023-Jun	3,325	595	3,920	85	15	84,348	6,026	90,374	93	7	1,128	161	1,289	88	12	214
2023-Jul	2,518	325	2,843	89	11	85,726	4,602	90,328	95	5	1,134	110	1,244	91	9	220
2023-Aug	2,597	225	2,822	92	8	51,694	5,540	57,234	90	10	786	89	875	90	10	224
2023-Sep	4,513	995	5,508	82	18	28,562	5,315	33,877	84	16	518	91	609	85	15	233
2023-Oct	2,660	258	2,918	91	9	52,609	3,222	55,831	94	6	876	94	970	90	10	236
2023-Nov	2,498	342	2,840	88	12	46,473	3,166	49,639	94	6	731	108	839	87	13	211
23-Dec	911	103	1,014	90	10	5,972	258	6,230	96	4	119	11	130	92	8	86
Total	33,498	4,667	38,165			528,573	44,979	573,552			8,236	1,115	9,351			2,550
Average	2,792	389	3,180	88	12	44,048	3,748	47,796	92	8	686	93	779	88	12	213

Successful submissions demonstrate that TheraDoc is compliant with AUR certification criteria and exchanging EHI in the care settings for which it is marketed for use. Failed submissions likewise demonstrate that TheraDoc AUR data is being exchanged with NHSN and vetted against NHSN business rules.

An analysis of failed AU submissions identified the following most responsible reasons, in order of frequency:

- 59% - Inaccurate monthly NHSN AU reporting plan
- 19% - Inaccurate NHSN location type definition
- 12% - Duplicate submission error (same data submitted multiple times)
- 7% - AU data submitted before facility installed TheraDoc release supporting new NHSN business rules
- 3% - NHSN unable to accept reporting data

An analysis of failed AR submissions identified the following most responsible reasons, in order of frequency:

- 61% - Inaccurate monthly AR reporting plan
- 26% - Duplicate submission error (same data submitted multiple times)
- 7% - NHSN unable to accept reporting data
- 4% - Inaccurate NHSN location type definition
- 1% - Data quality error

The majority of these failures can be prevented with proper end-user training and awareness.

These outcomes successfully demonstrate that TheraDoc:

1. Is compliant with the certification criteria, including the required technical standards and vocabulary code sets;
2. Is exchanging electronic health information (EHI) in the care and practice settings for which it is marketed for use; and
3. EHI is received by and used in the certified Health IT.