Cerner Corporation Certified Health IT 2023 Real World Testing Results

Cerner Corporation, a wholly-owned subsidiary of Oracle, is proud to offer software that is certified under the Office of the National Coordinator (ONC) for Health Information Technology (HIT) Health IT Certification Program. Contained within is Cerner's Real World Testing results for calendar year 2023. These results reflect the outcomes of executing our 2023 Real World Testing plans for all 2015 Cures Update Edition certification criteria subject to the Real World Testing Condition & Maintenance of Certification requirements at 45 CFR 170.405 that were certified as of August 31, 2022.

Individual Real World Testing results are organized by certification criterion with identification of each Certified Health IT Module under which the criteria are certified on the ONC's Certified Health IT Product List (CHPL). In some instances, testing plans were combined for efficiency to account for multiple Certified Health IT Modules or certification criteria and the results are structured accordingly.

Some Certified Health IT Modules or versions of modules that were part of an original 2023 Real World Testing plan were also withdrawn during the calendar year after publication of the Real World Testing plan, or new ones were certified. Where relevant, a *Withdrawn Products* section is included in each set of results with the details of such changes. Other Real World Testing plans were modified from their original methodologies during the execution phase. Any such changes are explained with a *Changes to Original Real World Testing Plan* section in each set of results.

Please note, several Real World Testing results were generated via monitoring of production activity data from real world use of Cerner's Certified Health IT Modules. This production activity data was aggregated across customers and no protected health information (as defined under HIPAA) or customer-specific identifiable information was used or contained in the information provided for Real World Testing results.

Cerner affirms that these Real World Testing results are complete with all required elements. All information in these results is up to date and fully addresses Cerner's Real World Testing requirements.

Mike Hourigan, Sr. Director, Product Regulatory Strategy

mike.hourigan@oracle.com | 816-201-1924

January 26, 2024

Table of Contents

170.315(b)(1) Transitions of Care

Certified Health IT Module(s): Millennium (Clinical)

CHPL Product Numbers: 15.04.04.1221.Mill.18.06.1.221107

Relied Upon Software: N/A

Withdrawn Products

The following versions of the applicable certified HIT modules that were included with the original 2023 Real World Testing plan were withdrawn prior to submission of the corresponding Real World Testing results.

- Module name: FirstNet (Clinical)
- Version: 2015.01
- CHPL product number: 15.04.04.1221.Firs.15.04.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: FirstNet (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Firs.18.05.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: PowerChart (Clinical)
- Version: 2015.01
- CHPL product number: 15.04.04.1221.Powe.15.04.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: PowerChart (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Powe.18.05.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

The following versions of the applicable certified HIT modules were certified after the submission of the Real World Testing plan and were used in production of the data contained in these Real World Testing results.

- Module name: Millennium (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Mill.18.06.1.221107
- Certification date: November 7, 2022

Real World Testing Methodologies Summary

For Real World Testing of the certified capabilities for the Transition of Care criterion, we tracked and reported on the real world production activity of the below three distinct components of capabilities supported under the Transitions of Care criterion across our customer base. This real world production activity tracking was achieved via the use of a Cerner cross-database analytics tool which provides near real-time activity tracking of active production environment use.

1. The number of C-CDA documents of each required document template (CCD, Referral Note, Discharge Summary) that were created and transmitted outbound in production environments for real world care transitions and referrals using either Direct Messaging or IHE document exchange technologies
2. The use of the C-CDA viewer capabilities by end-users in production environments, which allow users to view a human-readable rendering of C-CDAs and customize display of the data
3. The use of C-CDA document validation capabilities, which provide users with visibility to conformance errors in C-CDA documents they receive and view.

Standards Updates

No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested
- Acute
- Ambulatory
- Behavioral Health
- Emergency Department
- Pediatrics

Real World Testing Milestones
1. Completed Real World Testing activities execution (execution of monthly report) at the end of Q3 2023.
2. Completed assessment of Real World Testing data for results and outcomes compilation at the end of 2023.

Real World Testing Expected Outcomes

We observed high volumes of successful document generation, which reached well over tens of millions on a monthly basis throughout 2023. This outcome is due to the broad customer base actively utilizing these certified capabilities in production environments and reflects the overall success of our certified capabilities in the real world.

The outcome for the C-CDA display component was consistent usage from month-to-month, which indicates successful utilization of the certified capabilities. We did not see a drop-off in volume. Although the results were somewhat scattered, we observed higher results than past years for the C-CDA validation component due to an uplift in our validator service to comply with the Cures Update. This still reflects our experience where the value of the conformance validation error visibility to end-users is limited as their focus is the content of the documents they are viewing and the ability to effectively reconcile data into the local record (a capability that is part of the 170.315(b)(2) Clinical Information Reconciliation and Incorporation criterion).

Real World Testing Metrics
- Number of standards-conformant C-CDA documents created per month by C-CDA document template (CCD, Referral Note, Discharge Summary):
  - Average number of standards-conformant C-CDA documents created per month = **26,354,130**
- Number of times per month a C-CDA document was opened and viewed utilizing the certified C-CDA viewer capability:
  - Average number of times a C-CDA document was opened and viewed per month = **390,234,060**
- Number of times per month the C-CDA validator capability was leveraged to assess the standards conformance of a C-CDA being viewed:
  - Average number of times the C-CDA validator capability was leveraged per month = **743,118**

170.315(b)(1) - Transitions of Care

Certified Health IT Module(s): **Soarian Clinicals**
CHPL Product Numbers: 15.04.04.1221.Soar.15.01.1.210331
Relied Upon Software: First Data Bank (FDB) Interoperability Module

Changes to Original Real World Testing Plan
- Summary of change: The original milestone to gather audit data from sample customers' production data was to be executed in Q3 2023. This was moved to execution in Q2 2023.
- Reason for change: Staffing availability allowed for the execution to occur earlier in Q2 2023.
- Impact to RWT execution: No impact. The same reporting period was used but report was executed a quarter earlier.

Real World Testing Methodologies Summary
Real World Testing of the Transitions of Care certified capabilities for Soarian Clinicals tracked customer use for sending a conformant Consolidated Clinical Document Architecture (C-CDA) document upon patient discharge from inpatient or emergency department encounters. The Continuity of Care Document (CCD), Referral Note, and Discharge Summary documents created in Soarian Clinicals are transmitted through Cerner's Document Management product. The data was collected through a file in Document Management per customer and sent to Cerner's Healthcare Intelligence analytics product for cross-customer production reporting. For this measure, we pulled a Cerner Healthcare Intelligence analytics report to provide the results data.

Additionally, we captured metrics on invalid C-CDA documents that were received inbound and demonstrated real world counts of C-CDAs that did not meet the minimum required specifications as defined by the Office of the National Coordinator for Health IT (ONC). We utilized a report to capture those metrics. Lastly, we demonstrated real world value of allowing the quantity and order of C-CDA sections displayed via reporting on a system setting that users can apply to establish viewing preferences. A report was used for the production customer systems and will continue to be used to collect metrics for this demonstration.

Standards Updates
No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested
- Acute
- Emergency Department

Real World Testing Milestones
1. Completed identification of target customer participants: end of January 2023
2. Completed readiness for customer query execution: end of Q2 2023
3. Completion of actual Real World Testing activities execution: end of Q2 2023
4. Completed assessment of Real World Testing data to compile results and outcomes: end of year 2023

Real World Testing Expected Outcomes
The Real World Testing outcomes for sending and receiving C-CDA documents were measured using a report derived from Cerner's Healthcare Intelligence analytics product and provided successful active engagement in the sample of customer production environments. The testing outcomes met the target as expected with high compliance of C-CDA sending and receiving in real world customer production environments.

For the validation criteria, the outcomes were measured by a unique report that reflects across the customer base showing the count of C-CDAs that are validated. This report is available to customers, however the use is varied. For customers who utilized the document validation capabilities for their incoming/received C-CDA documents from exchange partners there were a higher than expected amount of document errors. We believe this is a reflection of the industry maturity and not a reflection on specific product or customer usage. Despite the validation errors, the exchange of C-CDA data utilization remained high and the customers remained focused on the content of the C-CDA documents and the reconciliation of data rather than terminology and code sets being used. As the industry matures we anticipate seeing less validation errors in subsequent Real World Testing plans.

Real World Testing Metrics

ORACLE Health

- For the sending and receiving of C-CDA documents, the number of patient visits for which a C-CDA document was either received or sent (target 50%+): **3,288/3,994 = 82%**
- For the validation of C-CDA document, the rate of C-CDA documents received inbound with any error (target less than 25%): **1,181,224/1,443,190 (81.85%)**
  - Note that this is not an indication of non-conformity of the certified capabilities as the errors observed in documents received inbound from other systems.
- For the validation capabilities system settings, the number of customers who have changed their display settings (target less than 5%): **0 customers (0%)**

170.315(b)(2) Clinical Information Reconciliation and Incorporation

Certified Health IT Module(s): **Millennium (Clinical)**

CHPL Product Numbers: 15.04.04.1221.Mill.18.06.1.221107

Relied Upon Software: N/A

Withdrawn Products

The following versions of the applicable certified HIT modules that were included with the original 2023 Real World Testing plan were withdrawn prior to submission of the corresponding Real World Testing results.

- Module name: FirstNet (Clinical)
- Version: 2015.01
- CHPL product number: 15.04.04.1221.Firs.15.04.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: FirstNet (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Firs.18.05.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: PowerChart (Clinical)
- Version: 2015.01
- CHPL product number: 15.04.04.1221.Powe.15.04.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: PowerChart (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Powe.18.05.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

The following versions of the applicable certified HIT modules were certified after the submission of the Real World Testing plan and were used in production of the data contained in these Real World Testing results.

- Module name: Millennium (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Mill.18.06.1.221107
- Certification date: November 7, 2022

Real World Testing Methodologies Summary

For Real World Testing of the certified Clinical Information Reconciliation and Incorporation capabilities, we utilized reporting derived from a cross-database analytics tool to provide near real-time activity tracking of active production environment use of the relevant certified capabilities. With these reports, we were able to measure and report real world adoption of these certified capabilities by tracking discrete actions taken on the data extracted from Consolidated Clinical Document Architecture (C-CDA) documents received inbound from external sources. Specific actions tracked and reported on were:

- Problems added
- Problems rejected
- Allergies added
- Allergies rejected
- Home Medications added
- Home Medications rejected

These measurements provided supporting evidence that clinical data reconciliation was being actively utlilized by Cerner customers at the point of care. Reconciled data was received from either manually matched C-CDAs that were received inbound from Direct Messaging exchange, or automated patient matching from Integrating the Healthcare Enterprise (IHE) query-based exchange.

Standards Updates
No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested
- Acute
- Ambulatory
- Behavioral Health
- Emergency Department
- Pediatrics

Real World Testing Milestones
1. Retrieved client production activity tracking data reports the first week of Q4 2023.
2. Completed assessment of production activity tracking data reports mid-Q4 2023.
3. Completed compilation of Real World Testing results from production activity tracking data reports assessment at the end of 2023.

Real World Testing Expected Outcomes
In executing the identified Real World Testing plan, we observed general consistency across months throughout the year for overall reconciliation actions (including both add and reject actions). We also observed higher volumes of reconciliation actions for Problems and Home Medications than for Allergies reflecting a priority on those items for care providers and a higher rate of reliable codified data.

Real World Testing Metrics
The Real World Testing metrics for Clinical Information Reconciliation and Incorporation were as follows (all reconciliation actions tracked were taken on external data parsed from C-CDA documents received inbound):

- Number of Problems added and rejected per month:
    - Average # Problems added per month: **1,683,108**
    - Average # of Problems rejected per month: **2,646,318**
- Number of Allergies added and rejected per month:
    - Average # Allergies added per month: **178,224**
    - Average # of Allergies rejected per month: **750,460**
- Number of Home Medications added and rejected per month:
    - Average # Home Medications added per month: **1,314,741**
    - Average # of Home Medications rejected per month: **6,507,457**

170.315(b)(2) - Clinical Information Reconciliation and Incorporation

Certified Health IT Module(s): **Soarian Clinicals**
CHPL Product Numbers: 15.04.04.1221.Soar.15.01.1.210331
Relied Upon Software: First Data Bank (FDB) Interoperability Module

Changes to Original Real World Testing Plan
- Summary of change: The original milestone to gather audit data from sample clients' production data was to be executed in Q3 2023.
- Reason for change: Staffing availability allowed for the execution to occur earlier in Q2 2023.
- Impact to RWT execution: No impact. The same reporting period was used but report was executed a quarter earlier.

Real World Testing Methodologies Summary
Real World Testing of Clinical Information Reconciliation and Incorporation certified capabilities was conducted by tracking actual customer use of the Soarian Clinicals workflows in which a C-CDA document that was received was matched to a patient and reconciled into the local record. This shows correct patient matching and incorporation of data provided by the externally sourced C-CDA document. A report was generated specifically for Real World Testing to demonstrate incorporation with C-CDA documents.

The data provided by the C-CDA documents are accessed by clinicians through three clinical information reconciliation workflows: Allergy Reconciliation, Problem Reconciliation, and Medication Reconciliation. Our testing methodlogy leveraged customer production environment tracking via our Healthcare Intelligence analytics product with a report which counts when each and any of the reconciliation actions occurs with a C-CDA document for the pertinent workflows. This report was generated specifically for Real World Testing to demonstrate incorporation with C-CDA documents. It provided more specific details of the customer usage of C-CDA data for medication, problem, and allergy reconciliation.

Standards Updates
No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested
- Acute
- Emergency Department

Real World Testing Milestones
1. Completed identification of target client participants: end of January 2023
2. Completed technical readiness for client query execution: end of Q2 2023
3. Completed actual RWT activities execution: end of Q2 2023
4. Completed assessment of RWT data for results and outcomes compilation: end of year 2023

Real World Testing Expected Outcomes
Review of customer configuration identified two customers who had implemented all three clinical information reconciliation workflows (Allergy Reconciliation, Problem Reconciliation, and Medication Reconciliation). Of this customer subset, both had the Healthcare Intelligence reconciliation report necessary for the Real World Testing. Accordingly, the reconciliation report was successfully executed for the two customers who had the report implemented.

The reconciliation report was successfully executed for the two target customers and, upon review of the reconciliation report data, it was confirmed that the customers had implemented and actively utilized all three clinical information reconciliation workflows with incorporated of data from C-CDA documents. The testing outcomes met the target as expected for compliance of clinical information reconcilliation in the customer production environment.

Overall, the Real World Testing outcome for clinical information reconciliation of C-CDA documents demonstrated that the customers met the metrics of clinical information reconciliation with C-CDA documents.

Real World Testing Metrics

- Percentage of patient visits during the measurement period where at least one reconciliation workflow was performed (target = 50%+): **50.63% (2905/ 5738)**
    - Note – the target results for this measure were met. Additionally, customers are maintaining and using their medication, problem and allergy workflows through other means in Soarian Clinicals and some customers have not leveraged all of the capabilites with C-CDA reconciliation.

170.315(b)(3) Electronic Prescribing

Certified Health IT Module(s): **PowerChart Touch; Millennium (Clinical)**

CHPL Product Numbers: 15.04.04.1221.Powe.03.02.1.210308; 15.04.04.1221.Mill.18.06.1.221107

Relied Upon Software: Cerner Millennium (PowerChart Touch v4)

Withdrawn Products
The following versions of the applicable certified HIT modules that were included with the original 2023 Real World Testing plan were withdrawn prior to submission of the corresponding Real World Testing results.

- Module name: FirstNet (Clinical)
- Version: 2015.01
- CHPL product number: 15.04.04.1221.Firs.15.04.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: FirstNet (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Firs.18.05.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: PowerChart (Clinical)
- Version: 2015.01
- CHPL product number: 15.04.04.1221.Powe.15.04.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: PowerChart (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Powe.18.05.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

The following versions of the applicable certified HIT modules were certified after the submission of the Real World Testing plan and were used in production of the data contained in these Real World Testing results.

- Module name: Millennium (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Mill.18.06.1.221107
- Certification date: November 7, 2022

Changes to Original Real World Testing Plan
- Summary of change: Measurement period was shortened from 30 days to 5 days.
- Reason for the change: With thousands of transactions generated every hour for most message types across our large customer base, tracking for larger time periods proved challenging from a scaling perspective without notable benefit for the expanded timeframe.
- Impact to RWT execution: No impact. Significant amounts of data were able to be reviewed for the shortened measurement period to draw appropriate conclusions that transactions were continually reliable across applicable areas and message types.

Real World Testing Methodologies Summary
To conduct Real World Testing for the Electronic Prescribing certified capabilities, live transactions were reviewed over the course of 5 days spanning primary working hours for all applicable care venues. Both successful and failed transactions were evaluated and tracked to validate that the required standard is being leveraged correctly and show successful real world use of the certified capabilities. Although some transactions have higher failure rates than expected, those failures are not related to our system's conformance to cited standards and are explained as applicable in the results. Nearly 100% of evaluated traffic was successful and no failures were due to lack of standards conformance.

Standards Updates
No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested
- Acute
- Ambulatory
- Behavioral Health
- Emergency Department
- Pediatrics

Real World Testing Milestones
1. Identified the process in which to generate applicable transactions to be evaluated through network traffic: Q1 2023
2. Identified target domains to evaluate traffic across applicable venues of care: Q3 2023
3. Executed process to review transactions and generate applicable metrics: Q4 2023

Real World Testing Expected Outcomes
- Create new prescriptions (NewRx): All care settings
    - Expected result returned with no system failures due to standard non-conformance
- Request and respond to change prescriptions (RxChangeRequest, RxChangeResponse): Ambulatory care setting
    - Expected result returned with 1 system failure due to standard non-conformance related to client configuration
- Request and respond to cancel prescriptions (CancelRx, CancelRxResponse): All care settings
    - Expected result returned with no system failures due to standard non-conformance
- Request and respond to renew prescriptions (RxRenewalRequest, RxRenewalResponse): Ambulatory care setting
    - Expected result returned with no system failures due to standard non-conformance, though one error was due to variability of a medication's status across states
- Receive fill status notifications (RxFill): Current adoption too low to track (not industry supported until release on 2017071 and pharmacy adoption has not increased since release)
    - Traffic was identified as specific pharmacies have started use of the transaction for specific reasons (LTC pharmacies mostly)
    - Expected result returned with no system failures due to standard non-conformance
- Request and receive medication history (RxHistoryRequest, RxHistoryResponse): All care settings
    - Expected result returned with no system failures due to standard non-conformance
- Relay acceptance of a transaction back to the sender (Status): All care settings
    - Expected result returned with no system failures due to standard non-conformance
- Respond that there was a problem with the transaction (Error): All care settings
    - Expected result returned with no system failures due to standard non-conformance

Real World Testing Metrics
- Success rate across all prescription transactions (including renewal and change requests) routed electronically for the measured testing period of November 6th - November 10th (target = 90%+): **99.77% (36,217/36,298)**
- Overall eRx transaction monitoring results:
    - Med History Requests: 0 errors, 9,709 transactions reviewed
    - Cancel Requests: 6 errors, 2,986 transactions reviewed
    - Change Responses: 16 errors, 266 transactions reviewed
      NewRx: 13 errors, 13,440 transactions reviewed

- o Refill Responses: 46 errors, 4,897 transactions reviewed
- o Verify: 0 errors, 5,000 transactions reviewed
- o **Total: 81 errors, 36,298 transactions reviewed**

Additional tracking details:
- Create new prescriptions (NewRx): All care settings
  - o Extremely large volume for each customer over 1,000 transactions per hour process through our partners at peak times
  - o All failures were related to pharmacies unable to accept the message
    - No conformance related issues identified
- Request and respond to change prescriptions (RxChangeRequest, RxChangeResponse): Ambulatory care setting
  - o Small volume of transactions due to low adoption of the Change transaction by pharmacies
  - o Singular conformance related error:
    - Quantity unit of measure was transmitted with an invalid code
    - This would be caused by client configuration of an incorrect value assigned to a unit that was not provided to them rather than a system issue
  - o Response failures primarily fall into two buckets unrelated to conformance of the message:
    - Pharmacies rejecting the response due to delays in response or with no reason
    - Pharmacy rejecting the request based on the Change Type not being supported by their system
  - o Change requests to our system failed in 2 different buckets
    - Change type P not supported by the receiving user
    - Pharmacy non-conformance rejected
      - Some change responses errored due to the pharmacy cancelling the request prior to receiving our response
- Request and respond to cancel prescriptions (CancelRx, CancelRxResponse): All care settings
  - o Extremely large volume for each customer over 1,000 transactions per hour process through our partners at peak times
  - o Few errors were returned for our Cancel requests unrelated to message structure
    - All errors were related to the pharmacy's ability to process the request although they indicate that the transaction is supported in their system
  - o Errors returned for cancel responses in 2 buckets
    - Responding pharmacy errors in their message
    - Domain servers unable to respond (potential downtime)
- Request and respond to renew prescriptions (RxRenewalRequest, RxRenewalResponse): Ambulatory care setting
  - o Only a single error type on renewal requests from pharmacies sending to providers who do not accept renewals prior to the message reaching our system
  - o 1 failure was related to conformance
    - This was related to state specific variation controlling the distribution of BUTALBITAL rather than standards compliance
  - o 45 remaining failures on refill responses in 3 buckets
    - Primarily, the pharmacy cancelled the request before receiving our response
    - Generic pharmacy error returned
    - Duplicate response received
- Receive fill status notifications (RxFill)
  - o Around 500 responses received during the measured timeframe
    - Adoption is heavily based on pharmacy mix, so the selected pool for this year's measurement had far fewer than RWT 2022
  - o No failures identified from our system accepting responses
  - o Large amount of failures identified on the part of sending pharmacies due to nonconformance with the standard or responses identifying the pharmacy does not support the message type

- - Meets expectations that pharmacies are still working to support the transaction and overall adoption is low
- Request and receive medication history (RxHistoryRequest, RxHistoryResponse): All care settings
  - Extremely large volume for each customer over 1,000 transactions per hour process through our partners
  - No failures identified on sent or received messages
- Relay acceptance of a transaction back to the sender (Status): All care settings
  - Extremely large volume for each customer over 1,000 transactions per hour process through our partners
  - No errors identified
- Respond that there was a problem with the transaction (Error): All care settings
  - Error responses are tracked in relation to each message type above, including stand alone error statuses

170.315(b)(3) Electronic Prescribing

Certified Health IT Module(s): **Soarian Clinicals**
CHPL Product Numbers: 15.04.04.1221.Soar.15.01.1.210331
Relied Upon Software: N/A

Real World Testing Methodologies Summary
In order to demonstrate successful Real World Testing for the certified Electronic Prescribing capabilities, we leveraged customer production environment tracking via existing processes which involve retrieval of summarized, non-PHI volume statistics from the system utilizing process monitoring operations. Reports were compiled using this production activity monitoring data and volumes were subtotaled by success/failure status (where applicable), and by visit type of Inpatient (IP) and Emergency Department (ED) for a 30-day measurement period to demonstrate continued successful use over time while ensuring applicable transaction data is still available (i.e., before log purging).

Some components were exempt as there is no real world use today. Additional tracking for those components will be included as the industry adopts those use cases. Regarding methodology for the the leading/trailing zeros and oral liquid metric dosing requirements, mandating inclusion of functional requirements as part of implementation testing processes when enabling ePrescribing at customer sites guaranteed that we test real world use and not a simulation of use.

Standards Updates
No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested
- Acute
- Emergency Department

Real World Testing Milestones
1. Completed identification of target customer participants: Feburary 27th, 2023
2. Completion of actual Real World Testing activities execution: May 31st, 2023
3. Completed assessment of Real World Testing data for results and outcomes compilation: November 3rd, 2023

Real World Testing Expected Outcomes
The outcomes observed in the Real World Testing execution included the ability to show a large volume of each transaction across the supported care settings with a high rate of success. We observed a success rate above the target 90% sucess rate across all electronic transactions. This has demonstrated that all certified capabilities are working as expected in all care settings where they are intended to be used.

Real World Testing Metrics
- Success rate across all prescription transactions (including renewal and change requests) routed electronically for the measured 30-day testing period of May 1, 2023 – 31, 2023 (target = 90%+): **99.58% (38,024/38,184)**

170.315(c)(1)-(3) Clinical Quality Measures (CQMs)

Certified Health IT Module(s): **Millennium (CQMs)**

CHPL Product Numbers: 15.04.04.1221.Mill.18.04.1.220101
Relied Upon Software: Cerner Quality Reporting (all criteria)

Real World Testing Methodologies Summary

In order to demonstrate successful Real World Testing (RWT) for the CQM – record and export and CQM – report criteria, we tracked data submissions to Centers for Medicare and Medicaid Services (CMS) and The Joint Commission (TJC) for a sample of *Cerner Millennium®* customers that have used Cerner's Millennium (CQMs) certified capabilities to record and process the eCQM data through the Cerner Quality Clearinghouse portal for their CMS and TJC submissions. The measures listed below were used for the testing activities. Measures 1-4 in the list are applicable to Acute and Emergency Department care settings, while measures 5 and 6 are applicable to the Ambulatory Care setting.

1. ED-2
2. VTE-1
3. STK-2
4. Safe Use of Opioids
5. CMS-165
6. CMS-122

For the CQM – import and calculate criterion, we demonstrated successful real world use by coordinating with a customer that required the import of QRDA data files from an external third-party source system to *Cerner Millennium®* system and observed the successful use of our certified capabilities to import the data.

Standards Updates

CMS Implementation Guide for Quality Reporting Document Architecture: Category I; Hospital Quality Reporting; Implementation Guide for 2022 (170.205(h)(3))

- Method used for standard update: SVAP
- Date notification sent to ONC-ACB: October 14, 2022
- Date notification sent to customers: September 23, 2022
- Measure used to demonstrate conformance with updated standard: Metric #3 from this RWT plan demonstrates conformance to the new standard via tracking of successful submission for CMS and TJC reporting using the new standard

CMS Implementation Guide for Quality Reporting Document Architecture: Category III; Eligible Clinicians and Eligible Professionals Programs; Implementation Guide for 2022 (170.205(k)(3))

- Method used for standard update: SVAP
- Date notification sent to ONC-ACB: October 14, 2022
- Date notification sent to customers: September 23, 2022
- Measure used to demonstrate conformance with updated standard: Metric #3 from this RWT plan demonstrates conformance to the new standard via tracking of successful submission for CMS and TJC reporting using the new standard

Care Settings Tested

- Acute
- Ambulatory
- Emergency Department

Real World Testing Milestones

1. Completed identification of target clients (EH and EC): end of Q1 2023
2. Completed execution of RWT activities: end of Q2 2023
3. Completed assessment of RWT data for results and outcomes compilation: end of year 2023

Real World Testing Expected Outcomes

RWT outcomes for the Millennium (CQMs) certified HIT module consisted of successful QRDA file submission to CMS and TJC across the tracked customers. More specifically, for Eligible Hospitals, Cerner reports displayed the measure outcomes for each qualifying encounter and the aggregated outcome count for the quarter. The

encounter could have an outcome assigned of Initial Population, Denominator, Denominator Exclusion, Numerator, or Exception. The aggregated count included a total for each of the outcomes. These counts matched CMS/TJC submission reports.

For Eligible Clinician measures, the QRDA III Cerner audit report matched the submission detail report generated by the Cerner Quality Clearinghouse. The following outcomes were evaluated: Patient population, Denominator, Denominator Exclusion, Numerator, Exception, Performance rate, Medicare Population (Denominator), and Tax Identification Number (TIN) counts. The validation of the expected outcome correlated to successful real-world use of the certified capabilities.

Real World Testing Metrics
- CQM – record and export criterion: percentage of selected patients for whom QRDA files are successfully generated (target = 100%). **Actual result = 100% (MET)**
- CQM – import and calculate the percentage of patient data successfully imported (target = 90%). **Actual result = 100% (MET)**
- CQM – report criterion: percentage of successful QRDA file submissions to CMS/TJC with less than 10% outcome mismatches against Cerner reporting (target = 95%). **Actual result = 100% (MET)**

170.315(c)(1)-(3) Clinical Quality Measures (CQMs)

Certified Health IT Module(s): **Soarian Clinicals**

CHPL Product Numbers: 15.04.04.1221.Soar.15.01.1.210331
Relied Upon Software: Health Services Analytics (all criteria)

Real World Testing Methodologies Summary

The methodology for Real World Testing (RWT) of the Soarian Clinicals CQM certified capabilities under the CQM - record and export (170.315(c)(1)) and CQM - report (170.315 (c)(3) criteria made use of the real world generation of certified Quality Reporting Architecture (QRDA) files by customers and their subsequent successful submission of that data to the Centers for Medicare and Medicaid Services (CMS) and The Joint Commission (TJC) for eCQM reporting programs. We utilized a client pool that represents an appropriate sampling of different hospital settings, workflows, and processes that are used in the real world for the certified capabilities.

As part of the methodology, reports were validated in a systemic way by utilizing various queries and Soarian Clinicals eCQM reporting data. These reports were compared with the reports provided by the regulaory agencies (CMS/TJC) after submission to determine the success rate of these criteria. The following Eligible Hospital measures were used during the testing:
1. Admit Decision Time to ED Departure for Admitted ED Patients (eED-2)
2. ICU Venous Thromboembolism Prophylaxis (eVTE-2)
3. Discharged on Antithrombotic Therapy (STK-2)
4. Safe Use of Opioids

For the CQM - Import and calculate criterion (170.315 (c)(2)), the methodology utilized test scripts and actual mock testing scenario execution on the testing EHR environment that appropriately mirrors real world use and conditions. A set of mock data was imported into Cerner's Healthcare Intelligence eMeasure application and used to generate the QRDA file.

Standards Updates

CMS Implementation Guide for Quality Reporting Document Architecture: Category I; Hospital Quality Reporting; Implementation Guide for 2022 (170.205(h)(3))
- Method used for standard update: SVAP
- Date notification sent to ONC-ACB: October 14, 2022
- Date notification sent to customers: September 23, 2022
- Measure used to demonstrate conformance with updated standard: Metric #3 from this RWT plan demonstrates conformance to the new standard via tracking of successful submission for CMS and TJC reporting using the new standard

Care Settings Tested
- Acute
- Emergency Department

Real World Testing Milestones
1. Completed identification of target clients (EH) for CQM – record and export and CQM – report criteria: end of Q1 2023 2.
2. Completed set up of testing EHR environment that replicates CQM – import and calculate criterion usage in the real world: end of Q1 2023
3. Completed actual RWT activities for CQM – record and export and CQM – report criteria: end of Q1 2023
4. Completed actual RWT activities for CQM – import and calculate criterion: end of Q2 2023 5. Complete assessment of RWT data for results and outcomes compilation: end of year 2023

Real World Testing Expected Outcomes

Real World Testing outcomes for the Soarian Clinicals CQM certified capabilities comprise the metrics of the customer's successful QRDA file submission and the accuracy metrics from the CMS Submission Portal provides the comparative count of submitted QRDA1 files and accepted QRDA1 files to CMS. For Eligible Hospitals, CMS reports display the measure outcomes for each qualifying encounter and the aggregated outcome count for the

quarter. The encounter could have an outcome assigned of Initial Population, Denominator, Denominator Exclusion, Numerator, or Exception. The aggregated count includes a total for each of the outcomes.

For Eligible Hospital measures (c2) criterion, import and calculate functionality was tested in the mock EHR environment that mirrors real world conditions and the imported aggregated count was matched with the outcome received after the execution. The validation of the expected outcome correlates to successful real world use of the certified capabilities.

Real World Testing Metrics
1. CQM – record and export criterion: percentage of selected patients for whom QRDA files are successfully generated (target = 100%). **Actual result = 100% (MET)**
2. CQM – import and calculate: percentage of patient data successfully imported (target = 90%). **Actual result = 100% (MET)**
3. CQM – report criterion: percentage of successful QRDA file submissions to CMS/TJC with less than 10% outcome mismatches against Cerner reporting (target = 95%). **Actual result = 100% (MET)**

170.315(e)(1) View, Download, and Transmit to 3rd Party

Certified Health IT Module(s): **HealtheLife**
CHPL Product Numbers: 15.04.04.1221.Hlif.23.06.1.230331
Relied Upon Software: Cerner Millennium

Withdrawn Products

The following versions of the applicable certified HIT modules that were included with the original 2023 Real World Testing plan were withdrawn prior to submission of the corresponding Real World Testing results.

- Module name: HealtheLife
- Version: 2021
- CHPL product number: 15.04.04.1221.Heal.H9.04.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module version was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: HealtheLife
- Version: 2022
- CHPL product number: 15.04.04.1221.Heal.22.05.1.220228
- Withdrawal date: April 27, 2023
- Results data captured for withdrawn listing (Y/N)? No – while the certified HIT module version was not withdrawn until April 2023, it was out of circulation and superseded by the newer 2023 version as of January 1, 2023.

The following versions of the applicable certified HIT modules were certified after the submission of the Real World Testing plan and were used in production of the data contained in these Real World Testing results.

- Module name: HealtheLife
- Version: 2023
- CHPL product number: 15.04.04.1221.Hlif.23.06.1.230331
- Certification date: March 31, 2023

Changes to Original Real World Testing Plan
- Summary of change: The methodology was adapted to track real world usage data through audit logs of a select set of six customers instead of aggregated metrics across all customers.
- Reason for the change: Unanticipated challenges delayed the implementation needed to capture RWT metrics at scale across the full customer population.
- Impact to Real World Testing execution: No impact. The altered methodology was able to achieve the same intended result as the original design (and as submited in 2022), as the specific customer subset used for tracking provides a representative sample of the full customer base, accounting for various sizes and types of customers, coverage of all applicable care settings, and differences in implementation specifics.

Real World Testing Methodologies Summary

To obtain real-world data, events from the product audit logs were aggregated from a subset of representative sample customers. The audit events used reflect usage of certified capabilities. The customers were strategically selected to represent different sizes of markets covering all of the applicable care settings. The targeted customers represent a mix of large conglomerate health systems that span multiple metropolitan service areas (1), regional health centers serving one broad metropolitan service area (2), small physician practices clinics (1), critical access (1) and community hospitals (1).

Standards Updates

No new adopted standard for the criterion have been voluntarily certified.

Care Settings Tested
• Acute • Ambulatory • Emergency Department

Real World Testing Milestones
1. Completed identification of target client participants: end of October 2023 2. Completed validation of audit report used for tracking real world use of the applicable certified capabilities: end of November 2023 3. Completed collection of audit events representing RWT activities: mid-December 2023 4. Completed assessment of RWT data for results and outcomes compilation: end of year 2023

Real World Testing Expected Outcomes
The outcomes from the Real World Testing plan met the expectations. The metrics show that the viewing capabilities continue to be the most used certified capabilities within the product. Volume for the events of viewing was greater than the events for downloading and transmitting health records as view actions are considered primary use of HealtheLife and more user-friendly. Download and transmit features in HealtheLife are accessed less frequently and thus will have a lower volume of events.

Real World Testing Metrics

• Number of unique HealtheLife users that viewed an element of the health record during the measurement period: **327,695**
    o July 2023 – 104,613
    o August 2023 – 112,744
    o September 2023 – 110,338
• Number of total combined viewing events of the health record during the measurement period: **6,149,259**
    o July 2023 – 1,914,027
    o August 2023 – 2,183,213
    o September 2023 – 2,052,019
• Number of unique HealtheLife users that downloaded a CCD during the measurement period: **428,611**
    o July 2023 – 135,124
    o August 2023 – 152,904
    o September 2023 – 140,583
• Number of unique HealtheLife users that transmitted a CCD during the measurement period: **452**
    o July 2023 – 238
    o August 2023 – 98
    o September 2023 – 116
• Number of unique HealtheLife users that viewed Access Logs: **40,561**
    o July 2023 – 12,680
    o August 2023 – 14,870
    o September 2023 – 13,011
• Number of total viewing events of Access Logs: **45,477**
    o July 2023 – 14,581
    o August 2023 – 16,194
    o September 2023 – 14,702

170.315(e)(1) View, Download, and Transmit to 3rd Party

Certified Health IT Module(s): Patient Portal – MMD

CHPL Product Numbers: 15.07.04.1221.Pati.MM.01.0.180720

Relied Upon Software: N/A

Real World Testing Methodologies Summary

Cerner's elected methodology for the Real World Testing (RWT) of the View, Download, and Transmit to 3rd Party (VDT) criterion for the Patient Portal – MMD certified HIT module consisted of specialized reports that capture data on both the reportable usage of the VDT capabilities in specific care settings, as well as gauging items such as a patients' or authorized representatives' experience accessing their healthcare information. This includes, among other items, accessibility and ease of searching for their information to ensure that the full scope of the certified capabilities are accounted for.

A report was generated from Patient Portal – MMD customers' production environments twice during the calendar year that shows the usage of the following VDT capabilities per care setting and selected date range:

- Discharged patients had access to the Patient Portal on time
- Discharged patients had access to their C-CDA on time
- New patients being provisioned to the Patient Portal (in addition to counting new user account creations per quarter, also count how many of those discharged in the quarter already had access prior to the visit, verses new patients without a prior portal account)
- Patients or their proxies logging in to the Patient Portal • Patients or proxies viewed their C-CDA's
- Patients or proxies downloaded their C-CDA's
- Patients or proxies transmitted their C-CDA's (both securely and via unsecured email)
- Patients accessed their audit log

An additional Patient Portal – MMD user report was generated from the customers' production environments twice during the calendar year showing the usage of the following VDT capabilities per de-identified user and selected date range:

- Number of logins
- Number of total documents viewed
- Number of total C-CDA's viewed
- Number of dashboard (parsed C-CDA aggregated) views
- Number of Acute visits
- Number of Ambulatory visits
- Number of Emergency visits

Activity tracking in these reports was designed to account for various available methods of access provison, including: manual (a system component), rapid ADT (an integration), Experian (an integration), and validation code entry (a system component).

Standards Updates

No new adopted standard for the criterion have been voluntarily certified.

Care Settings Tested

- Acute
- Ambulatory
- Emergency Department

Real World Testing Milestones

1. Completed actual RWT activities execution: mid-Q4 2023
2. Assessed data and compiled RWT results: end of Q2 and Q4 2023

Real World Testing Expected Outcomes

2023 RWT observed outcomes provided a baseline for expected outcomes for 2024. We anticipate active participation especially among the Inpatient population of the VDT criteria. Some of the VDT events will not have

much activity across all Care Centers, but viewing health information was expected to be a popular event. We also expected new patients to continually gain access to the Patient Portal throughout the observed measurement periods.

- Metric #3: Success rate for Consolidated Clinical Document Architecture (C-CDA) documents received on time in the patient portal (target = 98%): Most customers' Inpatient settings achieved 90-99% success. There were a few outliers in the Ambulatory Care Setting who achieved <, = 20% success. As in year 2022, the Ambulatory Care population brought down the success rate to overall 33% success rate.
- Metric #4: See Metric #2 Details. Metric # is new calculation introduced in 2023 to provide more detail as to why new user creations did not achieve as high a success rate as anticipated. Metric 4 identifies the # of patients who already had a username created from a prior visit and would therefore not need to create a new username for portal access.

Overall, the inpatient population achieved the highest scores for engagement. The 'view' and 'download' functions were utilized most frequently with minimal 'transmit' activity.

Outcome Challenges:
- Customers who offer self-provisioning had a reduced amount of proxy engagement. Self-provisioning only allows the patient to be provisioned as a user.
- Customers who utilized manual provisioning only did not achieve the desired 90% success rate for providing access.
- An overall lower level of patient engagement across all customers than expected.

Real World Testing Metrics
- Success rate for patients being provided access to their health information during the measurement periods (target = 90%): **85%**
    - Customers who offer Self Provisioning achieved 100% success. Most other customers achieved 80% success who use manual provisioning. There were a few outliers who achieved less than 50% success.
- Percentage of patients or proxies who have created a username when offered to exercise ability to access their health information on the patient portal during the measurement periods (target = 60%): **76%**
    - 14% of discharged patients seen during the year already had access to the portal. New patients in the Inpatient setting were the highest population who took the step to create their account once given access. Emergency patients achieved the least success of username creation.
- Success rate for HL7® CDA® Consolidated Clinical Document Architecure (C-CDA) documents received on time in the patient portal during the measurement periods (target = 98%): **33%**
    - Most customers' Inpatient settings achieved 90-99% success. There were a few outliers in the Ambulatory Care Setting who achieved <= 20% success. As in year 2022, the Ambulatory Care population brought down the success rate to overall 33%.
- Percentage of patients or proxies who had previously created a username when offered to exercise the ability to access their health information on the patient portal prior to the 2023 measurement period, which would carry forward. (target = 20%): **14%**
    - Metric #4 is a new calculation introduced in 2023 to provide more detail in relation to Metric #2. Metric #4 identifies the # of patients who already had a username created from a prior visit and would therefore not need to create a new username for portal access after a discharge during the measurement period.

170.315(f)(1) Transmission to Immunization Registries

Certified Health IT Module(s): **Millennium (Immunizations)**
CHPL Product Numbers: 15.04.04.1221.Mill.I8.03.1.220101
Relied Upon Software: Cerner Hub - Immunizations OR Vaccinations Outgoing Interface

Changes to Original Real World Testing Plan
- Summary of change: The metrics from the original RWT plan were altered upon recognition that the eight (8) metrics defined in the RWT plan were really four (4) metrics that were each duplicated unintentionally in the final RWT plan. The finalized results reflect the four (4) metrics and identify the metrics from the RWT plan that were determined to be a duplicate for each.
- Reason for change: Original metrics published in the RWT plan were identified as containing duplicates that were unintentionally included in the publication.
- Impact to RWT execution: No impact. All of the intended metric data was delivered and only duplicate metrics were excluded.

Withdrawn Products
The following versions of the applicable certified HIT modules that were included with the original 2023 Real World Testing plan were withdrawn prior to submission of the corresponding Real World Testing results.

- Module name: FirstNet (Immunizations)
- Version: 2015.01
- CHPL product number: 15.07.04.1221.Firs.I5.01.1.180625
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: PowerChart (Immunizations)
- Version: 2015.01
- CHPL product number: 15.04.04.1221.Powe.15.01.1.180728
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

Real World Testing Methodologies Summary
The Real World Testing methodology for the certified Transmission to Immunization Registries capabilities of the Millennium (Immunizations) certified HIT module was centered on tracking transaction counts for registry submissions and queries over the course of the month of October 2023. This count included any exceptions thrown and associated based on VXU or QBP transaction attempts. These numbers where then compared in totality to the successful messages which yielded a percent of successful transactions that was then segregated by the specific transaction type. Additionally, we retrieved finished project counts from our internal JIRA onboard queue to give an estimate of sites actively using these services in the real world.

Standards Updates
No new adopted standard for the criterion have been voluntarily certified.

Care Settings Tested
- Acute
- Ambulatory
- Emergency Department
- Pediatrics

Real World Testing Milestones
1. Completed compilation of plan for specific data to measure: end of 2022
2. Executed data reporting of RWT activities for identified timeframe: end of Q3 2023
3. Completed assessment of RWT data for results and outcomes compilation: end of year 2023

Real World Testing Expected Outcomes

ORACLE
Health

In coducting the Real World Testing activities, we observed that we met our 90% rate of successful transmissions of VXUs (1,603,040 received vs 1,756,099 sent/replayed) at 91.3% success rate based on the data we've retrieved from the month of October 2023. In addition, we observed 2,322,370 QBPs were sent successful to Immunization Information Systems (IIS) for a 97.6% success rate. These are generated by 362 live customers for query and 422 live for vaccine submissions.

Real World Testing Metrics
- Total transactions from internal client transaction data across the measurement period: **4,134,376** (1,756,099 submissions and 2,378,277 queries)
- Total transactions from state IIS data across the measurement period: **N/A** (duplicate of above metric)
- Number of successful messages from internal client transaction data across the measurement period: **3,925,410** (1,603,040 submissions and 2,322,370)
- Number of successful messages from state IIS data across the measurement period: **N/A** (duplicate of above metric)
- Number of failure messages from internal client transaction data across the measurement period: **208,966** (153,059 submissions and 55,907 queries)
- Number of failure messages from state IIS data across the measurement period: **N/A** (duplicate of above metric)
- Success rate for submissions and queries from internal client transaction data across the measurement period (target = 90%+): **94.95%** (3,925,410 / 4,134,376)
  - Submissions: 91.28% (1,603,040 / 1,756,099)
  - Queries: 97.65% (2,322,370 / 2,378,277)
- Success rate for submissions and queries with state IISs across the measurement period (target = 90%+): **N/A** (duplicate of above metric)

Note: failure rate for the third metric accounts for intermittent failures beyond the system's control, such as:
- Registration staff did not accurately capture patient demographics, or patient was unwilling/unable to provide information necessary to successfully match a patient during query (e.g., mother's maiden name)
- Clinician mis-documents vaccine details during administration (e.g., incorrect lot number)
- Network connectivity issues or failures on the endpoint's end resulting in inability to accept valid requests

170.315(f)(1) Transmission to Immunization Registries

Certified Health IT Module(s): **Soarian Clinicals**
CHPL Product Numbers: 15.04.04.1221.Soar.15.01.1.210331
Relied Upon Software: N/A

Changes to Original Real World Testing Plan
- Summary of change: The plan metric was altered to consolidate Immunization Information Systems (IIS) and internal customer transaction data instead of reporting them out separately.
- Reason for the change: Since we only have data from two state IISs, combining the data better represents transmission to immunization registries across our customer base.
- Impact to Real World Testing execution: No impact. The altered metric does not materially impact how our customers are using our solution to transmit to immunization registries, nor did it inhibit our ability to produce valid results.

Real World Testing Methodologies Summary
Real World Testing of the Soarian Clinicals Transmission to Immunization Registries certified capabilities consisted of a combination of production activity tracking via transaction results from connected state Immunization Information Systems (IIS) where available, along with a compilation of internal transaction results compiled from our customer base.

This compiled data was reviewed and assessed to produce metrics that provide an objective indication of the overall success customers have achieved in using the certified HIT module for its intended functions.

Standards Updates
No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested
- Acute
- Emergency Department

Real World Testing Milestones
1. Completion of actual Real World Testing activities execution for the target customers: end of Q3 2023.
2. Completion of assessment of Real World Testing data for results and outcomes compilation: end of year 2023.

Real World Testing Expected Outcomes
We continue to observe state-specific challenges with VXU transactions. In one state, we were not receiving any ACK transactions which impacted the results for the customers in that state. Fortunately, as expalined in the Changes to Original Real World Testing Plan section above, we were able to coordinate and work with several customers to assist with gathering reports from the state IISs to obtain the necessary data for meaningful analysis and results.

Overall, the testing we were able to perform with the available customers demonstrated high rates of successful data submissions reflecting successful use of the certified capabilities in the real world.

Real World Testing Metrics
- Total QBP query transaction success rate across the July – Sept 2023 measurement period (target = 90%+): **99.82%** (434,171 / 434,946)
- Total VXU submission transaction success rate across the July – Sept 2023 measurement period (target = 90%+): **99.52%** (134,479 / 135,139)

170.315(f)(2) Transmission to Public Health Agencies — Syndromic Surveillance

Certified Health IT Module(s): **HealthSentry; Syndromic Surveillance**

CHPL Product Numbers:15.04.04.1221.Heal.23.06.1.230331; 15.04.04.1221.Synd.23.06.0.230331

Relied Upon Software: N/A

Withdrawn Products
The following versions of the applicable certified HIT modules that were included with the original 2023 Real World Testing plan were withdrawn prior to submission of the corresponding Real World Testing results.

- Module name: HealthSentry
- Version: 2021
- CHPL product number: 15.04.04.1221.Heal.20.04.1.210308
- Withdrawal date: April 1, 2023
- Results data captured for withdrawn listing (Y/N)? No – while the certified HIT module version was not withdrawn until April 2023, it was out of circulation and superseded by the newer 2023 version as of January 1, 2023.

- Module name: HealthSentry
- Version: 2022
- CHPL product number: 15.04.04.1221.Heal.22.05.1.220222
- Withdrawal date: April 1, 2023
- Results data captured for withdrawn listing (Y/N)? No – while the certified HIT module version was not withdrawn until April 2023, it was out of circulation and superseded by the newer 2023 version as of January 1, 2023.

- Module name: Syndromic Surveillance
- Version: 2022
- CHPL product number: 15.04.04.1221.Synd.22.05.1.220222
- Withdrawal date: April 1, 2023
- Results data captured for withdrawn listing (Y/N)? No – while the certified HIT module version was not withdrawn until April 2023, it was out of circulation and superseded by the newer 2023 version as of January 1, 2023.

The following versions of the applicable certified HIT modules were certified after the submission of the Real World Testing plan and were used in production of the data contained in these Real World Testing results.

- Module name: HealthSentry
- Version: 2023
- CHPL product number: 15.04.04.1221.Heal.23.06.1.230331
- Certification date: March 31, 2023

- Module name: Syndromic Surveillance
- Version: 2023
- CHPL product number: 15.04.04.1221.Synd.23.06.0.230331
- Certification date: March 31, 2023

Real World Testing Methodologies Summary
Real World Testing methology for the Syndromic Surveillance certified capabilities consisted of producing evidence of successful creation and transmission of the required PHIN Messaging Guide for Syndromic Surveillance, Release 2.0 specification transactions for Emergency Department (ED) encounters to target public health agencies (PHA) via engagement with a representative sample of customers.

The target customers were actively transmitting syndromic surveillance information to their respective PHA and submission logs were captured for an appropriate 30-day period to show evidence of ongoing transmission of the following Admission, Discharge, and Transfer (ADT) HL7® transactions:

- A01 – Admissions
- A04 – Emergency Department (ED)
- A03 – Discharge
- A08 – Revise Patient Information

Standards Updates

No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested

- Acute
- Emergency Department

Real World Testing Milestones

1. Established target customers for test sample: end of Q1 2023
2. Gathered sample customer submission logs: end of Q1 2023
3. Prepared summary RWT results report: end of Q2 2023

Real World Testing Expected Outcomes

The results of the Real World Testing indicated successful ongoing transmission of the HL7® transactions to the target PHA. The success rates showed unequivocally that the test sample customers actively and successfully submitted required information for their ED patients during the measurement period, including admissions (A01), discharges (A03), and ED registrations (A04), as well as any update transactions (A08) specific to data reported for syndromic surveillance for the patients included in the reporting test period. Ultimately, this shows that the certified capabilities are enabling our customers to successfully satisfy "active engagement' expectations with public health registries as required as part of measurement under the Centers' for Medicare and Medicaid Services' (CMS) Promoting Interoperability programs.

Real World Testing Metrics

- Percentage of successful daily syndromic surveillance transactions (A01, A04 – ED, A03, A08) for sample clients across the 30-day selected measurement period (target = 85%+):
  - HealthSentry = **100%** (154,987 / 154,987)
  - Syndromic Surveillance = **100%** (309,460 / 309,460)

170.315(f)(2) - Transmission to Public Health Agencies – Syndromic Surveillance

Certified Health IT Module(s): **Soarian Clinicals**
CHPL Product Numbers: 15.04.04.1221.Soar.15.01.1.210331
Relied Upon Software: Cerner OPENLink

Changes to Original Real World Testing Plan
- Summary of change: The original milestone to gather audit data from sample customers' production data was to be executed in Q3 2023
- Reason for change: Staffing restraints required the execution to occur earlier in Q2 2023
- Impact to RWT execution: No impact. The same amount of elapsed time was used, only a quarter earlier.

Real World Testing Methodologies Summary
The objective of this Real World Testing plan was to provide evidence of ongoing (near real-time), successful reporting of syndromic surveillance information to target public health agencies (PHA). The Real World Testing methodology consisted of two components as summarized below:

1. Collect audit data from the Production database of a representative sample of 2 customers actively transmitting syndromic surveillance information to their respective public health agency (PHA). The auditing showed evidence of ongoing (near real-time) events that generate the following ADT HL7® transactions for syndromic surveillance reporting of Acute (Inpatient), Emergency Department (ED) and any customer designated Urgent Care encounters: A01 – Inpatient Admissions, A04 – Emergency Department (ED)/Urgent Care Registrations, A03 – Discharge (Inpatient/ED/UrgentCare), A08 – Revise Patient Information (Inpatient/ED/Urgent Care). Audit data was collected for a 2-week testing period within the reporting year and the total (aggregate) number of ADT message events (A01, A04, A03, A08) was provided for each 2-week sample of audit data. The numbers provide totals for the 2-week test period.
2. Monitor Soarian Clinicals issue reporting and tracking tools for any issues specific to the syndromic surveillance certified capabilities to support that they are functioning as expected and customers submitting data to their respective PHA are not encountering issues with the successful transmission/receipt of the supported HL7® ADT transactions.

Standards Updates
No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested
- Acute
- Emergency Department

Real World Testing Milestones
1. Monitored for reported issues: initiated Q1 2023 and continued through Q4 2023
2. Identified representative test customer sample and test period for audit data collection: end of Q2 2023
3. Gathered audit data from sample customers production data for test period: end of Q3 2023
4. Prepared summary report: end of year 2023

Real World Testing Expected Outcomes
The results of the Real World Testing demonstrated the ongoing and successful creation of the supported syndromic surveillance ADT HL7® transactions. It substantiated that the representative sample customers generated and sent information for their acute inpatient, ED and designated urgent care patients during the measurement period. This included A01, A03, A04, and A08 transactions specific to syndromic surveillance for qualifying patients/encounters included in the reporting test period. These results coupled with no reported issues specific to syndromic surveillance reporting shows successful "active engagement" with public health registries (as defined for CMS Promoting Interoperability programs) by Soarian Clinicals customers.

Real World Testing Metrics
Result – Successful Submission Volume
Both sampled customers showed ongoing outbound events for the supported ADT HL7® transactions throughout the test period. Below are aggregate numbers per customer for the 2-week test period:

- Customer 1:
  - HL7_A01- 143
  - HL7_A03 – 2,523
  - HL7_A04 – 2,384
  - HL7_A08 – 33,808
  - **Total = 38,858**
- Customer 2:
  - HL7_A01- 137
  - HL7_A03 – 2,429
  - HL7_A04 – 2,272
  - HL7_A08 – 32,140
  - **Total = 36,978**

The volume of A08 transactions generated will vary based on a customer's system configuration, charting practices, patient volume and acuity as well as Patient Registration practices. Even though the numbers vary, each of the test customers showed active transaction activity.

Result – Monitor of Reported Issues
Internal reporting and tracking tools were monitored throughout the 2023 reporting year for reported issues specific to the syndromic surveillance certified capabilities. No issues have been opened in 2023 regarding syndromic surveillance indicating that the feature is functioning as expected and customers submitting data to their respective DOH jurisdiction are not encountering issues with the successful transmission/receipt of the supported HL7® ADT transactions.

170.315(f)(3) Transmission to Public Health Agencies — Reportable Laboratory Tests and Value/Results

Certified Health IT Module(s): **HealthSentry; Electronic Lab Results**

CHPL Product Numbers: 15.04.04.1221.Heal.23.06.1.230331; 15.04.04.1221.Elec.23.06.0.230331

Relied Upon Software: N/A

Withdrawn Products

The following versions of the applicable certified HIT modules that were included with the original 2023 Real World Testing plan were withdrawn prior to submission of the corresponding Real World Testing results.

- Module name: HealthSentry
- Version: 2021
- CHPL product number: 15.04.04.1221.Heal.20.04.1.210308
- Withdrawal date: April 1, 2023
- Results data captured for withdrawn listing (Y/N)? No – while the certified HIT module version was not withdrawn until April 2023, it was out of circulation and superseded by the newer 2023 version as of January 1, 2023.

- Module name: HealthSentry
- Version: 2022
- CHPL product number: 15.04.04.1221.Heal.22.05.1.220222
- Withdrawal date: April 1, 2023
- Results data captured for withdrawn listing (Y/N)? No – while the certified HIT module version was not withdrawn until April 2023, it was out of circulation and superseded by the newer 2023 version as of January 1, 2023.

- Module name: Electronic Lab Results
- Version: 2022
- CHPL product number: 15.04.04.1221.Elec.22.05.1.220222
- Withdrawal date: April 1, 2023
- Results data captured for withdrawn listing (Y/N)? No – while the certified HIT module version was not withdrawn until April 2023, it was out of circulation and superseded by the newer 2023 version as of January 1, 2023.

The following versions of the applicable certified HIT modules were certified after the submission of the Real World Testing plan and were used in production of the data contained in these Real World Testing results.

- Module name: HealthSentry
- Version: 2023
- CHPL product number: 15.04.04.1221.Heal.23.06.1.230331
- Certification date: March 31, 2023

- Module name: Electronic Lab Results
- Version: 2023
- CHPL product number: 15.04.04.1221.Elec.23.06.0.230331
- Certification date: March 31, 2023

Real World Testing Methodologies Summary

The Real World Testing methodology for the Reportable Laboratory Tests and Value/Results certified capabilities consisted of providing evidence of successful creation and transmission of the required HL7® 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 1 transactions for reportable laboratory results to target public health agencies (PHA). This was accomplished via engagement wiith a

representative sample of customers actively transmitting reportable lab information to their respective PHA and capturing submission logs for a 30-day period during the calendar year.
Standards Updates No new adopted standard for the criterion was included in this testing plan.
Care Settings Tested • Acute
Real World Testing Milestones 1. Established target customers for test sample: end of Q1 2023 2. Gathered sample customer submission logs: end of Q1 2023 3. Prepared summary report: end of Q2 2023
Real World Testing Expected Outcomes The outcomes observed for the Real World Testing plan included sample customers generating and transmitting information for their reportable laboratory results successfully on a daily-basis during the test period. This provided objective evidence that the certified capabilities are enabling customers to meet "active engagement' expectations with public health registries as required as part of measurement under the Centers' for Medicare and Medicaid Services' (CMS) Promoting Interoperability programs.

Real World Testing Metrics
• Percentage of successful daily reportable laboratory results transactions for sample clients across the 30-day selected measurement period (target = 85%+):
    o HealthSentry = **100%** (9,477 / 9,477)
    o Electronic Lab Results = **99.84%** (212,221 / 212,563)

170.315(f)(3) Transmission to Public Health Agencies - Reportable Laboratory Tests and Value/Results

Certified Health IT Module(s): **NOVIUS Lab**
CHPL Product Numbers: 15.07.04.1221.NOVI.NO.01.0.180720
Relied Upon Software: N/A

Changes to Original Real World Testing Plan
- Summary of change: The period of time used to evaluate real world customer transactions was decreased from a full calendar quarter (3 months) to a period over 2 months. Data from 1 customer was collected April 25 - May 11, 2023. Data from the 2nd customer was collected June 8 - June 28, 2023.
- Reason for change: With the significant increase of public health laboratory test/result reporting the desired amount of transactions being sent to the public health agencies (PHA) was also significantly increased. This allowed the necessary volume of transactions to achieve the needs of Real World Testing to be accessed over a shorter timeframe.
- Impact to RWT execution: No impact. The desired transaction examples were still obtained as expected in a shorter amount of testing time.

Real World Testing Methodologies Summary
The Real World Testing methodology utilized a combination of customer production databases and outbound transaction queries. The unique public health transactions generated by two customers and who are actively engaged with their PHA for laboratory tests/results reporting were evaluated. The evaluation period lasted for a total period of about 7 weeks. An inquiry was also submitted to the customers' PHA requesting a response indicating if the customers were, in fact, actively engaged and reporting laboratory tests/results to the PHAs' satisfaction.

Standards Updates
No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested
- Acute
- Emergency Department

Real World Testing Milestones
1. Completed Identification of target NOVIUS Lab customers (those who have their systems configured to electronically send results to their public health department) and their reportable result transactions to public health: end of Q1 2023
2. Executed the reports/queries on identified customer production databases: end of Q2 2023
3. Attempted to work with identified state PHAs and obtain a report showing customers are actively sending results and in active engagement: end of Q2 2023
4. Generated final RWT result report: end of Q3 2023

Real World Testing Expected Outcomes
During the reporting period there were transactions sent to the PHA from each customer. As expected, the number of transactions fluctuated throughout the weeks. One customer sent transactions each day during the evaluation period. There were a few days during the evaluation period that the other customer did not have reportable results to report and therefore no transactions were sent to their PHA.

Additionally, as a response to our request, one PHA indicated the evaluated customer was in active engagement and successfully transmitting laboratory tests and results to their satisfaction. We did not receive a response from the second PHA. However, having no active issues during the meaurement period related to NOVIUS Lab's Reportable Laboratory Testing and Values/Results certified capabilities provides supplemental assurances that this customer is achieving "active engagement" as expected and that submissions are conformant and received successfully by the PHA.

Real World Testing Metrics
The original target metric published in the RWT plan was to obtain at least 10 successful transactions sent to a respective public health agency. During the approximate 7 week evaluation period the two sample customers

transmitted significantly more transactions. On average, one customer sent **31 unique transactions per day** (representing the Acute and ED care settings) to their state PHA, and the other sample customer sent an average of **20 unique transactions per day** representing both care settings.

170.315(f)(5) Transmission to Public Health Agencies — Electronic Case Reporting

Certified Health IT Module(s): **Electronic Case Reporting**
CHPL Product Numbers: 15.04.04.1221.Case.01.00.1.211229
Relied Upon Software: Cerner Millennium; eCR Now FHIR App

Real World Testing Methodologies Summary
The Real World Testing mehtodology for the certified Electronic Case Reporting capabilities consisted of executing a comparison of our processed Electronic Initial Case Report (eICR) documents for three randomized customers that have fully implemented our product for active use in their production environments to the amount of reported conditions based in the clinical EHR (Millennium). This comparison yielded results that provided an indication of the success rate of eICR transmissions in real world use.

Standards Updates
No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested
- Acute
- Ambulatory

Real World Testing Milestones
1. Identified target customer subset on which to perform RWT activities: end of Q1 2023
2. Contacted customers and AIMS for assistance: N/A (not needed)
3. Completed comparison of successfully transmitted eICRs to records of cases that should have been triggered: end of Q3 2023
4. Completed analysis and documentation of RWT findings and outcomes: end of Q4 2023

Real World Testing Expected Outcomes
The overall expectation was that the volume of eICRs generated would closely match (95%+) the volume actual cases reported in the EHR. What we found in comparison is that the eICRs generated actually surpassed the cases reported quite significantly. In some cases this was 2.5x to 3x the number of eICRs generated compared to the cases that were notified (e.g., in a large hospital system 9,438 eICRs were generated for only 3,938 patients with reportable diseases identified).

While this was an unexpected outcome, further analysis revealed that this was caused by the process by which cases are tirggered through use of the eCR Now FHIR app. Ultimately, eICRs are being triggered based on a set of conditions that may or may not end up being reportable for a given state/jurisdiction based on the parameters set up at the Association of Public Health Laboratories (APHL) Informatics Messaging Services (AIMS) layer. Thus, we end up generating eICRs for significantly more instances than are actually reportable, and those that are determined to not be reportable at the AIMS layer are purged without submission. In some instances, the eCR Now FHIR app may also generate multiple times based on the patient's time and encounter data updates that occur.

We believe that this will partially self-correct itself for 2024 testing for two reasons. First, more PHAs will begin accepting all conditions for eCR meaning that more generated eICRs will result in a reported case. Second, we are working to realign how we identify a reportable condition that should have an eICR generated by shifting to events-based generation.

Real World Testing Metrics
- Success rate of reportable conditions for the applicable state/local PHA for which an eICR document is successfully submitted to the AIMS platform during the measurement period (target 95%+):
    - In the 3 sample customers tested, we observed that the number of eICRs generated significantly surpassed the number in each scenario:
        - 3,938 cases to 9,438 eICRs generated
        - 850 cases to 3,233 eICRs generated
        - 1,027 cases to 2,088 eICRs generated

170.315(f)(5) Transmission to Public Health Agencies — Electronic Case Reporting

Certified Health IT Module(s): **Soarian Clinicals**
CHPL Product Numbers: 15.04.04.1221.Soar.15.01.1.210331
Relied Upon Software: N/A

Changes to Original Real World Testing Plan
- Summary of change: The original milestone for test execution in a Production-like environment was Q3 2023
- Reason for change: Staffing availabilitya llowed for the execution to occur earlier in Q2 2023
- Impact to RWT execution: No impact. Testing was executed a quarter earlier in the Production-like environment.

Real World Testing Methodologies Summary
The Real World Testing (RWT) methodology employed for the Soarian Clinicals Electronic Case Reporting (eCR) certified capabilities involved production-like activity testing and tracking for verification of use of the capabilities in the real world. Cerner specifically tracked client-like data to verify reporting activity of sending an HL7® CDA® Electronic Initial Case Report (eICR) document.

To execute the methodology, testing was executed in production-like environment with Advanced Interoperability Services (AIS) to test the eCR workflow with sending of the eICR document. We did not be use client production environments for this testing as there were no Soarian Clinicals clients live in production for real world testing. To note, at this time Soarian Clinicals clients have not implemented primarily due to the fact that Public Health Agencies are partnering with the Association of Public Health Laboratories (APHL) Informatics Messaging Services (AIMS) platform to accept the eICR documents with additional triggering requirements that extend beyond the scope of certification requirements. Soarian Clinicals does not currently support those additional triggering requirements.

Standards Updates
No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested
- Acute
- Emergency Department

Real World Testing Milestones
1. Completed production-like environment setup for testing with end to end connections: end of Q2 2023
2. Completed actual RWT activities execution: end of Q2 2023
3. Completed assessment of RWT activities and outcomes: end of year 2023

Real World Testing Expected Outcomes
Although there is no specific content exchange standard for eCR, the eICR document is the standard being adopted across the industry. Accordingly, we observed the RWT activities demonstrate that the certified capabilities enable successful Electronic Case Reporting in alignment with real world industry best practices.

Testing was executed in production-like environment with Advanced Interoperability Services (AIS) to demonstrate the eCR workflow with sending of the eICR document. Various patient scenarios were successfully executed to appropriately trigger the sending of an eICR document to AIS. Each document was subsequently retrieved from a repository and viewed online. The eICR document was also validated successfully using the AIMS validator.

Real World Testing Metrics
- Successful USCDI v1-compliant eICR document transmission (target 100%): **100% (10 / 10)**

170.315(f)(6) Transmission to Public Health Agencies — Antimicrobial Use and Resistance Reporting

Certified Health IT Module(s): **Antimicrobial Usage and Resistance Reporting**

CHPL Product Numbers: 15.04.04.1221.Anti.23.07.1.230331

Relied Upon Software: Cerner Millennium

Withdrawn Products

The following versions of the applicable certified HIT modules that were included with the original 2023 Real World Testing plan were withdrawn prior to submission of the corresponding Real World Testing results.

- Module name: Antimicrobial Usage and Resistance Reporting
- Version: 2021
- CHPL product number: 15.04.04.1221.Anti.20.05.1.210601
- Withdrawal date: April 1, 2023
- Results data captured for withdrawn listing (Y/N)? No – while the certified HIT module version was not withdrawn until April 2023, it was out of circulation and superseded by the newer 2023 version as of January 1, 2023.

- Module name: Antimicrobial Usage and Resistance Reporting
- Version: 2022
- CHPL product number: 15.04.04.1221.Anti.20.06.1.220509
- Withdrawal date: May 4, 2023
- Results data captured for withdrawn listing (Y/N)? No – while the certified HIT module version was not withdrawn until April 2023, it was out of circulation and superseded by the newer 2023 version as of January 1, 2023.

The following versions of the applicable certified HIT modules were certified after the submission of the Real World Testing plan and were used in production of the data contained in these Real World Testing results.

- Module name: Antimicrobial Usage and Resistance Reporting
- Version: 2023
- CHPL product number: 15.04.04.1221.Anti.23.07.1.230331
- Certification date: March 31, 2023

Real World Testing Methodologies Summary

Real World Testing for the certified AUR capabilities consisted of two components. First, direct real-world use of our certified AUR reports was tracked via cross-database analytics tooling to confirm successful utilization. Second, relevant customers actively participating in the National Health Safety Network's (NHSN) registry for AUR were engaged via a survey in an attempt to confirm successful participation. Direct customer engagement was necessary as NHSN is unable to provide a usable report for this information.

For the second component of the methodology, a report was first executed to positively identify the set of customers who had adopted the latest round of updates for the AUR reports. However, for internal quality improvement, the survey was supplied to all customers who have used the AUR capabilities, regardless of whether or not they implemented the lastest updates. The survey was shared with customers via email and via various existing customer engagement channels.

Standards Updates

No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested

- Acute
- Emergency Department

Real World Testing Milestones 1. Identified target customers actively using AUR Reporting in production for the 2023 reporting year: end of Q3 2023 2. Completed execution of reports for production activity tracking data and retrieval of NHSN submission evidence from partner customers: end of Q3 2023 3. Compiled data for RWT results submission: end of Q4 2023
Real World Testing Expected Outcomes Related to direct confirmatin that customers were able to successfully upload reports to NHSN, the following outcomes were observed: • 24 customers were identified as having taken the latest updates for the AUR reports. Of the 24 customers only 4 responded to the survey regarding the ability to successfully upload to NHSN. 8 additional customers who had not taken the latest updates also responded. Of the clients who responded: o Inconclusive: 4 (survey was not filled out completely) After engaging with the responding customers directly, we confirmed that 2 of the 4 were able to upload AU successfully, but are unable to participate in the AR reporting due to not having a discrete microbiology system, which qualifies for an exemption. Their responses are reflected in the success rates below. Success rates for engaged customers: • 100% success rate AU: 9 • 100% success rate AR: 7 (2 are exempted due to not having discrete results from their laboratory) • *17% success rate AU and AR: 1 *One customer had a success rate of 17% for uploading AU and AR data. However, the failures experienced were caused by issues with virtual desktop manager preventing successful executionand upload of reports and not connected to the certified functionality. In summary, we have observed that customers are able to successfully generate conformant AUR reports and upload data without issues related to the certified functionality.
Real World Testing Metrics • Total number of successfully generated Antimicrobial Use (AU) reports over the January - June 2023 measurement period: **7,608** • Total number of successfully generated Antimicrobial Resistance (AR) reports over the January - June 2023 measurement period: **4,010** Note – these numbers include any customer who has implemented and executed the AU and AR reports in a production environment, regardless of which AUR package was adopted.

170.315(f)(6) - Transmission to Public Health Agencies – Antimicrobial Use and Resistance Reporting

Certified Health IT Module(s): **Soarian Clinicals**
CHPL Product Numbers: 15.04.04.1221.Soar.15.01.1.210331
Relied Upon Software: N/A

Changes to Original Real World Testing Plan
- Summary of change: Metrics were altered to to change the Antimicrobial Resistance (AR) metric from *Total number of successfully generated Antimicrobial Resistance (AR) reports over tested time period* to *Total number of test Antimicrobial Resistance (AR) files submitted to NHSN successfully during the measurement period*.
- Reason for change: None of our customers implemented AR for active production use during the measurement period.
- Impact to Real World Testing exaction: This impacted our ability to produce true real world data for the testing on the AR reporting side. However, we were still able to conduct testing mirroring real world use for AR reporting and obtain actual real world data for the AU reporting capabilities.

Real World Testing Methodologies Summary
The methodology employed for the Soarian Clinicals Antimicrobial Use (AU) Reporting certified capabilities involved production activity tracking for use of the capabilities in the real world. Cerner support tracked customer monthly file generation produced for submission to the National Health Safety Network's (NHSN) AUR registry.

The methodology for AR reporting was altered as described above to utilize internal testing activities that closely mirror real world conditions. This helped to ensure the reporting capability was functional and able to be used successfully in lieu of any active customer production implementations.

Standards Updates
No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested
- Acute
- Emergency Department

Real World Testing Milestones
1. Completion of tracking actual monthly files generated by our targeted client base: end of Q3 2023
   a. Three customers were identified as actively utilizing AU reporting.There currently are no clients utilizing AR reporting during the measurable time period
2. Completed assessment of Real World Testing data for results and outcomes compilation: end of year 2023
   a. Three customers successfully generated AU files monthly (Aug-Sept) and confirmed successful upload to NHSN.
3. Completed internal testing for AR reports: end of Q3 2023

Real World Testing Expected Outcomes
We have observed low overall adoption of the AUR reporting capabilities across our customer base, particularly with the AU report, which has not been implemented for active production use. This is primarily due to the capabilities currently being optional for Centers for Medicare and Medicaid Services (CMS) Promoting Interoperability programs and Soarian Clinicals having an impending sunset date. However, for the customers we were able to track, we observed that AU reports were successfully generated and uploaded monthly to NHSN demonstrating successful use of the certified capabilities for their intended purpose.

Real World Testing Metrics
- Total number of successfully generated Antimicrobial Use (AU) reports over July – Sept 2023 measuring period: **165** (produced by 3 customers)
- Total number of test Antimicrobial Resistance (AR) files submitted to NHSN successfully during the measurement period: **144,658** (0 failures during testing)

170.315(f)(7) Transmission to Public Health Agencies — Health Care Surveys

Certified Health IT Module(s): **Millennium (Health Care Surveys)**
CHPL Product Numbers: 15.04.04.1221.Mill.HC.03.1.220101
Relied Upon Software: N/A

Withdrawn Products

The following versions of the applicable certified HIT modules that were included with the original 2023 Real World Testing plan were withdrawn prior to submission of the corresponding Real World Testing results.

- Module name: PowerChart (Health Care Surveys)
- Version: 2015.01
- CHPL product number: 15.04.04.1221.Powe.HC.00.1.180801
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

Real World Testing Methodologies Summary

Cerner's Real World Testing methodology for the Millennium (Health Care Surveys) certified HIT module consisted of working in unison with the National Health Care Surveys (NHCS) registry representatives on a quarterly basis to track Cerner customer surveyed participants' submission status. This included confirmation that the certified capabilities being utilized by these participants are fulfilling the submission requirements in accordance with the mandatory HL7® CDA® R2 Implementation Guide: National Health Care Surveys (NHCS), R1 DSTU Release 1.2 - US Realm standard.

Standards Updates

No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested

- Acute
- Ambulatory
- Emergency Department

Real World Testing Milestones

1. First touchpoint with NHCS: end of Q1 2023
2. Second touchpoint with NHCS: end of Q2 2023
3. Third touchpoint with NHCS: end of Q3 2023
4. Compiled data for RWT results from NHCS status reports during CY 2023: end of Q4 2023

Real World Testing Expected Outcomes

Observations from the Real World Testing activities provided positive affirmation from the NHCS registry representatives that all sampled providers/facilities utilizing Cerner's certified capabilities were able to successfully participate to their satisfaction and submit conformant data.

Real World Testing Metrics

Success rate of compliance with NHCS reporting submission for sampled Cerner clients (target = 100%): **100%**

Application Access and Standardized API – 170.315(g)(7), (9), (10)

Certified Health IT Module(s): FirstNet (Clinical); PowerChart (Clinical); Millennium (Clinical)

CHPL Product Numbers: 15.04.04.1221.Mill.18.06.1.221107

Relied Upon Software: N/A

Withdrawn Products

The following versions of the applicable certified HIT modules that were included with the original 2023 Real World Testing plan were withdrawn prior to submission of the corresponding Real World Testing results.

- Module name: FirstNet (Clinical)
- Version: 2015.01
- CHPL product number: 15.04.04.1221.Firs.15.04.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: FirstNet (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Firs.18.05.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: PowerChart (Clinical)
- Version: 2015.01
- CHPL product number: 15.04.04.1221.Powe.15.04.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: PowerChart (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Powe.18.05.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

The following versions of the applicable certified HIT modules were certified after the submission of the Real World Testing plan and were used in production of the data contained in these Real World Testing results.

- Module name: Millennium (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Mill.18.06.1.221107
- Certification date: November 7, 2022

Changes to Original Real World Testing Plan
- Summary of change: Updated testing metrics to reflect testing of 170.315(g)(10)-certified capabilities, which had been certified and deployed between the publishing of the 2023 RWT testing plan and the beginning of the 2023 testing period.

- Reason for the change: The published RWT plan for 2023 reflected capabilities which were certified at the time of publication, however, certification of additional capabilities as part of the Cures Update was more appropriate to focus on for testing (along with the maintained 170.315(g)(7) and (9) criteria).
- Impact to Real World Testing execution: This created a change in the targeted testing metrics for the plan but ultimately provided more relevant testing data about current certified capabilities, which resulted in more valuable testing results.

Real World Testing Methodologies Summary

The Real World Testing (RWT) methodology for the Millennium (Clinical) Application Access certified capabilities consisted of tracking live production API requests and responses from registered consumer applications. This tracking was accomplished via utilization of a Cerner cross-database analytics tool which provides near real-time activity tracking of production environment activity, including a dedicated dashboard of tracking specific to Cerner's certified APIs. This dedicated API dashboard provides real world utilization data that can provide the insights necessary to ensure that the certified APIs are reliably serving their intended purpose for our clients after achieving certified status. The data provided includes daily activity data across all connected client systems by requesting application type (consumer vs. provider), a count of authentication tokens granted for patient access, a count of successful CCD retrieval requests, and a count of unique applications with successful Bulk extracts.

Standards Updates

HL7 FHIR® US Core Implementation Guide STU 4.0.0, June 28, 2021 (170.215(a)(2))
- Method used for standard update: SVAP
- Date notification sent to ONC-ACB: N/A (utilized for initial certification)
- Date notification sent to customers: N/A (utilized for initial certification)
- Measure used to demonstrate conformance with updated standard: Metrics #3 and #4 from this RWT plan demonstrates conformance to the new standard via tracking of successful API transactions (single patient and bulk data, respectively) utilizing the new standard version.

Care Settings Tested
- Acute
- Ambulatory
- Behavioral Health
- Emergency Department
- Pediatrics

Real World Testing Milestones
1. Compiled a comprehensive list of all client API implementations to be included in the API dashboard tracking, including updates to RWT plan to account for changes in certified capabilities: end of Q1 2023
2. Reviewed current production activity tracking dashboard in-depth to identify any data gaps or issues to be addressed: end of Q1 2023
3. Began data retrieval and follow-up on any "loose ends" discovered in prep activities: end of Q3 2022
4. Completed all RWT execution and results compilation for CY 2023: end of Q4 2023

Real World Testing Expected Outcomes

Millennium (Clinical) and FirstNet (Clinical) certified APIs RWT execution included high volumes of successful API transactions across all of the live production endpoints, as well as a high volume of successful C-CDA retrievals and patient tokens granted. The fairly low volume of unique applications which successfully completed a bulk extract during the measurement period reflects the gradual adoption of this capability by the consumer base.

Collectively, these observation from the 2023 align with expectations and reflect a high quality real world experience with our certified APIs for both customers and third-party developers.

Real World Testing Metrics
- Tracking events associating a request to a patient and issuing a token (g7): **1.66M Patient access tokens granted** (January 1st - December 31st, 2023)
- Tracking events returning a C-CDA document in FHIR response (g9): 248k Successful CCD retrievals (January 1st - December 31st, 2023)
- Success rate for Single Patient APIs (g10) (target = 98%+):
  - **99.32%** Success rate for calls with a Patient access token
  - **99.23%** Success rate for calls with a Provider or System access token
- Bulk API adoption tracking (g10): **7 Unique applications with successful bulk extracts**

Application Access and Standardized API – 170.315(g)(7), (9), (10)

Certified Health IT Module(s): **Soarian Clinicals**

CHPL Product Numbers: 15.04.04.1221.Soar.15.01.1.210331

Relied Upon Software: Ignite Soarian API

Changes to Original Real World Testing Plan
- Summary of change: The original plan referenced the Common Clinical Data Set (CCDS) and the 170.315(g)(8) criterion. As Soarian Clinicals is now certified for the 2015 Cures Update, the metrics were upgraded to reflect the FHIR resources satisfying the more robust USCDI V1 data set associated with the 170.315(g)(10) criterion.
- Reason for change: Soarian Clinicals is certified to the 2015 Cures Update edition, which has replaced the older CCDS with USCDI V1 as part of the new 170.315(g)(10) criterion.
- Impact to Real World Testing execution: There was no impact to Real World Testing methodology or execution. The change applied the same methodology to the more extensive set of FHIR resources reflected in the USCDI, which replaced the CCDS.

Real World Testing Methodologies Summary
The methodology for Real World Testing of the Soarian Clinicals certified APIs involved collection of API usage statistics from customers' production environments. Each time a clinically relevant Fast Healthcare Interoperability Resources (FHIR) resource is retrieved by an app, the Soarian Clinicals EHR inserts a record in an API activity log that includes the type of resource (Patient, AllergyIntolerance, etc.), patient, and success/failure indicator. Our methodology was to query this log to ensure a positive count of successful retrievals across all resources required for the Application Access criteria.

Standards Updates
No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested
- Acute
- Emergency Department

Real World Testing Milestones
1. Identified production client environments for which API usage statistics would be gathered: Q1 2023
2. Assessed need for fallback test method, based on client API usage. If necessary, set up EHR environment that mirrors real world to implement fallback test method*: Q2 2023 (fallback method was not required)
3. Executed RWT activities: Q3 2023
4. Completed assessment of RWT data for results and outcomes compilation: Q4 2023

*Our test plan identified two options: collecting test results from a real customer and a backup option that entailed testing in a simulated environment with the characteristics of a real customer environment. The backup option was included in the plan because the Soarian Clinicals EHR is on an end-of-life trajectory, with declining customer numbers. In 2023, we were able to collect test results from a real customer.

Real World Testing Expected Outcomes
The outcome of the testing activities was successful in that positive numbers of successful queries were observed for all covered FHIR resources in the customer production environment.

Real World Testing Metrics
- Number of successful API reads for each FHIR API resource for the USCDI V1 data scope across the testing year at customer site (target = at least 1 successful access event for each resource):
  - AllergyIntolerance – 51
  - Binary – 56
  - CarePlan – 50
  - CareTeam – 50
  - Condition – 50
  - Device – 50

- DiagnosticReport – 50
- DocumentReference – 47
- Encounter – 50
- Goal – 50
- Immunization – 50
- MedicationRequest – 50
- Observation – 150
- Patient – 228
- Person – 10
- Procedure - 50

170.315(h)(1) Direct Project

Certified Health IT Module(s): FirstNet (Clinical); PowerChart (Clinical); Millennium (Clinical); Soarian Clinicals

CHPL Product Numbers: 15.04.04.1221.Mill.18.06.1.221107; 15.04.04.1221.Soar.15.01.1.210331

Relied Upon Software: Cerner Direct HISP

Withdrawn Products

The following versions of the applicable certified HIT modules that were included with the original 2023 Real World Testing plan were withdrawn prior to submission of the corresponding Real World Testing results.

- Module name: FirstNet (Clinical)
- Version: 2015.01
- CHPL product number: 15.04.04.1221.Firs.15.04.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: FirstNet (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Firs.18.05.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: PowerChart (Clinical)
- Version: 2015.01
- CHPL product number: 15.04.04.1221.Powe.15.04.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

- Module name: PowerChart (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Powe.18.05.1.210308
- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? No - the certified HIT module was withdrawn prior to commencing real world testing activities in CY 2023.

The following versions of the applicable certified HIT modules were certified after the submission of the Real World Testing plan and were used in production of the data contained in these Real World Testing results.

- Module name: Millennium (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Mill.18.06.1.221107
- Certification date: November 7, 2022

Real World Testing Methodologies Summary

The Real World Testing methodologies for Cerner's Direct Project certified capabilities, which are shared across the Millennium (Clinical) and Soarian Clinicals certified HIT modules, consisted of collecting data on Direct messages that were sent and received through the Cerner Direct Health Information Service Provider (HISP). This reporting included measures for the % of inbound and outbound messages that were processed by the HISP in less than 1 hour and a measure of system uptime using our 27 microservices health check data.

All measures were reported as a monthly percentage meeting the criterion established. Through this reporting, we were able to track data on all Soarian Clinicals and *Cerner Millennium*® (Millennium (Clinical)) customers live with the Cerner Direct HISP in production environments. This also allowed us to reliably track collective success and failure rates of real world transactions through our Direct HISP.

Standards Updates
No new adopted standard for the criterion was included in this testing plan.

Care Settings Tested
- Acute
- Ambulatory
- Behavioral Health
- Emergency Department
- Pediatrics

Real World Testing Milestones
1. Developed reporting queries to initiate data capture for all Real World Testing metrics: end of CY 2022
2. Completed assessment of Real World Testing data for results and outcomes compilation: end of CY 2023

Real World Testing Expected Outcomes
From January 2023-June 2023, nearly all messaging activity was processed within an hour and system downtime % was consistently low, which indicated high system reliablity. From July 2023-August 2023, messages sent and received using the Cerner HISP experienced some delays. This issue was due to onboarding of customers in the public health sector. As a result, the system may have taken longer than one hour to deliver messages across the customer base. This issue impacted both of our Real World Testing metrics for July and August, as outlined below. Mitigation steps were performed to overcome capacity limitation issues and we continued to meet our Real World Testing metrics throughout the rest of CY 2023.

Real World Testing Metrics
- Percentage of inbound and outbound messages processed in less than 1 hour over the Q1-Q3 2023 measurement period (target >=99.9%):
    - Outbound = **99.89%** (16,369,213 / 16,386,235)
    - Inbound = **99.99%** (12,074,394 / 12,074,975)
        - Note – this collective metric was achieved for all months except for outbound messages processed in July (99.67%) and August (99.58%).
- Overall system uptime over the Q1-Q3 2023 measurement period (target >=99.9%): **99.96%**
    - Note – this metric was achieved for all months except for July (99.85%) and August (99.86).