Cerner Certified Health IT 2022 Real World Testing Results

Cerner 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 2022. These results reflect the outcomes of executing our 2022 Real World Testing plans for all 2015 Edition and 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, 2021.

Individual Real World Testing results are organized by the 2015 Edition or 2015 Cures Update Edition certification criteria 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 and the results are structured accordingly.

Some certified Health IT modules or versions of modules that were part of an original 2022 Real World Testing plan were also withdrawn during the calendar year after publication of the Real World Testing plan, or new ones were certified. Where relevant, a *Withdrawn Products* section is included in each set of results with the details of such changes.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.

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170.315(b)(1) Transitions of Care

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

CHPL Product Numbers: 15.04.04.1221.Firs.15.04.1.210308; 15.04.04.1221.Firs.18.05.1.210308; 15.04.04.1221.Powe.15.04.1.210308; 15.04.04.1221.Powe.18.05.1.210308

Withdrawn Products

The following versions of the applicable certified HIT modules that were included with the original 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- Module name: FirstNet (Clinical)
- Version: 2018
- CHPL product number: 15.04.04.1221.Firs.18.05.1.210308
- Withdrawal date: December 31, 2022
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- Withdrawal date: December 31, 2022
- Results data captured for withdrawn listing (Y/N)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

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 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.

- 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;
- 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; and
- 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 refinement of new C-CDA generation cross-customer dashboard in Q4 2021
2. Completed actual Real World Testing activities execution (included execution of monthly report) at the end of Q3 2022
3. Completed assessment of Real World Testing data for results and outcomes compilation at the end of 2022

Real World Testing Outcomes

We observed extremely high volumes of successful document generation, which reached well over tens of millions on a monthly basis throughout 2022. 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. We observed low usage for the C-CDA validation component with somewhat scattered numbers on a month-to-month basis. This reflects our experience where the value of the conformance validation error visibility to end-users is very low 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: **22,320,944**
- 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/viewed per month: **142,444,336**

- 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: **127,218**

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

Changes to Original Real World Testing Plan

- Summary of Change: Updated the type of report collected at customer production
- Reason for Change: Leveraged Cerner's Healthcare Intelligence reporting for Automated Measures, Supporting Electronic Referral Loops by Sending Health Information. This report was the most utilized across Soarian Clinicals customers in production, giving the most accurate data.
- Impact to Real World Testing Execution: No impact, added clarity on the type of report used for tracking.

- Summary of Change: Increased the number of validated documents by optimizing deployment of the solution.
- Reason for Change: This was required to ensure optimal real world customer deployment and usage
- Impact to Real World Execution: No impact. However, based on the metrics collected in 2022, for 2023 Real World Testing, the testing metrics have been updated to reflect validation of C-CDA documents rather than the percentage of documents that are in error from external sources.

- Summary of Change: For the preference criteria, a new report was created and deployed into customer production.
- Reason for Change: The new report availability was delayed, altering original planned execution.
- Impact to Real World Execution: Due to this timeline, the metrics on the change of preference were zero within the first month in production. This result is expected as we do not expect customers to continuously change their preferences on viewing displayed C-CDA sections.

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 created 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 new report was created 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 the identification of target customer participants: end of January 2022
2. Completed the readiness for customer query execution: end of Q3 2022
3. Completed the actual Real World Testing activities execution (includes execution of monthly report): end of Q3 2022
4. Completed the assessment of Real World Testing data to compile results and outcomes: end of year 2022

Our milestones remained the same, the execution was moved from Q2 to Q3 due to new reports created and general availability timelines for the C-CDA validation and preference report.

Real World Testing Outcomes

The Real World Testing outcomes for sending and receiving C-CDA documents were measured using a monthly 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 customer production.

For the validation criteria, the outcomes were measured by a unique monthly 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

- For the sending and receiving of C-CDA documents, number of patient visits for which a C-CDA document was either received or sent (target 50%+): **1,264/1,580 (80%)**
- For the validation of C-CDA document, rate of C-CDA documents received inbound with any error (target less than 25%): **114,687/135,740 (84.49%)**
    - Note that this is not an indication of non-conformity of the certified capabilities as the errors are with documents received inbound from other systems.
- For the validation capabilities system settings, 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): **FirstNet (Clinical); PowerChart (Clinical)**

CHPL Product Numbers: 15.04.04.1221.Firs.15.04.1.210308; 15.04.04.1221.Firs.18.05.1.210308; 15.04.04.1221.Powe.15.04.1.210308; 15.04.04.1221.Powe.18.05.1.210308

Withdrawn Products

The following versions of the applicable certified HIT modules that were included with the original 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

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, and 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 customer production activity tracking data reports the first week of Q4 2022
2. Completed assessment of production activity tracking data reports mid-Q4 2022
3. Completed compilation of Real World Testing results from production activity tracking data reports assessment at the end of 2022

Real World Testing 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: **1,363,415**
  - Average # of Problems rejected per month: **1,916,219**
- Number of Allergies added and rejected per month:
  - Average # Allergies added per month: **127,249**
  - Average # of Allergies rejected per month: **497,998**
- Number of Home Medications added and rejected per month:
  - Average # Home Medications added per month: **1,096,460**
  - Average # of Home Medications rejected per month: **5,273,866**

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

Changes to Original Real World Testing Plan

- Summary of change: The target customer base for the Real World Testing activities was simplified to focus on one representative sample customer instead of all customers.
- Reason for the change: Challenges were encountered with customer adoption of the new report created for Real World Testing to track production activity specific to the capabiltiies of the Clinical Information Reconciliation and Incorporation criterion. Accordingly, our sampling had to be reduced to one representative customer who had fully adopted the new report and was known to have active regulatory engagement.
- Impact to RWT execution: The reduced scope of customers imposed some limitations on our ability to gain insights on use of the certified capabilities. However, we were still able to achieve the goals of the Real World Testing plan and produce results as described below. We look forward to broader adoption of the report for our 2023 Real World Testing activities.

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 the 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 new report was created and implemented 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 only when each of the reconciliation actions occurs with a C-CDA document for the pertinent workflows. This report was created and implemented 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 the identification of target customer participants: end of January 2022
2. Completed the technical readiness for customer query execution: end of Q2 2022
3. Completed the actual Real World Testing activities execution (includes monthly report execution): end of Q3 2022

4. Completed the assessment of Real World Testing data for results and outcomes compilation: end of year 2022

Real World Testing Outcomes

Review of customer configuration revealed four customers who had implemented all three clinical information reconciliation workflows (Allergy Reconciliation, Problem Reconciliation, and Medication Reconciliation). Of this customer subset, one had the new Healthcare Intelligence reconciliation report and active regulatory engagement necessary for the Real World Testing. The remaining three customers either had not adopted the updates containing the report as of July 2022 when technical readiness activities for test execution had been completed, or did not have active regulatory engagement. Accordingly, the reconciliation report was successfully executed in July 2022 for the two customers who had the new report implemented.

The reconciliation report was successfully executed in July 2022 for the target client who had the new report implemented. Upon review of the reconciliation report data, it was confirmed that the client had implemented and actively utilized all three clinical information reconciliation workflows with incorporated of data from C-CDA documents.

Overall, the Real World Testing outcome for clinical information reconciliation of C-CDA documents demonstrated that the customers had low adoption 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%+): **29.07% (1,136/3,907)**

Note – the target results for this measure were not met, however, this does not indicate that customers are not fulfilling the Clinical Information Reconciliation and Incorporation requirements. With this new report, the data specificially looked at only reconciliation and incorporation of data from a C-CDA document. 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. Additionally, the external data on C-CDAs can, at times, create noise with extraneous data. As the amount of data continues to grow it can be a negative in attempting to incorporate the data for a patient visit and into the clinician's workflows.

170.315(b)(3) Electronic Prescribing

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

CHPL Product Numbers: 15.04.04.1221.Firs.15.04.1.210308; 15.04.04.1221.Firs.18.05.1.210308; 15.04.04.1221.Powe.15.04.1.210308; 15.04.04.1221.Powe.18.05.1.210308; 15.04.04.1221.Powe.03.02.1.210308

Withdrawn Products

The following versions of the applicable certified HIT modules that were included with the original 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

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. Q1 2022: identified the process in which to generate applicable transactions to be evaluated through network traffic
2. Q3 2022: identified target domains to evaluate traffic across applicable venues of care
3. Q4 2022: executed process to review transactions and generate applicable metrics

Real World Testing 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 no system failures due to standard non-conformance
- 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
- 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 28th - December 2nd (target = 90%+): **99.9% (89,825/89,906)**

Overall eRx transaction monitoring results:

- Med History Requests: 0 errors, 26,367 transactions reviewed
- Cancel Requests: 3 errors, 4,437 transactions reviewed
- Change Responses: 3 errors, 36 transactions reviewed
- NewRx: 9 errors, 34,511 transactions reviewed
- Refill Responses: 66 errors, 10,774 transactions reviewed
- Verify: 0 errors, 13,781 transactions reviewed
- Total: 81 errors, 89,906 transactions reviewed

Additional tracking details:

- Create new prescriptions (NewRx): All care settings
    - Extremely large volume for each customer over 1,000 transactions per hour process through our partners
    - 2 failure scenarios tracked during specific time range
        - One failure due to pharmacy not supporting schedule 2 medications specifically and another failure due to the medication's status being different between states
- Request and respond to change prescriptions (RxChangeRequest, RxChangeResponse): Ambulatory care setting
    - Small volume of transactions due to low adoption of the Change transaction
    - 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
    - Extremely large volume for each customer over 1,000 transactions per hour process through our partners
    - Few errors were returned for our Cancel requests unrelated to message structure
    - Few 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
    - Large volume for each customer around 200 transactions per hour
    - 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
    - 66 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)

    - Around 400 successful responses per day during the tracking period
    - No failures identified from our system accepting responses
    - Large amount of failures identified on the part of sending pharmacies due to non-conformance 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 mixed
- 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
    - 10 total failures on stand alone status messages all from pharmacy initiated transactions being non-conformant
    - No failures in Millennium generated stand alone status messages
- 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

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: April 19, 2022
2. Completion of actual Real World Testing activities execution: June 29, 2022
3. Completed assessment of Real World Testing data for results and outcomes compilation: July 6, 2022

Real World Testing 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, 2022 – 31, 2022 (target = 90%+): **99.78% (30,198/30,265)**

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

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

CHPL Product Numbers: 15.07.04.1221.Firs.15.02.1.190514; 15.04.04.1221.Firs.18.03.1.200101; 15.04.04.1221.Powe.C5.02.1.190514; 15.04.04.1221.Powe.C8.03.1.200101; 15.07.04.1221.Mill.15.03.1.220101; 15.04.04.1221.Mill.18.04.1.220101

Withdrawn Products

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

- Module name: FirstNet (CQMs)
- Version: 2015.01
- CHPL product number: 15.07.04.1221.Firs.15.02.1.190514
- Withdrawal date: April 1, 2022
- Results data captured for withdrawn listing (Y/N)? No

- Module name: FIrstNet (CQMs)
- Version: 2018
- CHPL product number: 15.04.04.1221.Firs.18.03.1.200101
- Withdrawal date: April 1, 2022
- Results data captured for withdrawn listing (Y/N)? No

- Module name: PowerChart (CQMs)
- Version: 2015.01
- CHPL product number: 15.04.04.1221.Powe.C5.02.1.190514
- Withdrawal date: April 1, 2022
- Results data captured for withdrawn listing (Y/N)? No

- Module name: PowerChart (CQMs)
- Version: 2018
- CHPL product number: 15.04.04.1221.Powe.C8.03.1.200101
- Withdrawal date: April 1, 2022
- Results data captured for withdrawn listing (Y/N)? No

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 (CQMs)*
- Version: 2018
- CHPL product number: 15.07.04.1221.Mill.15.03.1.220101
- Certification date: January 1, 2022

- Module name: Millennium (CQMs)*
- Version: 2018
- CHPL product number: 15.04.04.1221.Mill.18.04.1.220101
- Certification date: January 1, 2022

*Please note that Millennium (CQMs) is the replacement certified HIT module which inherited its certified status from the predecessor FirstNet (CQMs) and PowerChart (CQMs) certified HIT module names.

Real World Testing Methodologies Summary

The following is an overview of the methodologies and approaches that were employed for the Real World Testing of the Clinical Quality Measures (CQM) criteria.

The CQM – record and export criterion at 170.315(c)(1) enables the customer/user to record all of the data that would be required to calculate CQMs and allows the customer/user to export a data file conforming to the HL7® CDA® Release 2 Implementation Guide for: Quality Reporting Document Architecture – Category 1 (QRDA I); Release 1, DSTU Release 3 specifications at any time. The CQM – import and calculate criterion at 170.315(c)(2) enables the customer to import and calculate every CQM used for reporting purposes utilizing the same HL7® CDA® QRDA I specification. The CQM – report crterion at 170.315(c)(3) enables a user to electronically create a data file conformant with the Category I and Category III CMS Implementation Guides for Quality Reporting Document Architecture for transmission of clinical quality measurement data.

In order to demonstrate successful real world testing for the CQM – record and export and CQM – report criteria, we tracked data submissions to the Centers for Medicare and Medicaid Services (CMS) and Joint Commission (TJC) for a sample of *Cerner Millennium*® customers that have used Cerner's Millennium (CQMs) certified capabilities to record and process the CQM data through the Cerner Quality Clearinghouse portal. The following Eligible Hospital (EH) measures were used during the testing: ED-2, VTE-1, VTE-2. These are applicable to Acute and Emergency Department care settings. Additionally, CMS-165 and CMS-122 were included as these are applicable to the Ambulatory Care setting.

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

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. Completed identification of target customers (EH and EC): end of January 2022
2. Completed actual Real World Testing activities execution: end of Q3 2022
3. Completed assessment of Real World Testing data for results and outcomes compilation: end of year 2022

Real World Testing Outcomes

Real World Testing outcomes for the the CQM certified capabilities centered on the customer's successful QRDA file submission to CMS and TJC. For Eligible Hospitals, Cerner reports were found to display the measure outcomes for each qualifying encounter and the aggregated outcome count for the quarter as anticipated. 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. 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 correlates to observation of 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%): **100%**
- CQM – import and calculate
  - Percentage of patient data successfully imported (target = 90%): **100%**
- CQM – report criterion
  - Percentage of successful QRDA file submissions to CMS/TJC with less than 10% outcome mismatches against Cerner reporting (target = 95%): **100%**

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

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

CHPL Product Numbers: 15.04.04.1221.Soar.15.01.1.210331

Real World Testing Methodologies Summary

The methodology for Real World Testing 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 Document 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 CQM reporting programs. We utilized a customer pool that represented 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 systematic way by utilizing various queries and Soarian Clinicals eCQM reports. These reports were then compared with the reports provided by the regulatory agencies (CMS/TJC) after submission to determine the success rate of these criteria. The following Eligible Hospital measures were used during the testing: Admit Decision Time to ED Departure for Admitted ED Patients (eED-2), ICU Venous Thromboembolism Prophylaxis (eVTE-2), and Discharged on Antithrombotic Therapy (STK-2).

For the CQM – import and calculate criterion (170.315(c)(2)), the methodology made use of test scripts and the actual mock testing scenario execution was performed on the testing EHR environment that appropriately mirrored 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 files.

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 customers (EH) for CQM – record and export and CQM – report criteria: end of Q1 2022.
2. Completed set up of testing EHR environment that replicates CQM – import and calculate criterion usage in the real world: end of Q1 2022.
3. Completed actual Real World Testing activities for CQM – record and export and CQM – report criteria: end of Q1 2022.
4. Completed actual Real World Testing activities for CQM – import and calculate criterion: end of Q2 2022.
5. Completed assessment of Real World Testing data for results and outcomes compilation: end of year 2022.

Real World Testing Outcomes

Real World Testing outcomes for the Soarian Clinicals CQM certified capabilities were comprised of the metrics of the customer's successful QRDA file submission and the accuracy metrics from the CMS Submission Portal providing 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 included a total for each of the outcomes.

For the Eligible Hospital measures 170.315 (c)(2) criterion, import and calculate functionality in the testing EHR environment mirrored real world conditions and the imported aggregated count was matched with the outcome received after the execution. The validation of the expected outcome correlated to the successful real world use of the certified capabilities.

Real World Testing Metrics

- CQM 170.315 (c)(1) – record and export criterion
  - Percentage of selected patients for whom QRDA files are successfully generated (target = 100%): **100%**
- CQM 170.315 (c)(2) – import and calculate
  - Percentage of patient data successfully imported (target = 90%): **100%**
- CQM 170.315 (c)(3)– report criterion
  - Percentage of successful QRDA file submissions to CMS/TJC with less than 10% outcome mismatches against Cerner reporting (target = 95%): **100%**

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

Certified Health IT Module(s): **HealtheLife**

CHPL Product Numbers: 15.04.04.1221.Heal.H9.03.1.200317; 15.04.04.1221.Heal.H9.04.1.210308; 15.04.04.1221.Heal.22.05.1.220228

Withdrawn Products

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

- Module name: HealtheLife
- Version: 2020
- CHPL product number: 15.04.04.1221.Heal.H9.03.1.200317
- Withdrawal date: April 1, 2022
- Results data captured for withdrawn listing (Y/N)? No

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: 2022
- CHPL product number: 15.04.04.1221.Heal.22.05.1.220228
- Certification date: February 28, 2022

Changes to Original Real World Testing Plan

- Summary of change: The data set used for RWT metrics changed from the entirety of the Cerner commercial customer base to a subset of the customers. These customers were strategically selected to ensure representation of all relevant market segments, care settings, and various sizes/types of organizations using the HealtheLife certified funcitonality. 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 (1), critical access (1), and community hospitals (1).
- Reason for the change: Due to the very large customer base for the HealtheLife product, the data volume tracking across the full customer base became overly burdensome to manage without tangible benefit to the purpose and needs of RWT.
- Impact to Real World Testing execution: No impact. The same goals and needs were achieved from a more targeted sampling of the broader HealtheLife customer base.

Real World Testing Methodologies Summary

To perform Real World Testing for the View, Download, and Transmit to 3rd Party (VDT) criterion, we tracked real world use of the HealtheLife patient portal by consumers credentialed for access to their health information by our customers.

This data was aggregated through an auditing tool and subsquently de-identified and compiled to deduce the defined metrics. The audit events that were captured were chosen to reflect use of capabilities that closely align with the requirements of the VDT criterion, which is reflected by the associated metrics defined for the Real World Testing plan. The data set used is representative of use of the HealtheLife product by customers based in the U.S.

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. Completed planning and estimates for the development requirements to carry out the defined Real World Testing plan: end of Q1 2022
2. Completed proof of concept of capturing and aggregation of VDT audit events defined in the Real World Testing plan (including report for manual compilation of data): end of Q2 2022
3. Establish and execute operational processes allowing retrieval of data for defined metrics needed for submission of Real World Testing results: end of Q4 2022

Real World Testing Outcomes

The outcomes Cerner observed from the HealtheLife Real World Testing plan include high volume of frequently used VDT capabilities within the product. The volume of unique users reflects that the volume for the events of viewing is 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 more advanced features and accessed less frequently and this is reflected through a lower volume of events.

Real World Testing Metrics

The following metric results provide volumes of applicable events for the August – October 2022 measurement period for our 5 target customers for the testing activities.

- Number of unique HealtheLife users that viewed an element of the health record: **300,514**
  - August 2022 - 98,214
  - September 2022 - 98,993
  - October 2022 - 103,307
- Number of total combined viewing events of the health record: **5,505,464**
  - August 2022 - 1,857,527
  - September 2022 - 1,792,470
  - October 2022 - 1,855,467
- Number of unique HealtheLife users that downloaded or transmitted a CCD: **66,136 (download) & 275 (transmit)**
  - August 2022
    - Download - 22,255
    - Transmit – 95
  - September 2022
    - Download - 21,454
    - Transmit – 86
  - October 2022
    - Download - 22,427
    - Transmit – 94
- Number of unique HealtheLife users that viewed Access Logs: **3,598**
  - August 2022 - 1,252

- September 2022 – 973
- October 2022 - 1,373

- Number of total viewing events of Access Logs: **6,310**
  - August 2022 - 2,155
  - September 2022 - 1,556
  - October 2022 - 2,599

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

Changes to Original Real World Testing Plan

- Summary of change: Anticipated generating and analyzing four full quarters of data. Instead, the measurement period was reduced to a 5 month period from the start of Q3 through mid-Q4.
- Reason for the change: The volume of data for the full year was unable to be efficiently processed in time to conduct necessary assessments and reporting for the Real World Testing results.
- Impact: No impact. The constrainted measurement period provided ample data to fulfill the metrics and overall goals of the testing.

Real World Testing Methodologies Summary

Our elected methodology for the Real World Testing of the View, Download, and Transmit to 3rd Party (VDT) criterion for the MMD-Patient Portal certified HIT module consisted of executing 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 patient's or proxy's experience accessing their healthcare information. This included, among other items, accessibility and ease of searching for their information to ensure that the full scope of the certified capabilities is accounted for.

1. A report was generated from MMD Patient Portal customers' production environments on a quarterly basis that showed 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
    - 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

2. An additional MMD Patient Portal user report was generated from the customer's production environments on a quarterly basis that showed 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 accounted 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 was included in this testing plan.

Care Settings Tested

- Acute
- Ambulatory
- Emergency Department

Real World Testing Milestones

1. Completed selection of targeted customers whose data was leveraged for the reports: end of Q1 2022
2. Completion of actual Real World Testing activities execution: mid-Q4 2022
3. Assessed data and compiled Real World Testing results: end of Q4 2022

Real World Testing Outcomes

The resuls of the testing activities demonstrate consistency across customers and individual care settings and across individual months. Variances across these were minimal. The inpatient population achieved the highest scores for engagement while the 'view' and 'download' functions were utilized most frequently with minimal 'transmit' activity, and less than 1% unsecure email activity. This reflects expectations as patients are far more likely to download and interact with their health information themselves than they are to send it to another recipient.

We also observed neglible engagement with the 'My Activity' report and minimal proxy engagement. However, proxy engagement was highest amongst the inpatient population.

Finally, the customers that utilized self-provisioning and automated provisioning tools scored highest on the access measure and that corresponded with higher patient engagement scores. This, again, matches expectations as the self-provisioning and automated provisioning capabilities streamline the process for the patient and their proxies reducing time and effort to engage with their health data.

Real World Testing Metrics

- Success rate for patients being provided access to their health information (target = 90%): **83.45% (1,748,328/2,094,952)**
  - Note - customers who offer self provisioning achieved 100% success. Most other customers achieved ~80% success via manual provisioning.
- Percentage of patients or proxies who have created a username when offered to exercise the ability to access their health information on the patient portal (target = 60%): **0.007% (15,644/2,094,952)**
  - Note – a majority of patients seen during the year already had access to the portal and therefore would not have need to create a new username to access their data. Accordingly, these numbers turned out to be extremely low. 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 Consolidated Clinical Document Architecture (C-CDA) documents received on time in the patient portal (target = 98%): **35.83% (750,636/2,094,952)**
  - Note – most customers' Inpatient settings achieved 90-99% success. There were a few outliers in the Ambulatory care setting who achieved ~20% success, likely attributable to the fact that many such customers were not relying on our product for their obligations under the Centers for Medicare and Medicaid Services (CMS) MIPS Promoting Interoperability Performance Category.

170.315(f)(1) Transmission to Immunization Registries

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

CHPL Product Numbers: 15.07.04.1221.Firs.I5.01.1.180625; 15.04.04.1221.Firs.I8.02.1.200101; 15.04.04.1221.Powe.15.01.1.180728; 15.04.04.1221.Powe.18.02.1.200101; 15.04.04.1221.Mill.I8.03.1.220101

Withdrawn Products

The following versions of the applicable certified HIT modules that were included with the original 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- Module name: FirstNet (Immunizations)
- Version: 2018
- CHPL product number: 15.04.04.1221.Firs.I8.02.1.200101
- Withdrawal date: April 1, 2022
- Results data captured for withdrawn listing (Y/N)? No

- 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- Module name: PowerChart (Immunizations)
- Version: 2018
- CHPL product number: 15.04.04.1221.Powe.18.02.1.200101
- Withdrawal date: April 1, 2022
- Results data captured for withdrawn listing (Y/N)? No

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 (Immunizations)*
- Version: 2018
- CHPL product number: 15.04.04.1221.Mill.I8.03.1.220101
- Certification date: January 1, 2022

*Please note that Millennium (Immunizations) is the replacement certified HIT module which inherited its certified status from the predecessor FirstNet (Immunizations) and PowerChart (Immunizations) certified HIT module names.

Changes to Original Real World Testing Plan

- Summary of change: The measurement period for the reporting (VXU) messages portion of the Real World Testing plan was reduced from a full calendar quarter to a 20-day period.
- Reason for change: Challenges were encountered with producing reliable data for an entire calendar quarter considering the volume of transactions across our large customer base and their individual abilty to purge response messages at a timeframe of their discretion.
- Impact to Real World Testing execution: No impact. Having nearly a month's data is still valuable and provides the same assurances we were seeking when originally targeting a full calendar quarter for the measurement period.

Real World Testing Methodologies Summary

For the Transmission to Immunization Registries criterion as certified under the PowerChart (Immunizations), FirstNet (Immunizations), and Millennium (Immunizations) certified HIT modules, our Real World Testing methodology was centered on direct monitoring real world production use of the certified capabilities.

The measurement period monitored for the query (QBP) portion of the testing was Q3 2022 (July 1 - Sept. 30 2022), and the measurement period for the submission (VXU) portion was November 29 - December 20, 2022. The specific system activities tracked included the following:

- User-initiated queries to Immunization Information Systems (IIS) for patient immunization history
- Reconciliation of immunization history data to update the local patient record and EHR immunization forecast
- Administration of vaccines (whether via automated scanning or manual entry) to initiate submission of the vaccination records to an IIS

We accomplished this production activity tracking via the use of a Cerner cross-database analytics tool which provides near real-time activity tracking of active production environment use. Additionally, Cerner's new, more advanced certified capability for immunizations reporting under these certified HIT modules enables moitoring of more granular details for immunization history query and reconcilation, such as failure reasons and discrete data volumes accepted or rejected into the local patient record.

Standards Updates

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

Care Settings Tested

- Acute
- Ambulatory
- Emergency Department
- Pediatrics

Real World Testing Milestones

1. Completed compilation of plan for specific data to measure: end of 2021
2. Executed data reporting of Real World Testing activities for identified timeframe: EOY 2022
3. Completed assessment of Real World Testing data for results and outcomes compilation: January 2023

Real World Testing Outcomes

Through the identified Real World Testing methdology, we expected to observe high volume daily use of certified capabilities in production environments by our customers, which was confirmed in our results. The close monitoring and reporting for our first Real World Testing activities has allowed us to establish baselines for what to expect in future Real World Testing plans.

Real World Testing Metrics

- Number of production domains live with query and reporting capabilites to any IIS as of the Q3 2022 measurement period: **~539 active reporting (VXU) connections and ~550 active query (QBP) connections**
    - Note – in most cases there is 1 of each connection per customer. However, some customers have multiple connections when operating across different states/public health jurisdictions.
- Success rate for queries (QBPs) sent to an IIS over the Q3 2022 measurement period (target = 90%): **98.22% (6,384,791/6,500,765)**
    - Note – the ~2% "failure" (i.e., no response) rate is attributable to network latency and related issues and an expected reality.
- Success rate for submissions (VXUs) to an IIS over the November 29 - December 20, 2022 measurement period (target = 90%): **94.5% (154,991/164,022)**
    - Note – the ~5.5% failure rate is attributable to realities such as patient demographic recording errors (e.g., mother's maiden name), vaccine misdocumentaiton (e.g., incorrect lot number), and general network connectivity issues.

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

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 one state IIS, 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

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 compliation of internal transaction results compiled from our customer base.

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 2022.
2. Complete assessment of Real World Testing data for results and outcomes compilation: end of year 2022

Real World Testing Outcomes

We observed state-specific challenges with VXU transactions. In one state, we were not recieving any ACK transactions which impacted the results for the customers in that state. We are following up with each impacted customer to review their interface configuration. We also observed some customers were not monitoring for successful transactions with warnings to make changes accordingly to prevent future warnings. Despite these limitations, the testing we were able to perform with the available customer demonstrated high rates of sucessful 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 August – October 2022 measurement period (target = 90%+): **99.8% (1,003,203/1,005,214)**
- Total VXU submission transaction success rate across the August – October 2022 measurement period (target = 90%+): **94.5% (42,795/45,286)**

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.20.03.1.200303; 15.04.04.1221.Heal.20.04.1.210308; 15.04.04.1221.Heal.22.05.1.220222; 15.04.04.1221.Synd.20.04.1.210308; 15.04.04.1221.Synd.22.05.1.220222

Withdrawn Products

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

- Module name: HealthSentry
- Version: 2020
- CHPL product number: 15.04.04.1221.Heal.20.03.1.200303
- Withdrawal date: April 1, 2022
- Results data captured for withdrawn listing (Y/N)? No

- Module name: Syndromic Surveillance
- Version: 2021
- CHPL product number: 15.04.04.1221.Synd.20.04.1.210308
- Withdrawal date: April 1, 2022
- Results data captured for withdrawn listing (Y/N)? No

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: 2022
- CHPL product number: 15.04.04.1221.Heal.22.05.1.220222
- Certification date: February 22, 2022

- Module name: Syndromic Surveillance
- Version: 2022
- CHPL product number: 15.04.04.1221.Synd.22.05.1.220222
- Certification date: February 22, 2022

Changes to Original Real World Testing Plan

- Summary of change: In the original Real World Testing plan publication, we had defined two possible paths ("Plan A" and "Plan B") for our Real World Testing. Plan A consisted of leveraging a report tracking syndromic surveillance data submission furnished by the National Syndromic Surveillance Program (NSSP). However, Plan A ended up being infeasible so our Real World Testing results reflect execution of Plan B, consisting of tracking active data submissions via submission logs produced by the certified HIT modules under test.
- Reason for the change: The NSSP was unable to provide a report that would sufficiently serve the needs of Real World Testing.
- Impact to Real World Testing execution: No impact. The need to use an alternate methodology was a known possibility from the start as evidenced by the inclusion of a "Plan B" in our Real World Testing plan. The Plan B methodology was able to achieve the same intended results for the Real World Testing.

Real World Testing Methodologies Summary

As described above, our Real World Testing for the Syndromic Surveillance certified capabilities followed what was originally described as "Plan B" in our Real World Testing plan. This included 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 via engagement with a representative sample of customers. The target customers were actively transmitting syndromic surveillance information to their respective department of health (DOH) 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

The representative sample of customers included 5 small community-based hospitals as well as 5 larger facilities spanning multiple geographic regions to appropriately account for the various sizes and types of hospitals using the certified HIT modules.

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 2022
2. Gathered sample customer submission logs: end of Q1 2022
3. Prepared summary Real World Testing results report: end of Q2 2022

Real World Testing Outcomes

Outcomes of the Real World Testing demonstrated successful ongoing transmission of the HL7® transactions to the target DOHs for the representative sample of customers. This showed successful “active engagement’ with public health registries as required for the sampled customers who rely on the certified capabilities 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 customers across the 30-day selected measurement period (target = 85%+): **100%**
    - HealthSentry: 154,648/154,648 (100%)
    - Syndromic Surveillance: 222,229/222,229 (100%)

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

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. 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 3 customers (representing 20% of current customers) actively transmitting syndromic surveillance information to their respective Department of Health (DOH) jurisdiction. 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 DOH jurisdiction 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. Identified customers for representative test sample: end of year 2021
2. Monitored for reported issues: end of Q1 2022 (Note – this monitoring was initiated in Q1 2022 and continued through Q4 2022)
3. Planned for audit data collection: end of Q2 2022
4. Gathered audit data from sample customers Production data for test period: end of Q3 2022
5. Prepared summary report: end of year 2022

Real World Testing 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

All 3 customers showed ongoing outbound events for the supported ADT HL7® transactions throughout the 2-week test period. Below are aggregate numbers per customer for the 2-week test period (July 1, 2022 through July 14, 2022):

Customer #1	Customer #2	Customer #3
HL7_A01 – 670	HL7_A01 – 237	HL7_A01 - 191
HL7_A03 - 3206	HL7_ A03 – 1752	HL7_A03 - 2550
HL7_A04 – 2544	HL7_A04 – 1499	HL7_A04 - 2354
HL7_A08 – 106817	HL7_A08 – 37696	HL7_A08 - 33803
TOTAL = **113,237**	TOTAL = **41,184**	TOTAL = **38,898**

Note – customer #1 shows a significantly higher number of A08 transactions generated. This customer has a higher volume of admissions and ED encounters. They are also configured to send all of the required/certified Nursing observations outbound. 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 2022 reporting year for reported issues specific to the syndromic surveillance certified capabilities. No issues have been opened in 2022 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): **Electronic Lab Results; HealthSentry**

CHPL Product Numbers: 15.04.04.1221.Heal.20.03.1.200303; 15.04.04.1221.Heal.20.04.1.210308; 15.04.04.1221.Heal.22.05.1.220222; 15.04.04.1221.Elec.20.04.1.210308; 15.04.04.1221.Elec.22.05.1.220222

Withdrawn Products

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

- Module name: Electronic Lab Results
- Version: 2021
- CHPL product number: 15.04.04.1221.Elec.20.04.1.210308
- Withdrawal date: April 1, 2022
- Results data captured for withdrawn listing (Y/N)? No

- Module name: HealthSentry
- Version: 2020
- CHPL product number: 15.04.04.1221.Heal.20.03.1.200303
- Withdrawal date: April 1, 2022
- Results data captured for withdrawn listing (Y/N)? No

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: Electronic Lab Results
- Version: 2022
- CHPL product number: 15.04.04.1221.Elec.22.05.1.220222
- Certification date: February 22. 2022

- Module name: HealthSentry
- Version: 2022
- CHPL product number: 15.04.04.1221.Heal.22.05.1.220222
- Certification date: February 22. 2022

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. This was accomplished via engagement wiith a representative sample of customers actively transmitting reportable lab information to their respective department of health (DOH) 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 2022
2. Gathered sample customer submission logs: end of Q1 2022
3. Prepared summary report: end of Q2 2022

Real World Testing Outcomes

Outcomes of the Real World Testing demonstrated successful ongoing transmission of the HL7® transactions to the target DOHs for the representative sample of customers. This showed successful "active engagement' with public health registries as required for the sampled customers who rely on the certified capabilities 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 customers across the 30-day selected measurement period (target = 85%+): **99.7%**
    - Electronic Lab Results: 9,709/9,774 (99.33%)
    - HealthSentry: 11,734/11,734 (100%)

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

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 calender quarter (3 months) to 1 month (April 2022).
- 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 department was also significantly increased. This allowed the necessary volume of transactions to achieve the needs of Real World Testing to be accessed from a shorter timeframe.
- Impact to RWT execution: No impact. The desired transaction examples were 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 public health agencies for laboratory tests/results reporting were evaluated. The evaluation period lasted for a period of 1 month.

An inquiry was also submitted to the customers' public health agency (note; both customers were represented by the same public health agency) asking for a response indicating if the customers were in fact actively engaged and reporting laboratory tests/results.

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. End of Q1 2022 - completed the identification of target NOVIUS Lab customers
2. End of Q2 2022 - completed the execution of the database queries and outbound transactions. Also, received a response from the customer's respective public health department regarding their active engagment
3. End of Q3 2022 - completed the Real World Testing result report.

Real World Testing Outcomes

During the reporting period there were transactions sent to the public health agency from each customer. As expected, the number of transactions fluctuated throughout the weeks, however both customers sent transactions each day during the evaluation period.

In addition, as a response to our request, the representative public health agency indicated both customers were in active engagment and successfully transmitting laboratory tests and results to their satisfaction.

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 1 month evaluation period (April 2022) the two 'study' customers transmitted significantly more transactions. On average, one customer sent **14 unique transactions per day** (representing the Acute and ED care settings) to their state public health department and the other study customer sent an average of **38 unique transactions per day** representing both care settings.

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.20.04.1.200324; 15.04.04.1221.Anti.20.05.1.210601; 15.04.04.1221.Anti.20.06.1.220509

Withdrawn Products

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

- Module name: Antimicrobial Usage and Resistance Reporting
- Version: 2020
- CHPL product number: 15.04.04.1221.Anti.20.04.1.200324
- Withdrawal date: April 1, 2022
- Results data captured for withdrawn listing (Y/N)? No

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: 2022
- CHPL product number: 15.04.04.1221.Anti.20.06.1.220509
- Certification date: May 9, 2022

Changes to Original Real World Testing Plan

- Summary of change: The Real World Testing methodology was altered to target a list of customers who had adopted our latest round of updates for the certified Antimicrobial Use and Resistance (AUR) reporting capabilities for the portion of the methodology focused on engaging directly with customers to confirm successful submission to National Health Safety Network (NHSN). This is a change from the original plan to target all customers who have attempted to execute an AUR report.
- Reason for the change: Surveying a list of customers who ran the report without targeting those who have adopted the latest round of updates would not have been an accurate list of those actually planning to participate in the AUR registry and submit to NHSN.
- Impact to Real World Testing execution: No impact. The altered methodology provided more accurate results aligned with the expectations and requirements of the NHSN for the AUR registry.

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 of the reports. Second, relevant customers actively participating in the NHSN's 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 survery 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 customers using the version of AUR Reporting currently in production: end of Q3 2022
2. Completed execution of reports for production activity tracking data and retrieval of NHSN submission evidence from partner customers: end of Q3 2022
3. Compiled data for Real World Testing results submission: end of Q4 2022

Real World Testing Outcomes

During our review of Antimicrobial Use (AU) and Antimicrobial Resistance (AR) report generation the number of times customers generated the reports exceeded our expectations. This was a welcome indication that customers are not only utilizing the reports successfully, but doing so more frequently than expected. We also observed higher overall volumes of execution for the AU reports than the AR reports. This matched expectations as the AU report is a much simpler report to execute and use, and is therefore more commonly utilized.

Related to direct confirmatin that customers were able to successfully upload reports to NHSN, the following outcomes were observed:

- 61 customers were identified as having taken the latest updates for the AUR reports. Of the 61 customers only 2 responded to the survey regarding the ability to successfully upload to NHSN.
- 3 additional customers who had not taken the latest updates also responded.
- Of the 2 customers who have adopted the most recent updates, 1 was confirmed to have successfully uploaded Antimicrobial Use (AU) data for the Janaury - October 2022 date range. The customer did not attempt to upload Antimicrobial Resistance (AR) data. The second customer was confirmed to have successfully uploaded AU data for the January - July 2022 date range and AR data for the January - July 2022 date range.
- Of the 3 other customers targeted, 2 were able to successfully upload AU and AR data for each month they attempted. The other was unable upload AR data for 1 of the 10 months they attempted and were able to successfully upload AU data for all 10 months they attempted.

Real World Testing Metrics

1. Total number of successfully generated Antimicrobial Use (AU) reports over the January - October 2022 measurement period: **8,415**
    - Note – these numbers include any customer who has implemented and executed AU in a production environment, regardless of which AUR package was adopted.
2. Total number of successfully generated Antimicrobial Resistance (AR) reports over the January - October 2022 measurement period: **3,699**
    - Note – this includes any customer who has implemented and run AR in a production environment, regardless of which AUR package was taken.

Note – a report can be run in multiple formats including report view, CSV, and to generate the CDA-based NHSN file. Use data was incluuded in the metric results regardless of which version was run.

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

Changes to Original Real World Testing Plan

- Summary of change: Metric was altered to not include AR (Antimicrobial Resistance) activity. As such we also altered our methology to perform internal AR testing to ensure the success of the capability to best of our ability.
- Reason for change: None of our customers implemented AR during the measurement period.
- Impact to Real World Testing exection: 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 Antimicroibal 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 to be uploaded to NHSN. We also engaged with the NHSN to review and provided feedback to NHSN on their initial activity reports as the report in its current state was not suitable for inclusion in these results.

The methodology for AR reporting was altered as described above to utilize internal testing activities. This helped to ensure the reporting capability was functional and able to be used successfully in lieu of any active client 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 actual monthly files generated by our targeted client base: end of Q3 2022
    - Three clients were identified as actively utlitizing AU reporting and none for AR reporting
2. Completed assessment of Real World Testing data for results and outcomes compilation: end of year 2022
    - Two clients successfully generated AU files monthly (Aug-Oct) and confirmed successful upload to NHSN.
    - One client successfully generated AU files monthly (Aug-Sept) and confirmed successful upload to NHSN.
3. Completed internal testing for AR reports: end of Q3 2022

Real World Testing Outcomes

We have observed low overall adoption of the AUR reporting capabilities across our customer base, particular with the AU report, which has not been implemented. 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 for the real world purpose of the certified capabilities.
Real World Testing Metrics 1. Total number of successfully generated Antimicrobial Use (AU) reports over tested time period: **3 customers successfully generated and uploaded to NHSN.** 2. Total number of successfully generated Antimicrobial Resistance (AR) reports over tested time period: **No customers implemented AR reporting**

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

Certified Health IT Module(s): **Millennium (Health Care Surveys); PowerChart (Health Care Surveys)**

CHPL Product Numbers: 15.04.04.1221.Powe.HC.00.1.180801; 15.04.04.1221.Powe.HC.02.1.200101; 15.04.04.1221.Mill.HC.03.1.220101

Withdrawn Products

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

- Module name: PowerChart (Health Care Surveys)
- Version: 2018
- CHPL product number: 15.04.04.1221.Powe.HC.02.1.200101
- Withdrawal date: April 1, 2022
- Results data captured for withdrawn listing (Y/N)? No

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 (Health Care Surveys)*
- Version: 2018
- CHPL product number: 15.04.04.1221.Mill.HC.03.1.220101
- Certification date: January 1, 2022

*Please note that Millennium (Health Care Surveys) is the replacement certified HIT module which inherited its certified status from the predecessor PowerChart (Health Care Surveys) certified HIT module name.

Real World Testing Methodologies Summary

Our Real World Testing methodology for the National Health Care Surveys (NHCS) certified capabilities was centered on direct engagement with contacts from the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics responsible for operating the NHCS. Given that the CDC does not provide access to the list of participating providers/facilities this approach was the ideal way to ensure successful use of the capabilities in the real world for their intended purposes (i.e., successful submission to the NHCS). This methodology was achieved via quarterly checkpoints with CDC contacts on the status of submissions from participants relying on Cerner's certified capabilities, including collaboration to resolve any identified gaps or issues identified.

Note: the above was identified as methodology option #1 in the published Real World Testing plan. Since this methodology was able to be used successfully, the fallback option #2 identified in the plan was not needed.

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. Identified partner customers (that are sampled by CDC and engage with Cerner for submission assistance) to perform the testing and validation (T&V) on for the coming year: Nov 10, 2021
    - Based on guidance from the CDC, we contacted for updates on the partner customers and learned that some of them were not in compliance and were requiring a package from Cerner to be installed: June 16, 2022
2. Compiled data for Real World Testing results showing all customers (16) have been in successful in their submission and have passed testing and validation: Dec 15, 2022

Real World Testing Outcomes

With the contact between CDC and Cerner tracking the success of our customers participating in the NHCS, we were able to have positive engagement and confirm successful submission for all surveyed customers. This included assisting work through quesitons and issues related to sites utilizing our certified capabilities.

Real World Testing Metrics

- Success rate of compliance with NHCS reporting submission for sampled Cerner customers (target = 100%): **100% (16/16)**

170.315(g)(7)-(9) Application Access

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

CHPL Product Numbers: 15.04.04.1221.Firs.15.04.1.210308; 15.04.04.1221.Firs.18.05.1.210308; 15.04.04.1221.Powe.15.04.1.210308; 15.04.04.1221.Powe.18.05.1.210308

Withdrawn Products

The following versions of the applicable certified HIT modules that were included with the original 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

Real World Testing Methodologies Summary

The Real World Testing (RWT) methodology for the FirstNet (Clinical) and PowerChart (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 lend the insights necessary to ensure that the certified APIs are reliably serving their intended purpose for our customers after achieving certified status.

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. Compiled a comprehensive list of all customer API implementations to be included in the API dashboard tracking: end of Q1 2022
2. Reviewed current production activity tracking dashboard in-depth to identify any data gaps or issues to be addressed: end of Q1 2022
3. Began data retrieval from dashboard and followed-up on "loose ends" discovered in prep activities: end of Q3 2022
4. Completed all RWT execution and results compilation for CY 2022: end of Q4 2022

Real World Testing Outcomes

PowerChart (Clinical) and FirstNet (Clinical) certified APIs Real World Testing execution included high volumes of successful API transactions across all of the live production endpoints. This was observed on a daily basis showing application usage for the certified APIs. The transaction counts below for the measurement period of January 1, 2022 - November 6, 2022 provide a reflection of these observed outcomes.

- Total Transactions: 1,481,398,845
- Total Warnings Received: 58,152
- Total Errors Received: 599,343

Real World Testing Metrics

- Success rate of transactions observed across customer production activity for the January 1, 2022 - November 6, 2022 measurement period (target = 98%+): **99.95% (1,480,741,350/1,481,398,845)**
    - Percentage Transactions resulting in warning = 0.0039%
    - Percentage Transactions resulting in error = 0.0404%

170.315(g)(7)-(9) Application Access

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

CHPL Product Numbers: 15.04.04.1221.Soar.15.01.1.210331

Changes to Original Real World Testing Plan

- Summary of change: Some milestones were achieved later than originally projected quarters.
- Reason for change: Availability of customer environment for testing was slightly delayed.
- Impact to Real World Testing execution: No impact. The intended result was achieved at a later date than originally projected.

- Summary of change: The Real World Testing plan includes Conformance as a FHIR resource type to be checked under metrics. The original plan included this in a list of FHIR resource types whose count would be extracted from the EHR's "API Activity Log." This resource, being non-clinical, not included in the Common Clinical Data Set (CCDS), and having no attachment to a patient, is not included in this log. Instead, we captured the output of a Conformance resource from the internal real world test environment as evidence of a successful test.
- Reason for change: A decision was made to exclude the Conformance resource from the activity log due to reasons cited above.
- Impact to Real World Testing execution: No impact. Conformance resource response captured and verified in internal real world test environment.

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 (all but the Conformance 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 customer environments for which API usage statistics will be gathered: Q3 2022 (Original projection Q1 2022)
2. Assessed the need for fallback test method, based on customer API usage. It was assessed that is was not necessary to set up EHR environment that mirrors real world to implement fallback test method: Q3 2022 (Original projection Q2 2022)
3. Executeed Real World Testing activities: Q4 2022 (Original projection Q3 2022)
4. Complete assessment of Real World Testing data for results and outcomes compilation Q4 2022

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 2022, we were able to collect test results from a real customer.

Real World Testing 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 CCDS data scope across the testing year (target = at least 1 successful access event for each resource):
  - AllergyIntolerance – **51**
  - CarePlan – **20**
  - Condition – **51**
  - Device – **51**
  - DiagnosticReport – **51**
  - DocumentReference – **14**
  - Immunization – **51**
  - MedicationStatement – **32**
  - Observation – **51**
  - Patient – **51**
  - Procedure - **51**

170.315(h)(1) Direct Project

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

CHPL Product Numbers: 15.04.04.1221.Firs.15.04.1.210308; 15.04.04.1221.Firs.18.05.1.210308; 15.04.04.1221.Powe.15.04.1.210308; 15.04.04.1221.Powe.18.05.1.210308; 15.04.04.1221.Soar.15.01.1.210331

Withdrawn Products

The following versions of the applicable certified HIT modules that were included with the original 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

- 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)? Yes - the results data within this submission includes data from customers using this version of the certified HIT module during calendar year 2022 prior to its withdrawal

Real World Testing Methodologies Summary

For Real World Testing of the certified capabilities for the Direct Project criterion, we tracked and reported on the total number of real world Direct messages sent and received to identify the overall success rate of message processing. This real world production activity tracking was achieved via the use of transaction logs from the certified module providing reliable data on real world activity.

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. Q1 2022: Created message log queries and associated Cerner Direct HISP Message Volume by Transaction report for the identified metrics
2. Q4 2022: Completed retrieval of data from the Cerner Direct HISP Message Volume by Transaction report.
3. End of year 2022: Completed assessment of Real World Testing data for results and outcomes compilation

Real World Testing Outcomes

1. Consistently higher outbound message counts as compared to inbound.
2. Steadily increasing message volumes from month to month (2.6M to 2.8M over the testing period).
3. Outbound messages met the 80% metric with flying colors averaging close to 97%. Inbound messages consistently below target of 85% metric. 8 out of 9 months falling below the 80% (see Metrics section for more details).

Real World Testing Metrics

- Success rate for all message transactions (inbound and outbound) over the Q1-Q3 2022 measurement period (target = 80%+): **82.28% (7,785,670/9,462,364)**
    - Outbound messages success rate: 96.67% (2,327,056/2,407,110)
    - Inbound messages success rate: 77.36% (5,458,614/7,055,254)

As indicated in the Real World Testing plan, there are numerous factors that can cause inbound message processing failure which are beyond the control of the certified technology. Most commonly this is due to an inactive address (e.g., a recipient having either changed their address or having left the organization altogether). This has been a lesson learned from our first year of Real World Testing and led to alterations in our 2023 Real World Testing plan to focus on the message processing efficiency and uptime of our technology, as opposed to successful delivery as the latter is heavily influenced by outside factors.