General Information

Developer Name	**Dynamic Health IT Inc.**
Product Name	**ConnectEHR +BulkFHIR**
Version Number	**FHIR4-B**
Certified Health IT Edition	**2015 Edition Cures Update**
Product List (CHPL) ID	**15.02.05.2713.DY4B.04.03.0.211221**
Real World Testing Public URL	**https://www.dynamichealthit.com/real-world-testing**

Changes to Original Plan

Summary of Change	Reason	Impact
Utilized NIST tool for testing f1 and f3 as opposed to a production environment.	Production testing partner was not available to test transmission to public health agencies in the time frame we needed.	Unable to test with a live registry, but able to still confirm transmission and validity of messages.
Portal error logs and system logs were reviewed to gather statistics on usage.	Patients did not respond to the survey within our time frame.	Users seem to continue to have issues recalling their passwords for login. Doesn't seem to be a platform issue. Reset username and password link proved to support patient's successful login.We do not see any adjustments needed at this point.

Summary of Testing Methods and Key Findings

Accurate and secure transmission of patient health information is paramount to ensuring interoperability between different health IT solutions. We chose to demonstrate this capability in ConnectEHR and Dynamic FHIR multiple ways:

- Collaborating with an ambulatory trading partner to monitor transitions-of-care for a number of patients directly from internal provider to external provider and vice versa
- Verifying that CCDAs are able to be exported from the ConnectEHR application by administrative users in bulk on demand and on a scheduled basis
- Accessing live patient data by onboarding Dynamic FHIR to a PHR
- Accessing live patient data by logging into the ConnectEHR Patient Portal website and viewing, downloading, and transmitting the CCDAs
- Incorporation of CCDs received via Direct protocol, aiding in Closing the Referral Loop

In each scenario, we confirmed that the data transmitted was accurate, up to date, in conformance to ONC standards, and scored an average of B- on the CCDA Scorecard. Feedback from the scorecard is actively being used to drive improvements with the goal of increasing the average grade.

Adoption of Direct messaging for transitions-of-care has increased a great deal to the point where the ConnectEHR user interface requires some performance enhancements in response to the volume of messages being transmitted. We are overall encouraged by this increase, and plan to continue streamlining the Direct messaging workflow in ConnectEHR as implementation continues to grow.

Realtime export and nightly batch export of CCDs to the HIEs has enabled interoperability and provided for patients to be registered seamlessly with the HIE. DHIT works directly with HIEs to ensure the latest CCD format is accepted. This functionality has enabled providers to query the HIEs for patient data.

In the past year ConnectEHR has been utilized by EHR vendors for ONC Certification and Real World Use of Immunizations for more than 22 State Registries. Most recently, with the bidirectional Immunization workflow, many EHRs that plan to utilize ConnectEHR for Public Health Reporting have signed up and are on a waiting list to be onboarded for Immunization testing with the States. Many of DHIT's clients are Specialty EHRs and do not submit Immunization to a Registry. ConnectEHR's Immunization functionality is bidirectional and environment agnostic. To ensure ConnectEHR remains compliant and all functionality is working as expected, ConnectEHR is regularly tested against the NIST test tool. All NIST test cases passed for the 2023 measurement period as expected.

In addition, continuing to meet the ever changing criteria, requirements and conformance for the FHIR API specific criteria has allowed DHIT to adapt to enforcement of secure technologies such as OAuth2.0, TLS 1.2 restrictions, and other cryptographically secure technology to help facilitate fast but secure interoperable data. These standards were applied as each launch - Standalone Patient, Standalone Provider, EHR Practitioner and EHR Patient - was executed using 3rd party apps like ONC’s Inferno Test Tool, Postman, as well as our Dynamic FHIR Client Test Tool. The same standards are applied when using System Apps to perform both Single Patient API queries as well as Bulk Data queries for exporting data by groups of Patients.

By continuing to support the Standalone Patient Launch, we enable an EHR system to provide patients the ability to access their data as FHIR Resources across 3rd party apps of their choice while being able to revoke that same access conveniently and at their discretion. For EHR systems that want to extend the ability for their Providers this same opportunity to utilize FHIR, the EHR Practitioner Launch has been demonstrated and discussed so that further use cases can be utilized at the Provider level. We have begun to see implementations of MultiPatient API or Bulk Data, which allows for population level data to be requested and returned for groups of patients, from EHR systems as they work with larger projects like HIE’s. Some systems are leveraging use of this data exchange to integrate this data into their own internal workflows.

DHIT collaborated with a hospital trading partner to collect statistics on their use of ConnectEHR to transmit syndromic surveillance data. In 2023, just under 1 million messages were deidentified and successfully transported to the HIE.

Care setting(s) that were tested for real world interoperability

Ambulatory, Inpatient

Standards and implementation specifications (SVAP)

N/A

Metrics and Outcomes

Measurement/Metric	Associated Criteria	Outcomes
75% of C-CDAs flagged as restricted were received in restricted status based on confirmed receipt from trading partner	(b)(1) Transition of Care (Cures Update) (b)(7) Security tags - summary of care - send (b)(8) Security tags - summary of care - receive (h)(1) Direct Project	100% confirmed.
100% of outbound TOC's successfully received by HISP	(b)(1) Transition of Care (Cures Update) (h)(1) Direct Project	100% confirmed.
Average C-CDA grade from scorecard for C-CDAs generated from ConnectEHR is a “C” or better	(b)(1) Transition of Care (Cures Update) (h)(1) Direct Project	Average score was B-.
75% of trading partner's TOC C-CDAs successfully received by ConnectEHR.	(b)(1) Transition of Care (Cures Update) (h)(1) Direct Project	100% confirmed.
C-CDA count matches actual patient count for requested date range.	(b)(10) Electronic Health Information export	Confirmed patients who did not have encounters in the selected time range were not exported.
50% of spot-checked C-CDAs pass scorecard with overall grade of “C” or better.	(b)(10) Electronic Health Information export	Average grade was B-.
90% of unique patients with encounters in the review period are provided timely access (within 24 hours of their encounter) to health information to view online, download, and transmit to a third party.	(e)(1) View, Download, and Transmit to 3rd Party	Hospitals utilizing the portal and participating in Promoting Interoperability achieved Timely Access on average 95% of the time.

Successful Transmission to test tool will be reviewed for ACK & NAK to ensure 100% successful transmission.	(f)(1) Transmission to immunization registries	100% confirmed.
100% correct immunization history records successfully received in ConnectEHR confirmed by visual validation.	(f)(1) Transmission to immunization registries	100% confirmed.
100% correct immunization records successfully posted to test tool confirmed by visual validation.	(f)(1) Transmission to immunization registries	100% confirmed.
100% of HL7 Syndromic Surveillance messages successfully sent and acknowledged (via HL7 ACK) by public health agency	(f)(2) Transmission to public health agencies — syndromic surveillance	100% confirmed.
100% of syndromic surveillance messages successfully received and processed by public health agency based on either: a) Logging into agency web site and validating, or b) Using a report provided by agency	(f)(2) Transmission to public health agencies — syndromic surveillance	100% confirmed.
100% of HL7 Reportable lab messages successfully sent and acknowledged (via HL7 ACK) by public health agency	(f)(3) Transmission to public health agencies — reportable laboratory tests and value/results	100% confirmed.
100% of HL7 Reportable lab messages successfully received and processed by public health agency based on either: a) Logging into agency web site and validating, or b) Using a report provided by agency	(f)(3) Transmission to public health agencies — reportable laboratory tests and value/results	100% confirmed.
100% of eCR messages successfully received and processed by public health agency based on either: a) Logging into agency web site and validating, or b) Using a report provided by agency	(f)(5) Transmission to public health agencies — electronic case reporting	100% confirmed.

100% of encounters where Patient is able to retrieve FHIR API data from PHR app.	(g)(7) Application access— patient selection (g)(9) Application access— all data request (g)(10) Standardized API for patient and population services	100% confirmed.
100% of encounters from Step #1 where Patient's PHR data matches data from EHR. This will be done by visual validation of the following FHIR resources: a. Demographics b. Problems c. Medications d. Allergies	(g)(7) Application access— patient selection (g)(9) Application access— all data request (g)(10) Standardized API for patient and population services	100% confirmed.
100% of encounters where Provider is able to retrieve FHIR API data from app.	(g)(7) Application access— patient selection (g)(9) Application access— all data request (g)(10) Standardized API for patient and population services	100% confirmed.
100% of encounters from Step #3 where data for randomly-selected patients as presented in app matches data from EHR. This will be done by visual validation of the following FHIR resources: a. Demographics b. Problems c. Medications d. Allergies	(g)(7) Application access— patient selection (g)(9) Application access— all data request (g)(10) Standardized API for patient and population services	100% confirmed.

Key Milestones

Key Milestone	Care Setting	Date/Timeframe
Identified trading partner that met either of the following. • Had a state immunization registry that is enabled for bi-directional send/receive of immunization data. • Already had a functional bi-directional immunization interface or would like to implement one to their registry.	Amb/Inp	May 2023
Validated that immunization interface is functioning as expected	Amb/Inp	June 2023
Verified immunization data was received in registry for patient A	Amb/Inp	July 2023
Verified immunization data was received in EHR for patient B	Amb/Inp	July 2023
• Confirmed Trading Partner • Confirmed ability to send and receive clinical documents • Confirmed with TP that production data will be used, whether in an actual live environment or a copy of a live environment	Ambulatory	May 2023
• Care provider selected recipient from directory of Direct addresses and initiated sending of Clinical Document. The user was able to create a C-CDA Release 2.1 that also included the reason for referral, and the referring or transitioning provider's name and office contact information. • C-CDA Care Referral or Referral Note was triggered to send via Direct Protocol • Care provider reviewed the Direct Status screen (under Direct Outgoing menu choice) to ensure Clinical Document was successfully transmitted.	Ambulatory	June 2023
• Care provider selected recipient from directory of Direct addresses and initiated sending of Clinical Document. • Care provider created a C-CDA Release 2.1 Discharge Summary Document that also includes the discharge instructions. • Care provider reviewed the Direct Status screen (under Direct Outgoing menu choice) to ensure Clinical Document was successfully transmitted via Direct Protocol.	Ambulatory	June 2023
Recipient used scorecard to grade C-CDA	Ambulatory	June 2023

• Tester used Document Center to locate Clinical Document. • Care provider reviewed the Direct Status screen (under Direct Outgoing menu choice). • Recipient validated that Social History section of C-CDA is flagged as restricted	Ambulatory	July 2023
• Date and time ranges were able to be configurable via the UI • Targeted Practices were able to be configurable via the UI • Patients exported were able to be configurable via the UI	Amb/Inp	May 2023
Used the Edge Test Tool to check validity of output file	Amb/Inp	June 2023
Export summary was created and completed successfully	Amb/Inp	July 2023
Patient demographics were captured in the EHR	Inpatient	May 2023
• Ensured patient received activation email or • provided patient with Username and Password	Inpatient	June 2023
Recorded validation in the audit log that patient had transmitted the C-CDA via DIRECT or email	Inpatient	July 2023
Ran Timely Access report in ConnectEHR and compared to patient visit report from EHR to determine percentage of patients who had access within 24 hours.	Inpatient	August 2023
Syndromic surveillance messages were successfully received and processed by public health agency.	Inpatient	May 2023
Functioning HL7 2.5.1 interface to public health agency	Inpatient	June 2023
Client test partner selected	Amb/Inp	May 2023
Lab interface was functioning as expected	Amb/Inp	June 2023
Confirmed data received	Amb/Inp	September 2023
eCR messages were successfully received and processed by public health agency.	Amb/Inp	May 2023
Confirmed functioning eCR interface to public health agency	Amb/Inp	June 2023

• Partnered with PHR that can receive patient clinical data as described in this RWT plan. • Ensured that PHR had functionality to access the Dynamic FHIR API, as described here. • Partnered with EHR that is integrated with the Dynamic FHIR API and Patient Portal modules of ConnectEHR.	Amb/Inp	May 2023
Encounter was created and visually confirmed	Amb/Inp	June 2023
• Dynamic FHIR API transformed C-CDA into FHIR resources. • PHR app consumed FHIR resources to populate EHR data	Amb/Inp	July 2023
• Partner with a provider-centric app for improved patient care (e.g. growth charts, clinical decision support, patient charting). • Ensure that app has functionality to access the Dynamic FHIR API, as described here. • Partner with EHR that is integrated with the Dynamic FHIR API module of ConnectEHR.	Amb/Inp	May 2023
• Data is rendered correctly: Provider compares patient data in app to patient data in EHR and notes any discrepancies.	Amb/Inp	June 2023
• Partner with a provider-centric app that requires periodic bulk data downloads. • Ensure that app has functionality to access the Dynamic FHIR API, as described here. • Partner with EHR that is integrated with the Dynamic FHIR API module of ConnectEHR.	Amb/Inp	May 2023
• Data is rendered correctly: Provider compares patient data in app to patient data in EHR and notes any discrepancies.	Amb/Inp	June 2023