NC Health Information Exchange (NCQ)

Data Specifications
2020 Onboarding Packet

SAS Global Hosting and U.S. Professional Services

Version 3.0   10 September 2020

Contents

Information about This Document

1 Introduction

1.1   Purpose of this Document

This document contains the Data Specifications for the North Carolina state-operated health information exchange, NC HealthConnex. The following sections provide the required and optional content for HL7 2.x healthcare message types as well as the HL7 Clinical Document Architecture (CDA) documents that may be exchanged with NC HealthConnex.

1.2   Project Description

NC HealthConnex is the state-designated health information exchange managed by the North Carolina Health Information Exchange Authority (NC HIEA). SAS has been contracted to deliver the services necessary to support the NC HealthConnex technology infrastructure, to enable health care providers submit clinical information about their patients to NC HealthConnex, and to provide clinical and claims-based analytics to the State for state-funded health care.

Data flows into NC HealthConnex via connections to the Electronic Medical Record (EMR) systems of participating provider organizations. Data is submitted as HL7 messages (for example, HL7 2.x, specifically version 2.1 and higher) and as clinical documents (for example, the CDA standard). Data is exchanged bi-directionally with EMRs using the IHE standard when requested by the participant and technically feasible by the participant's EMR vendor. Data is stored centrally for the purposes of viewing in the clinical portal, exchanging clinical documents, and feeding into the provided outbound services.

In addition to the core functionality of the NC HealthConnex health information exchange infrastructure, additional services are available for full participants that are designed to integrate more complete patient information into care delivery including:

NC HealthConnex Clinical Portal

The Clinical Portal can be used to query and exchange patient records, view longitudinal patient records, and access other features such as the Veterans Administration (VA) and external HIEs via the eHealth Exchange.

Direct Secure Messaging

NC HealthConnex utilizes Secure Exchange Solutions (SES) as our HISP (Health Information Services Provider), which is also a participant in the DirectTrust framework. Full participants are eligible to receive a unique secure email address assigned in the NC HIEA Direct domain. Users can append files containing Protected Health Information to their Direct messages.

Provider Directory

The Provider Directory is a directory of secure email addresses of NC HealthConnex participants and North Carolina Providers participating in DirectTrust.

NC*Notify

NC*Notify is a subscription-based service that notifies providers as their patients receive services across the care continuum, spanning geography, health care systems, acute and ambulatory care settings.

Registries

The NC HIEA is a proud partner with the North Carolina Division of Public Health (NCDPH) and is working alongside this agency to deliver public health registry reporting for full participants through the NC HealthConnex connection including connection to the North Carolina Immunization Registry (NCIR), Electronic Lab Reporting (ELR), and a Diabetes Registry.

For additional information on NC HealthConnex and available services, please visit https://hiea.nc.gov/.

2   NC HealthConnex Connection Overview

2.1   High-Level Data Flow

Data flows into NC HealthConnex in the following ways:

1. Through VPN or TLS direct connections, which allows a provider's EMR to communicate with NC HealthConnex. Supported message transactions include:

   - HL7 v2 messages
   - CDA documents or related structures like CCDs

   When documents arrive in NC HealthConnex, they are stored in the Document Repository and are viewable in the Clinical Portal. CDA integrations are normally done in two ways:

   a. A one-directional feed of all applicable CDA documents for a provider organization's population, and
   b. A bi-directional query-response interface that abides by IHE specifications.

1. SFTP document exchange is used when a provider's EMR does not have the ability to connect directly with NC HealthConnex. Supported messages for exchange include:

   - HL7 v2 messages
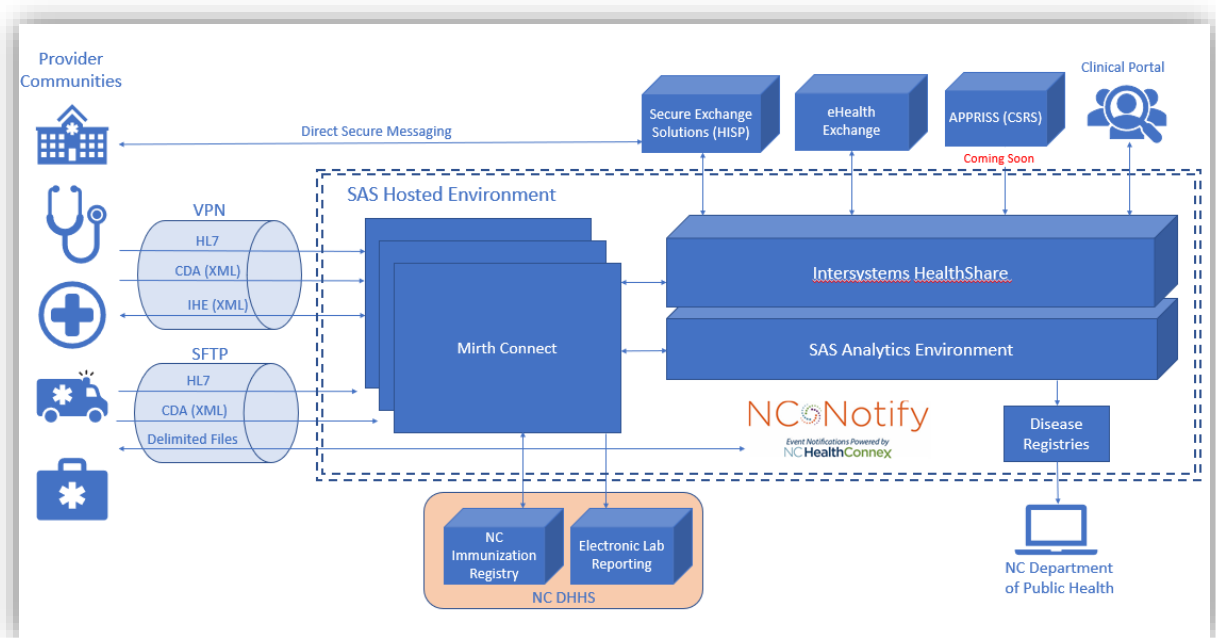   - CDA documents or related structures like CCDs.
   - Delimited Files used for the NC HealthConnex notification service, NC*Notify

Figure 1: Basic Flow of Health Information

2.2   Overview of the Connection Process

Figure 2: Connection Process Flow

The process to set up an initial connection to NC HealthConnex follows the steps listed in **Figure 2**. At each step in the connection workflow there may be actions required of the participant, the entity through which the participant is connecting, the North Carolina Health Information Exchange Authority (NC HIEA), and/or the NC HIEA's technical vendor SAS.

While these steps reflect the process to set up an initial connection to NC HealthConnex, participants who onboard multiple facilities through one interface may go through a condensed subset of these steps when rolling on additional facilities.

- **PA Executed:** The process to connect to NC HealthConnex starts with the participant's signing the Participation Agreement. The Participation Agreement is the governing document between the North Carolina Health Information Exchange Authority and the participant. See **Section 2.3** for more information on the Participation Agreement.

- **Intake Process:** Once the Participation Agreement has been executed by the North Carolina Health Information Exchange Authority, the participant arrives into SAS' queue to connect. SAS contacts the participant and confirms their path to connect.

- **Technical Discussions:** Technical discussions are held with participants, their EMR, or their data connector once all stakeholders are engaged and ready to proceed with the connection. During the technical discussion, SAS reviews the connection requirements outlined in this document. If the participant connects through an EMR or data connector who has an established, live connection to NC HealthConnex, this step is skipped as no additional technical discussions are required.

- **Provide Portal Credentials:** During the technical onboarding of the participant, if they have signed a Full Participation Agreement, then the participant is provided credentials to access the NC HealthConnex Clinical Portal. The participant may be provided with portal credentials prior to SAS engaging with them or their EMR or data connector for technical onboarding. If the participant has a Submit Only PA, then this step is skipped.

- **Connectivity:** sFTP, TLS secured through mutual certificates, or VPN are available connection options. There is a preference for TLS or VPN. During this step SAS works with the entity connecting to establish and test connectivity. If the participant connects through an EMR or data connector who has an established, live connection to NC HealthConnex, then this step is skipped.

- **Development & Analysis:** SAS requests a sample set of messages to analyze and ensure the messages meet the data target requirements. If any data elements are missing or are not being sent in the correct format, SAS will work with the entity connecting on options to adjust the messages being sent. Once adjustments are made, a new sample set of messages is provided and the analysis is re-run. There may be several rounds of analysis depending on the number of changes required. If the participant connects through an EMR or data connector who has an established, live connection to NC HealthConnex, then this step is skipped.

- **Approvals:** During the approvals step, the NC HIEA confirms a participant has a valid participation agreement on file prior to moving into a Live state.

- **Testing/QA:** SAS and the NC HIEA perform QA and User Acceptance Testing on the connection to ensure no additional development is required, and the participant's data displays in the portal as expected.

- **Live in Production:** The participant is moved into production, and SAS confirms receipt of the participant's data in the production environment.

A sample project plan is in **Figure 3**. Note that dates and durations may vary depending on the number of interfaces being developed, the amount of analysis required, and responsiveness of the entity connecting.

Figure 3: Sample Project Plan

Task Name	Duration	Predecessors	Assigned To
Connection to NC HealthConnex ADT	15.25d		
Preparation Process	1d		
Participant Participation Agreement fully executed by both parties	0		Participant
Project Kick-off	1d		SAS
Distribute checklist, specifications, contact list, etc.	0	4SS	SAS
Schedule Technical Discussion	0	4	SAS
Send OIDs	0	4	Participant
Send Sample Messages	0	4, 18	Participant
Establish Connectivity	15d		
Complete and Return Connectivity Checklist	3d	5	Participant
Complete technical discussion	0.25d	6	SAS, Participant
Determine connection path	1d	11	Participant
Register OIDs/Build in HealthShare	1d	7	SAS
Provide PAA Credentials	1d	13	SAS
Complete VPN/sFTP/TLS Configuration ADT	10d	10	SAS
Complete VPN/sFTP/TLS Configuration CCD	10d	10	Participant
Test & Confirm Connectivity	2d	15, 16	SAS, Participant
Milestone: Connectivity Complete	0	17	17
Configure Interface ADT/PIX	5.75d		
Run Analysis	1d	8, 18	SAS
Feedback to participant	0.25d	20	SAS
As needed - Feedback Loop	5 days	21	
Complete development	1d	20,21,22	SAS
Peer Review	0.25d	22	SAS
Milestone: Development & Analysis Complete	0	23	23
Integrated Testing ADT/PIX	1.5d		
Perform Integrated Testing	1d	24	SAS
Address Issues Identified & Make Fixes	0.5d	26	SAS
QA/UAT ADT/PIX	1.25d		
Perform QA	0.5d	27	27
Address Issues Identified & Make Fixes	0.5d	29	SAS
Document/Approval	0.25d	30	SAS
Milestone: Testing/QA Complete	0	31	
Deployment ADT/PIX	0.5d		
Move Interface to Production	0.25d	32	SAS
Verify Messages in Production	0.25d	34	SAS
Milestone: Live in Prod	0	35	
Notify Participant	0	36	SAS
Configure Interface CCD	14.25d		
Run Analysis	3d	8, 18	SAS
Feedback to participant	0.25d	39	SAS
As needed - Feedback Loop	5d	41	
Complete development	5d	40,41,42	SAS
Peer Review	0.5d	41	SAS
Milestone: Development & Analysis Complete	0	42	
Integrated Testing CCD	2d		
Perform Integrated Testing	1d	43	SAS
Address Issues Identified & Make Fixes	1d	45	SAS
QA/UAT CCD	3.5d		
Perform QA	2d	46	
Address Issues Identified & Make Fixes	1d	48	SAS
Document/Approval	0.5d	49	SAS
Milestone: Testing/QA Complete	0	50	
Deployment CCD	0.5d		
Move Interface to Production	0.25d	49	SAS
Verify Messages in Production	0.25d	53	SAS
Milestone: Live in Prod	0	54	
Notify Participant	0	55	SAS

2.3   General Implementation Requirements

Participation Agreement

The Participation Agreement is the legal contract that governs data sharing between the health care provider and the NC HIEA. This agreement can be found on the NC HealthConnex website with instructions for completion.

- The [Full Participation Agreement](#), which is aligned with the eHealth Exchange Data Use and Reciprocal Support Agreement or DURSA, will allow providers full use of current and future NC HealthConnex value-added features and satisfies the State requirement to submit clinical and demographic data. Organizations with a Full Participation Agreement may submit data to NC HealthConnex either through a unidirectional connection or a bi-directional data connection. Full participants with a unidirectional connection can access patient data using the NC HealthConnex clinical portal.

- The [Submission Only Participation Agreement](#) will enable a provider to submit the clinical and demographic data required by law in a unidirectional technical connection in order to be in compliance with the HIE Act. However, this agreement will prohibit all other data exchange services, including HIE data query and response, clinical or event notifications, and public health registries. Participants with a Submission Only Agreement should consult with legal counsel prior to sending data that does not pertain to health care services paid for with State funds pursuant to the HIE Act. Being able to only submit State funded data will also depend on the technical capability of your EMR vendor to implement data filtering. Please note: the [HIE Act](#) was amended on June 6, 2019, and certain provider types are no longer required to connect. If an exempt provider would like to voluntarily participate in NC HealthConnex in order to view patient records or utilize the HIE value-added features, the organization must complete a Full Participation Agreement.

Required Technology

To connect to NC HealthConnex, participants must have required technology in place. This includes EMRs that are minimally capable of sending HL7 V2.x messages and higher. EMR products that are ONC-certified for Meaningful Use for Centers for Medicare & Medicaid Services (CMS) Incentive Programs are preferred. Additional information can be found on the [2019 Promoting Interoperability Medicaid Program page](#).

Timely Data

The submission of timely data is required to connect to NC HealthConnex. This means real-time ADT messages and/or timely CCD documents are sent within 24 hours of the close of an encounter.

Full Demographic Patient Information Provided

Patient information must be provided in full ADT messages. If PIX messages are used to register a Patient, accompanying CCD documentation must be provided.

Data Elements Required

Participants must submit all data elements they collect from the NC HealthConnex Data Target (**Table 2**). The required data target elements align with the Office of National Coordinator for Health Information Technology (ONC) [Common Clinical Data Set (CCDS)](#). If specific information from the Data Target cannot

be supplied, then this must be clarified and documented during the onboarding process. Additional detailed information on meeting data element requirements can be found in **Section 3**.

2.4   Connection Pathways

VPN – This type of connection is a secure peer to peer connection between Healthcare Organizations and NC HealthConnex. VPN or mTLS are the preferred method to encrypt data to and from NC HealthConnex.

Information needed for VPN connection set up is listed in **Table 1**.

Table 1: Information Needed for VPN Connection

Parameters	SAS	Customer
VPN Hardware:	Cisco ISR 4331 router	
VPN Peer Address:	149.173.3.121	
IKE version	IKEv1	
Phase 1 protocols (SAS preferred is listed. Indicate customer preference, if different)	Encryption: AES-256 Hash algorithm: SHA-256 Auth mode: pre-shared key Diffie Hellman: Group 5 Lifetime: 86,400 seconds	
Pre-shared key (Customer: place an X indicating if SAS or Customer should provide)		
Phase 2 protocols (SAS preferred is listed. Indicate customer preference, if different.)	Encryption: AES-256 Hash algorithm: HMAC-SHA-256 Auth mode: pre-shared key Diffie Hellman: Group 5 Lifetime: 3600 sec / 4608000 KB	
IPSEC encapsulation mode: (SAS preferred is listed. Indicate customer preference, if different.)	Tunnel	

mTLS (mutualTLS)

This type of connection provides encryption utilizing mutual TLS and requires certificate exchange between the Healthcare Organization and NC HealthConnex. VPN or mTLS are the preferred method to encrypt data to and from NC HealthConnex.

To set up a mTLS connection to NC HealthConnex, the following information is needed:

- Participant Information: Organization name and address

- Contact Information: Contact information for staff working to set up connection including a business or project manager and IT contact who will set up the connection
- Technical Details: Sending IP address (for both test and production servers) as well as IP Service Provider

   Note: The highest version of TLS that is supported is minimum 1.2.

SFTP

This type of connection is used for unidirectional submission of HL7 and/or CDA Data Files. SFTP can also be used for ELR Submission to NCDPH via NC HealthConnex.

Information needed to set up the SFTP connection include:

- Participant Information: Organization name and address
- Contact Information: Contact information for staff working to set up connection including a business or project manager and IT Contact who will set up the connection
- SFTP Technical Details: Sending IP address (for both test and production servers) as well as IP Service Provider

3   Field-Level Data Target

To ensure quality data is submitted, **Table 2** outlines the data elements required for connection to NC HealthConnex. The data elements in the table are broken down into two categories; R=Required and RC = Required if Collected.

As a part of the connection process we can work towards aligning with the data you collect. To see an example of an adjusted Data Target for a Specialty provider, see Appendix 1.

Table 2: NC HealthConnex Data Target

NC HealthConnex Standard Data Target			
Section	**Data Element**	**Example**	**R=Required RC=Required if Collected**
Patient	Sending Organization	General Hospital	R
	Sending Organization OID	2.16.840.1.113883.3.3282.1004098	R
	Date/Time of Message	20160627084300	R
	CCD/Message Type	Summary of Care CCDA v2.1, Admit, Discharge	R
	Unique Message ID	EPIC_12345678	R
	Patient ID	Pied-1234	R
	Patient ID Type	Preferred Types: MRN, SSN, Driver's License	R
	Organization Associated with Patient ID	Piedmont	R
	Patient Primary Care Provider	Dr. Sally Smith	RC
	Primary Care Provider NPI	987654321	RC
	Patient Last Name	Smith	R
	Patient Middle Name	Doe	RC
	Patient First Name	John	R
	Patient Name Suffix	Jr	RC
	Patient Birthdate	19620717	R
	Patient Gender	Male	R
	Patient Street Address	123 Lane Drive	R
	Patient City	Raleigh	R
	Patient State	NC	R
	Patient Zip Code	27605	R
	Patient Country	USA	RC
	Patient Telephone	919-123-4567	RC
	Patient Race	White or Caucasian	R
	Patient Language	ENG	RC
	Patient Ethnicity	Not Hispanic or Latino	R
	Patient SSN	123456789	RC
	Driver's License	999999	RC
	DeathIndicator	Y	RC

	DeathDateTime	20160627084300	RC
	Patient Class	Outpatient	R
	Service Level	Group Therapy* only specialty providers	R* Only for group therapy providers
	Unique Encounter Visit Number	1223456	RC
	Visit DateTime Low	20160627084300	R
	Visit DateTime High	20160627084300	RC
	Care Provider NPI	123456789	R
	Encounter Place of Service/Facility	Facility 1	R
	Encounter Place of Service/Facility ID	987654321	R
	Hospital Service	Emergency	RC
	Department/Ward	ICU	RC
	Room	108	RC
	Bed	A	RC
	Organization Entered At	Facility 1	R
	Reason for Visit	Cough	RC
Encounter/Visit	**Attending Provider**	Dr. John Smith	R
	Attending Provider NPI	123456789	R
	Referring Provider	Dr. John Smith	RC
	Referring Provider NPI	123456789	RC
	Consulting Provider	Dr. John Smith	RC
	Consulting Provider NPI	123456789	RC
	Admitting Provider	Dr. John Smith	RC
	Admitting Provider NPI	123456789	RC
	Admit Source	emd, outp, born, gp, mp, nursing, psych, rehab, other	RC
	Admit Reason Code	99999	RC
	Admit Reason Description	Acute Resp Failure	RC
	Admit Type Code	E	RC
	Admit Type Description	Emergency	RC
	Discharge Disposition Code	01	RC
	Discharge Disposition Description	Discharged to home or self care (routine discharge)	RC
	Discharge Date/Time	20160627094500	RC
	Dicharge Location Code	FT	RC
	Discharge Location Description	Facility Two	RC
	Code	8867-4	RC
Vitals	**Code Description**	HEART RATE	RC
	Code System Name	LOINC	RC

	Observation Value	80	RC
	Observation Value Units	/min	RC
	Organization Entered At	Facility 1	RC
	DateTime of Observation	20160701192000	RC
Social History	Code	8517006	RC
	Code Description	Former Smoker	RC
	Code System Name	SNOMED CT	RC
	DateTime of Observation	20160627084300	RC
	Time Low	20050701	RC
	Time High	20080601	RC
	Organization Entered At	Facility 1	RC
Allergies	Allergy Category	Adverse Reaction to Drug	RC
	Code	2556	RC
	Code Description	Citalopram	RC
	Code System Name	RXNORM	RC
	Allergy Status	Active	RC
	DateTime of Observation	20160627084300	RC
	Time Low of Allergy	20151019	RC
	Time High of Allergy	20151019	RC
	Allergy Reaction Display Name	Hives	RC
	Severity Display Name	Mild	RC
	Organization Entered At	Piedmont	RC
Diagnosis	Code	55607006	RC
	Code Description	Diverticulitis of large intestine	RC
	Code System Name	SNOMED CT	RC
	Diagnosing Provider Name	Dr. John Snow	RC
	Diagnosing Provider NPI	123456789	RC
	Diagnosis Encounter Number	1223456	RC
	Diagnosis DateTime Entered On	20160627084300	RC
	Organization Entered At	Facility 1	RC
	Diagnosis Status	final, working	RC
Procedures	Code	93010	RC
	Code Description	Electrocardiogram	RC
	Code System Name	CPT	RC
	Procedure DateTime (Low/High if available)	20160628084300.00	RC
	Procedure Encounter Number	1223456	RC
	Organization Entered At	Facility 1	RC
Results (Lab/Rad)	Description of Order	Codes like "NW" for New Order and "CA" for Cancelled	RC
	Ordered Lab/Rad Date	20160628084300	RC
	Unique order identifier	Lab123	RC

	Ordering Provider	Dr. Sally Doe	RC
	Ordering Provider NPI	123456789	RC
	Result Status	Final, Received	RC
	Ordered item Code	3094-0	RC
	Ordered Item Code Description	Comprehensive Metabolic Panel	RC
	Ordered Item Code System Name	LOINC	RC
	Interpreting Provider	Dr. John Doe	RC*RAD Results only
	Interpreting Provider NPI	258963254	RC*RAD Results only
	Specimen Collection DateTime	20160628084300	RC
	Result TimeLow	20150404083400	RC
	Result TimeHigh	20150404083400	RC
	Unique Result Identifier	Result123	RC
	Result Code	2345-7	RC
	Result Code Description	Blood Glucose	RC
	Result Code System Name	LOINC	RC
	Result Observation Value	126	RC
	Result Observation Value Unit	mg/dL	RC
	Result Observation Reference Range	60-125	RC
	Result Observation Interpretation Display Name	High	RC
	Unique Encounter Visit Number	1234	RC
	Organization Entered At	Facility 1	RC
	Performing Location	Lab Location	RC
Medications	**Instance (Order) ID**	123455	RC
	Code	236608	RC
	Code Description	Glucosamine-Msm-Chondroit-Hrb	RC
	Code System Name	RXNORM	RC
	Medication Order Status	Active, In Progress	RC
	Code for Route of Medication	C38288	RC
	Medication Route Display Name	Oral	RC
	Medication Dose Value	1	RC
	Medication Dose Unit	tbl	RC
	Medication Frequency	Twice Daily	RC
	Prescribing Provider Name	Dr. John Snow	RC
	Prescribing Provider NPI	123456789	RC
	Unique Encounter Visit Number	1234	RC
	Organization Entered At	Facility 1	RC
	Medication Order Date	20190304084300	RC

	Medication Time Low	20150218	RC
	Medication Time High	20160622	RC
Immunizations	**Instance (Order) ID**	123455	RC
	Immunization DateTime	20081026084300	RC
	Organization Entered At	Facility 1	RC
	Code	43	RC
	Code Description	HEPATITIS B, ADULT	RC
	Code System Name	CVX	RC
	Immunization Status	Given/Refused	RC
	Immunization Dose	0.5	RC
	Immunization Dose Units	mL	RC
	Immunization Route	Intramuscular Injection	RC
Problems	**Problem Instance ID**	1234	RC
	Code	249288007	RC
	Code Description	Incomplete bladder emptying	RC
	Code System Name	SNOMED CT	RC
	Problem Status Code	Active	RC
	Problem Time Low	201509010	RC
	Problem Time High	20150928	RC
	Provider Name	Dr. John Snow	RC
	Provider NPI	123456789	RC
	Unique Encounter Visit Number	1234	RC
	Organization Entered At	Facility 1	RC
Insurance	**HealthFund**	Blue Cross Blue Shield	RC
	Entered At	Piedmont	RC
Family History	**Family Member**	Mother	RC
	Diagnosis	Diabetes	RC
	Organization Entered At	Facility 1	RC
Plan of Care (Appointments)	**Unique Appointment ID**	23659	RC
	Appointment Time Low	20181014	RC
	Organization Entered At	Facility 1	RC
	Provider to be Seen	Dr. Sam Smith	RC
	NPI of Provider to be seen	985632145	RC
Plan of Care (Orders)	**Unique Order identifier**	Lab456	RC
	Organization Entered At	Facility 1	RC
	Ordered item Code	57021-8	RC
	Ordered Item Code Description	CBC W Auto Differential panel - Blood	RC
	Ordered Item Code System Name	LOINC	RC
N/A	**Sending Application**	EPIC700	RC
	Prior Patient Numbers	1234567	RC

	Prior Visit Number	9988776655	RC

4   HL7 Message Specifications

Detailed HL7 message specifications for ADT, ORU, and OMP messages can be found in attached Appendix 1.

4.1   ADT Message Example

Figure 4: ADT Message Example

```
MSH|^~\&|MEDITECH|FACILITYCODE|NCHIE|NCHIE|201603221326||ADT^A04|456DSFAD1215A1|P|2.4
EVN|A04|201603221326|||||201601060812
PID|||MR00444911||SMITH^JOHN^ROBERT||19820224|M||2106-3|608 NORTH ST^^DURHAM^NC^27701||919-555-
2139|919-555-6000|UNK|M|VAR|MF051765609|999-99-9999|||
PD1||||859^PROVIDER^PRIMARY^CARE^^^^^&FACILITYCODE^^^^FACILITYCODE
PV1||O|MF.OPSRGI|C|||WHESE^PROVIDER^ATTENDING^N|||UC||||9|||||MF051765609|||||||||||||||||||||||||||
|201601060812
PV2|||ACCIDENTAL FALL^ACCIDENTAL FALL
IN1|1|EPO|80|AETNA US HEALTHCARE|||||
AL1|1|DA|F001000476^PENICILLINS^CODINGSYSTEM|U|UNK|20160322
AL1|2|DA|F006001550^CODEINE^CODINGSYSTEM|U|HYPERTHERMIA|20160322
AL1|3|DA|F006001554^HYDROCODONE^CODINGSYSTEM|MO|NAUSEA/VOMITING|20160322
AL1|4|DA|F006002755^ERYTHROMYCIN BASE^CODINGSYSTEM|U|RASH|20160322
DG1|1|I10|R19.7^DIARRHEA, UNSPECIFIED^I10|||A
DG1|2|I10|K64.4^RESIDUAL HEMORRHOIDAL SKIN TAGS^I10|||W
DG1|3|I10|R10.31^RIGHT LOWER QUADRANT PAIN^I10|||W
PR1|1|LOCAL|0DBK8ZX^EXCISION OF ASCENDING COLON, ENDO,
DIAGN^LOCAL||20160106|||||||5168^SURGEON^PROVIDER
PR1|2|LOCAL|0DBB8ZX^EXCISION OF ILEUM, ENDO, DIAGN^LOCAL||20160106|||||||5168^SURGEON^PROVIDER
PR1|3|LOCAL|0DBN8ZX^EXCISION OF SIGMOID COLON, ENDO,
DIAGN^LOCAL||20160106|||||||5168^SURGEON^PROVIDER
PR1|4|LOCAL|0DBM8ZX^EXCISION OF DESCENDING COLON, ENDO,
DIAGN^LOCAL||20160106|||||||5168^SURGEON^PROVIDER
PR1|5|LOCAL|0DBL8ZX^EXCISION OF TRANSVERSE COLON, ENDO,
DIAGN^LOCAL||20160106|||||||5168^SURGEON^PROVIDER
```

4.2　ORU Message Example

Figure 5: ORU Message Example

```
MSH|^~\&|FACILITYCODE^FACILITYCODE|FACILITYCODE^FACILITYCODE|ISC^ISC|NCHIE^NORTH CAROLINA HEALTH
INFORMATION EXCHANGE|20160323101427||ORU^R01|1739662.1|P|2.2
PID|1||M000640513^^^FACILITYCODE&FACILITYCODE^FACILITYCODE||SMITH^JOHN^J||19800324|M||2131-1|5616
WHITE STREET^^ROANOKE RAPIDS^NC^27870-
9041|||||W||V0651312318^^^FACILITYCODE&FACILITYCODE^FACILITYCODE|999-88-7777
PV1|1|O|FACILITYCODE&FACILITYCODE^FACILITYCODE||||||||||||||||MAIN10549130102019-06-14
09:53:00.000^^^FACILITYCODE^VN|||||||||||||||||||||||||201906140953
ORC|NW|LAB|MAIN105492019-06-1409:53:00.000|||||||||^^^^^^^FACILITYCODE^^^^DN
OBR|1|02196843^FACILITYCODE^FACILITYCODE|6541561516^FACILITYCODE^FACILITYCODE|CBC^CBC^L|||2016032
30958|||||||201603231004||1654984^PROVIDER^ORDERING^^^^^^FACILITYCODE-PV&FACILITYCODE-
PV||01984087|||||201603230958||CH|F|
OBX|1|ST|6690-2^LEUKOCYTES^LN|1|8.1|K/UL|4.8-10.8|N||A|F|||201603231011
OBX|2|ST|789-8^ERYTHROCYTES^LN|1|4.41|M/UL|4.2-5.4|N||A|F|||201603231011
OBX|3|ST|718-7^HEMOGLOBIN^LN|1|12.8|G/DL|12.5-16.0|N||A|F|||201603231011
```

4.3　OMP Message Example

Figure 6: OMP Message Example

```
MSH|^~\&|FACILITYCODE^FACILITYCODE|FACILITYCODE^FACILITYCODE|ISC^ISC|NCHIE^NORTH CAROLINA HEALTH
INFORMATION EXCHANGE|201605281200||OMP^O09|1739662.1|P|2.5
PID|1||M000640513^^^FACILITYCODE&FACILITYCODE^FACILITYCODE||VELASQUEZ^RICARDO^J||19800324|M||2131
-1|5616 WHITE STREET^^ROANOKE RAPIDS^NC^27870-
9041|||||W||V0651312318^^^FACILITYCODE&FACILITYCODE^FACILITYCODE|999-88-7777
PV1|1|O|FACILITY NAME^^^MAIN OFFICE||||C879903839-2992^PROVIDER LAST^PROVIDER FIRST^^^^^MAIN
OFFICE^^^^DN|||||||||||4FBE8F3D-B808-4949-BE4B-849011A36E9D^^^MAIN
OFFICE^VN||||||||||||||||||||||||||201605281100
ORC|NW|||||||201605281218||| C879903839-2992^PROVIDER LAST^PROVIDER FIRST^^^^^MAIN OFFICE^^^^DN
RXO|00143965609^SERTRALINE 25 MG TABLET^NDC^00143965609^SERTRALINE 25 MG
TABLET^L|1.00||TA^TABLET^L|||^TAKE 1 TABLET BY ORAL ROUTE  EVERY DAY^L||||0||0|||||25|MG^MG^L
RXR|1^ORAL^L
```

5 CDA Xpath Specifications

Detailed Xpath specifications for CDA documents will be sent to you prior to your technical onboarding call. If you have questions about these specifications, please email NCHealthConnex@SAS.com.

6   Clinical Document Specifications

6.1   Overview

NC HealthConnex stores clinical documents, represented as CDA documents and the CCD constructs therein, from various participants in the repository, displays documents in the NC HealthConnex Clinical Portal, and sends documents for various facilities using the IHE IT Infrastructure (ITI) Technical Framework. To participate in sending and receiving clinical documents to and from NC HealthConnex, a participant must conform to the specifications provided by IHE. These specifications can be accessed from the following links listed in sections 6.1.1 and 6.1.2.

6.1.1   IHE IT Infrastructure (ITI) Technical Framework (2018)

http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol1.pdf
http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_TF_Vol3.pdf

6.1.2   Additional IHE ITI Transaction Format Message Examples

http://wiki.ihe.net/?title=XDS.b_Implementation

In addition, included below are descriptions of the ITI transactions NC HealthConnex supports.

6.2   Retrieving Documents from NC HealthConnex

6.2.1   ITI-8 – Patient Identity Feed (Register Patient)

ITI-8 message – from Participant to NC HealthConnex

The participant sends ITI-8 message to register a patient in NC HealthConnex's Master Patient Index (MPI) system. This links the patient's local facility identifier (MRN, patient ID) to the patient's enterprise identifier (MPI EUID, Enterprise ID).

6.2.2   ITI-44 – (Register Patient, method 2)

ITI-44 message – from Participant to NC HealthConnex

As an alternative to sending an ITI-8, a participant can send an ITI-44 message to register patient in NC HealthConnex's MPI system. This links the patient's local facility identifier (MRN, patient ID) to the patient's enterprise identifier (MPI EUID, Enterprise ID). The difference between the ITI-8 and ITI-44 is that the ITI-44 is an XML document, whereas an ITI-8 is an HL7 message.

6.2.3   ITI-9 – PIX Query (Get Enterprise ID)

ITI-9 query – from Participant to NC HealthConnex

The participant sends ITI-9 query to NC HealthConnex using a patient's local ID in order to get enterprise identifier (MPI EUID, Enterprise ID).

ITI-9 response – from NC HealthConnex to Participant

NC HealthConnex responds with patient's enterprise identifier (NCHIE EUID, Enterprise ID). This enterprise identifier is used in the ITI-18 query, so the participant can see what documents are associated with this patient from all facilities sending to NC HealthConnex.

6.2.4   ITI-45 – PIX Query (Get Enterprise ID, method 2)

ITI-45 query – from Participant to NC HealthConnex

As an alternative to the ITI-9 query, the participant can send an ITI-45 query to NC HealthConnex using a patient's local ID and facilityCode/OID in order to get enterprise identifier (MPI EUID, Enterprise ID). The difference between the ITI-9 query and ITI-45 query is that the ITI-45 is an XML document, whereas an ITI-9 is an HL7 message.

6.2.5   ITI-18 – Registry Stored Query (Use Enterprise ID to get List of Available Documents)

ITI-18 query – from Participant to NC HealthConnex

The participant sends ITI-18 query message including a patient's EUID in order to see which documents are available in NC HealthConnex's system from all facilities sending to NC HealthConnex.

ITI-18 response – from NC HealthConnex to Participant

NC HealthConnex responds with list of available documents that can be pulled by the participant.

'This response says, "I have two documents available for you to pull back via an ITI-43 request".

6.2.6   ITI-43 – Retrieve Document Set (Retrieve Wanted Documents)

ITI-43 request – from Participant to NC HealthConnex

The participant sends an ITI-43 message asking for one or more documents included in the ITI-18 response.

ITI-43 response – from NC HealthConnex to Participant

NC HealthConnex sends an ITI-43 response including the documents the participant indicated they wanted via the ITI-43 request.

6.3   Sending Documents to the NC HealthConnex

6.3.1   ITI-8 (Register Patient)

ITI-8 message – from Participant to NC HealthConnex

The participant sends ITI-8 message to register a patient in NC HealthConnex's MPI system. This links the patient's local facility identifier (MRN, patient ID) to the patient's enterprise identifier (MPI EUID, Enterprise ID).

6.3.2   ITI-41 (Provide and Register CDA)

ITI-41 message – from Participant to NC HealthConnex

The participant sends ITI-41 message to provide and register a CCD in NC HealthConnex's document repository.

6.3.3   ITI-41 response – from NC HealthConnex to Participant

NC HealthConnex sends a response message indicating whether ITI-41 message was loaded into repository successfully. Notice the 'ResponseStatusType:Success'. This indicates the document successfully loaded into the document repository.

6.4   Additional Specification Resources

For more resources on formatting documents for use in ITI transactions, please refer to the IHE specifications found in 6.1.1 and 6.1.2.

Contact Information

If you have questions regarding this document, contact us at NCHealthConnex@SAS.com.