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USER GUIDE

NIST Transport Testing Tool (TTT)

DRAFT

NIST
National Institute of Standards and Technology

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OVERVIEW

Role of NIST

The National Institute of Standards and Technology (NIST) is the federal technology agency that works with industry to develop and apply technology, measurements, and standards. Under the American Recovery and Reinvestment Act of 2009, NIST was called upon to consult the Office of the National Coordinator (ONC) for Health IT in a mission to encourage greater adoption of interoperable health information technology. In order to accomplish this mission, NIST is collaborating with ONC to recognize a program for the voluntary certification of health information technology as being in compliance with applicable certification criteria to meet defined Meaningful Use (MU) 2 requirements. NIST is helping ONC develop the necessary functional and conformance testing requirements, test cases, and test tools in support of the health IT certification program.

Transport Testing Tool

Per the guidance of the Office of the National Coordinator for Health Information Technology (ONC), NIST has developed a tool to test the transport and content-related standards from the ONC Standards & Certification Criteria 2014 certification criteria. Specifically, the test tool, known as the Transport Testing Tool ("the Tool"), will test for Direct (S/MIME), Simple Object Access Protocol (SOAP), and XDM for direct transport standards and C-CDA-based content. The Tool uses MDHT validation to test C-CDA document conformance with the applicable Document, Section, Entry Templates specified in the C-CDA Implementation Guide. The MDHT validation will allow the Tool to provide intuitive validation results to the users which identify the XML snippets that do not conform to the C-CDA specification. The results will also display errors and/or warnings along with the conformance statement that is not being met by the C-CDA document.

Authorized Testing Laboratories (ATLs) will certify EHR module achievement of several ONC Standards & Certification Criteria 2014 Edition Objectives (described below) using the Tool, specifically their ability to send and receive messages and C-CDA attachments. The methods by which messages should be sent and received will be outlined further within this user guide.

Purpose

The purpose of this user guide is to outline the process by which users/EHR's ("System Under Test") may send and receive messages and CDA attachments to the tool for the purposes of transport and content testing, as required by ONC.

Access

The Tool can be accessed through two different methods:

- Use the online tool available at http://transport-testing.nist.gov. This link will be referred to as the "Home Page".
  This document describes the 2014 Edition Testing processes for this online version only.

- Download an executable (Apache WAR) and install it on your system.

Supported systems: Only Linux-based systems are supported for our February 15th, 2013 release. Windows is not supported for this release, but will be considered in later releases

Local Install:

To Install TTT locally and run, follow the instructions below:

Installation instructions: https://github.com/meaningfuluse/mu2/blob/master/transport/ttt-configuration.md

Download link for WAR file: http://sourceforge.net/projects/iheos/files/TransportTestingTool/

Security

On the Home page of the TTT tool, there are two Trust Anchors and one certificate that must be downloaded and installed on the System Under Test (SUT) to send and receive Direct Messages.

- **TTT Public Cert can be displayed from here. The Mime Body of the Direct message must be encrypted with this self-signed Public Cert.**
  - This is the TTT's public certificate that must be used to encrypt the content that will be sent to the TTT.
- **TTT Trust Anchor can be displayed from here.**
  - This is the TTT's Trust Anchor that must be installed in the SUT to verify trust relationships. Organizations implementing Direct specifications must configure what are called "trust anchors" to ensure common trust among information exchange participants who are using Direct specifications.
- **TTT Trust Anchor representing an invalid trust relationship can be displayed from here.**
  - This is an Invalid Trust Anchor that must be installed in the SUT **ONLY** when instructed by the Test Procedures to invalidate the Trust Relationship for testing. **DO NOT USE** this at any other time.

Testing Overview

The Transport Testing Tool will allow users/EHRs to send and receive messages using various transport methods, dependent on the specific MU objective. The objectives that have been outlined for testing purposes are:

- **170.314(e)(1) View, Download, Transmit to 3rd Party (Ambulatory)**
- **170.314(e)(1) View, Download, Transmit to 3rd Party (Inpatient)**
- **170.314(e)(2) Clinical Summary**
- **170.314(b)(1) Transitions of Care (Ambulatory)**
- **170.314(b)(1) Transitions of Care (Inpatient)**
- **170.314(b)(2) Transitions of Care (Ambulatory)**
- **170.314(b)(2) Transitions of Care (Inpatient)**
- **170.314(b)(7) Data Portability (Ambulatory)**
- **170.314(b)(7) Data Portability (Inpatient)**

This User Guide is organized into the following sections:

1. **Registration:**
Before sending or receiving of messages can take place, a user/EHR must take the prerequisite step of registering address and contact information with the Tool. This step is required to exchange critical information between the System Under Test (SUT) and the Tool such as contact e-mail addresses, direct addresses, certificates, and SOAP endpoint information.

2. **Sending Messages:**
There are *required* and *optional* methods via which users/EHRs can test their ability to send messages with C-C-CDA attachments to the Tool, as outlined below:

- **Direct with S/MIME (*Required* for MU2 certification)**
  - 170.314(e)(1) View, Download, Transmit to 3rd Party (Ambulatory)
  - 170.314(e)(1) View, Download, Transmit to 3rd Party (Inpatient)
  - 170.314(b)(2) Transitions of Care (Ambulatory)
  - 170.314(b)(2) Transitions of Care (Inpatient)

- **Direct with XDM Attachment Messages (*Optional* for MU2 certification)**
  - 170.314(b)(2) Transitions of Care (Ambulatory)
  - 170.314(b)(2) Transitions of Care (Inpatient)

- **SOAP with C-CDA Attachments (*Optional* for MU2 certification)**
  - 170.314(b)(2) Transitions of Care (Ambulatory)
  - 170.314(b)(2) Transitions of Care (Inpatient)

3. Receiving Messages:

There are *required* and *optional* methods via which users/EHRs can test their ability to receive messages with C-CDA/CCR/C32 attachments from the Tool, as outlined below:

- **Direct with S/MIME (*Required* for MU2 certification)**
  - CCR via S/MIME (*Required* for MU2 certification)
    - 170.314(b)(1) Transitions of Care (Ambulatory)
    - 170.314(b)(1) Transitions of Care (Inpatient)
  - C-CDA via S/MIME (*Required* for MU2 certification)
    - 170.314(b)(1) Transitions of Care (Ambulatory)
    - 170.314(b)(1) Transitions of Care (Inpatient)
  - C32 via S/MIME (*Required* for MU2 certification)
    - 170.314(b)(1) Transitions of Care (Ambulatory)
    - 170.314(b)(1) Transitions of Care (Inpatient)
- **Direct with XDM Attachment Messages (*Optional* for MU2 certification)**
  - CCR via S/MIME XDM (*Optional* for MU2 certification)
    - 170.314(b)(1) Transitions of Care (Ambulatory)
    - 170.314(b)(1) Transitions of Care (Inpatient)
  - C-CDA via S/MIME XDM (*Optional* for MU2 certification)
    - 170.314(b)(1) Transitions of Care (Ambulatory)
    - 170.314(b)(1) Transitions of Care (Inpatient)
  - C32 via S/MIME XDM (*Optional* for MU2 certification)
    - 170.314(b)(1) Transitions of Care (Ambulatory)
    - 170.314(b)(1) Transitions of Care (Inpatient)
- **Simple Object Access Protocol (SOAP) (*Optional* for MU2 certification)**
  - CCR via SOAP (*Optional* for MU2 certification)
    - 170.314(b)(1) Transitions of Care (Ambulatory)
    - 170.314(b)(1) Transitions of Care (Inpatient)
  - C-CDA via SOAP (*Optional* for MU2 certification)
    - 170.314(b)(1) Transitions of Care (Ambulatory)
    - 170.314(b)(1) Transitions of Care (Inpatient)
  - C32 via SOAP (*Optional* for MU2 certification)
    - 170.314(b)(1) Transitions of Care (Ambulatory)
    - 170.314(b)(1) Transitions of Care (Inpatient)

4. <u>Manual Validation:</u>

There is another *<u>optional</u>* method via which users/EHR's can validate C-CDA's with the Transport Testing Tool to debug and ensure that the C-CDA's are conformant. This capability can be used to validate the content for the following objectives:

- **170.314(b)(1) Transitions of Care (Ambulatory)**
- **170.314(b)(1) Transitions of Care (Inpatient)**
- **170.314(b)(2) Transitions of Care (Ambulatory)**
- **170.314(b)(2) Transitions of Care (Inpatient)**
- **170.314(b)(7) Data Portability (Ambulatory)**
- **170.314(b)(7) Data Portability (Inpatient)**
- **170.314(e)(2) Clinical Summary**
- **170.314(e)(1) View, Download and Transmit to 3rd Party (Ambulatory)**
- **170.314(e)(1) View, Download and Transmit to 3rd Party (Inpatient)**
- **Non-specific CCDA**

1.0 REGISTRATION

Registration is required in order to be able to send or receive Direct or Direct/XDM messages using the Tool.

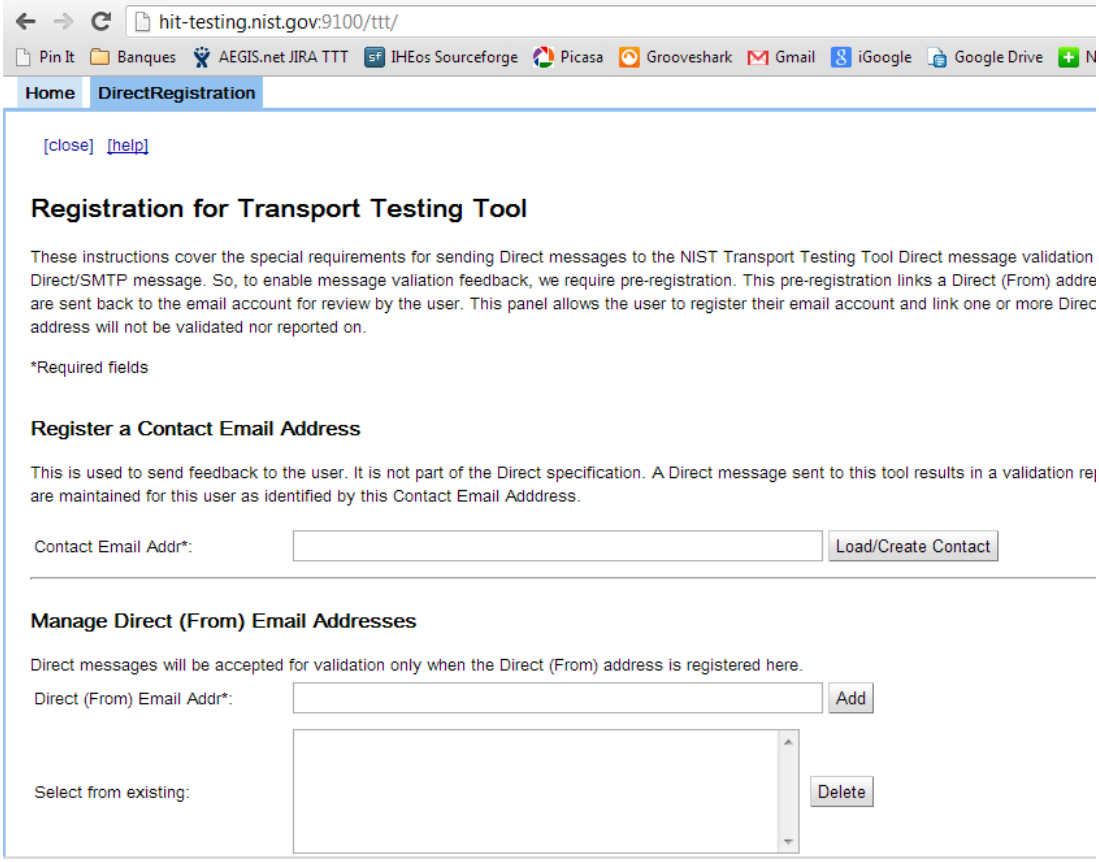
1.1.1 REGISTERING A DIRECT WEB ADDRESS

To register a Direct addresses with the Transport Testing Tool, users must visit the Home Page and click on "**Registration**" under the Direct column.

PLEASE NOTE: Users who do not register their Direct address will not be recognized by the Tool and therefore be unable to send or receive Direct or Direct + XDM messages.

At the Registration Page, users will be asked to provide the following information:

- Contact E-mail Address (personal e-mail address);
- Direct E-mail Address.



1) Enter in the contact email address, this address will be used to email all validation reports.

2) Enter in the From Direct Address. This address will be registered in TTT and any valid content from this address will be validated and the corresponding validation report emailed to the contact address.

Once users have registered, they will be placed on a "white list" – a list of approved addresses from which the Transport Testing Tool will accept messages. Again please note that users who do not register their contact email address and direct address will not be recognized by the tool and therefore be unable to send or receive messages.

After registering, go back to the "**Home**" tab.

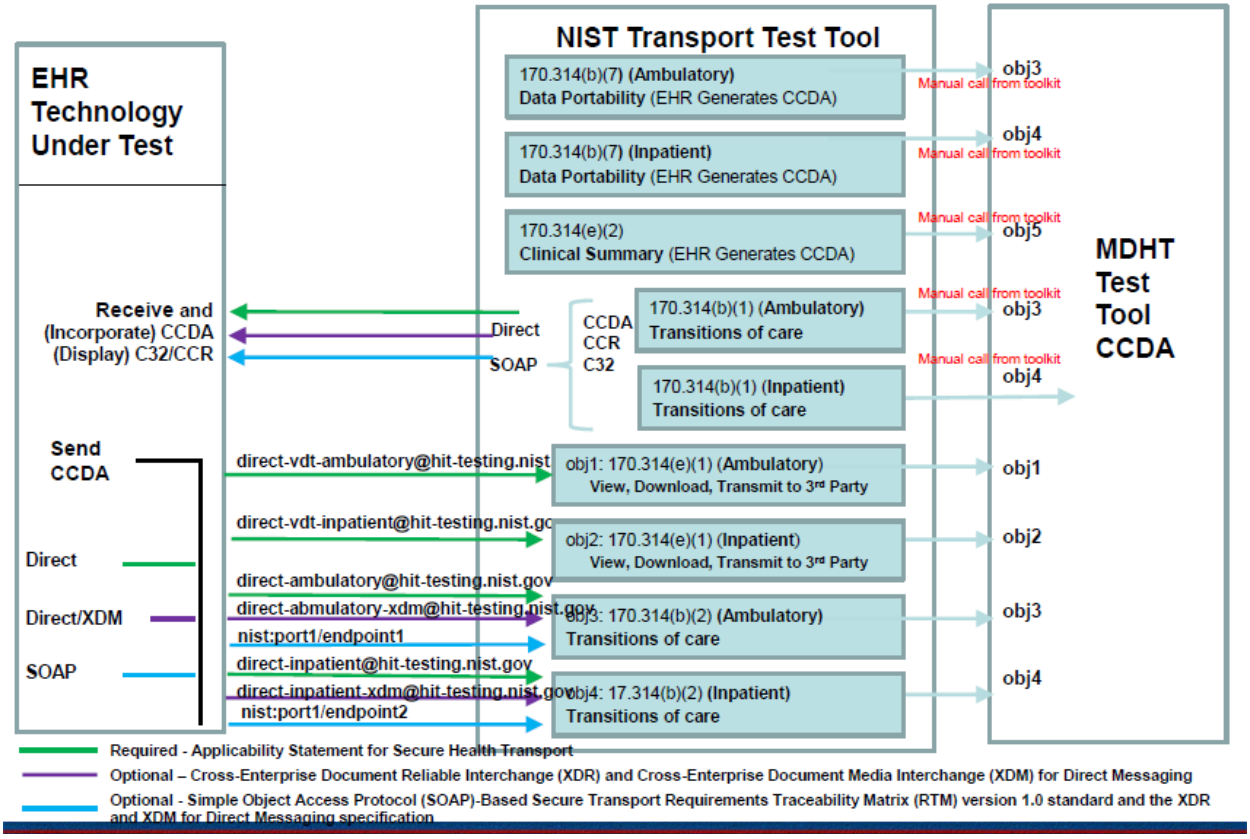
Once complete, refer to step 2.0 of this guide.

1.1.2 REGISTERING A SOAP WEB ADDRESS

Those using the SOAP/SAML send and receive features of the tool do not need to pre-register in the registration section. Registration of the endpoints to be used will be done at the time of the send or receive. Also, since the interaction is interactive, the validation results are displayed on the screen so there is no need to register a contact email address.

1.1.3 DIAGRAM FOR SEND/RECEIVE BY MU OBJECTIVE

Once registration is complete, the Transport Testing Tool will allow users/EHR's to send and receive messages by several methods, dependent on the specific MU objective. This is a visual depiction of the process that will be explained in the subsequent sections. Green lines are mandatory DIRECT protocol send and receives. Purple are DIRECT + XDM protocol send and receives, and light blue are the SOAP/SAML protocol send and receives.


EHR Technology Under Test
NIST Transport Test Tool
MDHT Test Tool CCDA
170.314(b)(7) (Ambulatory) Data Portability (EHR Generates CCDA)
170.314(b)(7) (Inpatient) Data Portability (EHR Generates CCDA)
170.314(e)(2) Clinical Summary (EHR Generates CCDA)
170.314(b)(1) (Ambulatory) Transitions of care
170.314(b)(1) (Inpatient) Transitions of care
obj1: 170.314(e)(1) (Ambulatory) View, Download, Transmit to 3rd Party
obj2: 170.314(e)(1) (Inpatient) View, Download, Transmit to 3rd Party
obj3: 170.314(b)(2) (Ambulatory) Transitions of care
obj4: 17.314(b)(2) (Inpatient) Transitions of care
obj3
obj4
obj5
obj3
obj4
obj1
obj2
obj3
obj4
Manual call from toolkit
Receive and (Incorporate) CCDA (Display) C32/CCR
Direct
SOAP
CCDA
CCR
C32
Send CCDA
Direct
Direct/XDM
SOAP
direct-vdt-ambulatory@hit-testing.nist
direct-vdt-inpatient@hit-testing.nist.go
direct-ambulatory@hit-testing.nist.gov
direct-abmulatory-xdm@hit-testing.nist.gov
nist:port1/endpoint1
direct-inpatient@hit-testing.nist.gov
direct-inpatient-xdm@hit-testing.nist.gov
nist:port1/endpoint2
Required - Applicability Statement for Secure Health Transport
Optional – Cross-Enterprise Document Reliable Interchange (XDR) and Cross-Enterprise Document Media Interchange (XDM) for Direct Messaging
Optional - Simple Object Access Protocol (SOAP)-Based Secure Transport Requirements Traceability Matrix (RTM) version 1.0 standard and the XDR and XDM for Direct Messaging specification

2.0 SENDING C-CDA MESSAGES TO THE TRANSPORT TESTING TOOL

There are three different mechanisms via which users can send messages with a C-CDA attachment (Direct; Direct + XDM; SOAP). Below we will outline the process for sending via each mechanism.

2.1 Send a Direct Message to the TTT

Sending messages via Direct is the *required* mechanism for MU2 certification outlined by ONC's Standards & Certification Criteria 2014 Edition Objectives.

The MU Objectives against which a user can test his system, currently supported by this tool, are:

Note: Meaningful Use (MU) objectives with the same direct email address below use the same validation service in the MDHT validator (i.e., the C-CDA is the same), they are repeated here to make clear which address to use by MU objective.

Direct (To) address	Purpose
direct-clinical-summary@<host-address>	MU2 170.314(e)(2) - Clinical Summary
direct-ambulatory@<host-address>	MU2 170.314(b)(2) Transition of Care/Referral Summary - For Ambulatory Care
direct-ambulatory@<host-address>	MU2 170.314(b)(7) Data Portability - For Ambulatory Care
direct-ambulatory@<host-address>	MU 2 170.314(b)(1) Transition of Care Receive – For Ambulatory Care
direct-inpatient@<host-address>	MU2 170.314(b)(2) Transition of Care/Referral Summary - For Inpatient Care
direct-inpatient@<host-address>	MU2 170.314(b)(7) Data Portability - For Inpatient Care
direct-inpatient@<host-address>	MU 2 170.314(b)(1) Transition of Care Receive – For Inpatient Care
direct-vdt-ambulatory@<host-address>	MU2 170.314 (e)(1) Ambulatory Summary
direct-vdt-inpatient@<host-address>	MU2 170.314 (e)(1) Inpatient Summary
direct-vdt-inpatient-toc@<host-address>	MU2 170.314 (e)(1) Inpatient Summary- TOC

C-CDA@<host-address>	Non-specific C-CDA

Table 1 - Test procedures for Direct

The prerequisite to sending messages to the Transport Testing Tool via Direct, is registering a Direct address. To register a Direct address, go to step 1.1.1.

SEND TO TTT:

Note: The Sender will include the Public Key signing certificate in messages sent to the Transport Testing Tool
Once registered with the TTT tool, the user selects the Meaningful Use (MU) objective the content they are sending (C-CDA or human readable text) represents. The content will automatically be validated and a report sent back to the contact email address entered when registering.

1. Choose one of the direct email addresses to send the content: (based on the objective you want to test)

Direct Email Address	Meaningful Use Objective
direct-clinical-summary@<host-address>	MU2 170.314(e)(2) - Clinical Summary
direct-ambulatory@<host-address>	MU2 170.314(b)(2) Transition of Care/Referral Summary - For Ambulatory Care
direct-ambulatory@<host-address>	MU2 170.314(b)(7) Data Portability - For Ambulatory Care
direct-ambulatory@<host-address>	MU 2 170.314(b)(1) Transition of Care Receive – For Ambulatory Care
direct-inpatient@<host-address>	MU2 170.314(b)(2) Transition of Care/Referral Summary - For Inpatient Care
direct-inpatient@<host-address>	MU2 170.314(b)(7) Data Portability - For Inpatient Care
direct-inpatient@<host-address>	MU 2 170.314(b)(1) Transition of Care Receive – For Inpatient Care
direct-vdt-ambulatory@<host-address>	MU2 170.314 (e)(1) View Download and Transmit - For Ambulatory Care
direct-vdt-inpatient@<host-address>	MU2 170.314 (e)(1) View Download and Transmit - For Inpatient Care
ccda@<host-address>	Non-specific CCDA

2. Once sent, the validation report will be mailed back to the address entered at registration time.

Note: <host-address> is set to the address of the machine the Transport Test tool is running on.

Note: Each address can also accept text/plain MIME types to validate human-readable text**.**

2.2 Send a Direct + XDM message to the TTT

Sending messages via Direct + XDM is an *optional* mechanism for MU2 certification outlined by ONC's Standards & Certification Criteria 2014 Edition Objectives. The Direct + XDM mechanism is referenced in Meaningful Use for sending CDA instances as XDM zip archives attached to Direct messages.

There are two MU Objectives for which a user can send messages via Direct + XDM:

- **170.314(b)(2) Transitions of Care (Ambulatory)**
- **170.314(b)(2) Transitions of Care (Inpatient)**

Direct (To) address	Purpose
direct-ambulatory-xdm@<host-address>	MU2 170.314(b)(2) Transition of Care/Referral Summary - For Ambulatory Care
direct-inpatient-xdm@<host-address>	MU2 170.314(b)(2) Transition of Care/Referral Summary - For Inpatient Care

Note: <host-address> is set to the address of the machine the Transport Test tool is running on.

The prerequisite to sending messages to the Transport Testing Tool via Direct plus XDM, is registering a Direct address. To register a Direct address, go to step 1.1.1.

Once registered with the TTT tool, the user selects the Meaningful Use (MU) objective the content they are sending (C-CDA or human readable text) represents. The content will automatically be validated and a report sent back to the contact email address entered when registering.

1. Choose one for the direct email address to send the content:

Direct Email Address	Meaningful Use Objective
direct-ambulatory-xdm@<host-address>	MU2 170.314(b)(2) Transition of Care/Referral Summary - For Ambulatory Care
direct-inpatient-xdm@<host-address>	MU2 170.314(b)(2) Transition of Care/Referral Summary - For Inpatient Care

2. Once sent, the validation report will be mailed back to the contact address entered at registration time.

Note: <host-address> is set to the address of the machine the Transport Test tool is running on.

Note: Each address can also accept text/plain MIME types to validate human-readable text**.**

2.3 Send a SOAP message to the TTT

Sending messages via **Simple Object Access Protocol (SOAP)** is an *optional* mechanism for MU2 certification outlined by ONC's Standards & Certification Criteria 2014 Edition Objectives. Unlike the previous mechanisms, Direct and Direct + XDM, SOAP allows a user to make a remote function call over the Internet using the same process one would use for a normal Web address.

There are two MU Objectives for which a user can send messages via SOAP:

- **170.314(b)(2) Transitions of Care (Ambulatory):**
- **170.314(b)(2) Transitions of Care (Inpatient)**

SOAP endpoint address	Purpose
nist:port1/endpoint3	MU2 170.314(b)(2) Transition of Care/Referral Summary - For Ambulatory Care
nist:port1/endpoint4	MU2 170.314(b)(2) Transition of Care/Referral Summary - For Inpatient Care

Note: The endpoints above are sample only; the actual endpoints are generated by the tool**.**

To send a CCDA to the Transport Test Tool using SOAP/SAML, you must generate the SOAP endpoints to be used within the tool by:

Define an Actor Simulator:

1. On the Home panel, select the "**Simulator Control**" in the "**Simulators**" column
2. Select "**Document Recipient**" from the Actor Type pull-down menu.
3. Click "**Create Actor Simulator**"
4. Copy the End Point Displayed in "**PnR TLS endpoint**", this is a TLS endpoint, DO NOT USE the PnR endpoint above it, as it is non-TLS.
5. Select the Expected C-CDA Type from the list that you will send to the TTT, this will allow the C-CDA to be sent to the appropriate Validator. This endpoint will always be associated with this type C-CDA, you will create an endpoint for each C-CDA you will send.
6. Enter in the "**Name**" field the Name you wish to give this connection; you will reference this name in subsequent menus to select it as the connection.
7. Click "Save", this will create a new simulator under the name you entered above. You can continue to create several connections here, give each a different name to reference later.
8. Leave the "**Sim Control**" menu up, click "**Home**"

Send the Message to TTT:

1. On the SUT, send the message to the TTT.
2. After the message is sent, click on "**Simulator Message View**" under simulators to view the output from the validation from TTT. Select from the pulldown menu "Simulator" the name you entered for the connection above. If you created several connections above, you can look at each one from this page by selecting the name for the connection from the menu.
3. On the left, a list of all messages exchanged will be displayed, click on any message and the messages will be displayed and the results of the validation at the bottom. Repeat for all messages you will to look at.

3.0 SENDING MESSAGES FROM THE TRANSPORT TESTING TOOL TO A SYSTEM UNDER TEST

As outlined in the Testing Overview, per ONC's Standards & Certification Criteria 2014 Edition Objectives there are three different mechanisms via which users can receive messages with CCR, C-CDA, or C32 attachments from the Transport Testing Tool:

- Direct with S/MIME (*required*)
  - CCR via S/MIME (Required by MU2)
  - C-CDA via S/MIME (Required by MU2)
  - C32 via S/MIME (Required by MU2)

- Direct with XDM Attachment Messages (*optional*)
  a. CCR via S/MIME XDM (Optional)
  b. C-CDA via S/MIME XDM (Optional)
  c. C32 via S/MIME XDM (Optional)

- Simple Object Access Protocol (SOAP) (*optional*)
  - CCR via SOAP (Optional)
  - C-CDA via SOAP (Optional)
  - C32 via SOAP(Optional)

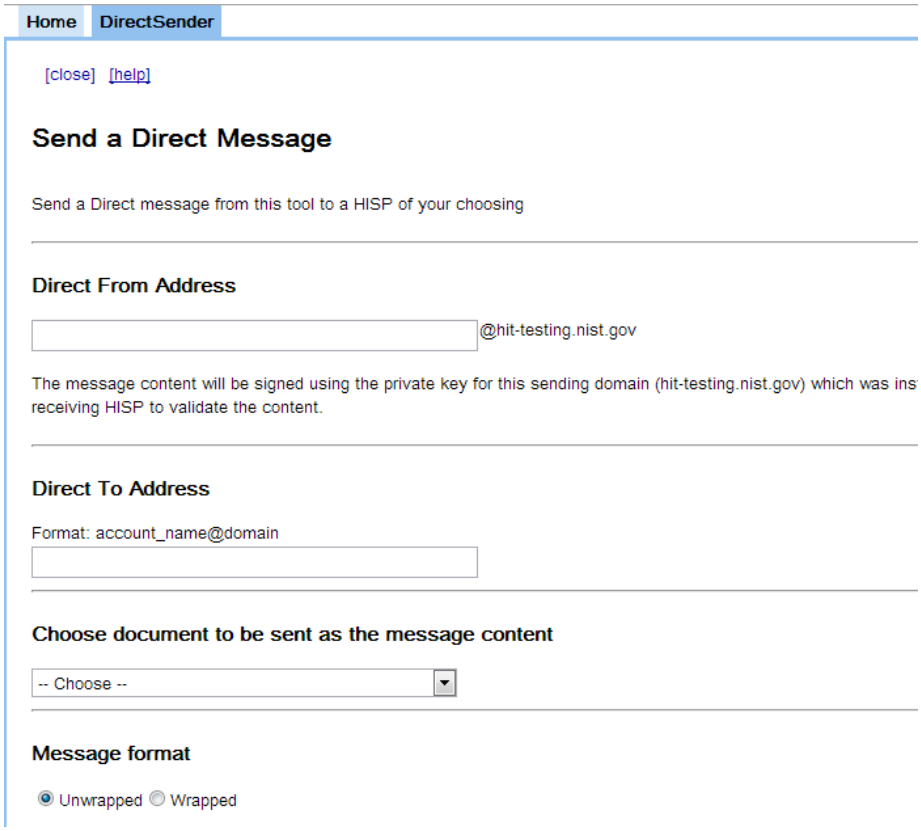
For each of the three mechanisms, there are two Objectives for which users can receive C-CDA, CCR, or C32 files:

- **170.314(b)(1) Transitions of Care (Ambulatory)**
- **170.314(b)(1) Transitions of Care (Inpatient)**

3.1 Send a Direct message to a System Under Test

A user may receive CCR, CDA, or C32 files from the Transport Testing Tool via Direct**.** The process to receive Direct messages is outlined below.

1. From the Home Page tab, click "**Send Direct Message**" link from the "Direct" column.



Screenshot 1 - Send Direct Message tab

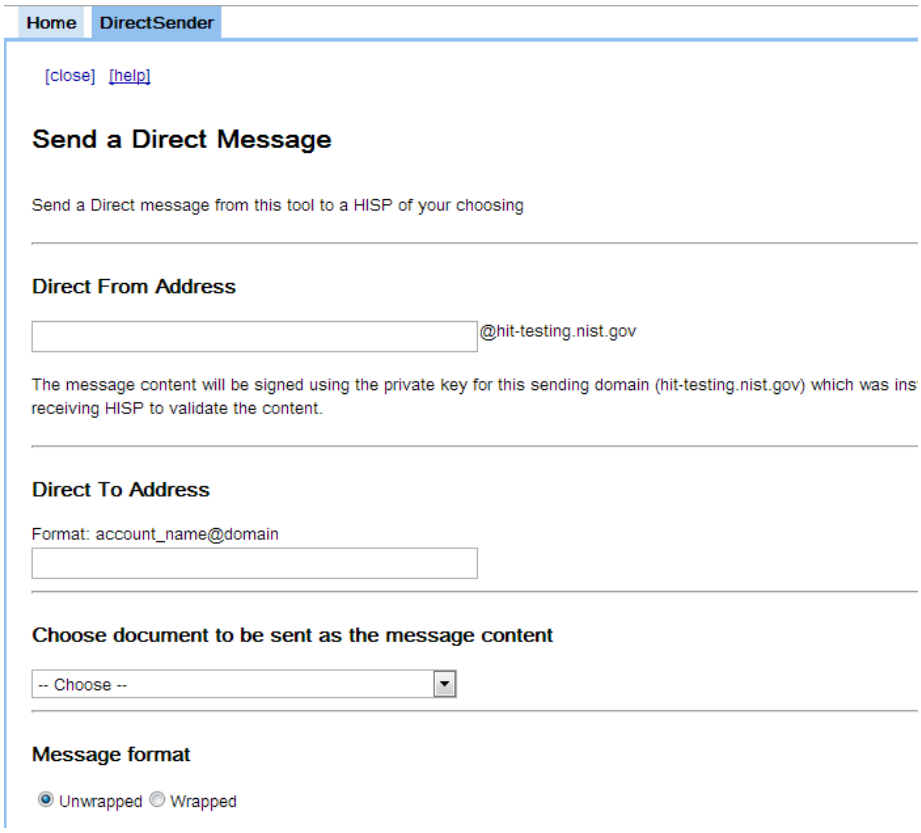
Send a Direct message, with the attached C-CDA document, to one of the authorized e-mail addresses corresponding to the Objective under test, listed in *Table 1 - Test procedures*.

2. In the **Direct From Address** field, this must be the address the SUT is expecting to receive mail from. The MDN will be sent back to TTT using this address and this name will appear in the message sent in the from field.
3. In the **Direct To Address** field, type the Direct address to send the message. This field will only accept one email address.
4. Choose one of the six samples using the pull-down menu. There are 2 C-CCDA, 2-CCR and 2 C32 samples to choose from. (**Note: There is an XDM version for each of these samples also, do not select samples ending with _in_XDM)**
5. Choose a message format of "Wrapped" or "Unwrapped", this will either wrap a message according to RFC 5751. (**Note:** All applications must support unwrapped, wrapped is optional)
6. Click the browse button and upload the certificate to be used to encrypt the message sent (public key)
7. Click submit and the Direct Message will be sent.

3.2 Send a Direct + XDM message to a System Under Test

A user may receive CCR, C-CDA, or C32 attachments from the Transport Testing Tool via **Direct + XDM.** The process to receive Direct + XDM messages is outlined below.

1. From the Home Page tab, click "**Send Direct Message**" link from the "Direct" column.



Screenshot 2 - Send Direct Message tab

Send a Direct message, with the attached C-CDA document, to one of the authorized e-mail addresses corresponding to the Objective under test, listed in *Table 1 - Test procedures*.

1. In the **Direct From Address** field, this must be the address the SUT is expecting to receive mail from. The MDN will be sent back to TTT using this address and this name will appear in the message sent in the from field.
2. In the **Direct To Address** field, type the Direct address to send the message. This field will only accept one email address.
3. Choose one of the six samples using the pull-down menu. There are 2 C-CCDA, 2-CCR and 2 C32 samples to choose from. (**Note: Select samples ending with _in_XDM)**

4. Choose a message format of "Wrapped" or "Unwrapped", this will either wrap a message according to RFC 5751. (**Note:** All applications must support unwrapped, wrapped is optional)
5. Click the browse button and upload the certificate to be used to encrypt the message sent (public key)
   Click submit and the Direct Message will be sent

3.3 Send a SOAP message to a System Under Test

A user may receive CCR, C-CDA, or C32 attachments from the tool via **SOAP.** The process to receive SOAP messages is outlined below.

In order to receive SOAP messages, users should follow the steps outlined below:

The Transport Testing Tool will call the user's SOAP service endpoint using the IHE XDR transaction and provide a CCR, C-CDA, or C32 document. (Selectable within the tool):

The SOAP message is generated and sent to the SUT.

1) Define an **Actor** in the Transport Testing Tool terminology.

1. In the **Home** panel , select the **Site/Actor Configuration** link from the "Tools" Column
2. On the menu on the left, click the + button to add a new actor.
   ** **Note:** Do not enter information in the non-TLS Endpoints column; this is the second column, non-TLS is not supported in Meaningful Use 2014.
3. Fill the form provided. The mandatory fields are the following:
   - **Site Name** : the name to represent SUT (This name will appear as a menu item later on for you to select)
   - In the **Document Recipient** section , column name "**XDR Provide and Register"** enter the endpoint used by the SUT to receive this XDR message.
4. Hit the **Save Changes** button. This action is password protected. Please type the admin password in the prompt to validate changes**.(the admin password is from the installation)**
5. Click the **close** button in the upper left corner.

To have TTT send a SOAP message:

1. On the Home panel, select the "**XDR send"** link from the "**Send Test Data**" column.

- In the top "**Environment"** drop down list, select the "**MU 2014**" environment

- Fill in a valid **patient ID** that corresponds to a correct patient record that exists in the SUT that will receive the C-CDA.
- Select a **Test Data Set** that corresponds to the documents to send, this will be one of the 2 C-CCDA, CCR or C32 samples available.
- Select "**NHIN SAML"** in the **SAML** menu.
- Check the **TLS** checkbox.
- Select the actor defined in the previous step in the **Document Recipient** checklist.
- Hit the **Run** button.
- Click on "**Inspect Results**", to view the response from the SUT.

4.0 MANUALLY VALIDATING C-CDA

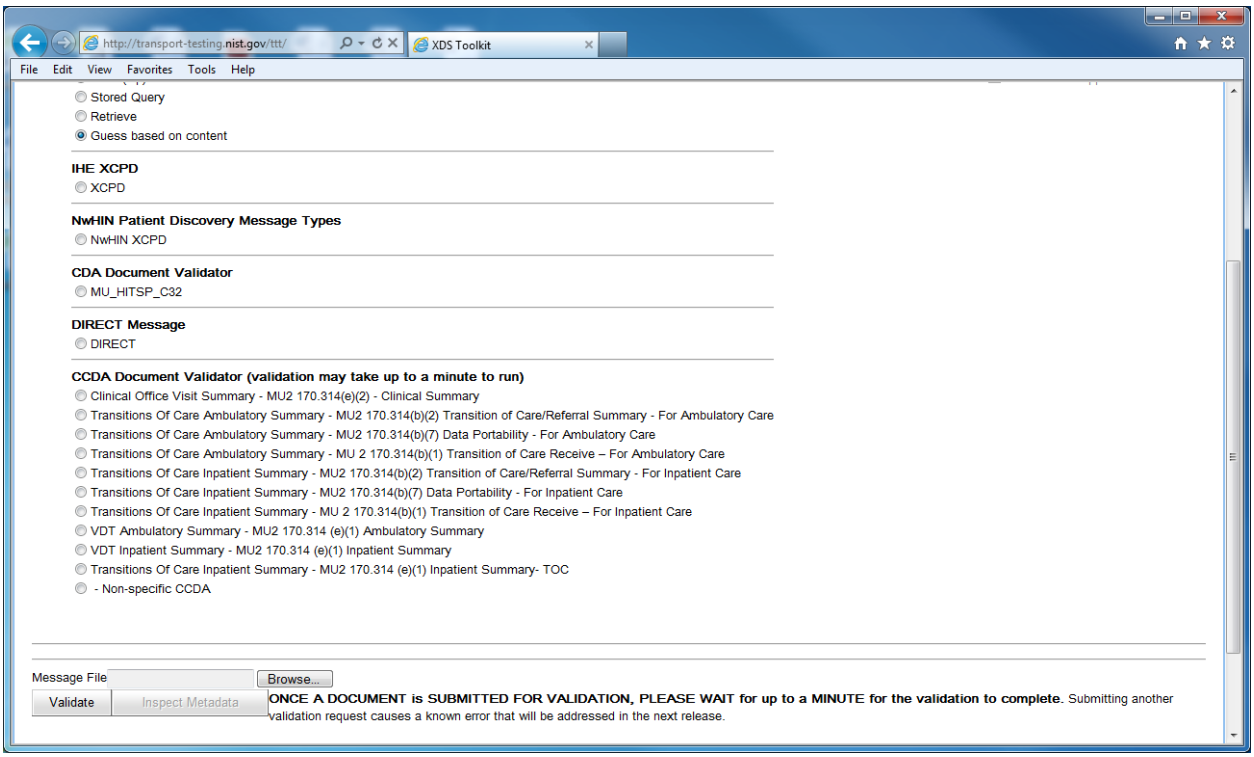
As outlined in the Testing Overview, per ONC's Standards & Certification Criteria 2014 Edition Objectives, Manual Upload is an *optional* mechanism for validating C-CDA under MU2.

There are five Objectives for which a user may manually validate C-CDA:

- **170.314(b)(1) Transitions of Care (Ambulatory)**
- **170.314(b)(1) Transitions of Care (Inpatient)**
- **170.314(b)(7) Data Portability (Ambulatory)**
- **170.314(b)(7) Data Portability (Inpatient)**
- **170.314(e)(2) Clinical Summary**

To manually upload and validate a C-CDA with the Tool, visit the Home Page and click on "**Message and C-CDA document validators**."

> **PLEASE NOTE:** Users do not need to register with the tool to manually validate C-CDAs.



Screenshot 3 - Message Validator tab

Under the "C-CDA Document Validator" field select the Objective corresponding to the file containing the XML representation of the C-CDA that requires validation. There are 9 Objectives and 1 non-specific C-CDA for which a user may manually validate C-CDA:

- **170.314(e)(1) View, Download, Transmit to 3rd Party (Ambulatory)**
- **170.314(e)(1) View, Download, Transmit to 3rd Party (Inpatient)**
- **170.314(e)(2) Clinical Summary**
- **170.314(b)(1) Transitions of Care (Ambulatory)**
- **170.314(b)(1) Transitions of Care (Inpatient)**
- **170.314(b)(2) Transitions of Care (Ambulatory)**
- **170.314(b)(2) Transitions of Care (Inpatient)**
- **170.314(b)(7) Data Portability (Ambulatory)**
- **170.314(b)(7) Data Portability (Inpatient)**
- **Non-specific C-CDA**

Click the "**Browse**" button at the bottom of the screen. Search for and select the file intended for manual validation which corresponds to the previously selected objective. Click "**Open**" to upload the selected file.

Click the "**Validate**" button.

If the Manual Upload was successful, the Tool will display the results of the validation on that same page.

> **PLEASE NOTE**: If the Manual Upload was not successful, the Tool will display a message saying "Validation Not Successful. Click HELP to troubleshoot" and the results will not be displayed on that same page.

5.0 APPENDIX

Model Driven Health Tools (MDHT)/Meaningful Use (MU) Stage 2 Data Requirements Summary

Outlined in the table below are the Meaningful Use Stage 2 data requirements that the MDHT tool will test for in order to validate Consolidated CDA. The specific sections of a C-CDA template are listed out by MU2 Data Requirement and organized by Objective. Vocabulary Requirements are notes as well.

5.1 170.314(b)(2) Transitions of Care (Ambulatory)

170.314(b)(2) Transitions of Care (Ambulatory)			
MU2 Data Requirements	**CCDA Template**	**OID**	**Vocabulary Requirements**
	(CCDA Header Template)		
Patient Name	patient/name		
Patient Sex	patient/administrativeGenderCode		
Patient Date of Birth	patient/birthTime		
Patient Race	patient/raceCode		
Patient Ethnicity	patient/ethnicGroupCode		
Patient Preferred Language	patient/languageCommunication		
Provider Name and Office Contact Information	encompassingEncounter/responsibleParty		
Care Team Members	encompassingEncounter/encounterParticipants		
Care Team Members	assignedEntity/assignedPerson		
	(CCDA Section Template)		
Medication Allergies	**Allergies (entries required)**	Allergies (entries required: 2.16.840.1.113883.10.20.22.2.6.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Medications	**Medications (entries required)**	Medications (entries required: 2.16.840.1.113883.10.20.22.2.1.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Medications	**Hospital Discharge Medications**	Hospital Discharge Medications (entries required: 2.16.840.1.113883.10.20.22.2.11.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Problems	**Problem (entries required)**	Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Encounter Diagnoses		Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	ICD10-CM or IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Encounter Diagnoses	**Hospital Admission Diagnosis**	Hospital Admission Diagnosis (2.16.840.1.113883.10.20.22.2.43)	ICD10-CM or IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Reason for Referral	**Reason for Referral**	Reason for Referral (1.3.6.1.4.1.19376.1.5.3.1.3.1)	
Procedures	**Procedures (entries required)**	Procedures (entries required: 2.16.840.1.113883.10.20.22.2.7.1)	SNOMED-CT or CPT/HCPCS; ICD-10-PCS and CDT are "optional", meaning they have to certify use of SNOMED CT or CPT/HCPCS as well

Functional Status	Functional Status Problem Observation	Functional Status Problem Observation (2.16.840.1.113883.10.20.22.4.68)	
	Functional Status Result Observation	Functional Status Result Observation (2.16.840.1.113883.10.20.22.4.67)	
Cognitive Status	Cognitive Status Problem Observation	Cognitive Status Problem Observation (2.16.840.1.113883.10.20.22.4.73)	
	Cognitive Status Result Observation	Cognitive Status Result Observation (2.16.840.1.113883.10.20.22.4.74)	
Immunizations; Immunizations Administered during the Visit	**Immunizations (entries required)**	Immunizations (entries required: 2.16.840.1.113883.10.20.22.2.2.1)	HL7 Standard Code Set CVX -- Vaccines Administered, updates through July11, 2012
Vital signs (height, weight, BP, BMI)	**Vital Signs**	Vital Signs (entries optional: 2.16.840.1.113883.10.20.22.2.4 or entries required: 2.16.840.1.113883.10.20.22.2.4.1)	
Laboratory Value(s)/Result(s)	**Results**	Results (entries required: 2.16.840.1.113883.10.20.22.2.3.1)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced
Care plan field(s), including goals and instructions	**Assessment and Plan**	Assessment and Plan (2.16.840.1.113883.10.20.22.2.9)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
	Plan of Care	Plan of Care (2.16.840.1.113883.10.20.22.2.10)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
Laboratory Test(s)	Plan of Care Activity Observation	Plan of Care Activity Observation (2.16.840.1.113883.10.20.22.4.44)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
Smoking Status	Smoking Status Observation	Smoking Status Observation (2.16.840.1.113883.10.22.4.78)	Smoking status must be coded in one of the following SNOMEDCT® codes: (1) Current every day smoker. 449868002 (2) Current some day smoker. 428041000124106 (3) Former smoker. 8517006 (4) Never smoker. 266919005 (5) Smoker, current status unknown. 77176002 (6) Unknown if ever smoked. 266927001 (7) Heavy tobacco smoker. 428071000124103 (8) Light tobacco smoker. 428061000124105
Encounter Diagnosis	Encounter Diagnosis	Assessment (2.16.840.1.113883.10.20.22.2.8), Assessment and Plan (2.16.840.1.113883.10.20.22.2.9), Hospital Admission Diagnosis (2.16.840.1.113883.10.20.22.2.43), Hospital Discharge Diagnosis (2.16.840.1.113883.10.20.22.2.24), Postoperative Diagnosis (2.16.840.1.113883.10.20.22.2.35), Postprocedure Diagnosis (2.16.840.1.113883.10.20.22.2.36), Encounters (entries required: 2.16.840.1.113883.10.20.22.2.22.1), Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	ICD10-CM or IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release

5.2 170.314(b)(2) Transitions of Care (Inpatient)

170.314(b)(2) Transitions of Care (Inpatient)			
MU2 Data Requirements	**CCDA Template**	**OID**	**Vocabulary Requirements**
	(CCDA Header Template)		
Patient Name	patient/name		
Patient Sex	patient/administrativeGenderCode		
Patient Date of Birth	patient/birthTime		
Patient Race	patient/raceCode		
Patient Ethnicity	patient/ethnicGroupCode		
Patient Preferred Language	patient/languageCommunication		
Provider Name and Office Contact Information	encompassingEncounter/responsibleParty		
Care Team Members	encompassingEncounter/encounterParticipants		
Care Team Members	assignedEntity/assignedPerson		
	(CCDA Section Template)		
Medication Allergies	**Allergies (entries required)**	Allergies (entries required: 2.16.840.1.113883.10.20.22.2.6.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Medications	**Medications (entries required)**	Medications (entries required: 2.16.840.1.113883.10.20.22.2.1.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Medications	**Hospital Discharge Medications**	Hospital Discharge Medications (entries required: 2.16.840.1.113883.10.20.22.2.11.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Discharge Instructions	**Hospital Discharge Instructions**	Hospital Discharge Instructions (2.16.840.1.113883.10.20.22.2.41)	
Problems	**Problem (entries required)**	Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Encounter Diagnoses		Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	ICD10-CM or IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Encounter Diagnoses	**Hospital Admission Diagnosis**	Hospital Admission Diagnosis (2.16.840.1.113883.10.20.22.2.43)	ICD10-CM or IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Procedures	**Procedures (entries required)**	Procedures (entries required: 2.16.840.1.113883.10.20.22.2.7.1)	SNOMED-CT or CPT/HCPCS; ICD-10-PCS and CDT are "optional", meaning they have to certify use of SNOMED CT or CPT/HCPCS as well
Functional Status	Functional Status Problem Observation	Functional Status Problem Observation (2.16.840.1.113883.10.20.22.4.68)	
	Functional Status Result Observation	Functional Status Result Observation (2.16.840.1.113883.10.20.22.4.67)	

Cognitive Status	Cognitive Status Problem Observation	Cognitive Status Problem Observation (2.16.840.1.113883.10.20.22.4.73)	
	Cognitive Status Result Observation	Cognitive Status Result Observation (2.16.840.1.113883.10.20.22.4.74)	
Immunizations; Immunizations Administered during the Visit	**Immunizations (entries required)**	Immunizations (entries required: 2.16.840.1.113883.10.20.22.2.2.1)	HL7 Standard Code Set CVX -- Vaccines Administered, updates through July11, 2012
Vital signs (height, weight, BP, BMI)	**Vital Signs**	Vital Signs (entries optional: 2.16.840.1.113883.10.20.22.2.4 or entries required: 2.16.840.1.113883.10.20.22.2.4.1)	
Laboratory Value(s)/Result(s)	**Results**	Results (entries required: 2.16.840.1.113883.10.20.22.2.3.1)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced
Care plan field(s), including goals and instructions	**Assessment and Plan**	Assessment and Plan (2.16.840.1.113883.10.20.22.2.9)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
	Plan of Care	Plan of Care (2.16.840.1.113883.10.20.22.2.10)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
Laboratory Test(s)	Plan of Care Activity Observation	Plan of Care Activity Observation (2.16.840.1.113883.10.20.22.4.44)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
Smoking Status	Smoking Status Observation	Smoking Status Observation (2.16.840.1.113883.10.22.4.78)	Smoking status must be coded in one of the following SNOMEDCT® codes: (1) Current every day smoker. 449868002 (2) Current some day smoker. 428041000124106 (3) Former smoker. 8517006 (4) Never smoker. 266919005 (5) Smoker, current status unknown. 77176002 (6) Unknown if ever smoked. 266927001 (7) Heavy tobacco smoker. 428071000124103 (8) Light tobacco smoker. 428061000124105
Encounter Diagnosis	Encounter Diagnosis	Assessment (2.16.840.1.113883.10.20.22.2.8), Assessment and Plan (2.16.840.1.113883.10.20.22.2.9), Hospital Admission Diagnosis (2.16.840.1.113883.10.20.22.2.43), Hospital Discharge Diagnosis (2.16.840.1.113883.10.20.22.2.24), Postoperative Diagnosis (2.16.840.1.113883.10.20.22.2.35), Postprocedure Diagnosis (2.16.840.1.113883.10.20.22.2.36), Encounters (entries required: 2.16.840.1.113883.10.20.22.2.22.1), Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	ICD10-CM or IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release

5.3 170.314(b)(7) Data Portability (Ambulatory)

170.314(b)(7) Data Portability (Ambulatory)			
MU2 Data Requirements	**CCDA Template**	**OID**	**Vocabulary Requirements**
	(CCDA Header Template)		
Patient Name	patient/name		
Patient Sex	patient/administrativeGenderCode		
Patient Date of Birth	patient/birthTime		
Patient Race	patient/raceCode		
Patient Ethnicity	patient/ethnicGroupCode		
Patient Preferred Language	patient/languageCommunication		
Provider Name and Office Contact Information	encompassingEncounter/responsibleParty		
Care Team Members	encompassingEncounter/encounterParticipants		
Care Team Members	assignedEntity/assignedPerson		
	(CCDA Section Template)		
Medication Allergies	**Allergies (entries required)**	Allergies (entries required: 2.16.840.1.113883.10.20.22.2.6.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Medications	**Medications (entries required)**	Medications (entries required: 2.16.840.1.113883.10.20.22.2.1.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Medications	**Hospital Discharge Medications**	Hospital Discharge Medications (entries required: 2.16.840.1.113883.10.20.22.2.11.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Problems	**Problem (entries required)**	Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Encounter Diagnoses		Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	ICD10-CM or IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Encounter Diagnoses	**Hospital Admission Diagnosis**	Hospital Admission Diagnosis (2.16.840.1.113883.10.20.22.2.43)	ICD10-CM or IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Reason for Referral	**Reason for Referral**	Reason for Referral (1.3.6.1.4.1.19376.1.5.3.1.3.1)	
Procedures	**Procedures (entries required)**	Procedures (entries required: 2.16.840.1.113883.10.20.22.2.7.1)	SNOMED-CT or CPT/HCPCS; ICD-10-PCS and CDT are "optional", meaning they have to certify use of SNOMED CT or CPT/HCPCS as well
Functional Status	Functional Status Problem Observation	Functional Status Problem Observation (2.16.840.1.113883.10.20.22.4.68)	
	Functional Status Result Observation	Functional Status Result Observation (2.16.840.1.113883.10.20.22.4.67)	

Cognitive Status	Cognitive Status Problem Observation	Cognitive Status Problem Observation (2.16.840.1.113883.10.20.22.4.73)	
	Cognitive Status Result Observation	Cognitive Status Result Observation (2.16.840.1.113883.10.20.22.4.74)	
Immunizations; Immunizations Administered during the Visit	**Immunizations (entries required)**	Immunizations (entries required: 2.16.840.1.113883.10.20.22.2.2.1)	HL7 Standard Code Set CVX -- Vaccines Administered, updates through July11, 2012
Vital signs (height, weight, BP, BMI)	**Vital Signs**	Vital Signs (entries optional: 2.16.840.1.113883.10.20.22.2.4 or entries required: 2.16.840.1.113883.10.20.22.2.4.1)	
Laboratory Value(s)/Result(s)	**Results**	Results (entries required: 2.16.840.1.113883.10.20.22.2.3.1)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced
Care plan field(s), including goals and instructions	**Assessment and Plan**	Assessment and Plan (2.16.840.1.113883.10.20.22.2.9)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
	Plan of Care	Plan of Care (2.16.840.1.113883.10.20.22.2.10)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
Laboratory Test(s)	Plan of Care Activity Observation	Plan of Care Activity Observation (2.16.840.1.113883.10.20.22.4.44)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
Smoking Status	Smoking Status Observation	Smoking Status Observation (2.16.840.1.113883.10.22.4.78)	Smoking status must be coded in one of the following SNOMEDCT® codes: (1) Current every day smoker. 449868002 (2) Current some day smoker. 428041000124106 (3) Former smoker. 8517006 (4) Never smoker. 266919005 (5) Smoker, current status unknown. 77176002 (6) Unknown if ever smoked. 266927001 (7) Heavy tobacco smoker. 428071000124103 (8) Light tobacco smoker. 428061000124105
Encounter Diagnosis	Encounter Diagnosis	Assessment (2.16.840.1.113883.10.20.22.2.8), Assessment and Plan (2.16.840.1.113883.10.20.22.2.9), Hospital Admission Diagnosis (2.16.840.1.113883.10.20.22.2.43), Hospital Discharge Diagnosis (2.16.840.1.113883.10.20.22.2.24), Postoperative Diagnosis (2.16.840.1.113883.10.20.22.2.35), Postprocedure Diagnosis (2.16.840.1.113883.10.20.22.2.36), Encounters (entries required: 2.16.840.1.113883.10.20.22.2.22.1), Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	ICD10-CM or IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release

5.4 170.314(b)(7) Data Portability (Inpatient)

170.314(b)(7) Data Portability (Inpatient)			
MU2 Data Requirements	**CCDA Template**	**OID**	**Vocabulary Requirements**
	(CCDA Header Template)		
Patient Name	patient/name		
Patient Sex	patient/administrativeGenderCode		
Patient Date of Birth	patient/birthTime		
Patient Race	patient/raceCode		
Patient Ethnicity	patient/ethnicGroupCode		
Patient Preferred Language	patient/languageCommunication		
Provider Name and Office Contact Information	encompassingEncounter/responsibleParty		
Care Team Members	encompassingEncounter/encounterParticipants		
Care Team Members	assignedEntity/assignedPerson		
	(CCDA Section Template)		
Medication Allergies	**Allergies (entries required)**	Allergies (entries required: 2.16.840.1.113883.10.20.22.2.6.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Medications	**Medications (entries required)**	Medications (entries required: 2.16.840.1.113883.10.20.22.2.1.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Medications	**Hospital Discharge Medications**	Hospital Discharge Medications (entries required: 2.16.840.1.113883.10.20.22.2.11.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Discharge Instructions	**Hospital Discharge Instructions**	Hospital Discharge Instructions (2.16.840.1.113883.10.20.22.2.41)	
Problems	**Problem (entries required)**	Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Encounter Diagnoses		Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	ICD10-CM or IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Encounter Diagnoses	**Hospital Admission Diagnosis**	Hospital Admission Diagnosis (2.16.840.1.113883.10.20.22.2.43)	ICD10-CM or IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Procedures	**Procedures (entries required)**	Procedures (entries required: 2.16.840.1.113883.10.20.22.2.7.1)	SNOMED-CT or CPT/HCPCS; ICD-10-PCS and CDT are "optional", meaning they have to certify use of SNOMED CT or CPT/HCPCS as well
Functional Status	Functional Status Problem Observation	Functional Status Problem Observation (2.16.840.1.113883.10.20.22.4.68)	
	Functional Status Result Observation	Functional Status Result Observation (2.16.840.1.113883.10.20.22.4.67)	

Cognitive Status	Cognitive Status Problem Observation	Cognitive Status Problem Observation (2.16.840.1.113883.10.20.22.4.73)	
	Cognitive Status Result Observation	Cognitive Status Result Observation (2.16.840.1.113883.10.20.22.4.74)	
Immunizations; Immunizations Administered during the Visit	**Immunizations (entries required)**	Immunizations (entries required: 2.16.840.1.113883.10.20.22.2.2.1)	HL7 Standard Code Set CVX -- Vaccines Administered, updates through July11, 2012
Vital signs (height, weight, BP, BMI)	**Vital Signs**	Vital Signs (entries optional: 2.16.840.1.113883.10.20.22.2.4 or entries required: 2.16.840.1.113883.10.20.22.2.4.1)	
Laboratory Value(s)/Result(s)	**Results**	Results (entries required: 2.16.840.1.113883.10.20.22.2.3.1)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced
Care plan field(s), including goals and instructions	**Assessment and Plan**	Assessment and Plan (2.16.840.1.113883.10.20.22.2.9)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
	Plan of Care	Plan of Care (2.16.840.1.113883.10.20.22.2.10)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
Laboratory Test(s)	Plan of Care Activity Observation	Plan of Care Activity Observation (2.16.840.1.113883.10.20.22.4.44)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
Smoking Status	Smoking Status Observation	Smoking Status Observation (2.16.840.1.113883.10.22.4.78)	Smoking status must be coded in one of the following SNOMEDCT® codes: (1) Current every day smoker. 449868002 (2) Current some day smoker. 428041000124106 (3) Former smoker. 8517006 (4) Never smoker. 266919005 (5) Smoker, current status unknown. 77176002 (6) Unknown if ever smoked. 266927001 (7) Heavy tobacco smoker. 428071000124103 (8) Light tobacco smoker. 428061000124105
Encounter Diagnosis	Encounter Diagnosis	Assessment (2.16.840.1.113883.10.20.22.2.8), Assessment and Plan (2.16.840.1.113883.10.20.22.2.9), Hospital Admission Diagnosis (2.16.840.1.113883.10.20.22.2.43), Hospital Discharge Diagnosis (2.16.840.1.113883.10.20.22.2.24), Postoperative Diagnosis (2.16.840.1.113883.10.20.22.2.35), Postprocedure Diagnosis (2.16.840.1.113883.10.20.22.2.36), Encounters (entries required: 2.16.840.1.113883.10.20.22.2.22.1), Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	ICD10-CM or IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release

5.5 170.314(e)(1) View, Download, Transmit to 3rd Party (Ambulatory)

170.314(e)(1) View, Download, Transmit to 3rd Party (Ambulatory)			
MU2 Data Requirements	**CCDA Template**	**OID**	**Vocabulary Requirements**
	(CCDA Header Template)		
Patient Name	patient/name		
Patient Sex	patient/administrativeGenderCode		
Patient Date of Birth	patient/birthTime		
Patient Race	patient/raceCode		
Patient Ethnicity	patient/ethnicGroupCode		
Patient Preferred Language	patient/languageCommunication		
Provider Name and Office Contact Information	encompassingEncounter/responsibleParty		
Care Team Members	encompassingEncounter/encounterParticipants		
Care Team Members	assignedEntity/assignedPerson		
	(CCDA Section Template)		
Medication Allergies	**Allergies (entries required)**	Allergies (entries required: 2.16.840.1.113883.10.20.22.2.6.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Medications	**Medications (entries required)**	Medications (entries required: 2.16.840.1.113883.10.20.22.2.1.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Medications	**Hospital Discharge Medications**	Hospital Discharge Medications (entries required: 2.16.840.1.113883.10.20.22.2.11.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Problems	**Problem (entries required)**	Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Procedures	**Procedures (entries required)**	Procedures (entries required: 2.16.840.1.113883.10.20.22.2.7.1)	SNOMED-CT or CPT/HCPCS; ICD-10-PCS and CDT are "optional", meaning they have to certify use of SNOMED CT or CPT/HCPCS as well
Vital signs (height, weight, BP, BMI)	**Vital Signs**	Vital Signs (entries optional: 2.16.840.1.113883.10.20.22.2.4 or entries required: 2.16.840.1.113883.10.20.22.2.4.1)	
Laboratory Value(s)/Result(s)	**Results**	Results (entries required: 2.16.840.1.113883.10.20.22.2.3.1)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced
Care plan field(s), including goals and instructions	**Assessment and Plan**	Assessment and Plan (2.16.840.1.113883.10.20.22.2.9)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
	Plan of Care	Plan of Care (2.16.840.1.113883.10.20.22.2.10)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
Laboratory Test(s)	Plan of Care Activity Observation	Plan of Care Activity Observation (2.16.840.1.113883.10.20.22.4.44)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
Smoking Status	Smoking Status Observation	Smoking Status Observation (2.16.840.1.113883.10.22.4.78)	Smoking status must be coded in one of the following SNOMEDCT® codes: (1) Current every day smoker. 449868002 (2) Current some day smoker. 428041000124106 (3) Former smoker. 8517006 (4) Never smoker. 266919005 (5) Smoker, current status unknown. 77176002 (6) Unknown if ever smoked. 266927001 (7) Heavy tobacco smoker. 428071000124103 (8) Light tobacco smoker. 428061000124105

5.6 170.314(e)(1) View, Download, Transmit to 3rd Party (Inpatient)

170.314(e)(1) View, Download, Transmit to 3rd Party (Inpatient)			
MU2 Data Requirements	**CCDA Template**	**OID**	**Vocabulary Requirements**
	(CCDA Header Template)		
Patient Name	patient/name		
Patient Sex	patient/administrativeGenderCode		
Patient Date of Birth	patient/birthTime		
Patient Race	patient/raceCode		
Patient Ethnicity	patient/ethnicGroupCode		
Patient Preferred Language	patient/languageCommunication		
Care Team Members	encompassingEncounter/encounterParticipants		
Admission and Discharge Dates	encompassingEncounter/effectiveTime		
Admission and Discharge Location	encompassingEncounter/location		
Care Team Members	assignedEntity/assignedPerson		
	(CCDA Section Template)		
Medication Allergies	**Allergies (entries required)**	Allergies (entries required: 2.16.840.1.113883.10.20.22.2.6.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Medications	**Medications (entries required)**	Medications (entries required: 2.16.840.1.113883.10.20.22.2.1.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Medications	**Hospital Discharge Medications**	Hospital Discharge Medications (entries required: 2.16.840.1.113883.10.20.22.2.11.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Discharge Instructions	**Hospital Discharge Instructions**	Hospital Discharge Instructions (2.16.840.1.113883.10.20.22.2.41)	
Problems	**Problem (entries required)**	Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Reason for Hospitalization	**Hospital Admission Diagnosis**	Hospital Admission Diagnosis (2.16.840.1.113883.10.20.22.2.43)	

Reason for Hospitalization; Reason for Visit	**Chief Complaint**	Chief Complaint (1.3.6.1.4.1.19376.1.5.3.1.1.13.2.1)	
	Chief Complaint and Reason for Visit	Chief Complaint and Reason for Visit (2.16.840.1.113883.10.20.22.2.13)	
	Reason for Visit	Reason for Visit (2.16.840.1.113883.10.20.22.2.12)	
	Encounters	Encounters (entries required: 2.16.840.1.113883.10.20.22.2.22.1)	
	Hospital Admission Diagnosis	Hospital Admission Diagnosis (2.16.840.1.113883.10.20.22.2.43)	
	Preoperative Diagnosis	Preoperative Diagnosis (2.16.840.1.113883.10.20.22.2.35)	
Procedures	**Procedures (entries required)**	Procedures (entries required: 2.16.840.1.113883.10.20.22.2.7.1)	SNOMED-CT or CPT/HCPCS; ICD-10-PCS and CDT are "optional", meaning they have to certify use of SNOMED CT or CPT/HCPCS as well
Vital signs (height, weight, BP, BMI)	**Vital Signs**	Vital Signs (entries optional: 2.16.840.1.113883.10.20.22.2.4 or entries required: 2.16.840.1.113883.10.20.22.2.4.1)	
Laboratory Value(s)/Result(s)	**Results**	Results (entries required: 2.16.840.1.113883.10.20.22.2.3.1)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced
Care plan field(s), including goals and instructions	**Assessment and Plan**	Assessment and Plan (2.16.840.1.113883.10.20.22.2.9)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
	Plan of Care	Plan of Care (2.16.840.1.113883.10.20.22.2.10)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
Laboratory Test(s)	Plan of Care Activity Observation	Plan of Care Activity Observation (2.16.840.1.113883.10.20.22.4.44)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
Smoking Status	Smoking Status Observation	Smoking Status Observation (2.16.840.1.113883.10.22.4.78)	Smoking status must be coded in one of the following SNOMEDCT® codes: (1) Current every day smoker. 449868002 (2) Current some day smoker. 428041000124106 (3) Former smoker. 8517006 (4) Never smoker. 266919005 (5) Smoker, current status unknown. 77176002 (6) Unknown if ever smoked. 266927001 (7) Heavy tobacco smoker. 428071000124103 (8) Light tobacco smoker. 428061000124105

5.7 170.314(b)(2) Clinical Summary

170.314(e)(2) Clinical Summary			
MU2 Data Requirements	**CCDA Template**	**OID**	**Vocabulary Requirements**
	(CCDA Header Template)		
Patient Name	patient/name		
Patient Sex	patient/administrativeGenderCode		
Patient Date of Birth	patient/birthTime		
Patient Race	patient/raceCode		
Patient Ethnicity	patient/ethnicGroupCode		
Patient Preferred Language	patient/languageCommunication		
Provider Name and Office Contact Information	encompassingEncounter/responsibleParty		
Care Team Members	encompassingEncounter/encounterParticipants		
Date of Visit	encompassingEncounter/effectiveTime		
Visit Location	encompassingEncounter/location		
Care Team Members	assignedEntity/assignedPerson		
	(CCDA Section Template)		
Medication Allergies	**Allergies (entries required)**	Allergies (entries required: 2.16.840.1.113883.10.20.22.2.6.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Medications	**Medications (entries required)**	Medications (entries required: 2.16.840.1.113883.10.20.22.2.1.1)	RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine, August 6, 2012 Release
Medications Administered during the Visit	**Medications (entries required)**	Medications (entries required: 2.16.840.1.113883.10.20.22.2.1.1)	
Medications Administered during the Visit	**Medications Administered**	Medications Administered (2.16.840.1.113883.10.20.22.2.38)	
Problems	**Problem (entries required)**	Problem (entries required: 2.16.840.1.113883.10.20.22.2.5.1)	IHTSDO SNOMED CT® International Release July 2012 and US Extension to SNOMED CT® March 2012 Release
Reason for Hospitalization; Reason for Visit	**Chief Complaint**	Chief Complaint (1.3.6.1.4.1.19376.1.5.3.1.1.13.2.1)	
	Chief Complaint and Reason for Visit	Chief Complaint and Reason for Visit (2.16.840.1.113883.10.20.22.2.13)	
	Reason for Visit	Reason for Visit (2.16.840.1.113883.10.20.22.2.12)	
	Encounters	Encounters (entries required: 2.16.840.1.113883.10.20.22.2.22.1)	
	Hospital Admission Diagnosis	Hospital Admission Diagnosis (2.16.840.1.113883.10.20.22.2.43)	
	Preoperative Diagnosis	Preoperative Diagnosis (2.16.840.1.113883.10.20.22.2.35)	

Procedures	**Procedures (entries required)**	Procedures (entries required: 2.16.840.1.113883.10.20.22.2.7.1)	SNOMED-CT or CPT/HCPCS; ICD-10-PCS and CDT are "optional", meaning they have to certify use of SNOMED CT or CPT/HCPCS as well
Clinical Instructions; Recommended Patient Decision Aids	**Instructions**	Instructions (2.16.840.1.113883.10.20.22.2.45)	
Immunizations; Immunizations Administered during the Visit	**Immunizations (entries required)**	Immunizations (entries required: 2.16.840.1.113883.10.20.22.2.2.1)	HL7 Standard Code Set CVX -- Vaccines Administered, updates through July11, 2012
Vital signs (height, weight, BP, BMI)	**Vital Signs**	Vital Signs (entries optional: 2.16.840.1.113883.10.20.22.2.4 or entries required: 2.16.840.1.113883.10.20.22.2.4.1)	
Laboratory Value(s)/Result(s)	**Results**	Results (entries required: 2.16.840.1.113883.10.20.22.2.3.1)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced
Care plan field(s), including goals and instructions	**Assessment and Plan**	Assessment and Plan (2.16.840.1.113883.10.20.22.2.9)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
	Plan of Care	Plan of Care (2.16.840.1.113883.10.20.22.2.10)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
Laboratory Test(s)	Plan of Care Activity Observation	Plan of Care Activity Observation (2.16.840.1.113883.10.20.22.4.44)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
Diagostic Test(s) Pending; Future Scheduled Test(s)			
Future Scheduled Appointments; Referrals to Other Providers	Plan of Care Activity Encounter	Assessment and Plan (2.16.840.1.113883.10.20.22.2.9)	Logical Observation Identifiers Names and Codes (LOINC®) Database version 2.40, a universal code system for identifying laboratory and clinical observations produced by the Regenstrief Institute, Inc.
	Plan of Care Activity Act		
Smoking Status	Smoking Status Observation	Smoking Status Observation (2.16.840.1.113883.10.22.4.78)	Smoking status must be coded in one of the following SNOMEDCT® codes: (1) Current every day smoker. 449868002 (2) Current some day smoker. 428041000124106 (3) Former smoker. 8517006 (4) Never smoker. 266919005 (5) Smoker, current status unknown. 77176002 (6) Unknown if ever smoked. 266927001 (7) Heavy tobacco smoker. 428071000124103 (8) Light tobacco smoker. 428061000124105