

Consuming a BC CDA at Level One

How to find and extract essential elements

Table of Contents

Introduction	4
General Formatting	4
Names	4
Dates	4
IDs.....	4
Essential Header Elements.....	5
Template ID.....	5
Document ID	5
LOINC Code (Report Type)	6
Title.....	6
Effective Date/Time	6
Fixed Header Elements.....	6
Confidentiality	6
Language	6
Header Structures	7
Patient	7
Patient IDs	7
Patient Address	7
Patient Name.....	7
Patient Demographics.....	7
Example Patient XML	8
Author	8
Authoring Time.....	8
Authoring Provider	8
Authoring Device ID	9
Authoring Software	9
Example Author XML.....	9
Custodian	9
Facility ID	10
Facility ID OID	10
Custodian Name	10
Example Custodian XML.....	10
Information Recipient	10
Primary Recipient.....	10

Secondary Recipients	11
Example Information Recipient XML.....	11
Recipient Locations	11
Participating Providers	11
Ordering Provider.....	11
Example Ordering Provider XML.....	12
Family Provider.....	12
Order	12
Order ID.....	12
Order Status Code	13
Example Order XML.....	13
Service Event	13
Status Code	13
Observation Date	13
Procedure Name	13
Procedure Performer	13
Example Service Event XML	14
Related Document	14
Parent Document ID.....	14
Example Related Document XML.....	14
Encompassing Encounter	14
Patient Encounter ID	15
Admission / Discharge Date	15
Discharge Disposition	15
Participating Providers	15
Encounter Location / Facility.....	16
Facility ID	16
Location Code.....	16
Example Encompassing Encounter XML	17
Level 1 Text Body	17
Level 3 Text Body	18

Introduction

A level one CDA is a plain text report with a discrete header. Almost all of the effort involved in consuming a level one CDA is in consuming the header. This document will focus on the discrete elements found in a typical level one BC CDA report. These are common BC CDA header objects that should be extracted and displayed in the receiving EMR.

For those EMRs that are already consuming HL7 v2, this document will also supply the equivalent IHA POI HL7 v2 field to ease transition to the new XML format.

General Formatting

Names

Names are complex objects, with multiple parts. They usually have at least a family and one or more given names, and provider names will often have a prefix (like Dr). There are other name parts available, but these are the most common.

Extracting the last name is straightforward, but there are often multiple given names, so it is safest to assume that there will be multiple given names and loop through them.

```
<name use="L">
  <prefix>Dr.</prefix>
  <family>Franklin</family>
  <given>Rosalind</given>
  <given>Elise</given>
</name>
```

Dates

Dates are in the format `YYYYMMDDhhmm±ZZzz` where the `±ZZzz` represents the time-zone expressed as offset from UTC. In British Columbia, this offset will be `-0600` (Mountain Daylight Time), `-0700` (Pacific Daylight Savings Time, Creston, and Mountain Standard Time), or `-0800` (Pacific Standard Time). The following example is October 5th, 2017, 9:27 AM PDT.

```
<effectiveTime value="201710050927-0700" />
```

The `effectiveTime` structure has two possible formats. The format above is used if there is only a single date. If a date range is needed (for example, admit and discharge times), then there will be two child elements, `"low"` and `"high"`, each with a date value. The low value is the start date, the high value is the end date.

```
<effectiveTime>
  <low value="201710111424-0700" />
  <high value="201710112359-0700" />
</effectiveTime>
```

IDs

IDs always include a `"root"` and an `"extension"`, and often they will have an `"assigning authority name"`. The extension holds the ID that you're looking for, while the root tells you what identifier this is. For instance, a patient's BC Provincial Healthcare Number will have a root of `2.16.840.1.113883.4.50` and a physician's BC MSP license has a root of `2.16.840.1.113883.3.40.2.11`. So when looking for a specific ID, you don't have to hope that it is always the third ID listed, you can use the root to specify the exact ID that you're looking for. The assigning authority name, if present, holds the human-readable name of the root, a textual `"namespace"` of the ID. It is always good practice to include the `assigningAuthorityName` for every ID, to assist developers. If this attribute is present, developers can use the `assigningAuthorityName` to familiarise themselves with the various root OIDs used in a CDA.

```
<id root="2.16.840.1.113883.4.50" extension="9878424368" assigningAuthorityName="BC Patient Health Number" />
```

Essential Header Elements

The CDA has several important, basic elements that are found at the root level.

Template ID

The “template” of the CDA is the type of CDA being sent. For CDA level 1, there is almost no difference between the templates; this ID is mainly used for categorizing the document in the EMR. The assigningAuthorityName is used in this element to provide a human-readable template name.

Template ID **OID** XPath: /ClinicalDocument/templateId/@root

Template ID **Text** XPath (if not present, use Title instead): /ClinicalDocument/templateId/@assigningAuthorityName

Template ID XML:

```
<templateId root="2.16.840.1.113883.3.51.60.2.3" assigningAuthorityName="Procedure Note template" />
```

Here is a list of CDX templates. In order to pass conformance profile 1, an EMR must be able to consume all of the level 1 CDA templates and display the narrative text of a level 3 document (see *note below).

Name	OID	POI Type	
		MSH.3	MSH.5
Unstructured Report	2.16.840.1.113883.10.20.19	IHAOE	ITS
Consultation Note	2.16.840.1.113883.10.20.4	IHAOE	ITS
Discharge Summary	2.16.840.1.113883.3.51.60.2.4	IHAOE	ITS
History and Physical Note	2.16.840.1.113883.10.20.2	IHAOE	ITS
Operative Note	2.16.840.1.113883.10.20.7	IHAOE	ITS
Procedure Note	2.16.840.1.113883.3.51.60.2.3	IHAOE	ITS
Progress Note	2.16.840.1.113883.10.20.21	IHAOE	ITS
Anatomic Pathology Report	2.16.840.1.113883.3.51.60.2.2	IHALAB	PTH
Lab Report*	2.16.840.1.113883.3.51.60.2.1	IHALAB	LAB,MIC,BBK
e2e Unstructured Referral	2.16.840.1.113883.3.1818.10.1.5	(e2e)	
e2e Unstructured Document	2.16.840.1.113883.3.1818.10.1.4	(e2e)	
e2e Generic Episodic Document	2.16.840.1.113883.3.1818.10.1.2	(PITO e2e)	
e2e Patient Chart Transfer*	2.16.840.1.113883.3.1818.10.1.3	(PITO e2e)	
e2e EMR Conversion Template*	2.16.840.1.113883.3.1818.10.1.1	(PITO e2e)	
Admit Notification	2.16.840.1.113883.3.51.60.2.7	(ADT)	
Discharge Notification	2.16.840.1.113883.3.51.60.2.6	(ADT)	

*These templates are CDA Level 3, with discrete body elements (sections & entries).

Document ID

The Document ID is the unique ID that identifies this CDA document. It will always be a GUID. This is the ID used to query the delivery status of a document in the CDX system, and it is generated by the authoring system. An area of confusion in the CDX system is the second identifier used to retrieve a document from CDX. This is the “Message ID”, and it is even more unique than the Document ID. Because a single document can be distributed to multiple recipients, there is a Message ID for each document-recipient combination. The Message ID is an internal CDX ID, and it doesn’t need to be retained by the EMR after the document has been retrieved from CDX.

XPath: /ClinicalDocument/id[@root='2.16.840.1.113883.3.277.100.3']/@extension

Document ID XML:

```
<id root="2.16.840.1.113883.3.277.100.3" extension="11f5f3e4-aeae-4507-8ceb-ede4afb21234" assigningAuthorityName="CDX Clinical Document ID" />
```

LOINC Code (Report Type)

The LOINC Code is the primary document classifier. The Template ID can be used to get a rough classification, but the LOINC Code provides a specific, standard document type. This code can be used to reliably categorize documents within an EMR system. The standard name associated with the code will usually be provided in the `displayName` attribute. This display name is also usually used for the Title (see below).

The LOINC Code document classification system is sometimes referred to as the “Document Ontology.”

POI HL7 field: `OBR.4.4`

XPath: `/ClinicalDocument/ code[@codeSystem='2.16.840.1.113883.6.1']/@code`

LOINC Code XML:

```
<code codeSystem="2.16.840.1.113883.6.1" code="34117-2" codeSystemName="LOINC Code" displayName="History & Physical Note" />
```

Title

The document title is usually the same as the `displayName` attribute of the LOINC code element.

POI HL7 field: `OBR.4.5` or `OBR.4.2`

XPath: `/ClinicalDocument/title`

XML: `<title>History & Physical Note</title>`

Effective Date/Time

This is the date and time when the **document was created**. This is **NOT** the date when the patient was seen, or the procedure or test was performed. Those dates are found elsewhere in the header.

POI HL7 field: `MSH.7`

XPath: `/ClinicalDocument/effectiveTime/@value`

XML: `<effectiveTime value="201705171655-0700" />`

Fixed Header Elements

Some useful-looking header elements are always the same value, and so are not actually useful to the consumer.

Confidentiality

According to the BC CDA implementation guide, this is required but unused. If present it will always be set to “N” for “Normal”. For this reason it isn’t a useful element to extract.

Language

According to the BC CDA implementation guide, this is required but unused. If present it will always be set to “en-CA” for “English”. For this reason it isn’t a useful element to extract.

Header Structures

Most header elements are nested inside structures of related information.

Patient

Patient IDs

Patients can have several IDs included in the CDA. The most important ID is the Provincial Healthcare Number (PHN), because this ID remains the same across multiple systems. Other patient IDs can be useful when communicating between clinics with the same EMR, or responding to a document from a source system like Meditech that needs IDs from its own system.

PHN XPath: `/ClinicalDocument/recordTarget/patientRole/id[@root='2.16.840.1.113883.4.50']/@extension`

PHN POI HL7 field: PID.4, PID.19

Patient Address

The patient address in the BC CDA has, admittedly, a strange structure. The street address lines are in the root <addr> element, and each line is terminated by a <delimiter /> element. The city, province and postal code are all in child elements, as expected, but not the street address. There may also be a leading carriage return on the first street address line coming from Meditech; this should be removed with a trim function.

The province is in ISO 3166-2 format, meaning that “BC” is represented as “CA-BC”.

street address 1 XPath: `/ClinicalDocument/recordTarget/patientRole/addr/text()[1]`

street address 2 XPath: `/ClinicalDocument/recordTarget/patientRole/addr/text()[2]`

street address POI HL7 field: PID.11.1, PID.11.2

city XPath: `/ClinicalDocument/recordTarget/patientRole/addr/city`

city POI HL7 field: PID.11.3

province XPath: `/ClinicalDocument/recordTarget/patientRole/addr/state`

province POI HL7 field: PID.11.4

postal code XPath: `/ClinicalDocument/recordTarget/patientRole/addr/postalCode`

postal code POI HL7 field: PID.11.5

Patient Name

See the “Names” section in the “General Formatting” above.

XPath to last name: `/ClinicalDocument/recordTarget/patientRole/patient/name/family`

Patient Demographics

XPath to Date of Birth: `/ClinicalDocument/recordTarget/patientRole/patient`

XPath to gender: `/ClinicalDocument/recordTarget/patientRole/patient`

Example Patient XML

```
<!-- ===== Patient Information ===== -->
<recordTarget typeCode="RCT" contextControlCode="OP">
  <patientRole classCode="PAT">
    <id root="2.16.840.1.113883.4.50" extension="9878424368" assigningAuthorityName="BC Patient Health Number"
  />
    <id root="2.16.840.1.113883.3.277.1.74" extension="A0-B20170111142938809" assigningAuthorityName="IHA
Internal Patient ID" />
    <id root="2.16.840.1.113883.3.277.1.71" extension="KG00665649" assigningAuthorityName="IHA Patient Unit
Number" />
    <id root="2.16.840.1.113883.3.277.1.72" extension="KG0818222/17" assigningAuthorityName="IHA Patient
Account Number" />
    <addr use="H">
      Box 123<delimiter />699 East Broadway<delimiter />
        <city>Kamloops</city>
        <state>CA-BC</state>
        <postalCode>V2B 0E9</postalCode>
      </addr>
      <telecom use="H" value="tel:250-872-2211" />
      <patient classCode="PSN" determinerCode="INSTANCE">
        <name use="L">
          <family>Cdxtwokgh</family>
          <given>Chad</given>
          <given>Cdx Only</given>
        </name>
        <administrativeGenderCode code="M" />
        <birthTime value="20050429" />
      </patient>
    </patientRole>
  </recordTarget>
```

Author

There are generally one or two author structures, the human author and the authoring device. The human author is structured like other providers, and is normally the ordering provider (except in the case of consults created in response to a referral) and sender of the document. Lab reports will often not have a human author (they are often created by analysis machines). The authoring device will have an ID which is usually the original HL7 v2 message ID and a software ID, which, for IHA, is a combination of the Meditech interface code and the facility code.

Authoring Time

Both author structures will have a datetime, which is the time that the document was authored, not when it was sent. In the case of a dictated report, this will be the dictation time. In the case of a lab, this is the specimen collection time. The time element is the same for both author structures, so it doesn't matter which one is used.

POI HL7 field: OBR.7

XPath: /ClinicalDocument/author/time/@value

XML: <time value="201710110930-0700" />

Authoring Provider

See "Names" under "General Formatting" for extracting the provider names.

POI HL7 field: OBR.16

XPath: /ClinicalDocument/author/assignedAuthor

XPath for BC MSP ID:

/ClinicalDocument/author/assignedAuthor/id[@root='2.16.840.1.113883.3.40.2.11']/@extension

XPath for Last Name (OBR.16.2):

/ClinicalDocument/author/assignedAuthor/assignedPerson/name/family

Authoring Device ID

This is usually the original HL7 v2 message ID. The different health authorities will use different ID types.

POI HL7 field: MSH.10

XPath for **IHA**: /ClinicalDocument/author/assignedAuthor/id[@root='2.16.840.1.113883.3.277.1.81']/@extension

XPath for **NHA**: /ClinicalDocument/author/assignedAuthor/id[@root='2.16.840.1.113883.3.523.1.22']/@extension

XML: <id assigningAuthorityName="NHA Message Number" extension="Q607321631T1024379362" root="2.16.840.1.113883.3.523.1.22" />

Authoring Software

This is usually the original HL7 v2 message ID. The different health authorities will use different ID types.

POI HL7 field: OBR.24, MSH.3

XPath for **IHA**:

/ClinicalDocument/author/assignedAuthor/assignedAuthoringDevice/softwareName[@codeSystem='2.16.840.1.113883.3.277.1.12']/@code

XPath for **NHA**:

/ClinicalDocument/author/assignedAuthor/assignedAuthoringDevice/softwareName[@codeSystem='2.16.840.1.113883.3.523.1.63']/@code

XML: <softwareName code="OE_IHKGH" codeSystem="2.16.840.1.113883.3.277.1.12" codeSystemName="IHA Software Code" displayName="Interior Health Meditech" />

Example Author XML

```
<!-- ===== Author: Person and/or software that created this document ===== -->
<author typeCode="AUT" contextControlCode="OP">
  <time value="201710110930-0700" />
  <assignedAuthor classCode="ASSIGNED">
    <id root="2.16.840.1.113883.3.40.2.11" extension="93199" assigningAuthorityName="BC MSP Provider License Number" />
    <id root="2.16.840.1.113883.3.277.1.61" extension="MCAH3" assigningAuthorityName="IHA Provider Code: IHA-MT PVD-ID" />
    <assignedPerson classCode="PSN" determinerCode="INSTANCE">
      <name use="L">
        <family>McArthur</family>
        <given>Heather</given>
      </name>
    </assignedPerson>
  </assignedAuthor>
</author>
<author typeCode="AUT" contextControlCode="OP">
  <time value="201710110930-0700" />
  <assignedAuthor classCode="ASSIGNED">
    <id root="2.16.840.1.113883.3.277.1.81" extension="456914965" assigningAuthorityName="IHA Message Number" />
    <assignedAuthoringDevice classCode="DEV" determinerCode="INSTANCE">
      <softwareName code="OE_IHKGH" codeSystem="2.16.840.1.113883.3.277.1.12" codeSystemName="IHA Software Code" displayName="Interior Health Meditech" />
    </assignedAuthoringDevice>
  </assignedAuthor>
</author>
```

Custodian

The custodian of a document is the organization that has responsibility for it. In CDX, this is typically used to designate the health authority or EMR vendor, and the specific hospital or clinic, which produced the document. The id.root attribute is specific to the organization, and the id.extension attribute is the specific facility or clinic that produced the document. Sometimes an EMR vendor may use the CDX Clinic ID OID, and then place the clinic ID into the extension.

Facility ID

POI HL7 field: MSH.4

XPath: /ClinicalDocument/custodian/assignedCustodian/representedCustodianOrganization/id/@extension

XML:

```
<id root="2.16.840.1.113883.3.277.1.62" extension="IHKGH" assigningAuthorityName="IHA Meditech Location Identifier" />
```

Facility ID OID

This OID can be useful to determine who to contact when there are problems with a document.

Here are some example facility OIDs.

Organization Facility ID	OID
Interior Health Authority Facility	2.16.840.1.113883.3.277.1.62
Northern Health Authority Facility	2.16.840.1.113883.3.523.1.64
CDX Clinic ID	2.16.840.1.113883.3.277.100.2

XPath: /ClinicalDocument/custodian/assignedCustodian/representedCustodianOrganization/id/@root

Custodian Name

XPath to name (may not be populated in E2E documents):

/ClinicalDocument/custodian/assignedCustodian/representedCustodianOrganization/name

Example Custodian XML

```
<!-- ===== Custodian: organization responsible for this document ===== -->
<custodian typeCode="CST">
  <assignedCustodian classCode="ASSIGNED">
    <representedCustodianOrganization classCode="ORG" determinerCode="INSTANCE">
      <id root="2.16.840.1.113883.3.277.1.62" extension="IHKGH" assigningAuthorityName="IHA Meditech Location Identifier" />
      <name>Interior Health Authority</name>
    </representedCustodianOrganization>
  </assignedCustodian>
</custodian>
```

Information Recipient

An EMR can use the information recipients to determine the correct inbox for an incoming document when the patient isn't recognized, or if the patient has been seen by multiple providers. There will always be a primary recipient, and there may be one or more secondary recipients. Because there will most likely be multiple secondary recipients, it is important to loop through all of them.

See "Names" under "General Formatting" for extracting the provider names.

Primary Recipient

POI HL7 field: OBR.16 / ZDR.2

XPath to **primary** recipient: /ClinicalDocument/informationRecipient[@typeCode='PRCP']/intendedRecipient

XPath to **BC MSP ID**:

/ClinicalDocument/informationRecipient[@typeCode='PRCP']/intendedRecipient/id[@root='2.16.840.1.113883.3.40.2.11']/@extension

XPath to **Meditech ID** (POI OBR.16.1 / ZDR.2.1):

/ClinicalDocument/informationRecipient[@typeCode='PRCP']/intendedRecipient/id[@root='2.16.840.1.113883.3.277.1.61']/@extension

Secondary Recipients

XPath to **first secondary** recipients' BC MSP ID:

```
/ClinicalDocument/informationRecipient[@typeCode='IRC'][1]/intendedRecipient/id[@root='2.16.840.1.113883.3.40.2.11']/@extension
```

XPath to **second secondary** recipient's **last name**:

```
/ClinicalDocument/informationRecipient[@typeCode='IRC'][2]/intendedRecipient/informationRecipient/name/family
```

Example Information Recipient XML

```
<!-- ===== Information Recipients: Providers who have requested a copy of this document ===== -->
<informationRecipient typeCode="PRCP">
  <intendedRecipient classCode="ASSIGNED">
    <id root="2.16.840.1.113883.3.40.2.11" extension="93195" assigningAuthorityName="BC MSP Provider License Number" />
    <id root="2.16.840.1.113883.3.277.1.61" extension="PLISIH0" assigningAuthorityName="IHA Provider Code: IHA-MT PVD-ID" />
    <informationRecipient classCode="PSN" determinerCode="INSTANCE">
      <name use="L">
        <prefix>Dr</prefix>
        <family>Plisihh</family>
        <given>Homer</given>
      </name>
    </informationRecipient>
  </intendedRecipient>
</informationRecipient>
```

Recipient Locations

The recipient location may also be included. E2E documents (clinic to clinic) usually include the destination location as well as the recipient provider. It is also possible to have no recipient provider, only a recipient location. The location is contained in a receivedOrganization element, and it is a peer to the informationRecipient element that contains the associated recipient provider.

XPath to recipient locations: /ClinicalDocument/informationRecipient/intendedRecipient/**receivedOrganization**

XPath to **primary** recipient location:

```
/ClinicalDocument/informationRecipient[@typeCode='PRCP']/intendedRecipient/receivedOrganization
```

```
<informationRecipient typeCode="PRCP">
  <intendedRecipient classCode="ASSIGNED">
    <!-- (recipient provider would be here) -->
    <!-- Recipient organization: -->
    <receivedOrganization>
      <id root="2.16.840.1.113883.3.277.100.2" extension="cdxtest-jtp" assigningAuthorityName="CDX Clinic Registry ID" />
      <name>Jays testing place</name>
    </receivedOrganization>
  </intendedRecipient>
</informationRecipient>
```

Participating Providers

There is often a great deal of overlap between participating providers and recipients, since the family provider (primary care provider) and ordering provider are often also recipients. The ordering provider is especially useful for referral scenarios, because the ordering provider is the person making the referral, and any responses to the referral (like a consult note or other report) are sent back to the ordering provider.

XPath for provider type name: /ClinicalDocument/participant/functionCode/@displayName

Ordering Provider

POI HL7 fields: OBR.16, ZDR.2, PV1.7, ORC.12

XPath for **Ordering Provider**:

/ClinicalDocument/participant[**FunctionCode/@code='ORD'**]/associatedEntity

XPath for **BC MSP ID**:

/ClinicalDocument/participant[functionCode/@code='ORD']/associatedEntity/**id[@root='2.16.840.1.113883.3.40.2.11']/@extension**

XPath for **Last Name** (OBR.16.2):

/ClinicalDocument/participant[functionCode/@code='ORD']/associatedEntity/associatedPerson/name/**family**

Example Ordering Provider XML

```
<!-- ==== Ordering Physician ==== -->
<participant typeCode="REF" contextControlCode="OP">
  <functionCode code="ORD" displayName="Ordering Provider" />
  <associatedEntity classCode="PROV">
    <id root="2.16.840.1.113883.3.40.2.11" extension="93199" assigningAuthorityName="BC MSP Provider License Number" />
    <id root="2.16.840.1.113883.3.277.1.61" extension="MCAH3" assigningAuthorityName="IHA Provider Code: IHA-MT PVD-ID" />
    <associatedPerson classCode="PSN" determinerCode="INSTANCE">
      <name use="L">
        <family>McArthur</family>
        <given>Heather</given>
      </name>
    </associatedPerson>
  </associatedEntity>
</participant>
```

Family Provider

POI HL7 fields: ZDR.4, OBR.28

XPath for **Family Provider**:

/ClinicalDocument/participant[**FunctionCode/@code='PCP'**]/associatedEntity

XPath for **BC MSP ID**:

/ClinicalDocument/participant[functionCode/@code='PCP']/associatedEntity/**id[@root='2.16.840.1.113883.3.40.2.11']/@extension**

XPath for Family Provider's **Last Name** (ZDR.4.2):

/ClinicalDocument/participant[functionCode/@code='PCP']/associatedEntity/associatedPerson/name/**family**

XML has the same structure as the Ordering Provider, above, except for the functionCode, which is set to "PCP" instead of "ORD".

Order

The Order is very important for connecting versions of a document together. When the Order ID is the same as a previously received document, it means that the document is probably a modification of the previous document. If this matches a previously received document, check the status code in the Service Event to see if the document is an addendum or correction.

The Order is also very important for referrals and consultations. The consultation note generated in response to a referral will have the referral's document ID in the Order ID field. This allows the EMR to match the consultation to the associated referral and "close the loop".

Order ID

POI HL7 field: OBR.2

XPath: /ClinicalDocument/inFulfillmentOf/order/id/**@extension**

XML: <id root="2.16.840.1.113883.3.277.1.22" extension="RAD20170227-0005IHRIH" assigningAuthorityName="IHA Order Number (Requisition Number)" />

Order Status Code

This field combines the HL7 v2 concepts of “Order Control” (OBR.1), “Order Status” (OBR.5) and “Response Flag” (OBR.6) together. It combines them with colons as separators: Order Control[:Order Status][:Response Flag]

POI HL7 field: OBR.1 (OBR.5, OBR.6)

XPath: /ClinicalDocument/inFulfillmentOf/order/statusCode/@code

XML: <code code="NW" codeSystemName="Order Status (Order Control[:Order Status][:Response Flag])" />

Example Order XML

```
<!-- ==== Order information ==== -->
<inFulfillmentOf typeCode="FLFS">
  <order classCode="ENC" moodCode="RQO">
    <id root="2.16.840.1.113883.3.277.1.22" extension="RAD20170227-0005IHRIH" assigningAuthorityName="IHA Order Number (Requisition Number)" />
    <code code="NW" codeSystemName="Order Status (Order Control[:Order Status][:Response Flag])" />
  </order>
</inFulfillmentOf>
```

Service Event

The Service Event has much of the information found in the OBR segment in HL7 v2 messages. It is important for several reasons. It most importantly contains the **status code** for reports, a flag for corrected or amended reports. The service event also has the important “Observation Date”, the date found in OBR.7 in POI messages. The service event also sometimes contains information about the procedure performed. Diagnostic imaging reports will have the code associated with the study performed (a combination of OBR.4.1 and OBR.4.2 in POI).

Status Code

If the status code is not “completed” or “signed”, the report is a version of another report, and it should be matched to the previous version using patient info, effective date, and order ID. The status code has its own custom namespace, which makes it more complicated to extract. The namespace for the rest of the CDA is “urn:h17-org:v3”, but the namespace for the status code is “urn:bccda”. This will probably require some namespace management.

POI HL7 field: OBR.25

XPath: /ClinicalDocument/documentationOf/serviceEvent/bccda:statusCode/@code

XML: <bccda:statusCode code="signed" />

Observation Date

This is the procedure date, or the test date. In a discharge summary this field will contain the discharge date.

POI HL7 field: OBR.7

XPath: /ClinicalDocument/documentationOf/serviceEvent/bccda:statusCode/@code

XML: <effectiveTime value="201702270848-0800" />

Procedure Name

XPath for procedure name: /ClinicalDocument/documentationOf/serviceEvent/code/@displayName

Procedure Performer

XPath for procedure performer last name:

/ClinicalDocument/documentationOf/serviceEvent/performer/assignedEntity/assignedPerson/name/Family

Example Service Event XML

```
<!-- ===== Service Event: Procedure ===== -->
<documentationOf typeCode="DOC">
  <serviceEvent classCode="ACT" moodCode="EVN">
    <code code="RAD:ELBL" displayName="ELBOW LT" codeSystemName="Meditech RAD Procedure Code" />
    <!-- Observation Date (OBR.7) -->
    <effectiveTime value="201702270848-0800" />
    <performer typeCode="PPRF">
      <assignedEntity classCode="ASSIGNED">
        <id root="2.16.840.1.113883.3.40.2.11" extension="93195" assigningAuthorityName="BC MSP Provider License Number" />
        <id root="2.16.840.1.113883.3.277.1.61" extension="PLISIH0" assigningAuthorityName="IHA Provider Code: IHA-MT PVD-ID" />
        <assignedPerson classCode="PSN" determinerCode="INSTANCE">
          <name use="L">
            <prefix>Dr</prefix>
            <family>Plisim</family>
            <given>Homer</given>
          </name>
        </assignedPerson>
      </assignedEntity>
    </performer>
    <bccda:statusCode code="signed" />
  </serviceEvent>
</documentationOf>
```

Related Document

In the BC CDA, the related document is used for two purposes, to identify the source of the CDA (most likely an HL7 v2 message), or to identify a previous version of a document, which the current document is replacing. The first use will have the typeCode "XFRM", which says that this CDA was **transformed** from the related document. The second use will have the typeCode "RPLC", which says that this CDA **replaces** the related document.

Because the source systems of Interior Health and Northern Health are limited in their ability to identify previous versions of a document, IHA and NHA only ever use the Related Document structure to identify the source HL7 v2 message. Because of this, the typeCode will always be set to "XFRM", and the Parent Document ID will contain the Message Control ID of the source HL7 v2 message (This usually ends up being the same as the authoring device id). Within the context of clinic-to-clinic bidirectional document exchange, however, this may have more flexibility.

Parent Document ID

POI HL7 field: MSH.10

XPath: /ClinicalDocument/relatedDocument/parentDocument/id/@extension

XML: <id root="2.16.840.1.113883.3.277.1.81" extension="ITS123456789" assigningAuthorityName="IHA Message Number" />

Example Related Document XML

```
<!-- ===== Parent Document: HL7 v2 message from Meditech ===== -->
<relatedDocument typeCode="XFRM">
  <parentDocument classCode="DOCCLIN" moodCode="EVN">
    <id root="2.16.840.1.113883.3.277.1.81" extension="ITS123456789" assigningAuthorityName="IHA Message Number" />
  </parentDocument>
</relatedDocument>
```

Encompassing Encounter

The Encompassing Encounter is the CDA equivalent of the PV1 segment. This is where you'll find the patient's encounter ID (Account Number in Meditech), the facility where the encounter took place, the admission and (possibly) discharge dates, the discharge disposition, and the provider(s) that participated in the encounter.

Patient Encounter ID

POI HL7 fields: Admit PV1.44, Discharge PV1.45

XPath: /ClinicalDocument/componentOf/encompassingEncounter/id/@extension

XML:
<id root="2.16.840.1.113883.3.277.1.72" extension="KA0108436/17" assigningAuthorityName="IHA Patient Account Number" />

Admission / Discharge Date

There's an added layer of complexity here, since these dates have two possible structures. If there's only an admission date, then the effectiveTime element will just have a value that holds the date. If there's both an admission and discharge date, there will be a structure with low (admission) and high (discharge) values.

POI HL7 fields: Admit PV1.44, Discharge PV1.45

XPath for **admission date only**: /ClinicalDocument/componentOf/encompassingEncounter/effectiveTime/@value

XML for **admission date only**: <effectiveTime value="201710121320-0700" />

XPath for **admission date**: /ClinicalDocument/componentOf/encompassingEncounter/effectiveTime/low/@value

XPath for **discharge date**: /ClinicalDocument/componentOf/encompassingEncounter/effectiveTime/high/@value

XML for **admission and discharge dates**:

```
<effectiveTime>
  <low value="201710111424-0700" />
  <high value="201710112359-0700" />
</effectiveTime>
```

Discharge Disposition

The Discharge Disposition element will be present if known, especially in Discharge Summaries.

HL7 field: PV1.36

XPath: /ClinicalDocument/componentOf/encompassingEncounter/dischargeDispositionCode/@code

XML:
<dischargeDispositionCode code="306689006" codeSystem="2.16.840.1.113883.6.96" codeSystemName="snomed-CT" displayName="Discharge to home" />

Participating Providers

There are several possible participating providers that can appear here. The role of the provider is set by the typeCode of the encounterParticipant.

typeCode	Provider Type	HL7 v2 Field	Description
ADM	admitter	PV1.17, ZDR.1	The provider who is responsible for admitting a patient to a patient encounter.
ATND	attender	PV1.7, ZDR.2	The primary provider that has responsibility for overseeing a patient's care during a patient encounter.
CON	consultant	PV1.9	An advising provider participating in the encounter by performing evaluations and making recommendations.
REF	referrer	PV1.8, OBR.28, ZDR.3	The provider that referred the patient for services resulting in the encounter. The referrer should technically be the same as the ordering provider, because a referral is an order.

The participating providers have the same structure as other providers. Here are some example XPath statements:

XPath for **Admitting Provider**:

/ClinicalDocument/componentOf/encompassingEncounter/encounterParticipant[typeCode/@code='ADM']/assignedEntity

XPath for **Attending Provider's BC MSP ID**:

```
/ClinicalDocument/componentOf/encompassingEncounter/encounterParticipant[typeCode/@code='ATND']/assignedEntity/id[@root='2.16.840.1.113883.3.40.2.11']/@extension
```

XPath for **Consulting Provider's Last Name**:

```
/ClinicalDocument/componentOf/encompassingEncounter/encounterParticipant[typeCode/@code='CON']/assignedEntity/name/family
```

Encounter Location / Facility

There are two relevant elements in this structure, the Facility ID and Location Code. The Location Code is used by both IHA and NHA to send details about the patient's specific location; the patient type, unit code, room number, and bed number are placed into this element, separated by colons.

Facility ID

POI HL7 field: PV1.39

XPath: /ClinicalDocument/componentOf/encompassingEncounter/location/healthCareFacility/id/@extension

XML: <id root="2.16.840.1.113883.3.277.1.62" extension="IHKLH" assigningAuthorityName="IHA Meditech Location Identifier" />

Location Code

POI HL7 field: PV1.18, PV1.3

XPath: /ClinicalDocument/componentOf/encompassingEncounter/location/healthCareFacility/code/@code

XML: <code code="IN:NELKLHOBS:KLH201:1" codeSystemName="Patient Type:Unit:Room:Bed" />

Example Encompassing Encounter XML

```
<!-- ===== Encompassing Encounter: Patient Visit ===== -->
<componentOf typeCode="COMP">
  <!--Patient Account Number (PID_18)-->
  <encompassingEncounter classCode="ENC" moodCode="EVN">
    <id root="2.16.840.1.113883.3.277.1.72" extension="KA0108436/17" assigningAuthorityName="IHA Patient
Account Number" />
    <!--Encounter has an admission date (low) and discharge date (high)-->
    <effectiveTime>
      <low value="201710111424-0700" />
      <high value="201710112359-0700" />
    </effectiveTime>
    <dischargeDispositionCode code="306689006" codeSystem="2.16.840.1.113883.6.96" codeSystemName="snomed-
CT" displayName="Discharge to home" />
    <!--Admitting Provider (PV1_17)-->
    <encounterParticipant typeCode="ADM">
      <assignedEntity classCode="ASSIGNED">
        <id root="2.16.840.1.113883.3.40.2.11" extension="93195" assigningAuthorityName="BC MSP Provider
License Number" />
        <id root="2.16.840.1.113883.3.277.1.61" extension="PLISIH0" assigningAuthorityName="IHA Provider
Code: IHA-MT PVD-ID" />
        <assignedPerson classCode="PSN" determinerCode="INSTANCE">
          <name use="L">
            <prefix>Dr</prefix>
            <family>Plisihh</family>
            <given>Homer</given>
          </name>
        </assignedPerson>
      </assignedEntity>
    </encounterParticipant>
    ...
    <location>
      <healthCareFacility classCode="SDLOC">
        <id root="2.16.840.1.113883.3.277.1.62" extension="IHKLH" assigningAuthorityName="IHA Meditech
Location Identifier" />
        <!--code represents the patient location, in the form "Pt.Type:Unit[:Room[:Bed]]"-->
        <code code="IN:NELKLHOB5:KLH201:1" codeSystemName="Patient Type:Unit:Room:Bed" />
      </healthCareFacility>
    </location>
  </encompassingEncounter>
</componentOf>
```

Level 1 Text Body

A level 1 CDA has only one more structure other than the header, the “Non-XML” unformatted text body. Note that this text body may contain UTF-8 characters.

POI HL7 field: OBX.5

XPath: /ClinicalDocument/component/nonXMLBody/text

XML:

```
<component typeCode="COMP">
  <nonXMLBody classCode="DOCBODY" moodCode="EVN">
    <text mediaType="text/plain" representation="TXT">-----
--      TEXT REPORT EXAMPLE      --
-----
The text might be hundreds of lines long.
UTF-8 TESTING: φ μ ¼ ½ ¾ ° ±
    </text>
  </nonXMLBody>
</component>
```

Level 1 Attachment Body

An unstructured level 1 CDA may not have a text body. It might have an attachment body instead. This attachment is usually a PDF, but it might be a JPG, RTF, TIFF or other binary format. There should only be one file attached. The body of the CDA will only have a **reference element** in the text element. This reference element might have a file name, URL, or a SHA-1 hash of the document.

XPath:

File hash: /ClinicalDocument/component/nonXMLBody/text/reference/@value

XML:

```
<component typeCode="COMP">
  <nonXMLBody classCode="DOCBODY" moodCode="EVN">
    <text mediaType="text/plain" representation="TXT">
      <reference value="hash:cfa3427e3c5e4232dc40aed4f02d6fa3fcf9cb44" />
    </text>
  </nonXMLBody>
</component>
```

Level 3 Text Body

A level 3 CDA has discrete data available to be consumed in sections and entries. However, even if you can't consume this discrete data, your software needs to be able to display the narrative text blocks. The simplest way to do this is provide a stylesheet view of the XML; the stylesheet will properly format the text automatically.

The more adventurous can render the text. Level 3 narrative text uses basic HTML-style markup. The various components of tables (`table`, `caption`, `tbody`, `tr`, `th`, and `td`) are supported along with other elements such as `br`, `paragraph`, and `footnote`. Extra styling is indicated using the `styleCode` attribute of the `content` element.

XPath: /ClinicalDocument/component/structuredBody/component/section/component/section/text

XML:

```
<component typeCode="COMP">
  <structuredBody classCode="DOCBODY" moodCode="EVN">
    <component typeCode="COMP">
      <section classCode="DOCSECT" moodCode="EVN">
        <templateId root="1.3.6.1.4.1.19376.1.3.3.2.1" assigningAuthorityName="Laboratory Specialty Section" />
        <code codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC Code" code="26436-6"
displayName="Laboratory Studies" />
        <title>Laboratory Studies</title>
        <component typeCode="COMP">
          <section classCode="DOCSECT" moodCode="EVN">
            <templateId root="1.3.6.1.4.1.19376.1.3.3.2.2" assigningAuthorityName="Laboratory Report Item
Section" />
            <code codeSystem="2.16.840.1.113883.2.20.5.1" codeSystemName="pCLOCD" code="24339-4"
displayName="Gas Panel; Venous Blood" />
            <!-- ===== Derived Text Representation of Discrete Lab Results ===== -->
            <title>Gas Panel; Venous Blood</title>
            <text>
              <table>
                <caption>Specimen Information</caption>
                <tbody>
                  <tr>
                    <th>Specimen #:</th>
                    <td>ABC123:123456</td>
                  </tr>
                  <tr>
                    <th>Collected:</th>
```

```

        <td>13/Oct/2017 12:00 PDT</td>
    </tr>
    <tr>
        <th>Received:</th>
        <td>13/Oct/2017 12:10 PDT</td>
    </tr>
    <tr>
        <th>Requisition #:</th>
        <td>IHKGGH-20171013-123456</td>
    </tr>
</tbody>
</table>
<br />
<table>
    <caption>24339-4 Gas Panel; Venous Blood</caption>
    <tbody>
        <tr>
            <th>Test ID:</th>
            <th>Test Name:</th>
            <th>Test Result:</th>
            <th>Result Flags:</th>
            <th>Reference Range:</th>
            <th>Result Units:</th>
            <th>Time Resulted:</th>
            <th>Status:</th>
        </tr>
        <!-- 1 - pH; Venous Blood -->
        <tr ID="p2746-6_1-1">
            <td>2746-6</td>
            <td>pH; Venous Blood</td>
            <td>
                <!--This is an exceptional value and has been marked as such using the 'alert'
styleCode.-->
                <content styleCode="alert">7.32</content>
            </td>
            <td>
                <content styleCode="alert">L</content>
            </td>
            <td>
                <content styleCode="alert">7.33-7.43</content>
            </td>
            <td />
            <td>13/Oct/2017 12:27 PDT</td>
            <td>
                <content>completed</content>
            </td>
        </tr>
    </tbody>
</table>
<br />
<br />
<table>
    <tbody>
        <tr>
            <th>Result Flags Legend:</th>
            <td>
                <content>N</content>
                <br />
                <content styleCode="alert">H</content>/<content styleCode="alert">L</content>/<content
styleCode="alert">A</content><br /><content styleCode="alert">HH</content>/<content
styleCode="alert">LL</content>/<content styleCode="alert">AA</content></td>
            <td>Normal<br />Abnormal Value<br />Critical Value</td>
        </tr>
        <tr>
            <th>Performing Lab:</th>

```

```
        <td colspan="2">IHKLH - Kootenay Lake Hosp, Nelson</td>
    </tr>
    <tr>
        <th>Collecting Lab:</th>
        <td colspan="2">IHKLH - Interior Health Authority</td>
    </tr>
    <tr>
        <th>Report Status:</th>
        <td colspan="2">completed</td>
    </tr>
</tbody>
</table>
<footnote>
    <br />
    <br />
    <paragraph>
        <content styleCode="Bold">INQUIRIES - </content>Please direct all inquiries to the
Collecting Lab.</paragraph>
    <paragraph>
        <content styleCode="Bold">CONFIDENTIAL - </content>This clinical document contains
confidential personal information and is for direct care purposes only. Please use, copy and share with
authorized individuals only.</paragraph>
    <paragraph>
        <content styleCode="Center">*** If received in error call IH Information Privacy &
Security toll free at 1-855-980-5020 ***</content>
    </paragraph>
    <paragraph>
        <content styleCode="Bold">END OF REPORT</content>
    </paragraph>
</footnote>
</text>
...
```