



Florida Department of Health

Bureau of Epidemiology

Guide to Importing Data Into the National Healthcare Safety Network: Laboratory-Identified Organism

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Version Control

Version 1.0	12/14/2010	Original version
Version 1.1	12/22/1020	Remove MDRO bullet from section 1.4

1. Introduction

The purpose of this help document, developed by the Florida Department of Health (FDOH), is to assist facilities with creating the Clinical Document Architecture (CDA) files needed for importing the Laboratory-identified Organism Report (LIO) reports into the National Healthcare Safety Network (NHSN). This document will use CDA to refer to an XML file that follows the CDA format which is the required file type and format for importing data into the NHSN system. CDA is a set of constraints on the HL7 Reference Informational Model (RIM) that are defined in the CDA Release 2 (CDA R2) Refined Message Information Model (RMIM) to future define and restrict the sequence and cardinality of CDA objects and the vocabulary sets for coded elements. NHSN is a web-based system maintained by the Centers for Disease Control (CDC) where facilities can report healthcare-associated infections (HAI) for quality improvement purposes or in compliance with Centers for Medicare and Medicaid (CMS) Hospital Inpatient Quality Reporting Program.

The directions in this document are taken from the CDC HL7 Implementation Guide for CDA Release 2 NHSN Healthcare Associated Infection (HAI) Reports, Release 5 (U.S. Realm). Summarization of the CDC HI7 Implementation Guide document will help direct the developer to the sections needed for the specific report being discussed in this document. The section and table numbers used within this document have been labeled and numbered as they are in the CDC [HL7 Implementation Guide for CDA Release 2: NHSN Healthcare Associated Infection \(HAI\) Reports, Release 5](#) so as to make the references between the two documents straightforward. An example of the [LIO-Num Example](#) CDA file provided by the CDC will also assist in their development of the import file.

1.1 Audience

The target audience for this document is primarily developers of software systems who want to enable their system to report HAI data to the NHSN and secondarily, Infection Preventionists (IP) who will be working with their software system developers.

1.2 Schedule of Events

Each IP and software system development group will have to set up a schedule for when and how often data will be added to the NHSN system. Since data can be imported at any time, one facility may decide to import daily, while another facility may decide to only import weekly. When a schedule of events is determined, the IT group can assist in setting up a scheduled job that will create the CDA file so the assigned group can import the file into NHSN.

1.3 Other Help Locations

If you need additional details that are not available in this document, there are several help documents available for reference on the CDC website and the Florida Department of Health website. Below is a list of the other help locations and documents:

- For questions concerning this document, please contact June Leverette at HAI_Program@doh.state.fl.us.
- CDC Release 5 document: [HL7 Implementation Guide for CDA Release 2: NHSN Healthcare Associated Infection \(HAI\) Reports; Release 5](#).

- Example of an LIO XML file at [LIO Nun Example](#).
- The CDC NHSN website can be accessed at <http://www.cdc.gov/nhsn/index.html>.
- If the help documents do not provide the information you need, you can always contact NHSN by emailing nhsn@cdc.gov or thru their web site at <http://www.cdc.gov/nhsn/contact.html>.

1.4 Things to Note when Creating a CDA File

Below is a list of additional information that may be helpful in clarifying some questions when trying to create a CDA file.

- The CDA file is designed to only import the required fields on each report. Optional fields on the report forms are not included in the CDA file. A couple of exceptions where optional fields can be included in the CDA file are: patient first, last, and middle names, and contributed to death question.
- Before a CDA file can be created, the facility OID number must be known to the group that will create the import file. To see if the facility OID has been registered with NHSN review the section on OIDs in the “[FDOH Guide to Importing Data into NHSN: Initial Setup](#)” document located on the FDOH HAI website. The facility OID will be extended to create the unique numbering schemes needed to create the CDA files. The scheme of OID numbers will include the vendor or IT Group number.
- References to tables within this document are in the appendices of the CDC [HL7 Implementation Guide for CDA Release 2: HAI Reports Release 5](#) document.
- Numerator and Denominator reports are two separate reports and therefore two separate CDA files. A Numerator report is the individual file with the patient level data. The Denominator report is a summary file that provides patient days and central line days for a given location, month and year. These two reports stand on their own but both reports are required for calculating HAI rates.

1.5 Comparison with Electronic Laboratory Reporting (ELR)

Many hospitals submit and receive electronic communication of reportable information from laboratories and public health agencies using Electronic Laboratory Reporting (ELR). ELR follows the Health Level Seven (HL7) format file and is an accredited and nationally recognized standard of electronic data exchange in healthcare environments.

If the facility is using the ELR exchange of data, the ELR record could be helpful in creating the Laboratory-identified Organism (LIO) import file. However, not all the data required to import the LIO data into the NHSN system may be transmitted in the facility’s ELR file. Each facility will need to review their ELR file to see what data fields are being transmitted to determine if their current ELR file holds all the data needed for creating the NHSN LIO file.

Below is a comparison of what data is required for NHSN and what data is optional or required in the ELR file. The first column in the table below lists all the fields on the LIO Form. The second column notes where within the HL7 file the data may be found. The third column indicates if the field is currently

required or option in the FDOH ELR file and the fourth column indicates whether the field is required or optional in the CDA file.

NHSN LIO Event Form fields	Location in HL7 file	ELR File	CDA File
Facility ID	MSH(4) or PID(3)(4)	Required	Required
Patient ID	PID(2) or PID(18)	Required	Required
SSN	PID(19) SSN Number Patient	Required	Not accepted
Patient Name	PID(5) Patient Name	Required	Optional
Last	(5)(1)	Required	Optional
First	(5)(2)	Required	Optional
Middle	(5)(3)	Required	Optional
Gender	PID(8) Administrative Sex	Required	Required
*Date of Birth	PID(7) Date/Time of Birth	Required	Required
Ethnicity	PID(22) Ethnic Group	Required	Not accepted
Race	PID(10) Race	Required	Not accepted
Event Type	Not part of the file	Not in file	will always be "LabID"
Date Specimen Collected	OBR(7)	Optional	Required
Specific Organism type	OBR(15)	Required	Required
Outpatient	PV1(2) Patient Class	Required	Required
Specimen Body Site/Source	OBR(15)	Required	Required
Specimen Source	OBR(15)	Required	Required
Date Admitted To Facility	PV1(44) Admit Date/Time or PID(18)	Optional	Required
Location	PV1(3)Assigned Patient Location or PV2(23) Clinic Organization Name	Optional	Required
Date Admitted to Location	PID(18) - Patient Account Number	Optional	Required
Was patient discharged from facility in past 3 months		Not in File	Can be derived based on PV2(26)
If yes Date	PV2(26) Previous Treatment Date	Optional	Required to support discharge from facility when Yes - PV2(26)

2. Use of Implementation Guide

2.1 (1.6.1 Keywords)

The implementation guide section contains information that is important in understanding this FDOH document. The information in this FDOH document

comes directly from the CDC [HL7 Implementation Guide for CDA Release 2: NHSN Healthcare Associated Infection \(HAI\) Reports, Release 5](#) document which should be referenced if more information is needed.

The following keywords in this document are to be interpreted as:

- **SHALL**: an absolute requirement, but allows for NULL values via an additional conformance statement
- **SHALL NOT**: an absolute prohibition against inclusion
- **SHOULD/SHOULD NOT**: valid reasons to include or ignore a particular item, but must be understood and carefully weighed
- **MAY/NEED NOT**: truly optional; can be included or omitted as the author decides with no implications

2.2 (1.6.2 Constraints)

The CDA conformance statements are shown in figure 1 below with each constraint uniquely identified by an identifier at or near the end of the constraint (e.g., "CONF: 605"). Note that the identifiers are persistent not sequential.

Figure 1 (Figure 1: Constraints format example)

Immunocompromised Observation
[observation: templateId 2.16.840.1.113883.10.20.5.6.19]

[description of the template]

1. **SHALL** contain [1..1] **@classCode**="OBS" Observation (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:2348)
2. **SHALL** contain [1..1] **@moodCode**="EVN" Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:2349)
3. **SHALL** contain [1..1] **code/@code**="ASSERTION" Assertion (CodeSystem: 2.16.840.1.113883.5.4 HL7ActCode) **STATIC** (CONF:2350)
4. **SHALL** contain [1..1] **statusCode/@code**="completed" (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:2351)
5. **SHALL** contain [1..1] **value/@code**="370388006" Patient immunocompromized (CodeSystem: 2.16.840.1.113883.6.96 SNOMEDCT) **STATIC** (CONF:2352)

The conformance verb keyword at the start of a constraint (**SHALL**, **SHOULD**, **MAY**, etc.) indicates business conformance and the cardinality indicator (0..1, 1..1, 1..*, etc.) specifies the allowable occurrences within a document instance. The cardinality indicators may be interpreted as follows:

- 0..1 as zero to one present
- 1..1 as one and only one present
- 1..* as one or more present
- 0..* as zero to many present

2.3 (1.6.5 Succession Management)

CDA-conformant HAI instances use the elements defined in the CDA header (documentId, setId, version number, and relatedDocument/typeCode) to manage replacements and updates of the import documents. As with all CDA documents, the ClinicalDocument/id uniquely identifies a document instance (an electronic file) and the incremented version numbers identify subsequent versions of the document.

NHSN assigns each participating vendor a root Object Identifier (OID) and the vendor is responsible for controlling the structure of OIDs assigned under its root.

- To find out if your facility has already been assigned an OID you will need to log into the NHSN system. From the Navigation menu select the "Facility > Facility Info" and the OID should be displayed in the Object Identifier field.
- If your facility has not already been assigned an OID follow the directions in the [FDOH Guide to Importing Data into HNSH: Initial Setup](#) to receive an OID for the facility. Each OID owner such as a facility or vendor controls the structure of the OIDs it assigns under its root, and is responsible for ensuring that each identifier it issues is globally unique. A vendor must, for example, ensure that there is no duplication amongst the setIds issued by its various software installations. The example instance

identifiers in this guide use the following plan for assigning instance identifiers:

Table 1 (Table 79: Structure of Example OIDs)

Usage	OID
a healthcare facility OID	2.16.840.1.113883.3.117.1.1.5.1.1
its patient IDs	2.16.840.1.113883.3.117.1.1.5.1.1.1
its non-patient IDs	2.16.840.1.113883.3.117.1.1.5.1.1.2
a vendor OID	2.16.840.1.113883.3.117.1.1.5.2.1
its first software installation	2.16.840.1.113883.3.117.1.1.5.2.1.1
its setlds	2.16.840.1.113883.3.117.1.1.5.2.1.1.1
its document IDs	2.16.840.1.113883.3.117.1.1.5.2.1.1.2
its encompassing encounter IDs	2.16.840.1.113883.3.117.1.1.5.2.1.1.3
its procedure IDs	2.16.840.1.113883.3.117.1.1.5.2.1.1.4

Conformant to that structure, the following example instance identifiers are used in this guide and in the sample files.

Table 2 (Table 80: Values of Example Instance Identifiers Used in This Guide)

Facility IDs and Facility-assigned OIDs		
Usage	OID	extension
a location in a facility	2.16.840.1.113883.3.117.1.1.5.1.1	9W
a patient ID	2.16.840.1.113883.3.117.1.1.5.1.1.1	123456
an author ID	2.16.840.1.113883.3.117.1.1.5.1.1.2	anAuthorID
a legal authenticator ID	2.16.840.1.113883.3.117.1.1.5.1.1.2	aLegalAuthenticatorID
Vendor IDs and Vendor-assigned OIDs		
Usage	OID	extension
a setld	2.16.840.1.113883.3.117.1.1.5.2.1.1.1	31
a document ID	2.16.840.1.113883.3.117.1.1.5.2.1.1.2	20202201
an encompassing Encounter ID	2.16.840.1.113883.3.117.1.1.5.2.1.1.3	31
a procedure ID	2.16.840.1.113883.3.117.1.1.5.2.1.1.4	92

2.4 (1.8 Supporting Tool)

IT groups checking the CDA file they have generated for errors in the file may find the use of the Schematron schemas helpful. Please refer to the HL7 Implementation Guide for CDA Release 2, Release 5 for the detail and location of the Schematron technology and for the location of the CDA Validator, which is available as an online application that can be used to validate the CDA document's conformance.

3. (3.1 Summary of TemplatedId Used Across Report Types)

Each CDA file that will be uploaded into the NSHN system must contain certain information. Below are the report-specific requirements for the Laboratory-identified Organism Report (LIO). These requirements specify the document-level templated value that identifies the report type, the preferred report title, and the sections required in that report type.

Table 3 (Table 5: Sequence of Sections / Templates within Report Types)

Italics indicate conditional requirements. All other items are required, except in the instance of an “or” that indicates a choice between sets of required items.

HAI Implementation Guide (2.16.840.1.113883.10.20.5.4.20)	
Document	Section and Clinical Statements Libraries
Infection-type Reports	
Laboratory-identified Organism Report (...20.5.17)	Findings Section (LIO) (...20.5.5.17) <ul style="list-style-type: none"> • Pathogen Identified Observation (LIO) (...20.5.6.52) <ul style="list-style-type: none"> ○ Specimen Collection Procedure (LIO) (...20.5.6.53) <ul style="list-style-type: none"> ▪ Specimen Collection Encounter (LIO) (...20.5.6.54) <i>If organism reported is C.difficile and a prior discharge in past 3 months</i> Encounters Section (LIO) (...20.5.5.16)

4. (2 NHSN HAI Generic Constraints)

Section five briefly describes the CDA constraints common across all single-patient HAI Report types.

The individual report-specific constraints are defined in the [report-specific constraints](#) above and the body of the CDF file is defined in this NHSN HAI Generic Constraints section and the [Generic Constraints for a LIO](#) section below. If additional information is needed about the NHSN HAI generic constraints please refer to Section 2 of the HL7 Implementation Guide for CDA Release 2: NHSN Healthcare Associated Infection (HAI) Reports, Release 5 (US Realm).

4.1 (2.1 Healthcare Associated Infection Report)

[ClinicalDocument: templated 2.16.840.1.113883.10.20.5.4.20]

The ClinicalDocument template records constraints on all NHSN HAI Reports (generic constraints). Additional constraints are noted in the specialization templates for single-patient and population-summary reports, and in the templates for specific report types. For the templates for this report review [Section 3](#) of this document.

4.2 (2.1.1 Top-level Element)

In a CDA document, the top-level element, also called the document element, is ClinicalDocument, in the urn:hl7-org:v3 namespace.

4.3 (2.1.2 Document Information)

The first header information in a CDA document is about the document itself—what kind of document it is; its language, confidentiality status, and title; and its succession management detail.

For all templates specified in this document, the `templateId` is a required element.

1. In a document instance, a templated structure **SHALL** contain a `templateId` to assert conformance to this Implementation Guide. (CONF: 4503).
2. A `templateId` element **SHALL** be present representing conformance to the constraints for a specific report type. (CONF:4504).
3. **SHALL NOT** contain [1..1] `templateId/@extension` (CONF:4505)
This specification is for the U.S. realm.
4. **SHALL** contain [1..1] `realmCode/@code="US" STATIC` (CONF:4506)

CDA requires that a `ClinicalDocument/typeId` be present to identify the constraints imposed by CDA Release 2.0, essentially acting as a CDA version identifier. The effect of the CDA Release 2.0 requirement is:

The value of `typeId/@root` shall be 2.16.840.1.113883.1.3 and the value of `typeId/@extension` shall be POCD_HD000040. [CDA R2]

Figure 2 (Figure 5: CDA header – template identifiers example)

```
<ClinicalDocument
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:mif="urn:hl7-org:v3/mif" xmlns="urn:hl7-org:v3">

  <realmCode code="US"/>

  <typeId root="2.16.840.1.113883.1.3" extension="POCD_HD000040"/>

  <!-- Conformant to HAI Generic Constraints -->
  <templateId root="2.16.840.1.113883.10.20.5.4.20" />

  <!-- Conformant to the HAI Constraints for BSI Numerator Report -->
  <templateId root="2.16.840.1.113883.10.20.5.7" />

  ...
</ClinicalDocument>
```

CDA requires a code element that specifies the type of the clinical document.

5. **SHALL** contain [1..1] `code/@code="51897-7" Healthcare Associated Infection Report (CodeSystem: 2.16.840.1.113883.6.1 LOINC) STATIC` (CONF:4507)
6. **SHALL** contain [1..1] `title` (CONF:4508)
CDA requires an `effectiveTime` element representing the time of document creation.
7. **SHALL** contain [1..1] `effectiveTime` (CONF:4509)

CDA requires a confidentiality code that indicates the sensitivity of the document. All HAI submissions carry the same value of "normal". Note that this designation does not affect local policy on safeguarding confidentiality of patient-identifiable personal health information.

8. **SHALL** contain [1..1] `confidentialityCode/@code="N"` Normal (CodeSystem: 2.16.840.1.113883.5.25 HL7 Confidentiality Code) **STATIC** (CONF:4510).
9. **SHALL** contain [1..1] `languageCode/@code="en-US"` **STATIC** (CONF:4511).
10. **SHALL** contain [1..1] `setId` (CONF:4512)
11. **SHALL** contain [1..1] `versionNumber` (CONF:4513)
12. If `versionNumber/@value` is greater than 1, a `relatedDocument` element **SHALL** be present where the value of `@typeCode` **SHALL** be RPLC (replace) and the value of `parentDocument/id` **SHALL** be populated with the `ClinicalDocument/id` of the document being replaced. In all cases (regardless of the version number), values of APND and XFRM **SHALL NOT** be used for `relatedDocument/@typeCode`. (CONF:4514).

Figure 3 (Figure 6: CDA header – document information example)

```

<ClinicalDocument
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:mif="urn:hl7-org:v3/mif" xmlns="urn:hl7-org:v3">
  ...
  <id root="2.16.840.1.113883.3.117.1.1.5.2.1.1.2"
    extension="20202201"/>

  <code codeSystem="2.16.840.1.113883.6.1"
    codeSystemName="LOINC"
    code="51897-7"
    displayName="Healthcare Associated Infection Report"/>

  <title>Bloodstream Infection Report (BSI)</title>

  <effectiveTime value="20061219"/>

  <confidentialityCode codeSystem="2.16.840.1.113883.5.25"
    code="N" />

  <languageCode code="en-US"/>

  <setId root="2.16.840.1.113883.3.117.1.1.5.2.1.1.1"
    extension="31"/>
  <versionNumber value="1"/>

  ...
</ClinicalDocument>

```

4.4 (2.2.2 Header Constraints, HAI Single-Patient Reports)

[ClinicalDocument: templateId 2.16.840.1.113883.10.20.5.4.1]

This template records the constraints specific to HAI single-patient reports. These constraints are common to all HAI reports.

In the `recordTarget` element, which is required by CDA, an `id` element representing the patient ID assigned by the facility is required. Additional `id` elements representing secondary patient IDs and a United States Social Security Number (`id/@root 2.16.840.1.113883.4.1`) may also be present.

In a single-patient report, the author may be software or may be a person in the role of infection control professional (ICP). The CDA Release 2.0 requirement is:

An `author` element shall be present. The `author` element shall contain a `time` element that represents the time of authoring of the information, and an `assignedAuthor` element that represents the author of the information. The `assignedAuthor` element shall contain an `id` element. [CDA R2]

In the `componentOf/encompassingEncounter` element,

- The `effectiveTime/low` element represents the date admitted to the facility.
 - Some report types also record whether the patient was an outpatient.
 - Physical location is recorded in `location/healthCareFacility/id`, where the value of `@root` represents the facility OID assigned by NHSN. (Most single-patient report types also require `@extension`, representing the facility's unit identifier, such as "9W", and `healthCareFacility/code` representing the type of location. See the sections on [report-specific constraints](#) to see if this is required for the report. The Immunization, Procedure, and Laboratory-identified Organism Reports do not require this information.)
1. Conforms to Healthcare Associated Infection Report Template (`templateId: 2.16.840.1.113883.10.20.5.4.20`).
 2. **SHALL** contain [1..1] `recordTarget/patientRole` (CONF:3084).
 - a. This `recordTarget/patientRole` **SHALL** contain [1..*] `id` (CONF:3085).
 - i. Such `ids` **SHALL** contain `@root` (CONF:3087).
 - ii. Such `ids` **SHALL** contain `@extension` (CONF:3088).
 - b. This `recordTarget/patientRole` **SHALL** contain [1..1] `patient` (CONF:3220).
 - i. This `patient` **MAY** contain [0..1] `name` (CONF:3221).
 - ii. This `patient` **SHALL** contain [1..1] `administrativeGenderCode/@code` (CodeSystem: 2.16.840.1.113883.5.1 HL7 Gender Codes) **STATIC** (CONF:3222).
 - iii. This `patient` **SHALL** contain [1..1] `birthTime` (CONF:3223).
 3. The `author` **MAY** be software or **MAY** be a person in the role of infection control professional (ICP). (CONF:3089).

4. **SHALL** contain [1..1] **componentOf/encompassingEncounter** (CONF:3090).
 - a. This **componentOf/encompassingEncounter** **SHALL** contain [1..1] **effectiveTime/low** (CONF:3091).
 - b. This **componentOf/encompassingEncounter** **SHALL** contain [1..1] **location/healthCareFacility/id** (CONF:3092).

Figure 4 (Figure 9: CDA header – recordTarget example)

```

<ClinicalDocument
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:mif="urn:hl7-org:v3/mif" xmlns="urn:hl7-org:v3">
  ...
  <recordTarget>
    <patientRole>
      <!-- Patient ID - scoped by facility -->
      <id root="2.16.840.1.113883.3.117.1.1.5.1.1.1"
        extension="123456"/>
      <patient>
        <name>
          <family>Nuclear</family>
          <given>Ned</given>
        </name>
        <administrativeGenderCode
          codeSystem="2.16.840.1.113883.5.1"
          codeSystemName="HL7 Gender codes"
          code="M"/>
        <birthTime value="19320924"/>
      </patient>
    </patientRole>
  </recordTarget>
  ...
</ClinicalDocument>

```

Figure 5 (Figure 10: CDA header – facility location and admission date, single-patient report example)

```

<ClinicalDocument
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:mif="urn:hl7-org:v3/mif" xmlns="urn:hl7-org:v3">
  ...
  <componentOf>
    <encompassingEncounter>

      <id root="2.16.840.1.113883.3.117.1.1.5.2.1.1.3"
        extension="31"/>

      <code codeSystem="2.16.840.1.113883.5.4"
        codeSystemName="HL7 ActCode"
        code="AMB"
        displayName="Ambulatory"/>

      <effectiveTime>
        <!-- Date Admitted to Facility -->
        <low value="20061218"/>
      </effectiveTime>

      <location>
        <healthCareFacility>
          <!-- Facility ID -->
          <id root="2.16.840.1.113883.3.117.1.1.5.1.1" extension="9W"/>
          <code codeSystem="2.16.840.1.113883.6.259"
            codeSystemName="HL7 HealthcareServiceLocation"
            code="1029-8"
            displayName="Medical/Surgical critical care"/>
        </healthCareFacility>
      </location>
    </encompassingEncounter>
  </componentOf>
  ...
</ClinicalDocument>

```

4.5 (2.1.4 The Author, Custodian and Legal Authenticator)

The author, which may be software or may be a person in the role of infection control professional (ICP), is required in all single-patient reports. The CDA Release 2.0 requirement is:

An author element shall be present. The author element shall contain a time element that represents the time of authoring of the information, and an assignedAuthor element that represents the author of the information. The assignedAuthor element shall contain an id element. [CDA R2]

CDA also requires the custodian be recorded; the NHSN is the custodian of NHSN HAI Reports.

13. **SHALL** contain [1..1] **custodian/assignedCustodian/representedCustodianOrganization/id/@root="2.16.840.1.114222.4.3.2.11"** (CONF:4515).

CDA requires that a `legalAuthenticator` element be present if the document has been legally authenticated. Local policy may delegate the function of legal authentication to a device or system that generates the CDA document. In these cases, the legal authenticator must still be a person accepting responsibility for the document content, not the device or system.

Figure 6 (Figure 7: CDA header – author, custodian, and legalAuthenticator example)

```

<ClinicalDocument
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:mif="urn:hl7-org:v3/mif" xmlns="urn:hl7-org:v3">
  ...
  <author>
    <time value="20061219"/>
    <assignedAuthor>
      <id root="2.16.840.1.113883.3.117.1.1.5.1.1.2"
        extension="anAuthorID"/>
    </assignedAuthor>
  </author>

  <custodian>
    <assignedCustodian>
      <representedCustodianOrganization>
        <id root="2.16.840.1.114222.4.3.2.11"/>
      </representedCustodianOrganization>
    </assignedCustodian>
  </custodian>

  <legalAuthenticator>
    <time value="20061224"/>
    <signatureCode code="S"/>
    <assignedEntity>
      <id root="2.16.840.1.113883.3.117.1.1.5.1.1.2"
        extension="aLegalAuthenticatorID"/>
    </assignedEntity>
  </legalAuthenticator>
  ...
</ClinicalDocument>

```

4.6 (2.1.5 Document body)

An HAI Report uses the CDA `structuredBody`. Specified sections are required in each report type; see the section on [report-specific constraints](#). Additional sections that may be present in the file will not be processed by NHSN.

14. **SHALL** contain [1..1] `component/structuredBody` (CONF:4516)
15. The `structuredBody` element **SHALL** contain a `component` element for each section required by the particular report type. Additional sections may be present but their content will not be processed by NHSN. (CONF:4517).

Figure 7 (Figure 8: Structured body example)

```
<ClinicalDocument
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:mif="urn:hl7-org:v3/mif" xmlns="urn:hl7-org:v3">
  ...
  <component>
    <structuredBody>
      <component>
        <section>
          ...
        </section>
        ...
      </component>
    </structuredBody>
  </component>
</ClinicalDocument>
```

4.7 (2.3.1 HAI Section Generic Constraints)

[section: templateId 2.16.840.1.113883.10.20.5.4.3]

This template records the constraints that apply to all sections specified in the NHSN HAI Implementation Guide. Each section element conforming to constraints in this guide will have a `templateId`, a `code`, a `title`, a narrative block (`text` element), and the specific entries required by the report type. Top-level sections conforming to other guides are allowed and need not conform to these constraints.

1. **SHALL** contain [1..1] `code/@code` (CodeSystem: 2.16.840.1.113883.6.1 LOINC) **STATIC** (CONF:3171).
2. **SHALL** contain [1..1] `title` (CONF:3172).
3. **SHALL** contain [1..1] `text` (CONF:3173).
4. **SHALL** contain [1..*] `entry` (CONF:3174).

Figure 8 (Figure 12: Section example)

```
<section>
  <templateId root="2.16.840.1.113883.10.20.5.5.15"/>
  <code codeSystem="2.16.840.1.113883.6.1"
    codeSystemName="LOINC"
    code="18769-0"
    displayName="Findings Section"/>
  <title>Bug-Drug Tests</title>
  <text>
    ...
  </text>
  <entry>
    ...
  </entry>
</section>
```

4.8 (2.3.2 Narrative Block and @typeCode = "DRIV")

The Narrative Block in the CDA file is not detailed in this document because of the almost infinite set of semantic structures that can be developed. It is worth noting that the Narrative Block is required for the CDA file, but it can be left as an empty shell if the facility does not wish to use the section. Many facilities do use the narrative block because it allows the user to have a human view of the record

that can be reviewed by an IP before the file is imported into the NHSN system. The example of the [LOI-Num Example](#) CDA file contains examples of the narrative block.

The CDC has created a generate-narrative file that can be used when generating a narrative block. IT groups that are interested in using the generate-narrative file can request the file and get assistance implementing it with their system by sending an email to Marla Albitz at malbitz@cdc.gov.

5. Generic Constraints for Laboratory-identified Organism (LIO) report

The following section will help guide IT groups in developing the generic constraints section for a Laboratory-identified Organism (LIO) Report CDA file if their hospital system does not have the capability to generate this file for them. Only the required sections needed for the LIO report will be noted in this section.

5.1 Common Header Constraints

The common header constraints are explained in [Section 4 \(2 NHSN HAI Generic Constraints\)](#) of this document.

5.2 (3.12 HAI Laboratory-identified Organism (LIO) Report)

[ClinicalDocument: templateId 2.16.840.1.113883.10. 20.5.17]

The preferred title for the LIO Report is “Laboratory-identified Organism Report”.

The LIO Report records whether the patient was an outpatient.

The LIO Report records the laboratory identification of a microorganism in a specimen. This is not an infection-type report: the presence of the organism is not equivalent to the presence of an infection. These reports are submitted if the facility is monitoring the organism identified. Each report records a single organism.

The LIO Report records three dates: date of admission to the facility, date of admission to the in-facility location where the specimen was collected, and date of specimen collection. The `encompassingEncounter/code` element records whether the patient is an inpatient or an outpatient. If the patient is an outpatient, the date of specimen collection is recorded as the date of admission to the facility.

1. Conforms to Header Constraints, HAI Single-patient Reports Template (templateId: 2.16.840.1.113883.10.20.5.4.1).
2. **SHALL** contain [1..1] `componentOf/encompassingEncounter/code` (CONF:3079).
3. **SHALL NOT** contain [1..1] `componentOf/encompassingEncounter/location/healthCareFacility/id/@extension` (CONF:3128).
4. **SHALL NOT** contain [1..1] `componentOf/encompassingEncounter/location/healthCareFacility/code` (CONF:3129).
5. **SHALL** contain [1..1] `component/structuredBody` (CONF:3207).

- a. This component/structuredBody **SHALL** contain [1..1] component (CONF:3081) such that it
 - i. **SHALL** contain [1..1] Findings Section (LIO) (templateId:2.16.840.1.113883.10.20.5.5.17) (CONF:3082).
- 6. If the organism being monitored is *C.difficile* and if the patient was discharged from this facility within the prior three months, a component element containing an Encounters Section (LIO) (templateId 2.16.840.1.113883.10.20.5.5.16) **SHALL** be present. (CONF:3080).

5.3 (4.3 Encounters Section in a LIO Report)

[section: templateId 2.16.840.1.113883.10.20.5.5.16]

In a LIO Report the Encounters Section is present if the patient was previously discharged from the facility within the past three months, and records the date of that discharge. This section conforms to the CCD Encounters Section, found in the HL7 Release 5 document, template (templateId 2.16.840.1.113883.10.20.1.3).

- 1. Conforms to HAI Section Generic Constraints Template (templateId: 2.16.840.1.113883.10.20.5.4.3).
- 2. **SHALL** contain [1..1] code/@code="46240-8" History of Encounters (CodeSystem: 2.16.840.1.113883.6.1 LOINC) **STATIC** (CONF:3071).
- 3. **SHALL** contain [1..1] entry (CONF:3072).
 - a. This entry **SHALL** contain [1..1] Prior Discharge Encounter (templateId:2.16.840.1.113883.10.20.5.6.51) (CONF:3073).

5.4 (5.2.46 Prior Discharge Encounter)

[encounter: templateId 2.16.840.1.113883.10.20.5.6.51]

The Prior Discharge Encounter records the date of a prior discharge from the facility. It is required in a LIO Report if there was such a previous discharge and the organism reported is *C.difficile*. This template conforms to the CCD Encounter Activity template (templateId 2.16.840.1.113883.10.20.1.21).

- 1. **SHALL** contain [1..1] @classCode="ENC" Encounter (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:3074).
- 2. **SHALL** contain [1..1] @moodCode="EVN" Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:3075).
- 3. **SHALL** contain [1..1] id (CONF:3076).
 - a. This id **SHALL** contain [1..1] @nullFlavor="NI" No information (CodeSystem: 2.16.840.1.113883.5.1008 HL7NullFlavor) **STATIC** (CONF:3208).
- 4. **SHALL** contain [1..1] code/@code="IMP" Inpatient encounter (CodeSystem: 2.16.840.1.113883.5.4 HL7ActCode) **STATIC** (CONF:3077).
- 5. **SHALL** contain [1..1] effectiveTime/high/@value (CONF:3078).

An example of the prior discharge encounter records would look like the following which is from the LIO_Num example file.

Figure 9: (LIO-Num file) - prior discharge records

```

<component>
  <structuredBody>
    <!-- *****
    Encounters Section
    ***** -->
    <!-- This section will be present if the patient was discharged from
    this facility within the previous 3 months. -->

    <component>
      <section>
        <templateId root="2.16.840.1.113883.10.20.5.5.16"/>
        <code code="46240-8" codeSystem="2.16.840.1.113883.6.1"
        displayName="Encounters"/>
        <title xmlns:cda="urn:hl7-org:v3">Encounters: Previous
        discharge from this facility</title>

        <entry typeCode="DRIV">
          <encounter classCode="ENC" moodCode="EVN">
            <!-- CCD Encounter activity template -->

            <templateId root="2.16.840.1.113883.10.20.1.21"/>
            <!-- HAI Prior Discharge Encounter template -->

            <templateId root="2.16.840.1.113883.10.20.5.6.51"/>
            <id nullFlavor="NI"/>
            <code codeSystem="2.16.840.1.113883.5.4" code="IMP"
            displayName="Inpatient encounter"/>
            <effectiveTime>
              <high value="20081205"/>
            </effectiveTime>
          </encounter>
        </entry>
      </section>
    </component>
    .
    .
    .
  </structuredBody>
</component>

```

5.5 (4.5 Findings Section a LIO Report)

[section: templateId 2.16.840.1.113883.10.20.5.5.17]

The Findings Section in a LIO Report records a laboratory-identified microorganism. It differs from the Findings Section in Infection Reports in that it records only one microorganism (if more were identified, each is recorded in a separate report), details about the specimen collection are recorded, and no drug-susceptibility test results are recorded. If no organism is found, no report is submitted; thus, the explicit statement "no organism found," which is used in the Findings Section in Infection Reports, is not used here.

1. Conforms to HAI Section Generic Constraints Template (templateId: 2.16.840.1.113883.10.20.5.4.3).
2. **SHALL** contain [1..1] code/@code="18769-0" Findings Section (CodeSystem: 2.16.840.1.113883.6.1 LOINC) **STATIC** (CONF:3067).

3. **SHALL** contain [1..1] **entry** (CONF:3068).
 - a. This entry **SHALL** contain [1..1] **Pathogen Identified Observation (LIO)** (templateId:2.16.840.1.113883.10.20.5.6.52) (CONF:3069).

An example of the findings section of the record would look like the following which is from the LIO_Num example file.

Figure 10: (LIO-Num file) - findings section

```

<component>
  <section>
    <templateId root="2.16.840.1.113883.10.20.5.5.17"/>
    <code codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"
      code="18769-0" displayName="Findings"/>
    <title xmlns:cda="urn:hl7-org:v3">Lab-identified organism</title>
    <text xmlns:cda="urn:hl7-org:v3"></text>

    <!-- The organism identified -->
    <entry typeCode="DRIV">
    <observation classCode="OBS" moodCode="EVN">

      <!-- Pathogen Identified Observation (LIO) -->
      <templateId root="2.16.840.1.113883.10.20.5.6.52"/>

      . . .

    </observation>
  </section>
</component>

```

5.6 (5.2.42 Pathogen Identified Observation (LIO))

[observation: templateId 2.16.840.1.113883.10.20.5.6.52]

The Pathogen Identified Observation in a LIO Report records a laboratory-identified microorganism and the details about the specimen collection.

The microorganism is recorded in the same way as in the Findings Organizer in Infection Reports.

1. **SHALL** contain [1..1] **@classCode="OBS" Observation** (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:3058).
2. **SHALL** contain [1..1] **@moodCode="EVN" Event** (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:3059).
3. **SHALL** contain [1..1] **code/@code="41852-5" Microorganism identified** (CodeSystem: 2.16.840.1.113883.6.1 LOINC) **STATIC** (CONF:3060).
4. **SHALL** contain [1..1] **statusCode/@code="completed" Completed** (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:3061).
5. **SHALL** contain [1..1] **value/@code**, which **SHALL** be selected from ValueSet 2.16.840.1.114222.4.11.3194 NHSNSignificantPathogenCode **STATIC** 20090625 (CONF:3062).
6. **SHALL** contain [1..1] **entryRelationship** (CONF:3063).
 - a. This entryRelationship **SHALL** contain [1..1] **Specimen Collection Procedure (LIO)**

(templateId:2.16.840.1.113883.10.20.5.6.53)
(CONF:3064).

An example of the pathogen identified observation section of the record would look like the following, which is from the LIO_Num example file.

Figure 11: (LIO-Num file) - pathogen identified observation

```
<component>
  <section>
    <templateId root="2.16.840.1.113883.10.20.5.5.17"/>
    . . .

    <!-- The organism identified -->
    <entry typeCode="DRIV">
      <observation classCode="OBS" moodCode="EVN">

        <!-- Pathogen Identified Observation (LIO) -->
        <templateId root="2.16.840.1.113883.10.20.5.6.52"/>
        <code codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"
          code="41852-5" displayName="Microorganism Identified"/>
        <statusCode code="completed"/>
        <value xsi:type="CD" codeSystem="2.16.840.1.113883.6.96"
          codeSystemName="SNOMED CT" code="5933001"
          displayName="Clostridium difficile (organism)"/>

        <procedure classCode="PROC" moodCode="ENV">
          <templateID root = "2.16.840.1.113883.10.20.5.6.53"/>
          . . .

      </observation>
    </entry>
  </section>
</component>
```

5.7 (5.2.60 Specimen Collection Procedure (LIO))

[procedure: templateId 2.16.840.1.113883.10.20.5.6.53]

The Specimen Collection Procedure (LIO) records the type of specimen and the date a specimen was collected. The Specimen Collection Encounter (LIO) is also included, which indicates the in-facility location where the specimen was drawn and, for an inpatient, the date the patient was admitted or transferred to that in-facility location.

The template is derived from the NICV Specimen Collection Procedure (templateId 2.16.840.1.113883.10.20.15.3.2). In the NHSN LIO Report, a collection procedure code is not recorded. The `effectiveTime` element records the date when the specimen was collected. The `participant` element records the specimen type.

1. **SHALL** contain [1..1] `@classCode="PROC" Procedure (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) STATIC (CONF:3046).`
2. **SHALL** contain [1..1] `@moodCode="EVN" Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) STATIC (CONF:3047).`
3. **SHALL** contain [1..1] `effectiveTime/@value (CONF:3048).`
4. **SHALL** contain [1..1] `participant (CONF:3049).`
 - a. This participant **SHALL** contain [1..1] `@typeCode="PRD" Product (CodeSystem: 2.16.840.1.113883.5.90 HL7ParticipationType) STATIC (CONF:3050).`

- b. This participant **SHALL** contain [1..1] **participantRole** (CONF:3051).
 - i. This participantRole **SHALL** contain [1..1] **@classCode="SPEC"** Specimen (CodeSystem: 2.16.840.1.113883.5.110 HL7RoleClass) **STATIC** (CONF:3052).
 - ii. This participantRole **SHALL** contain [1..1] **playingEntity/code/@code**, which **SHALL** be selected from ValueSet 2.16.840.1.114222.4.11.3249 NHSNSpecimenTypeCode **STATIC** 20090731 (CONF:3053).
- 5. **SHALL** contain [1..1] **entryRelationship** (CONF:3054).
 - a. This entryRelationship **SHALL** contain [1..1] **@typeCode="COMP"** Has component (CodeSystem: 2.16.840.1.113883.5.1002 HL7ActRelationshipType) **STATIC** (CONF:3055).
 - b. This entryRelationship **SHALL** contain [1..1] **@inversionInd="true"** (CONF:3056).
 - c. This entryRelationship **SHALL** contain [1..1] **Specimen Collection Encounter (LIO)** (templateId:2.16.840.1.113883.10.20.5.6.54) (CONF:3057).

Figure 11: (Figure 88: Specimen collection date and type example)

```

<procedure classCode="PROC" moodCode="EVN">
  <templateId root="2.16.840.1.113883.10.20.5.6.53"/>

  <!-- Date specimen collected -->
  <effectiveTime value="20090121"/>

  <!-- Specimen type -->
  <participant typeCode="PRD">
    <participantRole classCode="SPEC">
      <playingEntity>
        <code codeSystem="2.16.840.1.113883.6.96"
              codeSystemName="SNOMED CT"
              code="122571007"
              displayName="Pericardial fluid"> </code>
      </playingEntity>
    </participantRole>
  </participant>
  ...
</procedure>

```

5.8 (5.2.59 Specimen Collection Encounter (LIO))

[encounter: templateId 2.16.840.1.113883.10.20.5.6.54]

The Specimen Collection Encounter (LIO) records the in-facility location where a specimen was collected and, if the patient was an inpatient, the date the patient was admitted or transferred to that in-facility location.

This template conforms to the CCD Encounter Activity template (templateId 2.16.840.1.113883.10.20.1.21). That template requires an id; in the NHSN LIO Report, the id of the encounter is not reported.

The `participant` element represents the in-facility location where the specimen was drawn, and conforms to the CCD Encounter Location template

(templateId 2.16.840.1.113883.10.20.1.45). The value of participantRole/id/@root will be the same as the healthCareFacility in the encompassingEncounter, but here it is scoping the in-facility location where the specimen was collected, represented in the @extension.

1. **SHALL** contain [1..1] **id** (CONF:3034).
 - a. This id **SHALL** contain [1..1] **@nullFlavor="NI"** No information (CodeSystem: 2.16.840.1.113883.5.1002 HL7ActRelationshipType) **STATIC** (CONF:3210).
2. If the patient was an inpatient, an effectiveTime/low element **SHALL** be present representing the date the patient was admitted or transferred to that location. (CONF:3035).
3. **SHALL** contain [1..1] **participant** (CONF:3036).
 - a. This participant **SHALL** contain [1..1] **@typeCode="LOC"** Location (CodeSystem: 2.16.840.1.113883.5.90 HL7ParticipationType) **STATIC** (CONF:3037).
 - b. This participant **SHALL** contain [1..1] **participantRole** (CONF:3038).
 - i. This participantRole **SHALL** contain [1..1] **@classCode="SDLOC"** Service delivery location (CodeSystem: 2.16.840.1.113883.5.110 HL7RoleClass) **STATIC** (CONF:3039).
 - ii. This participantRole **SHALL** contain [1..1] **id** (CONF:3040).
 1. This id **SHALL** contain **@root** (CONF:3041).
 2. This id **SHALL** contain **@extension** (CONF:3042).
 - iii. This participantRole **SHALL** contain [1..1] **playingEntity** (CONF:3043).
 1. This playingEntity **SHALL** contain [1..1] **@classCode="PLC"** Place (CodeSystem: 2.16.840.1.113883.5.41 HL7EntityClass) **STATIC** (CONF:3044).
 2. This playingEntity **SHALL** contain [1..1] **code/@code**, which **SHALL** be selected from ValueSet 2.16.840.1.113883.13.19 NHSNHealthcareServiceLocationCode **DYNAMIC** (CONF:3045).

Figure 12: (Figure 87: Specimen collection location and admission date example)

```
<encounter classCode="ENC" moodCode="EVN">
  <templateId root="2.16.840.1.113883.10.20.5.6.54"/>

  <id nullFlavor="NI" />

  <!-- If person was an inpatient at the in-facility location
        where the specimen was taken:
        date admitted/transferred there -->
  <effectiveTime>
    <low value="20090117" />
  </effectiveTime>

  <!-- The in-facility location where the specimen was taken -->
  <participant typeCode="LOC">
    <templateId root="2.16.840.1.113883.10.20.1.45"/> <!-- CCD -->

    <participantRole classCode="SDLOC">
      <id root="2.16.840.1.113883.3.117.1.1.5.1.1" extension="9W"/>

      <playingEntity classCode="PLC">
        <code codeSystem="2.16.840.1.113883.6.259"
              codeSystemName="HL7 Healthcare Service Location Code"
              code="1029-8"
              displayName="Medical/Surgical Critical Care"/>
      </playingEntity>

    </participantRole>
  </participant>
</encounter>
```