



# **Florida Department of Health**

## **Bureau of Epidemiology**

### **Guide to Importing Data Into the National Healthcare Safety Network: Urinary Tract Infection**

# Table of Contents

<b>1. Introduction</b>	<b>4</b>
1.1 Audience	4
1.2 Schedule of Events	4
1.3 Other Help Locations	4
1.4 Things to Note when Creating a CDA File	5
<b>2. Use of Implementation Guide</b>	<b>5</b>
2.1 (1.6.1 Keywords)	5
2.2 (1.6.2 Constraints)	6
2.3 (1.6.5 Succession Management)	6
2.4 (1.8 Supporting Tool)	8
<b>3. (3.1 Summary of TemplatedId Used Across Report Types)</b>	<b>8</b>
<b>4. (2 NHSN HAI Generic Constraints)</b>	<b>9</b>
4.1 (2.1 Healthcare Associated Infection Report)	9
4.2 (2.1.1 Top-level Element)	10
4.3 (2.1.2 Document Information)	10
4.4 (2.2.2 Header Constraints, HAI Single-Patient Reports)	12
4.5 (2.1.4 The Author, Custodian and Legal Authenticator)	15
4.6 (2.1.5 Document body)	16
4.7 (2.3.1 HAI Section Generic Constraints)	17
4.8 (2.3.2 Narrative Block and @typeCode = "DRIV")	17
<b>5. Generic Constraints for UTI Numerator Report</b>	<b>18</b>
5.1 Common Header Constraints	18
5.2 (3.6 HAI Urinary Tract Infection Numerator Report (UTI))	18
5.3 (4.1.3 Infection Risk Factors Section in a UTI Report)	19
5.4 (5.2.66 Urinary Catheter Observation)	19
5.5 (5.2.24 History of Object Presence Observation)	20
5.6 (4.2.6 Infection Details Section in a UTI Report)	21
5.7 (5.2.34 Infection-type Observation)	21
5.8 (5.1.2 Criteria of Diagnosis Organizer)	25
5.9 (5.2.12 Criterion of Diagnosis Observation)	26
5.10 (5.2.55 Secondary Bloodstream Infection Observation)	28
5.11 (5.2.30 Infection Condition Observation)	28
5.12 (5.2.13 Death Observation)	29
5.13 (5.2.31 Infection Contributed to Death Observation)	30
5.14 (4.4 Findings Section in an Infection Report)	31
5.15 (5.1.3 Findings Organizer)	32
5.16 (5.2.41 Pathogen Identified Observation)	33
5.17 (5.2.43 Pathogen Ranking Observation)	35
5.18 (5.2.15 Drug-susceptibility Test Observation)	36
5.19 (5.2.35 MDRO Observation)	37

**Version Control**

Version 1.0	12/10/2010	Original version
Version 1.1	12/22/2010	Changed wording in sections 1, 1.1, 1.4, 4.8 and 5 for better clarification. Remove the 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 Urinary Tract Infection (UTI) numerator report 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) to further 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 HL7 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 [UTI-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](mailto: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 Urinary Tract Infection Numerator Report CDA file at [UTI-Num 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](mailto: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 that may arise 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 Florida Department of Health HAI website for instruction on registering with NHSN. 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.

## 2. Use of Implementation Guide

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.

### 2.1 (1.6.1 Keywords)

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 NHSN: 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 setIds	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)**

<b>Facility IDs and Facility-assigned OIDs</b>		
<b>Usage</b>	<b>OID</b>	<b>extension</b>
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
<b>Vendor IDs and Vendor-assigned OIDs</b>		
<b>Usage</b>	<b>OID</b>	<b>extension</b>
a setId	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 encompassingEncounter 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 Urinary Tract Infection Numerator Report (UTI). These requirements specify the document-level templatedId 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.

<b>HAI Implementation Guide (2.16.840.1.113883.10.20.5.4.20)</b>	
Document	Section and Clinical Statements Libraries
<b>Infection-type Reports</b>	
Urinary Tract Infection Report ( <a href="#">...20.5.11</a> )	<p>Infection Risk Factors (UTI) Section (<a href="#">...20.5.5.4</a>)</p> <ul style="list-style-type: none"> <li>• Urinary Catheter Observation (<a href="#">...20.5.6.48</a>) <ul style="list-style-type: none"> <li>◦ <i>History of Object Presence Observation</i> (<a href="#">...20.5.6.56</a>)</li> </ul> </li> </ul> <p>Infection Details (UTI) Section (<a href="#">...20.5.5.10</a>)</p> <ul style="list-style-type: none"> <li>• Infection-type Observation (<a href="#">...20.5.6.23</a>) <ul style="list-style-type: none"> <li>◦ Criteria of Diagnosis Organizer (<a href="#">...20.5.6.11</a>) <ul style="list-style-type: none"> <li>▪ Criterion of Diagnosis Observation(s) (<a href="#">...20.5.6.10</a>)</li> </ul> </li> <li>◦ Secondary Bloodstream Infection Observation (<a href="#">...20.5.2.2.7.15</a>)</li> <li>◦ Infection Condition Observation (<a href="#">...20.5.6.21</a>)</li> </ul> </li> </ul> <p><i>(If patient died)</i></p> <ul style="list-style-type: none"> <li>• <i>Death Observation</i> (<a href="#">...20.5.6.12</a>) <ul style="list-style-type: none"> <li>◦ <i>Infection Contributed to Death Observation</i> (<a href="#">...20.5.6.22</a>)</li> </ul> </li> </ul> <p>Findings Section (<a href="#">...20.5.5.15</a>)</p> <ul style="list-style-type: none"> <li>• <i>Pathogen Identified Observation (no pathogens identified)</i> (<a href="#">...20.5.2.5.1</a>)</li> </ul> <p><b>or</b></p> <ul style="list-style-type: none"> <li>• <i>Findings Organizer(s)</i> (<a href="#">...20.5.6.14</a>) <ul style="list-style-type: none"> <li>◦ Pathogen Identified Observation (<a href="#">...20.5.2.5.1</a>)</li> <li>◦ Pathogen Ranking Observation (<a href="#">...20.5.2.5.1.1</a>)</li> <li>◦ Drug-susceptibility Test Observation(s) (<a href="#">...20.5.2.5.1.2</a>)</li> </ul> </li> <li>• MDRO Observation (<a href="#">...20.5.6.24</a>)</li> </ul>

## 4. (2 NHSN HAI Generic Constraints)

Section four 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](#) 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: templateId 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. Constraints common to all HAI reports are recorded in this template.

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 [UTI-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](mailto:malbitz@cdc.gov).

## 5. Generic Constraints for UTI Numerator Report

The following section will help guide IT groups in developing the generic constraints section for a UTI 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 UTI 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 (3.6 HAI Urinary Tract Infection Numerator Report (UTI))

[ClinicalDocument: templateId 2.16.840.1.113883.10.20.5.11]

The UTI Report records an infection of the urinary tract. The preferred title is “Urinary Infection Report (UTI)”.

The date of the infection is recorded as `effectiveTime` in the Infection-type Observation (templateId 2.16.840.1.113883.10.20.5.6.23).

1. Conforms to Header Constraints, HAI Single-person Reports Template (templateId: 2.16.840.1.113883.10.20.5.4.1).
2. **SHALL** contain [1..1] `componentOf/encompassingEncounter/location/healthCareFacility/id/@extension` (CONF:3126).
3. **SHALL** contain [1..1] `componentOf/encompassingEncounter/location/healthCareFacility/code/@code`, which **SHALL** be selected from ValueSet 2.16.840.1.113883.13.19 `NHSNHealthcareServiceLocationCode` **DYNAMIC** (CONF:3127).
4. **SHALL** contain [1..1] `component/structuredBody` (CONF:2875).
  - a. This `component/structuredBody` **SHALL** contain [1..1] `component` (CONF:2876) such that it
    - i. **SHALL** contain [1..1] **Infection Risk Factors Section in a UTI Report** (templateId:2.16.840.1.113883.10.20.5.5.4) (CONF:2877).

- b. This component/structuredBody **SHALL** contain [1..1] component (CONF:2878) such that it
  - i. **SHALL** contain [1..1] **Infection Details Section in a UTI Report** (templateId:2.16.840.1.113883.10.20.5.5.10) (CONF:2879).
- c. This component/structuredBody **SHALL** contain [1..1] component (CONF:2880) such that it
  - i. **SHALL** contain [1..1] **Findings Section** (templateId:2.16.840.1.113883.10.20.5.5.15) (CONF:2881).

### 5.3 (4.1.3 Infection Risk Factors Section in a UTI Report)

[section: templateId 2.16.840.1.113883.10.20.5.5.4]

In a Urinary Tract Infection Report, the Infection Risk Factors Section contains a single Urinary Catheter Observation.

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="51898-5" Risk Factors Section (CodeSystem: 2.16.840.1.113883.6.1 LOINC) **STATIC** (CONF:2782).
3. **SHALL** contain [1..1] entry (CONF:2783).

This entry **SHALL** contain [1..1] **Urinary Catheter Observation** (templateId:2.16.840.1.113883.10.20.5.6.48) (CONF:2784).

### 5.4 (5.2.66 Urinary Catheter Observation)

[observation: templateId 2.16.840.1.113883.10.20.5.6.48]

This observation records whether the person was using a urinary catheter.

If a urinary catheter is present, set the value of @negationInd to false. If the urinary catheter is not present, set the value of @negationInd to true.

1. **SHALL** contain [1..1] @classCode="OBS" Observation (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:2456).
2. **SHALL** contain [1..1] @moodCode="EVN" Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:2457).
3. **SHALL** contain @negationInd (CONF:2458).
4. **SHALL** contain [1..1] code/@code="ASSERTION" Assertion (CodeSystem: 2.16.840.1.113883.5.4 HL7ActCode) **STATIC** (CONF:2459).
5. **SHALL** contain [1..1] statusCode/@code="completed" Completed (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:2460).
6. **SHALL** contain [1..1] value/@code="3191-4" Urinary catheter present (CodeSystem: 2.16.840.1.113883.6.277 cdcNHSN) **STATIC** (CONF:2461).
7. If a urinary catheter is not present (@negationInd="true"), an entryRelationship **SHALL** be present where the value of @typeCode is COMP

containing a History of Object Presence Observation  
(templateId:2.16.840.1.113883.10.20.5.6.56) . (CONF:4208).

**Figure 9: (Figure 2: Urinary catheter observation example)**

```
<entry>
  <observation classCode="OBS" moodCode="EVN" negationInd="false">
    <templateId root="2.16.840.1.113883.10.20.5.6.48"/>
    <code codeSystem="2.16.840.1.113883.5.4"
      code="ASSERTION"/>
    <statusCode code="completed"/>
    <value xsi:type="CD"
      codeSystem="2.16.840.1.113883.6.277"
      codeSystemName="cdcNHSN"
      code="3191-4"
      displayName="Urinary Catheter Present"/>
  </observation>
</entry>
```

## 5.5 (5.2.24 History of Object Presence Observation)

[observation: templateId 2.16.840.1.113883.10.20.5.6.56]

This observation records a fact about the history of an object's presence.

If the patient had a urinary catheter removed within 48 hours, set the value of @negationInd to false. If the patient did not have a urinary catheter removed within 48 hours, set the value of @negationInd to true.

1. **SHALL** contain [1..1] @classCode="OBS" Observation (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:4209).
2. **SHALL** contain [1..1] @moodCode="EVN" Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:4210).
3. **SHALL** contain @negationInd (CONF:4211).
4. **SHALL** contain [1..1] code/@code="ASSERTION" Assertion (CodeSystem: 2.16.840.1.113883.5.4 HL7ActCode) **STATIC** (CONF:4212).
5. **SHALL** contain [1..1] statusCode/@code="completed" Completed (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:4213).
6. **SHALL** contain [1..1] value/@code="2404-2" Removed within 48 hours prior (CodeSystem: 2.16.840.1.113883.6.277 cdcNHSN) **STATIC** (CONF:4214).

**Figure 10: (Figure 3: History of object presence observation example)**

```
<observation classCode="OBS" moodCode="EVN" negationInd="false">
  <templateId root="2.16.840.1.113883.10.20.5.6.56"/>
  <code codeSystem="2.16.840.1.113883.5.4"
    code="ASSERTION"/>
  <statusCode code="completed"/>
  <value xsi:type="CD"
    codeSystem="2.16.840.1.113883.6.277"
    codeSystemName="cdcNHSN"
    code="2404-2"
    displayName="Removed within 48 hours prior"/>
</observation>
```

## 5.6 (4.2.6 Infection Details Section in a UTI Report)

[section: templateId 2.16.840.1.113883.10.20.5.5.10]

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="51899-3" Details Section** (CodeSystem: 2.16.840.1.113883.6.1 LOINC) **STATIC** (CONF:2807).
3. **SHALL** contain [1..1] **entry** (CONF:2808) such that it
  - a. **SHALL** contain [1..1] **Infection-type Observation** (templateId:2.16.840.1.113883.10.20.5.6.23) (CONF:2809).
4. If the patient died, an **entry** element **SHALL** be present containing a Death Observation (templateId 2.16.840.1.113883.10.20.5.6.12); if the patient did not die, an **entry** element **MAY** be present containing a Death Observation (templateId 2.16.840.1.113883.10.20.5.6.12). (CONF:2810).

## 5.7 (5.2.34 Infection-type Observation)

[observation: templateId 2.16.840.1.113883.10.20.5.6.23]

The Infection-type Observation is used in all infection reports. It is an assertion of the infection type, and contains **entryRelationships** to record the “criteria”—the information used to arrive at a diagnosis of the infection type.

The value of the **id** element must be globally unique and need not be an ID used outside the document. Its function within the document is to identify this infection as being the same as that recorded in the Infection Contributed to Death Observation, if present.

1. **SHALL** contain [1..1] **@classCode="OBS" Observation** (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:2095).
2. **SHALL** contain [1..1] **@moodCode="EVN" Event** (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:2096).
3. **SHALL** contain [1..1] **@negationInd="false"** (CONF:4224).
4. **SHALL** contain [1..1] **id** (CONF:2097).

5. **SHALL** contain [1..1] `code/@code="ASSERTION"` Assertion (CodeSystem: 2.16.840.1.113883.5.4 HL7ActCode) **STATIC** (CONF:3025).
6. **SHALL** contain [1..1] `statusCode/@code="completed"` Completed (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:2099).
7. **SHALL** contain [1..1] `effectiveTime` (CONF:2100).
8. **SHALL** contain [1..1] `value/@code`, which **SHALL** be selected from ValueSet 2.16.840.1.113883.13.20 NHSNInfectionTypeCode **DYNAMIC** (CONF:2101).
9. **SHALL** contain [1..1] `entryRelationship` (CONF:2215) such that it
  - a. **SHALL** contain [1..1] `@typeCode="SPRT"` Supports (CodeSystem: 2.16.840.1.113883.5.1002 HL7ActRelationshipType) **STATIC** (CONF:2103).
  - b. **SHALL** contain [1..1] **Criteria of Diagnosis Organizer** (`templateId:2.16.840.1.113883.10.20.5.6.11`) (CONF:2102).
10. If the report is an Infection-type Report and the infection type is not BSI or a Generic Infection Report, an `entryRelationship` element **SHALL** be present where the value of `@typeCode` is REFR, containing an Infection Condition Observation (`templateId 2.16.840.1.113883.10.20.5.6.21`). In a Generic Infection Report, an `entryRelationship` element **MAY** be present where the value of `@typeCode` is REFR, containing an Infection Condition Observation (`templateId 2.16.840.1.113883.10.20.5.6.21`). (CONF:2606).
11. If the report is an Infection-type Report and the infection type is not BSI or a Generic Infection Report, an `entryRelationship` element **SHALL** be present where the value of `@typeCode` is REFR, containing a Secondary Bloodstream Infection Observation (`templateId 2.16.840.1.113883.10.20.5.2.2.7.15`). In a Generic Infection Report, an `entryRelationship` element **MAY** be present where the value of `@typeCode` is REFR, containing a Secondary Bloodstream Infection Observation (`templateId 2.16.840.1.113883.10.20.5.2.2.7.15`). (CONF:2607).
12. If the report is a BSI Report, an `entryRelationship` element **SHALL** be present where the value of `@typeCode` is COMP, containing a Bloodstream Infection Evidence Type Observation (`templateId 2.16.840.1.113883.10.20.5.6.4`). (CONF:2608).
13. If the report is an SSI Report, an `entryRelationship` element **SHALL** be present where the value of `@typeCode` is COMP, containing an Occasion of HAI Detection Observation (`templateId 2.16.840.1.113883.10.20.5.6.27`). (CONF:2609).
14. If the infection is a CDAD infection (`templateId 2.16.840.1.113883.10.20.5.6.5`), an `entryRelationship` element **SHALL** be present where the value of `@typeCode` is REFR, containing an Admission to ICU clinical statement (`templateId 2.16.840.1.113883.10.20.5.6.1`). (CONF:2610).

15. If the infection is a CDAD infection (templateId 2.16.840.1.113883.10.20.5.6.5), an entryRelationship element **SHALL** be present where the value of @typeCode is RSON, containing a CDAD-related Surgery clinical statement (templateId 2.16.840.1.113883.10.20.5.6.6). (CONF:2611).
16. If the report is a Pneumonia Infection Report an entryRelationship element **SHALL** be present where the value of @typeCode is SUBJ and the value of @inversionInd is true. The entryRelationship element **SHALL** contain a Post-Procedure Observation (templateId 2.16.840.1.113883.10.20.5.6.31). (CONF:2612).

**Table 4: (Table 1: Infection Type Value Set)**

Value Set: NHSNInfectionTypeCode 2.16.840.1.113883.13.20 Code System: cdcNHSN 2.16.840.1.113883.6.277 or SNOMED CT 2.16.840.1.113883.6.96		
Code	Code System	Meaning
431193003	SNOMED CT	Bloodstream Infection
233604007	SNOMED CT	Pneumonia
433202001	SNOMED CT	Surgical Site Infection
68566005	SNOMED CT	Urinary Tract Infection
1792-1	cdcNHSN	MDRO Infection
1795-4	cdcNHSN	CDAD Infection
Generic (Custom) Infection Report types		
312158001	SNOMED CT	Gastrointestinal Infection
1796-2	cdcNHSN	Infection of the Reproduction System
1797-0	cdcNHSN	Infection of the Ear/Eyes/Nose or Throat
50417007	SNOMED CT	Lower respiratory Infection
128402005	SNOMED CT	Infection of the cardiovascular system
128116006	SNOMED CT	Infection of the Central Nervous System
19824006	SNOMED CT	Skin or Soft Tissue Infection
1798-8	cdcNHSN	Bone or Joint Infection
91302008	SNOMED CT	Systemic Infection

**Figure 11: (Figure 4: Infection-type observation example)**

```

<observation classCode="OBS" moodCode="EVN" negationInd="false">
  <templateId root="2.16.840.1.113883.10.20.5.6.23"/>
  <id root="2.16.840.1.113883.3.117.1.1.5.1.1.XXX"
extension="21987654321"/>
  <code codeSystem="2.16.840.1.113883.5.4" code="ASSERTION"/>
  <statusCode code="completed"/>
  <effectiveTime value="20081205"/>
  <value xsi:type="CD"
    codeSystem="2.16.840.1.113883.6.277"
    codeSystemName=" cdcNHSN"
    code="1795-4"
    displayName="CDAD Infection">
  </value>

  <entryRelationship typeCode="SPRT">
    <organizer>
      <templateId root="2.16.840.1.113883.10.20.5.6.11"/>
    </organizer>
  </entryRelationship>

  ...
</observation>

```

**Figure 11: (Figure 5: Infection-type observation example)**

```
<observation classCode="OBS" moodCode="EVN" negationInd="false">
  <templateId root="2.16.840.1.113883.10.20.5.6.23"/>
  <id root="2.16.840.1.113883.3.117.1.1.5.1.1.XXX"
extension="21987654321"/>
  <code codeSystem="2.16.840.1.113883.5.4" code="ASSERTION"/>
  <statusCode code="completed"/>
  <effectiveTime value="20081205"/>
  <value xsi:type="CD"
    codeSystem="2.16.840.1.113883.6.277"
    codeSystemName=" cdcNHSN"
    code="1795-4"
    displayName="CDAD Infection">
  </value>

  <entryRelationship typeCode="SPRT">
    <organizer>
      <templateId root="2.16.840.1.113883.10.20.5.6.11"/>
    </organizer>
  </entryRelationship>

  ...
</observation>
```

## 5.8 (5.1.2 Criteria of Diagnosis Organizer)

[organizer: templateId 2.16.840.1.113883.10.20.5.6.11]

This organizer groups together the criteria used in the diagnosis of an infection. Each criterion is recorded as a Criterion of Diagnosis Observation. The organizer appears within an Infection-type Observation.

The Criteria of Diagnosis Organizer is used in several report types. The NHSN Protocol specifies which criteria are to be recorded for each report type. Those rules do not form part of this template. The NHSN submission requirement is that, in a given report type, a Criterion of Diagnosis Observation must be present for every datum required by the NHSN Protocol for that report type, with an appropriate value for @negationInd.

1. **SHALL** contain [1..1] @classCode="CLUSTER" Cluster (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:2091).
2. **SHALL** contain [1..1] @moodCode="EVN" Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:2092).
3. **SHALL** contain [1..1] statusCode/@code="completed" Completed (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:2093).
4. **SHALL** contain [1..\*] component (CONF:2195).
  - a. Such components **SHALL** contain [1..1] **Criterion of Diagnosis Observation** (templateId:2.16.840.1.113883.10.20.5.6.10) (CONF:2094).

**Figure 12: (Figure 6: Criteria of diagnosis organizer example )**

```
<organizer classCode="CLUSTER" moodCode="EVN">
  <templateId root="2.16.840.1.113883.10.20.5.6.11"/>
  <statusCode code="completed"/>
  <component>
    <observation>
      ...
    </observation>
  </component>
  ...
</organizer>
```

## 5.9 (5.2.12 Criterion of Diagnosis Observation)

[observation: templateId 2.16.840.1.113883.10.20.5.6.10]

This observation records a criterion used in the diagnosis of the infection type. It appears within the Criterion of Diagnosis Organizer.

If the Criterion of Diagnosis was used in arriving at the diagnosis of the infection type, set the value of @negationInd to false. If the criterion was not used, set the value of @negationInd to true.

The NHSN Criterion of Diagnosis value set includes the criteria for Signs & Symptoms, Laboratory Results, and Clinical Diagnosis as a single value-set. The NHSN Protocol specifies which Criterion of Diagnosis Observations must appear in each report type for which they are required. Those rules do not form part of this template.

1. **SHALL** contain [1..1] @classCode="OBS" Observation (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:2058).
2. **SHALL** contain [1..1] @moodCode="EVN" Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:2059).
3. **SHALL** contain @negationInd (CONF:2060).
4. **SHALL** contain [1..1] code/@code="ASSERTION" Assertion (CodeSystem: 2.16.840.1.113883.5.4 HL7ActCode) **STATIC** (CONF:2061).
5. **SHALL** contain [1..1] statusCode/@code="completed" Completed (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:2062).
6. **SHALL** contain [1..1] value/@code, which **SHALL** be selected from ValueSet 2.16.840.1.114222.4.11.3195 NHSNCriterionOfDiagnosisCode **DYNAMIC** (CONF:2063).

**Table 5: (Table 2: Criterion of Diagnosis Value Set (excerpt))**

Value Set: NHSNCriterionOfDiagnosisCode 2.16.840.1.114222.4.11.3195 Code System: SNOMED CT 2.16.840.1.113883.6.96 or cdcNHSN 2.16.840.1.113883.6.277		
The full table is shown in <a href="#">Criterion of Diagnosis Value Set</a> found in the Release 7 document		
Code	Code System	Meaning
2403-4	cdcNHSN	1 positive culture with ≥103 CFU/ml and < 105 CFU/ml with no more than 2 species of microorganisms
1942-2	cdcNHSN	>15 colonies cultured from IV cannula tip using semiquantitative culture method
1932-3	cdcNHSN	>=5% BAL cells w/bacteria
1938-0	cdcNHSN	4-fold rise in L. pneumophila antibody titer
1935-6	cdcNHSN	4-fold rise in paired sera for pathogen
128477000	SNOMED CT	Abscess
255320000	SNOMED CT	Purulent drainage or material
422400008	SNOMED CT	Vomiting
...		

**Figure 13: (Figure 7: Criterion of diagnosis observation examples)**

```

<observation classCode="OBS" moodCode="EVN" negationInd="false">
  <templateId root="2.16.840.1.113883.10.20.5.6.10"/>
  <code codeSystem="2.16.840.1.113883.5.4" code="ASSERTION"/>
  <statusCode code="completed"/>
  <value xsi:type="CD"
    codeSystem="2.16.840.1.113883.6.96"
    codeSystemName="SNOMED"
    code="255320000"
    displayName="Purulent drainage"/>
</observation>

<observation classCode="OBS" moodCode="EVN" negationInd="true">
  <templateId root="2.16.840.1.113883.10.20.5.6.10"/>
  <code codeSystem="2.16.840.1.113883.5.4" code="ASSERTION"/>
  <statusCode code="completed"/>
  <value xsi:type="CD"
    codeSystem="2.16.840.1.113883.6.96"
    codeSystemName="SNOMED"
    code="386661006"
    displayName="Fever"/>
</observation>

```

## 5.10 (5.2.55 Secondary Bloodstream Infection Observation)

[observation: templateId 2.16.840.1.113883.10.20.5.2.2.7.15]

This observation records whether a secondary bloodstream infection was present.

If a secondary bloodstream infection was present, set the value of observation/@negationInd to false. If a secondary bloodstream infection was not present, set the value of observation/@negationInd to true.

1. **SHALL** contain [1..1] @classCode="OBS" Observation (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:2150).
2. **SHALL** contain [1..1] @moodCode="EVN" Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:2151).
3. **SHALL** contain @negationInd (CONF:2224).
4. **SHALL** contain [1..1] code/@code="ASSERTION" Assertion (CodeSystem: 2.16.840.1.113883.5.4 HL7ActCode) **STATIC** (CONF:2152).
5. **SHALL** contain [1..1] statusCode/@code="completed" Completed (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:2153).
6. **SHALL** contain [1..1] value/@code="3111-2" Secondary bloodstream infection (CodeSystem: 2.16.840.1.113883.6.277 cdcNHSN) **STATIC** (CONF:2154).

**Figure 14: (Figure 8: Secondary bloodstream infection observation example)**

```
<observation classCode="OBS" moodCode="EVN" negationInd="false" ">
  <templateId root="2.16.840.1.113883.10.20.5.2.2.7.15"/>
  <code code="ASSERTION"
    codeSystem="2.16.840.1.113883.5.4"/>
  <statusCode code="completed"/>
  <value
    xsi:type="CD"
    code="3111-2"
    codeSystem="2.16.840.1.113883.6.277"
    codeSystemName="cdcNHSN"
    displayName="Secondary bloodstream infection"/>
</observation>
```

## 5.11 (5.2.30 Infection Condition Observation)

[observation: templateId 2.16.840.1.113883.10.20.5.6.21]

This observation records the infection condition being reported.

1. **SHALL** contain [1..1] @classCode="OBS" Observation (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:2145).
2. **SHALL** contain [1..1] @moodCode="EVN" Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:2146).
3. **SHALL** contain [1..1] @negationInd="false" (CONF:4217).

4. **SHALL** contain [1..1] `code/@code="ASSERTION"` Assertion (CodeSystem: 2.16.840.1.113883.5.4 HL7ActCode) **STATIC** (CONF:2147).
5. **SHALL** contain [1..1] `statusCode/@code="completed"` Completed (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:2148).
6. **SHALL** contain [1..1] `value/@code`, which **SHALL** be selected from ValueSet 2.16.840.1.114222.4.11.3196 NHSNInfectionConditionCode **STATIC** 20090625 (CONF:2149).

**Table 6: (Table 3: Infection Condition Value Set (excerpt))**

Value Set: NHSNInfectionConditionCode 2.16.840.1.114222.4.11.3196 Code System: SNOMED CT 2.16.840.1.113883.6.96 or cdcNHSN 2.16.840.1.113883.6.277		
The full table is shown in <a href="#">Infection Condition Value Set</a> found in the Release 7 document		
Code	Code System	Meaning
1623-8	cdcNHSN	Arterial or venous infection
2402-6	cdcNHSN	Asymptomatic Bacteremic UTI (ABUTI)
1601-4	cdcNHSN	Breast abscess or mastitis
1625-3	cdcNHSN	Symptomatic UTI (SUTI)
...		

**Figure 15: (Figure 9: Infection condition observation example)**

```

<observation classCode="OBS" moodCode="EVN" negationInd="false">
  <templateId root="2.16.840.1.113883.10.20.5.6.21"/>
  <code codeSystem="2.16.840.1.113883.5.4" code="ASSERTION"/>
  <statusCode code="completed"/>
  <value xsi:type="CD"
    codeSystem="2.16.840.1.113883.6.277"
    codeSystemName="cdcNHSN "
    code="1601-4"
    displayName=" Breast abscess or mastitis"/>
</observation>

```

## 5.12 (5.2.13 Death Observation)

[observation: templateId 2.16.840.1.113883.10.20.5.6.12]

This observation records whether the patient died and, if so, whether the infection being recorded contributed to that death.

If the patient died, set the value of @negationInd to false. If the patient did not die, set the value of @negationInd to true.

If the patient died, the Death Observation must also indicate whether the infection contributed to the death using an entryRelationship element containing an Infection Contributed to Death Observation. An inversionInd attribute on this entryRelationship element indicates that it should be interpreted as if the roles of the source and target entries were reversed. Thus,

the observation reports whether the infection “supported” (contributed to) the death. The CAUS value does not have the force of “cause of death” on a death certificate; it indicates that the infection is causal or contributory to the death.

1. **SHALL** contain [1..1] **@classCode="OBS"** Observation (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:2081).
2. **SHALL** contain [1..1] **@moodCode="EVN"** Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:2082).
3. **SHALL** contain **@negationInd** (CONF:2083).
4. **SHALL** contain [1..1] **code/@code="ASSERTION"** Assertion (CodeSystem: 2.16.840.1.113883.5.4 HL7ActCode) **STATIC** (CONF:2084).
5. **SHALL** contain [1..1] **statusCode/@code="completed"** Completed (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:2085).
6. **SHALL** contain [1..1] **value/@code="419099009"** Dead (CodeSystem: 2.16.840.1.113883.6.96 SNOMEDCT) **STATIC** (CONF:2086).
7. If the patient died, an entryRelationship element **SHALL** be present where the value of **@typeCode** is CAUS (causal or contributory) and the value of **@inversionInd** is true. The entryRelationship **SHALL** contain an Infection Contributed to Death Observation (templateId 2.16.840.1.113883.10.20.5.6.22). If the infection contributed to death, the value of entryRelationship/**@negationInd** **SHALL** be false. If the infection did not contribute to the death, the value of **@negationInd** **SHALL** be true. (CONF:2599).

**Figure 16: (Figure 10: Death observation example – patient did not die)**

```

<!-- "Dead" is negated = patient did not die -->
<observation classCode="OBS" moodCode="EVN" negationInd="true">
  <templateId root="2.16.840.1.113883.10.20.5.6.12"/>
  <code codeSystem="2.16.840.1.113883.5.4"
    code="ASSERTION"/>
  <statusCode code="completed"/>
  <value xsi:type="CD"
    code="419099009"
    codeSystem="2.16.840.1.113883.6.96"
    codeSystemName="SNOMED"
    displayName="Dead"/>
</observation>

```

### 5.13 (5.2.31 Infection Contributed to Death Observation)

[observation: templateId 2.16.840.1.113883.10.20.5.6.22]

In some HAI Reports this observation is required in a Death Observation if the patient died.

1. **SHALL** contain [1..1] **@classCode="OBS"** Observation (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:2045).
2. **SHALL** contain [1..1] **@moodCode="EVN"** Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:2046).
3. **SHALL** contain [1..1] **code/@code="ASSERTION"** Assertion (CodeSystem: 2.16.840.1.113883.5.4 HL7ActCode) **STATIC** (CONF:2049).

4. **SHALL** contain [1..1] **id** (CONF:2047).
5. The value of the **id** **SHALL** be the same as the value of the **id** element in the Infection-type Observation (**templateId** 2.16.840.1.113883.10.20.5.6.23). (CONF:2048).
6. **SHALL** contain [1..1] **statusCode/@code="completed"** Completed (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:2050).

**Figure 17: (Figure 11: Infection contributed to death observation example)**

```

<!-- patient did die -->
<observation classCode="OBS" moodCode="EVN" negationInd="false">
  <templateId root="2.16.840.1.113883.10.20.5.6.12"/>
  <code codeSystem="2.16.840.1.113883.5.4"
    code="ASSERTION"/>
  <statusCode code="completed"/>
  <value xsi:type="CD"
    code="419099009"
    codeSystem="2.16.840.1.113883.6.96"
    codeSystemName="SNOMED"
    displayName="Dead"/>

  <!--infection did not contribute to death -->
  <entryRelationship typeCode="CAUS" inversionInd="true"
    negationInd="true">
    <observation classCode="OBS" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.5.6.22"/>
      <id root="2.16.840.1.113883.3.117.1.1.5.1.1.XXX"
        extension="21987654321"/>
      <code codeSystem="2.16.840.1.113883.5.4"
        code="ASSERTION" />
      <statusCode code="completed"/>
    </observation>
  </entryRelationship>
</observation>

```

## 5.14 (4.4 Findings Section in an Infection Report)

[section: **templateId** 2.16.840.1.113883.10.20.5.5.15]

The Findings Section records whether infection organisms were identified and, if so, records details about them. Several NHSN Report types, such as the BSI and SSI Reports, include this section. The LOINC code and **templateId** are the same in all report types, and the information recorded is the same in each report type, with the following exceptions: in an MDRO/CDAD Infection Report, two additional clinical statements are required; the Generic Infection Report does not require an MDRO Observation.

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:2120).
3. If no pathogens were identified, the Findings Section **SHALL** contain a single entry element containing a Pathogen Identified Observation (**templateId**

- 2.16.840.1.113883.10.20.5.2.5.1) reporting that no pathogens were identified. (CONF:2605).
4. If pathogens were identified, the Findings Section **SHALL** contain at least one and no more than three `entry` elements containing a Findings Organizer (`templateId` 2.16.840.1.113883.10.20.5.6.14) reporting pathogens identified. (CONF:2207).
  5. If pathogens were identified, and the report is not a Generic Infection Report, an `entry` element where the value of `@typeCode` is `COMP` **SHALL** be present containing an MDRO Observation (`templateId` 2.16.840.1.113883.10.20.5.6.24). (CONF:2123).
  6. If pathogens were identified and the report is an MDRO/CDAD Infection Report, an `entry` element **SHALL** be present where the value of `@typeCode` is `COMP`, containing a Significant Pathogens Observation (`templateId` 2.16.840.1.113883.10.20.5.6.41). (CONF:2208).
  7. If pathogens were identified and the report is an MDRO/CDAD Infection Report, an `entry` element **SHALL** be present where the value of `@typeCode` is `COMP`, containing a CDAD Observation (`templateId` 2.16.840.1.113883.10.20.5.6.5). (CONF:2127).

**Figure 18: (Figure 12: Findings 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>Findings</title>
  ...
</section>

```

### 5.15 (5.1.3 Findings Organizer)

[`organizer: templateId` 2.16.840.1.113883.10.20.5.6.14]

Each Findings Organizer represents a set of information concerning a single pathogen identified. The organizer contains two `component` elements that record the pathogen and its rank in regard to the other pathogens identified, and can contain additional `component` elements recording drug-susceptibility test findings.

For bacterial pathogens, at least one drug-susceptibility test result is required. For nonbacterial pathogens, drug-susceptibility test results are not required.

1. **SHALL** contain [1..1] `@classCode="CLUSTER"` Cluster (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:2075).
2. **SHALL** contain [1..1] `@moodCode="EVN"` Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:2076).
3. **SHALL** contain [1..1] `statusCode/@code="completed"` Completed (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:2077).
4. **SHALL** contain [1..1] `component` (CONF:2200) such that it

- a. **SHALL** contain [1..1] **Pathogen Identified Observation** (templateId:2.16.840.1.113883.10.20.5.2.5.1) (CONF:2078).
5. **SHALL** contain [1..1] **component** (CONF:2201) such that it
  - a. **SHALL** contain [1..1] **Pathogen Ranking Observation** (templateId:2.16.840.1.113883.10.20.5.2.5.1.1) (CONF:2079).
6. If the pathogen is a bacterial pathogen, at least one **component element SHALL** be present containing a **Drug-susceptibility Test Observation** (templateId 2.16.840.1.113883.10.20.5.2.5.1.2). (CONF:2204).

**Figure 19: (Figure 13: Findings organizer example)**

```

<organizer classCode="CLUSTER" moodCode="EVN">
  <templateId root="2.16.840.1.113883.10.20.5.6.14"/>

  <component>
    <observation classCode="OBS" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.5.2.5.1"/>
      ...
    </observation>
  </component>

  <component>
    <observation classCode="OBS" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.5.2.5.1.1"/>
      ...
    </observation>
  </component>

  <component>
    <observation classCode="OBS" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.5.2.5.1.2"/>
      ...
    </observation>
  </component>
</organizer>

```

## 5.16 (5.2.41 Pathogen Identified Observation)

[observation: templateId 2.16.840.1.113883.10.20.5.2.5.1]

A Pathogen Identified Observation either represents a pathogen identified (in which case it appears in an organizer with detail about the pathogen) or records that no pathogens were identified.

In many cases, the value-set table provides a code for an unspecified species, for example, “*Acidaminococcus species*” (SNOMED CT 131202007, NHSN ACISP), for use when a more precise code is not available. The code for an unspecified species is preferred to a genus-level code.

The NHSN Pathogen Code Value Set includes a code for the case in which no pathogens were identified.

1. **SHALL** contain [1..1] **@classCode="OBS" Observation** (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:2040).

2. **SHALL** contain [1..1] **@moodCode="EVN"** Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:2041).
3. **SHALL** contain [1..1] **code/@code="41852-5"** Microorganism identified (CodeSystem: 2.16.840.1.113883.6.1 LOINC) **STATIC** (CONF:2042).
4. **SHALL** contain [1..1] **statusCode/@code="completed"** Completed (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:2043).
5. **SHALL** contain [1..1] **value/@code**, which **SHALL** be selected from ValueSet 2.16.840.1.113883.13.16 NHSNPathogenCode **DYNAMIC** (CONF:2044).

**Table 7: (Table 4: Pathogen Value Set (excerpt))**

Value Set: NHSNPathogenCode 2.16.840.1.113883.13.16 Code System: SNOMED CT 2.16.840.1.113883.6.96 or cdcNHSN 2.16.840.1.113883.6.277			
The full table is shown in <a href="#">Pathogen Value Set</a> found in the Release 7 document			
Category	cdcNHSN	Display Name	SDO Fully Specified Name
--	3119-7	No pathogen identified	
Category	SNOMED CT Concept ID	Display Name	SNOMED CT Fully Specified Name
BACTERIUM	372391001	<i>Abiotrophia</i> species	<i>Abiotrophia</i> species (organism)
PARASITE	50875003	<i>Acanthamoeba</i>	<i>Acanthamoeba</i> (organism)
BACTERIUM	413423003	<i>Achromobacter</i> spp.	<i>Achromobacter</i> species (organism)
BACTERIUM	413424009	<i>Achromobacter xylosoxidans</i>	<i>Achromobacter xylosoxidans</i> (organism)
BACTERIUM	48321006	<i>Clostridium symbiosum</i>	<i>Clostridium symbiosum</i> (organism)
BACTERIUM	116197008	<i>Staphylococcus coagulase negative</i>	<i>Staphylococcus</i> , coagulase negative (organism)
...			

**Figure 20: (Figure 14: Pathogen identified observation example)**

```
<observation classCode="OBS" moodCode="EVN">
  <templateId root="2.16.840.1.113883.10.20.5.2.5.1"/>
  <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"
        code="116197008"
        displayName="Staphylococcus, coagulase negative (organism)"/>
</observation>
```

### 5.17 (5.2.43 Pathogen Ranking Observation)

[observation: templateId 2.16.840.1.113883.10.20.5.2.5.1.1]

The NHSN pathogen findings record up to three pathogens. This observation records the relative importance of a pathogen in that set with respect to its role in the infection.

The value is a coded ordinal, where the value of @code is the number 1 or 2 or 3: 1 represents the highest-ranked pathogen of up to three pathogens recorded.

1. **SHALL** contain [1..1] @classCode="OBS" Observation (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:2032).
2. **SHALL** contain [1..1] @moodCode="EVN" Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:2033).
3. **SHALL** contain [1..1] code/@code="ASSERTION" Assertion (CodeSystem: 2.16.840.1.113883.5.4 HL7ActCode) **STATIC** (CONF:2034).
4. **SHALL** contain [1..1] statusCode/@code="completed" Completed (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:2035).
5. **SHALL** contain [1..1] value (CONF:2039).
6. The value of value/@xsi:type **SHALL** be CO (Coded Ordinal), the value of value/@codeSystem **SHALL** be 2.16.840.1.113883.6.277 cdcNHSN, and the value of value/@code **SHALL** be the number 1 or 2 or 3, where 1 represents the highest-ranked pathogen of up to three pathogens recorded. (CONF:2915).

**Figure 21: (Figure 15: Pathogen ranking observation example)**

```
<observation classCode="OBS" moodCode="EVN">
  <templateId root="2.16.840.1.113883.10.20.5.2.5.1.1"/>
  <code codeSystem="2.16.840.1.113883.5.4"
    codeSystemName="HL7"
    code="ASSERTION"/>
  <statusCode code="completed"/>
  <value xsi:type="CO"
    codeSystem="2.16.840.1.113883.6.277"
    codeSystemName="cdcNHSN"
    code="1"
    displayName="Pathogen ranking 1"/>
</observation>
```

**5.18 (5.2.15 Drug-susceptibility Test Observation)**

[observation: templateId 2.16.840.1.113883.10.20.5.2.5.1.2]

This observation uses two codes, one to identify the drug, and the other to record the pathogen’s susceptibility to it. A LOINC code represents a methodless isolate drug-susceptibility test, an HL7 ObservationInterpretation code represents the susceptibility finding.

1. **SHALL** contain [1..1] **@classCode="OBS"** Observation (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:2028).
2. **SHALL** contain [1..1] **@moodCode="EVN"** Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:2029).
3. **SHALL** contain [1..1] **code/@code**, which **SHALL** be selected from ValueSet 2.16.840.1.113883.13.15 NHSNDrugSusceptibilityTestCode **DYNAMIC** (CONF:2030).
4. **SHALL** contain [1..1] **statusCode/@code="completed"** Completed (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:2036).
5. **SHALL** contain [1..1] **interpretationCode** (CONF:2031).
6. If the interpretation result is known, the value of **interpretationCode/@code** **SHALL** be selected from Value Set 2.16.840.1.113883.13.13 NHSNDrugSusceptibilityFindingCode **STATIC** 20080130. If the drug was not tested, the value of **@nullFlavor** **SHALL** be NASK. (CONF:2135).

**Table 8: (Table 5: Drug-susceptibility Tests Value Set (excerpt))**

Value Set: NHSNDrugSusceptibilityTestsCode 2.16.840.1.113883.13.15 Code System: LOINC 2.16.840.1.113883.6.1		
The full table is shown in <a href="#">Drug-susceptibility Tests Value Set</a> found in the Release 7 document		
Code	Code System	Meaning
18860-7	LOINC	Amikacin Susc Islt
18862-3	LOINC	Amoxicillin+Clav Susc Islt

Value Set: NHSNDrugSusceptibilityTestsCode 2.16.840.1.113883.13.15 Code System: LOINC 2.16.840.1.113883.6.1		
The full table is shown in <a href="#">Drug-susceptibility Tests Value Set</a> found in the Release 7 document		
Code	Code System	Meaning
18907-6	LONIC	Clarithro Susc Islt
...	LOINC	...

**Table 9: (Table 6: Drug-susceptibility Finding Value Set)**

Value Set: NHSNDrugSusceptibilityFindingCode 2.16.840.1.113883.13.13 Code System: HL7 ObservationInterpretation 2.16.840.1.113883.5.83		
Code	Code System	Meaning
S	HL7 ObservationInterpretation	Susceptible
I	HL7 ObservationInterpretation	Intermediate
R	HL7 ObservationInterpretation	Resistant

**Figure 22: (Figure 16: Drug-susceptibility test observation example)**

```

<observation classCode="OBS" moodCode="EVN">
  <templateId root=" 2.16.840.1.113883.10.20.5.2.5.1.2" />
  <code codeSystem="2.16.840.1.113883.6.1"
    codeSystemName="LOINC"
    code="19000-9"
    displayName="Vancomycin Susc Islt"/>
  <statusCode code="completed"/>
  <interpretationCode codeSystem="2.16.840.1.113883.5.83"
    codeSystemName="HL7 Observation Interpretation"
    code="S"
    displayName="susceptible"/>
</observation>

```

## 5.19 (5.2.35 MDRO Observation)

[observation: templateId 2.16.840.1.113883.10.20.5.6.24]

This observation records whether the primary infection being reported was caused by a multi-drug-resistant organism (MDRO). It is a general or summary observation not associated with any individual pathogen in the Findings Section.

If the infection organism was multi-drug resistant, set the value of @negationInd to false. If the infection organism was not multi-drug resistant, set the value of @negationInd to true.

1. **SHALL** contain [1..1] @classCode="OBS" Observation (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) **STATIC** (CONF:2023).
2. **SHALL** contain [1..1] @moodCode="EVN" Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActMood) **STATIC** (CONF:2024).

3. **SHALL** contain `@negationInd` (CONF:2025).
4. **SHALL** contain `[1..1] code/@code="ASSERTION"` Assertion (CodeSystem: 2.16.840.1.113883.5.4 HL7ActCode) **STATIC** (CONF:2026).
5. **SHALL** contain `[1..1] statusCode/@code="completed"` Completed (CodeSystem: 2.16.840.1.113883.5.14 HL7ActStatus) **STATIC** (CONF:2037).
6. **SHALL** contain `[1..1] value/@code="1792-1"` MDRO Infection (CodeSystem: 2.16.840.1.113883.6.277 cdcNHSN) **STATIC** (CONF:2027).

**Figure 23: (Figure 17: MDRO observation example)**

```

<!-- The observation is negated, i.e. MDRO=no -->
<observation classCode="OBS" moodCode="EVN" negationInd="true">
  <templateId root="2.16.840.1.113883.10.20.5.6.24"/>
  <code codeSystem="2.16.840.1.113883.5.4" code="ASSERTION"/>
  <statusCode code="completed"/>
  <value xsi:type="CD"
    codeSystem="2.16.840.1.113883.6.277"
    codeSystemName="cdcNHSN"
    code="1792-1"
    displayName="MDRO Infection"/>
</observation>

```