CDAR2\_IG\_HAIRPT\_R3\_D2\_2017JUL\_

Vol3\_AU\_AR\_Appendix



**HL7 CDA® R2 Implementation Guide:**

**NHSN Healthcare Associated Infection (HAI) Reports**

**Release 3, STU 2—US Realm**

**Volume 3—Appendix:**

**Antimicrobial Resistance (AR) and**

**Antimicrobial Use (AU)**

**Subset For Implementers**

July 2017

**Release 3, 2nd HL7 Standard for Trial Use (STU)**

**Sponsored by:   
Structured Documents Work Group**

**National Healthcare Safety Network**

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Acknowledgments

This implementation guide was produced and developed by Lantana Consulting Group in conjunction with the Division of Healthcare Quality Promotion in the National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) at the Centers for Disease Control and Prevention (CDC). Its development and ultimate deployment is a result of the dedication of the team—led by Daniel A. Pollock, M.D., Surveillance Branch Chief, Division of Healthcare Quality Promotion, NCEZID, CDC—and their support of the development of interoperable data standards for the CDC’s National Healthcare Safety Network (NHSN).

The best standards are those driven by business requirements. A strong set of Healthcare Associated Infection (HAI) surveillance application vendors monitor, evaluate, and test each release of this guide.

Past contributors: The vendors who participated in the 2007-2008 pilot activities of Bloodstream Infection Reports and Surgical Site Infection deserve special thanks and acknowledgment: MedMined™ services from Cardinal Health, EpiQuest, ICPA, Premier, TheraDoc, and Vecna Technologies. Throughout the development of this guide, Marla Albitz provided essential translation of NHSN business and technical requirements so that Kate Hamilton, Bob Dolin, Rick Geimer, and Susan Hardy could turn those requirements into a CDA-compliant specification. Liora Alschuler provided oversight and review. Additional contributors to the DSTU releases have been Jonathan Edwards, Maggie Dudeck, Dawn Sievert, Teresa Horan, Mary Andrus, Melinda Neuhauser, Ruby Phelps, Mindy Durrance, Alicia Shugart, Tygh Walker, Chris Cole, Cindy Gross, and Scott Fridkin (data specifications); Wenkai Li, Pavla Frazier, Gaye Dolin, Margaret Marshburn, Rob Hausam, Sundak Ganesan, and Denny Cordy (vocabulary); Kelly Peterson (database administration); Venu Sarraff (data importation); and Brett Marquard and Lauren Wood (project management and technical editing). We also thank Ted Klein, Cecil Lynch, and Daniel Vreeman for timely issuance of identifiers and codes.

This specification is a set of constraints on existing work, and the extent to which it can accommodate the expressive requirements of HAI reporting over time is a function of the richness of the model on which it is built, the Health Level Seven (HL7) Reference Information Model (RIM) and the RIM document standard, and the Clinical Document Architecture Release 2 (CDA R2). We thank all those who have worked for over a decade to produce these fundamental specifications.

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# Introduction

Purpose

This appendix is a stand-alone document containing the CDA implementation guidance for Single-Person (Numerator) and Summary (Denominator) Reports dealing with Antimicrobial Resistance (AR) and Antimicrobial Use (AU) data. These reports are the Antimicrobial Resistance Option (ARO) Summary Report (Denominator), the Antimicrobial Use (AUP) Summary Report (Denominator), and the HAI AUR Antimicrobial Resistance Option (ARO) Report (Numerator).

The templates contained in this appendix document are exact copies of the AU and AR templates contained in *HL7 Implementation Guide for CDA® Release 2: NHSN Healthcare Associated Infection (HAI) Reports Release 3, DSTU 2—US Realm, Volume 2 - Templates and Supporting Material.*

This appendix also contains much of the material presented in the *HL7 Implementation Guide for CDA® Release 2: NHSN Healthcare Associated Infection (HAI) Reports Release 3, DSTU 2—US Realm, Volume 1 - Introductory Material.*

Audience

The audience for this work is all developers of software systems who want to enable their systems for reporting HAI data to the NHSN.

Organization of the Appendix

Introductory Material

These chapters provide an overview of Clinical Document Architecture (CDA), recent changes to the standard, and information on how to understand and use the CDA templates provided.

* **Chapter 1—Introduction**
* **Chapter 2—CDA R2 Background** contains selected background material on the CDA Release 2 (CDA R2) base standard to aid the reader in conceptualizing the “templated CDA” approach to implementation guide development.
* **Chapter 3—Design Considerations** describes design considerations and overarching principles that have been developed and applied across the CDA templates in this guide. Material in this section can be thought of as “heuristics”, as opposed to the formal and testable constraints found in chapters 5 through 7 of this guide.
* **Chapter 4—Using This Implementation Guide** describes the rules and formalisms used to constrain the CDA R2 standard. It describes the formal representation of CDA templates, the mechanism by which templates are bound to vocabulary, and additional information necessary to understand and correctly implement the normative content found in chapters 5 through 7 of this guide.

CDA Templates and Supporting Material

* **Chapter 5—Document-Level Templates** defines the report requirements for HAI CDA documents.

The Healthcare Associated Infection Report requirements apply to any HAI CDA document. They apply to constraints on the CDA header and sections, and include the requirement that the body be represented by a structuredBody element.

The header requirements for population summary reports and for single-person reports differ significantly. HAI defines a generic header template for each of these two sets of requirements. Report-specific templates give additional requirements for each report type in this guide.

* **Chapter 6—Section-Level Templates** defines the generic constraints that apply to all sections along with specific requirements for each section used by the HAI reports in this guide.
* **Chapter 7—Entry-Level Templates** defines clinical statements. Machine processable data are sent in the entry templates. The entry templates are referenced by one or more section templates. Entry-level templates are always contained in section-level templates, and section-level templates are always contained in a document. Requirements for all entries (including organizers) used by the reports in this guide are in alphabetical order.
* **Chapter 8—Template IDs in This Guide** lists the template identifiers used by this guide for HAI reporting to NHSN. These template identifiers are assigned at the document, section, and entry level. Tables list NHSN templates by type and name and by containment.
* **Chapter 9—Value Sets in This Guide** lists all value set names and OIDs used by HAI templates in this guide. Links are provided to external value set sources if appropriate. Additionally, the hai\_voc.xls spreadsheet is provided as a resource for value-set information.
* **Chapter 10—Code Systems in This Guide** lists all code system names and OIDs used by HAI templates in this guide, both for value sets and single-value bindings.
* **Chapter 11—Changes From Previous Version** details all changes made in templates for this release.
* **Chapter 12—References**lists documents and sources cited by this guide.
* **Appendices** include a list of acronyms and abbreviations, example instance identifiers, and vocabulary heuristics for code systems and value sets.

Example Instance Identifiers

Much of the initial development of this guide was driven by a pilot project in July 2007. The pilot project used object identifiers (OIDs) assigned to a fictional facility and vendor to illustrate the numbering schemes for which facilities and vendors are responsible.

Except for the example patient identifiers, the example code in this document and the accompanying sample files use these pilot OIDs. Example patient identifiers use the HL7 example OID. In practice, the identifiers will be assigned by facilities and software applications submitting reports to NHSN.

These pilot instance identifiers begin with 2.16.840.1.113883.3.117.1.1.5; HL7 example identifiers begin with 2.16.840.1.113883.19.5. They are used throughout this guide and are documented in the appendix on [Example Instance Identifiers (Non-normative).](#App_Example_Instance_Identifers)

# CDA R2 Background

This implementation guide uses the *HL7 Clinical Document Architecture, Release 2.0 (CDA R2)* as its base standard.[[1]](#footnote-1) CDA R2 is “… a document markup standard that specifies the structure and semantics of ‘clinical documents’ for the purpose of exchange” [CDA R2, Section 1.1]. Clinical documents, according to CDA, have the following characteristics:

* Persistence
* Stewardship
* Potential for authentication
* Context
* Wholeness
* Human readability

CDA defines a header that for classification and management and a document body that carries the clinical record. While the header metadata are prescriptive and designed for consistency across all instances, the body is highly generic, leaving the designation of semantic requirements to implementation.

Templated CDA

CDA R2 can be constrained by mechanisms defined in the “Refinement and Localization”[[2]](#footnote-2) section of the *HL7 Version 3 Interoperability Standards*. The mechanism most commonly used to constrain CDA is referred to as “templated CDA”. In this approach, a library is created containing modular CDA templates such that the templates can be reused across any number of CDA document types, as shown in the following figure.

Figure 1: Templated CDA



Many different kinds of templates may be created. Among them, the most common are:

* **Document-level templates:** These templates constrain fields in the CDA header, and define containment relationships to CDA sections. For example, a History-and-Physical document-level template might require that the patient’s name be present, and that the document contain a Physical Exam section.
* **Section-level templates:** These templates constrain fields in the CDA section, and define containment relationships to CDA entries. For example, a Physical-exam section-level template might require that the section/code be fixed to a particular LOINC code, and that the section contain a Systolic Blood Pressure observation.
* **Entry-level templates:** These templates constrain the CDA clinical statement model in accordance with real world observations and acts. For example, a Systolic-blood-pressure entry-level template defines how the CDA Observation class is constrained (how to populate observation/code, how to populate observation/value, etc.) to represent the notion of a systolic blood pressure.

A CDA implementation guide (such as this one) includes reference to those templates that are applicable. On the implementation side, a CDA instance populates the template identifier (templateId) field where it wants to assert conformance to a given template. On the receiving side, the recipient can then not only test the instance for conformance against the CDA XML schema, but also test the instance for conformance against asserted templates.

Template identifiers are critical to the validation methods chosen at this time for submissions to the NHSN. NHSN may reject as nonconformant instances that do not conform to the template identifier constraints defined here.

Please reference the NHSN webpage (<http://www.cdc.gov/nhsn/>) to identify which HAI release NHSN currently supports for a given report.

Change Notification Process

CDC maintains an e-mail list of contacts at organizations interested in or responsible for implementations of CDA for HAI reporting to NHSN. To be added to the list, send a request with your contact information to [nhsncda@cdc.gov](mailto:nhsncda@cdc.gov). CDC uses the list for e-mail notifications of changes, including new data requirements. Changes may apply to this guide and to other documents such as business rules that are needed to implement and support CDA for HAI reporting to NHSN. NHSN CDA related information may be found at <https://www.cdc.gov/nhsn/cdaportal/index.html>.

# Design Considerations

Design considerations describe overarching principles that have been developed and applied across the CDA templates in this guide. Material in this section can be thought of as “heuristics”, as opposed to the formal and testable constraints found in chapters 5 through 7 of this guide.

Rendering Header Information for Human Presentation

Metadata carried in the header may already be available for rendering from electronic health records (EHRs) or other sources external to the document; therefore, there is no strict requirement to render directly from the document. An example of this would be a doctor using an EHR that already contains the patient’s name, date of birth, current address, and phone number. When a CDA document is rendered within that EHR, those pieces of information may not need to be displayed since they are already known and displayed within the EHR’s user interface.

Good practice recommends that the following be present whenever the document is viewed:

* Document title and document dates
* Service and encounter types, and date ranges as appropriate
* Names of all persons along with their roles, participations, participation date ranges, identifiers, address, and telecommunications information
* Names of selected organizations along with their roles, participations, participation date ranges, identifiers, address, and telecommunications information
* Date of birth for recordTarget(s)

Unknown and No Known Information

Information technology solutions store and manage data, but sometimes data are not available. An item may be unknown, not relevant, or not computable or measurable, such as where a patient arrives at an Emergency Department unconscious and with no identification.

In many cases, the CDA standard will stipulate that a piece of information is required (e.g., via a **SHALL** conformance verb). However, in most of these cases, the standard provides an “out”, allowing the sender to indicate that the information isn’t known.

Here, we provide guidance on representing unknown information. Further details can be found in the HL7 V3 Data Types, Release One specification that accompanies the CDA R2 normative standard.

A “@nullFlavor” attribute may be used to indicate that information is unknown. Allowable values for populating the attribute give more details about the reason the information is unknown, as shown in the following example.

***Figure*** 2: nullFlavor Example

<!-- CDA requires the consumable element, however NHSN does not

collect further information about the antifungal -->

<consumable>

<manufacturedProduct>

<templateId root="2.16.840.1.113883.10.20.22.4.37"/>

<manufacturedMaterial>

<code nullFlavor="NI"/>

</manufacturedMaterial>

</manufacturedProduct>

</consumable>

Use null flavors for unknown, required, or optional attributes, where allowed per the NHSN protocol:

NI No information. This is the most general and default null flavor.

NA Not applicable. Known to have no proper value (e.g., last menstrual period for a male).

UNK Unknown. A proper value is applicable, but is not known.

ASKU Asked, but not known. Information was sought, but not found (e.g., the patient was asked but did not know).

NAV Temporarily unavailable. The information is not available, but is expected to be available later.

NASK Not asked. The patient was not asked.

MSK There is information on this item available but it has not been provided by the sender due to security, privacy, or other reasons. There may be an alternate mechanism for gaining access to this information.

OTH The actual value is not an element in the value domain of a variable. (e.g., concept not provided by required code system).

The list above contains those null flavors that are commonly used in clinical documents. For the full list and descriptions, see the nullFlavor vocabulary domain in the CDA R2 normative standard.

Unless a nullFlavor is explicitly stated in a constraint in the IG, nullFlavors are not allowed.

Figure 3: Attribute Required—nullFlavor not allowed

**1. SHALL** contain exactly one [1..1] code (CONF:15407).

a. This code **SHALL** contain exactly one [1..1] **@code**="11450-4" Problem List   
 (CodeSystem: LOINC 2.16.840.1.113883.6.1) (CONF:15408).

or

2**. SHALL** contain exactly one [1..1] **effectiveTime/@value** (CONF:5256).

Figure 4: Allowed nullFlavors When Element is Required—with XML examples

1. **SHALL** contain at least one [1..\*] id

2. **SHALL** contain exactly one [1..1] code

3. **SHALL** contain exactly one [1..1] effectiveTime

<entry>

<observation classCode="OBS" moodCode="EVN">

<id nullFlavor="**NI**"/>

<code nullFlavor="**OTH**">

<originalText>New Grading system</originalText>

</code>

<statusCode code="completed"/>

<effectiveTime nullFlavor="**UNK**"/>

<value xsi:type="CD" nullFlavor="OTH">

<originalText>Spiculated mass grade 5</originalText>

</value>

</observation>

</entry>

If a sender wants to state that a piece of information is unknown, the following principles apply:

1. If the sender doesn’t know an attribute of an act, that attribute can be null.

Figure 5: Unknown Medication Example

<entry>

**<text>patient was given a medication but I do not know what it was</text>**

<substanceAdministration moodCode="EVN" classCode="SBADM">

<consumable>

<manufacturedProduct>

<manufacturedLabeledDrug>

<code **nullFlavor="NI"**/>

</manufacturedLabeledDrug>

</manufacturedProduct>

</consumable>

</substanceAdministration>

</entry>

2. If the sender doesn’t know if an act occurred, the nullFlavor is on the act (detail could include specific allergy, drug, etc.).

Figure 6: Unknown Medication Use of Anticoagulant Drug Example

<entry>

<substanceAdministration moodCode="EVN" classCode="SBADM" **nullFlavor="NI">**

**<text>I do not know whether or not patient received an anticoagulant**

**drug</text>**

<consumable>

<manufacturedProduct>

<manufacturedLabeledDrug>

**<code code="81839001" displayName="anticoagulant drug"**

**codeSystem="2.16.840.1.113883.6.96"**

**codeSystemName="SNOMED CT"/>**

</manufacturedLabeledDrug>

</manufacturedProduct>

</consumable>

</substanceAdministration>

</entry>

3. If the sender wants to state ‘no known’, a negationInd can be used on the corresponding act (substanceAdministration, Procedure, etc.)

Figure 7: No Known Medications Example

<entry>

<substanceAdministration moodCode="EVN" classCode="SBADM" **negationInd=”true”>**

**<text>No known medications</text>**

<consumable>

<manufacturedProduct>

<manufacturedLabeledDrug>

**<code code="410942007" displayName="drug or medication"**

**codeSystem="2.16.840.1.113883.6.96"**

**codeSystemName="SNOMED CT"/>**

</manufacturedLabeledDrug>

</manufacturedProduct>

</consumable>

</substanceAdministration>

</entry>

These next examples illustrate additional nuances of representing unknown information in coded fields.

Figure 8: Value Known—code for value not known

<entry>

<observation classCode="OBS" moodCode="EVN">

...

<value xsi:type="CD" nullFlavor="OTH">

<originalText>Spiculated mass grade 5</originalText>

</value>

</observation>

</entry>

Figure 9: Value Completely Unknown

<entry>

<observation classCode="OBS" moodCode="EVN">

...

<value xsi:type="CD" nullFlavor="UNK"/>

</observation>

</entry>

Figure 10: Value Known—code in required code system not known but code from another code system is known

<entry>

<observation classCode="OBS" moodCode="EVN">

...

<value xsi:type="CD" nullFlavor="OTH">

<originalText>Spiculated mass grade 5</originalText>

<translation code="129742005" displayName="spiculated lesion"

codeSystem="2.16.840.1.113883.6.96"

codeSystemName="SNOMED CT"/>/>

</value>

</observation>

</entry>

Negating Clinical Statements

Usually, clinical statements in a CDA document assert positive statements. A procedure element represents a procedure that took place and an observation represents an observation about a patient condition or a laboratory result. In this implementation guide, when negationInd is set to true, it is understood that it negates the act as described by the act’s descriptive properties (including act.code, procedure.effectiveTime, observation.value, etc.) and any of the act’s components, rather than at the level of a specific value in the act. The inert properties such as act.id, act.moodCode, and act.confidentialityCode are not negated and always have the same meaning. In other words, when an act is negated, it indicates that the event as specified did not occur. For example, if the clinical statement is asserting that a wrong procedure has been performed on a certain date and its negationInd is set to true, the whole clinical statement is negated, including any attributes such as the assertion and the effectiveTime. This clinical statement indicates that we are not asserting that this event occurred on this date—there is no assertion that a wrong procedure was performed on this date. For further details and examples, see the definition of Act.negationInd in the HL7 Reference Information Model (RIM), Version 2.07 (the version of the HL7 RIM from which CDA, Release 2 is derived) and the discussion of *Negation Indicators in RIM Classes* in *Core Principles and Properties of V3 Models*.

## Summary Document ServiceEvent Codes

For all the summary reports, the documentationOf/serviceEvent/code element records the type of summary data reported. This corresponds to the NHSN form type. This pattern is similar to that used in C-CDA (all releases) (e.g., Operative Note).

# Using This Implementation Guide

This chapter describes the rules and formalisms used to constrain the CDA R2 standard. It describes the formal representation of CDA templates, the mechanism by which templates are bound to vocabulary, and additional information necessary to understand and correctly implement the normative content found in chapters 5 through 7 of this guide.

Levels of Constraint

The CDA standard describes conformance requirements in terms of three general levels corresponding to three different, incremental types of conformance statements:

* Level 1 requirements impose constraints upon the CDA Header. The body of a Level 1 document may be XML or an alternate allowed format. If XML, it must be CDA-conformant markup.
* Level 2 requirements specify constraints at the section level of a CDA XML document: most critically, the section code and the cardinality of the sections themselves, whether optional or required.
* Level 3 requirements specify constraints at the entry level within a section. A specification is considered “Level 3” if it requires any entry-level templates.

Note that these levels are rough indications of what a recipient can expect in terms of machine-processable coding and content reuse. They do not reflect the level or type of clinical content, and many additional levels of reusability could be defined.

The section libraries for each document type list the required and optional sections.

Conformance Conventions Used in This Guide

Templates and Conformance Statements

Conformance statements within this implementation guide are presented as constraints from Trifolia Workbench, a template repository. An algorithm converts constraints recorded in Trifolia to a printable presentation. Each constraint is uniquely identified by an identifier at or near the end of the constraint (e.g., CONF:86-7345). The digits in the conformance number before the hyphen identify which IG the template belongs to and the number after the hyphen is unique to the owning IG. Together, these two numbers uniquely identify each constraint. These identifiers are persistent but not sequential. Conformance numbers in this guide associated with a conformance statement that is carried forward from a previous version of this guide will carry the same conformance number from the previous version. This is true even if slightly edited. If a conformance statement is entirely new, it will have a new conformance number.

Bracketed information following each template title indicates the template type (section, observation, act, procedure, etc.), the identifier oid or identifier urn, and whether the template is [open or closed](#IG_S_Open_and_Closed_Templates). The identifier oid is the templateId/@root value; all templateIds have an @root value. Newer and/or versioned templates also have an @extension value, which is a date identifying the version of this template; such templates are identified by urn and the HL7 version (urn:hl7ii). The urn identifier includes both the @root and @extension value for the templateId (for example, identifier urn:hl7ii:2.16.840.1.113883.10.20.5.5.41:2014-06-09).

Each section and entry template in this guide includes a context table. The "Contained By" column indicates which templates use this template, and if the template is optional or required in the containing template. The "Contains" column indicates any templates that the template uses.

Figure 11: Context Tables

***XXX: Allergy Problem Act (V2) Contexts***

| **Contained By:** | **Contains:** |
| --- | --- |
| Allergies Section (entries optional) (V2) (optional)  Allergies Section (entries required) (V2) (required) | Allergy - Intolerance Observation (V2)  Author Participation |

Each template also includes a constraint overview table to summarize the constraints in the template.

Figure 12: Constraints Overview Table Example

| **XPath** | **Card.** | **Verb** | **Data Type** | **CONF#** | **Fixed Value** |
| --- | --- | --- | --- | --- | --- |
| observation[identifier: oid:2.16.840.1.113883.10.20.22.4.31] | | | | | |
| @classCode | 1..1 | SHALL |  | XXXX | 2.16.840.1.113883.5.6 (HL7ActClass) = OBS |
| @moodCode | 1..1 | SHALL |  | XXXX | 2.16.840.1.113883.5.1001 (ActMood) = EVN |
| code | 1..1 | SHALL |  | XXXX |  |
| @code | 1..1 | SHALL |  | XXXX | 2.16.840.1.113883.6.96 (SNOMED CT) = 445518008 |
| value | 1..1 | SHALL | PQ | XXXX |  |
| @unit | 1..1 | SHALL | CS | XXXX | 2.16.840.1.113883.11.20.9.21 (AgePQ\_UCUM) |
| templateId | 1..1 | SHALL |  | XXXX |  |
| @root | 1..1 | SHALL |  | XXXX | 2.16.840.1.113883.10.20.22.4.31 |
| statusCode | 1..1 | SHALL |  | XXXX |  |
| @code | 1..1 | SHALL |  | XXXX | 2.16.840.1.113883.5.14 (ActStatus) = completed |

The following figure shows a typical template’s set of constraints presented in this guide. The next chapters describe specific aspects of conformance statements—open vs. closed statements, conformance verbs, cardinality, vocabulary conformance, containment relationships, and null flavors. The expression “such that it” means, you (**SHALL**/**SHOULD**/**MAY**) have one of those things that look like that, but you can also have another one of those things that look different. The example below states that you must have templateId with a root of 2.16.840.1.113883.10.20.22.4.31 but you can also have other template IDs.

Figure 13: Constraints Format Example

***Age Observation***

[observation: identifier oid:2.16.840.1.113883.10.20.22.4.31(open)]

1. SHALL contain exactly one [1..1] @classCode="OBS" Observation (CodeSystem: HL7ActClass 2.16.840.1.113883.5.6 STATIC) (CONF:XXXX).
2. SHALL contain exactly one [1..1] @moodCode="EVN" Event (CodeSystem: ActMood 2.16.840.1.113883.5.1001 STATIC) (CONF: XXXX).
3. SHALL contain exactly one [1..1] templateId (CONF:XXXX) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.22.4.31" (CONF: XXXX).
4. SHALL contain exactly one [1..1] code (CONF:7615).
   1. This code SHALL contain exactly one [1..1] @code="445518008" Age At Onset (CodeSystem: SNOMED CT 2.16.840.1.113883.6.96 STATIC) (CONF: XXXX).
5. SHALL contain exactly one [1..1] statusCode (CONF: XXXX).
   1. This statusCode SHALL contain exactly one [1..1] @code="completed" Completed (CodeSystem: ActStatus 2.16.840.1.113883.5.14 STATIC) (CONF: XXXX).
6. SHALL contain exactly one [1..1] value with @xsi:type="PQ" (CONF:XXXX).
   1. This value SHALL contain exactly one [1..1] @unit, which SHALL be selected from ValueSet AgePQ\_UCUM 2.16.840.1.113883.11.20.9.21 DYNAMIC (CONF: XXXX).

Template Versioning

A new version of an existing implemenation guide reuses templates from the previous version. During the ballot phase or update phase, templates carry the designation “Published” to indicate the template is unchanged from the previous version or “Draft” to indicate a new or revised template. Substantial revisions to previously published templates are always indicated by “(Vn)” in all cases: ballot-phase, update-phase, and published guides.

If there are no substantive changes to a template that has been successfully published, the template will carry the same templateId/@root (identifier oid) and templateId/@extension as in the previous implementation guide (in the case of older templates, the @extension attribute will not be present). During a new ballot or update phase, “Published” is appended to the main heading for the template to indicate that the template cannot be commented on in the ballot or update. The “Published” designation is removed on final publication versions.

A revised version of a previously published template keeps the same templateId/@root as the previous version, but it is assigned a new templateId/@extension. The notation “(Vn)” (V2, V3, etc.) is also added to the template name. Versions are not necessarily forward or backward compatible. A versioning may be due to substantive changes in the template and/or the fact that a contained template has changed. The “(Vn)” designation is persistent; it appears with that template when it is used in subsequent guides. During a new ballot or update phase, “Draft” is appended to the main heading for the template to indicate that it may be voted on in the ballot or commented on in the update; the “Draft” designation is removed on final publication versions.

A revised version of a template is explicitly linked to the prior version. When a new version appears for the first time in an IG, a detailed change log is automatically generated, a detailed change log is automatically generated. All such changes for a given IG are shown in Chapter 12 “Changes From Previous Version”.

The following figure shows an example of a versioned template: HAI AUR Antimicrobial Resistance Option (ARO) Report (oid:2.16.840.1.113883.10.20.5.31) has versioned to HAI AUR Antimicrobial Resistance Option (ARO) Report (V2) (urn:hl7ii:2.16.840.1.113883.10.20.5.31:2014-06-09).

Figure 14: Versioned Template Change Log Example

| **Change** | **Old** | **New** |
| --- | --- | --- |
| Name | HAI AUR Antimicrobial Resistance Option (ARO) Report | HAI AUR Antimicrobial Resistance Option (ARO) Report (V2) |
| Oid | oid:2.16.840.1.113883.10.20.5.31 | urn:hl7ii:2.16.840.1.113883.10.20.5.31:2014-06-09 |
| CONF #: 1129-30474 Added |  | SHALL contain exactly one [1..1] @extension="2014-06-09" (CONF:1129-30474). |
| CONF #: 1129-21153 Modified | SHALL contain exactly one [1..1] Findings Section in an ARO Report (identifier: oid:2.16.840.1.113883.10.20.5.5.32) | SHALL contain exactly one [1..1] Findings Section in an ARO Report (V2) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.5.32:2014-06-09) |

Open and Closed Templates

HAI templates are, with one exception, closed templates. This means that the template constraints specify everything that is allowed. In open templates, by contrast, all of the features of the CDA R2 base specification are allowed except as constrained by the templates.

The exception to closed templates in HAI reports is that the structuredBody is open: it may contain sections not specified in this guide. The content of such unspecified sections is not processed by NHSN.

Conformance Verbs (Keywords)

The keywords **shall, should, may, need not, should not,** and **shall not** in this document are to be interpreted as described in the HL7 Version 3 Publishing Facilitator's Guide.[[3]](#footnote-3)

* **shall**: an absolute requirement
* **shall not**: an absolute prohibition against inclusion
* **should/should not**: best practice or recommendation. There may be valid reasons to ignore an item, but the full implications must be understood and carefully weighed before choosing a different course
* **may/need not**: truly optional; can be included or omitted as the author decides with no implications

The keyword "**shall"** allows the use of nullFlavor unless the requirement is on an attribute or the use of nullFlavor is explicitly precluded.

Cardinality

The cardinality indicator (0..1, 1..1, 1..\*, etc.) specifies the allowable occurrences within a document instance. The cardinality indicators are interpreted with the following format “m…n” where m represents the least and n the most:

* 0..1 zero or one
* 1..1 exactly one
* 1..\* at least one
* 0..\* zero or more
* 1..n at least one and not more than n

When a constraint has subordinate clauses, the scope of the cardinality of the parent constraint must be clear. In the next figure, the constraint says exactly one participant is to be present. The subordinate constraint specifies some additional characteristics of that participant.

Figure 15: Constraints Format—only one allowed

1. **SHALL** contain exactly one [1..1] **participant** (CONF:2777).

a. This participant **SHALL** contain exactly one [1..1] **@typeCode**="LOC"   
 (CodeSystem: 2.16.840.1.113883.5.90 HL7ParticipationType)   
 (CONF:2230).

In the next figure, the constraint says only one participant “like this” is to be present. Other participant elements are not precluded by this constraint.

Figure 16: Constraints Format—only one like this allowed

1. **SHALL** contain exactly one [1..1] **participant** (CONF:2777) such that it

a. **SHALL** contain exactly one [1..1] **@typeCode**="LOC" (CodeSystem:

2.16.840.1.113883.5.90 HL7ParticipationType) (CONF:2230).

Optional and Required with Cardinality

The terms *optional* and *required* describe the *lower* bound of cardinality as follows:

*Optional* means that the number of allowable occurrences of an element may be 0; the cardinality will be expressed as [0..1] or [0..\*] or similar. In these cases, the element may not be present in the instance.

*Required* means that the number of allowable occurrences of an element must be at least 1; the cardinality will be expressed as [m..n] where m >=1 and n >=m for example [1..1] or [1..\*]. In these cases, the element must be present in the instance. If an element is required, but is not known (and would otherwise be omitted if it were optional), it must be represented by a null flavor. See “[Unknown and No Known Information”](#IG_S_Unknown_and_No_Known_Information).

Vocabulary Conformance

The templates in this document use terms from several code systems. These vocabularies are defined in various supporting specifications and may be maintained by other bodies, as is the case for the LOINC and SNOMED CT vocabularies.

Note that value-set identifiers (e.g., ValueSet 2.16.840.1.113883.1.11.78 Observation Interpretation (HL7) **DYNAMIC)** do not appear in CDA submissions; they tie the conformance requirements of an implementation guide to the appropriate code system for validation.

Value-set bindings adhere to HL7 Vocabulary Working Group best practices, and include both a conformance verb (**shall**, **should**, **may**, etc.) and an indication of **dynamic** vs. **static** binding. Value-set constraints can be **static**, meaning that they are bound to a specified version of a value set, or **dynamic**, meaning that they are bound to the most current version of the value set. A simplified constraint, used when the binding is to a single code, includes the meaning of the code, as follows.

Figure 17: Binding to a Single Code

**2. SHALL** contain exactly one [1..1] **code** (CONF:15403).

a) This code **SHALL** contain exactly one [1..1] **@code**="11450-4" Problem List

(CONF:15408).

b) This code **SHALL** contain exactly one [1..1] **@codeSystem**="2.16.840.1.113883.6.1"

(CodeSystem: LOINC 2.16.840.1.113883.6.1 **STATIC**) (CONF: 31141).

The notation conveys the actual code (11450-4), the code’s displayName (Problem List), the OID of the codeSystem from which the code is drawn (2.16.840.1.113883.6.1), and the codeSystemName (LOINC).

HL7 Data Types Release 1 requires the codeSystem attribute unless the underlying data type is “Coded Simple” or “CS”, in which case it is prohibited. The displayName and the codeSystemName are optional, but recommended, in all cases.

The above example would be properly expressed as follows.

Figure 18: XML Expression of a Single-code Binding

<code code="11450-4" codeSystem="2.16.840.1.113883.6.1"/>

<!-- or -->

<code code="11450-4" codeSystem="2.16.840.1.113883.6.1"

displayName="Problem List"

codeSystemName=”LOINC”/>

A full discussion of the representation of vocabulary is outside the scope of this document; for more information, see the HL7 V3 Normative Edition 2010[[4]](#footnote-4) sections on Abstract Data Types and XML Data Types R1.

Value set tables are presented below the first template that uses that value set; links are provided in subsequent templates that use the same value set. The value set tables include the value set identifier, a description, a link (where appropriate), and a list of codes in the value set. Ellipses in the last row of value-set members shown indicate that the list is an excerpt and the complete source must be accessed to see all members. Where the table is an excerpt and no link is provided, the full set of values are contained in the hai\_voc.xls spreadsheet included with this package.

Figure 19: Example Value Set Table

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: Referral Types 2.16.840.1.113883.11.20.9.56  A value set of SNOMED CT codes descending from "3457005" patient referral (procedure).  Value Set Source: https://vsac.nlm.nih.gov | | | |
| **Code** | **Code System** | **Code System OID** | **Print Name** |
| 44383000 | SNOMED CT | 2.16.840.1.113883.6.96 | Patient referral for consultation |
| 391034007 | SNOMED CT | 2.16.840.1.113883.6.96 | Refer for falls assessment (procedure) |
| 86395003 | SNOMED CT | 2.16.840.1.113883.6.96 | Patient referral for family planning (procedure) |
| 306106002 | SNOMED CT | 2.16.840.1.113883.6.96 | Referral to intensive care service (procedure) |
| 306140002 | SNOMED CT | 2.16.840.1.113883.6.96 | Referral to clinical oncology service (procedure) |
| 396150002 | SNOMED CT | 2.16.840.1.113883.6.96 | Referral for substance abuse (procedure) |
| ... |  |  |  |

Data Types

All data types used in a CDA document are described in the CDA R2 normative standard. All attributes of a data type are allowed unless explicitly prohibited by this specification.

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 documents. As with all CDA documents, the ClinicalDocument/id uniquely identifies a document instance (an electronic file). Incremented version numbers identify subsequent versions of the document.

NHSN assigns each participating facility a root OID. The vendor system generates the ClinicalDocument/setId. The vendor is responsible for extending its OID as necessary to support the several unique numbering schemes it must generate; these include document identifiers and facility-generated procedure identifiers.

XML Conventions Used in This Guide

XPath Notation

Instead of the traditional dotted notation used by HL7 to represent RIM classes, this document uses XML Path Language (XPath) notation[[5]](#footnote-5) in conformance statements and elsewhere to identify the Extensible Markup Language (XML) elements and attributes within the CDA document instance to which various constraints are applied. The implicit context of these expressions is the root of the document. This notation provides a mechanism that will be familiar to developers for identifying parts of an XML document.

XPath statements appear in this document in a monospace font.

XPath syntax selects nodes from an XML document using a path containing the context of the node(s). The path is constructed from node names and attribute names (prefixed by a ‘@’) and catenated with a ‘/’ symbol.

Figure 20: XML Document Example

<author>

<assignedAuthor>

...

<code codeSystem='2.16.840.1.113883.6.96'

codeSystemName='SNOMED CT'

code='17561000'

displayName='Cardiologist' />

...

</assignedAuthor>

</author>

In the above example, the code attribute of the code could be selected with the XPath expression in the next figure.

Figure 21: XPath Expression Example

author/assignedAuthor/code/@code

XML Examples and Sample Documents

Extensible Mark-up Language (XML) examples appear in figures in this document in this monospace font. Portions of the XML content may be omitted from the content for brevity, marked by an ellipsis (...) as shown in the example below.

Figure 22: ClinicalDocument Example

<ClinicalDocument xmls="urn:h17-org:v3">

...

</ClinicalDocument>

Within the narrative, XML element (code, assignedAuthor, etc.) and attribute (SNOMED CT, 17561000, etc.) names also appear in this monospace font.

Supporting Tools

Validation

This guide expresses CDA R2 constraints in a technology-neutral formalism. The release when published also provides a non-normative set of Schematron schemas based on the technology-neutral formalism, which can test template conformance.

Schematron is “a language for making assertions about patterns found in XML documents.” The schemas provided for CDA and for this package support two-stage validation. First, the CDA schema CDA.xsd validates the basic structural and semantic requirements of any CDA instance. Second, the IG-specific Schematron schema validates the specific requirements of this package.

Validation services are provided through the NHSN import mechanism and by Lantana Group’s CDA Validator (<https://www.lantanagroup.com/validator/>). The CDA Validator is an online application that validates a CDA document’s conformance to several standards and implementation guides; it includes the Schematron files described above.

Generation of Narrative Block

Clinical documents generated by clinicians for a patient chart can assume an almost infinite set of semantic structures. For this reason, CDA relies on a narrative block (section/text) to convey the comprehensive clinical report, i.e., all the information that a human reader would consider the definitive, legal content of the record. (Human readability and rendering requirements are described in CDA R2, Section 1.2.3. See [References](#IG_S_References).)

In contrast, the structure and semantics of HAI reports to the NHSN are tightly constrained for unambiguous insertion into the NHSN database. Few elements allow unstructured, uncoded narrative. The definitive, human-readable, legal contents of a report can be derived entirely from the CDA titles and coded entries. Therefore, for the convenience of implementers, this project created a transform that derives the narrative block from the CDA entries. Use of this transform is not required; implementers can use local methods to create the CDA narrative block.

Display Transforms

The content required for correct interpretation by a human reader of a compliant instance must be displayable using any CDA stylesheet. Thus, instances conforming to this IG can be viewed using CDA.xsl or any other stylesheet.

In addition, this project has a customized stylesheet that conforms more closely to the display format typical of such records.

# Document-Level Templates

Healthcare Associated Infection Report

[ClinicalDocument: identifier urn:oid:2.16.840.1.113883.10.20.5.4.25 (open)]

Published as part of NHSN Healthcare Associated Infection (HAI) Reports Release 1 - US Realm

This template records constraints on all NHSN Healthcare Associated Infection Reports (generic constraints). Further constraints are found in the specialization templates for single-patient and population summary reports, and in the templates for specific report types.

Annotations before some constraints provide additional information for the implementer.

Elements required by CDA that are not further constrained in this guide are not presented as HAI-specific constraints.

Note: The section on “Template Ids in this Guide” includes a containment table showing all the entries within each report type.

Table 1: Healthcare Associated Infection Report Constraints Overview

| XPath | Card. | Verb | Data Type | CONF# | Value |
| --- | --- | --- | --- | --- | --- |
| ClinicalDocument (identifier: urn:oid:2.16.840.1.113883.10.20.5.4.25) | | | | | |
| realmCode | 1..1 | SHALL |  | [86-18431](#C_86-18431) |  |
| @code | 1..1 | SHALL | CD | [86-18432](#C_86-18432) | US |
| typeId | 1..1 | SHALL |  | [86-18463](#C_86-18463) |  |
| @root | 1..1 | SHALL |  | [86-18464](#C_86-18464) | 2.16.840.1.113883.1.3 |
| @extension | 1..1 | SHALL |  | [86-18465](#C_86-18465) | POCD\_HD000040 |
| templateId | 1..1 | SHALL |  | [86-18460](#C_86-18460) |  |
| @root | 1..1 | SHALL |  | [86-18461](#C_86-18461) | 2.16.840.1.113883.10.20.5.4.25 |
| @extension | 0..0 | SHALL NOT |  | [86-18462](#C_86-18462) |  |
| id | 1..1 | SHALL |  | [86-18466](#C_86-18466) |  |
| @root | 0..1 | MAY |  | [86-18467](#C_86-18467) |  |
| @extension | 0..1 | MAY |  | [86-18468](#C_86-18468) |  |
| code | 1..1 | SHALL |  | [86-18433](#C_86-18433) |  |
| @code | 1..1 | SHALL |  | [86-18434](#C_86-18434) | 51897-7 |
| @codeSystem | 1..1 | SHALL |  | [86-27413](#C_86-27413) | urn:oid:2.16.840.1.113883.6.1 (LOINC) |
| title | 1..1 | SHALL |  | [86-18435](#C_86-18435) |  |
| effectiveTime | 1..1 | SHALL |  | [86-18436](#C_86-18436) |  |
| confidentialityCode | 1..1 | SHALL |  | [86-18437](#C_86-18437) |  |
| @code | 1..1 | SHALL | CD | [86-18438](#C_86-18438) | urn:oid:2.16.840.1.113883.5.25 (HL7Confidentiality) = N |
| languageCode | 1..1 | SHALL |  | [86-18439](#C_86-18439) |  |
| @code | 1..1 | SHALL |  | [86-18440](#C_86-18440) | en-US |
| setId | 1..1 | SHALL |  | [86-18441](#C_86-18441) |  |
| versionNumber | 1..1 | SHALL |  | [86-18442](#C_86-18442) |  |
| recordTarget | 1..\* | SHALL |  | [86-18472](#C_86-18472) |  |
| author | 1..\* | SHALL |  | [86-18473](#C_86-18473) |  |
| custodian | 1..1 | SHALL |  | [86-18443](#C_86-18443) |  |
| assignedCustodian | 1..1 | SHALL |  | [86-18444](#C_86-18444) |  |
| representedCustodianOrganization | 1..1 | SHALL |  | [86-18445](#C_86-18445) |  |
| id | 1..1 | SHALL |  | [86-18446](#C_86-18446) |  |
| @root | 1..1 | SHALL |  | [86-18447](#C_86-18447) | 2.16.840.1.114222.4.3.2.11 |
| legalAuthenticator | 0..1 | SHOULD |  | [86-18474](#C_86-18474) |  |
| relatedDocument | 0..\* | MAY |  | [86-18469](#C_86-18469) |  |
| @typeCode | 1..1 | SHALL |  | [86-18470](#C_86-18470) | urn:oid:2.16.840.1.113883.5.1002 (HL7ActRelationshipType) = RPLC |
| parentDocument | 1..1 | SHALL |  | [86-28401](#C_86-28401) |  |
| id | 1..\* | SHALL |  | [86-28402](#C_86-28402) |  |
| component | 1..1 | SHALL |  | [86-18448](#C_86-18448) |  |
| structuredBody | 1..1 | SHALL |  | [86-18449](#C_86-18449) |  |
| component | 1..\* | SHALL |  | [86-18475](#C_86-18475) |  |

1. SHALL contain exactly one [1..1] realmCode (CONF:86-18431).
   1. This realmCode SHALL contain exactly one [1..1] @code="US" (CONF:86-18432).
2. SHALL contain exactly one [1..1] typeId (CONF:86-18463).
   1. This typeId SHALL contain exactly one [1..1] @root="2.16.840.1.113883.1.3" (CONF:86-18464).
   2. This typeId SHALL contain exactly one [1..1] @extension="POCD\_HD000040" (CONF:86-18465).
3. SHALL contain exactly one [1..1] templateId (CONF:86-18460) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.4.25" (CONF:86-18461).
   2. SHALL NOT contain [0..0] @extension (CONF:86-18462).

CDA requires a ClinicalDocument/id element representing a unique identifier for the document. The id may be represented by either @root or @root plus @extension, so long as the resulting id is globally unique.

CDA provides id, setId, versionNumber, and relatedDocument elements to support succession management (document versioning).

The id element identifies the CDA document instance (the electronic file). It is independent of the setId and versionNumber elements.

1. SHALL contain exactly one [1..1] id (CONF:86-18466).
   1. This id MAY contain zero or one [0..1] @root (CONF:86-18467).
   2. This id MAY contain zero or one [0..1] @extension (CONF:86-18468).
2. SHALL contain exactly one [1..1] code (CONF:86-18433).
   1. This code SHALL contain exactly one [1..1] @code="51897-7" Healthcare Associated Infection Report (CONF:86-18434).
   2. This code SHALL contain exactly one [1..1] @codeSystem (CodeSystem: LOINC urn:oid:2.16.840.1.113883.6.1) (CONF:86-27413).

The preferred title content for each report type is given with the constraints for each report type.

1. SHALL contain exactly one [1..1] title (CONF:86-18435).
2. SHALL contain exactly one [1..1] effectiveTime (CONF:86-18436).

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.

1. SHALL contain exactly one [1..1] confidentialityCode (CONF:86-18437).
   1. This confidentialityCode SHALL contain exactly one [1..1] @code="N" Normal (CodeSystem: HL7Confidentiality urn:oid:2.16.840.1.113883.5.25 STATIC) (CONF:86-18438).
2. SHALL contain exactly one [1..1] languageCode (CONF:86-18439).
   1. This languageCode SHALL contain exactly one [1..1] @code="en-US" (CONF:86-18440).
3. SHALL contain exactly one [1..1] setId (CONF:86-18441).
4. SHALL contain exactly one [1..1] versionNumber (CONF:86-18442).

CDA requires a recordTarget element that must contain a patientRole element. This is represented differently in single-person and population summary reports. See the templates for generic single-person and population summary reports for details of how to represent the patient or group subject.

1. SHALL contain at least one [1..\*] recordTarget (CONF:86-18472).

In a single-person report, the author may be software or may be a person in the role of infection control professional (ICP). In a population summary report, the author will be the software forming the message. The effect of the CDA Release 2.0 requirements 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. (from CDA R2)

When the report author is vendor software, it can record the software installation id, an email address, and the vendor name.

1. SHALL contain at least one [1..\*] author (CONF:86-18473).

CDA requires that the document custodian be recorded. The NHSN is the custodian of NHSN HAI Reports.

1. SHALL contain exactly one [1..1] custodian (CONF:86-18443).
   1. This custodian SHALL contain exactly one [1..1] assignedCustodian (CONF:86-18444).
      1. This assignedCustodian SHALL contain exactly one [1..1] representedCustodianOrganization (CONF:86-18445).
         1. This representedCustodianOrganization SHALL contain exactly one [1..1] id (CONF:86-18446).
            1. This id SHALL contain exactly one [1..1] @root="2.16.840.1.114222.4.3.2.11" (CONF:86-18447).

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. The effect of the CDA Release 2.0 requirements is:

The legalAuthenticator element shall contain a time element that represents the time of authentication of the document, a signatureCode element where the value of @code is S, and an assignedEntity element that represents the authenticator of the document. The assignedEntity element shall contain an id element. (from CDA R2)

HAI Reports are not signed reports and do not require a legalAuthenticator.

1. SHOULD contain zero or one [0..1] legalAuthenticator (CONF:86-18474).
2. MAY contain zero or more [0..\*] relatedDocument (CONF:86-18469).
   1. The relatedDocument, if present, SHALL contain exactly one [1..1] @typeCode="RPLC" replace (CodeSystem: HL7ActRelationshipType urn:oid:2.16.840.1.113883.5.1002 STATIC) (CONF:86-18470).
   2. The relatedDocument, if present, SHALL contain exactly one [1..1] parentDocument (CONF:86-28401).
      1. This parentDocument SHALL contain at least one [1..\*] id (CONF:86-28402).
         1. The value of id SHALL be populated with the ClinicalDocument/id of the document being replaced (CONF:86-28403).
   3. If versionNumber/@value is greater than 1, a relatedDocument element SHALL be present (CONF:86-18471).
3. SHALL contain exactly one [1..1] component (CONF:86-18448).
   1. This component SHALL contain exactly one [1..1] structuredBody (CONF:86-18449).
      1. This structuredBody SHALL contain at least one [1..\*] component (CONF:86-18475).
      2. 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:86-18450).

HAI Population Summary Report Generic Constraints

[ClinicalDocument: identifier urn:oid:2.16.840.1.113883.10.20.5.4.28 (open)]

Published as part of NHSN Healthcare Associated Infection (HAI) Reports Release 1 - US Realm

A Population Summary Report records summary data for a group, such as the patients in a particular ward, during a specified period. This report type differs in several ways from the HAI single-person reports.

These report types are used to record many different data sets. The basic structure of the body templates for this report type are:

   •  A Summary Data Section:

      o  A Summary Encounter records the location to which the data pertain.

      o  Various Summary Data Observations record data as code-value pairs.

A population-summary report must conform to the Healthcare Associated Infection Report above. In addition:

   •  The patient identifier (required by CDA) is recorded with a nullFlavor.

   •  A participant element records that the subject of the report is a group.

   •  A second participant element records the reporting facility.  (The in-facility unit identifier and type to which the data pertain are recorded in the Summary Encounter Section of the document body.)

   •  In the documentationOf/serviceEvent element,

      o  The effectiveTime element records the first and last days of the period reported.

      o  The code element records the type of summary data reported. This corresponds to the NHSN form type.

The data set being reported is identified by a code in the CDA header; for example, the cdcNHSN concept “1887-9” identifies the data set “Summary data reporting Antimicrobial Usage”. The codes for these data sets are listed in value set NHSNPopulationSummaryReportTypeCode (2.16.840.1.114222.4.11.3595).

Note that a few data sets are stratified. For example, the NICU (Neonatal Intensive Care Unit) data set is stratified by birthweight; the Antimicrobial Usage data set is stratified by antimicrobial and by route of administration. The stratifying factor is recorded as a CDA element in the Summary Encounter or Summary Data Observation. For example, in an Antimicrobial Use report, the antimicrobial information is represented as a participant. The requirements for each data set are provided in the relevant Summary Data Observation.

Most of the concepts reported are defined for the NHSN protocol and are not expected to see widespread external use: the codes for these concepts come from the NHSN code system.

Key encounter data:

   •  Facility identifier is required. This represents the reporting facility; the location to which the data pertain, such as a unit, is recorded with the data in the Summary Encounter.

   •  A code identifying the data set is required.

   •  The period reported is required.

Note: The section on “Template Ids in this Guide” includes a containment table showing all the entries within each report type.

Table 2: HAI Population Summary Report Generic Constraints Constraints Overview

| XPath | Card. | Verb | Data Type | CONF# | Value |
| --- | --- | --- | --- | --- | --- |
| ClinicalDocument (identifier: urn:oid:2.16.840.1.113883.10.20.5.4.28) | | | | | |
| templateId | 1..1 | SHALL |  | [86-22431](#C_86-22431) |  |
| @root | 1..1 | SHALL |  | [86-22432](#C_86-22432) | 2.16.840.1.113883.10.20.5.4.28 |
| recordTarget | 1..1 | SHALL |  | [86-22433](#C_86-22433) |  |
| patientRole | 1..1 | SHALL |  | [86-22434](#C_86-22434) |  |
| id | 1..1 | SHALL |  | [86-22435](#C_86-22435) |  |
| @nullFlavor | 1..1 | SHALL |  | [86-22436](#C_86-22436) | NA |
| participant | 1..1 | SHALL |  | [86-22437](#C_86-22437) |  |
| @typeCode | 1..1 | SHALL |  | [86-22438](#C_86-22438) | urn:oid:2.16.840.1.113883.5.90 (HL7ParticipationType) = SBJ |
| @contextControlCode | 1..1 | SHALL | CS | [86-22439](#C_86-22439) | urn:oid:2.16.840.1.113883.5.1057 (HL7ContextControl) = OP |
| associatedEntity | 1..1 | SHALL |  | [86-22440](#C_86-22440) |  |
| @classCode | 1..1 | SHALL |  | [86-22441](#C_86-22441) | urn:oid:2.16.840.1.113883.5.41 (HL7EntityClass) = PRS |
| code | 1..1 | SHALL |  | [86-22442](#C_86-22442) |  |
| @code | 1..1 | SHALL |  | [86-22443](#C_86-22443) | urn:oid:2.16.840.1.113883.6.96 (SNOMED CT) = 389109008 |
| participant | 1..1 | SHALL |  | [86-22444](#C_86-22444) |  |
| @typeCode | 1..1 | SHALL |  | [86-22445](#C_86-22445) | urn:oid:2.16.840.1.113883.5.90 (HL7ParticipationType) = LOC |
| @contextControlCode | 1..1 | SHALL | CS | [86-22446](#C_86-22446) | urn:oid:2.16.840.1.113883.5.1057 (HL7ContextControl) = OP |
| associatedEntity | 1..1 | SHALL |  | [86-22447](#C_86-22447) |  |
| @classCode | 1..1 | SHALL |  | [86-22448](#C_86-22448) | urn:oid:2.16.840.1.113883.5.110 (HL7RoleClass) = SDLOC |
| id | 1..1 | SHALL |  | [86-22449](#C_86-22449) |  |
| @root | 1..1 | SHALL |  | [86-22450](#C_86-22450) |  |
| documentationOf | 1..1 | SHALL |  | [86-22451](#C_86-22451) |  |
| serviceEvent | 1..1 | SHALL |  | [86-22452](#C_86-22452) |  |
| @classCode | 1..1 | SHALL |  | [86-22453](#C_86-22453) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = CASE |
| code | 1..1 | SHALL |  | [86-22454](#C_86-22454) | urn:oid:2.16.840.1.114222.4.11.3595 (NHSNPopulationSummaryReportTypeCode) |
| effectiveTime | 1..1 | SHALL |  | [86-22456](#C_86-22456) |  |
| low | 1..1 | SHALL |  | [86-22457](#C_86-22457) |  |
| high | 1..1 | SHALL |  | [86-22458](#C_86-22458) |  |

1. Conforms to [Healthcare Associated Infection Report](#D_Healthcare_Associated_Infection_Repor) template (identifier: urn:oid:2.16.840.1.113883.10.20.5.4.25).
2. SHALL contain exactly one [1..1] templateId (CONF:86-22431) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.4.28" (CONF:86-22432).
3. SHALL contain exactly one [1..1] recordTarget (CONF:86-22433).
   1. This recordTarget SHALL contain exactly one [1..1] patientRole (CONF:86-22434).
      1. This patientRole SHALL contain exactly one [1..1] id (CONF:86-22435).
         1. This id SHALL contain exactly one [1..1] @nullFlavor="NA" not applicable (CONF:86-22436).
4. SHALL contain exactly one [1..1] participant (CONF:86-22437) such that it
   1. SHALL contain exactly one [1..1] @typeCode="SBJ" Subject (CodeSystem: HL7ParticipationType urn:oid:2.16.840.1.113883.5.90 STATIC) (CONF:86-22438).
   2. SHALL contain exactly one [1..1] @contextControlCode="OP" (CodeSystem: HL7ContextControl urn:oid:2.16.840.1.113883.5.1057 STATIC) (CONF:86-22439).
   3. SHALL contain exactly one [1..1] associatedEntity (CONF:86-22440).
      1. This associatedEntity SHALL contain exactly one [1..1] @classCode="PRS" Person (CodeSystem: HL7EntityClass urn:oid:2.16.840.1.113883.5.41 STATIC) (CONF:86-22441).
      2. This associatedEntity SHALL contain exactly one [1..1] code (CONF:86-22442).
         1. This code SHALL contain exactly one [1..1] @code="389109008" Group (CodeSystem: SNOMED CT urn:oid:2.16.840.1.113883.6.96 STATIC) (CONF:86-22443).
5. SHALL contain exactly one [1..1] participant (CONF:86-22444) such that it
   1. SHALL contain exactly one [1..1] @typeCode="LOC" Location (CodeSystem: HL7ParticipationType urn:oid:2.16.840.1.113883.5.90 STATIC) (CONF:86-22445).
   2. SHALL contain exactly one [1..1] @contextControlCode="OP" (CodeSystem: HL7ContextControl urn:oid:2.16.840.1.113883.5.1057 STATIC) (CONF:86-22446).
   3. SHALL contain exactly one [1..1] associatedEntity (CONF:86-22447).
      1. This associatedEntity SHALL contain exactly one [1..1] @classCode="SDLOC" Service delivery location (CodeSystem: HL7RoleClass urn:oid:2.16.840.1.113883.5.110 STATIC) (CONF:86-22448).
      2. This associatedEntity SHALL contain exactly one [1..1] id (CONF:86-22449).

The value of @root must be the NHSN assigned Facility OID.

* + - 1. This id SHALL contain exactly one [1..1] @root (CONF:86-22450).

1. SHALL contain exactly one [1..1] documentationOf (CONF:86-22451).
   1. This documentationOf SHALL contain exactly one [1..1] serviceEvent (CONF:86-22452).
      1. This serviceEvent SHALL contain exactly one [1..1] @classCode="CASE" (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6 STATIC) (CONF:86-22453).
      2. This serviceEvent SHALL contain exactly one [1..1] code, which SHALL be selected from ValueSet [NHSNPopulationSummaryReportTypeCode](#NHSNPopulationSummaryReportTypeCode) urn:oid:2.16.840.1.114222.4.11.3595 STATIC (CONF:86-22454).
      3. This serviceEvent SHALL contain exactly one [1..1] effectiveTime (CONF:86-22456).
         1. This effectiveTime SHALL contain exactly one [1..1] low (CONF:86-22457).
         2. This effectiveTime SHALL contain exactly one [1..1] high (CONF:86-22458).
2. The author SHALL represent the software forming the message (CONF:86-22459).

Table 3: NHSNPopulationSummaryReportTypeCode

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: NHSNPopulationSummaryReportTypeCode urn:oid:2.16.840.1.114222.4.11.3595  A full listing of codes can be found in the hai\_voc.xls file provided with this package. | | | |
| Code | Code System | Code System OID | Print Name |
| 1879-6 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Summary data reporting catheter and ventilator use in a ICU/Other |
| 1880-4 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Summary data reporting catheter and ventilator use in a SCA |
| 1881-2 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Summary data reporting catheter and ventilator use in a NICU |
| 1884-6 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Summary data reporting Active Surveillance Testing |
| 2316-8 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Summary data reporting vascular access types for chronic hemodialysis patients |
| 1887-9 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Summary data reporting Antimicrobial Usage |
| 2410-9 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Summary data reporting antimicrobial resistance patterns at a facility |
| 1657-6 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Summary data reporting Outpatient procedure component events at a facility |
| 2543-7 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Hemovigilance Module - Monthly Reporting Denominator |
| 86558-4 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Summary data reporting healthcare personnel influenza vaccinations |

Antimicrobial Resistance Option (ARO) Summary Report (V2)

[ClinicalDocument: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.46:2015-04-01 (closed)]

Published as part of NHSN Healthcare Associated Infection (HAI) Reports Release 2 - US Realm

Table 4: Antimicrobial Resistance Option (ARO) Summary Report (V2) Contexts

| Contained By: | Contains: |
| --- | --- |
|  | [Summary Data Section (ARO) (V2)](#S_Summary_Data_Section_ARO_V2) |

Note: The section on “Template Ids in this Guide” includes a containment table showing all the entries within each report type.

The required title for the CDA document is “Denominator for Antimicrobial Resistance Option (ARO)”. The tables below show the data required at the time of publication.

The ARO Report extends the simple pattern for Summary Encounter. Required data elements are recorded as entries within the Summary Encounter, with a specified location of 'Facility Wide Inpatient'.

Table 5: Antimicrobial Resistance Option (ARO) Summary Report (V2) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| ClinicalDocument (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.46:2015-04-01) | | | | | |
| templateId | 1..1 | SHALL |  | [1181-28301](#C_1181-28301) |  |
| @root | 1..1 | SHALL |  | [1181-28302](#C_1181-28302) | 2.16.840.1.113883.10.20.5.7.2 |
| templateId | 1..1 | SHALL |  | [1181-22969](#C_1181-22969) |  |
| @root | 1..1 | SHALL |  | [1181-2970](#C_1181-2970) | 2.16.840.1.113883.10.20.5.46 |
| @extension | 1..1 | SHALL |  | [1181-30544](#C_1181-30544) | 2015-04-01 |
| title | 1..1 | SHALL |  | [1181-22971](#C_1181-22971) | Denominator for Antimicrobial Resistance Option (ARO) |
| documentationOf | 1..1 | SHALL |  | [1181-22972](#C_1181-22972) |  |
| serviceEvent | 1..1 | SHALL |  | [1181-22973](#C_1181-22973) |  |
| code | 1..1 | SHALL |  | [1181-22974](#C_1181-22974) |  |
| @code | 1..1 | SHALL |  | [1181-22975](#C_1181-22975) | 2410-9 |
| @codeSystem | 1..1 | SHALL |  | [1181-22976](#C_1181-22976) | urn:oid:2.16.840.1.113883.6.277 (cdcNHSN) = 2.16.840.1.113883.6.277 |
| component | 1..1 | SHALL |  | [1181-22977](#C_1181-22977) |  |
| structuredBody | 1..1 | SHALL |  | [1181-22978](#C_1181-22978) |  |
| component | 1..1 | SHALL |  | [1181-22979](#C_1181-22979) |  |
| section | 1..1 | SHALL |  | [1181-22980](#C_1181-22980) | [Summary Data Section (ARO) (V2) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.5.52:2015-04-01](#S_Summary_Data_Section_ARO_V2) |

1. Conforms to [HAI Population Summary Report Generic Constraints](#D_HAI_Population_Summary_Report_Generic) template (identifier: urn:oid:2.16.840.1.113883.10.20.5.4.28).

This template id represents the IG in which this template is published.

1. SHALL contain exactly one [1..1] templateId (CONF:1181-28301) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.7.2" (CONF:1181-28302).
2. SHALL contain exactly one [1..1] templateId (CONF:1181-22969) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.46" (CONF:1181-2970).
   2. SHALL contain exactly one [1..1] @extension="2015-04-01" (CONF:1181-30544).
3. SHALL contain exactly one [1..1] title="Denominator for Antimicrobial Resistance Option (ARO)" (CONF:1181-22971).
4. SHALL contain exactly one [1..1] documentationOf (CONF:1181-22972).
   1. This documentationOf SHALL contain exactly one [1..1] serviceEvent (CONF:1181-22973).
      1. This serviceEvent SHALL contain exactly one [1..1] code (CONF:1181-22974).
         1. This code SHALL contain exactly one [1..1] @code="2410-9" Summary data reporting antimicrobial resistance patterns at a facility (CONF:1181-22975).
         2. This code SHALL contain exactly one [1..1] @codeSystem="2.16.840.1.113883.6.277" (CodeSystem: cdcNHSN urn:oid:2.16.840.1.113883.6.277) (CONF:1181-22976).
5. SHALL contain exactly one [1..1] component (CONF:1181-22977).
   1. This component SHALL contain exactly one [1..1] structuredBody (CONF:1181-22978).
      1. This structuredBody SHALL contain exactly one [1..1] component (CONF:1181-22979).
         1. This component SHALL contain exactly one [1..1] [Summary Data Section (ARO) (V2)](#S_Summary_Data_Section_ARO_V2) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.5.52:2015-04-01) (CONF:1181-22980).

Antimicrobial Use (AUP) Summary Report (V2)

[ClinicalDocument: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.44:2015-04-01 (closed)]

Published as part of NHSN Healthcare Associated Infection (HAI) Reports Release 2 - US Realm

Table 6: Antimicrobial Use (AUP) Summary Report (V2) Contexts

| Contained By: | Contains: |
| --- | --- |
|  | [Summary Data Section (AUP) (V2)](#S_Summary_Data_Section_AUP_V2) |

Note: The section on “Template Ids in this Guide” includes a containment table showing all the entries within each report type.

The required title for the CDA document is the “Antimicrobial Use, Pharmacy Option (AUP) Summary Report”.

NHSN reporting requires:

   •  Patient presence:

      o  If the reporting location is a single unit such as a ward, Number of Patient-Present Days, or

      o  If the encounter location is facility-wide rather than a single unit, Number of Admissions and Number of Patient-present Days.

   •  Antimicrobial usage: for each antimicrobial reported,

      o  Number of Therapy Days for the antimicrobial (this is not a simple total of the stratified data; consult the NHSN protocol for the calculation)

      o  Number of Therapy Days for the antimicrobial stratified by route of actual administration (four observations, one for each route)

Table 7: Antimicrobial Use (AUP) Summary Report (V2) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| ClinicalDocument (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.44:2015-04-01) | | | | | |
| templateId | 1..1 | SHALL |  | [1181-28303](#C_1181-28303) |  |
| @root | 1..1 | SHALL |  | [1181-28304](#C_1181-28304) | 2.16.840.1.113883.10.20.5.7.2 |
| templateId | 1..1 | SHALL |  | [1181-22898](#C_1181-22898) |  |
| @root | 1..1 | SHALL |  | [1181-22899](#C_1181-22899) | 2.16.840.1.113883.10.20.5.44 |
| @extension | 1..1 | SHALL |  | [1181-30543](#C_1181-30543) | 2015-04-01 |
| title | 1..1 | SHALL |  | [1181-22900](#C_1181-22900) | Antimicrobial Use, Pharmacy Option (AUP) Summary Report |
| documentationOf | 1..1 | SHALL |  | [1181-22901](#C_1181-22901) |  |
| serviceEvent | 1..1 | SHALL |  | [1181-22902](#C_1181-22902) |  |
| code | 1..1 | SHALL |  | [1181-22903](#C_1181-22903) |  |
| @code | 1..1 | SHALL |  | [1181-22904](#C_1181-22904) | 1887-9 |
| @codeSystem | 1..1 | SHALL |  | [1181-22905](#C_1181-22905) | urn:oid:2.16.840.1.113883.6.277 (cdcNHSN) = 2.16.840.1.113883.6.277 |
| component | 1..1 | SHALL |  | [1181-22906](#C_1181-22906) |  |
| structuredBody | 1..1 | SHALL |  | [1181-22907](#C_1181-22907) |  |
| component | 1..1 | SHALL |  | [1181-22908](#C_1181-22908) |  |
| section | 1..1 | SHALL |  | [1181-22909](#C_1181-22909) | [Summary Data Section (AUP) (V2) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.5.51:2015-04-01](#S_Summary_Data_Section_AUP_V2) |

1. Conforms to [HAI Population Summary Report Generic Constraints](#D_HAI_Population_Summary_Report_Generic) template (identifier: urn:oid:2.16.840.1.113883.10.20.5.4.28).

This template id represents the IG in which this template is published.

1. SHALL contain exactly one [1..1] templateId (CONF:1181-28303) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.7.2" (CONF:1181-28304).
2. SHALL contain exactly one [1..1] templateId (CONF:1181-22898) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.44" (CONF:1181-22899).
   2. SHALL contain exactly one [1..1] @extension="2015-04-01" (CONF:1181-30543).
3. SHALL contain exactly one [1..1] title="Antimicrobial Use, Pharmacy Option (AUP) Summary Report" (CONF:1181-22900).
4. SHALL contain exactly one [1..1] documentationOf (CONF:1181-22901).
   1. This documentationOf SHALL contain exactly one [1..1] serviceEvent (CONF:1181-22902).
      1. This serviceEvent SHALL contain exactly one [1..1] code (CONF:1181-22903).
         1. This code SHALL contain exactly one [1..1] @code="1887-9" Summary data reporting antimicrobial usage (CONF:1181-22904).
         2. This code SHALL contain exactly one [1..1] @codeSystem="2.16.840.1.113883.6.277" (CodeSystem: cdcNHSN urn:oid:2.16.840.1.113883.6.277) (CONF:1181-22905).
5. SHALL contain exactly one [1..1] component (CONF:1181-22906).
   1. This component SHALL contain exactly one [1..1] structuredBody (CONF:1181-22907).
      1. This structuredBody SHALL contain exactly one [1..1] component (CONF:1181-22908).
         1. This component SHALL contain exactly one [1..1] [Summary Data Section (AUP) (V2)](#S_Summary_Data_Section_AUP_V2) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.5.51:2015-04-01) (CONF:1181-22909).

HAI Single-Person Report Generic Constraints

[ClinicalDocument: identifier urn:oid:2.16.840.1.113883.10.20.5.4.27 (open)]

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This template records the constraints for HAI single-person reports. It is used by all numerator reports covered by this guide. It is also used by the Procedure Denominator Report.

A single-person report must conform to the Healthcare Associated Infection Report template. In addition, key data about the patient are recorded in the recordTarget element.

   •  A patient identifier representing the facility-assigned patient ID is required. Other identifiers for the person can also be present, such as a United States Social Security Number (id/@root = 2.16.840.1.113883.4.1), a Medicare beneficiary identifier (id/@root = 2.16.840.1.113883.4.338), or secondary patient IDs (id/@root = the appropriate facility OID for patient IDs).

   •  The patient name is optional; consult the NHSN reporting protocol and requirements.

   •  Patient gender and birthdate are required.

The report-specific requirements specify the encounter data to record for each single-person report type. These data always include an identifier for the reporting facility, and usually include the encounter type (inpatient or outpatient), the admission date or encounter date, and the facility unit identifier and type.

Note: The section on “Template Ids in this Guide” includes a containment table showing all the entries within each report type.

Table 8: HAI Single-Person Report Generic Constraints Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| ClinicalDocument (identifier: urn:oid:2.16.840.1.113883.10.20.5.4.27) | | | | | |
| templateId | 1..1 | SHALL |  | [86-22415](#C_86-22415) |  |
| @root | 1..1 | SHALL |  | [86-22416](#C_86-22416) | 2.16.840.1.113883.10.20.5.4.27 |
| recordTarget | 1..1 | SHALL |  | [86-22417](#C_86-22417) |  |
| patientRole | 1..1 | SHALL |  | [86-22418](#C_86-22418) |  |
| id | 1..\* | SHALL |  | [86-22419](#C_86-22419) |  |
| @root | 1..1 | SHALL |  | [86-22420](#C_86-22420) |  |
| @extension | 1..1 | SHALL |  | [86-22421](#C_86-22421) |  |
| patient | 1..1 | SHALL |  | [86-22422](#C_86-22422) |  |
| name | 0..1 | MAY |  | [86-22423](#C_86-22423) |  |
| administrativeGenderCode | 1..1 | SHALL |  | [86-22424](#C_86-22424) |  |
| @code | 1..1 | SHALL |  | [86-22425](#C_86-22425) | urn:oid:2.16.840.1.113883.1.11.1 (Administrative Gender (HL7 V3)) |
| birthTime | 1..1 | SHALL |  | [86-22426](#C_86-22426) |  |
| @value | 1..1 | SHALL |  | [86-22427](#C_86-22427) |  |
| raceCode | 0..1 | MAY |  | [86-22428](#C_86-22428) | urn:oid:2.16.840.1.114222.4.11.7232 (NHSNRaceCategory) |
| ethnicGroupCode | 0..1 | MAY |  | [86-22429](#C_86-22429) | urn:oid:2.16.840.1.114222.4.11.837 (Ethnicity) |

1. Conforms to [Healthcare Associated Infection Report](#D_Healthcare_Associated_Infection_Repor) template (identifier: urn:oid:2.16.840.1.113883.10.20.5.4.25).
2. SHALL contain exactly one [1..1] templateId (CONF:86-22415) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.4.27" (CONF:86-22416).
3. SHALL contain exactly one [1..1] recordTarget (CONF:86-22417).
   1. This recordTarget SHALL contain exactly one [1..1] patientRole (CONF:86-22418).
      1. This patientRole SHALL contain at least one [1..\*] id (CONF:86-22419).
         1. Such ids SHALL contain exactly one [1..1] @root (CONF:86-22420).
         2. Such ids SHALL contain exactly one [1..1] @extension (CONF:86-22421).
      2. This patientRole SHALL contain exactly one [1..1] patient (CONF:86-22422).

In the name element, the sub-elements should be in the following order: family, given, and optionally a second given representing the middle name(s). A name element is not allowed to contain mixed content.

* + - 1. This patient MAY contain zero or one [0..1] name (CONF:86-22423).
      2. This patient SHALL contain exactly one [1..1] administrativeGenderCode (CONF:86-22424).
         1. This administrativeGenderCode SHALL contain exactly one [1..1] @code, which SHALL be selected from ValueSet [Administrative Gender (HL7 V3)](#Administrative_Gender_HL7_V3) urn:oid:2.16.840.1.113883.1.11.1 STATIC (CONF:86-22425).
      3. This patient SHALL contain exactly one [1..1] birthTime (CONF:86-22426).
         1. This birthTime SHALL contain exactly one [1..1] @value (CONF:86-22427).
      4. This patient MAY contain zero or one [0..1] raceCode, which SHALL be selected from ValueSet [NHSNRaceCategory](#NHSNRaceCategory) urn:oid:2.16.840.1.114222.4.11.7232 DYNAMIC (CONF:86-22428).
      5. This patient MAY contain zero or one [0..1] ethnicGroupCode (ValueSet: [Ethnicity](#Ethnicity) urn:oid:2.16.840.1.114222.4.11.837 STATIC) (CONF:86-22429).

1. The author MAY be software or MAY be a person in the role of infection control professional (ICP) (CONF:86-22430).

Table 9: Administrative Gender (HL7 V3)

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: Administrative Gender (HL7 V3) urn:oid:2.16.840.1.113883.1.11.1  Administrative Gender based upon HL7 V3 vocabulary. This value set contains only male, female and undifferentiated concepts.  Value Set Source: <https://vsac.nlm.nih.gov/> | | | |
| Code | Code System | Code System OID | Print Name |
| F | HL7AdministrativeGender | urn:oid:2.16.840.1.113883.5.1 | Female |
| M | HL7AdministrativeGender | urn:oid:2.16.840.1.113883.5.1 | Male |
| UN | HL7AdministrativeGender | urn:oid:2.16.840.1.113883.5.1 | Undifferentiated |

Table 10: NHSNRaceCategory

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: NHSNRaceCategory urn:oid:2.16.840.1.114222.4.11.7232  A full listing of codes can be found in the hai\_voc.xls file provided with this package.  Value Set Source: <https://phinvads.cdc.gov> | | | |
| Code | Code System | Code System OID | Print Name |
| 1002-5 | Race & Ethnicity - CDC | urn:oid:2.16.840.1.113883.6.238 | American Indian or Alaska Native |
| 2028-9 | Race & Ethnicity - CDC | urn:oid:2.16.840.1.113883.6.238 | Asian |
| 2054-5 | Race & Ethnicity - CDC | urn:oid:2.16.840.1.113883.6.238 | Black or African American |
| 2076-8 | Race & Ethnicity - CDC | urn:oid:2.16.840.1.113883.6.238 | Native Hawaiian or Other Pacific Islander |
| 2106-3 | Race & Ethnicity - CDC | urn:oid:2.16.840.1.113883.6.238 | White |

Table 11: Ethnicity

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: Ethnicity urn:oid:2.16.840.1.114222.4.11.837  Code System: Race & Ethnicity - CDC 2.16.840.1.113883.6.238  Value Set Source: <https://vsac.nlm.nih.gov/> | | | |
| Code | Code System | Code System OID | Print Name |
| 2135-2 | Race & Ethnicity - CDC | urn:oid:2.16.840.1.113883.6.238 | Hispanic or Latino |
| 2186-5 | Race & Ethnicity - CDC | urn:oid:2.16.840.1.113883.6.238 | Not Hispanic or Latino |

HAI AUR Antimicrobial Resistance Option (ARO) Report (V4)

[ClinicalDocument: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.31:2016-08-01 (closed)]

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Table 12: HAI AUR Antimicrobial Resistance Option (ARO) Report (V4) Contexts

| Contained By: | Contains: |
| --- | --- |
|  | [Findings Section in an ARO Report (V3)](#S_Findings_Section_in_an_ARO_Report_V3) |

Note: The section on “Template Ids in this Guide” includes a containment table showing all the entries within each report type.

This report records the antimicrobial susceptibility testing results for one pathogen isolate from an individual inpatient subject. Each report records a single organism.

Preferred document title: “Antimicrobial Resistance Option (ARO) Report”

Key encounter data:

   •  The encounter type (inpatient or outpatient) is required.

   •  An admission date is required.

   •  The facility identifier is required. Unit identifier and unit type are not recorded in the header.

Other dates and locations:

   •  Date of specimen collection is recorded in the effectiveTime element of the Specimen Collection Procedure (V2) template.

Table 13: HAI AUR Antimicrobial Resistance Option (ARO) Report (V4) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| ClinicalDocument (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.31:2016-08-01) | | | | | |
| templateId | 1..1 | SHALL |  | [3247-30540](#C_3247-30540) |  |
| @root | 1..1 | SHALL |  | [3247-30541](#C_3247-30541) | 2.16.840.1.113883.10.20.5.7.3.1.1 |
| templateId | 1..1 | SHALL |  | [3247-21951](#C_3247-21951) |  |
| @root | 1..1 | SHALL |  | [3247-21952](#C_3247-21952) | 2.16.840.1.113883.10.20.5.31 |
| @extension | 1..1 | SHALL |  | [3247-30542](#C_3247-30542) | 2016-08-01 |
| componentOf | 1..1 | SHALL |  | [3247-21139](#C_3247-21139) |  |
| encompassingEncounter | 1..1 | SHALL |  | [3247-21140](#C_3247-21140) |  |
| code | 1..1 | SHALL |  | [3247-21141](#C_3247-21141) | urn:oid:2.16.840.1.113883.13.1 (NHSNEncounterTypeCode) |
| effectiveTime | 1..1 | SHALL |  | [3247-21143](#C_3247-21143) |  |
| low | 1..1 | SHALL |  | [3247-21144](#C_3247-21144) |  |
| @value | 1..1 | SHALL |  | [3247-21145](#C_3247-21145) |  |
| location | 1..1 | SHALL |  | [3247-21146](#C_3247-21146) |  |
| healthCareFacility | 1..1 | SHALL |  | [3247-21147](#C_3247-21147) |  |
| id | 1..1 | SHALL |  | [3247-21148](#C_3247-21148) |  |
| @root | 1..1 | SHALL |  | [3247-21149](#C_3247-21149) |  |
| component | 1..1 | SHALL |  | [3247-21150](#C_3247-21150) |  |
| structuredBody | 1..1 | SHALL |  | [3247-21151](#C_3247-21151) |  |
| component | 1..1 | SHALL |  | [3247-21152](#C_3247-21152) |  |
| section | 1..1 | SHALL |  | [3247-21153](#C_3247-21153) | [Findings Section in an ARO Report (V3) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.5.32:2016-08-01](#S_Findings_Section_in_an_ARO_Report_V3) |

1. Conforms to [HAI Single-Person Report Generic Constraints](#D_HAI_SinglePerson_Report_Generic_Const) template (identifier: urn:oid:2.16.840.1.113883.10.20.5.4.27).

This template id represents the IG in which this template is published.

1. SHALL contain exactly one [1..1] templateId (CONF:3247-30540) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.7.3.1.1" (CONF:3247-30541).
2. SHALL contain exactly one [1..1] templateId (CONF:3247-21951) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.31" (CONF:3247-21952).
   2. SHALL contain exactly one [1..1] @extension="2016-08-01" (CONF:3247-30542).
3. SHALL contain exactly one [1..1] componentOf (CONF:3247-21139).
   1. This componentOf SHALL contain exactly one [1..1] encompassingEncounter (CONF:3247-21140).
      1. This encompassingEncounter SHALL contain exactly one [1..1] code, which SHALL be selected from ValueSet [NHSNEncounterTypeCode](#NHSNEncounterTypeCode) urn:oid:2.16.840.1.113883.13.1 STATIC (CONF:3247-21141).
      2. This encompassingEncounter SHALL contain exactly one [1..1] effectiveTime (CONF:3247-21143).
         1. This effectiveTime SHALL contain exactly one [1..1] low (CONF:3247-21144).
            1. This low SHALL contain exactly one [1..1] @value (CONF:3247-21145).  
               Note: Admission Date
         2. The value of the admission date SHALL NOT be earlier than January 1, 1986; SHALL NOT be earlier than the date of birth; and SHALL NOT be later than the event date (CONF:3247-23358).
      3. This encompassingEncounter SHALL contain exactly one [1..1] location (CONF:3247-21146).
         1. This location SHALL contain exactly one [1..1] healthCareFacility (CONF:3247-21147).
            1. This healthCareFacility SHALL contain exactly one [1..1] id (CONF:3247-21148).

The value of @root must be the NHSN assigned Facility OID.

This id SHALL contain exactly one [1..1] @root (CONF:3247-21149).

1. SHALL contain exactly one [1..1] component (CONF:3247-21150).
   1. This component SHALL contain exactly one [1..1] structuredBody (CONF:3247-21151).
      1. This structuredBody SHALL contain exactly one [1..1] component (CONF:3247-21152) such that it
         1. SHALL contain exactly one [1..1] [Findings Section in an ARO Report (V3)](#S_Findings_Section_in_an_ARO_Report_V3) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.5.32:2016-08-01) (CONF:3247-21153).

Table 14: NHSNEncounterTypeCode

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: NHSNEncounterTypeCode urn:oid:2.16.840.1.113883.13.1  Code System: HL7 ActCode 2.16.840.1.113883.5.4  A full listing of codes can be found in the hai\_voc.xls file provided with this package. | | | |
| Code | Code System | Code System OID | Print Name |
| AMB | HL7ActCode | urn:oid:2.16.840.1.113883.5.4 | Outpatient |
| IMP | HL7ActCode | urn:oid:2.16.840.1.113883.5.4 | Inpatient |

# Section-Level Templates

HAI Section Generic Constraints

[section: identifier urn:oid:2.16.840.1.113883.10.20.5.4.26 (closed)]

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This template records the constraints that apply to all sections specified in the NHSN HAI Implementation Guide.

Table 15: HAI Section Generic Constraints Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| section (identifier: urn:oid:2.16.840.1.113883.10.20.5.4.26) | | | | | |
| templateId | 1..1 | SHALL |  | [86-21958](#C_86-21958) |  |
| @root | 1..1 | SHALL |  | [86-21959](#C_86-21959) | 2.16.840.1.113883.10.20.5.4.26 |
| code | 1..1 | SHALL |  | [86-21953](#C_86-21953) |  |
| @code | 1..1 | SHALL |  | [86-21954](#C_86-21954) | urn:oid:2.16.840.1.113883.6.1 (LOINC) |
| title | 1..1 | SHALL |  | [86-21955](#C_86-21955) |  |
| text | 1..1 | SHALL |  | [86-21956](#C_86-21956) |  |
| entry | 1..\* | SHALL |  | [86-21957](#C_86-21957) |  |

1. SHALL contain exactly one [1..1] templateId (CONF:86-21958) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.4.26" (CONF:86-21959).
2. SHALL contain exactly one [1..1] code (CONF:86-21953).
   1. This code SHALL contain exactly one [1..1] @code (CodeSystem: LOINC urn:oid:2.16.840.1.113883.6.1 STATIC) (CONF:86-21954).
3. SHALL contain exactly one [1..1] title (CONF:86-21955).
4. SHALL contain exactly one [1..1] text (CONF:86-21956).
5. SHALL contain at least one [1..\*] entry (CONF:86-21957).

Findings Section in an ARO Report (V3)

[section: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.5.32:2016-08-01 (closed)]

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Table 16: Findings Section in an ARO Report (V3) Contexts

| Contained By: | Contains: |
| --- | --- |
| [HAI AUR Antimicrobial Resistance Option (ARO) Report (V4)](#D_HAI_AUR_Antimicrobial_Resistance_Opti) (required) | [Specimen Collection Procedure (ARO) (V3)](#E_Specimen_Collection_Procedure_ARO_V3) |

The Findings Section in an ARO Report records the details concerning one pathogen isolate and its related antimicrobial susceptibility testing results.

Table 17: Findings Section in an ARO Report (V3) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| section (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.5.32:2016-08-01) | | | | | |
| templateId | 1..1 | SHALL |  | [3247-21128](#C_3247-21128) |  |
| @root | 1..1 | SHALL |  | [3247-21129](#C_3247-21129) | 2.16.840.1.113883.10.20.5.5.32 |
| @extension | 1..1 | SHALL |  | [3247-30475](#C_3247-30475) | 2016-08-01 |
| code | 1..1 | SHALL |  | [3247-21132](#C_3247-21132) |  |
| @code | 1..1 | SHALL |  | [3247-21133](#C_3247-21133) | 18769-0 |
| @codeSystem | 1..1 | SHALL |  | [3247-30601](#C_3247-30601) | urn:oid:2.16.840.1.113883.6.1 (LOINC) = 2.16.840.1.113883.6.1 |
| entry | 1..1 | SHALL |  | [3247-21136](#C_3247-21136) |  |
| procedure | 1..1 | SHALL |  | [3247-30473](#C_3247-30473) | [Specimen Collection Procedure (ARO) (V3) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.188:2016-08-01](#E_Specimen_Collection_Procedure_ARO_V3) |

1. Conforms to [HAI Section Generic Constraints](#S_HAI_Section_Generic_Constraints) template (identifier: urn:oid:2.16.840.1.113883.10.20.5.4.26).
2. SHALL contain exactly one [1..1] templateId (CONF:3247-21128) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.5.32" (CONF:3247-21129).
   2. SHALL contain exactly one [1..1] @extension="2016-08-01" (CONF:3247-30475).
3. SHALL contain exactly one [1..1] code (CONF:3247-21132).
   1. This code SHALL contain exactly one [1..1] @code="18769-0" Findings Section (CONF:3247-21133).
   2. This code SHALL contain exactly one [1..1] @codeSystem="2.16.840.1.113883.6.1" (CodeSystem: LOINC urn:oid:2.16.840.1.113883.6.1) (CONF:3247-30601).
4. SHALL contain exactly one [1..1] entry (CONF:3247-21136).
   1. This entry SHALL contain exactly one [1..1] [Specimen Collection Procedure (ARO) (V3)](#E_Specimen_Collection_Procedure_ARO_V3) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.188:2016-08-01) (CONF:3247-30473).

Figure 23: Findings Section in an ARO Report (V3) Example

<section>

<!-- [HAI R1] HAI Section Generic Constraints -->

<templateId root="2.16.840.1.113883.10.20.5.4.26" />

<!-- [HAI R3D1.1] Findings Section in an ARO Report (V3) -->

<templateId root="2.16.840.1.113883.10.20.5.5.32" extension="2016-08-01" />

<code codeSystem="2.16.840.1.113883.6.1"

codeSystemName="LOINC"

code="18769-0"

displayName="Findings section" />

<title>Findings</title>

<text>

...

</text>

<entry typeCode="DRIV">

<procedure classCode="PROC" moodCode="EVN">

<!-- [HAI R3D1.1] Specimen Collection Procedure (ARO) (V3) -->

<templateId root="2.16.840.1.113883.10.20.5.6.188" extension="2016-08-01" />

...

</procedure>

</entry>

</section>

Summary Data Section (ARO) (V2)

[section: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.5.52:2015-04-01 (closed)]

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Table 18: Summary Data Section (ARO) (V2) Contexts

| Contained By: | Contains: |
| --- | --- |
| [Antimicrobial Resistance Option (ARO) Summary Report (V2)](#D_Antimicrobial_Resistance_Option_ARO_S) (required) | [Summary Encounter (ARO) (V2)](#E_Summary_Encounter_ARO_V2) |

The Summary Data Section is used in a population summary report. The specific counts to be reported in the Summary Data Section vary by report topic, but the section itself conveys the same kind of information wherever used; therefore, the section is represented by the same LOINC section code whatever the data reported.

The Summary Data Section (ARO) extends its generic equivalent, but is specific to the Antimicrobial Resistance Option (ARO) Summary Report.

Table 19: Summary Data Section (ARO) (V2) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| section (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.5.52:2015-04-01) | | | | | |
| templateId | 1..1 | SHALL |  | [1181-23070](#C_1181-23070) |  |
| @root | 1..1 | SHALL |  | [1181-23071](#C_1181-23071) | 2.16.840.1.113883.10.20.5.5.52 |
| @extension | 1..1 | SHALL |  | [1181-30566](#C_1181-30566) | 2015-04-01 |
| code | 1..1 | SHALL |  | [1181-23072](#C_1181-23072) |  |
| @code | 1..1 | SHALL |  | [1181-23073](#C_1181-23073) | 51900-9 |
| @codeSystem | 1..1 | SHALL |  | [1181-28366](#C_1181-28366) | urn:oid:2.16.840.1.113883.6.1 (LOINC) = 2.16.840.1.113883.6.1 |
| entry | 1..\* | SHALL |  | [1181-23074](#C_1181-23074) |  |
| encounter | 1..1 | SHALL |  | [1181-23075](#C_1181-23075) | [Summary Encounter (ARO) (V2) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.199:2015-04-01](#E_Summary_Encounter_ARO_V2) |

1. Conforms to [HAI Section Generic Constraints](#S_HAI_Section_Generic_Constraints) template (identifier: urn:oid:2.16.840.1.113883.10.20.5.4.26).
2. SHALL contain exactly one [1..1] templateId (CONF:1181-23070) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.5.52" (CONF:1181-23071).
   2. SHALL contain exactly one [1..1] @extension="2015-04-01" (CONF:1181-30566).
3. SHALL contain exactly one [1..1] code (CONF:1181-23072).
   1. This code SHALL contain exactly one [1..1] @code="51900-9" Summary Data Section (CONF:1181-23073).
   2. This code SHALL contain exactly one [1..1] @codeSystem="2.16.840.1.113883.6.1" (CodeSystem: LOINC urn:oid:2.16.840.1.113883.6.1) (CONF:1181-28366).
4. SHALL contain at least one [1..\*] entry (CONF:1181-23074).
   1. Such entries SHALL contain exactly one [1..1] [Summary Encounter (ARO) (V2)](#E_Summary_Encounter_ARO_V2) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.199:2015-04-01) (CONF:1181-23075).

Figure 24: Summary Data Section (ARO) (V2) Example

<section>

<!-- HAI Generic Section template -->

< templateId root="2.16.840.1.113883.10.20.5.4.26"/>

<!-- HAI Summary Data Section (ARO) template (V2) -->

<templateId root="2.16.840.1.113883.10.20.5.5.52"

extension="2015-04-01"/>

<code codeSystem="2.16.840.1.113883.6.1"

codeSystemName="LOINC"

code="51900-9"

displayName="Summary Data Section"/>

...

<entry>

<encounter classCode="ENC" moodCode="EVN">

<!-- HAI Summary Encounter (ARO) (V2) template -->

<templateId root="2.16.840.1.113883.10.20.5.6.199"

extension="2015-04-01"/>

...

</encounter>

</entry>

</section>

Summary Data Section (AUP) (V2)

[section: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.5.51:2015-04-01 (closed)]

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Table 20: Summary Data Section (AUP) (V2) Contexts

| Contained By: | Contains: |
| --- | --- |
| [Antimicrobial Use (AUP) Summary Report (V2)](#D_Antimicrobial_Use_AUP_Summary_Report_) (required) | [Summary Encounter (AUP) (V2)](#E_Summary_Encounter_AUP_V2)  [Summary Encounter Patient Presence (AUP) (V2)](#E_Summary_Encounter_Patient_Presence_AU) |

The Summary Data Section is used in a population summary report. The specific counts to be reported in the Summary Data Section vary by report topic, but the section itself conveys the same kind of information wherever used; therefore, the section is represented by the same LOINC section code whatever the data reported.

The Summary Data Section (AUP) extends its generic equivalent, but is specific to the Antimicrobial Use (AUP) Summary Report.

Table 21: Summary Data Section (AUP) (V2) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| section (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.5.51:2015-04-01) | | | | | |
| templateId | 1..1 | SHALL |  | [1181-23013](#C_1181-23013) |  |
| @root | 1..1 | SHALL |  | [1181-23014](#C_1181-23014) | 2.16.840.1.113883.10.20.5.5.51 |
| @extension | 1..1 | SHALL |  | [1181-30565](#C_1181-30565) | 2015-04-01 |
| code | 1..1 | SHALL |  | [1181-23015](#C_1181-23015) |  |
| @code | 1..1 | SHALL |  | [1181-23016](#C_1181-23016) | 51900-9 |
| @codeSystem | 1..1 | SHALL |  | [1181-28367](#C_1181-28367) | urn:oid:2.16.840.1.113883.6.1 (LOINC) = 2.16.840.1.113883.6.1 |
| entry | 1..1 | SHALL |  | [1181-23017](#C_1181-23017) |  |
| encounter | 1..1 | SHALL |  | [1181-23018](#C_1181-23018) | [Summary Encounter Patient Presence (AUP) (V2) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.197:2015-04-01](#E_Summary_Encounter_Patient_Presence_AU) |
| entry | 1..\* | SHALL |  | [1181-23046](#C_1181-23046) |  |
| encounter | 1..1 | SHALL |  | [1181-23047](#C_1181-23047) | [Summary Encounter (AUP) (V2) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.198:2015-04-01](#E_Summary_Encounter_AUP_V2) |

1. Conforms to [HAI Section Generic Constraints](#S_HAI_Section_Generic_Constraints) template (identifier: urn:oid:2.16.840.1.113883.10.20.5.4.26).
2. SHALL contain exactly one [1..1] templateId (CONF:1181-23013) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.5.51" (CONF:1181-23014).
   2. SHALL contain exactly one [1..1] @extension="2015-04-01" (CONF:1181-30565).
3. SHALL contain exactly one [1..1] code (CONF:1181-23015).
   1. This code SHALL contain exactly one [1..1] @code="51900-9" Summary Data Section (CONF:1181-23016).
   2. This code SHALL contain exactly one [1..1] @codeSystem="2.16.840.1.113883.6.1" (CodeSystem: LOINC urn:oid:2.16.840.1.113883.6.1) (CONF:1181-28367).
4. SHALL contain exactly one [1..1] entry (CONF:1181-23017) such that it
   1. SHALL contain exactly one [1..1] [Summary Encounter Patient Presence (AUP) (V2)](#E_Summary_Encounter_Patient_Presence_AU) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.197:2015-04-01) (CONF:1181-23018).
5. SHALL contain at least one [1..\*] entry (CONF:1181-23046) such that it
   1. SHALL contain exactly one [1..1] [Summary Encounter (AUP) (V2)](#E_Summary_Encounter_AUP_V2) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.198:2015-04-01) (CONF:1181-23047).

Figure 25: Summary Data Section (AUP) (V2)

<section>

<!-- HAI Generic Section template -->

< templateId root="2.16.840.1.113883.10.20.5.4.26"/>

<!-- HAI Summary Data Section (AUP) (V2) template -->

<templateId root="2.16.840.1.113883.10.20.5.5.51"

extension="2015-01-04"/>

<code codeSystem="2.16.840.1.113883.6.1"

codeSystemName="LOINC"

code="51900-9"

displayName="Summary Data Section"/>

...

<entry>

<encounter classCode="ENC" moodCode="EVN">

<!-- HAI Summary Encounter Patient Presence (AUP) (V2) template -->

<templateId root="2.16.840.1.113883.10.20.5.6.197"

extension="2015-01-04"/>

...

</encounter>

</entry>

<entry>

<encounter classCode="ENC" moodCode="EVN">

<!-- HAI Summary Encounter (AUP) (V2) template -->

<templateId root="2.16.840.1.113883.10.20.5.6.198"

extension="2015-01-04"/>

...

</encounter>

</entry>

<entry>

<encounter>

...

</encounter>

</entry>

</section>

# Entry-Level Templates

Antimicrobial Susceptibility Final Interpretation Result

[observation: identifier urn:oid:2.16.840.1.113883.10.20.5.6.175 (closed)]

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Table 22: Antimicrobial Susceptibility Final Interpretation Result Contexts

| Contained By: | Contains: |
| --- | --- |
| [Antimicrobial Susceptibility Tests Organizer (V3)](#E_Antimicrobial_Susceptibility_Tests_Or) (required) |  |

This clinical statement represents the final susceptibility result of a cluster of antimicrobial susceptibility tests performed on one pathogen-drug combination. Although several tests performed on one pathogen using the same antimicrobial agent may yield conflicting results, this clinical statement provides the final and definitive susceptibility testing result. That result is recorded in the interpretationCode element.

Table 23: Antimicrobial Susceptibility Final Interpretation Result Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| observation (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.175) | | | | | |
| @classCode | 1..1 | SHALL |  | [86-21067](#C_86-21067) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = OBS |
| @moodCode | 1..1 | SHALL |  | [86-21068](#C_86-21068) | urn:oid:2.16.840.1.113883.5.1001 (HL7ActMood) = EVN |
| templateId | 1..1 | SHALL |  | [86-28203](#C_86-28203) |  |
| @root | 1..1 | SHALL |  | [86-28204](#C_86-28204) | 2.16.840.1.113883.10.20.22.4.2 |
| templateId | 1..1 | SHALL |  | [86-21071](#C_86-21071) |  |
| @root | 1..1 | SHALL |  | [86-21072](#C_86-21072) | 2.16.840.1.113883.10.20.5.6.175 |
| id | 1..1 | SHALL |  | [86-21069](#C_86-21069) |  |
| @nullFlavor | 1..1 | SHALL |  | [86-21070](#C_86-21070) | NA |
| code | 1..1 | SHALL |  | [86-21075](#C_86-21075) |  |
| @code | 1..1 | SHALL |  | [86-28099](#C_86-28099) | 365705006 |
| @codeSystem | 1..1 | SHALL |  | [86-28100](#C_86-28100) | urn:oid:2.16.840.1.113883.6.96 (SNOMED CT) = 2.16.840.1.113883.6.96 |
| statusCode | 1..1 | SHALL |  | [86-21076](#C_86-21076) |  |
| @code | 1..1 | SHALL |  | [86-21077](#C_86-21077) | urn:oid:2.16.840.1.113883.5.14 (HL7ActStatus) = completed |
| effectiveTime | 1..1 | SHALL |  | [86-21078](#C_86-21078) |  |
| @nullFlavor | 1..1 | SHALL |  | [86-22630](#C_86-22630) | NA |
| value | 1..1 | SHALL | CD | [86-21079](#C_86-21079) | urn:oid:2.16.840.1.113883.13.13 (NHSNDrugSusceptibilityFindingCode) |

1. Conforms to Result Observation template (identifier: urn:oid:2.16.840.1.113883.10.20.22.4.2).
2. SHALL contain exactly one [1..1] @classCode="OBS" (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6) (CONF:86-21067).
3. SHALL contain exactly one [1..1] @moodCode="EVN" (CodeSystem: HL7ActMood urn:oid:2.16.840.1.113883.5.1001) (CONF:86-21068).
4. SHALL contain exactly one [1..1] templateId (CONF:86-28203) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.22.4.2" (CONF:86-28204).
5. SHALL contain exactly one [1..1] templateId (CONF:86-21071) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.175" (CONF:86-21072).
6. SHALL contain exactly one [1..1] id (CONF:86-21069).
   1. This id SHALL contain exactly one [1..1] @nullFlavor="NA" (CONF:86-21070).
7. SHALL contain exactly one [1..1] code (CONF:86-21075).
   1. This code SHALL contain exactly one [1..1] @code="365705006" Final Interpretation Result (CONF:86-28099).
   2. This code SHALL contain exactly one [1..1] @codeSystem="2.16.840.1.113883.6.96" (CodeSystem: SNOMED CT urn:oid:2.16.840.1.113883.6.96) (CONF:86-28100).
8. SHALL contain exactly one [1..1] statusCode (CONF:86-21076).
   1. This statusCode SHALL contain exactly one [1..1] @code="completed" Completed (CodeSystem: HL7ActStatus urn:oid:2.16.840.1.113883.5.14) (CONF:86-21077).
9. SHALL contain exactly one [1..1] effectiveTime (CONF:86-21078).
   1. This effectiveTime SHALL contain exactly one [1..1] @nullFlavor="NA" (CONF:86-22630).
10. SHALL contain exactly one [1..1] value with @xsi:type="CD", where the code SHALL be selected from ValueSet [NHSNDrugSusceptibilityFindingCode](#NHSNDrugSusceptibilityFindingCode) urn:oid:2.16.840.1.113883.13.13 (CONF:86-21079).

Table 24: NHSNDrugSusceptibilityFindingCode

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: NHSNDrugSusceptibilityFindingCode urn:oid:2.16.840.1.113883.13.13  Code System: HL7ObservationInterpretation 2.16.840.1.113883.5.83  A full listing of codes can be found in the hai\_voc.xls file provided with this package. | | | |
| Code | Code System | Code System OID | Print Name |
| I | HL7ObservationInterpretation | urn:oid:2.16.840.1.113883.5.83 | Intermediate |
| R | HL7ObservationInterpretation | urn:oid:2.16.840.1.113883.5.83 | Resistant |
| S | HL7ObservationInterpretation | urn:oid:2.16.840.1.113883.5.83 | Susceptible |
| NS | HL7ObservationInterpretation | urn:oid:2.16.840.1.113883.5.83 | Non-Susceptible |
| S-DD | HL7ObservationInterpretation | urn:oid:2.16.840.1.113883.5.83 | Susceptible-dose dependant |

Figure 26: Antimicrobial Susceptibility Final Interpretation Result Example

<!-- This observation specifies the Final Interpretation Result -->

<observation classCode="OBS" moodCode="EVN">

<!-- Antimicrobial Susceptibility Final Interpretation Result -->

<templateId root="2.16.840.1.113883.10.20.5.6.175" />

<!-- Consolidated CDA Result Observation template -->

<templateId root="2.16.840.1.113883.10.20.22.4.2" />

<id nullFlavor="NA" />

<code code="365705006"

displayName="Final Interpretation Result"

codeSystem="2.16.840.1.113883.6.96"

codeSystemName="SNOMED CT" />

<statusCode code="completed" />

<effectiveTime nullFlavor="NA" />

<value xsi:type="CD" codeSystem="2.16.840.1.113883.5.83"

codeSystemName="HL7 Observation Interpretation"

code="R"

displayName="Resistant" />

</observation>

Antimicrobial Susceptibility Isolate Participant

[participant: identifier urn:oid:2.16.840.1.113883.10.20.5.6.202 (closed)]

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Table 25: Antimicrobial Susceptibility Isolate Participant Contexts

| Contained By: | Contains: |
| --- | --- |
| [Isolate Susceptibility Tests Organizer (V3)](#E_Isolate_Susceptibility_Tests_Organize) (required) |  |

This template identifies an isolate for the purpose of antimicrobial susceptibility testing.

Table 26: Antimicrobial Susceptibility Isolate Participant Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| participant (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.202) | | | | | |
| @typeCode | 1..1 | SHALL |  | [86-27150](#C_86-27150) | SBJ |
| templateId | 1..1 | SHALL |  | [86-27137](#C_86-27137) |  |
| @root | 1..1 | SHALL |  | [86-27138](#C_86-27138) | 2.16.840.1.113883.10.20.5.6.202 |
| participantRole | 1..1 | SHALL |  | [86-27151](#C_86-27151) |  |
| @classCode | 1..1 | SHALL |  | [86-27152](#C_86-27152) | ISLT |
| id | 1..\* | SHALL |  | [86-27153](#C_86-27153) |  |
| playingEntity | 1..1 | SHALL |  | [86-27154](#C_86-27154) |  |
| code | 1..1 | SHALL |  | [86-27155](#C_86-27155) | urn:oid:2.16.840.1.113883.13.16 (NHSNPathogenCode) |

1. SHALL contain exactly one [1..1] @typeCode="SBJ" (CONF:86-27150).
2. SHALL contain exactly one [1..1] templateId (CONF:86-27137) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.202" (CONF:86-27138).
3. SHALL contain exactly one [1..1] participantRole (CONF:86-27151).
   1. This participantRole SHALL contain exactly one [1..1] @classCode="ISLT" (CONF:86-27152).

This is the unique isolate identifier

* 1. This participantRole SHALL contain at least one [1..\*] id (CONF:86-27153).
  2. This participantRole SHALL contain exactly one [1..1] playingEntity (CONF:86-27154).
     1. This playingEntity SHALL contain exactly one [1..1] code, which SHALL be selected from ValueSet [NHSNPathogenCode](#NHSNPathogenCode) urn:oid:2.16.840.1.113883.13.16 DYNAMIC (CONF:86-27155).

Table 27: NHSNPathogenCode

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: NHSNPathogenCode urn:oid: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  A full listing of codes can be found in the hai\_voc.xls file provided with this package. | | | |
| Code | Code System | Code System OID | Print Name |
| 50471002 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Zika virus (organism) |
| 2423009 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Chikungunya virus (organism) |

Figure 27: Antimicrobial Susceptibility Isolate Participant Example

<participant typeCode="SBJ">

<!-- Antimicrobial Susceptibility Isolate Participant template -->

<templateId root="2.16.840.1.113883.10.20.5.6.202"/>

<participantRole classCode="ISLT">

<!-- Isolate identifier - unique for each isolate in that year –->

<id root="8d7ebcf7-528e-48e8-9e04-350b11b591d1" extension="125698523"/>

<playingEntity>

<code code="3092008"

displayName="Staphylococcus aureus"

codeSystem="2.16.840.1.113883.6.96"

codeSystemName="SNOMED CT"/>

</playingEntity>

</participantRole>

</participant>

Antimicrobial Susceptibility Result Observation (V3)

[observation: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.6.186:2016-08-01 (closed)]

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Table 28: Antimicrobial Susceptibility Result Observation (V3) Contexts

| Contained By: | Contains: |
| --- | --- |
| [Antimicrobial Susceptibility Result Organizer (V3)](#E_Antimicrobial_Susceptibility_Result_O) (required) |  |

This clinical statement represents the result of one discrete susceptibility test. The type of test is recorded in the code element. The test method is recorded in the methodCode. The susceptibility result of that test is recorded in the interpretationCode element. The numeric result of that test is recorded in the value element as an inequality. The numeric component is recorded in the value/.../@value attribute. The unit of measure is recorded in the value/.../@unit attribute. The inequality is recorded in the value/low and value/high and value/center elements. For example:

Greater than 0.5 mg/ul

    <value>

        <low value="0.5" unit="mg/ul"/>

    </value>

Greater than or equal to 0.9 mg/ul

    <value>

        <low value="0.9" unit="mg/ul" inclusive="true"/>

    </value>

Less than 0.7 mg/ul

    <value>

        <high value="0.7" unit="mg/ul"/>

    </value>

Less than or equal to 0.4 mg/ul

    <value>

        <high value="0.4" unit="mg/ul" inclusive="true"/>

    </value>

Exactly equal to 0.2 mg/ul

    <value>

        <center value="0.2" unit="mg/ul"/>

    </value>

Table 29: Antimicrobial Susceptibility Result Observation (V3) Constraints Overview

| XPath | Card. | Verb | Data Type | CONF# | Value |
| --- | --- | --- | --- | --- | --- |
| observation (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.186:2016-08-01) | | | | | |
| @classCode | 1..1 | SHALL |  | [3247-22632](#C_3247-22632) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = OBS |
| @moodCode | 1..1 | SHALL |  | [3247-22633](#C_3247-22633) | urn:oid:2.16.840.1.113883.5.1001 (HL7ActMood) = EVN |
| @negationInd | 1..1 | SHALL |  | [3247-22699](#C_3247-22699) |  |
| templateId | 1..1 | SHALL |  | [3247-30551](#C_3247-30551) |  |
| @root | 1..1 | SHALL |  | [3247-30552](#C_3247-30552) | 2.16.840.1.113883.10.20.22.4.2 |
| templateId | 1..1 | SHALL |  | [3247-22634](#C_3247-22634) |  |
| @root | 1..1 | SHALL |  | [3247-22635](#C_3247-22635) | 2.16.840.1.113883.10.20.5.6.186 |
| @extension | 1..1 | SHALL |  | [3247-30553](#C_3247-30553) | 2016-08-01 |
| id | 1..1 | SHALL |  | [3247-22636](#C_3247-22636) |  |
| @nullFlavor | 1..1 | SHALL |  | [3247-22637](#C_3247-22637) | NA |
| code | 1..1 | SHALL |  | [3247-22638](#C_3247-22638) | urn:oid:2.16.840.1.113883.13.15 (NHSNDrugSusceptibilityTestsCode) |
| statusCode | 1..1 | SHALL |  | [3247-22639](#C_3247-22639) |  |
| @code | 1..1 | SHALL |  | [3247-22640](#C_3247-22640) | completed |
| effectiveTime | 1..1 | SHALL |  | [3247-22641](#C_3247-22641) |  |
| @nullFlavor | 1..1 | SHALL |  | [3247-22642](#C_3247-22642) | NA |
| value | 1..1 | SHALL | IVL\_PQ | [3247-22643](#C_3247-22643) |  |
| low | 0..1 | MAY |  | [3247-22644](#C_3247-22644) |  |
| @value | 0..1 | MAY |  | [3247-23095](#C_3247-23095) |  |
| @unit | 0..1 | MAY |  | [3247-23096](#C_3247-23096) |  |
| @inclusive | 0..1 | MAY | BL | [3247-22645](#C_3247-22645) |  |
| high | 0..1 | MAY |  | [3247-22646](#C_3247-22646) |  |
| @value | 0..1 | MAY |  | [3247-23097](#C_3247-23097) |  |
| @unit | 0..1 | MAY |  | [3247-23098](#C_3247-23098) |  |
| @inclusive | 0..1 | MAY |  | [3247-22647](#C_3247-22647) |  |
| center | 0..1 | MAY |  | [3247-22648](#C_3247-22648) |  |
| @value | 0..1 | MAY |  | [3247-23099](#C_3247-23099) |  |
| @unit | 0..1 | MAY |  | [3247-23100](#C_3247-23100) |  |
| @nullFlavor | 0..1 | MAY |  | [3247-23366](#C_3247-23366) |  |
| interpretationCode | 1..1 | SHALL |  | [3247-23101](#C_3247-23101) | urn:oid:2.16.840.1.113883.13.13 (NHSNDrugSusceptibilityFindingCode) |
| methodCode | 1..1 | SHALL |  | [3247-30599](#C_3247-30599) |  |
| @code | 1..1 | SHALL |  | [3247-30602](#C_3247-30602) | urn:oid:2.16.840.1.113883.10.20.5.9.4 (NHSNDrugSusceptibilityTestMethod) |
| @codeSystem | 1..1 | SHALL |  | [3247-30603](#C_3247-30603) |  |

1. Conforms to Result Observation template (identifier: urn:oid:2.16.840.1.113883.10.20.22.4.2).
2. SHALL contain exactly one [1..1] @classCode="OBS" (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6) (CONF:3247-22632).
3. SHALL contain exactly one [1..1] @moodCode="EVN" (CodeSystem: HL7ActMood urn:oid:2.16.840.1.113883.5.1001) (CONF:3247-22633).
4. SHALL contain exactly one [1..1] @negationInd (CONF:3247-22699).
5. SHALL contain exactly one [1..1] templateId (CONF:3247-30551) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.22.4.2" (CONF:3247-30552).
6. SHALL contain exactly one [1..1] templateId (CONF:3247-22634) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.186" (CONF:3247-22635).
   2. SHALL contain exactly one [1..1] @extension="2016-08-01" (CONF:3247-30553).
7. SHALL contain exactly one [1..1] id (CONF:3247-22636).
   1. This id SHALL contain exactly one [1..1] @nullFlavor="NA" (CONF:3247-22637).
8. SHALL contain exactly one [1..1] code, which SHOULD be selected from ValueSet [NHSNDrugSusceptibilityTestsCode](#NHSNDrugSusceptibilityTestsCode) urn:oid:2.16.840.1.113883.13.15 DYNAMIC (CONF:3247-22638).
9. SHALL contain exactly one [1..1] statusCode (CONF:3247-22639).
   1. This statusCode SHALL contain exactly one [1..1] @code="completed" (CONF:3247-22640).
10. SHALL contain exactly one [1..1] effectiveTime (CONF:3247-22641).
    1. This effectiveTime SHALL contain exactly one [1..1] @nullFlavor="NA" (CONF:3247-22642).
11. SHALL contain exactly one [1..1] value with @xsi:type="IVL\_PQ" (CONF:3247-22643).
    1. This value MAY contain zero or one [0..1] low (CONF:3247-22644).
       1. The low, if present, MAY contain zero or one [0..1] @value (CONF:3247-23095).
       2. The low, if present, MAY contain zero or one [0..1] @unit (CONF:3247-23096).
       3. The low, if present, MAY contain zero or one [0..1] @inclusive (CONF:3247-22645).
    2. This value MAY contain zero or one [0..1] high (CONF:3247-22646).
       1. The high, if present, MAY contain zero or one [0..1] @value (CONF:3247-23097).
       2. The high, if present, MAY contain zero or one [0..1] @unit (CONF:3247-23098).
       3. The high, if present, MAY contain zero or one [0..1] @inclusive (CONF:3247-22647).
    3. This value MAY contain zero or one [0..1] center (CONF:3247-22648).
       1. The center, if present, MAY contain zero or one [0..1] @value (CONF:3247-23099).
       2. The center, if present, MAY contain zero or one [0..1] @unit (CONF:3247-23100).
    4. This value MAY contain zero or one [0..1] @nullFlavor (CONF:3247-23366).
12. SHALL contain exactly one [1..1] interpretationCode, which SHOULD be selected from ValueSet [NHSNDrugSusceptibilityFindingCode](#NHSNDrugSusceptibilityFindingCode) urn:oid:2.16.840.1.113883.13.13 (CONF:3247-23101).
13. SHALL contain exactly one [1..1] methodCode (CONF:3247-30599).
    1. This methodCode SHALL contain exactly one [1..1] @code, which SHALL be selected from ValueSet [NHSNDrugSusceptibilityTestMethod](#NHSNDrugSusceptibilityTestMethod) urn:oid:2.16.840.1.113883.10.20.5.9.4 DYNAMIC (CONF:3247-30602).
    2. This methodCode SHALL contain exactly one [1..1] @codeSystem (CONF:3247-30603).

Table 30: NHSNDrugSusceptibilityTestsCode

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: NHSNDrugSusceptibilityTestsCode urn:oid:2.16.840.1.113883.13.15  Code System: LOINC 2.16.840.1.113883.6.1 or cdcNHSN 2.16.840.1.113883.6.277  A full listing of codes can be found in the hai\_voc.xls file provided with this package. | | | |
| Code | Code System | Code System OID | Print Name |
| 18855-7 | LOINC | urn:oid:2.16.840.1.113883.6.1 | 5-fluorocytosine Susc Islt |
| 18860-7 | LOINC | urn:oid:2.16.840.1.113883.6.1 | Amikacin Susc Islt |
| 18862-3 | LOINC | urn:oid:2.16.840.1.113883.6.1 | Amoxicillin+Clav Susc Islt |
| 18864-9 | LOINC | urn:oid:2.16.840.1.113883.6.1 | Ampicillin Susc Islt |
| 18865-6 | LOINC | urn:oid:2.16.840.1.113883.6.1 | Ampicillin+Sulbac Susc Islt |
| 57095-2 | LOINC | urn:oid:2.16.840.1.113883.6.1 | Anidulafungin Susc Islt |
| 18866-4 | LOINC | urn:oid:2.16.840.1.113883.6.1 | Azithromycin Susc Islt |
| 18868-0 | LOINC | urn:oid:2.16.840.1.113883.6.1 | Aztreonam Susc Islt |
| 32378-2 | LOINC | urn:oid:2.16.840.1.113883.6.1 | Caspofungin Susc Islt |
| 18878-9 | LOINC | urn:oid:2.16.840.1.113883.6.1 | Cefazolin Susc Islt |
| ... | | | |

Table 31: NHSNDrugSusceptibilityTestMethod

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: NHSNDrugSusceptibilityTestMethod urn:oid:2.16.840.1.113883.10.20.5.9.4  A full listing of codes can be found in the hai\_voc.xls file provided with this package. | | | |
| Code | Code System | Code System OID | Print Name |
| 50545-3 | LOINC | urn:oid:2.16.840.1.113883.6.1 | Bacterial susceptibility panel by Minimum inhibitory concentration (MIC) |
| 50546-1 | LOINC | urn:oid:2.16.840.1.113883.6.1 | Bacterial susceptibility panel by Disk diffusion (KB) |
| 49589-5 | LOINC | urn:oid:2.16.840.1.113883.6.1 | Bacterial susceptibility panel by Gradient strip |

Figure 28: Antimicrobial Susceptibility Result Observation (V3)

<observation classCode="OBS" moodCode="EVN" negationInd="false">

<!-- [C-CDA R1.1] Result Observation -->

<templateId root="2.16.840.1.113883.10.20.22.4.2" />

<!-- [HAI R3D1.1] Antimicrobial Susceptibility Result Observation (V3) -->

<templateId root="2.16.840.1.113883.10.20.5.6.186" extension="2016-08-01" />

<id nullFlavor="NA" />

<code code="18907-6"

displayName="Clarithro Susc Islt"

codeSystemName="LOINC"

codeSystem="2.16.840.1.113883.6.1" />

<statusCode code="completed" />

<effectiveTime nullFlavor="NA" />

<value xsi:type="IVL\_PQ">

<low value="5.0" unit="ug/ml" />

</value>

<interpretationCode codeSystem="2.16.840.1.113883.5.83"

codeSystemName="HL7 Observation Interpretation"

code="R"

displayName="Resistant" />

<methodCode codeSystem="2.16.840.1.113883.6.1"

codeSystemName="LOINC"

code="49589-5"

displayName="Bacterial susceptibility panel by Gradient strip (E-test)" />

</observation>

Figure 29: Antimicrobial Susceptibility Result Observation (V3) - Not Done

<observation classCode="OBS" moodCode="EVN" negationInd="true">

<!-- [C-CDA R1.1] Result Observation -->

<templateId root="2.16.840.1.113883.10.20.22.4.2" />

<!-- [HAI R3D1.1] Antimicrobial Susceptibility Result Observation (V3) -->

<templateId root="2.16.840.1.113883.10.20.5.6.186" extension="2016-08-01" />

<id nullFlavor="NA" />

<code code="18907-6"

displayName="Clarithro Susc Islt"

codeSystemName="LOINC"

codeSystem="2.16.840.1.113883.6.1" />

<statusCode code="completed" />

<effectiveTime nullFlavor="NA" />

<value xsi:type="IVL\_PQ" nullFlavor="NA" />

<interpretationCode nullFlavor="NA" />

<methodCode codeSystem="2.16.840.1.113883.6.1"

codeSystemName="LOINC"

code="50546-1"

displayName="Bacterial susceptibility panel by Disk diffusion (KB)" />

</observation>

Antimicrobial Susceptibility Result Organizer (V3)

[organizer: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.6.200:2016-08-01 (closed)]

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Table 32: Antimicrobial Susceptibility Result Organizer (V3) Contexts

| Contained By: | Contains: |
| --- | --- |
| [Antimicrobial Susceptibility Tests Organizer (V3)](#E_Antimicrobial_Susceptibility_Tests_Or) (required) | [Antimicrobial Susceptibility Result Observation (V3)](#E_Antimicrobial_Susceptibility_Res_Obs) |

This organizer groups a battery of antimicrobial susceptibility tests. Each drug tested must have an observation for each method in the value set NHSNDrugSusceptibilityTestMethod.

Table 33: Antimicrobial Susceptibility Result Organizer (V3) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| organizer (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.200:2016-08-01) | | | | | |
| @classCode | 1..1 | SHALL |  | [3247-27103](#C_3247-27103) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = BATTERY |
| @moodCode | 1..1 | SHALL |  | [3247-27104](#C_3247-27104) | urn:oid:2.16.840.1.113883.5.1001 (HL7ActMood) = EVN |
| templateId | 1..1 | SHALL |  | [3247-30554](#C_3247-30554) |  |
| @root | 1..1 | SHALL |  | [3247-28208](#C_3247-28208) | 2.16.840.1.113883.10.20.22.4.1 |
| templateId | 1..1 | SHALL |  | [3247-27105](#C_3247-27105) |  |
| @root | 1..1 | SHALL |  | [3247-27106](#C_3247-27106) | 2.16.840.1.113883.10.20.5.6.200 |
| @extension | 1..1 | SHALL |  | [3247-30555](#C_3247-30555) | 2016-08-01 |
| id | 1..1 | SHALL |  | [3247-27107](#C_3247-27107) |  |
| @nullFlavor | 1..1 | SHALL |  | [3247-30591](#C_3247-30591) | urn:oid:2.16.840.1.113883.5.1008 (HL7NullFlavor) = NA |
| code | 1..1 | SHALL |  | [3247-27108](#C_3247-27108) |  |
| @code | 1..1 | SHALL |  | [3247-28101](#C_3247-28101) | 18725-2 |
| @codeSystem | 1..1 | SHALL |  | [3247-28102](#C_3247-28102) | urn:oid:2.16.840.1.113883.6.1 (LOINC) = 2.16.840.1.113883.6.1 |
| statusCode | 1..1 | SHALL |  | [3247-27109](#C_3247-27109) |  |
| @code | 1..1 | SHALL |  | [3247-27110](#C_3247-27110) | urn:oid:2.16.840.1.113883.5.14 (HL7ActStatus) = completed |
| component | 1..\* | SHALL |  | [3247-27111](#C_3247-27111) |  |
| observation | 1..1 | SHALL |  | [3247-27112](#C_3247-27112) | [Antimicrobial Susceptibility Result Observation (V3) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.186:2016-08-01](#E_Antimicrobial_Susceptibility_Res_Obs) |

1. Conforms to Result Organizer template (identifier: urn:oid:2.16.840.1.113883.10.20.22.4.1).
2. SHALL contain exactly one [1..1] @classCode="BATTERY" (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6) (CONF:3247-27103).
3. SHALL contain exactly one [1..1] @moodCode="EVN" (CodeSystem: HL7ActMood urn:oid:2.16.840.1.113883.5.1001) (CONF:3247-27104).
4. SHALL contain exactly one [1..1] templateId (CONF:3247-30554) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.22.4.1" (CONF:3247-28208).
5. SHALL contain exactly one [1..1] templateId (CONF:3247-27105) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.200" (CONF:3247-27106).
   2. SHALL contain exactly one [1..1] @extension="2016-08-01" (CONF:3247-30555).
6. SHALL contain exactly one [1..1] id (CONF:3247-27107).
   1. This id SHALL contain exactly one [1..1] @nullFlavor="NA" (CodeSystem: HL7NullFlavor urn:oid:2.16.840.1.113883.5.1008) (CONF:3247-30591).
7. SHALL contain exactly one [1..1] code (CONF:3247-27108).
   1. This code SHALL contain exactly one [1..1] @code="18725-2" Microbiology Studies (CONF:3247-28101).
   2. This code SHALL contain exactly one [1..1] @codeSystem="2.16.840.1.113883.6.1" (CodeSystem: LOINC urn:oid:2.16.840.1.113883.6.1) (CONF:3247-28102).
8. SHALL contain exactly one [1..1] statusCode (CONF:3247-27109).
   1. This statusCode SHALL contain exactly one [1..1] @code="completed" (CodeSystem: HL7ActStatus urn:oid:2.16.840.1.113883.5.14) (CONF:3247-27110).

Each drug tested must have an observation for each method in the value set NHSNDrugSusceptibilityTestMethod.

1. SHALL contain at least one [1..\*] component (CONF:3247-27111).
   1. Such components SHALL contain exactly one [1..1] [Antimicrobial Susceptibility Result Observation (V3)](#E_Antimicrobial_Susceptibility_Res_Obs) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.186:2016-08-01) (CONF:3247-27112).

Figure 30: Antimicrobial Susceptibility Result Organizer (V3) Example

<organizer classCode="BATTERY" moodCode="EVN">

<!-- [C-CDA R1.1] Result Organizer -->

<templateId root="2.16.840.1.113883.10.20.22.4.1" />

<!-- [HAI R3D1.1] Antimicrobial Susceptibility Result Organizer (V3) -->

<templateId root="2.16.840.1.113883.10.20.5.6.200" extension="2016-08-01" />

<id nullFlavor="NA" />

<code code="18725-2"

codeSystem="2.16.840.1.113883.6.1"

codeSystemName="LOINC"

displayName="Microbiology Studies" />

<statusCode code="completed" />

<component>

<observation classCode="OBS" moodCode="EVN" negationInd="false">

<!-- [C-CDA R1.1] Result Observation -->

<templateId root="2.16.840.1.113883.10.20.22.4.2" />

<!-- [HAI R3D1.1] Antimicrobial Susceptibility Result Observation (V3) -->

<templateId root="2.16.840.1.113883.10.20.5.6.186" extension="2016-08-01" />

...

</observation>

</component>

<!-- This observation specifies the susceptibility test was not done. (NegationInd = true) -->

<component>

<observation classCode="OBS" moodCode="EVN" negationInd="true">

<!-- [C-CDA R1.1] Result Observation -->

<templateId root="2.16.840.1.113883.10.20.22.4.2" />

<!-- [HAI R3D1.1] Antimicrobial Susceptibility Result Observation (V3) -->

<templateId root="2.16.840.1.113883.10.20.5.6.186" extension="2016-08-01" />

...

</observation>

</component>

...

</organizer>

Antimicrobial Susceptibility Tests Organizer (V3)

[organizer: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.6.177:2016-08-01 (closed)]

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Table 34: Antimicrobial Susceptibility Tests Organizer (V3) Contexts

| Contained By: | Contains: |
| --- | --- |
| [Isolate Susceptibility Tests Organizer (V3)](#E_Isolate_Susceptibility_Tests_Organize) (required) | [Antimicrobial Susceptibility Final Interpretation Result](#E_Antimicrobial_Susceptibility_Final_In)  [Antimicrobial Susceptibility Result Organizer (V3)](#E_Antimicrobial_Susceptibility_Result_O) |

This organizer identifies a set of antimicrobial susceptibility tests performed on a pathogen along with the final antimicrobial susceptibility result generated by those tests with regard to that pathogen-agent combination.

Table 35: Antimicrobial Susceptibility Tests Organizer (V3) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| organizer (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.177:2016-08-01) | | | | | |
| @classCode | 1..1 | SHALL |  | [3247-21091](#C_3247-21091) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = CLUSTER |
| @moodCode | 1..1 | SHALL |  | [3247-21092](#C_3247-21092) | urn:oid:2.16.840.1.113883.5.1001 (HL7ActMood) = EVN |
| templateId | 1..1 | SHALL |  | [3247-30498](#C_3247-30498) |  |
| @root | 1..1 | SHALL |  | [3247-30499](#C_3247-30499) | 2.16.840.1.113883.10.20.22.4.1 |
| templateId | 1..1 | SHALL |  | [3247-21093](#C_3247-21093) |  |
| @root | 1..1 | SHALL |  | [3247-21094](#C_3247-21094) | 2.16.840.1.113883.10.20.5.6.177 |
| @extension | 1..1 | SHALL |  | [3247-30500](#C_3247-30500) | 2016-08-01 |
| id | 1..\* | SHALL |  | [3247-21097](#C_3247-21097) |  |
| @nullFlavor | 1..1 | SHALL |  | [3247-22723](#C_3247-22723) | NA |
| code | 1..1 | SHALL |  | [3247-21098](#C_3247-21098) |  |
| @code | 1..1 | SHALL |  | [3247-21099](#C_3247-21099) | urn:oid:2.16.840.1.113883.6.1 (LOINC) = 18725-2 |
| statusCode | 1..1 | SHALL |  | [3247-21100](#C_3247-21100) |  |
| @code | 1..1 | SHALL |  | [3247-21101](#C_3247-21101) | urn:oid:2.16.840.1.113883.5.14 (HL7ActStatus) = completed |
| component | 1..1 | SHALL |  | [3247-21104](#C_3247-21104) |  |
| organizer | 1..1 | SHALL |  | [3247-27178](#C_3247-27178) | [Antimicrobial Susceptibility Result Organizer (V3) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.200:2016-08-01](#E_Antimicrobial_Susceptibility_Result_O) |
| component | 1..1 | SHALL |  | [3247-21106](#C_3247-21106) |  |
| observation | 1..1 | SHALL |  | [3247-22712](#C_3247-22712) | [Antimicrobial Susceptibility Final Interpretation Result (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.175](#E_Antimicrobial_Susceptibility_Final_In) |

1. Conforms to Result Organizer template (identifier: urn:oid:2.16.840.1.113883.10.20.22.4.1).
2. SHALL contain exactly one [1..1] @classCode="CLUSTER" (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6) (CONF:3247-21091).
3. SHALL contain exactly one [1..1] @moodCode="EVN" (CodeSystem: HL7ActMood urn:oid:2.16.840.1.113883.5.1001) (CONF:3247-21092).
4. SHALL contain exactly one [1..1] templateId (CONF:3247-30498) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.22.4.1" (CONF:3247-30499).
5. SHALL contain exactly one [1..1] templateId (CONF:3247-21093) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.177" (CONF:3247-21094).
   2. SHALL contain exactly one [1..1] @extension="2016-08-01" (CONF:3247-30500).
6. SHALL contain at least one [1..\*] id (CONF:3247-21097).
   1. Such ids SHALL contain exactly one [1..1] @nullFlavor="NA" (CONF:3247-22723).
7. SHALL contain exactly one [1..1] code (CONF:3247-21098).
   1. This code SHALL contain exactly one [1..1] @code="18725-2" Microbiology studies (CodeSystem: LOINC urn:oid:2.16.840.1.113883.6.1) (CONF:3247-21099).
8. SHALL contain exactly one [1..1] statusCode (CONF:3247-21100).
   1. This statusCode SHALL contain exactly one [1..1] @code="completed" Completed (CodeSystem: HL7ActStatus urn:oid:2.16.840.1.113883.5.14) (CONF:3247-21101).
9. SHALL contain exactly one [1..1] component (CONF:3247-21104) such that it
   1. SHALL contain exactly one [1..1] [Antimicrobial Susceptibility Result Organizer (V3)](#E_Antimicrobial_Susceptibility_Result_O) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.200:2016-08-01) (CONF:3247-27178).
10. SHALL contain exactly one [1..1] component (CONF:3247-21106) such that it
    1. SHALL contain exactly one [1..1] [Antimicrobial Susceptibility Final Interpretation Result](#E_Antimicrobial_Susceptibility_Final_In) (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.175) (CONF:3247-22712).

Figure 31: Antimicrobial Susceptibility Tests Organizer (V3) Example

<organizer classCode="CLUSTER" moodCode="EVN">

<!-- [C-CDA R1.1] Result Organizer -->

<templateId root="2.16.840.1.113883.10.20.22.4.1" />

<!-- [HAI R3D1.1] Antimicrobial Susceptibility Tests Organizer (V3) -->

<templateId root="2.16.840.1.113883.10.20.5.6.177" extension="2016-08-01" />

<id nullFlavor="NA" />

<code code="18725-2"

codeSystem="2.16.840.1.113883.6.1"

codeSystemName="LOINC"

displayName="Microbiology Studies" />

<statusCode code="completed" />

<component>

<organizer classCode="BATTERY" moodCode="EVN">

<!-- [C-CDA R1.1] Result Organizer -->

<templateId root="2.16.840.1.113883.10.20.22.4.1" />

<!-- [HAI R3D1.1] Antimicrobial Susceptibility Result Organizer (V3) -->

<templateId root="2.16.840.1.113883.10.20.5.6.200" extension="2016-08-01" />

...

</organizer>

</component>

<component>

<!-- This observation specifies the Final Interpretation result. -->

<observation classCode="OBS" moodCode="EVN">

<!-- [HAI R1] Antimicrobial Susceptibility Final Interpretation Result -->

<templateId root="2.16.840.1.113883.10.20.5.6.175" />

<!-- [C-CDA R1.1] Result Observation -->

<templateId root="2.16.840.1.113883.10.20.22.4.2" />

...

</observation>

</component>

</organizer>

ARO Staph Aureus Specific Tests Organizer

[organizer: identifier urn:oid:2.16.840.1.113883.10.20.5.6.190 (closed)]

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Table 36: ARO Staph Aureus Specific Tests Organizer Contexts

| Contained By: | Contains: |
| --- | --- |
| [Isolate Susceptibility Tests Organizer (V3)](#E_Isolate_Susceptibility_Tests_Organize) (optional) | [ARO Staph Aureus Specific Tests Result Observation](#E_ARO_Staph_Aureus_Specific_Tests_Resul) |

This organizer represents the set of specific tests conducted on an isolate of Staphylococcus aureus when performing antimicrobial susceptibility testing.

Table 37: ARO Staph Aureus Specific Tests Organizer Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| organizer (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.190) | | | | | |
| @classCode | 1..1 | SHALL |  | [86-22700](#C_86-22700) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = CLUSTER |
| @moodCode | 1..1 | SHALL |  | [86-22701](#C_86-22701) | urn:oid:2.16.840.1.113883.5.1001 (HL7ActMood) = EVN |
| templateId | 1..1 | SHALL |  | [86-28209](#C_86-28209) |  |
| @root | 1..1 | SHALL |  | [86-28210](#C_86-28210) | 2.16.840.1.113883.10.20.22.4.1 |
| templateId | 1..1 | SHALL |  | [86-22702](#C_86-22702) |  |
| @root | 1..1 | SHALL |  | [86-22703](#C_86-22703) | 2.16.840.1.113883.10.20.5.6.190 |
| id | 1..1 | SHALL |  | [86-22704](#C_86-22704) |  |
| @nullFlavor | 1..1 | SHALL |  | [86-23365](#C_86-23365) | NA |
| code | 1..1 | SHALL |  | [86-22705](#C_86-22705) |  |
| @code | 1..1 | SHALL |  | [86-22706](#C_86-22706) | urn:oid:2.16.840.1.113883.6.1 (LOINC) = 18725-2 |
| statusCode | 1..1 | SHALL |  | [86-22707](#C_86-22707) |  |
| @code | 1..1 | SHALL |  | [86-22708](#C_86-22708) | urn:oid:2.16.840.1.113883.5.14 (HL7ActStatus) = completed |
| component | 1..\* | SHALL |  | [86-22709](#C_86-22709) |  |
| observation | 1..1 | SHALL |  | [86-22710](#C_86-22710) | [ARO Staph Aureus Specific Tests Result Observation (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.189](#E_ARO_Staph_Aureus_Specific_Tests_Resul) |

1. Conforms to Result Organizer template (identifier: urn:oid:2.16.840.1.113883.10.20.22.4.1).
2. SHALL contain exactly one [1..1] @classCode="CLUSTER" (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6) (CONF:86-22700).
3. SHALL contain exactly one [1..1] @moodCode="EVN" (CodeSystem: HL7ActMood urn:oid:2.16.840.1.113883.5.1001) (CONF:86-22701).
4. SHALL contain exactly one [1..1] templateId (CONF:86-28209) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.22.4.1" (CONF:86-28210).
5. SHALL contain exactly one [1..1] templateId (CONF:86-22702) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.190" (CONF:86-22703).
6. SHALL contain exactly one [1..1] id (CONF:86-22704).
   1. This id SHALL contain exactly one [1..1] @nullFlavor="NA" (CONF:86-23365).
7. SHALL contain exactly one [1..1] code (CONF:86-22705).
   1. This code SHALL contain exactly one [1..1] @code="18725-2" Microbiology studies (CodeSystem: LOINC urn:oid:2.16.840.1.113883.6.1) (CONF:86-22706).
8. SHALL contain exactly one [1..1] statusCode (CONF:86-22707).
   1. This statusCode SHALL contain exactly one [1..1] @code="completed" Completed (CodeSystem: HL7ActStatus urn:oid:2.16.840.1.113883.5.14) (CONF:86-22708).
9. SHALL contain at least one [1..\*] component (CONF:86-22709) such that it
   1. SHALL contain exactly one [1..1] [ARO Staph Aureus Specific Tests Result Observation](#E_ARO_Staph_Aureus_Specific_Tests_Resul) (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.189) (CONF:86-22710).

Figure 32: ARO Staph Aureus Specific Tests Organizer Example

<organizer classCode="CLUSTER" moodCode="EVN">

<!-- ARO Staph Aureus Specific Tests Organizer -->

<templateId root="2.16.840.1.113883.10.20.5.6.190" />

<!-- Conforms to Consolidated CDA Result Organizer template -->

<templateId root="2.16.840.1.113883.10.20.22.4.1" />

<id nullFlavor="NA" />

<code code="18725-2"

codeSystem="2.16.840.1.113883.6.1"

codeSystemName="LOINC"

displayName="Microbiology studies" />

<statusCode code="completed" />

<component>

<observation classCode="OBS" moodCode="EVN">

<!-- ARO Staph Aureus Specific Tests Result Observation -->

<templateId root="2.16.840.1.113883.10.20.5.6.189" />

<!-- Conforms to Consolidated CDA Result Observation template -->

<templateId root="2.16.840.1.113883.10.20.22.4.2" />

...

</observation>

</component>

...

</organizer>

ARO Staph Aureus Specific Tests Result Observation

[observation: identifier urn:oid:2.16.840.1.113883.10.20.5.6.189 (closed)]

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Table 38: ARO Staph Aureus Specific Tests Result Observation Contexts

| Contained By: | Contains: |
| --- | --- |
| [ARO Staph Aureus Specific Tests Organizer](#E_ARO_Staph_Aureus_Specific_Tests_Organ) (required) |  |

This clinical statement represents the results of a Staphylococcus aureus-specific test when performing antimicrobial susceptibility testing. The type of test is recorded in the code element; the results of the test are recorded in the value element.

Table 39: ARO Staph Aureus Specific Tests Result Observation Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| observation (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.189) | | | | | |
| @classCode | 1..1 | SHALL |  | [86-22687](#C_86-22687) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = OBS |
| @moodCode | 1..1 | SHALL |  | [86-22688](#C_86-22688) | urn:oid:2.16.840.1.113883.5.1001 (HL7ActMood) = EVN |
| templateId | 1..1 | SHALL |  | [86-28211](#C_86-28211) |  |
| @root | 1..1 | SHALL |  | [86-28212](#C_86-28212) | 2.16.840.1.113883.10.20.22.4.2 |
| templateId | 1..1 | SHALL |  | [86-22689](#C_86-22689) |  |
| @root | 1..1 | SHALL |  | [86-22690](#C_86-22690) | 2.16.840.1.113883.10.20.5.6.189 |
| id | 1..1 | SHALL |  | [86-22691](#C_86-22691) |  |
| @nullFlavor | 1..1 | SHALL |  | [86-22692](#C_86-22692) | NA |
| code | 1..1 | SHALL |  | [86-22693](#C_86-22693) | urn:oid:2.16.840.1.114222.4.11.7160 (NHSNStaphAureusSpecificTest) |
| statusCode | 1..1 | SHALL |  | [86-22694](#C_86-22694) |  |
| @code | 1..1 | SHALL |  | [86-22695](#C_86-22695) | completed |
| effectiveTime | 1..1 | SHALL |  | [86-22696](#C_86-22696) |  |
| @nullFlavor | 1..1 | SHALL |  | [86-22697](#C_86-22697) | NA |
| value | 1..1 | SHALL | CD | [86-22698](#C_86-22698) | urn:oid:2.16.840.1.114222.4.11.6074 (NHSNStaphAureusTestResults) |

1. Conforms to Result Observation template (identifier: urn:oid:2.16.840.1.113883.10.20.22.4.2).
2. SHALL contain exactly one [1..1] @classCode="OBS" (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6) (CONF:86-22687).
3. SHALL contain exactly one [1..1] @moodCode="EVN" (CodeSystem: HL7ActMood urn:oid:2.16.840.1.113883.5.1001) (CONF:86-22688).
4. SHALL contain exactly one [1..1] templateId (CONF:86-28211) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.22.4.2" (CONF:86-28212).
5. SHALL contain exactly one [1..1] templateId (CONF:86-22689) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.189" (CONF:86-22690).
6. SHALL contain exactly one [1..1] id (CONF:86-22691).
   1. This id SHALL contain exactly one [1..1] @nullFlavor="NA" (CONF:86-22692).
7. SHALL contain exactly one [1..1] code, which SHALL be selected from ValueSet [NHSNStaphAureusSpecificTest](#NHSNStaphAureusSpecificTest) urn:oid:2.16.840.1.114222.4.11.7160 STATIC (CONF:86-22693).
8. SHALL contain exactly one [1..1] statusCode (CONF:86-22694).
   1. This statusCode SHALL contain exactly one [1..1] @code="completed" (CONF:86-22695).
9. SHALL contain exactly one [1..1] effectiveTime (CONF:86-22696).
   1. This effectiveTime SHALL contain exactly one [1..1] @nullFlavor="NA" (CONF:86-22697).
10. SHALL contain exactly one [1..1] value with @xsi:type="CD", where the code SHALL be selected from ValueSet [NHSNStaphAureusTestResults](#NHSNStaphAureusTestResults) urn:oid:2.16.840.1.114222.4.11.6074 STATIC 2012-09-01 (CONF:86-22698).

Table 40: NHSNStaphAureusSpecificTest

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: NHSNStaphAureusSpecificTest urn:oid:2.16.840.1.114222.4.11.7160  Code System: LOINC 2.16.840.1.113883.6.1  A full listing of codes can be found in the hai\_voc.xls file provided with this package. | | | |
| Code | Code System | Code System OID | Print Name |
| 42721-1 | LOINC | urn:oid:2.16.840.1.113883.6.1 | Oxacillin Resistant Staphylococcus sp isolate [Presence] in Isolate by Latex agglutination |
| 48813-0 | LOINC | urn:oid:2.16.840.1.113883.6.1 | Bacterial methicillin resistance (mecA) gene [Presence] by Probe and target amplification method |

Table 41: NHSNStaphAureusTestResults

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: NHSNStaphAureusTestResults urn:oid:2.16.840.1.114222.4.11.6074  A full listing of codes can be found in the hai\_voc.xls file provided with this package. | | | |
| Code | Code System | Code System OID | Print Name |
| 10828004 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Positive |
| 260385009 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Negative |
| 261665006 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Unknown |

Figure 33: ARO Staph Aureus Specific Tests Result Example

<observation classCode="OBS" moodCode="EVN">

<!-- ARO Staph Aureus Specific Tests Result Observation -->

<templateId root="2.16.840.1.113883.10.20.5.6.189"/>

<!-- Conforms to Consolidated CDA Result Observation template -->

<templateId root="2.16.840.1.113883.10.20.22.4.2"/>

<id nullFlavor="NA"/>

<code code="42721-1"

displayName="Oxacillin Resistant Staphylococcus sp isolate [Presence]

in Isolate by Latex agglutination"

codeSystem="2.16.840.1.113883.6.1"

codeSystemName="LOINC"/>

<statusCode code="completed"/>

<effectiveTime nullFlavor="NA"/>

<value xsi:type="CD" codeSystem="2.16.840.1.113883.6.96"

codeSystemName="SNOMED CT"

code="260385009"

displayName="Negative"/>

</observation>

Isolate Susceptibility Tests Organizer (V3)

[organizer: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.6.201:2016-08-01 (closed)]

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Table 42: Isolate Susceptibility Tests Organizer (V3) Contexts

| Contained By: | Contains: |
| --- | --- |
| [Specimen Collection Procedure (ARO) (V3)](#E_Specimen_Collection_Procedure_ARO_V3) (required) | [Antimicrobial Susceptibility Isolate Participant](#E_Antimicrobial_Susceptibility_Isolate_)  [Antimicrobial Susceptibility Tests Organizer (V3)](#E_Antimicrobial_Susceptibility_Tests_Or)  [ARO Staph Aureus Specific Tests Organizer](#E_ARO_Staph_Aureus_Specific_Tests_Organ) |

This organizer records a laboratory-identified microorganism isolate and details of the antimicrobial susceptibility tests performed on that isolate.

Additionally, it records the unique isolate identifier for purposes of laboratory tracking. Special tests done on isolates of Staphylococcus aureus are also recorded here. The ARO Staph Aureus Specific Tests Organizer is omitted from this clinical statement if Staph. aureus is NOT the identified pathogen (i.e., the participant subject).

Table 43: Isolate Susceptibility Tests Organizer (V3) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| organizer (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.201:2016-08-01) | | | | | |
| @classCode | 1..1 | SHALL |  | [3247-27120](#C_3247-27120) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = CLUSTER |
| @moodCode | 1..1 | SHALL |  | [3247-27121](#C_3247-27121) | urn:oid:2.16.840.1.113883.5.1001 (HL7ActMood) = EVN |
| templateId | 1..1 | SHALL |  | [3247-27122](#C_3247-27122) |  |
| @root | 1..1 | SHALL |  | [3247-27123](#C_3247-27123) | 2.16.840.1.113883.10.20.5.6.201 |
| @extension | 1..1 | SHALL |  | [3247-30470](#C_3247-30470) | 2016-08-01 |
| id | 1..\* | SHALL |  | [3247-27124](#C_3247-27124) |  |
| @nullFlavor | 1..1 | SHALL |  | [3247-27125](#C_3247-27125) | NA |
| code | 1..1 | SHALL |  | [3247-27126](#C_3247-27126) |  |
| @code | 1..1 | SHALL |  | [3247-27127](#C_3247-27127) | urn:oid:2.16.840.1.113883.6.1 (LOINC) = 18725-2 |
| statusCode | 1..1 | SHALL |  | [3247-27128](#C_3247-27128) |  |
| @code | 1..1 | SHALL |  | [3247-27129](#C_3247-27129) | urn:oid:2.16.840.1.113883.5.14 (HL7ActStatus) = completed |
| participant | 1..1 | SHALL |  | [3247-27130](#C_3247-27130) | [Antimicrobial Susceptibility Isolate Participant (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.202](#E_Antimicrobial_Susceptibility_Isolate_) |
| component | 0..1 | MAY |  | [3247-27156](#C_3247-27156) |  |
| organizer | 1..1 | SHALL |  | [3247-27157](#C_3247-27157) | [ARO Staph Aureus Specific Tests Organizer (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.190](#E_ARO_Staph_Aureus_Specific_Tests_Organ) |
| component | 1..\* | SHALL |  | [3247-27158](#C_3247-27158) |  |
| organizer | 1..1 | SHALL |  | [3247-30469](#C_3247-30469) | [Antimicrobial Susceptibility Tests Organizer (V3) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.177:2016-08-01](#E_Antimicrobial_Susceptibility_Tests_Or) |

1. SHALL contain exactly one [1..1] @classCode="CLUSTER" (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6) (CONF:3247-27120).
2. SHALL contain exactly one [1..1] @moodCode="EVN" (CodeSystem: HL7ActMood urn:oid:2.16.840.1.113883.5.1001) (CONF:3247-27121).
3. SHALL contain exactly one [1..1] templateId (CONF:3247-27122) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.201" (CONF:3247-27123).
   2. SHALL contain exactly one [1..1] @extension="2016-08-01" (CONF:3247-30470).
4. SHALL contain at least one [1..\*] id (CONF:3247-27124).
   1. Such ids SHALL contain exactly one [1..1] @nullFlavor="NA" (CONF:3247-27125).
5. SHALL contain exactly one [1..1] code (CONF:3247-27126).
   1. This code SHALL contain exactly one [1..1] @code="18725-2" Microbiology studies (CodeSystem: LOINC urn:oid:2.16.840.1.113883.6.1) (CONF:3247-27127).
6. SHALL contain exactly one [1..1] statusCode (CONF:3247-27128).
   1. This statusCode SHALL contain exactly one [1..1] @code="completed" Completed (CodeSystem: HL7ActStatus urn:oid:2.16.840.1.113883.5.14) (CONF:3247-27129).
7. SHALL contain exactly one [1..1] [Antimicrobial Susceptibility Isolate Participant](#E_Antimicrobial_Susceptibility_Isolate_) (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.202) (CONF:3247-27130).

This component is included only if the isolate is Staphylococcus aureus.

1. MAY contain zero or one [0..1] component (CONF:3247-27156) such that it
   1. SHALL contain exactly one [1..1] [ARO Staph Aureus Specific Tests Organizer](#E_ARO_Staph_Aureus_Specific_Tests_Organ) (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.190) (CONF:3247-27157).
2. SHALL contain at least one [1..\*] component (CONF:3247-27158) such that it
   1. SHALL contain exactly one [1..1] [Antimicrobial Susceptibility Tests Organizer (V3)](#E_Antimicrobial_Susceptibility_Tests_Or) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.177:2016-08-01) (CONF:3247-30469).

Figure 34: Isolate Susceptibility Tests Organizer (V3) Example

<organizer classCode="CLUSTER" moodCode="EVN">

<!-- [HAI R3D1.1] Isolate Susceptibility Tests Organizer (V3) -->

<templateId root="2.16.840.1.113883.10.20.5.6.201" extension="2016-08-01" />

<id nullFlavor="NA" />

<code code="18725-2"

codeSystem="2.16.840.1.113883.6.1"

codeSystemName="LOINC"

displayName="Microbiology Studies" />

<statusCode code="completed" />

<participant typeCode="SBJ">

<!-- [HAI R1] Antimicrobial Susceptibility Isolate Participant (R1) -->

<templateId root="2.16.840.1.113883.10.20.5.6.202" />

...

</participant>

<!-- This component is included only if the pathogen identified is Staph. aureus -->

<component>

<organizer classCode="CLUSTER" moodCode="EVN">

<!-- [C-CDA R1.1] Result Organizer -->

<templateId root="2.16.840.1.113883.10.20.22.4.1" />

<!-- [HAI R1] ARO Staph Aureus Specific Tests Organizer -->

<templateId root="2.16.840.1.113883.10.20.5.6.190" />

...

</organizer>

</component>

<!-- Clarithromycin Susceptibility Testing -->

<component>

<organizer classCode="CLUSTER" moodCode="EVN">

<!-- [C-CDA R1.1] Result Organizer -->

<templateId root="2.16.840.1.113883.10.20.22.4.1" />

<!-- [HAI R3D1.1] Antimicrobial Susceptibility Tests Organizer (V3) -->

<templateId root="2.16.840.1.113883.10.20.5.6.177" extension="2016-08-01" />

...

</organizer>

</component>

<!-- Vancomycin susceptibility testing -->

<component>

<organizer classCode="CLUSTER" moodCode="EVN">

<!-- [C-CDA R1.1] Result Organizer -->

<templateId root="2.16.840.1.113883.10.20.22.4.1" />

<!-- [HAI R3D1.1] Antimicrobial Susceptibility Tests Organizer (V3) -->

<templateId root="2.16.840.1.113883.10.20.5.6.177" extension="2016-08-01" />

...

</organizer>

</component>

</organizer>

Specimen Collection Encounter (ARO)

[encounter: identifier urn:oid:2.16.840.1.113883.10.20.5.6.187 (closed)]

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Table 44: Specimen Collection Encounter (ARO) Contexts

| Contained By: | Contains: |
| --- | --- |
| [Specimen Collection Procedure (ARO) (V3)](#E_Specimen_Collection_Procedure_ARO_V3) (required) |  |

The Specimen Collection Encounter (ARO) records the in-facility location where a specimen was collected.

This template conforms to the C-CDA Encounter Activities template. That template requires an id; in the NHSN ARO Report, the id of the encounter is not reported, therefore a "NA" nullFlavor is used for the required id.

The participant element represents the in-facility location where the specimen was collected. 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.

Table 45: Specimen Collection Encounter (ARO) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| encounter (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.187) | | | | | |
| @classCode | 1..1 | SHALL |  | [86-22649](#C_86-22649) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = ENC |
| @moodCode | 1..1 | SHALL |  | [86-22650](#C_86-22650) | urn:oid:2.16.840.1.113883.5.1001 (HL7ActMood) = EVN |
| templateId | 1..1 | SHALL |  | [86-28279](#C_86-28279) |  |
| @root | 1..1 | SHALL |  | [86-28280](#C_86-28280) | 2.16.840.1.113883.10.20.22.4.49 |
| templateId | 1..1 | SHALL |  | [86-22651](#C_86-22651) |  |
| @root | 1..1 | SHALL |  | [86-22652](#C_86-22652) | 2.16.840.1.113883.10.20.5.6.187 |
| id | 1..1 | SHALL |  | [86-22653](#C_86-22653) |  |
| @nullFlavor | 1..1 | SHALL |  | [86-22654](#C_86-22654) | urn:oid:2.16.840.1.113883.5.1002 (HL7ActRelationshipType) = NA |
| effectiveTime | 1..1 | SHALL |  | [86-22655](#C_86-22655) |  |
| @nullFlavor | 1..1 | SHALL |  | [86-22656](#C_86-22656) | NA |
| participant | 1..1 | SHALL |  | [86-22657](#C_86-22657) |  |
| @typeCode | 1..1 | SHALL |  | [86-22658](#C_86-22658) | urn:oid:2.16.840.1.113883.5.90 (HL7ParticipationType) = LOC |
| participantRole | 1..1 | SHALL |  | [86-22659](#C_86-22659) |  |
| @classCode | 1..1 | SHALL |  | [86-22660](#C_86-22660) | urn:oid:2.16.840.1.113883.5.110 (HL7RoleClass) = SDLOC |
| id | 1..1 | SHALL |  | [86-22661](#C_86-22661) |  |
| @root | 1..1 | SHALL |  | [86-22662](#C_86-22662) |  |
| @extension | 1..1 | SHALL |  | [86-22663](#C_86-22663) |  |
| playingEntity | 1..1 | SHALL |  | [86-22664](#C_86-22664) |  |
| @classCode | 1..1 | SHALL |  | [86-22665](#C_86-22665) | urn:oid:2.16.840.1.113883.5.41 (HL7EntityClass) = PLC |
| code | 1..1 | SHALL |  | [86-22666](#C_86-22666) | urn:oid:2.16.840.1.113883.13.19 (NHSNHealthcareServiceLocationCode) |

1. Conforms to Encounter Activities template (identifier: urn:oid:2.16.840.1.113883.10.20.22.4.49).
2. SHALL contain exactly one [1..1] @classCode="ENC" Encounter (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6 STATIC) (CONF:86-22649).
3. SHALL contain exactly one [1..1] @moodCode="EVN" Event (CodeSystem: HL7ActMood urn:oid:2.16.840.1.113883.5.1001 STATIC) (CONF:86-22650).
4. SHALL contain exactly one [1..1] templateId (CONF:86-28279) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.22.4.49" (CONF:86-28280).
5. SHALL contain exactly one [1..1] templateId (CONF:86-22651) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.187" (CONF:86-22652).
6. SHALL contain exactly one [1..1] id (CONF:86-22653).
   1. This id SHALL contain exactly one [1..1] @nullFlavor="NA" (CodeSystem: HL7ActRelationshipType urn:oid:2.16.840.1.113883.5.1002) (CONF:86-22654).
7. SHALL contain exactly one [1..1] effectiveTime (CONF:86-22655).
   1. This effectiveTime SHALL contain exactly one [1..1] @nullFlavor="NA" (CONF:86-22656).
8. SHALL contain exactly one [1..1] participant (CONF:86-22657).
   1. This participant SHALL contain exactly one [1..1] @typeCode="LOC" Location (CodeSystem: HL7ParticipationType urn:oid:2.16.840.1.113883.5.90 STATIC) (CONF:86-22658).
   2. This participant SHALL contain exactly one [1..1] participantRole (CONF:86-22659).
      1. This participantRole SHALL contain exactly one [1..1] @classCode="SDLOC" Service delivery location (CodeSystem: HL7RoleClass urn:oid:2.16.840.1.113883.5.110 STATIC) (CONF:86-22660).
      2. This participantRole SHALL contain exactly one [1..1] id (CONF:86-22661).

The value of @root must be the NHSN assigned Facility OID.

* + - 1. This id SHALL contain exactly one [1..1] @root (CONF:86-22662).

The value of @extension must be a value registered with NHSN.

* + - 1. This id SHALL contain exactly one [1..1] @extension (CONF:86-22663).
    1. This participantRole SHALL contain exactly one [1..1] playingEntity (CONF:86-22664).
       1. This playingEntity SHALL contain exactly one [1..1] @classCode="PLC" Place (CodeSystem: HL7EntityClass urn:oid:2.16.840.1.113883.5.41 STATIC) (CONF:86-22665).
       2. This playingEntity SHALL contain exactly one [1..1] code, which SHALL be selected from ValueSet [NHSNHealthcareServiceLocationCode](#NHSNHealthcareServiceLocationCode) urn:oid:2.16.840.1.113883.13.19 DYNAMIC (CONF:86-22666).

Table 46: NHSNHealthcareServiceLocationCode

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: NHSNHealthcareServiceLocationCode urn:oid:2.16.840.1.113883.13.19  A classification of patient care locations within healthcare facilities for public health surveillance purposes.  A full listing of codes can be found in the hai\_voc.xls file provided with this package. | | | |
| Code | Code System | Code System OID | Print Name |
| 1250-0 | HL7 HealthcareServiceLocation | urn:oid:2.16.840.1.113883.6.259 | All Inpatient Locations [FACWIDEIN] |
| 1251-8 | HL7 HealthcareServiceLocation | urn:oid:2.16.840.1.113883.6.259 | All Outpatient Locations [FACWIDEOUT] |
| 1025-6 | HL7 HealthcareServiceLocation | urn:oid:2.16.840.1.113883.6.259 | Trauma Critical Care |
| 1026-4 | HL7 HealthcareServiceLocation | urn:oid:2.16.840.1.113883.6.259 | Burn Critical Care |
| 1027-2 | HL7 HealthcareServiceLocation | urn:oid:2.16.840.1.113883.6.259 | Medical Critical Care |
| 1028-0 | HL7 HealthcareServiceLocation | urn:oid:2.16.840.1.113883.6.259 | Medical Cardiac Critical Care |
| 1029-8 | HL7 HealthcareServiceLocation | urn:oid:2.16.840.1.113883.6.259 | Medical/Surgical Critical Care |
| 1030-6 | HL7 HealthcareServiceLocation | urn:oid:2.16.840.1.113883.6.259 | Surgical Critical Care |
| 1031-4 | HL7 HealthcareServiceLocation | urn:oid:2.16.840.1.113883.6.259 | Neurosurgical Critical Care |
| 1032-2 | HL7 HealthcareServiceLocation | urn:oid:2.16.840.1.113883.6.259 | Surgical Cardiothoracic Critical Care |
| ... | | | |

Figure 35: Specimen Collection Encounter (ARO) Example

<encounter classCode="ENC" moodCode="EVN">

<!--Specimen Collection Encounter (ARO) -->

<templateId root="2.16.840.1.113883.10.20.5.6.187"/>

<!-- Conforms to Consolidated CDA Encounter Activities template -->

<templateId root="2.16.840.1.113883.10.20.22.4.49"/>

<id nullFlavor="NA"/>

<effectiveTime nullFlavor="NA"/>

<!-- The in-facility location where the specimen was collected -->

<participant typeCode="LOC">

<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 HealthcareServiceLocation"

code="1029-8"

displayName="Medical/Surgical Critical Care" />

</playingEntity>

</participantRole>

</participant>

</encounter>

Specimen Collection Procedure (ARO) (V3)

[procedure: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.6.188:2016-08-01 (closed)]

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Table 47: Specimen Collection Procedure (ARO) (V3) Contexts

| Contained By: | Contains: |
| --- | --- |
| [Findings Section in an ARO Report (V3)](#S_Findings_Section_in_an_ARO_Report_V3) (required) | [Isolate Susceptibility Tests Organizer (V3)](#E_Isolate_Susceptibility_Tests_Organize)  [Specimen Collection Encounter (ARO)](#E_Specimen_Collection_Encounter_ARO) |

The Specimen Collection Procedure (ARO) records the date a specimen was collected and the type of specimen. It includes a Specimen Collection Encounter (ARO), which records the in-facility location where the specimen was collected. The template is derived from the Specimen Collection Procedure template from Public Health Case Reports.

In the ARO 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.

Table 48: Specimen Collection Procedure (ARO) (V3) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| procedure (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.188:2016-08-01) | | | | | |
| @classCode | 1..1 | SHALL |  | [3247-22668](#C_3247-22668) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = PROC |
| @moodCode | 1..1 | SHALL |  | [3247-22669](#C_3247-22669) | urn:oid:2.16.840.1.113883.5.1001 (HL7ActMood) = EVN |
| templateId | 1..1 | SHALL |  | [3247-22670](#C_3247-22670) |  |
| @root | 1..1 | SHALL |  | [3247-22671](#C_3247-22671) | 2.16.840.1.113883.10.20.5.6.188 |
| @extension | 1..1 | SHALL |  | [3247-30472](#C_3247-30472) | 2016-08-01 |
| effectiveTime | 1..1 | SHALL |  | [3247-22672](#C_3247-22672) |  |
| @value | 1..1 | SHALL |  | [3247-22673](#C_3247-22673) |  |
| specimen | 1..1 | SHALL |  | [3247-27160](#C_3247-27160) |  |
| specimenRole | 1..1 | SHALL |  | [3247-27161](#C_3247-27161) |  |
| specimenPlayingEntity | 1..1 | SHALL |  | [3247-27162](#C_3247-27162) |  |
| code | 1..1 | SHALL |  | [3247-27163](#C_3247-27163) | urn:oid:2.16.840.1.114222.4.11.3249 (NHSNSpecimenTypeCode) |
| entryRelationship | 1..1 | SHALL |  | [3247-22681](#C_3247-22681) |  |
| @typeCode | 1..1 | SHALL |  | [3247-22682](#C_3247-22682) | urn:oid:2.16.840.1.113883.5.1002 (HL7ActRelationshipType) = COMP |
| @inversionInd | 1..1 | SHALL |  | [3247-22683](#C_3247-22683) | true |
| encounter | 1..1 | SHALL |  | [3247-22684](#C_3247-22684) | [Specimen Collection Encounter (ARO) (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.187](#E_Specimen_Collection_Encounter_ARO) |
| entryRelationship | 1..\* | SHALL |  | [3247-27164](#C_3247-27164) |  |
| @typeCode | 1..1 | SHALL |  | [3247-27165](#C_3247-27165) | urn:oid:2.16.840.1.113883.5.1002 (HL7ActRelationshipType) = COMP |
| @inversionInd | 1..1 | SHALL |  | [3247-27432](#C_3247-27432) | true |
| organizer | 1..1 | SHALL |  | [3247-30471](#C_3247-30471) | [Isolate Susceptibility Tests Organizer (V3) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.201:2016-08-01](#E_Isolate_Susceptibility_Tests_Organize) |

1. SHALL contain exactly one [1..1] @classCode="PROC" Procedure (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6 STATIC) (CONF:3247-22668).
2. SHALL contain exactly one [1..1] @moodCode="EVN" Event (CodeSystem: HL7ActMood urn:oid:2.16.840.1.113883.5.1001 STATIC) (CONF:3247-22669).
3. SHALL contain exactly one [1..1] templateId (CONF:3247-22670) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.188" (CONF:3247-22671).
   2. SHALL contain exactly one [1..1] @extension="2016-08-01" (CONF:3247-30472).
4. SHALL contain exactly one [1..1] effectiveTime (CONF:3247-22672).
   1. This effectiveTime SHALL contain exactly one [1..1] @value (CONF:3247-22673).
5. SHALL contain exactly one [1..1] specimen (CONF:3247-27160).
   1. This specimen SHALL contain exactly one [1..1] specimenRole (CONF:3247-27161).
      1. This specimenRole SHALL contain exactly one [1..1] specimenPlayingEntity (CONF:3247-27162).
         1. This specimenPlayingEntity SHALL contain exactly one [1..1] code, which SHALL be selected from ValueSet [NHSNSpecimenTypeCode](#NHSNSpecimenTypeCode) urn:oid:2.16.840.1.114222.4.11.3249 DYNAMIC (CONF:3247-27163).
6. SHALL contain exactly one [1..1] entryRelationship (CONF:3247-22681) such that it
   1. SHALL contain exactly one [1..1] @typeCode="COMP" Has component (CodeSystem: HL7ActRelationshipType urn:oid:2.16.840.1.113883.5.1002 STATIC) (CONF:3247-22682).
   2. SHALL contain exactly one [1..1] @inversionInd="true" (CONF:3247-22683).
   3. SHALL contain exactly one [1..1] [Specimen Collection Encounter (ARO)](#E_Specimen_Collection_Encounter_ARO) (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.187) (CONF:3247-22684).
7. SHALL contain at least one [1..\*] entryRelationship (CONF:3247-27164) such that it
   1. SHALL contain exactly one [1..1] @typeCode="COMP" (CodeSystem: HL7ActRelationshipType urn:oid:2.16.840.1.113883.5.1002) (CONF:3247-27165).
   2. SHALL contain exactly one [1..1] @inversionInd="true" (CONF:3247-27432).
   3. SHALL contain exactly one [1..1] [Isolate Susceptibility Tests Organizer (V3)](#E_Isolate_Susceptibility_Tests_Organize) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.201:2016-08-01) (CONF:3247-30471).

Table 49: NHSNSpecimenTypeCode

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: NHSNSpecimenTypeCode urn:oid:2.16.840.1.114222.4.11.3249  Code System: SNOMED CT 2.16.840.1.113883.6.96  A full listing of codes can be found in the hai\_voc.xls file provided with this package.  The full table is shown in the hai\_voc.xls file provided with this package. | | | |
| Code | Code System | Code System OID | Print Name |
| 110893002 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Cutaneous cytologic material |
| 110894008 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Mammary cytologic material |
| 110896005 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Subcutaneous cytologic material |
| 110903005 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Nasal cytologic material |
| 110926003 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Gallbladder cytologic material |
| 110931001 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Penis cytologic material |
| 110933003 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Prostate cytologic material |
| 110935005 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Testis cytologic material |
| 110937002 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Seminal vesicle cytologic material |
| 110939004 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Vas deferens cytologic material |
| ... | | | |

Figure 36: Specimen Collection Procedure (ARO) (V3) Example

<procedure classCode="PROC" moodCode="EVN">

<!-- [HAI R3D1.1] Specimen Collection Procedure (ARO) (V3) -->

<templateId root="2.16.840.1.113883.10.20.5.6.188" extension="2016-08-01" />

<!-- Date specimen collected -->

<effectiveTime value="20090121" />

<specimen>

<specimenRole>

<specimenPlayingEntity>

<!-- Specimen type -->

<code codeSystem="2.16.840.1.113883.6.96"

codeSystemName="SNOMED CT"

code="119297000"

displayName="Blood specimen" />

</specimenPlayingEntity>

</specimenRole>

</specimen>

<entryRelationship typeCode="COMP" inversionInd="true">

<encounter classCode="ENC" moodCode="EVN">

<!-- [C-CDA R1.1] Encounter Activities -->

<templateId root="2.16.840.1.113883.10.20.22.4.49" />

<!-- [HAI R1] Specimen Collection Encounter (ARO) -->

<templateId root="2.16.840.1.113883.10.20.5.6.187" />

...

</encounter>

</entryRelationship>

<entryRelationship typeCode="COMP" inversionInd="true">

<organizer classCode="CLUSTER" moodCode="EVN">

<!-- [HAI R3D1.1] Isolate Susceptibility Tests Organizer (V3) -->

<templateId root="2.16.840.1.113883.10.20.5.6.201" extension="2016-08-01" />

...

</organizer>

</entryRelationship>

</procedure>

Summary Data Observation (AU/AR)

[observation: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.6.229:2015-04-01 (closed)]

Published as part of NHSN Healthcare Associated Infection (HAI) Reports Release 2 - US Realm

Table 50: Summary Data Observation (AU/AR) Contexts

| Contained By: | Contains: |
| --- | --- |
| [Summary Encounter Patient Presence (AUP) (V2)](#E_Summary_Encounter_Patient_Presence_AU) (required)  [Summary Encounter (AUP) (V2)](#E_Summary_Encounter_AUP_V2) (required)  [Summary Encounter (ARO) (V2)](#E_Summary_Encounter_ARO_V2) (required) |  |

This template specializes the Summary Data Observation for the AU/AR population-summary reports.

The documentationOf/serviceEvent/code in the header identifies the intended content of the report. For example, cdcNHSN code 1887-9 indicates that the data content is "Summary data reporting Antimicrobial Usage". NHSN protocol specifies which data to report for each type of content. The data required by NHSN for each type of content, at time of publication, are shown in the tables below.

The table of codes for a particular report indicate what data are required at time of publication for the NHSN protocol. Accordingly, the Summary Encounter will contain the same number of Summary Data Observations as codes in the table.

Most Summary Data Observations are a simple code-value pair. The code element identifies the datum being reported, and the value element records a number of days, patients, episodes, or events.

Table 51: Summary Data Observation (AU/AR) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| observation (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.229:2015-04-01) | | | | | |
| @classCode | 1..1 | SHALL |  | [1181-30549](#C_1181-30549) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = OBS |
| @moodCode | 1..1 | SHALL |  | [1181-30550](#C_1181-30550) | urn:oid:2.16.840.1.113883.5.1001 (HL7ActMood) = EVN |
| templateId | 1..1 | SHALL |  | [1181-30545](#C_1181-30545) |  |
| @root | 1..1 | SHALL |  | [1181-30551](#C_1181-30551) | 2.16.840.1.113883.10.20.5.6.229 |
| @extension | 1..1 | SHALL |  | [1181-30561](#C_1181-30561) | 2015-04-01 |
| code | 1..1 | SHALL |  | [1181-30546](#C_1181-30546) |  |
| statusCode | 1..1 | SHALL |  | [1181-30547](#C_1181-30547) |  |
| @code | 1..1 | SHALL |  | [1181-30559](#C_1181-30559) | urn:oid:2.16.840.1.113883.5.14 (HL7ActStatus) = completed |
| value | 1..1 | SHALL |  | [1181-30548](#C_1181-30548) |  |

1. SHALL contain exactly one [1..1] @classCode="OBS" Observation (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6 STATIC) (CONF:1181-30549).
2. SHALL contain exactly one [1..1] @moodCode="EVN" Event (CodeSystem: HL7ActMood urn:oid:2.16.840.1.113883.5.1001 STATIC) (CONF:1181-30550).
3. SHALL contain exactly one [1..1] templateId (CONF:1181-30545) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.229" (CONF:1181-30551).
   2. SHALL contain exactly one [1..1] @extension="2015-04-01" (CONF:1181-30561).
4. SHALL contain exactly one [1..1] code (CONF:1181-30546).
   1. If this is ARO Summary Data, NHSN protocol requires, at the time of publication, the data in the Codes for Antimicrobial Resistance Option (ARO) Summary Data table below (CONF:1181-30552).
   2. If this is AUP Summary Data, NHSN protocol requires, at the time of publication, the data in the Codes for Antimicrobial Usage, Pharmacy (AUP) Summary Data table below (CONF:1181-30557).
5. SHALL contain exactly one [1..1] statusCode (CONF:1181-30547).
   1. This statusCode SHALL contain exactly one [1..1] @code="completed" Completed (CodeSystem: HL7ActStatus urn:oid:2.16.840.1.113883.5.14) (CONF:1181-30559).
6. SHALL contain exactly one [1..1] value (CONF:1181-30548).
   1. If the observation reports a number of days, the value of value/xsi:type SHALL be PQ and the value of value/@unit SHALL be d. If the observation reports a number of patients, episodes or events the value of value/@xsi:type SHALL be INT. If the value is a code, the value of value/@xsi:type SHALL be CD (CONF:1181-30560).

Table 52: Codes for Antimicrobial Resistance Option (ARO) Summary Data

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: Codes for Antimicrobial Resistance Option (ARO) Summary Data urn:oid:2.16.840.1.113883.10.20.5.9.8  Code System: cdcNHSN 2.16.840.1.113883.6.277  NHSN protocol specifies which data to report for each type of content. The data required by NHSN for ARO Summary, at the time of publication, is contained in this table.  A full listing of codes can be found in the hai\_voc.xls file provided with this package. | | | |
| Code | Code System | Code System OID | Print Name |
| 1851-5 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Number of patient days |
| 1862-2 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Number of admissions |
| 2409-1 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Number of blood cultures performed |

Table 53: Codes for Antimicrobial Usage, Pharmacy (AUP) Summary Data

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: Codes for Antimicrobial Usage, Pharmacy (AUP) Summary Data urn:oid:2.16.840.1.113883.10.20.5.9.9  Code System: cdcNHSN 2.16.840.1.113883.6.277  NHSN protocol specifies which data to report for each type of content. The data required by NHSN for AUP Summary, at the time of publication, is contained in this table.  A full listing of codes can be found in the hai\_voc.xls file provided with this package. | | | |
| Code | Code System | Code System OID | Print Name |
| 2524-7 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Number of therapy days |
| 2525-4 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Number of patient-present days |
| 1862-2 | cdcNHSN | urn:oid:2.16.840.1.113883.6.277 | Number of admissions (for facility-wide inpatient reporting) |

Figure 37: Summary Data Observation (AU/AR) Example

<observation classCode="OBS" moodCode="EVN">

<!-- Summary Data Observation (AU/AR) templateId -->

<templateId root="2.16.840.1.113883.10.20.5.6.229"

extension="2015-04-01"/>

<code code="2409-1"

codeSystem="2.16.840.1.113883.6.277"

codeSystemName="cdcNHSN"

displayName="Number of blood cultures performed"/>

<statusCode code="completed"/>

<value xsi:type="INT" value="24" />

</observation>

Summary Data Observation (AUP)

[observation: identifier urn:oid:2.16.840.1.113883.10.20.5.6.194 (closed)]

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Table 54: Summary Data Observation (AUP) Contexts

| Contained By: | Contains: |
| --- | --- |
| [Summary Encounter (AUP) (V2)](#E_Summary_Encounter_AUP_V2) (required) |  |

This template specializes the Summary Data Observation for an Antimicrobial Use (AUP) Summary Report.

The Summary Data Observation (AUP) records data for the antimicrobial stratified by route of administration. (See the NHSN protocol for how the values are calculated.) If a value is not applicable for a combination of drug and route, the value of @nullFlavor must be "NA".

Table 55: Summary Data Observation (AUP) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| observation (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.194) | | | | | |
| @classCode | 1..1 | SHALL |  | [86-22910](#C_86-22910) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = OBS |
| @moodCode | 1..1 | SHALL |  | [86-22911](#C_86-22911) | urn:oid:2.16.840.1.113883.5.1001 (HL7ActMood) = EVN |
| templateId | 1..1 | SHALL |  | [86-22912](#C_86-22912) |  |
| @root | 1..1 | SHALL |  | [86-22913](#C_86-22913) | 2.16.840.1.113883.10.20.5.6.194 |
| code | 1..1 | SHALL |  | [86-22914](#C_86-22914) |  |
| statusCode | 1..1 | SHALL |  | [86-22915](#C_86-22915) |  |
| @code | 1..1 | SHALL |  | [86-28111](#C_86-28111) | urn:oid:2.16.840.1.113883.5.14 (HL7ActStatus) = completed |
| value | 1..1 | SHALL |  | [86-22916](#C_86-22916) |  |
| methodCode | 1..1 | SHALL |  | [86-23044](#C_86-23044) | urn:oid:2.16.840.1.114222.4.11.3361 (NHSNRouteOfAdminstrationAURPCode) |

1. SHALL contain exactly one [1..1] @classCode="OBS" Observation (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6 STATIC) (CONF:86-22910).
2. SHALL contain exactly one [1..1] @moodCode="EVN" Event (CodeSystem: HL7ActMood urn:oid:2.16.840.1.113883.5.1001 STATIC) (CONF:86-22911).
3. SHALL contain exactly one [1..1] templateId (CONF:86-22912) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.194" (CONF:86-22913).
4. SHALL contain exactly one [1..1] code (CONF:86-22914).
5. SHALL contain exactly one [1..1] statusCode (CONF:86-22915).
   1. This statusCode SHALL contain exactly one [1..1] @code="completed" Completed (CodeSystem: HL7ActStatus urn:oid:2.16.840.1.113883.5.14) (CONF:86-28111).
6. SHALL contain exactly one [1..1] value (CONF:86-22916).
7. SHALL contain exactly one [1..1] methodCode, which SHALL be selected from ValueSet [NHSNRouteOfAdminstrationAURPCode](#NHSNRouteOfAdminstrationAURPCode) urn:oid:2.16.840.1.114222.4.11.3361 (CONF:86-23044).
8. If the observation reports a number of days, the value of value/xsi:type SHALL be PQ and the value of value/@unit SHALL be d. If the observation reports a number of patients, the value of value/@xsi:type SHALL be INT. If the value is a code, the value of value/@xsi:type SHALL be CD (CONF:86-22917).

Table 56: NHSNRouteOfAdminstrationAURPCode

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: NHSNRouteOfAdminstrationAURPCode urn:oid:2.16.840.1.114222.4.11.3361  Code System: SNOMED CT 2.16.840.1.113883.6.96  A full listing of codes can be found in the hai\_voc.xls file provided with this package. | | | |
| Code | Code System | Code System OID | Print Name |
| 447964005 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Digestive tract route [A route that begins anywhere in the digestive tract extending from the mouth through rectum.] |
| 447694001 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Respiratory tract route [A route that begins within the respiratory tract, including the oropharynx and nasopharynx.] |
| 47625008 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Intravenous route [An intravascular route that begins with a vein.] |
| 78421000 | SNOMED CT | urn:oid:2.16.840.1.113883.6.96 | Intramuscular route [A route that begins within a muscle.] |

Figure 38: Summary Data Observation (AUP) Example

<observation classCode="OBS" moodCode="EVN">

<templateId root="2.16.840.1.113883.10.20.5.6.194" />

<code codeSystem="2.16.840.1.113883.6.277"

codeSystemName="cdcNHSN"

code="2524-7"

displayName="Number of Therapy Days" />

<statusCode code="completed" />

<value xsi:type="PQ" unit="d" value="3" />

<methodCode code="447694001" codeSystemName="SNOMED CT"

codeSystem="2.16.840.1.113883.6.96"

displayName="Respiratory tract route"/>

</observation>

Summary Encounter (ARO) (V2)

[encounter: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.6.199:2015-04-01 (closed)]

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Table 57: Summary Encounter (ARO) (V2) Contexts

| Contained By: | Contains: |
| --- | --- |
| [Summary Data Section (ARO) (V2)](#S_Summary_Data_Section_ARO_V2) (required) | [Summary Data Observation (AU/AR)](#E_Summary_Data_Observation_AUAR) |

A Summary Encounter records a set of summary data, usually for a population such as the patients in a ward in a specified period. The NHSN protocol defines which data to record for each type of summary report. For an ARO report, each datum is recorded as a Summary Data Observation (AU/AR).  The data requirements at time of publication are shown in a table under the Summary Data Observation (AU/AR) template, above.

A participant element records the location to which the data pertains. The location id has the form <id root=”…” extension=”…”/> with an extension of 'FACWIDEIN' representing the whole facility.

Table 58: Summary Encounter (ARO) (V2) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| encounter (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.199:2015-04-01) | | | | | |
| @classCode | 1..1 | SHALL |  | [1181-23077](#C_1181-23077) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = ENC |
| @moodCode | 1..1 | SHALL |  | [1181-23078](#C_1181-23078) | urn:oid:2.16.840.1.113883.5.1001 (HL7ActMood) = EVN |
| templateId | 1..1 | SHALL |  | [1181-23079](#C_1181-23079) |  |
| @root | 1..1 | SHALL |  | [1181-23080](#C_1181-23080) | 2.16.840.1.113883.10.20.5.6.199 |
| @extension | 1..1 | SHALL |  | [1181-30564](#C_1181-30564) | 2015-04-01 |
| participant | 1..1 | SHALL |  | [1181-23081](#C_1181-23081) |  |
| @typeCode | 1..1 | SHALL |  | [1181-23082](#C_1181-23082) | urn:oid:2.16.840.1.113883.5.90 (HL7ParticipationType) = LOC |
| participantRole | 1..1 | SHALL |  | [1181-23083](#C_1181-23083) |  |
| @classCode | 1..1 | SHALL |  | [1181-23084](#C_1181-23084) | urn:oid:2.16.840.1.113883.5.41 (HL7EntityClass) = SDLOC |
| id | 1..1 | SHALL |  | [1181-23085](#C_1181-23085) |  |
| @root | 1..1 | SHALL |  | [1181-23086](#C_1181-23086) |  |
| @extension | 1..1 | SHALL |  | [1181-23087](#C_1181-23087) | FACWIDEIN |
| code | 1..1 | SHALL |  | [1181-23088](#C_1181-23088) | urn:oid:2.16.840.1.113883.6.259 (HL7 HealthcareServiceLocation) |
| @code | 1..1 | SHALL |  | [1181-23089](#C_1181-23089) | 1250-0 |
| @codeSystem | 1..1 | SHALL |  | [1181-23090](#C_1181-23090) | 2.16.840.1.113883.6.259 |
| @displayName | 1..1 | SHOULD |  | [1181-23091](#C_1181-23091) | Facility Wide Inpatient |
| entryRelationship | 1..\* | SHALL |  | [1181-23092](#C_1181-23092) |  |
| @typeCode | 1..1 | SHALL |  | [1181-23093](#C_1181-23093) | urn:oid:2.16.840.1.113883.5.1002 (HL7ActRelationshipType) = COMP |
| observation | 1..1 | SHALL |  | [1181-23094](#C_1181-23094) | [Summary Data Observation (AU/AR) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.229:2015-04-01](#E_Summary_Data_Observation_AUAR) |

1. SHALL contain exactly one [1..1] @classCode="ENC" Encounter (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6 STATIC) (CONF:1181-23077).
2. SHALL contain exactly one [1..1] @moodCode="EVN" Event (CodeSystem: HL7ActMood urn:oid:2.16.840.1.113883.5.1001 STATIC) (CONF:1181-23078).
3. SHALL contain exactly one [1..1] templateId (CONF:1181-23079) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.199" (CONF:1181-23080).
   2. SHALL contain exactly one [1..1] @extension="2015-04-01" (CONF:1181-30564).
4. SHALL contain exactly one [1..1] participant (CONF:1181-23081) such that it
   1. SHALL contain exactly one [1..1] @typeCode="LOC" Location (CodeSystem: HL7ParticipationType urn:oid:2.16.840.1.113883.5.90 STATIC) (CONF:1181-23082).
   2. SHALL contain exactly one [1..1] participantRole (CONF:1181-23083).
      1. This participantRole SHALL contain exactly one [1..1] @classCode="SDLOC" Service Delivery Location (CodeSystem: HL7EntityClass urn:oid:2.16.840.1.113883.5.41 STATIC) (CONF:1181-23084).
      2. This participantRole SHALL contain exactly one [1..1] id (CONF:1181-23085).

The value of @root must be the NHSN assigned Facility OID.

* + - 1. This id SHALL contain exactly one [1..1] @root (CONF:1181-23086).

The value of @extension must be a value registered with NHSN.

* + - 1. This id SHALL contain exactly one [1..1] @extension="FACWIDEIN" (CONF:1181-23087).
    1. This participantRole SHALL contain exactly one [1..1] code (CodeSystem: HL7 HealthcareServiceLocation urn:oid:2.16.840.1.113883.6.259 DYNAMIC) (CONF:1181-23088).
       1. This code SHALL contain exactly one [1..1] @code="1250-0" (CONF:1181-23089).
       2. This code SHALL contain exactly one [1..1] @codeSystem="2.16.840.1.113883.6.259" (CONF:1181-23090).
       3. This code SHOULD contain exactly one [1..1] @displayName="Facility Wide Inpatient" (CONF:1181-23091).

1. SHALL contain at least one [1..\*] entryRelationship (CONF:1181-23092).
   1. Such entryRelationships SHALL contain exactly one [1..1] @typeCode="COMP" Has component (CodeSystem: HL7ActRelationshipType urn:oid:2.16.840.1.113883.5.1002 STATIC) (CONF:1181-23093).
   2. Such entryRelationships SHALL contain exactly one [1..1] [Summary Data Observation (AU/AR)](#E_Summary_Data_Observation_AUAR) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.229:2015-04-01) (CONF:1181-23094).

Figure 39: Summary Encounter (ARO) (V2)

<!-- Summary Encounter -->

<encounter classCode="ENC" moodCode="EVN">

<!-- Summary Encounter (ARO) (V2) templateId -->

<templateId root="2.16.840.1.113883.10.20.5.6.199"

extension="2015-04-01"/>

<!-- the location id and type -->

<participant typeCode="LOC">

<participantRole classCode="SDLOC">

<id root="2.111.111.111.10709" extension="FACWIDEIN"/>

<code codeSystem="2.16.840.1.113883.6.259"

codeSystemName="HL7 Healthcare Service Location Code"

code="1250-0"

displayName="Facility Wide Inpatient"/>

</participantRole>

</participant>

<entryRelationship typeCode="COMP">

<observation classCode="OBS" moodCode="EVN">

<!-- Summary Data Observation (AU/AR) templateId -->

<templateId root="2.16.840.1.113883.10.20.5.6.229"

extension="2015-04-01"/>

<code code="1851-5"

codeSystem="2.16.840.1.113883.6.277"

codeSystemName="cdcNHSN"

displayName="Patient Days"/>

<statusCode code="completed"/>

<value xsi:type="PQ" unit="d" value="235"/>

</observation>

</entryRelationship>

<entryRelationship typeCode="COMP">

<observation classCode="OBS" moodCode="EVN">

<!-- Summary Data Observation (AU/AR) templateId -->

<templateId root="2.16.840.1.113883.10.20.5.6.229"

extension="2015-04-01"/>

<code code="1862-2" codeSystem="2.16.840.1.113883.6.270"

codeSystemName="cdcNHSN"

displayName="Admission count"/>

<statusCode code="completed"/>

<value xsi:type="INT" value="46"/>

</observation>

</entryRelationship>

<entryRelationship typeCode="COMP">

<!-- Summary Data Observation (AU/AR) templateId -->

<observation classCode="OBS" moodCode="EVN">

<templateId root="2.16.840.1.113883.10.20.5.6.229"

extension="2015-04-01"/>

<code code="2409-1" codeSystem="2.16.840.1.113883.6.277"

codeSystemName="cdcNHSN"

displayName="Blood cultures performed"/>

<statusCode code="completed"/>

<value xsi:type="INT" value="24"/>

</observation>

</entryRelationship>

</encounter>

Summary Encounter (AUP) (V2)

[encounter: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.6.198:2015-04-01 (closed)]

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Table 59: Summary Encounter (AUP) (V2) Contexts

| Contained By: | Contains: |
| --- | --- |
| [Summary Data Section (AUP) (V2)](#S_Summary_Data_Section_AUP_V2) (required) | [Summary Data Observation (AU/AR)](#E_Summary_Data_Observation_AUAR)  [Summary Data Observation (AUP)](#E_Summary_Data_Observation_AUP) |

A Summary Encounter records a set of summary data, usually for a population such as the patients in a ward in a specified period. The NHSN protocol defines which data to record for each type of summary report. For an AUP report, data are recorded in both a Summary Data Observation (AU/AR) (non-stratified data) and a Summary Data Observation (AUP) (stratified data). The data requirements at time of publication are shown in a table under the Summary Data Observation (AU/AR) template, above.

A participant element records the location to which the data pertains. It has three parts: a location id, a location type code, and a scoping entity.  The location id has the form <id root=”…” extension=”…”/> representing a location such as ward 9W, or <id root=”…”/> representing the whole facility. The scoping entity is optional if an id is present.

In an Antimicrobial Use Report, each antimicrobial is represented by a Summary Encounter. The antimicrobial is recorded as a participant in the encounter, in addition to the location participant.

Table 60: Summary Encounter (AUP) (V2) Constraints Overview

| XPath | Card. | Verb | Data Type | CONF# | Value |
| --- | --- | --- | --- | --- | --- |
| encounter (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.198:2015-04-01) | | | | | |
| @classCode | 1..1 | SHALL |  | [1181-23019](#C_1181-23019) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = ENC |
| @moodCode | 1..1 | SHALL |  | [1181-23020](#C_1181-23020) | urn:oid:2.16.840.1.113883.5.1001 (HL7ActMood) = EVN |
| templateId | 1..1 | SHALL |  | [1181-23021](#C_1181-23021) |  |
| @root | 1..1 | SHALL |  | [1181-23022](#C_1181-23022) | 2.16.840.1.113883.10.20.5.6.198 |
| @extension | 1..1 | SHALL |  | [1181-30563](#C_1181-30563) | 2015-04-01 |
| participant | 1..1 | SHALL |  | [1181-23023](#C_1181-23023) |  |
| @typeCode | 1..1 | SHALL |  | [1181-23024](#C_1181-23024) | urn:oid:2.16.840.1.113883.5.90 (HL7ParticipationType) = LOC |
| participantRole | 1..1 | SHALL |  | [1181-23025](#C_1181-23025) |  |
| @classCode | 1..1 | SHALL |  | [1181-23026](#C_1181-23026) | urn:oid:2.16.840.1.113883.5.41 (HL7EntityClass) = SDLOC |
| participant | 1..1 | SHALL |  | [1181-23030](#C_1181-23030) |  |
| @typeCode | 1..1 | SHALL |  | [1181-23031](#C_1181-23031) | urn:oid:2.16.840.1.113883.5.90 (HL7ParticipationType) = CSM |
| participantRole | 1..1 | SHALL |  | [1181-23032](#C_1181-23032) |  |
| @classCode | 0..1 | MAY |  | [1181-23033](#C_1181-23033) | urn:oid:2.16.840.1.113883.5.110 (HL7RoleClass) = MANU |
| code | 1..1 | SHALL |  | [1181-23034](#C_1181-23034) | urn:oid:2.16.840.1.114222.4.11.3360 (NHSNAntimicrobialAgentAURPCode) |
| entryRelationship | 1..1 | SHALL |  | [1181-23036](#C_1181-23036) |  |
| @typeCode | 1..1 | SHALL |  | [1181-23037](#C_1181-23037) | urn:oid:2.16.840.1.113883.5.1002 (HL7ActRelationshipType) = COMP |
| observation | 1..1 | SHALL |  | [1181-23038](#C_1181-23038) | [Summary Data Observation (AU/AR) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.229:2015-04-01](#E_Summary_Data_Observation_AUAR) |
| entryRelationship | 4..4 | SHALL |  | [1181-23040](#C_1181-23040) |  |
| @typeCode | 1..1 | SHALL |  | [1181-23041](#C_1181-23041) | urn:oid:2.16.840.1.113883.5.1002 (HL7ActRelationshipType) = COMP |
| observation | 1..1 | SHALL |  | [1181-23042](#C_1181-23042) | [Summary Data Observation (AUP) (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.194](#E_Summary_Data_Observation_AUP) |

1. SHALL contain exactly one [1..1] @classCode="ENC" Encounter (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6 STATIC) (CONF:1181-23019).
2. SHALL contain exactly one [1..1] @moodCode="EVN" Event (CodeSystem: HL7ActMood urn:oid:2.16.840.1.113883.5.1001 STATIC) (CONF:1181-23020).
3. SHALL contain exactly one [1..1] templateId (CONF:1181-23021) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.198" (CONF:1181-23022).
   2. SHALL contain exactly one [1..1] @extension="2015-04-01" (CONF:1181-30563).
4. SHALL contain exactly one [1..1] participant (CONF:1181-23023) such that it
   1. SHALL contain exactly one [1..1] @typeCode="LOC" Location (CodeSystem: HL7ParticipationType urn:oid:2.16.840.1.113883.5.90 STATIC) (CONF:1181-23024).
   2. SHALL contain exactly one [1..1] participantRole (CONF:1181-23025).
      1. This participantRole SHALL contain exactly one [1..1] @classCode="SDLOC" Service Delivery Location (CodeSystem: HL7EntityClass urn:oid:2.16.840.1.113883.5.41 STATIC) (CONF:1181-23026).

The value of @root must be the NHSN assigned Facility OID.

The value of @extension must be a value registered with NHSN.

* + 1. If recording data from an in-facility location, the participantRole element shall contain an id element with both @root and @extension, and a code element where the value is selected from ValueSet 2.16.840.1.113883.13.19NHSNHealthcareServiceLocationCode DYNAMIC, recording the type of location (CONF:1181-23027).

The value of @root must be the NHSN assigned Facility OID.

* + 1. Or, if recording data from the whole facility, the participantRole element shall contain an id element with @root (CONF:1181-23028).

The value of @root must be the NHSN assigned Facility OID.

* + 1. Or, if recording data from a specialized subset of a facility, the participantRole element shall contain a code element where the value is selected from ValueSet 2.16.840.1.113883.13.19 NHSNHealthcareServiceLocationCode DYNAMIC, recording the type of location, and a scopingEntity element where the value of @classCode is “PLC” and id/@root is present (CONF:1181-23029).

1. SHALL contain exactly one [1..1] participant (CONF:1181-23030) such that it
   1. SHALL contain exactly one [1..1] @typeCode="CSM" Consumable (CodeSystem: HL7ParticipationType urn:oid:2.16.840.1.113883.5.90) (CONF:1181-23031).
   2. SHALL contain exactly one [1..1] participantRole (CONF:1181-23032).
      1. This participantRole MAY contain zero or one [0..1] @classCode="MANU" (CodeSystem: HL7RoleClass urn:oid:2.16.840.1.113883.5.110) (CONF:1181-23033).
      2. This participantRole SHALL contain exactly one [1..1] code, which SHALL be selected from ValueSet [NHSNAntimicrobialAgentAURPCode](#NHSNAntimicrobialAgentAURPCode) urn:oid:2.16.840.1.114222.4.11.3360 DYNAMIC (CONF:1181-23034).
2. SHALL contain exactly one [1..1] entryRelationship (CONF:1181-23036) such that it
   1. SHALL contain exactly one [1..1] @typeCode="COMP" Has component (CodeSystem: HL7ActRelationshipType urn:oid:2.16.840.1.113883.5.1002 STATIC) (CONF:1181-23037).
   2. SHALL contain exactly one [1..1] [Summary Data Observation (AU/AR)](#E_Summary_Data_Observation_AUAR) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.229:2015-04-01) (CONF:1181-23038).
   3. This Summary Data Observation (AU/AR) records Number of Therapy Days for the antimicrobial (this is not a simple total of the stratified data; consult the NHSN protocol for the calculation) (CONF:1181-23039).
3. SHALL contain [4..4] entryRelationship (CONF:1181-23040) such that it
   1. SHALL contain exactly one [1..1] @typeCode="COMP" (CodeSystem: HL7ActRelationshipType urn:oid:2.16.840.1.113883.5.1002) (CONF:1181-23041).
   2. SHALL contain exactly one [1..1] [Summary Data Observation (AUP)](#E_Summary_Data_Observation_AUP) (identifier: urn:oid:2.16.840.1.113883.10.20.5.6.194) (CONF:1181-23042).
   3. These Summary Data Observation (AUP) elements record Number of Therapy Days for the antimicrobial stratified by route of actual administration (four observations, one for each route) (CONF:1181-23043).

Table 61: NHSNAntimicrobialAgentAURPCode

|  |  |  |  |
| --- | --- | --- | --- |
| Value Set: NHSNAntimicrobialAgentAURPCode urn:oid:2.16.840.1.114222.4.11.3360  Code System: RxNorm 2.16.840.1.113883.6.88 or cdcNHSN 2.16.840.1.113883.6.277  A full listing of codes can be found in the hai\_voc.xls file provided with this package.  Value Set Source: <http://phinvads.cdc.gov> | | | |
| Code | Code System | Code System OID | Print Name |
| 620 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Amantadine |
| 641 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Amikacin |
| 723 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Amoxicillin (only) |
| 19711 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Amoxicillin with Clavulanate |
| 732 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Amphotericin B |
| 236594 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Amphotericin B Liposomal |
| 733 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Ampicillin (only) |
| 1009148 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Ampicillin with Sulbactam |
| 341018 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Anidulafungin |
| 18631 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Azithromycin |
| 1272 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Aztreonam |
| 140108 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Caspofungin |
| 2176 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Cefaclor |
| 2177 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Cefadroxil |
| 2180 | RxNorm | urn:oid:2.16.840.1.113883.6.88 | Cefazolin |
| ... | | | |

Figure 40: Summary Encounter (AUP) (V2) Example

<!-- encounter reporting data for one antimicrobial -->

<encounter classCode="ENC" moodCode="EVN">

<!—Summary Encounter (AUP) (V2) templateId -->

<templateId root="2.16.840.1.113883.10.20.5.6.198"

extension="2015-04-01"/>

<!-- the location ID and type -->

<participant typeCode="LOC">

<participantRole classCode="SDLOC">

<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 Healthcare Service Location Code"

code="1029-8"

displayName="Medical/Surgical Critical Care" />

</participantRole>

</participant>

<!-- the antimicrobial agent reported -->

<participant typeCode="CSM">

<participantRole classCode="MANU">

<code codeSystem="2.16.840.1.113883.6.88"

codeSystemName="RxNorm"

code="7980"

displayName="Penicillin G"/>

</participantRole>

</participant>

<!-- first of five data observations -->

<entryRelationship typeCode="COMP">

<observation classCode="OBS" moodCode="EVN">

<!-- Summary Data Observation (AU/AR) templateId -->

<templateId root="2.16.840.1.113883.10.20.5.6.229"

extension="2015-04-01"/>

<code codeSystem="2.16.840.1.113883.6.277"

codeSystemName="cdcNHSN"

code="2524-7"

displayName="Number of Therapy Days"/>

<statusCode code="completed"/>

<value xsi:type="PQ" unit="d" value="36"/>

<!-- use this when recording the four stratified data

<methodCode codeSystem="2.16.840.1.113883.6.96"

codeSystemName="SNOMED CT"

code="47625008"

displayName="Intravenous route" />

-->

</observation>

</entryRelationship>

<!-- ... four more observations here -->

<entryRelationship typeCode="COMP">

<observation classCode="OBS" moodCode="EVN">

<!-- Summary Data Observation (AUP) templateId -->

<templateId root="2.16.840.1.113883.10.20.5.6.194"/>

...

</observation>

</entryRelationship>

</encounter>

<!-- end of encounter for this antimicrobial -->

Summary Encounter Patient Presence (AUP) (V2)

[encounter: identifier urn:hl7ii:2.16.840.1.113883.10.20.5.6.197:2015-04-01 (closed)]

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Table 62: Summary Encounter Patient Presence (AUP) (V2) Contexts

| Contained By: | Contains: |
| --- | --- |
| [Summary Data Section (AUP) (V2)](#S_Summary_Data_Section_AUP_V2) (required) | [Summary Data Observation (AU/AR)](#E_Summary_Data_Observation_AUAR) |

A Summary Encounter records a set of summary data, usually for a population such as the patients in a ward in a specified period. The NHSN protocol defines which data to record for each type of summary report. The Summary Encounter Patient Presence (AUP) contains one or more Summary Data Observations (AU/AR). The data requirements at time of publication are shown in a table under the Summary Data Observation (AU/AR) template, above.

NHSN reporting requires:

   •  If the reporting location is a single unit such as a ward, Number of Patient-Present Days, or

   •  If the encounter location is facility-wide rather than a single unit, Number of Admissions and Number of Patient-present Days.

Table 63: Summary Encounter Patient Presence (AUP) (V2) Constraints Overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| XPath | Card. | Verb | Data Type | CONF# | Value |
| encounter (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.197:2015-04-01) | | | | | |
| @classCode | 1..1 | SHALL |  | [1181-22995](#C_1181-22995) | urn:oid:2.16.840.1.113883.5.6 (HL7ActClass) = ENC |
| @moodCode | 1..1 | SHALL |  | [1181-22996](#C_1181-22996) | urn:oid:2.16.840.1.113883.5.1001 (HL7ActMood) = EVN |
| templateId | 1..1 | SHALL |  | [1181-22997](#C_1181-22997) |  |
| @root | 1..1 | SHALL |  | [1181-22998](#C_1181-22998) | 2.16.840.1.113883.10.20.5.6.197 |
| @extension | 1..1 | SHALL |  | [1181-30562](#C_1181-30562) | 2015-04-01 |
| participant | 1..1 | SHALL |  | [1181-22999](#C_1181-22999) |  |
| @typeCode | 1..1 | SHALL |  | [1181-23000](#C_1181-23000) | urn:oid:2.16.840.1.113883.5.90 (HL7ParticipationType) = LOC |
| participantRole | 1..1 | SHALL |  | [1181-23001](#C_1181-23001) |  |
| @classCode | 1..1 | SHALL |  | [1181-23002](#C_1181-23002) | urn:oid:2.16.840.1.113883.5.41 (HL7EntityClass) = SDLOC |
| entryRelationship | 1..\* | SHALL |  | [1181-23006](#C_1181-23006) |  |
| @typeCode | 1..1 | SHALL |  | [1181-23007](#C_1181-23007) | urn:oid:2.16.840.1.113883.5.1002 (HL7ActRelationshipType) = COMP |
| observation | 1..1 | SHALL |  | [1181-23008](#C_1181-23008) | [Summary Data Observation (AU/AR) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.229:2015-04-01](#E_Summary_Data_Observation_AUAR) |

1. SHALL contain exactly one [1..1] @classCode="ENC" Encounter (CodeSystem: HL7ActClass urn:oid:2.16.840.1.113883.5.6 STATIC) (CONF:1181-22995).
2. SHALL contain exactly one [1..1] @moodCode="EVN" Event (CodeSystem: HL7ActMood urn:oid:2.16.840.1.113883.5.1001 STATIC) (CONF:1181-22996).
3. SHALL contain exactly one [1..1] templateId (CONF:1181-22997) such that it
   1. SHALL contain exactly one [1..1] @root="2.16.840.1.113883.10.20.5.6.197" (CONF:1181-22998).
   2. SHALL contain exactly one [1..1] @extension="2015-04-01" (CONF:1181-30562).
4. SHALL contain exactly one [1..1] participant (CONF:1181-22999) such that it
   1. SHALL contain exactly one [1..1] @typeCode="LOC" Location (CodeSystem: HL7ParticipationType urn:oid:2.16.840.1.113883.5.90 STATIC) (CONF:1181-23000).
   2. SHALL contain exactly one [1..1] participantRole (CONF:1181-23001).
      1. This participantRole SHALL contain exactly one [1..1] @classCode="SDLOC" Service Delivery Location (CodeSystem: HL7EntityClass urn:oid:2.16.840.1.113883.5.41 STATIC) (CONF:1181-23002).

The value of @root must be the NHSN assigned Facility OID.

The value of @extension must be a value registered with NHSN.

* + 1. If recording data from an in-facility location, the participantRole element shall contain an id element with both @root and @extension, and a code element where the value is selected from ValueSet 2.16.840.1.113883.13.19NHSNHealthcareServiceLocationCode DYNAMIC, recording the type of location (CONF:1181-23003).

The value of @root must be the NHSN assigned Facility OID.

* + 1. Or, if recording data from the whole facility, the participantRole element shall contain an id element with @root (CONF:1181-23004).

The value of @root must be the NHSN assigned Facility OID.

* + 1. Or, if recording data from a specialized subset of a facility, the participantRole element shall contain a code element where the value is selected from ValueSet 2.16.840.1.113883.13.19 NHSNHealthcareServiceLocationCode DYNAMIC, recording the type of location, and a scopingEntity element where the value of @classCode is “PLC” and id/@root is present (CONF:1181-23005).

1. SHALL contain at least one [1..\*] entryRelationship (CONF:1181-23006).
   1. Such entryRelationships SHALL contain exactly one [1..1] @typeCode="COMP" Has component (CodeSystem: HL7ActRelationshipType urn:oid:2.16.840.1.113883.5.1002 STATIC) (CONF:1181-23007).
   2. Such entryRelationships SHALL contain exactly one [1..1] [Summary Data Observation (AU/AR)](#E_Summary_Data_Observation_AUAR) (identifier: urn:hl7ii:2.16.840.1.113883.10.20.5.6.229:2015-04-01) (CONF:1181-23008).
2. This Summary Encounter SHALL contain a Summary Data Observation (AU/AR) that records Number of Patient-present Days for the reporting location (CONF:1181-23011).
3. If the reporting location is facility-wide inpatient units, this Summary Encounter SHALL contain a second Summary Data Observation (AU/AR) that records Number of Admissions (CONF:1181-23012).

Figure 41: Summary Encounter Patient Presence (AUP) (V2)

<!-- encounter recording patient presence -->

<encounter classCode="ENC" moodCode="EVN">

<!-- Summary Encounter Patient Presence (AUP) templateId -->

<templateId root="2.16.840.1.113883.10.20.5.6.197"

extension="2015-04-01" />

<!-- the location ID and type -->

<participant typeCode="LOC">

<participantRole classCode="SDLOC">

<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 Healthcare Service Location Code"

code="1029-8"

displayName="Medical/Surgical Critical Care" />

</participantRole>

</participant>

<!-- report for a single unit: Number of Patient-present Days -->

<entryRelationship typeCode="COMP">

<observation classCode="OBS" moodCode="EVN">

<!-- Summary Data Observation (AU/AP) templateId -->

<templateId root="2.16.840.1.113883.10.20.5.6.229"

extension="2015-04-01" />

...

</observation>

</entryRelationship>

<!-- if the reporting location is facility-wide inpatient units,

a second observation recording Number of Admissions -->

</encounter>

# Template Ids in This Guide

Table 64: Template List

| Template Title | Template Type | templateId |
| --- | --- | --- |
| [Antimicrobial Resistance Option (ARO) Summary Report (V2)](#D_Antimicrobial_Resistance_Option_ARO_S) | document | urn:hl7ii:2.16.840.1.113883.10.20.5.46:2015-04-01 |
| [Antimicrobial Use (AUP) Summary Report (V2)](#D_Antimicrobial_Use_AUP_Summary_Report_) | document | urn:hl7ii:2.16.840.1.113883.10.20.5.44:2015-04-01 |
| [HAI AUR Antimicrobial Resistance Option (ARO) Report (V4)](#D_HAI_AUR_Antimicrobial_Resistance_Opti) | document | urn:hl7ii:2.16.840.1.113883.10.20.5.31:2016-08-01 |
| [HAI Population Summary Report Generic Constraints](#D_HAI_Population_Summary_Report_Generic) | document | urn:oid:2.16.840.1.113883.10.20.5.4.28 |
| [HAI Single-Person Report Generic Constraints](#D_HAI_SinglePerson_Report_Generic_Const) | document | urn:oid:2.16.840.1.113883.10.20.5.4.27 |
| [Healthcare Associated Infection Report](#D_Healthcare_Associated_Infection_Repor) | document | urn:oid:2.16.840.1.113883.10.20.5.4.25 |
| [Findings Section in an ARO Report (V3)](#S_Findings_Section_in_an_ARO_Report_V3) | section | urn:hl7ii:2.16.840.1.113883.10.20.5.5.32:2016-08-01 |
| [HAI Section Generic Constraints](#S_HAI_Section_Generic_Constraints) | section | urn:oid:2.16.840.1.113883.10.20.5.4.26 |
| [Summary Data Section (ARO) (V2)](#S_Summary_Data_Section_ARO_V2) | section | urn:hl7ii:2.16.840.1.113883.10.20.5.5.52:2015-04-01 |
| [Summary Data Section (AUP) (V2)](#S_Summary_Data_Section_AUP_V2) | section | urn:hl7ii:2.16.840.1.113883.10.20.5.5.51:2015-04-01 |
| [Antimicrobial Susceptibility Final Interpretation Result](#E_Antimicrobial_Susceptibility_Final_In) | entry | urn:oid:2.16.840.1.113883.10.20.5.6.175 |
| [Antimicrobial Susceptibility Isolate Participant](#E_Antimicrobial_Susceptibility_Isolate_) | entry | urn:oid:2.16.840.1.113883.10.20.5.6.202 |
| [Antimicrobial Susceptibility Result Observation (V3)](#E_Antimicrobial_Susceptibility_Res_Obs) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.186:2016-08-01 |
| [Antimicrobial Susceptibility Result Organizer (V3)](#E_Antimicrobial_Susceptibility_Result_O) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.200:2016-08-01 |
| [Antimicrobial Susceptibility Tests Organizer (V3)](#E_Antimicrobial_Susceptibility_Tests_Or) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.177:2016-08-01 |
| [ARO Staph Aureus Specific Tests Organizer](#E_ARO_Staph_Aureus_Specific_Tests_Organ) | entry | urn:oid:2.16.840.1.113883.10.20.5.6.190 |
| [ARO Staph Aureus Specific Tests Result Observation](#E_ARO_Staph_Aureus_Specific_Tests_Resul) | entry | urn:oid:2.16.840.1.113883.10.20.5.6.189 |
| [Isolate Susceptibility Tests Organizer (V3)](#E_Isolate_Susceptibility_Tests_Organize) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.201:2016-08-01 |
| [Specimen Collection Encounter (ARO)](#E_Specimen_Collection_Encounter_ARO) | entry | urn:oid:2.16.840.1.113883.10.20.5.6.187 |
| [Specimen Collection Procedure (ARO) (V3)](#E_Specimen_Collection_Procedure_ARO_V3) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.188:2016-08-01 |
| [Summary Data Observation (AU/AR)](#E_Summary_Data_Observation_AUAR) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.229:2015-04-01 |
| [Summary Data Observation (AUP)](#E_Summary_Data_Observation_AUP) | entry | urn:oid:2.16.840.1.113883.10.20.5.6.194 |
| [Summary Encounter (ARO) (V2)](#E_Summary_Encounter_ARO_V2) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.199:2015-04-01 |
| [Summary Encounter (AUP) (V2)](#E_Summary_Encounter_AUP_V2) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.198:2015-04-01 |
| [Summary Encounter Patient Presence (AUP) (V2)](#E_Summary_Encounter_Patient_Presence_AU) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.197:2015-04-01 |

Table 65: Template Containments

| Template Title | Template Type | templateId |
| --- | --- | --- |
| [Antimicrobial Resistance Option (ARO) Summary Report (V2)](#D_Antimicrobial_Resistance_Option_ARO_S) | document | urn:hl7ii:2.16.840.1.113883.10.20.5.46:2015-04-01 |
| [Summary Data Section (ARO) (V2)](#S_Summary_Data_Section_ARO_V2) | section | urn:hl7ii:2.16.840.1.113883.10.20.5.5.52:2015-04-01 |
| [Summary Encounter (ARO) (V2)](#E_Summary_Encounter_ARO_V2) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.199:2015-04-01 |
| [Summary Data Observation (AU/AR)](#E_Summary_Data_Observation_AUAR) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.229:2015-04-01 |
| [Antimicrobial Use (AUP) Summary Report (V2)](#D_Antimicrobial_Use_AUP_Summary_Report_) | document | urn:hl7ii:2.16.840.1.113883.10.20.5.44:2015-04-01 |
| [Summary Data Section (AUP) (V2)](#S_Summary_Data_Section_AUP_V2) | section | urn:hl7ii:2.16.840.1.113883.10.20.5.5.51:2015-04-01 |
| [Summary Encounter (AUP) (V2)](#E_Summary_Encounter_AUP_V2) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.198:2015-04-01 |
| [Summary Data Observation (AU/AR)](#E_Summary_Data_Observation_AUAR) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.229:2015-04-01 |
| [Summary Data Observation (AUP)](#E_Summary_Data_Observation_AUP) | entry | urn:oid:2.16.840.1.113883.10.20.5.6.194 |
| [Summary Encounter Patient Presence (AUP) (V2)](#E_Summary_Encounter_Patient_Presence_AU) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.197:2015-04-01 |
| [Summary Data Observation (AU/AR)](#E_Summary_Data_Observation_AUAR) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.229:2015-04-01 |
| [HAI AUR Antimicrobial Resistance Option (ARO) Report (V4)](#D_HAI_AUR_Antimicrobial_Resistance_Opti) | document | urn:hl7ii:2.16.840.1.113883.10.20.5.31:2016-08-01 |
| [Findings Section in an ARO Report (V3)](#S_Findings_Section_in_an_ARO_Report_V3) | section | urn:hl7ii:2.16.840.1.113883.10.20.5.5.32:2016-08-01 |
| [Specimen Collection Procedure (ARO) (V3)](#E_Specimen_Collection_Procedure_ARO_V3) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.188:2016-08-01 |
| [Isolate Susceptibility Tests Organizer (V3)](#E_Isolate_Susceptibility_Tests_Organize) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.201:2016-08-01 |
| [Antimicrobial Susceptibility Isolate Participant](#E_Antimicrobial_Susceptibility_Isolate_) | entry | urn:oid:2.16.840.1.113883.10.20.5.6.202 |
| [Antimicrobial Susceptibility Tests Organizer (V3)](#E_Antimicrobial_Susceptibility_Tests_Or) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.177:2016-08-01 |
| [Antimicrobial Susceptibility Final Interpretation Result](#E_Antimicrobial_Susceptibility_Final_In) | entry | urn:oid:2.16.840.1.113883.10.20.5.6.175 |
| [Antimicrobial Susceptibility Result Organizer (V3)](#E_Antimicrobial_Susceptibility_Result_O) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.200:2016-08-01 |
| [Antimicrobial Susceptibility Result Observation (V3)](#E_Antimicrobial_Susceptibility_Res_Obs) | entry | urn:hl7ii:2.16.840.1.113883.10.20.5.6.186:2016-08-01 |
| [ARO Staph Aureus Specific Tests Organizer](#E_ARO_Staph_Aureus_Specific_Tests_Organ) | entry | urn:oid:2.16.840.1.113883.10.20.5.6.190 |
| [ARO Staph Aureus Specific Tests Result Observation](#E_ARO_Staph_Aureus_Specific_Tests_Resul) | entry | urn:oid:2.16.840.1.113883.10.20.5.6.189 |
| [Specimen Collection Encounter (ARO)](#E_Specimen_Collection_Encounter_ARO) | entry | urn:oid:2.16.840.1.113883.10.20.5.6.187 |
| [HAI Population Summary Report Generic Constraints](#D_HAI_Population_Summary_Report_Generic) | document | urn:oid:2.16.840.1.113883.10.20.5.4.28 |
| [HAI Single-Person Report Generic Constraints](#D_HAI_SinglePerson_Report_Generic_Const) | document | urn:oid:2.16.840.1.113883.10.20.5.4.27 |
| [Healthcare Associated Infection Report](#D_Healthcare_Associated_Infection_Repor) | document | urn:oid:2.16.840.1.113883.10.20.5.4.25 |
| [HAI Section Generic Constraints](#S_HAI_Section_Generic_Constraints) | section | urn:oid:2.16.840.1.113883.10.20.5.4.26 |

# Value Sets In This Guide

Table 66: Value Sets

| Name | OID | URL |
| --- | --- | --- |
| [Administrative Gender (HL7 V3)](#Administrative_Gender_HL7_V3) | urn:oid:2.16.840.1.113883.1.11.1 | <https://vsac.nlm.nih.gov/> |
| [Codes for Antimicrobial Resistance Option (ARO) Summary Data](#Codes_for_Antimicrobial_Resistance_Opti) | urn:oid:2.16.840.1.113883.10.20.5.9.8 | N/A |
| [Codes for Antimicrobial Usage, Pharmacy (AUP) Summary Data](#Codes_for_Antimicrobial_Usage_Pharmacy_) | urn:oid:2.16.840.1.113883.10.20.5.9.9 | N/A |
| [Ethnicity](#Ethnicity) | urn:oid:2.16.840.1.114222.4.11.837 | <https://vsac.nlm.nih.gov/> |
| [NHSNAntimicrobialAgentAURPCode](#NHSNAntimicrobialAgentAURPCode) | urn:oid:2.16.840.1.114222.4.11.3360 | <http://phinvads.cdc.gov> |
| [NHSNDrugSusceptibilityFindingCode](#NHSNDrugSusceptibilityFindingCode) | urn:oid:2.16.840.1.113883.13.13 | N/A |
| [NHSNDrugSusceptibilityTestMethod](#NHSNDrugSusceptibilityTestMethod) | urn:oid:2.16.840.1.113883.10.20.5.9.4 | N/A |
| [NHSNDrugSusceptibilityTestsCode](#NHSNDrugSusceptibilityTestsCode) | urn:oid:2.16.840.1.113883.13.15 | N/A |
| [NHSNEncounterTypeCode](#NHSNEncounterTypeCode) | urn:oid:2.16.840.1.113883.13.1 | N/A |
| [NHSNHealthcareServiceLocationCode](#NHSNHealthcareServiceLocationCode) | urn:oid:2.16.840.1.113883.13.19 | N/A |
| [NHSNPathogenCode](#NHSNPathogenCode) | urn:oid:2.16.840.1.113883.13.16 | N/A |
| [NHSNPopulationSummaryReportTypeCode](#NHSNPopulationSummaryReportTypeCode) | urn:oid:2.16.840.1.114222.4.11.3595 | N/A |
| [NHSNRaceCategory](#NHSNRaceCategory) | urn:oid:2.16.840.1.114222.4.11.7232 | <https://phinvads.cdc.gov> |
| [NHSNRouteOfAdminstrationAURPCode](#NHSNRouteOfAdminstrationAURPCode) | urn:oid:2.16.840.1.114222.4.11.3361 | N/A |
| [NHSNSpecimenTypeCode](#NHSNSpecimenTypeCode) | urn:oid:2.16.840.1.114222.4.11.3249 | N/A |
| [NHSNStaphAureusSpecificTest](#NHSNStaphAureusSpecificTest) | urn:oid:2.16.840.1.114222.4.11.7160 | N/A |
| [NHSNStaphAureusTestResults](#NHSNStaphAureusTestResults) | urn:oid:2.16.840.1.114222.4.11.6074 | N/A |

# Code Systems in This Guide

Table 67: Code Systems

| Name | OID |
| --- | --- |
| cdcNHSN | urn:oid:2.16.840.1.113883.6.277 |
| Healthcare Provider Taxonomy (HIPAA) | urn:oid:2.16.840.1.113883.6.101 |
| HL7 HealthcareServiceLocation | urn:oid:2.16.840.1.113883.6.259 |
| HL7ActClass | urn:oid:2.16.840.1.113883.5.6 |
| HL7ActCode | urn:oid:2.16.840.1.113883.5.4 |
| HL7ActMood | urn:oid:2.16.840.1.113883.5.1001 |
| HL7ActRelationshipType | urn:oid:2.16.840.1.113883.5.1002 |
| HL7ActStatus | urn:oid:2.16.840.1.113883.5.14 |
| HL7AdministrativeGender | urn:oid:2.16.840.1.113883.5.1 |
| HL7Confidentiality | urn:oid:2.16.840.1.113883.5.25 |
| HL7ContextControl | urn:oid:2.16.840.1.113883.5.1057 |
| HL7EntityClass | urn:oid:2.16.840.1.113883.5.41 |
| HL7NullFlavor | urn:oid:2.16.840.1.113883.5.1008 |
| HL7ObservationInterpretation | urn:oid:2.16.840.1.113883.5.83 |
| HL7ParticipationType | urn:oid:2.16.840.1.113883.5.90 |
| HL7RoleClass | urn:oid:2.16.840.1.113883.5.110 |
| ISBT-128 | urn:oid:2.16.840.1.113883.6.18 |
| LOINC | urn:oid:2.16.840.1.113883.6.1 |
| Race & Ethnicity - CDC | urn:oid:2.16.840.1.113883.6.238 |
| RxNorm | urn:oid:2.16.840.1.113883.6.88 |
| SNOMED CT | urn:oid:2.16.840.1.113883.6.96 |

# Changes from Previous Version

# References

* CDA Validator, [http://www.lantanagroup.com/validator.](http://www.lantanagroup.com/validator)
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* [SNOMED CT](http://www.snomed.org/snomedct/index.html)®: SNOMED Clinical Terms SNOMED International Organization. Available at: <http://www.ihtsdo.org/snomed-ct>.

1. Acronyms and Abbreviations

ACoS American College of Surgeons

AR Antimicrobial Resistance

ARO Antimicrobial Resistance Option

ASA American Society of Anesthesiologists

APRV Airway Pressure Release Ventilation

AU Antimicrobial Use

AUP Antimicrobial Use, Pharmacy Option (AUP) Summary Report

AUR Antimicrobial Use and Resistance Module

BPU Blood Products Usage

BSI Bloodstream Infection

C-CDA Consolidated CDA

CDA R2 CDA Release 2

CDA Clinical Document Architecture

CDAD C. difficile-associated disease

CDC Centers for Disease Control and Prevention

CDI *C. difficile* infection

CHI Consolidated Health Informatics

CLIP central-line insertion practice

CPT Current Procedural Terminology

DSTU Draft Standard for Trial Use

EHR electronic health record

EOID Evidence of Infection (Dialysis) Report

FOIA Freedom of Information Act

GIN Generic Incident Notification

HAI Healthcare Associated Infection

HAR Hemovigilance Adverse Reaction

HI Hemovigilance Incident Report

HITSP Healthcare Information Technology Standards Panel

HL7 Health Level Seven

HP FLU Influenza Vaccination Summary

HV Hemovigilance

ICP infection control professional

ICU intensive care unit

ID identifier

IDM Information Data Model

IG implementation guide

IHTSDO International Health Terminology Standard Development Organisation

ISBT International Society for Blood Transfusion

IV intravenous

LIO Laboratory-identified organism

LOINC Logical Observation Identifiers Names and Codes

MDRO Multi-drug-resistant organism

NCEZID National Center for Emerging and Zoonotic Infectious Diseases

NHSN National Healthcare Safety Network

NICU Neonatal Intensive Care Unit

NUCC National Uniform Claim Committee

OID object identifier

OPC Outpatient Procedure Component

PHCR Public Health Case Reports

PHIN VADS Public Health Information Network Vocabulary Access and Distribution System

PICC/IV peripherally inserted central catheter/intravenous

PNEU Pneumonia Infection Numerator Report

POM Prevention Process and Outcome Measures Monthly Monitoring

RIM Reference Information Model

RMIM Refined Message Information Model

SCA Specialty Care Area

SDWG Structured Documents Working Group

SNOMED-CT Systematized Nomenclature of Medicine--Clinical Terms

SSI Surgical Site Infection

TA-GVHD Transfusion associated graft vs. host disease

TSC Technical Steering Committee

URL Uniform Resource Locator

URN Universal Resource Name

UTI Urinary Tract Infection

VAE Ventilator Associated Event

VAD Ventricular Assist Device

VAT Vascular Access Type

XML Extensible Markup Language

1. Example Instance Identifiers (Non-normative)

As discussed in [Example Instance Identifiers](#IG_S_Example_Instance_Identifiers), much of the development of this guide was driven by a pilot project in July 2007. The pilot project assigned example OIDs to a fictional facility and vendor to illustrate the numbering schemes for which facilities and vendors are responsible. In practice, these identifiers will be assigned by facilities and software applications within those facilities participating in the NHSN.

All example OIDs in this IG and in the accompanying sample files begin with 2.16.840.1.113883.3.117.1.1.5. and are documented below for reference.

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 68: 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 personnel 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 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 |
| its event / incident IDs | 2.16.840.1.113883.3.117.1.1.5.2.1.1.5 |
| etc. |  |

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

Table 69: 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 |
| facility personnel: |  |  |
| author ID | 2.16.840.1.113883.3.117.1.1.5.1.1.2 | anAuthorID |
| legal authenticator ID | 2.16.840.1.113883.3.117.1.1.5.1.1.2 | aLegalAuthenticatorID |
| performer (nurse) | 2.16.840.1.113883.3.117.1.1.5.1.1.2 | 24242424 |
| Vendor-software-assigned OIDs | | |
| Usage | OID | extension |
| software ID | 2.16.840.1.113883.3.117.1.1.5.2.1.1 | aSoftwareID |
| setId | 2.16.840.1.113883.3.117.1.1.5.2.1.1.1 | 31 |
| document ID | 2.16.840.1.113883.3.117.1.1.5.2.1.1.2 | 20202201 93 |
| encounter ID | 2.16.840.1.113883.3.117.1.1.5.2.1.1.3 | 31 |
| procedure ID | 2.16.840.1.113883.3.117.1.1.5.2.1.1.4 | 92 |
| event / incident ID | 2.16.840.1.113883.3.117.1.1.5.2.1.1.5 | 21987654321 11987654321 |

1. Vocabulary Heuristics for Codes and Value Sets (Non-normative)

The CDC has identified questions and allowable responses for HAI form fields. In many cases these questions and responses have been mapped to local CDC/NHSN codes, and it is the CDC's intention to identify corresponding standard codes. Within the CDC, different groups have done vocabulary mapping work (e.g., with HL7 V2 messages), often with different results, and efforts are underway to not only reconcile internal CDC vocabulary usage, but also reconcile CDC vocabulary usage with the Healthcare Information Standards Technology Panel (HITSP) recommendations.

Vocabularies recommended in this guide are primarily standard vocabularies recommended for use in particular domains. In many cases these vocabularies are further constrained into value sets for use within this guide or were previously constrained into value sets by the CDC.

The incremental strategy for vocabulary reconciliation for codes, code systems, and value sets in this document is as follows.

Code and codeSystem Selection

* Where there is conflicting precedent within the CDC, CDC will advise on the preferred CDC code system.
* Where there is a preferred code system within the CDC that is consistent with HITSP recommendations, existing CDC-cited code systems are used.
* Where there is a preferred code system within the CDC that is not consistent with HITSP recommendations, divergence from HITSP is flagged, and reconciliation between CDC and HITSP is planned (but outside the scope of this document).
* Where there is no established precedent within the CDC, available HITSP recommendations will be followed.
* Where there is no established precedent within the CDC and no HITSP recommendations, precedent in prior CDA Implementation Guides will be followed.
* Where there is no established precedent within the CDC, no HITSP recommendations, and no prior CDA IG precedent:
  + An attempt will be made to map CDC/NHSN local codes to standard codes (e.g., SNOMED, HL7 V3 vocabularies).
  + Where there is no corresponding standard code, the CDC/NHSN local code will be cited. (Submitting local CDC/NHSN codes to SNOMED is outside the scope of this document.)
* If post-coordination of SNOMED terms and codes would be required to capture the CDC/NHSN concept, the local CDC/NHSN code will be used.

Value Set Assignment and Maintenance

* Where there is conflicting precedent within the CDC, CDC will advise on the preferred CDC value set.
* Where there is a preferred CDC value set that is consistent with HITSP recommendations, existing CDC value sets are used.
* Where there is a preferred CDC value set that is not consistent with HITSP recommendations, divergence from HITSP is flagged, and reconciliation between CDC and HITSP is planned (but outside the scope of this document).
* Where there is no established precedent within the CDC, available HITSP recommendations will be followed.
* Where there is no established precedent within the CDC and no HITSP recommendations, then precedent in prior CDA Implementation Guides will be followed.
* Where there is no established precedent within the CDC, no HITSP recommendations, and no prior CDA IG precedent, new value sets will be created, each having a value set OID assigned by the CDC.

1. HL7 CDA R2. <http://www.hl7.org/implement/standards/product_brief.cfm?product_id=7> [↑](#footnote-ref-1)
2. *HL7 V3: Refinement, Constraint and Localization.* <http://www.hl7.org/v3ballot/html/infrastructure/conformance/conformance.htm> [↑](#footnote-ref-2)
3. *HL7 Version 3 Publishing Facilitator's Guide.* <http://www.hl7.org/v3ballot/html/help/pfg/pfg.htm> [↑](#footnote-ref-3)
4. *HL7 Version 3 Interoperability Standards*. [http://www.hl7.org/memonly/downloads/v3edition.cfm - V32010](http://www.hl7.org/memonly/downloads/v3edition.cfm#V32010) [↑](#footnote-ref-4)
5. W3C, *XML Path Language.* <http://www.w3.org/TR/xpath/> [↑](#footnote-ref-5)