

# HITSP Radiology Result Message Component

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HITSP/C41



*Submitted to:*

**Healthcare Information Technology Standards Panel**

*Submitted by:*

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## DOCUMENT CHANGE HISTORY

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## 1.0 INTRODUCTION

As an introduction to the HITSP Radiology Result Message Component, this section provides a high level overview of the information sharing scenario enabled by following this specification, provides a document map of the construct relationships for this specification, acknowledges the copyright protections that pertain, and provides links to key reference documents and background material. If you are already familiar with this information, proceed to Section 2.0 Component Definition.

### 1.1 OVERVIEW

This section describes the contents of this specification and provides a high level definition of this Component and background information about the underlying standards that the Component is based on.

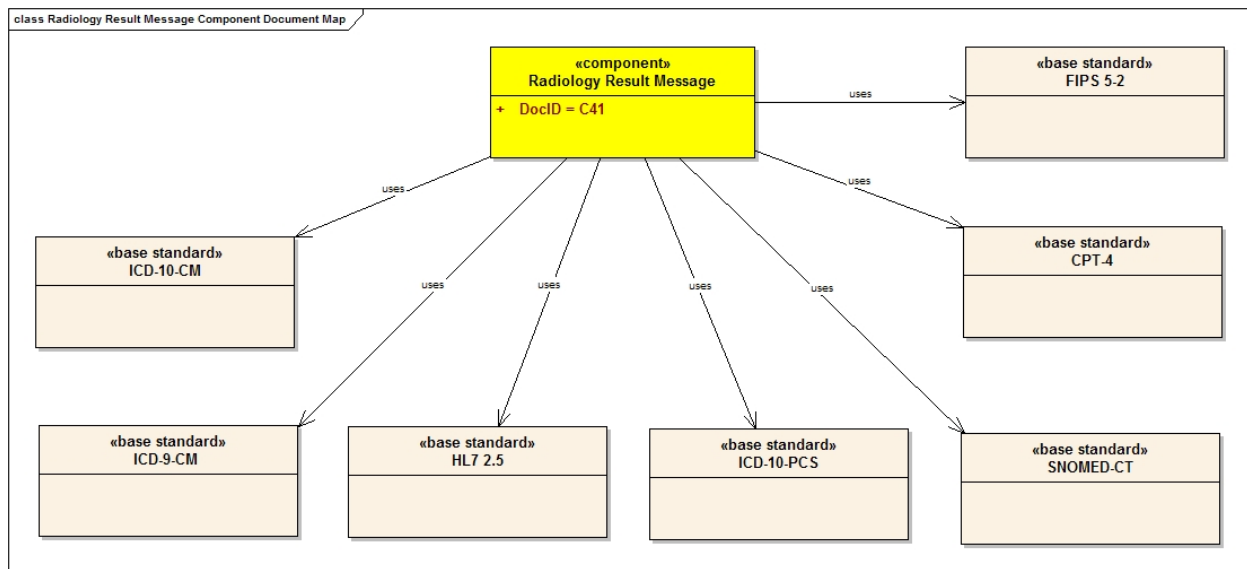
This Component supports the process of sending radiology result data from a Biosurveillance Message Sender to a Biosurveillance Message Receiver. Radiology result data are captured as part of the normal process of care performed by healthcare providers.

### 1.2 COMPONENT DOCUMENT MAP

Each HITSP Interoperability Specification (IS) is comprised of a suite of constructs that, taken as a whole, define how to integrate and constrain existing standards and specifications that will satisfy the requirements imposed by a given Use Case. The IS groups specific actions and actors to describe the relevant contexts using HITSP constructs that further identify and constrain standards where necessary. There are four types of HITSP constructs called Interoperability Specifications (IS), Transaction Packages (TP), Transactions (T), and Components (C). The current Radiology Result Message Component specification is used with other constructs to meet the requirements of one or more ISs. Review Section 1.2 (Interoperability Specification Document Map) from the relevant IS to better understand the context, dependencies, and relationships between the constructs that are used to meet the IS requirements. The document map in Figure 1.2-1 depicts primary standards that are selected, constrained, or referenced to define the atomic constructs used in an information exchange, or to meet an infrastructure requirement. Implementers should read the documents that describe the standards represented in the diagram for their details and specific uses.



Figure 1.2-1 Component Document Map



### 1.3 COPYRIGHT PERMISSIONS

#### COPYRIGHT NOTICE

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This material includes SNOMED Clinical Terms® (SNOMED CT®) which is used by permission of the International Health Terminology Standards Development Organization (IHTSDO). All rights reserved. SNOMED CT® was originally created by The College of American Pathologists.

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### 1.4 REFERENCE DOCUMENTS

This section contains links to key reference documents and background material.

The HITSP Interoperability Specification Overview provides the background information about the HITSP and its role in the overall U.S. efforts to realize large scale interoperability of health information. The document also provides a description of the HITSP process for healthcare standards harmonization and



explains how to use the Interoperability Specifications and other related documents to inform your health IT product development or product refinement.

The conventions that are used to convey the full descriptions and usage of standards in the HITSP specifications are contained in the HITSP Conventions List.

The acronyms used in this document are contained in the HITSP Acronyms List.

The HITSP Glossary provides definitions for relevant terms used by HITSP documents.

The HITSP Harmonization Framework describes the current framework within which the Interoperability Specifications are built.

A Technical Note, TN900 - Security and Privacy, has been developed as a reference document to provide the overall context for use of the HITSP Security and Privacy constructs. It includes the following:

- The scope, reference policy background, and Security and Privacy principles used in the development of the constructs
- A detailed description and schematics of the conceptual relationship between the Security and Privacy constructs
- A mapping of existing standards and constructs to be used in meeting the stated requirements of the AHIC Use Cases
- A list of identified gaps and the recommended approaches to resolving those gaps
- A roadmap for how the Security and Privacy constructs will evolve and eventually align with other HITSP Interoperability Specifications
- A conceptual framework for Security and Privacy management, including reference information on privacy policies, risk assessment, and risk management
- A glossary of terms used in all the Security and Privacy construct documents
- A description of the application of the Security and Privacy constructs to the HITSP Interoperability Specifications for the three initial AHIC Use Cases – Biosurveillance, Electronic Health Records - Laboratory Results Reporting, and Consumer Empowerment

HITSP will periodically update this Technical Note as required by the introduction of new contexts for use.



## 2.0 COMPONENT DEFINITION

A Component defines atomic constructs used to support an information exchange or to meet an infrastructure requirement. This is accomplished by:

- (a) Referencing one or more underlying standards
- (b) Specifying constraints and other rules for using the standards

### 2.1 CONTEXT OVERVIEW

This section provides a general description of the Component. It includes a detailed definition of the Component and the reason for its use. It also provides all the necessary background information that further describes the context in which the Component is needed, and the base or composite standard that the Component is based on.

This Component supports the process of sending patient radiology results data from a Message Sender to a Message Receiver. Patient encounter data are captured as part of the normal process of care performed by healthcare providers such as hospitals, emergency departments and outpatient clinics. This message may be used to support both clinical care and to support information re-use such as biosurveillance.

#### 2.1.1 COMPONENT CONSTRAINTS

This section describes the constraints that limit the context in which the Component may be used. A constraint describes a rule that limits the use of the actors, actions or data within the given context, or to which the interactions must conform to be used within the described context. It is a description of the limits and scope of the interactions and can describe actions or events that are not part of the initial definition for the context.

**Table 2.1.1-1 Component Constraints**

Constraint	Constraint Section
No applicable constraints	

#### 2.1.2 COMPONENT DEPENDENCIES

This section describes any specific mapping criteria for the standards underlying the Component. It elaborates on the relationships between different standards used by this Component, and how they map to each other. Additional required mapping criteria not currently enforced by the underlying standards, and any specific elements that are required for this mapping to succeed, are also provided.





**Table 2.1.2-1 Component Dependencies**

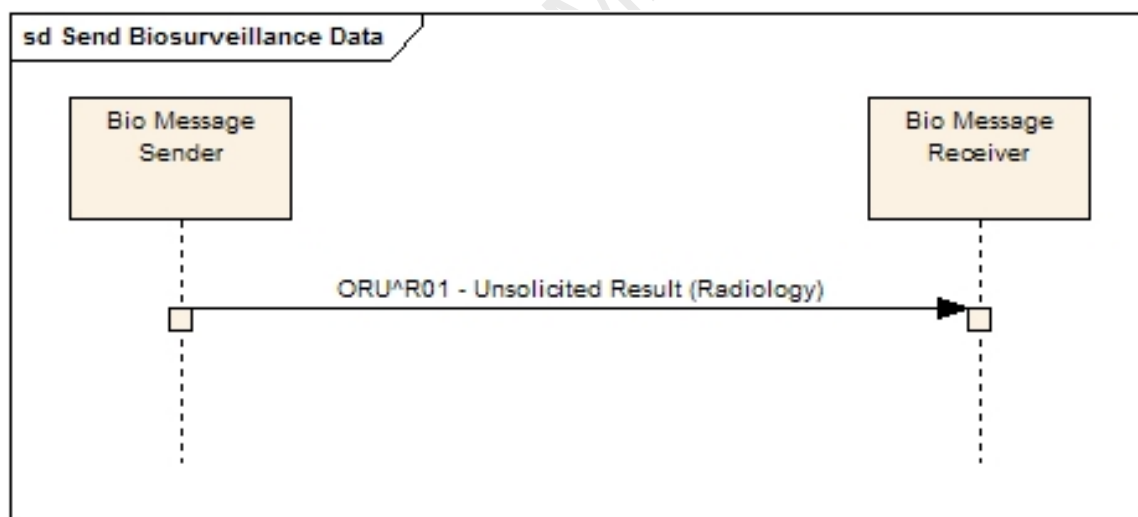
Standard/HITSP Component	Depends On (Name of standard/HITSP Component that it depends on)	Dependency Type (Pre-condition, Post-condition, General)	Purpose (Reason for this dependency)
No applicable dependencies			

## 2.2 RULES FOR IMPLEMENTING

The following section documents the content of the Component. It provides the basic elements and secondary standards that are supported by this Component and the constraints that are being placed on those standards. Specifically, it describes the subset or constraints that are required for this Component, and the minimum attributes of the Component as it relates to the base or composite standards on which it is based.

The Radiology Result Messaging component uses the HL7 V2.5 ORU^R01 unsolicited result message to send Biosurveillance data to the Biosurveillance system. The Biosurveillance data are constrained to the AHIC defined Biosurveillance data set (see Section 2.2.1.1 Minimum Data Set) and codified with the appropriate terminology.

**Figure 2.2-1 Send Biosurveillance Data**



### 2.2.1 DATA MAPPING

#### ***HL7 Segment and Field Descriptions***

This section contains descriptions of the segments used. Within each segment, the supported fields are briefly described. For more information on segments and fields, refer to the HL7 Standard.

This document uses the following table convention to describe HL7 messages, their segments and data elements used.



**Table 2.2.1-1 HL7 Table Convention**

Name of structure being documented, e.g., HL7 Patient Identification SEGMENT							
SEQ	LEN	DT	OPT	RPT	TBL	Data Element Name	Description / Comments
Where expanded descriptions/comments are needed, they will be placed in an additional multi-line row inserted immediately following each applicable data element. Otherwise, this extra row will not be present							

**Table / Column Notes:**

- a) HL7 messages and the table only contain data elements (i.e., segments, fields, components and sub-components) from HL7 version 2.5 that are actually to be populated in a message. This applies even when messages have segments, fields, components and sub-components that are not consecutive segments, fields, components or sub-components
- b) A field, which is not just a simple data element (i.e., the field contains a sub-structure of components), is always shown along with the component that are to be populated in the message
- c) A component, which is not just a simple data element (i.e., the component contains a sub-structure of sub-components), is always shown along with the sub-components that are to be populated in the message
- d) SEQ column – the HL7 segment's field number and, where applicable, component and sub-component numbers as decimals; e.g., the data element SEQ number for the Universal Service ID Number Assigning Authority of Patient Identifier List in a PID Segment is shown as 3.4.2
- e) LEN column – value directly copied from HL7 standard segment table for completeness
- f) DT column – value directly copied from HL7 standard segment table for completeness
- g) OPT column – for fields and components that are displayed solely to show structure of the field; value copied directly from HL7 standard segment table. For fields, components and sub-components that indicate actual data values to be populated in the message, one of the following codes:
  - R -- Required; i.e., must always be populated in message
  - RE -- Required if data are available in sending system
  - O -- Optional; i.e., may be populated solely at discretion of sending system
  - C -- Conditional; i.e., depends on a Boolean statement that is contained in Description / Comments
- h) RPT column – Y only if field repeats; components and sub-components only repeat within the context of a repeating field
- i) TBL column – the relevant HL7 Table from which data element values are populated. If data element is from a source other than an HL7 table, the applicable Code Domain is entered in Descriptions / Comments
- j) Data Element Name column – the HL7 standard name plus any other generally accepted short industry name useful in understanding the data to be populated for the data element
- k) Description/Comments column – any otherwise not already included information about the following attributes is included in the Description/Comments section, e.g.:



- Source – where data element is obtained; particularly if Source is not the sending system
- Rationale – where used for cases or situations that are not part of the norm
- Code Domain – typically, where code domain is not an HL7 table

### **MSH – Message Header Segment**

Use of the MSH segment is described in the Message Control portion of IHE-ITI TF-2 §C.1 along with IHE-ITI TF-2 Table C.1-1. Use of the MSH segment is described in IHE-ITI TF-2 §3.21.4.1.2.1. Further descriptions of MSH segment use are contained in the Message Control portion of IHE-ITI TF-2 §C.1 along with IHE-ITI TF-2 Table C.1-1. A HITSP Constraint on this usage is that data element MSH-5.1 must always be non-null valued.

### **PID – Patient Identification Segment**

The following table portrays the PID segment constrained to capture the patient demographic elements in the AHIC minimum data set. Use of the PID segment is described in IHE-ITI TF-2 §§3.8.4.1.2.3. The table below shows only additional HITSP Biosurveillance constraints on this usage.

**Table 2.2.1-2 HITSP Additional PID Segment Constraints**

HL7 Segment - PID - Patient Identification							
SEQ	LEN	DT	OPT	RPT	TBL	Data Element Name	Description/Comments
1	4	SI	R			Set ID – PID	Only the number 1 may be used
3	250	CX	R	Y		Patient Identifier List	
3.1		ST	R			ID Number	Include all check digits and other qualifiers - used only for pseudonymization purposes
3.4		HD	R			ID Number Assigning Authority	
3.4.2		ST	R			Assigning Authority's Universal ID	Shall only contain ISO Object Identifier (OID)
3.4.3		ID	R			Assigning Authority's Universal ID Type	Will always be 'ISO'
7	26	TS	RE			Date/Time of Birth	Will strip off day of birth and send only YYYYMM
8	1	IS	RE		0001	Administrative Sex	
11	250	XAD	O	Y		Patient Address	
11.1		SAD	O			Street Address	Not sent for Biosurveillance
11.2		ST	O			Other Designation	Not sent for Biosurveillance
11.3		ST	O			City	Though not required by HL7 standard, use of national postal service Standardized values are strongly recommended
11.4		ST	O			State/Province	
11.5		ST	O			ZIP/Postal Code	



HL7 Segment - PID - Patient Identification							
SEQ	LEN	DT	OPT	RPT	TBL	Data Element Name	Description/Comments
11.6		ST	O			Country	Though not required by HL7 standard, use of the International Standards Organization Codes for Representation of Names and Countries, ISO-3166, is strongly recommended; available from the American National Standards Institute 25 West 43rd Street, Fourth Floor New York, NY 10036

### **OBR – Observation Request Segment**

In the reporting of clinical data, the OBR serves as the report header. It identifies the observation set represented by the following atomic observations. It includes the relevant ordering information when that applies. It contains many of the attributes that usually apply to all of the included observations.

The OBR - Observation Request Segment usage for results messages is described in the ANSI/HL7 V2.5-2003 Chapter 7, Observation Reporting. There are no additional HITSP Biosurveillance constraints on this segment.

### **OBX – Observation Result Segment**

The OBX - Observation Result Segment is described in the ANSI/HL7 V2.5-2003 Chapter 7, Observation Reporting. There are no additional HITSP Biosurveillance constraints on this segment.

#### **2.2.1.1 MINIMUM DATA SET**

The following sections provide the AHIC Minimum Data Set Cross Reference.

### **CROSS REFERENCE TABLE KEY**

**Table 2.2.1.1-1 Cross-Reference Table Key**

DATA ELEMENTS CROSS REFERENCE	
Data Element	Definition
Data Element	Data element name/identifier
Description	Biosurveillance data element description
Source	Source of the data element – where the data were created
Destination	Destination of the data element – where it is going to be used
Limit/Range/Vocabulary	Expected data values if data element has finite values Pre-coordinated vocabulary value set name or coding system from which values may be drawn
HL7 Context	Segment and field where the data element appears in the HL7 message and other context as required
HL7 Data Type	HL7 data type for the data element – indicates format and processing requirements



Conditions for Use	Describe all the prevailing conditions that are assumed to be in place to be able to use the data. State the need for a particular actor if one is involved
--------------------	--

## **RADIOLOGY RESULTS**

The AHIC Biosurveillance Data Minimum and Target Data Elements used by this component are cross-referenced below to the HL7 context in which the element would be expressed in the messages being sent.

**Table 2.2.1.1-2 Radiology Result Minimum Data Set**

Data Element	Description	Source	Limit/Range/Vocabulary	Destination/ HL7 Context	Data Type	Conditions for Use
Study ID/ Radiology Number	This is a unique identifier for the radiological study, so that we can link report revisions with the original report. This should be a composite of the accession numbers from the institution and the institution ID	Radiology system assigned		OBR-3 Filler Order Number	EI	Required in each message
Pseudonymized Patient ID/ Randomized Data Linker	A pseudonym Patient ID is created to uniquely distinguish a patient across all visits to a single institution, or across all visits to a healthcare system when a common patient identification system is used. The Biosurveillance Patient ID does not contain personally identifiable information. It is used by the healthcare facility to associate Biosurveillance patient data to the patient's medical record	PID-3 Patient ID/MRN used to create the randomized linker patient ID		PID-3 Patient Identifier List	CX	Required in every message
Date of Birth	Patient's year and month of birth (day is not included for privacy purposes)	Most ADT messages carry the date of birth in PID-7		PID-7 Date of Birth in YYYYMM format	TS	
Sex	Patient sex	Most ADT messages carry Sex in PID-8	HL7 V2.5 Administrative Sex Codes	PID-8 Administrative Sex	IS	
Zip code	Patient's residence zip code			PID-11 Patient Address Component 5 Zip or Postal Code	String component of XAD data type	
State	Patient's residence – state		FIPS Alpha State Codes	PID-11 Patient Address Component 4 State or Province	String component of XAD data type	
Study date and time	Date/time the exam was performed			OBR-7 Observation Date/Time	TS	



Data Element	Description	Source	Limit/Range/Vocabulary	Destination/ HL7 Context	Data Type	Conditions for Use
Report Date/Time	Report/Reading Date			OBR-22 Results/Rpt Status Change Date/Time	TS	
Report Status	A flag indicating if this is a revised report with code referencing the study ID. Status of the report (preliminary, final, corrected) is required in a result message		HL7 v2.5 Result Status Codes	OBR-25 Results/ Report Status	ID	
Test Performed	Radiology test code/ description		CPT+ Textual Description which can include modification	OBR-4 Universal Service ID	CE	
Impressions	Radiologist's diagnosis and impressions		SNOMED CT Or ICD9-CM	OBX-2=TX OBX-3 19005-8^ X-RAY IMPRESSION^LN OBX-5=Impressions text	CE, TX	
Date/Time Revised	Date and time of the report revision			OBR-22 Result/Report Status Change Date/Time	TS	

## GUIDELINES AND EXAMPLES

This message portrays a Radiology Result where the Impressions are not encoded. Note that OBR-31 contains several ICD-9 codes passed as “reason for study”

```
MSH|^~\&|RADLIS|SendingFac^<OID>^ISO|ReceivingApp^<OID>^ISO|ReceivingFac^
<OID>^ISO|200709101912133||ORU^R01^ORU_R01|2007091018321330035|D|2.5
<CR>
PID|1||P410010^^^&<OID>&ISO||" "||196712|M<CR>
OBR|1||XR312739|^^^CXR^Chest X-
Ray^L|||||||||||||||||RAD|F|||||786.51^PRECORDIAL
PAIN^I9C~786.7^ABNORMAL CHEST SOUNDS^I9C~786.05^SHORTNESS OF
BREATH^I9C<CR>
OBX|1|TX|19005-8^XR IMPRESSION^LN|The film shows disseminated left lower
lobe infiltrates consistent with pneumonia. <CR>
```

This message portrays a Radiology Result where the Impressions are encoded.

```
MSH|^~\&|RADLIS|SendingFac^<OID>^ISO|ReceivingApp^<OID>^ISO|ReceivingFac^
<OID>^ISO|200709101912133||ORU^R01^ORU_R01|2007091018321330038|D|2.5
<CR>
PID|1||P410010^^^&<OID>&ISO||" "||196712|M<CR>
OBR|1||XR312739|^^^CXR^Chest X-
Ray^L|||||||||||||||||RAD|F|||||786.51^PRECORDIAL
```



PAIN^I9C~786.7^ABNORMAL CHEST SOUNDS^I9C~786.05^SHORTNESS OF  
 BREATH^I9C<CR>  
 OBX|1|CE|19005-8^XR IMPRESSION^LN|233604007^pneumonia  
 (disorder)^SNM||||F<CR>

## 2.3 LIST OF STANDARDS

It is important to understand that the standards selected here are within the context of the specific Use Case requirements and do not necessarily reflect selection in other contexts. The following standards are used to implement this Interoperability Specification:

**Table 2.3-1 List of Standards**

Standard	Description
American Medical Association (AMA) Current Procedural Terminology (CPT®) Fourth Edition (CPT-4)	A uniform coding system used primarily to identify medical services and procedures furnished by physicians and other healthcare professionals. For more information visit <a href="http://www.ama-assn.org">www.ama-assn.org</a> .
Federal Information Processing Standards (FIPS) Codes for the Identification of the States, the District of Columbia and the Outlying Areas of the United States and Associated Areas Publication # 5-2, May, 1987	A set of two-digit numeric codes and a set of two-letter alphabetic codes for representing the 50 states, the District of Columbia and the outlying areas of the United States and associated areas. The standard covers all land areas under the sovereignty of the United States, the freely associated states of Federated States of Micronesia and Marshall Islands and the trust territory of Palau. For more information visit <a href="http://www.itl.nist.gov">www.itl.nist.gov</a> . NOTE: ASC X12 transactions and ASC X12N Implementation Guides do not allow use of this standard; instead they require use of the U.S. Postal Service's National Zip Code and Post Office Directory -- which provides similar alphabetic code values.
Health Level Seven (HL7) Version 2.5 <sup>1</sup>	The HL7 Version 2.5 Messaging Standard is an application protocol for electronic data exchange in healthcare. It and prior versions have widespread use in the U.S. and internationally. Both message formats and value sets / code tables (e.g., diagnosis type, gender, patient class, result status, specimen collection method, abnormal flags, observation result status codes interpretation, timestamp format) are contained in the standard. Of particular focus for HITSP Interoperability Specifications are message formats described in Chapters 2, 3, 5, and 7 including patient demographic (ADT) and lab result reporting. These are also used within composite standards from IHE for Patient Identity Cross-Referencing and Feed (PIX), Patient Demographics Query (PDQ), and Acknowledgements. For more information visit <a href="http://www.hl7.org">www.hl7.org</a> .
International Classification of Diseases, 9th Revision, Clinical Modifications (ICD-9-CM)	The International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM), Volumes I, II (diagnoses) and III (procedures) describes the classification of morbidity information for statistical purposes and for the indexing of healthcare records by diseases and procedures. For more information visit <a href="http://www.cdc.gov/nchs">www.cdc.gov/nchs</a> .

<sup>1</sup> HITSP references HL7 2.5.1 messaging for lab results reporting, and HL7 2.5 for other messages. Future maintenance work will move toward referencing a single HL7 version across HITSP documents.



Standard	Description
International Classification of Diseases, 10th Revision, Procedure Coding System (ICD-10-PCS)	<p>The International Classification of Diseases, 10th Revision, Procedure Coding System (ICD-10-PCS), describes the classification of inpatient procedures for statistical purposes and for the indexing of healthcare records by procedures. ICD-10-PCS is a procedural coding system managed by the Centers for Medicare and Medicaid Services (CMS). For more information visit <a href="http://www.cms.hhs.gov">www.cms.hhs.gov</a>.</p> <p>Note: While ICD-10 is not deployed in US installations, we recognize the need to move toward new releases of coded values.</p>
International Classification of Diseases, 10th Revision, Related Health Problems (ICD-10-CM)	<p>The International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM), describes the classification of morbidity information for statistical purposes and for the indexing of healthcare records by diseases. The National Center for Health Statistics (NCHS), the Federal agency responsible for use of the International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10) in the United States, developed a clinical modification of the classification for morbidity purposes. For more information visit <a href="http://www.cdc.gov/nchs">www.cdc.gov/nchs</a>.</p> <p>Note: While ICD-10 is not deployed in US installations, we recognize the need to move toward new releases of coded values.</p>
International Health Terminology Standards Development Organization (IHTSDO) Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT®)	<p>SNOMED CT consists of a technical design, core content architecture and Core content. SNOMED CT Core content includes the technical specification of SNOMED CT and fully integrated multi-specialty clinical content. The Core content also includes a concepts table, description table, relationships table, history table, ICD-9-CM mapping and Technical Reference Guide. Additionally, SNOMED CT provides a framework to manage language dialects, clinically relevant subsets, qualifiers and extensions, as well as concepts and terms unique to particular organizations or localities. For more information visit <a href="http://www.ihtsdo.org">www.ihtsdo.org</a>.</p>





## 3.0 TECHNICAL IMPLEMENTATION

### 3.1 CONFORMANCE

This section describes the conformance criteria, which are objective statements of requirements that can be used to determine if a specific behavior, function, interface, or code set has been implemented correctly.

#### 3.1.1 CONFORMANCE CRITERIA

In order to claim conformance to this construct specification, an implementation must satisfy all the requirements and mandatory statements listed in this specification, the associated HITSP Interoperability Specification, its associated construct specifications, as well as conformance criteria from the selected base and composite standards. A conformant system must also be constrained as specified in Table 2.1.1-1, and implement all of the required actors, where defined, within the scope, subset or implementation option that is selected from the associated Interoperability Specification.

Claims of conformance may only be made for the overall HITSP Interoperability Specification with which this construct is associated.

#### 3.1.2 CONFORMANCE SCOPING, SUBSETTING AND OPTIONS

A HITSP Interoperability Specification must be implemented in its entirety for an implementation to claim conformance to the specification. HITSP may define the permissibility for actor scoping, subsetting or implementation options by which the specification may be implemented in a limited manner. Such scoping, subsetting and options may extend to associated constructs, such as this construct. This construct must implement all requirements within the selected scope, subset or options as defined in the associated Interoperability Specification to claim conformance.



## 4.0 APPENDIX

The following sections include relevant materials referenced throughout this document.

No additional information at this time.



## 5.0 CHANGE HISTORY

The following sections provide the history of changes made to this document.

### 5.1 MAY 11, 2007

This document is now Released for Implementation.

### 5.2 MARCH 19, 2008

This document has been updated to include the HITSP Security and Privacy constructs and has been updated to reflect the new template.

The following change has been made to the construct:

- Removed UCUM from Table 2.3-1 due to the new HITSP standards referencing approach.

### 5.2 MARCH 27, 2008

Upon approval by the HITSP Panel on March 27, 2008, this document is now Released for Implementation.

