Integrating the Healthcare Enterprise

IHE Patient Care Device
Technical Framework Supplement

Alarm Communication Management (ACM)

Trial Implementation

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Foreword

This is a supplement to the IHE Patient Care Device Trial Implementation Technical Framework V1.2. Each supplement undergoes a process of public comment and trial implementation before being incorporated into the volumes of the Technical Frameworks.

This supplement is submitted for Trial Implementation as of July 1, 2011 and will be available for testing at subsequent IHE Connectathons. The supplement may be amended based on the results of testing. Following successful testing it will be incorporated into Patient Care Device Final Text Technical Framework. Comments are invited and may be submitted at http://www.ihe.net/pcd/pcdcomments.cfm.

This supplement describes changes to the existing technical framework documents and where indicated amends text by addition (**bold underline**) or removal (~~**bold strikethrough**~~), as well as addition of large new sections introduced by editor's instructions to "add new text" or similar, which for readability are not bolded or underlined.

"Boxed" instructions like the sample below indicate to the Volume Editor how to integrate the relevant section(s) into the relevant Technical Framework volume:

Replace Section X.X by the following:

General information about IHE can be found at: www.ihe.net

Information about IHE Patient Care Device can be found at: http://www.ihe.net/Domains/index.cfm

Information about the structure of IHE Technical Frameworks and Supplements can be found at: http://www.ihe.net/About/process.cfm and http://www.ihe.net/profiles/index.cfm

The current version of the IHE Technical Framework can be found at: http://www.ihe.net/Technical_Framework/index.cfm

CONTENTS

1 Introduction

Profile Abstract

This supplement extends the Device Enterprise Communication profile of the IHE Patient Care Devices domain to further specify the communication of alarm data describing states and events significant to patient care from patient care devices to alarm manager systems (systems which route alarms to end devices for notification of caregivers, or to other systems that record patient care information).

These alarms may be physiological, that is, representing the physiological state of the patient (such as a heart rate above or below a caregiver-specified safe range for the patient), or technical, reflecting conditions in the patient care devices themselves that may require action from caregivers (such as ECG leads off the patient).

The intent of this supplement is to give a uniform way of representing such common alarm conditions in HL7 messages to facilitate interoperability of systems from different vendors.

Open Issues and Questions

None.

Closed Issues

It was decided to treat alarm representation in HL7 as an extension of previous PCD work for observation reporting from patient care devices, with multiple OBX segments representing the aspects of an alarm that did went beyond what could readily be represented in the single OBX segment per parameter model previously used.

ISO/IEEE 11073 was selected as the preferred coding system for parameters and events to be used in the communication of alarms. If no applicable term is available in that nomenclature and a LOINC term is, the LOINC term may be used.

Aside from that which is directly affected by this profile, communication and functionality within alarm manager systems and the communication protocols, messaging, and presentation used between alarm manager systems and alarm dissemination and alarm endpoint client systems is not within the scope of this profile.

Systems covered by this document shall pass through rather than modify alarms created by patient care devices, and shall not create additional alarms based on interpreting alarms or based on correlating alarms from different alarm reporting systems.

There was consensus that snippets from ECG or other physiological waveforms associated with alarms were desirable to provide for in this document, but it was decided to define that in a

separate profile, Waveform Communication Management (WCM). Inclusion of Waveform Communication Management (WCM) components in ACM Report Alarm [PCD-04] messages is the anticipated direction going forward, once sufficient vendors have produced WCM conformant implementations for the ACM AR, AM, and AC actors.

Volume 1 – Integration Profiles

This section describes the changes required in Volume 1 of the Technical Framework that result from including this Integration Profile.

1.7 History of Annual Changes

The Alarm Communication Management integration profile defines the communication of alarms from alarm source systems to alarm manager systems and from alarm manager systems to alarm communicator systems.

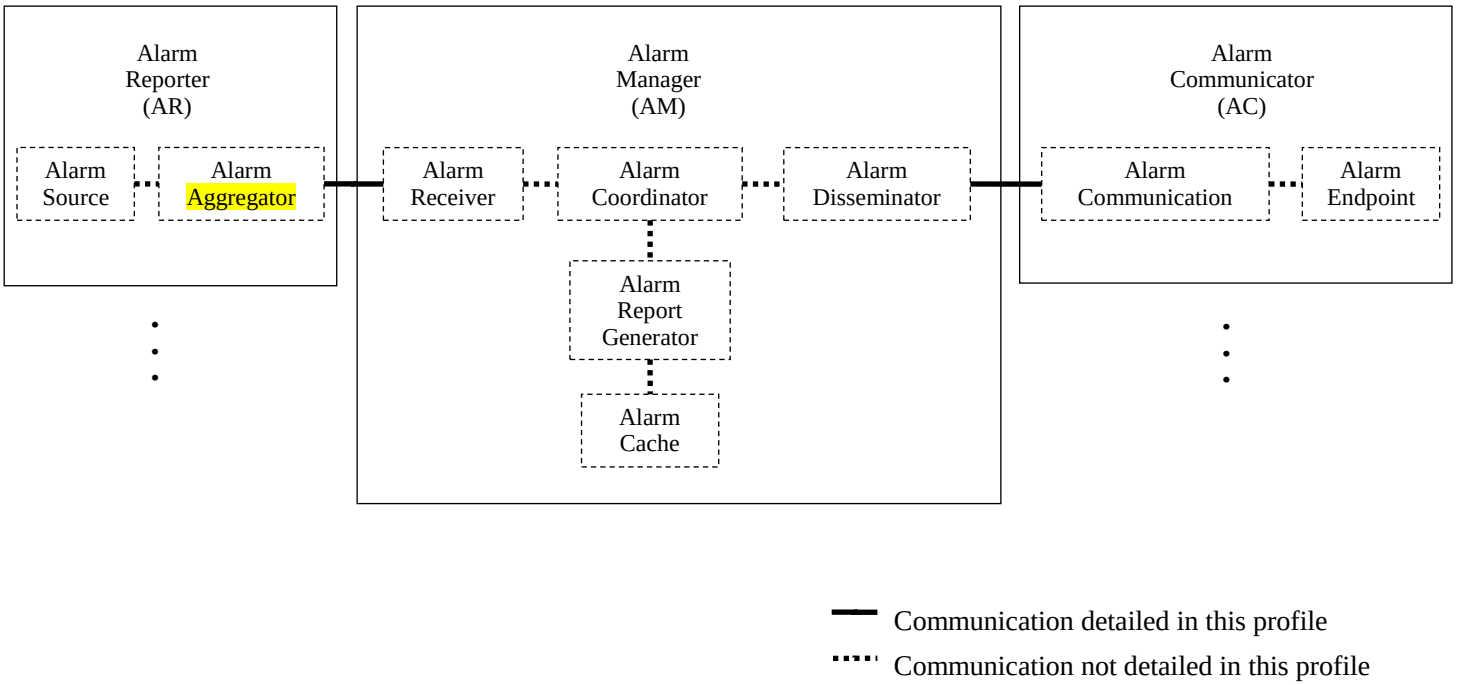
Add the following bullet to the end of the bullet list in section 1.7

- Added the ACM Profile which defines the communication of alarms from alarm source systems to alarm manager systems and from alarm manager systems to alarm communicator systems.
- Integrated PCD domain approved Change Proposals (CP) from 2010-2011 cycle, including housekeeping updates and changes, changes in HL7 events and triggers in preparation for HL7 versions 2.7 and 2.8, addition of WCTP as a protocol choice between the AM and AC actors, integration of WCM content into PCD-04 and PCD-06 transactions, addition of optional PIN/Carrier recipient specification on PCD-04 transaction.
- Integrated PCD domain approved Change Proposals (CP) from the 2011-2012 cycle, including housekeeping updates and changes, removal of SMTP as an optional choice for the AM - AC communication protocol for the PCD-06 Disseminate Alarm and PCD-07 Report Dissemination Alarm Status transactions leaving WCTP as the only permissible AM – AC communication protocol, removal of the Alarm Archiver (AA) actor and its two related transactions PCD-08 Subscribe to Alarm and PCD-11 Report Alarm to Archiver to expedite migration of the ACM profile into the PCD Technical Framework in the next cycle..

Add the following section to Table 2-1 Integration Profiles Dependencies in section 2.1

Related Profiles Patient Identifier Cross Referencing (PIX) Profile Patient Demographics Query (PDQ) Medical Equipment Management (MEM) Waveform Communication Management (WCM) Required Profiles ITI Consistent Time (CT)	<?>	<?>	<->

Add the following section to section 2.2



2.2.X ACM Integration Profile

This supplement provides for alarm dissemination between alarm source devices and systems, from the connector to and within the communication services to the required abstract semantics, in a manner that, if complied with, enables multi-vendor multi-modality interoperation.

The section shall be added to Vol 1

X Alarm Communication Management (ACM) Integration Profile

This supplement defines the communication of alarms from alarm source systems to alarm manager systems and from alarm manager systems to alarm communicator systems.

This supplement provides for alarm dissemination between alarm source devices and systems, from the connector to and within the communication services to the required abstract semantics, in a manner that, if complied with, enables multi-vendor multi-modality interoperation.

The intended use of the IHE PCD Alarm Communications Management Profile is to serve in communication of alarm information from patient care devices to an alarm manager system

communicating with secondary means of notification to caregivers. Typical secondary notification means would be annunciators, pagers, and smart phones.

Out of Scope

This profile is not for use in any part of a primary alarming system or any system deriving new alarms or modifying the identification or priority value of the alarm from the patient care device.

Grouping of alarms is out of scope for this profile.

The Alarm Communicator (AC) actor is not responsible for indicating that the endpoint operator has received but not responded to the notification – as in received sending delivered to device status, automatically displayed which may or may not send back read indication, but no operator interaction. Actions for non-response by the Alarm Communicator (AC) endpoint operator (clinical user) (escalation or sending to alternate devices) is within the scope of the Alarm Manager (AM) actor. Such actions have been identified as out of scope for the ACM profile.

X.1 Actors/ Transactions

Figure X.1-1 shows the actors directly involved in the ACM Integration Profile and the relevant transactions between them. Other actors that may be indirectly involved due to their participation in other related profiles, etc. are not necessarily shown.

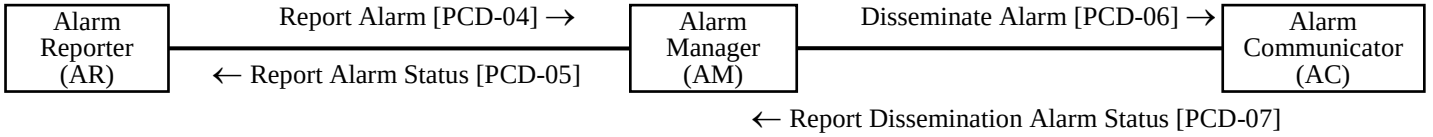


Figure X.1-1. ACM Profile Actor Diagram

Table X.1-1 lists the transactions for each actor directly involved in the ACM Profile. In order to claim support of this Integration Profile, an implementation must perform the required transactions (labeled "R"). Transactions labeled "O" are optional. A complete list of options defined by this Integration Profile and that implementations may choose to support is listed in Volume 1, Section X.2.

Table X.1-1. ACM Integration Profile – Actors and Transactions

Actors	Transactions	Direction	Optionality	Section in Vol. 2
Alarm Reporter (AR)	Report Alarm [PCD-04]	Outbound	R	3.Y

Actors	Transactions	Direction	Optionality	Section in Vol. 2
	Report Alarm Status [PCD-05]	Inbound	O	3.Y+1
Alarm Manager (AM)	Report Alarm [PCD-04]	Inbound	R	3.Y
	Report Alarm Status [PCD-05]	Outbound	O	3.Y+1
	Disseminate Alarm [PCD-06]	Outbound	R	3.Y+2
	Report Dissemination Alarm Status [PCD-07]	Inbound	R	3.Y+4
Alarm Communicator (AC)	Disseminate Alarm [PCD-06]	Inbound	R	3.Y+2
	Report Dissemination Alarm Status [PCD-07]	Outbound	R	3.Y+4

X.2 ACM Integration Profile Options

Options that may be selected for this Integration Profile are listed in the table X.2-1 along with the Actors to which they apply. Dependencies between options when applicable are specified in notes.

Table X.2-1. ACM – Actors and Options

Actor	Options	Vol & Section
Alarm Reporter (AR)	Subscribe to Alarm Status option	3.Y+1
	Include PIN/Carrier Recipients option	3.Y+1
Alarm Manager (AM)	Produce Alarm Status option	3.Y+1
	Include PIN/Carrier Recipients option	3.Y+1

The options request the Alarm Manager (AM) to provide the Alarm Reporter (AR) with dissemination status updates with regard to the alarm associated with the transaction, and whether or not the Alarm Reporter (AR) is prepared to receive the status updates.

X.3 ACM Use Cases and Interaction Diagrams

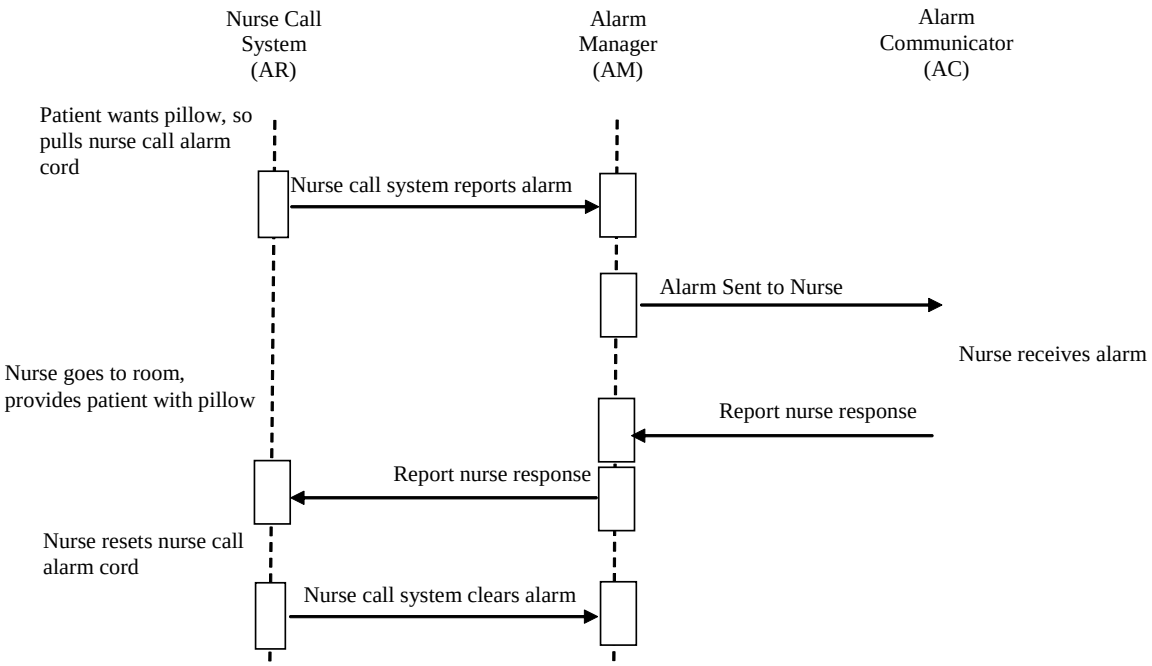
Alarm Communication Management is meant to improve clinical efficiency by using technology to deliver the right alarms, with the right priority, to the right individuals via devices with the right content, and through configuration escalating communication of alarms to devices associated with other individuals.

The following are the use cases. The use cases are noticeably generic and not so much focused on the alarm clinical purpose as they are focused on the system interactions. The use cases may be directly applicable to other IHE domains, and may be supplemented with additional use cases to serve specific needs in other domains.

X.3.1 Case A1: Location Sourced

Use Case – Patient wants a pillow. Patient pulls nurse call. Nurse call system lights the room's dome light and light at central station. Nurse call system, operating as an Alarm Reporter (AR) actor sends Report Alarm [PCD-04] to Alarm Manager (AM) indicating nurse call alarm. The Alarm Manager (AM) logs receipt of the alarm. The Alarm Manager (AM) identifies the appropriate nurse based upon configured nurse to patient assignments, identifies the appropriate Alarm Communicator (AC) actor and destination communication device based upon nurse to device configuration in Alarm Manager (AM), sends Disseminate Alarm [PCD-06] to nurse's communication device. The Alarm Manager (AM) logs the dissemination to the Alarm Communicator (AC). The nurse receives the alarm on their assigned device. The information minimally includes the patient location (room number). The nurse replies to the alarm on the communication device, the Alarm Communicator (AC) sends a Report Dissemination Alarm Status [PCD-07] to the Alarm Manager (AM). The Alarm Manager sends a Report Alarm Status [PCD-05] to the Alarm Reporter (AR). The nurse goes to the room, determines the needs of the patient, and provides the patient with a pillow. The nurse then resets the nurse call pull. The nurse call system turns off the room's dome light and the light at the central station. The nurse call system, operating as an Alarm Reporter (AR) actor sends Report Alarm [PCD-04] to Alarm Manager (AM) indicating reset of the nurse call alarm. The Alarm Manager (AM) receives the alarm turns off any configured alarm escalation and logs the alarm.

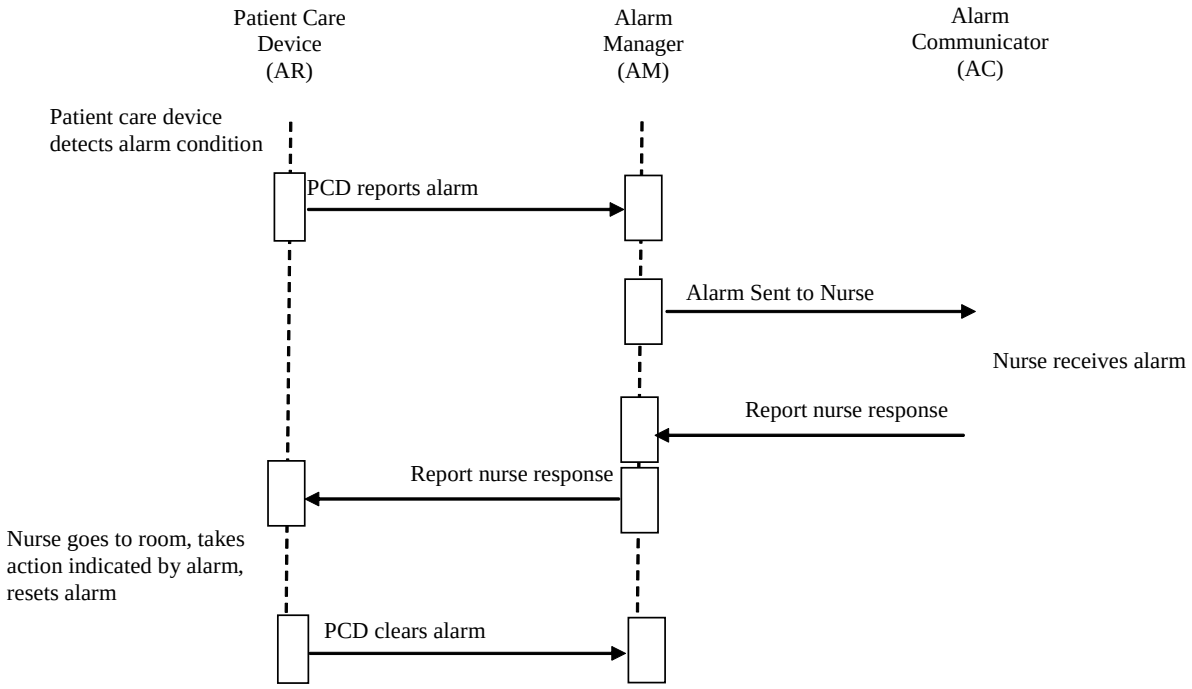
Case A1: Location Sourced



X.3.2 Case A2: Identified Patient Source

Use Case – Alarm occurs on PCD assigned to patient. PCD or PCD gateway system, operating as an Alarm Reporter (AR) actor sends Report Alarm [PCD-04] to Alarm Manager (AM) indicating PCD alarm. The Alarm Manager (AM) logs receipt of the alarm. The Alarm Manager (AM) identifies the appropriate nurse based upon configured nurse to patient assignments, identifies the appropriate Alarm Communicator (AC) actor and destination communication device based upon nurse to device configuration in Alarm Manager (AM), sends Disseminate Alarm [PCD-06] to nurse's communication device. The Alarm Manager (AM) logs the dissemination to the Alarm Communicator (AC). The nurse receives the alarm on their assigned device. The information minimally includes the patient identification. The nurse replies to the alarm on the communication device, the Alarm Communicator (AC) sends a Report Dissemination Alarm Status [PCD-07] to the Alarm Manager (AM). The Alarm Manager sends a Report Alarm Status [PCD-05] to the Alarm Reporter (AR). The nurse goes to the room, determines the needs of the patient, and responds to the PCD alarm. The nurse then clears the PCD alarm. The PCD or PCD gateway system, operating as an Alarm Reporter (AR) actor sends Report Alarm [PCD-04] to Alarm Manager (AM) indicating reset of the PCD alarm. The Alarm Manager (AM) receives the alarm turns off any configured alarm escalation and logs the alarm.

Case A2: Identified Patient Source



X.3.3 Case A3: Same as A1/A2 with Escalation with Cancel at Alarm Source

Use Case 3: (same as use case 1 or 2 with escalation with cancel at source) if the communication destination is inaccessible or the target individual is indicated as unavailable, then the alarm is rerouted to one or more alternatives with escalation to higher levels of responsibility until the alarm is canceled at its source and the alarm system notified of the cancel.

X.3.4 Case A4: Same as A1/A2 with Escalation with Cancel at Communication Endpoint

Use Case 4: (same as use case 1 or 2 with escalation with cancel at communication endpoint) if the communication destination is inaccessible or the target individual is indicated as unavailable then the alarm is rerouted to one or more alternatives with escalation to higher levels of responsibility until the alarm is canceled by a recipient at a communication endpoint.

X.3.5 Case A5: Same as A1/A2 with Escalation with Cancel at AM

Use Case 5: (same as use case 1 or 2 with escalation with cancel at alarm mgmt. system) if the communication destination is inaccessible or the target individual is indicated as unavailable then

the alarm is rerouted to one or more alternatives with escalation to higher levels of responsibility until the alarm is canceled by a user on the Alarm Manager (AM), however not automatically via algorithms in the Alarm Manager (AM).

X.3.6 Case A6: Alarm with no destination other than logging by the Alarm Manager (AM) actor

Use Case 6: The use case for this alarm is to log information with the Alarm Manager (AM) and not to disseminate the alarm to the Alarm Communicator (AC). The information can be marker information meant for logs or alarm technical information not meant for dissemination to users.

X.3.7 Case A7: Equipment Sourced Alarm

Use Case 7: The use case for this alarm is to communicate medical equipment management (MEM) events from devices when those events are not patient focused, such as battery low or failure to charge or periodic preventative maintenance alarms. Such events are device specific, patient independent, and location independent.

X.4 ACM Security Considerations

This profile does not impose specific requirements for authentication, encryption, or auditing, leaving these matters to site-specific policy or agreement.

<Appendix A> Actor Summary Definitions

Alarm Reporter – The Alarm Reporter (AR) actor sources the alarm to Alarm Manager (AM).

Alarm Manager – The Alarm Manager (AM) actor receives the alarm from the Alarm Reporter (AR), potentially analyzes the alarm, and dispatches the alarm to the Alarm Communicator (AC).

Alarm Communicator – The Alarm Communicator (AC) actor receives the alarm from the Alarm Manager (AM) and sends the alarm to the client application in the endpoint device.

Communication between these actors is covered in this profile. Communication between functional units within an actor is not covered in this profile.

Use Case 5: (same as use case 1 or 2 with escalation with cancel at alarm manager system) if the communication destination is inaccessible or the target individual is indicated as unavailable then the alarm is rerouted to one or more alternatives with escalation to higher levels of responsibility until the alarm is canceled by a user on the Alarm Manager (AM), however not automatically via algorithms in the Alarm Manager (AM).

Each actor is identified below. Actor identity can be explicitly provided in the alarm or can be inferred based on the static topological connections of the system.

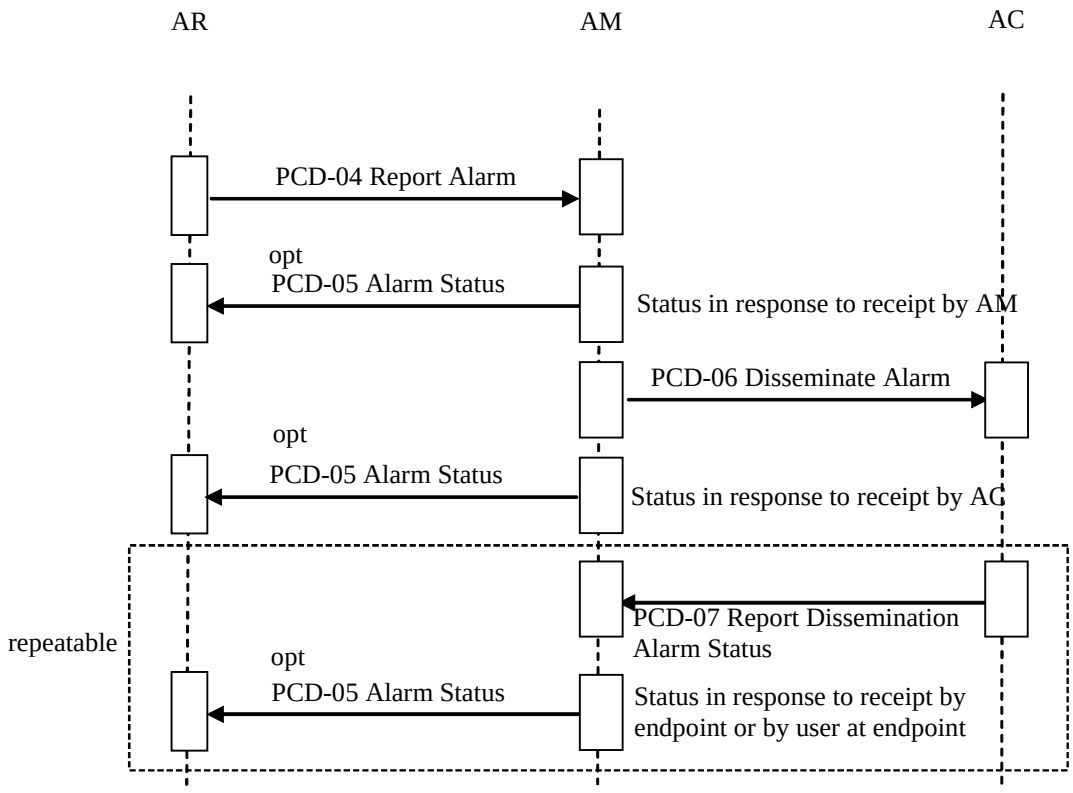
The functional units comprising an actor may be provided by one or more vendors in one or more systems. Reducing the total number of systems is preferred, but is not required.

Data flow of individual use model messaging communication indicates the command response sequences and directions.

Figure X.2-1. Basic Process Flow in ACM Profile

Alarm Reporter (AR) Actor

This actor originates the alarm.



The semantics and data types used to represent alarm type, alarm priority, alarm inactivation state and escalation and de-escalation of priority in the messages of this actor are based on IEC 60601-1-8 definitions.

A single source can produce multiple, possibly concurrent, alarms.

This profile specifies the required data and data types produced by this actor.

This profile specifies communication of the data produced by this actor.

This actor may optionally cancel an outstanding alarm condition.

This may optionally indicate cancellation of any related escalation.

An outstanding alarm condition may be optionally escalated via follow-on alarm.

This actor may aggregate and adapt alarms from multiple sources as needed to make them interoperable with the AM actor. It does not need to be the original source of the alarm data.

In large alarm source populations an aggregation system may be useful for concentration and possible alarm coordination (smart alarming).

Alarm Manager (AM) Actor

This actor receives alarms from the AR, manages them, and dispatches them to the AC actor.

The semantics and data types used to represent alarm type, alarm priority, alarm inactivation state and escalation and de-escalation of priority in the messages of this actor are based on IEC 60601-1-8 definitions.

This profile specifies the required data and data types produced by this actor in communication with the AC and AR actors.

If the following is performed, it is likely performed within the AM.

Alarm formatting for dissemination

Alarm harmonization across multiple similar and dissimilar AR

Any additional alarm priority actioning following any performed by the AR

Alarm mapping to AC actor endpoints,

additional recipients are optionally indicated in the Report Alarm [PCD-04] transaction

Alarm dissemination escalation

Alarm dissemination sequencing to AC actor endpoints

Alarm dissemination escalation to AC actor endpoints

Patient to staff assignments

Staff to AC actor endpoint assignments

Alarm reporting

Alarm caching

To accomplish assignments the AM may receive HL7 ADT message feeds from one or more sourcing systems for the following purposes.

Identify patients

Assign resources to patients (staff, equipment, rooms)

This profile specifies the required data and data types produced by this actor.

The protocol used in the communication of the data to/from the Alarm Manager (AM) actor and the Alarm Communicator (AC) actor is the Wireless Communication Transfer Protocol (WCTP).

Alarm Communicator (AC) Actor

The Alarm Communicator (AC) actor receives alarms from the Alarm Manager (AM) actor. Endpoint devices are connected either directly or indirectly to the Alarm Communicator (AC) actor. The Alarm Communicator (AC) may utilize a locally controlled or public infrastructure.

The protocol for communication between the Alarm Manager (AM) and the Alarm Communicator (AC) is the Wireless Communication Transfer Protocol (WCTP).

This profile does not specify the protocol used in the communication of the data to the final destination as it is potentially not controllable by the Alarm Communicator (AC).

This profile does not specify the presentation of the data at the endpoint as that is beyond its control.

This profile does not specify the human interface at the endpoint as that is beyond its control.

It is recognized that in healthcare communication there are certain data items which should not be transported over unsecured and unencrypted communication connections. A number of controls come into play including HIPAA requirements and ePHI guidelines. It is the responsibility of the deploying parties to insure that capabilities are put into place and monitored to assure that information protection requirements are met.

Wireless Communication Transfer Protocol (WCTP) was originally defined by the Personal Communications Industry Association (PCIA) consortium. The PCIA is not an SDO and is not at this time actively sustaining or enhancing WCTP. WCTP is in popular and stable use by a number of wide area communication service providers. The protocol provides the capabilities required by AM to AC communication, specifically Internet common practice recognized HTTP or HTTPS securable application to application communication, reliable TCP/IP transport, extensible XML data envelope, transactions for application to individual person communication, and communication status responses for closed loop confirmations for delivery to Alarm Communicator (AC), delivery to endpoint device, read by device operator, and operator responses. With permission from the PCIA, this IHE PCD ACM profile includes and adopts version 1.3 update 1 of the WCTP protocol as defined by PCIA at www.wctp.org for use in Alarm Manager (AC) to Alarm Communicator (AC) communication. Corrections and extensions to this capture of the protocol are the responsibility of the Alarm Communication Management (ACM) Working Group (WG) within the Patient Care Devices (PCD) domain of IHE. As the protocol has been in live operation with major communication carriers for some time the risk of changes required for corrective actions is perceived as low. The protocol includes defined areas for client-server agreed two-party extensions. The ACM profile will make use of that capability as needs arise.

Not all of the WCTP protocol possible request/response transactions are required for Alarm Manager (AM) to Alarm Communicator (AC) communication. Later sections of this document identify the specifics.

<Appendix B> Transaction Summary Definitions

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GLOSSARY

ACM – Alarm Communication Management

Physiological alarm – an alarm reflecting the physiological state of the patient (such as a heart rate above or below a caregiver-specified safe range for the patient).

Primary Alarm System – the patient care device itself provides visual and aural indications of alarms that can be seen and heard in the immediate patient vicinity, and that are the authoritative primary indicators of alarms resulting from monitoring the patient. It is understood that caregivers shall be in a position to take immediate action based on these primary alarm indications and shall not rely exclusively on secondary alarm systems for alarm notifications.

Secondary alarm system – a system intended to give "best effort" notification of alarms at additional locations, to additional persons, or for additional purposes such as archiving, but not intended to take the place of a primary alarm system as the authoritative primary indicator of alarms resulting from monitoring the patient.

Technical alarm – an alarm reflecting the state of the patient care device themselves that may require action from caregivers (such as ECG leads off the patient).

Volume 2 - Transactions

Add sections 3.Y

In anticipation of HL7 2.8 item 625, Add Alert Trigger Event, this profile is making forward looking use of the triggers and events from that item, specifically the use of ORU^R40 for [PCD-04], ORA^R41, and ORA^R42 for [PCD-05], and the Participation Information (PRT) segment which is in 2.7. The ORA event is Observational Report – Application Acknowledgement.

3.Y PCD-04 Report Alarm

This section corresponds to Transaction PCD-04 of the IHE Technical Framework. Transaction PCD-04 is used by the Alarm Reporter and the Alarm Manager (AM) actor.

3.Y.1 Scope

This transaction is used by the Alarm Reporter to report alarms to the Alarm Manager (AM). The Alarm Reporter (AR) sends alarms to the Alarm Manager (AM) actor in an unsolicited manner.

3.Y.2 Use Case Roles

Actor: Alarm Reporter

Role: Sends Report Alarm to the Alarm Manager (AM)

Actor: Alarm Manager (AM)

Role: Receives Report Alarm from Alarm Reporter

3.Y.3 Referenced Standards

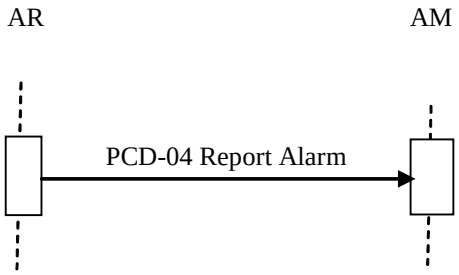
HL7 - Health Level 7 Version 2.6 Ch7 Observation Reporting

ISO/IEEE 11073-10201 Domain Information Model

ISO/IEEE 11073-10101 Nomenclature

3.Y.4 Interaction Diagrams

3.Y.4.1 AR reports to AM



AR sends Report Alarm to AM as HL7 OBX message

3.Y.4.1.1 HL7 Conformance Statement

490 The conformance statement for this intraction described below is adapted from HL7 2.6.

Table 3.Y.4.1.1 PCD-04 Transaction Conformance

Publication ID:	R40
Type:	Unsolicited
Publication Name:	IHEPCD-04ReportAlarm
Trigger:	None
Mode:	Immediate
Response:	ORU^R40^ORU_R40
Characteristics:	Sends defined alarm data
Purpose:	Report Alarm from AR to AM
Based on Segment Pattern:	R01

3.Y.4.1.2 PCD-04 Report Alarm (ORU^R40^ORU_R40) static definition

495 The PCD-04 Report Alarm message is used to communicate ACM data

From an Alarm Reporter (AR) to Alarm Manager (AM)

Common HL7 segments are defined in Appendix B Common Message Segments.

500 **Table 3.Y.4.1.2-1. ORU^R40^ORU_R40 HL7 Attribute table**

ORU^R40^ORU_R40	ORU Message	Usage	Card.	Section Ref
MSH	Message Header Segment	R	[1..1]	2.15.9
PID	Patient Identification Segment	CE	[1..1]	3.4.2
PV1	Patient Visit Segment	CE	[1..1]	3.4.3
[ORC]	Common Order Segment	O	[1..1]	4.5.1
OBR	Observation Request Segment	R	[1..1]	7.4.1
PRT	Participation Information Segment	O	[1..n]	HL7 2.7 7.4.4
OBX	Observation Result Segment	R	[1..n]	7.4.2
[NTE]	Notes and Comments Segment	O	[1..1]	2.5.10

Table 3.Y.4.1.2-2. ORU^R40^ORU_R40 Static Definition

ORU^R40^ORU_R40	Report Alarm Message
MSH	Message Header
[{SFT}]	Software Segment
{	--- ALARM_begin
[	--- PATIENT begin
PID	Patient Identification
[	--- LOCATION begin
PV1	Alarm Location
]	--- LOCATION end
]	--- PATIENT end
{	--- ALARM_IDENTIFICATION begin
[ORC]	Alarm Common
OBR	Alarm Identification
[{PRT}]	Participation (for observation and direct specification of additional recipients)
[{	--- ALARM_OBSERVATION begin
{OBX}	Alarm observation relative to OBR
{ [NTE] }	Notes and Comments
}]	--- ALARM OBSERVATION end
}	--- ALARM_IDENTIFICATION end

ORU^R40^ORU_R40	Report Alarm Message
}	--- ALARM end

If a single message contains multiple alarms for a given patient there must be an OBR preceding each group of OBX segments.

If ECG waveform snippets are to be included in the Report Alarm [PCD-04] transaction, they must be encoded in the HL7 message in accordance with the Waveform Communication Management (WCM) profile.

3.Y.4.1.3 Trigger Events

The AR has arrived at an event which may be an alarm and sends it to the AM.

3.Y.4.1.4 Message Semantics

This message is meant to convey from the AR actor to the AM actor the fact that an alarm is occurring, is still occurring, or has ended along with the data related to the alarm to identify the patient and/or location, the alarming condition, and any observations associate with the alarm.

3.Y.4.1.5 Expected Actions

The AM may or may not send an Alarm Dissemination to the AC and optionally sends Alarm Status to the AR based upon the Subscribe to Alarm Status option in the transaction.

HL7 ACK from the Alarm Manager (AM) actor back to the Alarm Reporter (AR) actor is used to communicate that the Alarm Manager (AM) actor has received the Report Alarm [PCD-04] transaction from the Alarm Reporter (AR) actor. The Report Alarm [PCD-04] is asynchronous to Report Dissemination Alarm Status [PCD-07] transactions by an indeterminate amount of time. HL7 ACK is therefore not used to report dissemination status of the alarm as it would leave the Alarm Reporter (AR) actor awaiting HL7 ACK receipt for an indeterminate amount of time. Status updates as to the dissemination of the alarm are optional and are communicated using the Report Alarm Status [PCD-05] transaction from the Alarm Manager (AM) to the Alarm Reporter (AR).

While the AR to AM message [PCD-04] is one message it is likely to result in many messages from AM to AC and many messages from AC back to AM and from AM back to AR. Communication device operator response delays may result in delays of AC to AM and AM back to AR message delays.

3.Y.4.1.6 Security Considerations

This profile does not impose specific requirements for authentication, encryption, or auditing, leaving these matters to site-specific policy or agreement.

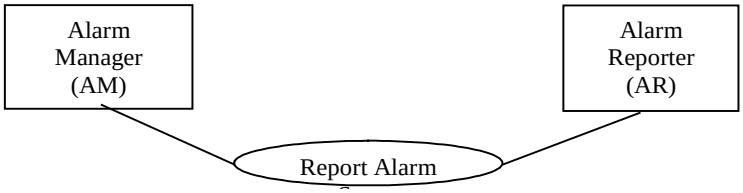
3.Y+1 PCD-05 Report Alarm Status

This section corresponds to Transaction PCD-05 of the IHE Technical Framework. Transaction PCD-05 is used by the Alarm Manager (AM) actor to report alarm status updates to the Alarm Reporter (AR) actor.

3.Y+1.1 Scope

This transaction is used by the Alarm Manager (AM) to report one or more dissemination status updates to the Alarm Reporter.

3.Y+1.2 Use Case Roles



Actor: Alarm Manager (AM)

Role: Sends Report Alarm Status to Alarm Reporter (AR)

Actor: Alarm Reporter (AR)

Role: Receives Report Alarm Status from the Alarm Manager (AM)

3.Y+1.3 Referenced Standard

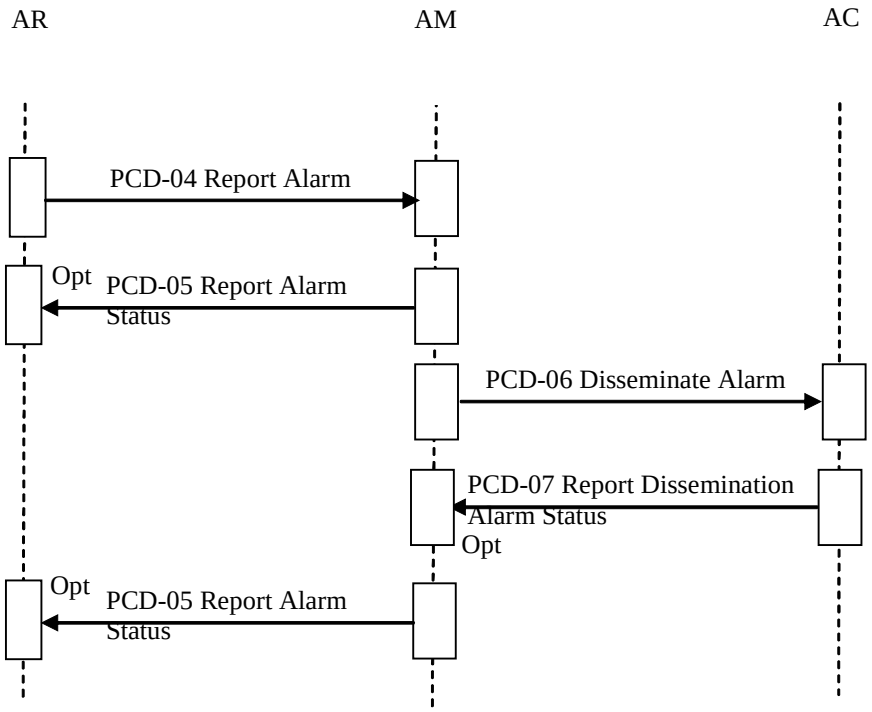
HL7 - Health Level 7 Version 2.6 Ch7 Observation Reporting

ISO/IEEE 11073-10201 Domain Information Model

ISO/IEEE 11073-10101 Nomenclature

3.Y+1.4 Interaction Diagrams

3.Y+1.4.1 AM status updates to AR



555 The AM sends Report Alarm Status to the AR actor as an HL7 message.

3.Y+1.4.1.1 Trigger Events

The AM has determined either through configuration and contextual data driven decision rules or through receipt of Dissemination Status from the Alarm Communicator that an alarm status update needs to be sent to the AR.

560 AM internal trigger events include the following:

- Accept (not specified, correct)
- Reject (not specified, nuisance but correct, false positive)
- Deliverable, had a mapped destination
- Queued to communications

565 ##### 3.Y+1.4.1.2 Message Semantics

This meaage is meant to convey from the AM actor to the AC actor the alarm text message for display on the communication device.

3.Y+1.4.1.3 HL7 Conformance Statement

The conformance statement for the interaction described below is adapted from HL7 2.6.

While HL7 2.8 item 625 provides for the Alarm Manager (AM) to send either ORA^R41 or ORA^R42 as Report Alarm Status [PCD-05] to the Alarm Reporter (AR), the use of ORA^R41 is not expected to be utilized by vendors as it presumes a guarantee of delivery that the Alarm Manager (AM) and the Alarm Communicator (AC) cannot assure. Therefore ORA^R42 is used for [PCD-05] in this profile.

R41 indicates that AM has received the alert and can provide some level of assurance that it will be delivered. This approach presumes assurance of delivery (considering the predominant use by healthcare of cost conscious one-way fire-and-forget pagers). If the delivery assurance is not achievable then R42 should be utilized in an implementation.

The PCD-04 message will presume a default filter for PCD-05 notifications so that only "delivered to one or more recipients" or "not successfully delivered to any recipients" will be the only notifications that the AR actor has to handle. This avoids the AM back to AR fire hose for all device specific notifications for all devices to which a notification is delivered. This also avoids the requirement for a filter segment in the PCD-04 message. In an R42 the Participation Information (PRT) segment PRT-4 field AAP (Alert Acknowledging Provider) is used to indicate the identity of the clinical user to which the alert has been delivered and acknowledged.

Table 3.Y+1.4.1.3 Transaction Conformance

Publication ID:	R42
Type:	Unsolicited
Publication Name:	IHEPCD-05ReportAlarmStatus
Trigger:	None
Mode:	Immediate
Response:	ORA^R42^ORA_R42
Characteristics:	Sends alarm status data
Purpose:	Provide alarm status from AM to AR
Based on Segment Pattern:	R01

3.Y+1.4.1.4 PCD-05 Report Alarm Status (ORA^R42^ORA_R42) static definition

The PCD-05 Report Alarm Status message is used to communicate ACM messaging status from an Alarm Manager (AM) to Alarm Reporter (AR)

Common HL7 segments are defined in Appendix B Common Message Segments.

Device Technical Framework and Appendix C Common Data Types.

Table 3.Y+1.4.1.4.-1. ORA^R42^ORA_R42 static definition

ORA^R42^ORA_R42	ORU Message	Usage	Card.	Section Ref
MSH	Message Header Segment	R	[1..1]	2.15.9
PID	Patient Identification Segment	CE	[1..1]	3.4.2
PV1	Patient Visit Segment	CD	[1..1]	3.4.3
[ORC]	Common Order Segment	O	[1..1]	4.5.1
OBR	Observation Request Segment	R	[1..1]	7.4.1
[PRT]	Participation Information Segment	O	[1..n]	HL7 2.7 7.4.4
OBX	Observation Result Segment	R	[1..n]	7.4.1
[NTE]	Notes and Comments Segment	O	[1..1]	2.5.10

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3.Y+1.4.1.5 Expected Actions

AR takes appropriate action based upon alarm status update.

3.Y+1.4.1.6 Security Considerations

This profile does not impose specific requirements for authentication, encryption, or auditing,
600 leaving these matters to site-specific policy or agreement.

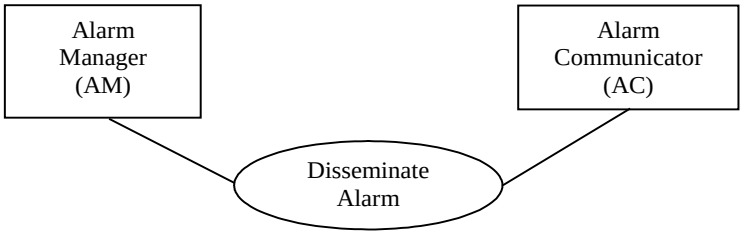
3.Y+2 PCD-06 Disseminate Alarm

This section corresponds to Transaction PCD-06 of the IHE Technical Framework. Transaction PCD-06 is used by the Alarm Manager (AM) actor to disseminate alarms to the Alarm Communicator (AC) actor.

605 ### 3.Y+2.1 Scope

This transaction is used by Alarm Manager (AM) to disseminate the alarm to the Alarm Communicator (AC).

3.Y+2.2 Use Case Roles



Actor: Alarm Manager (AM)

Role: Sends Disseminate Alarm to Alarm Communicator (AC)

Actor: Alarm Communicator (AC)

Role: Receives Disseminate Alarm from the Alarm Manager (AM)

3.Y+2.3 Referenced Standard

The communication protocol is WCTP. The communicated data items are in scope for this profile.

While alarm related data items available to the AM is specified in this profile the ability of individual communication devices to communicate, display, or respond to those data items are dependent upon the product capabilities and site specific configuration of the AC actor, the communication device, and the available communication infrastructure.

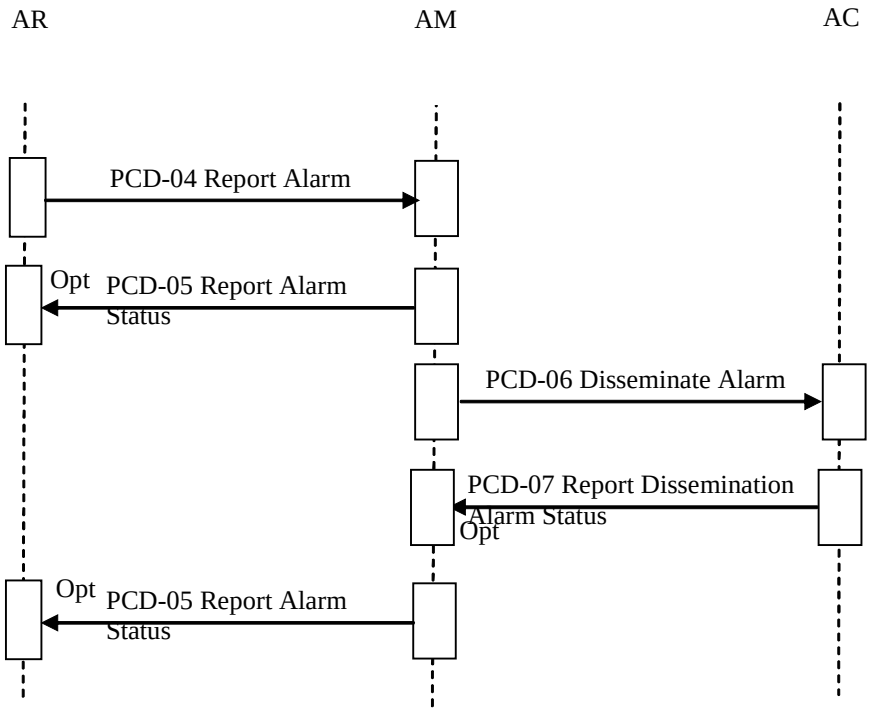
WCTP version 1.3 update 1 is as captured by this profile.

ISO/IEEE 11073-10201 Domain Information Model

ISO/IEEE 11073-10101 Nomenclature

3.Y+2.4 Interaction Diagrams

3.Y+2.4.1 AM disseminate alarm to AC



AM sends Disseminate Alarm to AC. The protocol is WCTP.

3.Y+2.4.1.1 HL7 Conformance Statement

The communication protocol is WCTP. There is no specified HL7 conformance.

3.Y+2.4.1.2 PCD-06 Disseminate Alarm static definition

The PCD-06 Disseminate Alarm message is used to communicate ACM data from an Alarm Manager (AM) to the Alarm Communicator (AC).

If ECG waveform snippets in Waveform Communication Management (WCM) format are included in the Report Alarm [PCD-04] transaction and the AM to AC protocol is WCTP then then the entire Report Alarm [PCD-04] message shall be included in a single extension XML element within the WCTP message body. This approach provides the maximum relevant data for the AC to process and display the evidentiary data.

3.Y+2.4.1.3 Trigger Events

The AM has determined that an alarm needs to be disseminated and so sends it to the AC.

3.Y+2.4.1.4 Message Semantics

This message communicates alarms to communication endpoint devices.

The table below lists the data items and their optionality. All of these data items are within the WCTP message text.

Table 3.Y+2.4.1.4-1. PCD-06 static definition

PCD-06	Fields	Usage	Card.
Alarm_Location	Alarm associated location	CE	[1..1]
Alarm_Patient	Patient Identification	CE	[1..1]
Alarm_Text	Textual alarm identification	R	[1..1]
Alarm_Identifier	Alarm unique identifier	O	[1..1]
Alarm_Callback	Call back connection information	O	[1..1]
Alarm_Reference	URL or application link potentially containing alarm or patient contextual information	O	[1..1]
Alarm_Comment	Notes and Comments associated with alarm	O	[1..1]
Alarm_Evidentiary_Data	Evidentiary data associated with alarm, e.g. waveform data graphic	O	[1..1]

3.Y+2.4.1.5 Expected Actions

AC sends alarm to endpoint.

3.Y+2.4.1.6 Security Considerations

This profile while utilizing communication capabilities supportive of authentication, encryption, or auditing, does not impose specific requirements leaving these matters to site-specific policy or agreement.

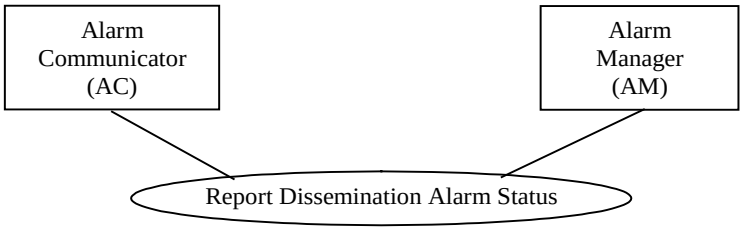
3.Y+3 PCD-07 Report Dissemination Alarm Status

This section corresponds to Transaction PCD-07 of the IHE Technical Framework. Transaction PCD-07 is used by the Alarm Communicator actor.

3.Y+3.1 Scope

This transaction is used by Alarm Communicator to report one or more dissemination status updates to the Alarm Manager (AM).

3.Y+3.2 Use Case Roles



Actor: Alarm Communicator (AC)

Role: Sends Dissemination Status to the Alarm Manager (AM)

Actor: Alarm Manager (AM)

Role: Receives Dissemination Status from the Alarm Communicator (AC)

3.Y+3.3 Referenced Standard

The communication protocol is WCTP, the same as for the Disseminate Alarm [PCD-06] transaction. The communicated data items are in scope for this profile.

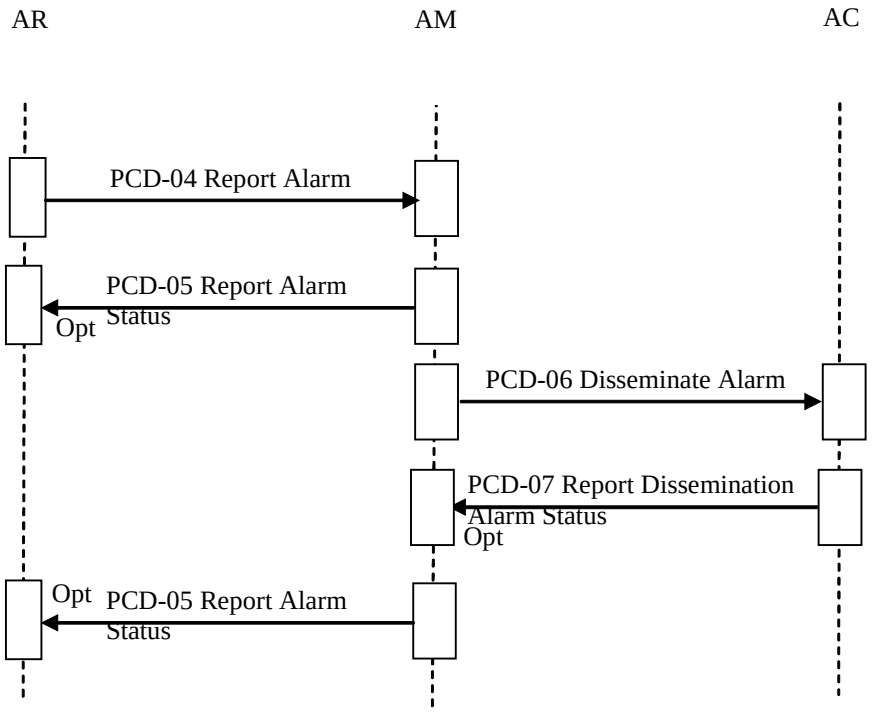
WCTP version 1.3 update 1 is as captured by this profile.

ISO/IEEE 11073-10201 Domain Information Model

ISO/IEEE 11073-10101 Nomenclature

3.Y+3.4 Interaction Diagrams

3.Y+3.4.1 AC status updates to AM



The AC sends Dissemination Status to the AM actor. The protocol utilized is WCTP.

3.Y+3.4.1.1 Trigger Events

The AC has determined a dissemination status update needs to be sent to the AM.

The following table lists the results of the dissemination from the AC back to the AM for optional relay back to the AR or AA. The required Communication Status Enumerations are indicated.

Table 3.Y+3.4.1.1-1. Status Enumerations

Usage	Communication Status Enumeration
R	Received by communications (accepted by WCTP gateway)
R	Undeliverable to endpoint
R	Delivered to endpoint
R	Read at endpoint
R	Accepted by endpoint
O	Accepted by endpoint as true positive
O	Accepted by endpoint as true positive however not clinically relevant
O	Accepted by endpoint as false positive

Usage	Communication Status Enumeration
R	Rejected by endpoint
O	Cancelled by endpoint
O	Cancelled by other than endpoint
O	Callback start at endpoint
O	Callback end at endpoint

A single alarm may go through multiple communications status updates as the alarm is communicated to the endpoint user or application. Which of the status updates are possible is AC actor and endpoint implementation dependent. Some endpoint devices are output only, such as marquee signs, some are one-way only such as pagers. Some pagers and services offer transmission confirmation. More advanced communications endpoints offer two-way capabilities allowing the operator of the endpoint to accept or cancel the alarm.

Detailed reason for status can optionally be included to encompass the concept of presence to allow for messages not making it to the endpoint or being rejected by the endpoint due to a presence state such as offline, busy, or do not disturb.

3.Y+3.4.1.2 Message Semantics

This message is used to communicate status updates on the communication of an alarm to endpoints.

3.Y+3.4.1.3 HL7 Conformance Statement

The communication protocol is vendor dependent. There is no specified HL7 conformance.

3.Y+3.4.1.4 PCD-07 Report Dissemination Alarm Status static definition

The PCD-07 Dissemination Status message is used to communicate ACM messaging status from an Alarm Communicator (AC) to Alarm Manager (AM)

The Alarm Communicator (AC) actor is not responsible for indicating that the endpoint operator has received but not responded to the notification – as in received sending delivered to device status, automatically displayed which may or may not send back read indication, but no operator interaction. Actions for non-response by the Alarm Communicator (AC) endpoint operator (clinical user) (escalation or sending to alternate devices) is within the scope of the Alarm Manager (AM) actor. Such actions have been identified within the ACM Trial Implementation as out of scope for the ACM profile.

The communication between the Alarm Manager (AM) and the Alarm Communicator (AC) is WCTP.

The endpoint device message communication protocol and presentation are outside the scope of the profile.

The table below lists the data items and their optionality.

Table 3.Y+3.4.1.4-1. PCD-07 static definition

PCD-07	ORU Message	Usage	Card.
Alarm_Identifier	Alarm unique identifier (see PCD-06)	R	[1..1]
Alarm_Status	Communication Status Enumeration item	R	[1..1]

3.Y+3.4.1.5 Expected Actions

The AM may or may not send the optional Report Alarm Status [PCD-05] to the Alarm Reporter (AR) as a result of Alarm Manager (AM) receipt of this message.

3.Y+3.4.1.6 Security Considerations

This profile while utilizing communication capabilities supportive of authentication, encryption, or auditing, does not impose specific requirements leaving these matters to site-specific policy or agreement.

3.Z Common Message Segments

The following descriptions rely on IHE PCD Technical Framework Appendix B Common Message Segments and A.1 Mapping ISO/IEEE 11073 Domain Information Model to HL7. All provisions of those referenced sections should be assumed to apply also to Alarm Communications Management. The additional information in this document supplements and comments on those referenced sections with specific reference to the communication of alarms.

3.Z.1 MSH Message Header Segment

3.Z.1.1 MSH-21 Message Profile Identifier (EI) 01598

This field contains a message profile identification consistent with IHE PCD TF direction so as to uniquely identify IHE PCD ACM PCD-xx messages from IHE PCD DEC PCD-xx messages, and from messages associated with other IHE PCD profiles.

Table 3.Z.1-1. Message Profile Identifiers

Transactions	Entity Identifier
Report Alarm [PCD-04]	IHE_PCD_ACM_001
Report Alarm Status [PCD-05]	IHE_PCD_ACM_002

Transactions	Entity Identifier
Disseminate Alarm [PCD-06]	IHE_PCD_ACM_003
Report Alarm Dissemination Status [PCD-07]	IHE_PCD_ACM_004

The PCD-06 and PCD-07 messages are not HL7 protocol messages and so do not require an MSH-21 value, however their numbers are reserved.

The sections below identify the data items used to identify the patient and/or the patient's location to the AM actor and which may be included in displays on the endpoint device to allow the notification recipient to determine the patient to which the alarm applies.

3.Z.2 PID Patient Identification Segment

This segment is required to be present and is populated with data used to identify the patient associated with the alarm in the case where the identity is available to the Alarm Source system. If the patient identification is not present, the alarm may be location source based per ACM use case A1 in which case the PV1 segment identifies the location associated with the alarm. Additional information may be present to more unambiguously identify the patient.

Table 3.Z.2-1. HL7 Attribute Table – PID – Patient Identification

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME
3	250	CX	O	Y		00106	Patient Identifier List
5	250	XPN	O	Y		00108	Patient name
7	26	TSO	O			00110	Date/Time of Birth
8	1	IS	O			00111	Administrative Sex

3.Z.2.1 PID-3 Patient Identifier List (CX) 00106

This information may be used by the AM actor in the message sent to the AC actor to identify the patient associated with the alarm within site specific HIPAA and electronic patient healthcare information policies.

3.Z.2.2 PID-5 Patient Name (XPN) 00108

This information may be used by the AM actor in the message sent to the AC actor to identify the patient associated with the alarm within site specific HIPAA and electronic patient healthcare information policies.

3.Z.2.3 PID-7 Date/Time of Birth (TSO) 00110

This information may be used by the AM actor in the message sent to the AC actor to identify the patient associated with the alarm within site specific HIPAA and electronic patient healthcare information policies.

3.Z.2.4 PID-8 Administrative Sex (IS) 00111

This information may be used by the AM actor in the message sent to the AC actor to identify the patient associated with the alarm within site specific HIPAA and electronic patient healthcare information policies.

3.Z.3 PV1 Patient Visit Segment

This segment is used to identify a patient location associated with the alarm. Real Time Location Services (RTLS) equipment or personnel location information is not passed in this segment. It is passed from the AR to the AM via the OBX segment.

If the Patient Identification (PID) segment is present in the alarm data and it contains an identified patient as in ACM use case A2 resolve patient location from a more contemporary information source than this segment.

Table 3.Z.3-1. HL7 Attribute Table – PV1 – Patient Visit

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME
3	80	PL	O			00133	Assigned Patient Location

3.Z.3.1 PV1-3 Assigned Patient Location (PL) 00133

This field contains the location associated with the alarm. This may not be the current location of the alarm related patient. It is typically a fixed location as in that associated with a patient station of a nurse call system.

3.Z.4 ORC Observation Control Segment

This segment is optionally used to convey order request information for alarms involving notification of order request. In addition, this segment may allow the association of the completed observation results reported in OBX segments with a particular previous order request.

Table 3.Z.4-1 HL7 Attribute Table – ORC – Observation Control

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME
2	22	EI	O			00216	Placer Order Number
12	250	XCN	O	Y		00226	Ordering Provider
14	250	XTN	O	Y/2		00228	Call Back Phone Number

ORC-2 Placer Order Number (EI) 00216

This field is the placer application's order number.

ORC-12 Ordering Provider (XCN) 00226

This field contains the identity of the person who is responsible for creating the request (i.e., ordering physician). ORC-12-ordering provider is the same as OBR-16-ordering provider. If the

ordering provider is not present in the ORC, it must be present in the associated OBR. This is particularly important when results are transmitted in an ORU message. In this case, the ORC is not required and the identifying filler order number must be present in the OBR segments.

ORC-14 Call Back Phone Number (XTN) 00228

This field contains the telephone number to call for clarification of a request or other information regarding the order. ORC-14-call back phone number is the same as OBR-17-order callback phone number.

3.Z.5 OBR Observation Request Segment

Table 3.Z.5-1 HL7 Attribute Table – OBX – Observation Result

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME
2	22	EI	O			00216	Placer Order Number
3	22	EI	R			00217	Filler Order Number
4	250	CE	R			00238	Universal Service Identifier
17	250	XTN	O	Y/2		00250	Order Callback Phone Number
28	3220	XCN	O	Y		00260	Result Copies To

OBR-2 Placer Order Number (EI) 00216

This field identifies an individual order (e.g., OBR) and is the same as ORC-2.

OBR-3 Filler Order Number (EI) 00217

This field serves as the unique identifier for the alarm. It is assigned by the Alarm Source and is used by system actors to associate all messages from all actors that pertain to a particular alarm throughout the history of the alarm. So the same value of OBR-3 will be sent by the Alarm Source in the messages concerning the start, end, continuation of the alarm, and will also be used in status messages from other actors concerning that alarm. It may consist of a unique identifier of the device such as an EUI-64 and a serial number or time stamp for the alarm, but other forms that are unique among alarms sourced by a particular Alarm Reporter are acceptable. An order number sourced by the filling application may be used in the case of an order and in this case must also serve to uniquely identify the related alarm events.

OBR-4 Universal Service Identifier (CE) 00238

This field contains the identifier code for the source of the alarm or the requested observation/test/battery. See the IHE Patient Care Device Technical Framework description of the DEC profile transactions for further information (Volume 2, Section B.7 OBR Observation Request Segment, OBR-4 Universal Service ID).

OBR-17 Order Callback Phone Number (XTN) 00250

This field is the telephone number for reporting a status or a result using the standard format with extension and/or beeper number when applicable. This can be used to pass the nurse call system patient station telephony call back information to the caregiver.

OBR-28 Result Copies To (XCN) 00260

This field should not be used in Report Alarm [PCD-04] transactions to indicate PIN/Carrier or other recipients for alarm dissemination. Instead use the Participant Information (PRT) segment.

3.Z.6 PRT Participation Information Segment

The optional HL7 2.7 Participation Information Segment (PRT) is used to identify requested additional or the actual recipients of alarm disseminations and the status of those disseminations for the Report Alarm [PCD-04] and Report Alarm Status [PCD-05] transactions.

One instance of the PRT segment occurs for each specified dissemination destination or dissemination status update.

Delivery of PRT segment in MSA (ACK) of ORA R41 is not practical unless there is a PCD-04 for each delivery destination, as there would be in PIN/Carrier usage, there may be group destinations and the MSA doesn't offer the expansion capability to deliver lots of PRT segments. Additionally the transmission of PCD-05 messages may be some period of time after the PCD-04 was received, depending upon the technical implementation of the AC actor end devices (slow devices, fast devices, devices connected by asynchronous serial interfaces, device queuing due to group transmissions, etc.).

The Participation Information segment contains the data necessary to add, update, correct, and delete from the record persons, organizations, or locations (participants) participating in the activity being transmitted.

In general, the PRT segment is used to describe a participant playing a particular role within the context of the message. In this profile the role being played is that of an alarm dissemination requested or actual recipient.

The positional location of the PRT segment indicates the relationship. When the segment is used following the OBR segment, then the participations relate to the relevant participations in the observation.

HL7 Attribute Table - PRT – Participation Information

SEQ	LEN	DT	OPT	RP/#	TBL #	ITEM #	ELEMENT NAME
1	1..4	EI	C	N		02379	Participation Instance ID
2	2..2	ID	R		0287	00816	Action Code
3		CWE	O			02380	Action Reason
4		CWE	R		0912	02381	Participation
5		XCN	C	Y		02382	Participation Person
6		CWE	C			02383	Participation Person Provider Type
7		CWE	C		0406	02384	Participant Organization Unit Type
8		XON	C	Y		02385	Participation Organization
9		PL	C	Y		02386	Participant Location
10		EI	C	Y		02348	Participation Device

SEQ	LEN	DT	OPT	RP/#	TBL #	ITEM #	ELEMENT NAME
11		DTM	O			02387	Participation Begin Date/Time (arrival time)
12		DTM	O			02388	Participation End Date/Time (departure time)
13		CWE	O			02389	Participation Qualitative Duration
14		XAD	C	Y		02390	Participation Address
15		XTN	O	Y		02391	Participant Telecommunication Address

3.Z.6.1 PRT-1 Participation Instance ID (EI) 02379

```
Components:<Entity Identifier (ST)> ^ <Namespace ID (IS)> ^ <Universal ID (ST)> ^
           <Universal ID Type (ID)>
```

Definition: This field contains a unique identifier of the specific participation record.

In the case of waypoints tracked for a shipment, it identifies the waypoint.

Condition: The identifier is required when known, but there are times we may only know a name but do not have an identifier.

For the Report Alarm Status [PCD-05] transaction this is the unique ID of the disseminated message and all status updates on the dissemination should use the same ID value.

3.Z.6.2 PRT-2 Action code (ID) 00816

Definition: This field reveals the intent of the message. Refer to *HL7 Table 0287 – Problem/goal action code* for valid values.

For the Report Alarm [PCD-04] transaction the PRT-2 Action code is always AD indicating Add.

For the Report Alarm Status [PCD-05] transaction the PRT-2 Action Code is AD indicating Add for the first status update and UP indicating Update for all others.

3.Z.6.3 PRT-3 Action Reason (CWE) 02380

```
Components:<Identifier (ST)> ^ <Text (ST)> ^ <Name of Coding System (ID)> ^ <Alternate
           Identifier (ST)> ^ <Alternate Text (ST)> ^ <Name of Alternate Coding
           System (ID)> ^ <Coding System Version ID (ST)> ^ <Alternate Coding System
           Version ID (ST)> ^ <Original Text (ST)> ^ <Second Alternate Identifier
           (ST)> ^ <Second Alternate Text (ST)> ^ <Name of Second Alternate Coding
           System (ID)> ^ <Second Alternate Coding System Version ID (ST)> ^ <Coding
           System OID (ST)> ^ <Value Set OID (ST)> ^ <Value Set Version ID (DTM)> ^
           <Alternate Coding System OID (ST)> ^ <Alternate Value Set OID (ST)> ^
           <Alternate Value Set Version ID (DTM)> ^ <Second Alternate Coding System
           OID (ST)> ^ <Second Alternate Value Set OID (ST)> ^ <Second Alternate
           Value Set Version ID (DTM)>
```

Definition: This field indicates the reason why the person, organization, location, or device is assuming (or changing) the role (e.g., shift change, new primary nurse, etc.).

For the Report Alarm [PCD-04] transaction the PRT-3 Action Reason, Text, is not populated.

For the Report Alarm Status [PCD-05] transaction the PRT-3 Action Reason, Text, is the Report Dissemination Alarm Status [PCD-07] status text value, and the Coding System is IHE_PCD_ACM.

Alarm Communicator (AC) status values correlated from the Report Dissemination Alarm Status [PCD-07] status values to be returned to the Alarm Manager (AM) resulting from Disseminate Alarm [PCD-06] from Alarm Manager (AM) to Alarm Communicator (AC) and transcribed into PRT-3-2 Text.

Table 3.Z.6.3-1. Communication Status Enumeration from Report Dissemination Alarm Status [PCD-07]

Req	Value for PRT-3-2	Description
R	Received	Received by Alarm Communicator (AC)
R	Undeliverable	Undeliverable to endpoint
R	Delivered	Delivered to endpoint
R	Read	Read at endpoint
R	Accepted	Accepted by endpoint
O	AcceptedPositive	Accepted by endpoint as true positive
O	AcceptedNotRelevant	Accepted by endpoint as true positive however not clinically relevant
O	AcceptedFalse	Accepted by endpoint as false positive
R	Rejected	Rejected by endpoint
O	Cancelled	Cancelled by endpoint (does not cancel at alarm source)
O	CancelledOther	Cancelled by other than endpoint (does not cancel alarm at source)
O	CallbackStart	Callback start at endpoint (start of telephony call to alarm indicated destination)
O	CallbackEnd	Callback end at endpoint (end of telephony call to alarm indicated destination)

3.Z.6.4 PRT-4 Participation (CWE) 02381

```
Components:<Identifier (ST)> ^ <Text (ST)> ^ <Name of Coding System (ID)> ^ <Alternate
           Identifier (ST)> ^ <Alternate Text (ST)> ^ <Name of Alternate Coding
           System (ID)> ^ <Coding System Version ID (ST)> ^ <Alternate Coding System
           Version ID (ST)> ^ <Original Text (ST)> ^ <Second Alternate Identifier
           (ST)> ^ <Second Alternate Text (ST)> ^ <Name of Second Alternate Coding
           System (ID)> ^ <Second Alternate Coding System Version ID (ST)> ^ <Coding
           System OID (ST)> ^ <Value Set OID (ST)> ^ <Value Set Version ID (DTM)> ^
           <Alternate Coding System OID (ST)> ^ <Alternate Value Set OID (ST)> ^
           <Alternate Value Set Version ID (DTM)> ^ <Second Alternate Coding System
           OID (ST)> ^ <Second Alternate Value Set OID (ST)> ^ <Second Alternate
           Value Set Version ID (DTM)>
```

Definition: This field indicates the functional involvement with the activity being transmitted (e.g., Case Manager, Evaluator, Transcriber, Nurse Care Practitioner, Midwife, Physician Assistant, etc.). Refer to *HL7 Table 0912 – Participation* for valid values.

For the Report Alarm [PCD-04] transaction the presence of one or more PRT segments containing PRT-4 Participation Identifier, Text is RCT (indicating Result Copies To) indicates AR direct indication of additional recipients.

For the Report Alarm [PCD-04] transaction the PRT-4 Participation Identifier, Text is RO (indicating Responsible Observer).

For the Report Alarm Status [PCD-05] transaction the PRT-4 Participation Identifier, Text is RO (indicating Responsible Observer), and Alternative Identifier is AAP for Alert Acknowledging Provider.

Table 3.Z.6.4-1. HL7 Table 0912 - Participation

Value	Description	Used with
AD	Admitting Provider	PV1-17 Admitting doctor
AI	Assistant/Alternate Interpreter	
AAP	Alert Acknowledging Provider	PCD ACM Report Alarm Status [PCD-05]
AP	Administering Provider	RXA-10 Administering Provider
ARI	Assistant Result Interpreter	
AT	Attending Provider	PV1-7 Attending doctor
AUT	AUT Author/Event Initiator	ORC-19 Action By
CP	Consulting Provider	
DP	Dispensing Provider	RXD-10 Dispensing Provider
EP	Entering Provider (probably not the same as transcriptionist?)	ORC-10 Entered By
EQUIP	Equipment	
FHCP	Family Health Care Professional	
MDIR	Medical Director	OBX-25 Performing Organization Medical Director
OP	Ordering Provider	ORC-12 Ordering Provider, OBR-16 Ordering Provider, RXO-14 Ordering Provider's DEA Number, RXE-13 Ordering Provider's DEA Number, ORC-24 Ordering Provider Address
PB	Packed by	
PH	Pharmacist (not sure how to dissect Pharmacist/Treatment Supplier's Verifier ID)	RXE-14 Pharmacist/Treatment Supplier's Verifier ID
PI	Primary Interpreter	
PO	Performing Organization	
POMD	Performing Organization Medical Director	
PP	Primary Care Provider	
PRI	Principal Result Interpreter	
RCT	Results Copies To	
RO	Responsible Observer	OBX-16 Responsible Observer
RP	Referring Provider	PV1-8 Referring doctor
RT	Referred to Provider	
SB	Send by	
SC	Specimen Collector	OBR-10 Collector Identifier

TN	Technician	
TR	Transcriptionist	
VP	Verifying Provider	ORC-11 Verified By
VPS	Verifying Pharmaceutical Supplier (not sure how to dissect Pharmacist/Treatment Supplier's Verifier ID)	RXE-14 Pharmacist/Treatment Supplier's Verifier ID
VTS	Verifying Treatment Supplier (not sure how to dissect Pharmacist/Treatment Supplier's Verifier ID)	RXE-14 Pharmacist/Treatment Supplier's Verifier ID
WAY	Waypoint	
WAYR	Waypoint Recipient	

3.Z.6.5 PRT-5 Participation Person (XCN) 02382

Components:<Person Identifier (ST)> ^ <Family Name (FN)> ^ <Given Name (ST)> ^ <Second and Further Given Names or Initials Thereof (ST)> ^ <Suffix (e.g., JR or III) (ST)> ^ <Prefix (e.g., DR) (ST)> ^ <WITHDRAWN Constituent> ^ <DEPRECATED-Source Table (CWE)> ^ <Assigning Authority (HD)> ^ <Name Type Code (ID)> ^ <Identifier Check Digit (ST)> ^ <Check Digit Scheme (ID)> ^ <Identifier Type Code (ID)> ^ <Assigning Facility (HD)> ^ <Name Representation Code (ID)> ^ <Name Context (CWE)> ^ <WITHDRAWN Constituent> ^ <Name Assembly Order (ID)> ^ <Effective Date (DTM)> ^ <Expiration Date (DTM)> ^ <Professional Suffix (ST)> ^ <Assigning Jurisdiction (CWE)> ^ <Assigning Agency or Department (CWE)> ^ <Security Check (ST)> ^ <Security Check Scheme (ID)>

Subcomponents for Family Name (FN): <Surname (ST)> & <Own Surname Prefix (ST)> & <Own Surname (ST)> & <Surname Prefix from Partner/Spouse (ST)> & <Surname from Partner/Spouse (ST)>

Subcomponents for Source Table (CWE): <Identifier (ST)> & <Text (ST)> & <Name of Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)> & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)> & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> & <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name of Second Alternate Coding System (ID)> & <Second Alternate Coding System Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> & <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> & <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> & <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Assigning Authority (HD): <Namespace ID (CWE)> & <Universal ID (ST)> & <Universal ID Type (ID)>


```
Subcomponents for Namespace ID (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
          Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
          & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
          & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
          <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
          of Second Alternate Coding System (ID)> & <Second Alternate Coding System
          Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
          <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
          <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
          <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
          OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Assigning Facility (HD):  <Namespace ID (CWE)> & <Universal ID (ST)>
          & <Universal ID Type (ID)>

Subcomponents for Namespace ID (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
          Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
          & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
          & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
          <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
          of Second Alternate Coding System (ID)> & <Second Alternate Coding System
          Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
          <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
          <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
          <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
          OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Name Context (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
          Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
          & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
          & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
          <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
          of Second Alternate Coding System (ID)> & <Second Alternate Coding System
          Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
          <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
          <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
          <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
          OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Assigning Jurisdiction (CWE):  <Identifier (ST)> & <Text (ST)> &
          <Name of Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate
          Text (ST)> & <Name of Alternate Coding System (ID)> & <Coding System
          Version ID (ST)> & <Alternate Coding System Version ID (ST)> & <Original
          Text (ST)> & <Second Alternate Identifier (ST)> & <Second Alternate Text
          (ST)> & <Name of Second Alternate Coding System (ID)> & <Second Alternate
          Coding System Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID
          (ST)> & <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)>
          & <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)>
          & <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
          OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Assigning Agency or Department (CWE):  <Identifier (ST)> & <Text
          (ST)> & <Name of Coding System (ID)> & <Alternate Identifier (ST)> &
          <Alternate Text (ST)> & <Name of Alternate Coding System (ID)> & <Coding
          System Version ID (ST)> & <Alternate Coding System Version ID (ST)> &
          <Original Text (ST)> & <Second Alternate Identifier (ST)> & <Second
          Alternate Text (ST)> & <Name of Second Alternate Coding System (ID)> &
          <Second Alternate Coding System Version ID (ST)> & <Coding System OID
          (ST)> & <Value Set OID (ST)> & <Value Set Version ID (DTM)> & <Alternate
          Coding System OID (ST)> & <Alternate Value Set OID (ST)> & <Alternate
          Value Set Version ID (DTM)> & <Second Alternate Coding System OID (ST)> &
          <Second Alternate Value Set OID (ST)> & <Second Alternate Value Set
          Version ID (DTM)>
```


Definition: This field contains the identity of the person who is represented in the participation that is being transmitted.

If this attribute repeats, all instances must represent the same person.

Condition: At least one of the Participation Person, Participation Organization, Participation Location, or Participation Device fields must be valued.

For the Report Alarm [PCD-04] transaction the PRT-5 participation Person is the identification of an addition recipient of the dissemination of the alarm. The PRT-15 Participation Telecommunication Address may also be used if only a PIN/Carrier destination is known.

For the Report Alarm Status [PCD-05] transaction the PRT-5 Participation Person is the identification of the person that was the participating recipient of the message.

3.Z.6.6 PRT-6 Participation Person Provider Type (CWE) 02383

```
Components:<Identifier (ST)> ^ <Text (ST)> ^ <Name of Coding System (ID)> ^ <Alternate
           Identifier (ST)> ^ <Alternate Text (ST)> ^ <Name of Alternate Coding
           System (ID)> ^ <Coding System Version ID (ST)> ^ <Alternate Coding System
           Version ID (ST)> ^ <Original Text (ST)> ^ <Second Alternate Identifier
           (ST)> ^ <Second Alternate Text (ST)> ^ <Name of Second Alternate Coding
           System (ID)> ^ <Second Alternate Coding System Version ID (ST)> ^ <Coding
           System OID (ST)> ^ <Value Set OID (ST)> ^ <Value Set Version ID (DTM)> ^
           <Alternate Coding System OID (ST)> ^ <Alternate Value Set OID (ST)> ^
           <Alternate Value Set Version ID (DTM)> ^ <Second Alternate Coding System
           OID (ST)> ^ <Second Alternate Value Set OID (ST)> ^ <Second Alternate
           Value Set Version ID (DTM)>
```

Definition: This field contains a code identifying the provider type for the participating person. This attribute correlates to the following master file attribute: STF-4 Staff Type. Coded values from the correlated master file table are used; the user defined master file table is used as the coding system for this attribute. For example, if you are using values from STF-2 Staff Type, the coding system would be HL70182 which is the table number for the user defined Staff Type table. This field is included in this segment to support international requirements. When ROL is used in an encounter message, it is not intended as a master file update.

Condition: This field may only be valued if PRT-5 Participation Person is valued.

For the Report Alarm Status [PCD-05] transaction this field is not populated.

3.Z.6.7 PRT-7 Participation Organization Unit Type (CWE) 02384

```
Components:<Identifier (ST)> ^ <Text (ST)> ^ <Name of Coding System (ID)> ^ <Alternate
           Identifier (ST)> ^ <Alternate Text (ST)> ^ <Name of Alternate Coding
           System (ID)> ^ <Coding System Version ID (ST)> ^ <Alternate Coding System
           Version ID (ST)> ^ <Original Text (ST)> ^ <Second Alternate Identifier
           (ST)> ^ <Second Alternate Text (ST)> ^ <Name of Second Alternate Coding
           System (ID)> ^ <Second Alternate Coding System Version ID (ST)> ^ <Coding
           System OID (ST)> ^ <Value Set OID (ST)> ^ <Value Set Version ID (DTM)> ^
           <Alternate Coding System OID (ST)> ^ <Alternate Value Set OID (ST)> ^
           <Alternate Value Set Version ID (DTM)> ^ <Second Alternate Coding System
           OID (ST)> ^ <Second Alternate Value Set OID (ST)> ^ <Second Alternate
           Value Set Version ID (DTM)>
```

Definition: This field identifies the environment in which the participant acts in the role specified in PRT-3 Action Reason. In the case of a person, the environment is not the specialty for the provider. The specialty information for the provider is defined in the PRA segment.

This attribute is included in the PRT segment to allow communication of this data when the participant information may not have been communicated previously in a master file or to provide better context. Refer to *User-defined table 0406 - Organization unit type*. This field is included in this segment to support international requirements, and is not intended as a master file update.

Condition: This field may only be valued if PRT-5 Participation Person is valued.

For the Report Alarm Status [PCD-05] transaction this field is not populated.

3.Z.6.8 PRT-8 Participation Organization (XON) 02385

```
Components:<Organization Name (ST)> ^ <Organization Name Type Code (CWE)> ^ <WITHDRAWN
           Constituent> ^ <Identifier Check Digit (NM)> ^ <Check Digit Scheme  (ID)>
           ^ <Assigning Authority (HD)> ^ <Identifier Type Code (ID)> ^ <Assigning
           Facility (HD)> ^ <Name Representation Code (ID)> ^ <Organization
           Identifier (ST)>

Subcomponents for Organization Name Type Code (CWE):  <Identifier (ST)> & <Text (ST)>
           & <Name of Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate
           Text (ST)> & <Name of Alternate Coding System (ID)> & <Coding System
           Version ID (ST)> & <Alternate Coding System Version ID (ST)> & <Original
           Text (ST)> & <Second Alternate Identifier (ST)> & <Second Alternate Text
           (ST)> & <Name of Second Alternate Coding System (ID)> & <Second Alternate
           Coding System Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID
           (ST)> & <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)>
           & <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)>
           & <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
           OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Assigning Authority (HD):  <Namespace ID (CWE)> & <Universal ID
           (ST)> & <Universal ID Type (ID)>

Subcomponents for Namespace ID (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
           Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
           & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
           & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
           <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
           of Second Alternate Coding System (ID)> & <Second Alternate Coding System
           Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
           <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
           <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
           <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
           OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Assigning Facility (HD):  <Namespace ID (CWE)> & <Universal ID (ST)>
           & <Universal ID Type (ID)>

Subcomponents for Namespace ID (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
           Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
           & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
           & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
           <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
           of Second Alternate Coding System (ID)> & <Second Alternate Coding System
           Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
           <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
           <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
           <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
           OID (ST)> & <Second Alternate Value Set Version ID (DTM)>
```

Definition: The organization that is involved in the participation. If PRT-5 Participation Person is valued, it reflects the affiliation of the individual participating as identified in PRT-4 Participation. Otherwise the organization is directly participating as identified in PRT-4 Participation.

If this attribute repeats, all instances must represent the same organization.

Condition: At least one of the Participation Person, Participation Organization, Participation Location, or Participation Device fields must be valued.

For the Report Alarm Status [PCD-05] transaction this field is not populated.

3.Z.6.9 PRT-9 Participation Location (PL) 02386

```
Components:<Point of Care (HD)> ^ <Room (HD)> ^ <Bed (HD)> ^ <Facility (HD)> ^
           <Location Status (IS)> ^ <Person Location Type (IS)> ^ <Building (HD)> ^
           <Floor (HD)> ^ <Location Description (ST)> ^ <Comprehensive Location
           Identifier (EI)> ^ <Assigning Authority for Location (HD)>

Subcomponents for Point of Care (HD):  <Namespace ID (CWE)> & <Universal ID (ST)> &
           <Universal ID Type (ID)>

Subcomponents for Namespace ID (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
           Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
           & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
           & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
           <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
           of Second Alternate Coding System (ID)> & <Second Alternate Coding System
           Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
           <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
           <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
           <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
           OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Room (HD):  <Namespace ID (CWE)> & <Universal ID (ST)> & <Universal
           ID Type (ID)>

Subcomponents for Namespace ID (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
           Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
           & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
           & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
           <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
           of Second Alternate Coding System (ID)> & <Second Alternate Coding System
           Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
           <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
           <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
           <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
           OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Bed (HD):  <Namespace ID (CWE)> & <Universal ID (ST)> & <Universal
           ID Type (ID)>
```

```
Subcomponents for Namespace ID (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
          Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
          & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
          & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
          <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
          of Second Alternate Coding System (ID)> & <Second Alternate Coding System
          Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
          <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
          <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
          <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
          OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Facility (HD):  <Namespace ID (CWE)> & <Universal ID (ST)> &
          <Universal ID Type (ID)>

Subcomponents for Namespace ID (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
          Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
          & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
          & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
          <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
          of Second Alternate Coding System (ID)> & <Second Alternate Coding System
          Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
          <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
          <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
          <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
          OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Building (HD):  <Namespace ID (CWE)> & <Universal ID (ST)> &
          <Universal ID Type (ID)>

Subcomponents for Namespace ID (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
          Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
          & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
          & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
          <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
          of Second Alternate Coding System (ID)> & <Second Alternate Coding System
          Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
          <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
          <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
          <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
          OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Floor (HD):  <Namespace ID (CWE)> & <Universal ID (ST)> & <Universal
          ID Type (ID)>

Subcomponents for Namespace ID (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
          Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
          & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
          & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
          <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
          of Second Alternate Coding System (ID)> & <Second Alternate Coding System
          Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
          <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
          <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
          <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
          OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Comprehensive Location Identifier (EI):  <Entity Identifier (ST)> &
          <Namespace ID (IS)> & <Universal ID (ST)> & <Universal ID Type (ID)>

Subcomponents for Assigning Authority for Location (HD):  <Namespace ID (CWE)> &
          <Universal ID (ST)> & <Universal ID Type (ID)>
```

```
Subcomponents for Namespace ID (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
          Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
          & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
          & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
          <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
          of Second Alternate Coding System (ID)> & <Second Alternate Coding System
          Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
          <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
          <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
          <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
          OID (ST)> & <Second Alternate Value Set Version ID (DTM)>
```

Definition: This field specifies the physical location (e.g., nurse station, ancillary service location, clinic, or floor) that is participating. If either PRT-5 Participation Person or PRT-8 Participation Organization is valued, it reflects the location of the individual or organization participating as identified in PRT-4 Participation. Otherwise the location is directly participating as identified in PRT-4 Participation.

If this attribute repeats, all instances must represent the same organization.

Condition: At least one of the Participation Person, Participation Organization, Participation Location, or Participation Device fields must be valued.

For the Report Alarm Status [PCD-05] transaction this field is not populated.

3.Z.6.10 PRT-10 Participation Device (EI) 02348

```
Components:<Entity Identifier (ST)> ^ <Namespace ID (IS)> ^ <Universal ID (ST)> ^
          <Universal ID Type (ID)>
```

Definition: Identifier for the device participating.

Example: The device used to register the shipment at the waypoint.

If this attribute repeats, all instances must represent the same device.

Condition: At least one of the Participation Person, Participation Organization, Participation Location, or Participation Device fields must be valued.

For the Report Alarm Status [PCD-05] transaction the Entity Identifier is the PIN/Carrier or device communication ID and namespace ID is the Alarm Communicator (AC) or Alarm Manager (AM) ID.

3.Z.6.11 PRT-11 Participation Begin Date/Time (DTM) 02387

Definition: This field contains the date/time when the participation began.

In the case of waypoints, this reflects the time a shipment arrives at the waypoint.

For the Report Alarm Status [PCD-05] transaction this field contains the time of the dissemination status or response update.

3.Z.6.12 PRT-12 Participation End Date/Time (DTM) 02388

Definition: This field contains the date/time when the participation ended.

In the case of waypoints, this reflects the time a shipment departs from the waypoint.

For the Report Alarm Status [PCD-05] transaction this field is not populated.

3.Z.6.13 PRT-13 Participation Qualitative Duration (CWE) 02389

Components:<Identifier (ST)> ^ <Text (ST)> ^ <Name of Coding System (ID)> ^ <Alternate Identifier (ST)> ^ <Alternate Text (ST)> ^ <Name of Alternate Coding System (ID)> ^ <Coding System Version ID (ST)> ^ <Alternate Coding System Version ID (ST)> ^ <Original Text (ST)> ^ <Second Alternate Identifier (ST)> ^ <Second Alternate Text (ST)> ^ <Name of Second Alternate Coding System (ID)> ^ <Second Alternate Coding System Version ID (ST)> ^ <Coding System OID (ST)> ^ <Value Set OID (ST)> ^ <Value Set Version ID (DTM)> ^ <Alternate Coding System OID (ST)> ^ <Alternate Value Set OID (ST)> ^ <Alternate Value Set Version ID (DTM)> ^ <Second Alternate Coding System OID (ST)> ^ <Second Alternate Value Set OID (ST)> ^ <Second Alternate Value Set Version ID (DTM)>

Definition: This field contains the qualitative length of time for participation (e.g., until the next assessment, four days, until discharge, etc.).

For the Report Alarm Status [PCD-05] transaction this field is not populated.

3.Z.6.14 PRT-14 Participation Address (XAD) 02390

Components:<Street Address (SAD)> ^ <Other Designation (ST)> ^ <City (ST)> ^ <State or Province (ST)> ^ <Zip or Postal Code (ST)> ^ <Country (ID)> ^ <Address Type (ID)> ^ <Other Geographic Designation (ST)> ^ <County/Parish Code (CWE)> ^ <Census Tract (CWE)> ^ <Address Representation Code (ID)> ^ <WITHDRAWN Constituent> ^ <Effective Date (DTM)> ^ <Expiration Date (DTM)> ^ <Expiration Reason (CWE)> ^ <Temporary Indicator (ID)> ^ <Bad Address Indicator (ID)> ^ <Address Usage (ID)> ^ <Addressee (ST)> ^ <Comment (ST)> ^ <Preference Order (NM)> ^ <Protection Code (CWE)> ^ <Address Identifier (EI)>

Subcomponents for Street Address (SAD): <Street or Mailing Address (ST)> & <Street Name (ST)> & <Dwelling Number (ST)>

Subcomponents for County/Parish Code (CWE): <Identifier (ST)> & <Text (ST)> & <Name of Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)> & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)> & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> & <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name of Second Alternate Coding System (ID)> & <Second Alternate Coding System Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> & <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> & <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> & <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Census Tract (CWE): <Identifier (ST)> & <Text (ST)> & <Name of Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)> & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)> & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> & <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name of Second Alternate Coding System (ID)> & <Second Alternate Coding System Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> & <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> & <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> & <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set OID (ST)> & <Second Alternate Value Set Version ID (DTM)>


```
Subcomponents for Expiration Reason (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
          Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
          & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
          & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
          <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
          of Second Alternate Coding System (ID)> & <Second Alternate Coding System
          Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
          <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
          <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
          <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
          OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Protection Code (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
          Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
          & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
          & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
          <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
          of Second Alternate Coding System (ID)> & <Second Alternate Coding System
          Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
          <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
          <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
          <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
          OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Address Identifier (EI):  <Entity Identifier (ST)> & <Namespace ID
          (IS)> & <Universal ID (ST)> & <Universal ID Type (ID)>
```

Definition: This field contains addresses associated with the participation. The address can repeat to indicate alternate addresses or an alternate expression of the same address.

Condition: The address must be present if the Participation is Performing Organization Medical Director.

For the Report Alarm Status [PCD-05] transaction this field is not populated.

3.Z.6.15 PRT-15 Participation Telecommunication Address (XTN) 02391

```
Components:<WITHDRAWN Constituent> ^ <Telecommunication Use Code (ID)> ^
          <Telecommunication Equipment Type (ID)> ^ <Communication Address (ST)> ^
          <Country Code (SNM)> ^ <Area/City Code (SNM)> ^ <Local Number (SNM)> ^
          <Extension (SNM)> ^ <Any Text (ST)> ^ <Extension Prefix (ST)> ^ <Speed
          Dial Code (ST)> ^ <Unformatted Telephone number  (ST)> ^ <Effective Start
          Date (DTM)> ^ <Expiration Date (DTM)> ^ <Expiration Reason (CWE)> ^
          <Protection Code (CWE)> ^ <Shared Telecommunication Identifier (EI)> ^
          <Preference Order (NM)>

Subcomponents for Expiration Reason (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
          Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
          & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
          & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
          <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
          of Second Alternate Coding System (ID)> & <Second Alternate Coding System
          Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
          <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
          <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
          <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
          OID (ST)> & <Second Alternate Value Set Version ID (DTM)>
```



```
Subcomponents for Protection Code (CWE):  <Identifier (ST)> & <Text (ST)> & <Name of
          Coding System (ID)> & <Alternate Identifier (ST)> & <Alternate Text (ST)>
          & <Name of Alternate Coding System (ID)> & <Coding System Version ID (ST)>
          & <Alternate Coding System Version ID (ST)> & <Original Text (ST)> &
          <Second Alternate Identifier (ST)> & <Second Alternate Text (ST)> & <Name
          of Second Alternate Coding System (ID)> & <Second Alternate Coding System
          Version ID (ST)> & <Coding System OID (ST)> & <Value Set OID (ST)> &
          <Value Set Version ID (DTM)> & <Alternate Coding System OID (ST)> &
          <Alternate Value Set OID (ST)> & <Alternate Value Set Version ID (DTM)> &
          <Second Alternate Coding System OID (ST)> & <Second Alternate Value Set
          OID (ST)> & <Second Alternate Value Set Version ID (DTM)>

Subcomponents for Shared Telecommunication Identifier (EI):  <Entity Identifier (ST)>
          & <Namespace ID (IS)> & <Universal ID (ST)> & <Universal ID Type (ID)>
```

Definition: The waypoint telecommunication address field carries telecommunications addresses for the waypoint. These telecommunications addresses are used to contact the waypoint for additional information regarding the receipt of the shipment. The address can repeat to indicate alternate addresses or an alternate expression of the same address.

For the Report Alarm [PCD-04] transaction this field may also be used if only a PIN/Carrier destination is known, in which case the PIN is in the first sub-component of the Communication Address component and the Carrier is in the second sub-component of the Communication Address component.

For the Report Alarm Status [PCD-05] transaction this field is not populated.

3.Z.7 OBX Observation Result Segment

Unlike a typical physiological measurement, which has a few key attributes that in the transactions of the DEC profile have been fitted readily into a single OBX segment, an alarm has multiple heterogeneous key attributes such as alarm source, alarm priority, and alarm phase which are called facets in this discussion, and which are encoded in multiple OBX segments hierarchically nested under a single OBR segment (all OBX segments under the OBR must pertain to a single alarm). The different OBX segments pertaining to a single alarm are distinguished by OBX-4 Observation Sub-ID, which uses a dotted notation to identify the specific source within an instrument, and for alarms, the facet represented by a particular OBX segment. This dotted notation is based on the DEC profile, which in turn is based on a suggestion in the HL7 version 2.6 specification (see section 7.4.2.4 "Observation Sub-ID").

Most alarm message characteristics are identified by combination of OBX-3 Observation Identifier and OBX-4 Observation Sub-ID and contain a value in OBX-5 Observation Value. Alarm Priority and Alarm Source are given in the OBX-8 Abnormal Flags field of the facet 1 OBX segment. They should not be repeated on subsequent OBX segments for other facets on the principle that data items should have one best placement and unneeded repetition invites inconsistency.

The Filler Order Number of the OBR segment uniquely identifies the alarm instance and must be the same for all messages pertaining to that alarm (start and end state transitions, continuation,

etc.) as well as messages back from the Alarm Manager (AM) actor that pertain to the particular alarm instance (replies, acknowledgements, etc.).

Since the information to be conveyed in this profile has much in common with clinical measurements already covered by the existing profile, only extensions and other necessary differences will be described here. For all other details, the DEC profile is to be followed.

3.Z.7.1 Semantics

The intention is to transmit transparently the key attributes of an event relevant to secondary notification of caregivers. These include:

- The identity of the alarm
- Whether its source is physiological or technical
- Its priority (severity)
- The state transition or persistent state that is being communicated by the current message

The representation relies on ISO/IEEE 11073 nomenclature and concepts for alarms, which in turn are consistent with IEC 60601-1-8 alarm nomenclature and concepts.

Table 3.Z.7.1-1 HL7 Attribute Table – OBX – Observation Result

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME
2	2	ID	C		0125	00570	Value Type
3	250	CE	R			00571	Observation Identifier
4	20	ST	C			00572	Observation Sub-ID
5	99999	varies	C	Y/2		00573	Observation Value
6	250	CE	O			00574	Units
7	60	ST	O			00575	References Range
8	5	IS	O	Y	0078	00576	Abnormal Flags
14	26	TS	CE				Observation Date/Time
18	22	EI	O	Y		01479	Equipment Instance Identifier

3.Z.7.2 OBX-2 Value Type (ID) 00570

This field contains the format of the observation value in the OBX.

3.Z.7.3 OBX-3 Observation Identifier (CE) 00571

This field contains a unique identifier for the kind of measurement or device-dependent data that is given in OBX-5 Observation Value of the current segment. It shall preferably be drawn from the MDC nomenclature, or, failing that, LOINC. Terms not in the MDC nomenclature should be submitted to ISO/IEEE 11073 committee for possible standardization. Pending standardization, on a temporary basis by site agreement, agreed-on numeric codes and identifier strings in the range reserved in the standard for private codes may be used if necessary.

3.Z.7.4 OBX-4 Observation Sub-ID (ST) 00572

This field is used to distinguish between multiple OBX segments with the same observation ID organized under one OBR. The sub-identifier is also used to group related components. The scheme used for alarms is an extension of that used in the DEC profile transactions for measurements, which should be studied by those planning to use the Alarm Communication Management supplement. It uses a dotted notation, where the elements are numbers distinguishing the hierarchical containment levels of different measurements and different technical subsystems within the ISO/IEE 11073 Domain Information Model of the patient care device, that is, <MDS>.<VMD>.<CHANNEL>.<METRIC >.

In the Alarm Communications Management profile, a fifth element, <FACET>, is added to distinguish the additional facets of an alarm, such as Alarm State, Phase, Inactivation State, and Evidentiary Data, that must be conveyed in associated additional OBX segments beyond the first.

Table 3.Z.7.4-1 Observation Sub-ID Facets

<FACET> value	Facet name	Comments
1	Event identification	This facet specifies the MDC event code for the alarm
2	Source identification	Identifies the physiological measurement or technical source responsible for the alarm.
3	Event phase	Whether the stimulus for the message is the beginning, end, or some other state or state transition of the alarm.
4	Alarm state	Indicates the state of the underlying alarm condition at the patient care device: inactive | active | latched (no longer active but persisted to allow caregivers to be notified of transient but significant events)
5	Inactivation State	Optional. Indicates whether visual or aural indications at the patient care device are inactivated.
6	Real-time location	Optional. Real time location data concerning the patient, if available. Applicable where there are technical means to determine the current location of the patient, as distinct from the administratively assigned location that may be present in segment PV1. The Observation Value for this facet is in system-dependent format, defined by site-specific agreement.
7	Evidentiary data	Optional. Real time waveform snippet if available.

3.Z.7.5 OBX-5 Observation Value (varies) 00573

This field contains the value observed by the alarm reporter. Its meaning differs according to the facet identified in OBX-4 Sub-ID (see above). The following sections give the details for each facet.

In all cases, OBX-2-value type contains the data type for this field according to which observation value is formatted. It is not a required field because some systems will report only the abnormal flags for the observation (OBX-8). The length of the observation field is variable, depending upon OBX-3-value type. This field may repeat for multipart, single answer results with appropriate data types, e.g., CE, TX, and FT data types.

Facet 1. Event Identification

The identity of alarms is represented by event codes from ISO/IEEE 11073-10101 nomenclature for alerts (Block E).

Table 3.Z.7.5-1 Event Identification Facet

Facet 2. Source identification

For an event code corresponding with a metric alarm, this segment identifies the particular measurement that is the source of the alarm by its MDC nomenclature code in OBX-3 Observation Identifier. If it has a numeric value, it shall be in OBX-5 Observation Value, and if available the alarm range set in the device will be encoded in OBX-7 Reference Rang

For a technical alarm, this facet specifies the subsystem that is the source of the event by its MDC object code in OBX-5 Observation Value, and by its dotted sub-ID notation according to the DEC specification for OBX-4 Observation Sub-ID.

Facet 3. Event Phase

Contains the current phase of the alarm from the EventCurrentPhase enumeration

tpoint |
start |
continue |
end |
update |
escalate |

de-escalate |
reset

Table 3.Z.7.5-2 Event Phase

The EventCurrentPhase identifies the state transition or state that the current alarm message is indicating: a ***tpoint*** event is a time point event with no duration, a ***continue*** event indicates that this message does not represent a state transition but rather reports the continuation of an event that started at some previous time. An ***update*** indicates a change other than a state transition in a previously reported alarm, such as a further change in an out-of-limit metric. The phases ***escalate*** and ***de-escalate*** represent changes in alarm priority as assessed by the patient care device.

State transitions

A message representing an alarm is sent aperiodically, when the alarm undergoes a state transition that may be significant for secondary notification (alarm start, alarm end, escalation or de-escalation of priority as evaluated by the alarm source patient care device, change of description).

By site agreement, messages representing current state of alarms may optionally also be sent at other times, as for example on a periodic timed basis.

Facet 4. Alarm current state

The value of the AlarmState facet reflects whether the alarm condition currently exists (inactive or active) or if the alarm condition formerly existed, does not now exist, but is “latched” or held by the patient care device so that caregivers may be notified of transient but significant conditions.

Table 3.Z.7.5-3 Alarm Current State

Facet 5. Inactivation state

The AlarmInactivationState reflects the current state of the visual and aural alarm indications at the patient care device sourcing the alarm.

This may be empty if unavailable or not wanted. May contain the value 'enabled', meaning that both visual and aural alarm indications are enabled at the device. May be repeated, to indicate separately the state of visual indications at the device by including zero or one of the values:

alarm-paused
alarm-off

and zero or one of the values:

audio-paused
audio-off

If neither of 'alarm-paused' or 'alarm-off' is included, the visual alarm indication is assumed to be enabled regardless of whether 'enabled' is also present.

If neither of 'audio-paused' or 'audio-off' is included, the aural alarm indication is assumed to be enabled regardless of whether 'enabled' is also present.

Facet 6. Real-time location

Optional. Real time location data concerning the patient, if available.

Applicable where there are technical means to determine the current location of the patient, as distinct from the administratively assigned location that may be present in segment PV1. The Observation Value for this facet is in system-dependent format, defined by site-specific agreement.

Facet 7. Evidentiary data

This facet encodes an array of real-time measurements typically representing a physiological waveform meant to be rendered at the endpoint device to assist the caregiver in assessing the condition of the patient that the alarm is for. It is intended to include a normative description of a data format in a future version of this document. At this time, any use of this facet must be by site-specific agreement.

3.Z.7.6 OBX-6 Units (CE) 00574

This field specifies the units associated with the observed value.

3.Z.7.7 OBX-7 References Range (ST) 00575

The range of values for Observation Value. The Alarm Manager (AM) actor does not use this field to analyze or indicate whether an alarm is due to an abnormal or critical value in the Observation Value. Instead the Abnormal Flags field is used.

3.Z.7.8 OBX-8 Abnormal Flags (IS) 00576

This field may be repeated and can contain zero or more abbreviations indicating different facets of the abnormality of a result, including the type of abnormality (using predefined abbreviations from the table of values in the HL7 standard), and also values from the tables below alarm priority and whether the alarm is physiological or technical (AlarmType).

Table 3.Z.7.8-1 Alarm Priority and Type

Alarm priority

AlarmPriorityIEEE is displayed for reference, to show the correspondence between the combined encoding for priority and source used in ISO/IEEE-1073 and the separate encodings used in this Profile.

The following abbreviations in the OBX-8 Abnormality Flags field can be used to indicate the type of abnormality, its priority as indicated by the source patient care device, and whether it is a physiological alarm based on monitoring observations from the patient, or a technical alert indicating a condition of the patient care device and not the patient which nonetheless requires caregiver action.

Table 3.Z.7.8-2 Abnormal Flags, Abnormality Types

Abnormality Type	Abbreviation
Normal, not abnormal	N
Below low normal	L
Below lower panic limits	LL
Above high normal	H
Above higher panic limits	HH
Abnormal (for non-numeric results)	A

Table 3.Z.7.8-3 Abnormal Flags, Alarm Priority

Alarm Priority	Abbreviation
no-alarm	PN
low priority	PL
medium priority	PM
high priority	PH

Table 3.Z.7.8-4 Abnormal Flags, Alarm Source

Alarm Source	Abbreviation
physiological	SP
technical	ST

This is a repeatable field and values from the above table may be combined by entering them as repetitions of the field, for example, a field value of 'H~PH~SP' would signify a physiological measurement with an abnormally high value, constituting a high priority alarm condition.

3.Z.7.9 OBX-14 Observation Date/Time

The OBX segment of the Source Identification facet shall populate this field with the timestamp of the event transition this alarm represents (for example, the start time for an alarm start message, the end time for an alarm end message, and so forth). This is to be distinguished from the time the message was sent, which is carried in OBR-7.

3.Z.7.10 OBX-18 Equipment Instance Identifier (EI) 01479

This field uniquely identifies the Alarm Reporter source of the alarm, preferably an EUI-64 (see base document).

3.Z.8 NTE Notes and Comment Segment

For indicated issues not addressed in information normative locations under agreement between the AR and AM actors. Site or system specific indications are optionally passed in this manner to the AM for dispatch decision making or through the AM to the AC to communications endpoints.

Table 3.Z.8-1. HL7 Attribute Table – NTE – Notes and Comment

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME
3	65536	FT	O	Y		00098	Comment

3.Z.8.1 NTE-3 Comment (FT) 00098

This field contains the comment contained in the segment.

3.Z.9 Capture of WCTP 1.3 update 1

This section is a capture of the protocol definition, guidelines, and usage constraints of Wireless Communication Transfer Protocol (WCTP).

3.Z.9.1 Pre-Configuration

The HTTP source to destination is assumed to be resolved through pre-configuration.

Whether or not secure http (HTTPS) is used or not is resolved through pre-configuration

The WCTP PollerID and security password used to identify the message send requestor (not the request itself) are assumed to be resolved through pre-configuration.

The URI values for the WCTP senderID and sendResponseToID are assumed to be resolved through pre-configuration.

3.Z.9.2 Endpoint Device Addressing

Endpoint entity (wireless device) addressing can be per WCTP (often the phone number of the endpoint device), but in any event it is presumed to be pre-configured so that there is a match from Alarm Manager (AM) to Alarm Communicator (AC).

3.Z.9.3 Polling Versus Push Responses

The decision as to whether polling or push response is used for status updates is assumed to be resolved through pre-configuration. WCTP would be best used in its web push response form rather than polling for responses so as to maintain responsiveness of status updates and replies.

Some WCTP implementations have minimum tolerable poll intervals to reduce overall polling of the WCTP gateway server, the Alarm Communicator (AC).

3.Z.9.4 Constraints

The use of WCTP for ACM does not require Message Response Redirection.

Sub-second timing is not expected to be needed by ACM use of WCTP.

The WCTP messageID is used to track the status of a message that was sent from the AM to the AC.

The WCTP notifyWhen element should indicate notifyWhenDelivered (notify upon delivery to device) and notify upon read receipt.

If WCTP version query is not supported then a request for version query must not be ignored. It must be responded to with a Not Supported WCTP confirmation response.

3.Z.9.5 Transactions

1565

Table 3.Z.9.5-1. WCTP requests and responses

Request	AC actor (WCTP Server)	AM actor (WCTP Client)	Needed
	Receives	Submits	
wctp-ClientQuery	Yes	No	No (polling)
wctp-LookupSubscriber	Yes	No	No
wctp-LookupResponse	No	Yes	No
wctp-DeviceLocation	Yes	No	No
wctp-DeviceLocationResponse	No	Yes	No
wctp-MessageReply	Yes	Yes	Yes
wctp-PollForMessages	Yes	No	No
wctp-ReturnToSvc	Yes	No	Yes
wctp-SendMsgMulti	Yes	No	No
wctp-StatusInfo	Yes	Yes	No
wctp-SubmitClientMessage	Yes	No	Yes
wctp-SubmitRequest	Yes	Yes	No
wctp-VersionQuery	Yes	Yes	Yes

Appendix 'X' Example Messages

Alarm Communications Management Sample message

This is an example of a physiological limit alarm. It is a pulse rate high alarm. It started at 12:10:10.

ER7 version: (Editor Note: MDC codes to be assigned for EVENT_PHASE, ALARM_STATE and INACTIVATION_STATE)

MSH|^~\&|||||20080515123100||ORU^R40^ORU_R40|MSGID5432346754|P|2.6|||NE|AL|||||IHE_PCD_ACM_001^HL7^2.16.840.1.113883.9.n.m ^HL7

PID|||123456789||Doe^John^Joseph||19630415

PV1|||SICU^301^2||||||||||||||11772233

OBR|1||09780979a9879^PHILIPS^ABCD002343785379^EUI-64|MDC_ALARM_EXAMPLE^Sample alarm^MDC^979879-9879^Example^SNM3|||20080515121000|||||||||800 555 2323

OBX|1|ST|196648^MDC_EVT_HI^MDC|1.1.1.1.1|PLETH PULSE HIGH|||H~PM~SP|||||20050515121010||||CD12345^ORIGatewayInc ICU-04^AECF114477885323^EUI-64|20080515121000

OBX|2|NM|149538^MDC_PLETH_PULS_RATE^MDC|1.1.1.1.2|160|264896^MDC_DIM_PULS_PER_MIN^MDC|40-140|H~PM~SP|||||20080515121000|||||264896^MDC_UPEXT_FINGER^MDC

OBX|3|ST|EVENT_PHASE|1.1.1.1.3|start

OBX|4|ST|ALARM_STATE|1.1.1.1.4|active

OBX|5|ST|INACTIVATION_STATE|1.1.1.1.5|audio-paused

xml version:

```
<?xml version="1.0" encoding="UTF-8"?>
<ORU_R01>
      <MSH>
      <MSH.7>
            <TS.1>20080515123100</TS.1>
      </MSH.7>
      <MSH.9>
            <MSG.1>ORU</MSG.1>
            <MSG.2>R40</MSG.2>
            <MSG.3>ORU_R40</MSG.3>
      </MSH.9>
      <MSH.10>MSGID5432346754</MSH.10>
      <MSH.11>
            <PT.1>P</PT.1>
      </MSH.11>
      <MSH.12>
            <VID.1>2.6</VID.1>
      </MSH.12>
      <MSH.15>NE</MSH.15>
      <MSH.16>AL</MSH.16>
      <MSH.21>
            <EI.1>IHE_PCD_ACM_001</EI.1>
            <EI.2>HL7</EI.2>
            <EI.3>2.16.840.1.113883.9.n.m</EI.3>
            <EI.4>HL7</EI.4>
      </MSH.21>
      </MSH>
<ORU_R01.PATIENT_RESULT>
<ORU_R01.PATIENT>
      <PID>
      <PID.3>
            <CX.1>123456789</CX.1>
      </PID.3>
      <PID.5>
            <XPN.1>
                  <FN.1>Doe</FN.1>
            </XPN.1>
            <XPN.2>John</XPN.2>
            <XPN.3>Joseph</XPN.3>
      </PID.5>
      <PID.7>
            <TS.1>19630415</TS.1>
      </PID.7>
      </PID>
<ORU_R01.VISIT>
      <PV1>
      <PV1.3>
            <PL.1>SICU</PL.1>
            <PL.2>301</PL.2>
            <PL.3>2</PL.3>
      </PV1.3>
```



```
      <PV1.19>
            <CX.1>11772233</CX.1>
      </PV1.19>
      </PV1>
</ORU_R01.VISIT>
</ORU_R01.PATIENT>
<ORU_R01.ORDER_OBSERVATION>
      <OBR>
      <OBR.1>1</OBR.1>
      <OBR.3>
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            <EI.2>PHILIPS</EI.2>
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