Integrating the Healthcare Enterprise

IHE Patient Care Coordination
Technical Framework Supplement

Bed Management
(BED)

Rev 1.2 - Trial Implementation

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Foreword

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

This supplement is published on November 2, 2018 for trial implementation and may 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 the Patient Care Coordination Technical Framework. Comments are invited and may be submitted at https://www.ihe.net/PCC_Public_Comments.

This supplement describes changes to the existing technical framework documents.

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

Amend Section X.X by the following:

Where the amendment adds text, make the added text **bold underline**. Where the amendment removes text, make the removed text **bold strikethrough**. When entire new sections are added, introduce with editor's instructions to "add new text" or similar, which for readability are not bolded or underlined.

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

Information about the IHE Patient Care Coordination domain can be found at https://www.ihe.net/IHE_Domains.

Information about the organization of IHE Technical Frameworks and Supplements and the process used to create them can be found at https://www.ihe.net/about_ihe/ihe_process and https://www.ihe.net/resources/profiles.

The current version of the IHE Patient Care Coordination Technical Framework can be found at https://www.ihe.net/resources/technical_frameworks.

55 **CONTENTS**

Introduction to this Supplement

The purpose of this supplement is to add support for integration of bed management with information systems in the hospital and Emergency Department (ED) environment to enable better utilization of beds and staff in the care of patients and to provide better care.

Open Issues and Questions

Closed Issues

1. Do we have options? If not, we should at least say so in the Options Section, that appears to be missing.
   We do not have any options.

2. Need to incorporate by reference 3.31.4 from ITI-2b, review PAM w/ ITI
   We have incorporated the reference.

3. Consider how this profile could be used in settings other than the ED. Do we want to increase scope?

   a. We have not increased scope, billing is noted as being specifically out of scope.

4. Should Order Placer be grouped with EDIS? No. It is not explicitly grouped to enable a separate CPOE and EDIS system to be integrated.

5. What concepts do we need to describe?
   Moved some content from overview to concepts.

6. What should we call the ADT Tracker Actor? Renamed to Tracker.

7. How do we integrate this with the IHE ITI PAM Profile?

   a. Should this profile's actors use PAM Actor names? No

   b. Should we require grouping with PAM Actors for certain transactions? No

8. What do we do about discharge?

   a. We placed this out of scope (could be a profile for next year because we have to integrate with discharge planning).

General Introduction and Shared Appendices

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*Update the following Appendices to the General Introduction as indicated below. Note that **these are not appendices to Volume 1**.*

Appendix A – Actor Summary Definitions

Add the following new actors to the IHE Technical Frameworks General Introduction Appendix A:

Actor	Definition
Tracker	System that receives duplicate copies of messages to enable real-time decision-support and analytics.
Bed Manager	A hospital or enterprise-wide system used to coordinate the identification and requisitioning of beds for incoming admissions and transfers and manage intra- and inter-hospital transfers
Emergency Department Information System	A departmental system that supports management of the course of care in the ED and supports communications with other hospital systems.

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Appendix B – Transaction Summary Definitions

Add the following new transactions to the IHE Technical Frameworks General Introduction Appendix B:

Transaction	Definition
Admission Notification [PCC-23]	The Admission Notification transaction notifies actors about admission of a patient to a bed.
Admission Order [PCC-24]	The Admission Order transaction notifies actors about the intention to admit a patient to a bed.
Patient Movement [PCC-25]	The Patient Movement transaction communicates information about movement of a patient from one location to another.

Appendix D – Glossary

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Add the following new glossary terms to the IHE Technical Frameworks General Introduction Appendix D:

None.

Volume 1 – Profiles

Add new Section X

X Bed Management (BED) Profile

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This transport profile facilitates bed management for patients admitted from the ED. Inefficiencies in transferring patients between the emergency department and inpatient setting result in poorer patient outcomes (e.g., morbidity, mortality or length of stay), increased patient dissatisfaction and poorer resource utilization in the ED. This profile describes how

175 communications between the ED and various inpatient systems can improve care, reduce cost and result in higher patient satisfaction, and enable tracking and monitoring of these activities to support quality improvement activities.

This profile does not address how charge information is transferred from various involved systems to the back office, or how discharge or transfers from the inpatient setting to other

180 settings are handled.

X.1 BED Actors and Transactions

This section defines the actors and transactions, and/or content modules in this profile. General definitions of actors are given in the Technical Frameworks General Introduction Appendix A at http://ihe.net/Technical_Frameworks.

185 Figure X.1-1 shows the actors directly involved in the BED Profile and the relevant transactions between them. If needed for context, other actors that may be indirectly involved due to their participation in other related profiles are shown in dotted lines. Actors which have a mandatory grouping are shown in conjoined boxes.
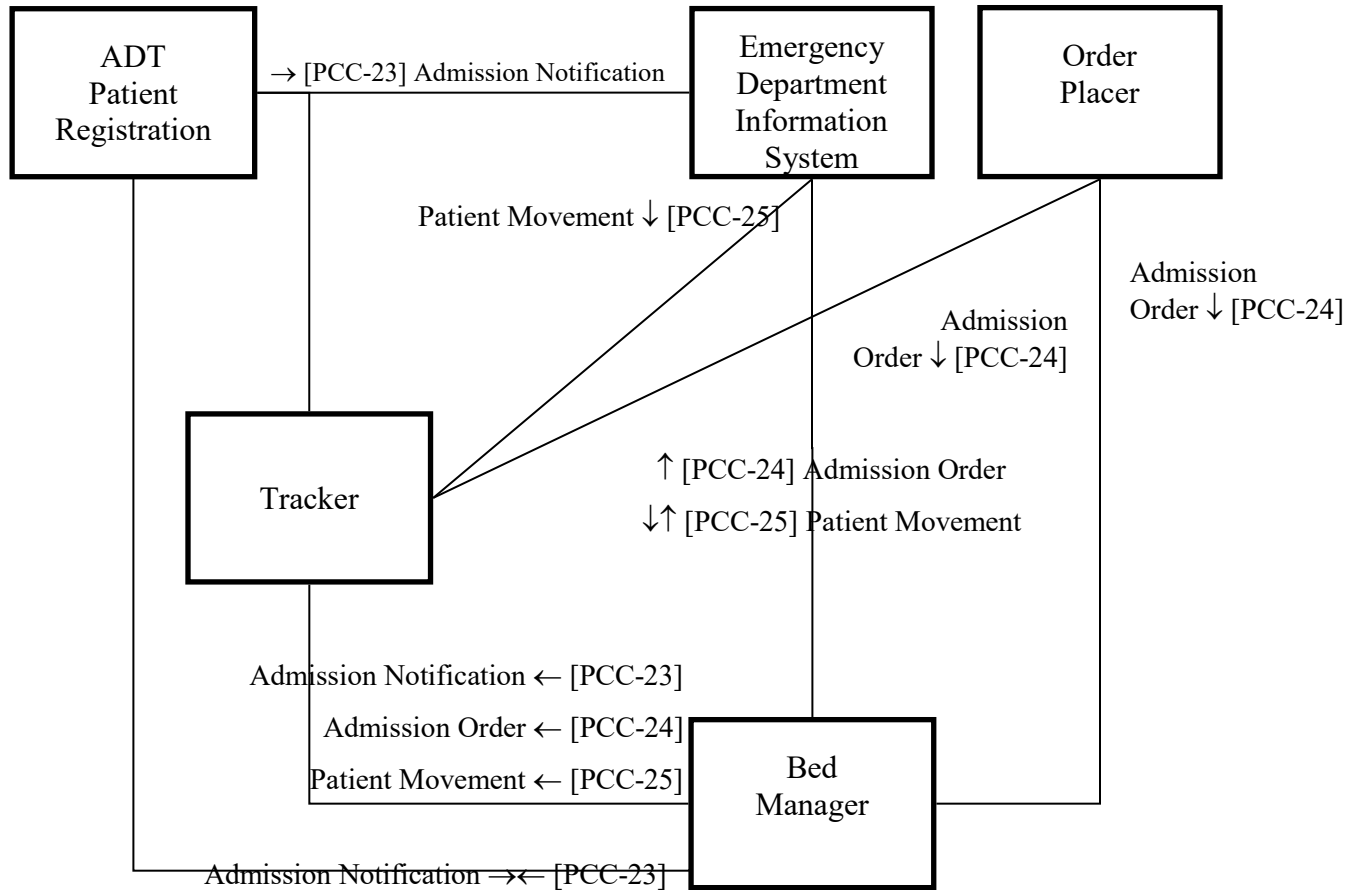
190   **Figure X.1-1: BED Actor Diagram**

Table X.1-1 lists the transactions for each actor directly involved in the BED Profile. To claim compliance with this profile, an actor shall support all required transactions (labeled "R") and may support the optional transactions (labeled "O").

Table X.1-1: BED Profile - Actors and Transactions

Actors	Transactions	Opt.	Reference
ADT Patient Registration	Admission Notification [PCC-23]	R	PCC TF-2: 3.23
Emergency Department Information System	Admission Notification [PCC-23]	R	PCC TF-2: 3.23
	Admission Order [PCC-24]	R	PCC TF-2: 3.24
	Patient Movement [PCC-25]	R	PCC TF-2: 3.25
Order Placer	Admission Order [PCC-24]	R	PCC TF-2: 3.24
	Patient Movement [PCC-25]	R	PCC TF-2: 3. 25
Bed Manager	Admission Notification [PCC-23]	R	PCC TF-2: 3.23

Actors	Transactions	Opt.	Reference
	Admission Order [PCC-24]	R	PCC TF-2: 3.24
	Patient Movement [PCC-25]	R	PCC TF-2: 3.25
Tracker	Admission Notification [PCC-23]	R	PCC TF-2: 3.23
	Admission Order [PCC-24]	R	PCC TF-2: 3.24
	Patient Movement [PCC-25]	R	PCC TF-2: 3.25

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X.1.1 Actor Descriptions and Actor Profile Requirements

X.1.1.1 ADT Patient Registration

On admission of a patient to an emergency department bed, the ADT Patient Registration sends
the Admission Notification [PCC-23] transaction to the Emergency Department Information
200   System, the Bed Manager, and the Tracker Actors.

X.1.1.2 Emergency Department Information System

When the patient is moved from the ED to another location, the Emergency Department
Information System sends the Patient Movement [PCC-25] transaction to the Bed Manager and
the Tracker Actors. It is also responsible for updating the patient location when it receives a
205   similar message from the Bed Manager indicating a new location for a patient.

X.1.1.3 Order Placer

When a physician communicates a heads up notification the Order Placer communicates it to the
Bed Manager and the Tracker Actors using the Admission Order [PCC-24] transaction. When
the order for patient admission is placed, it is also sent by the Order Placer to the Bed Manager
210   and the Tracker Actors using the Admission Order [PCC-24] transaction.

X.1.1.4 Bed Manager

The Bed Manager:

1. Tracks patient locations through receipt of Admission Notification and Patient Movement
   transactions.

215   2. On receipt of an Admission Order, the Bed Manager assigns a bed to a patient and
   communicates that assignment to other actors also using the Admission Order [PCC-24]
   transaction.

3. Upon receipt of an Admission Order that is just a heads up notification, the Bed Manager
   may take appropriate actions to ensure a bed will be available for the patient should they
220   be admitted (e.g., notifying the Bed Czar, updating staffing needs, et cetera).

X.1.1.5 Tracker

The Tracker receives duplicate copies of each message sent in this profile to enable real-time bed management decision-support. This can include dashboard display of patient flow indicators, rule-based alerts for ED crowding, or support development of comprehensive bed management and staffing analytics.

X.2 Actor Options

There are no options for actors in this profile.

Table X.2-1: Bed Management – Actors and Options

Actor	Option Name	Reference
ADT Patient Registration	No options defined	--
Emergency Department Information System	No options defined	--
Order Placer	No options defined	--
Bed Manager	No options defined	--
Tracker	No options defined	--

X.3 BED Required Actor Groupings

There are no required groupings for this profile.

Table X.3-1: Bed Management – Required Actor Groupings

BED Actor	Actor to be grouped with	Reference	Content Bindings Reference
ADT Patient Registration	None	--	--
Emergency Department Information System	None	--	--
Order Placer	None	--	--
Bed Manager	None	--	--
Tracker	None	--	--

X.4 BED Overview

The goal of this profile is to document the data exchange between interoperable systems that would enable bed management for patients admitted from the emergency department.

X.4.1 Concepts

Access to robust bed management functionality is a significant need within inpatient settings. Bed management is the ability for a healthcare facility or system to have real-time operational awareness of the status of all of its available beds and to be able to plan for the expedient use of beds through coordination of the bed turnover process. Beds are a scarce resource, and the limitation of access to beds leads to delays and waste within healthcare systems.

The maturity of bed management systems in use varies from hospital to hospital – from limited real-time awareness by a central bed authority (bed czar) to a robust, integrated health IT product which aids predictive planning and communication between various teams, and optimizes the availability of beds. Bed management IT products can be commercial off-the-shelf (COTS) products or home-grown. They can be separate IT packages or integrated functionality within an all-in-one health IT solution. While the solutions vary in terms of scale and degree of integration, the following set of functional components (although incorporated into different IT products in each site) is common to most systems:

- The patient registration system which stores data on ED visits and inpatient admissions and is the system of record for length of stay for billing purposes,

- The CPOE system which practitioners use to place orders, e.g., for orders for admission,

- The Emergency Department Information System (EDIS) which practitioners use to track care of patients, and

- The bed management system (BMS) which provides real-time awareness of the status of beds (clean, dirty, occupied, reserved, etc.)

As an example, an estimated 420,000 patients are admitted per year from Veterans Health Administration (VHA) EDs; they represent 17% of the nearly 2.4 million ED visits.[1] The VHA has developed standalone home-grown applications to monitor patient flow: EDIS, BMS operate alongside the VHA's EHR - CPRS/VistA (which includes a patient registration system). However these three nationally-sanctioned IT products do not share data among themselves.

- The current lack of interoperability between EDIS, BMS and patient registration systems creates several interrelated problems:

- Inefficiency for ED providers and staff who must enter or relay the same information to multiple information systems with no mechanism to monitor patient status in real time,

- Delays in patient transfers to inpatient units associated with patient transfer messaging failures and rework

- Poor data quality with which to measure the performance of patient transfer and care coordination systems due to siloed data

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1 Veterans Health Administration corporate data warehouse, unpublished data.

Delays have financial and clinical costs. In a 2011 study, Pines et al. found that a one-hour decrease in ED boarding times resulted in approximately $10,000 per day of increased revenue at their inner-city teaching hospital.[2] It is probable that financial benefits would also be achieved in other hospital settings if post-admission delays were decreased in a manner similar to the one highlighted in this study. In addition, prolonged post-admission delays are associated with increased mortality and length of stay in the hospital, even controlling for acuity and comorbid conditions.[3]

In order to adequately manage resources, information about current or possible admissions needs to be provided. Resources include not only beds, but nursing, physician and other staff (e.g., a sitter may be needed for agitated patients) necessary to ensure adequate care. The necessary information includes the reason for admission, isolation precautions necessary for adequate care of the patient and other patients around them, the expected time of admission or surgery, the level of care (often called acuity), and any necessary non-clinical precautions that need to be accounted for. Additional information such as the expected discharge date, estimated length of stay or expected discharge disposition can also be helpful in managing the necessary resources to care for the patient.

X.4.2 Use Cases

Two use cases describe the need for capabilities expressed in this profile.

- Admission to the Inpatient Setting
- Admission for Observation

These are described in more detail below.

X.4.2.1 Use Case #1: ED Admission

The ED Admission use case describes a scenario where a patient in the ED is known at some point during the ED encounter to need to be admitted. It illustrates the points at which the Emergency Department Information System communicates to Bed Management.

X.4.2.1.1 ED Admission Use Case Description

Mrs. Penny arrives for care in the ED where an administrative clerk creates an outpatient visit, (admits) Mrs. Penny in the ADT system for the ED, which is part of the EHR system. This populates EDIS with Mrs. Penny's name and visit information. Mrs. Penny is seen by Nurse Nickel, the triage nurse. Mrs. Penny receives care in the ED from Dr. Dent, who records himself as the provider of record in EDIS. During early care of Mrs. Penny, a nurse or doctor identifies that Mrs. Penny's complaint is likely to result in an inpatient admission. Dr. Dent or Nurse

2 Pines JM, Batt RJ, Hilton JA, Terwiesch C. The Financial Consequences of Lost Demand and Reducing Boarding in Hospital Emergency Departments. Ann Emerg Med. 2011 Oct;58(4):331–40.

3 Singer AJ, Thode HC, Jr., Viccellio P, Pines JM. The association between length of emergency department boarding and mortality. Acad Emerg Med. 2011;18(12):1324-9.

Nickel can create a "heads up" notification in the CPOE system to communicate the potential of an admission for Mrs. Penny to BMS. This is not a formal admission order because the patient may not be fully stabilized for admission and the clinician may not know at this time all the information necessary for an admission order (for example: service, team, level of care, and isolation or cohabitation needs). The action of creating a "heads up" notification updates a list of patients in BMS to give operational awareness of an estimate of total pending admissions from the ED.

Care proceeds, and eventually Dr. Dent decides to admit Mrs. Penny to the hospital. At this time, he enters the details of the admission into the CPOE system, including the necessary information regarding her bed requirements (for example: service, team, level of care, and isolation or cohabitation needs). Cohabitation and/or Isolation needs are determined using clinical decision support accomplished via patient information retrieved from Mrs. Penny's EHR; for instance, recommending isolation if data in the EHR reveals that the patient is colonized with Methicillin-resistant Staph aureus (MRSA). Dr. Dent's admission entry in EDIS updates Mrs. Penny's status to display in EDIS as "admitted, waiting bed assignment." It also creates a formal admission order in the EHR as well as a pending bed request in BMS. (Mrs. Penny is removed from the "heads up" list of patients if placed there earlier.) The information in the admission order/pending bed request identifies Mrs. Penny's ED care team as Dr. Dent and Nurse Nickel, and this information is updated in real time in EDIS with ED staff changes

The task of identifying an appropriate bed for Mrs. Penny involves coordination with individual wards and bed cleaning staff to locate available (or soon-to-be available) beds. Inpatient discharges and bed cleaning activities change bed statuses within BMS. The bed management administrator uses this information to identify the likely future bed for Mrs. Penny and enters the potential bed assignment into BMS. The potential bed assignment is sent from BMS to EDIS, where it is visible to ED staff. After report of Mrs. Penny's ED course of care is communicated between ED and floor nurses, ED administrative staff update Mrs. Penny's location in the ADT system from the ED to the ward. When Mrs. Penny leaves the ED, the ED administrator records her departure from the ED in EDIS. When Mrs. Penny arrives on the ward, the ward clerk enters in BMS that she has arrived on the ward for care.

While all of these activities are occurring, the bed management system is able to display in dashboards and by facility location the current and projected utilization of beds, and staffing needs can also be projected for the near future.

X.4.2.1.2 ED Admission Process Flow

The interaction diagram shown in Figure 1 illustrates the transactions used in a profile that supports Storyboard 1. These include the following existing HL7[4] Messages:

- Admit a Patient to the ED
- Pending Admit

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[4] HL7 is the registered trademark of Health Level Seven International.

340
- Admission Status Update

- Pending Transfer

- Admit/Visit Notification

- Patient Departing - Tracking

- Patient Arriving - Tracking

345 The diagram also includes a new transaction:

- Pending Admit - "Heads-up" Notification

This transaction uses the optional Event Reason Code field in the EVN message segment (updates user-defined table 0062) to indicate that the event type is a "heads-up" notification rather than a formal admit.

350 All messages are acknowledged and duplicates of each message can be sent to the Tracker. In order to improve readability, neither acknowledgements nor duplicated messages are shown in the interaction diagram in Figure X.4.2.1.2-1.
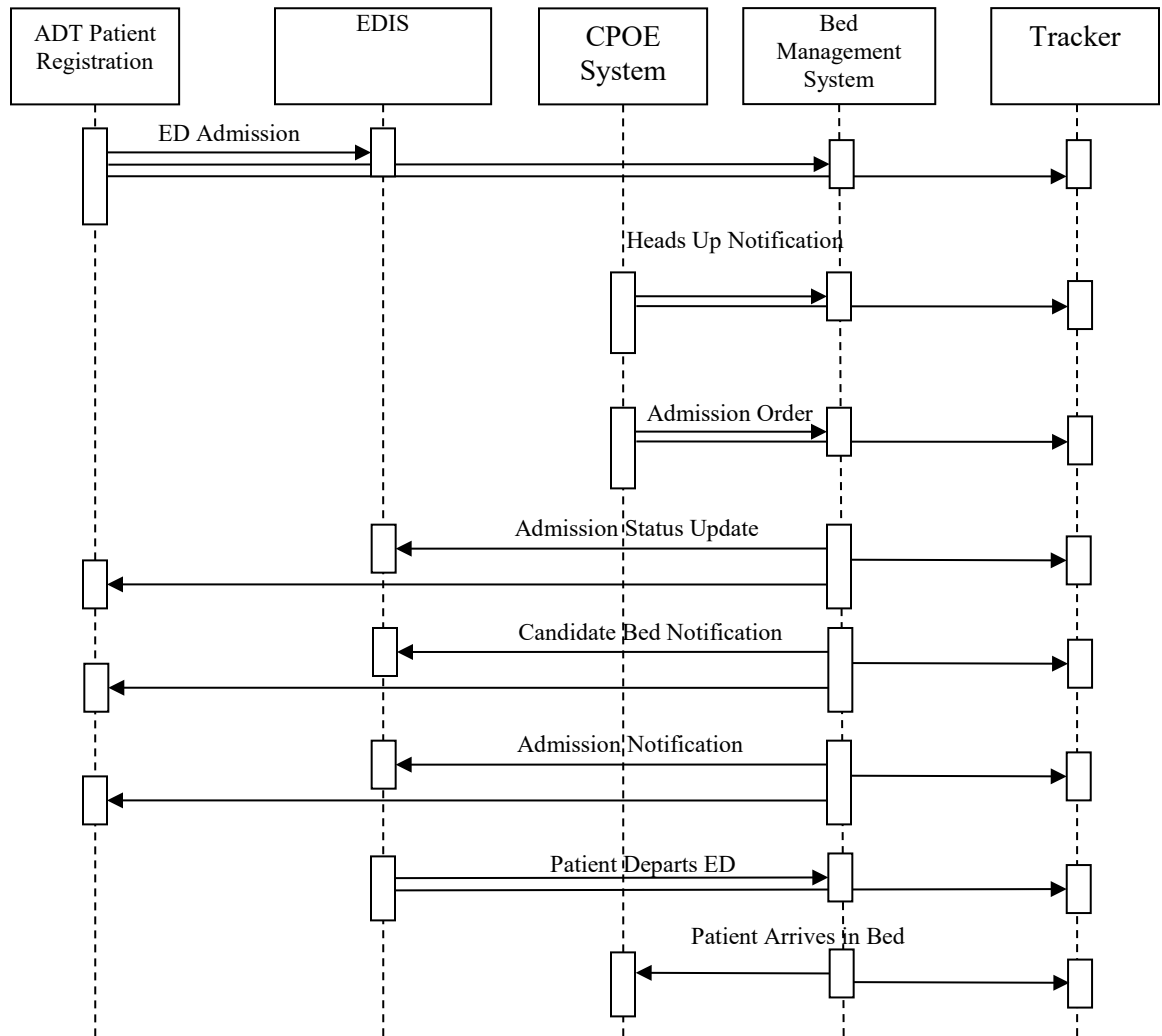
Figure X.4.2.1.2-1: ED Admission Process Interaction Diagram

355 X.4.2.2 Use Case #2: Admit for Observation

X.4.2.2.1 Admit for Observation Use Case Description

In Use Case 1, Mrs. Penny is admitted. However, there are also cases where Mrs. Penny might first be admitted for observation before she is then sent home or admitted to the hospital. An admission for observation consumes a bed, but often only for a short stay (less than a day). In 360 some facilities, observation wards are available which are typically only used for patients under observation. However, other facilities may use a regular bed for patient observation. The patient may then transition from observation to being discharged, or being admitted as an inpatient.

In this use case the same messages as shown in Use Case 1 can also be used to support admissions for observation. The patient class and bed location recorded in those messages is simply adjusted to account for the fact that the admission is to an observation ward rather than a regular inpatient ward.

X.5 BED Security Considerations

Actors in the BED Profile create, modify and consume patient demographics, clinical and administrative information which includes personally identifiable health information. This information must be protected against unauthorized access, modification or tampering. This profile recommends but does not require that connections between actors be grouped with the Secure Node or Secure Application Actors from the IHE ATNA Profile.

These actors ensure appropriate user authentication and authorization to access the application, and protect personally identifiable health information against unauthorized access, modification or tampering while the information is in transit.

X.6 BED Cross Profile Considerations

The BED Profile is designed to work alongside the IHE IT Infrastructure PAM Profile, but has differing requirements upon what actors are used and additional requirements for the messages that they send.

PAM – Patient Identity Source
A Patient Identity Source from the IT Infrastructure Patient Administration Management Profile may be grouped with an ADT Patient Registration to provide additional patient identity administration capabilities.

PAM – Patient Identity Consumer
A Patient Identity Consumer from the IT Infrastructure Patient Administration Management Profile may be grouped with an Emergency Department Information System to provide additional patient identity administration capabilities.

PAM – Patient Encounter Supplier
A Patient Encounter Supplier from the IT Infrastructure Patient Administration Management Profile may be grouped with an ADT Patient Registration to provide additional encounter administration capabilities.

PAM – Patient Encounter Consumer
A Patient Encounter Consumer from the IT Infrastructure Patient Administration Management Profile may be grouped with an Emergency Department Information System to provide additional encounter administration capabilities.

Volume 2 – Transactions

Add Sections 3.23, 3.24, and 3.25

3.23 Admission Notification [PCC-23]

400   ### 3.23.1 Scope

This transaction is used to notify actors of admission to an emergency department, inpatient or observation bed.

3.23.2 Actor Roles
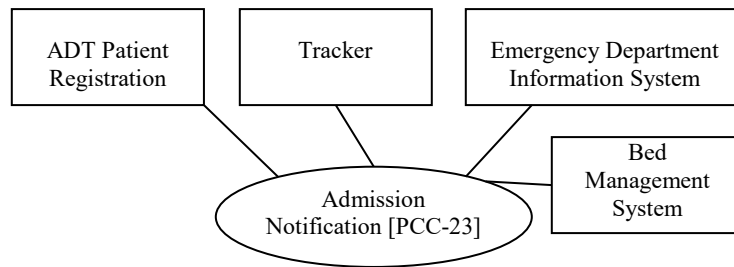
405   **Figure 3.23.2-1: Use Case Diagram**

Table 3.23.2-1: Actor Roles

Actor:	ADT Patient Registration
Role:	Admission Reporter (Admission to ED)
Role:	Admission Tracker (Admission to Hospital/Observation Ward)
Actor:	Tracker
Role:	Admission Tracker
Actor:	Emergency Department Information System
Role:	Admission Tracker
Actor:	Bed Manager
Role:	Admission Reporter (Admission to Hospital/Observation Ward)

3.23.3 Referenced Standards

HL7 Version 2.5

410 ### 3.23.4 Interaction Diagram
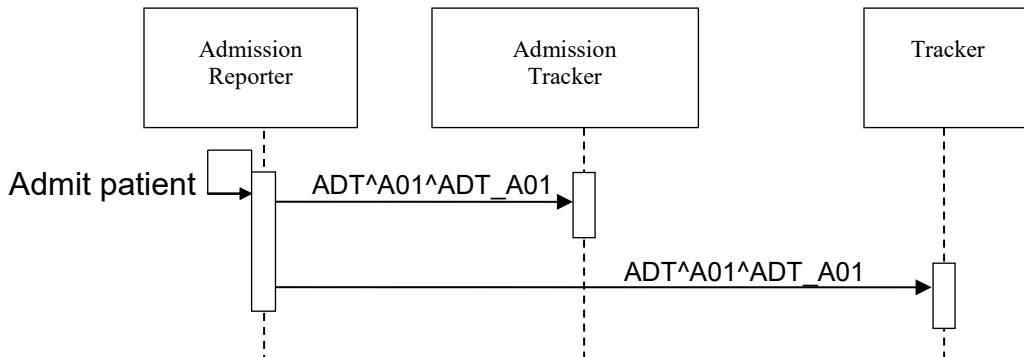
Figure 3.23.4-1: Interactions of Transaction PCC-23

3.23.4.1 Admit Patient - ADT^A01^ADT_A01

415 Upon patient admission to the ED, the ADT Patient Registration or the Bed Manager in the Admission Reporter role shall send an ADT A01 message using the ADT_A01 structure to the Emergency Department Information System and Tracker Actors in the Admission Tracker Roles. These actors shall be configured to receive such messages.

3.23.4.1.1 Trigger Event

420 This message is sent by the ADT Registration to the Emergency Department Information System and Tracker Actors to communicate the admission of a patient to the ED, or from the Bed Manager to the Emergency Department Information System and Tracker Actors to communicate the admission of a patient to a bed in an inpatient setting (e.g., the ED) or an observation ward.

MSH-9 is valued **ADT^A01^ADT_A01**.

3.23.4.1.2 Message Static Definition

425 The static definition of this message appears in the table below. The structure of common message segments is further defined in the section following.

Table 3.23.4.1.2-1: Static definition of ADT^A01^ADT_A01

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message Header	R	[1..1]	2
SFT	Software Segment	O	[0..*]	2
EVN	Event Type	R	[1..1]	2
PID	Patient Identification	R	[1..1]	3
PD1	Additional Demographics	O	[0..1]	3
ROL	Role	O	[0..*]	15

Segment	Meaning	Usage	Card.	HL7 chapter
NK1	Next of Kin / Associated Parties	O	[0..*]	3
PV1	Patient Visit	R	[1..1]	3
PV2	Patient Visit – Additional Info	R	[1..1]	3
ROL	Role	O	[0..*]	15
DB1	Disability Information	O	[0..*]	3
OBX	Observation/Result	O	[0..*]	7
AL1	Allergy Information	O	[0..*]	3
DG1	Diagnosis Information	O	[0..*]	6
DRG	Diagnosis Related Group	O	[0..1]	6
---	--- PROCEDURE begin	O	[0..*]	
PR1	Procedures	R	[1..1]	6
ROL	Role	O	[0..*]	15
---	--- PROCEDURE end			
GT1	Guarantor	O	[0..*]	6
---	--- INSURANCE begin	O	[0..*]	
IN1	Insurance	R	[1..1]	6
IN2	Insurance Additional Info.	O	[0..1]	6
IN3	Insurance Additional Info - Cert.	O	[0..1]	6
ROL	Role	O	[0..*]	15
---	--- INSURANCE end			
ACC	Accident Information	O	[0..1]	6
UB1	Universal Bill Information	O	[0..1]	6
UB2	Universal Bill 92 Information	O	[0..1]	6
PDA	Patient Death and Autopsy	O	[0..1]	3

430   This section below describes the format of common message segments used in ADT messages
for transactions in the Bed Management (BED) Integration Profile. These segments appear in
messages found in the Admission Notification [PCC-23], Admission Order [PCC-24] and Patient
Movement [PCC-25] transactions found in this document.

The MSH, EVN, PID, PV1, OBX, ROL, and AL1 segments are all as defined in ITI TF-2b:
3.30.5 Common HL7 Message Segments. The ZBE segment is as defined in ITI TF-2b: 3.31.6
435   Common HL7 Message Segments.

Note: When used in the [ITI-30] transaction, the PV1 Segment in [ITI-30] is specified to be a Pseudo-PV1 which contains
only Patient Class. However, the definition of this segment in [ITI-30] allows for broader use, presenting more
information necessary to manage the encounter (for example, as used in [ITI-31]). It is those latter constraints that must
be followed in messages used by this profile.

440   In addition to those constraints, the PV2 segments are also constrained as follows:

3.23.4.1.3 Common Message Segment Constraints

Standard Reference: HL7 Version 2.5, Chapter 3 (Section 3.4.4)

In transactions [PCC-23], [PCC-24], and [PCC-25], the PV2 segment may be used to convey additional data about the admission. The table below shows the constraints on this segment. Items in bold represent additional constraints created for this transaction.

Table 3.23.4.1.3-1: PV2 Segment

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME
1	80	PL	C	Y	0129	00181	Prior Pending Location
2	250	CE	O		0129	00182	Accommodation Code
3	250	CE	RE			00183	**Admit Reason**
4	250	CE	O			00184	Transfer Reason
5	25	ST	O	Y		00185	Patient Valuables
6	25	ST	O			00186	Patient Valuables Location
7	2	IS	RE	Y	0130	00187	**Visit User Code**
8	26	TS	RE			00188	**Expected Admit Date/Time**
9	26	TS	O			00189	**Expected Discharge Date/Time**
10	3	NM	O			00711	**Estimated Length of Inpatient Stay**
11	3	NM	O			00712	Actual Length of Inpatient Stay
12	50	ST	O			00713	Visit Description
13	250	XCN	O	Y		00714	Referral Source Code
14	8	DT	O			00715	Previous Service Date
15	1	ID	O		0136	00716	Employment Illness Related Indicator
16	1	IS	O		0213	00717	Purge Status Code
17	8	DT	O			00718	Purge Status Date
18	2	IS	O		0214	00719	Special Program Code
19	1	ID	O		0136	00720	Retention Indicator
20	1	NM	O			00721	Expected Number of Insurance Plans
21	1	IS	O		0215	00722	Visit Publicity Code
22	1	ID	O		0136	00723	Visit Protection Indicator
23	250	XON	O	Y		00724	Clinic Organization Name
24	2	IS	O		0216	00725	Patient Status Code
25	1	IS	O		0217	00726	Visit Priority Code
26	8	DT	O			00727	Previous Treatment Date
27	2	IS	O		0112	00728	**Expected Discharge Disposition**
28	8	DT	O			00729	Signature on File Date
29	8	DT	O			00730	First Similar Illness Date
30	250	CE	O		0218	00731	Patient Charge Adjustment Code
31	2	IS	O		0219	00732	Recurring Service Code

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME
32	1	ID	O		0136	00733	Billing Media Code
33	26	TS	RE			00734	**Expected Surgery Date and Time**
34	1	ID	O		0136	00735	Military Partnership Code
35	1	ID	O		0136	00736	Military Non-Availability Code
36	1	ID	O		0136	00737	Newborn Baby Indicator
37	1	ID	O		0136	00738	Baby Detained Indicator
38	250	CE	O		0430	01543	Mode of Arrival Code
39	250	CE	O	Y	0431	01544	Recreational Drug Use Code
40	250	CE	RE		0432	01545	**Admission Level of Care Code**
41	250	CE	RE	Y	0433	01546	**Precaution Code**
42	250	CE	O		0434	01547	Patient Condition Code
43	2	IS	O		0315	00759	Living Will Code
44	2	IS	O		0316	00760	Organ Donor Code
45	250	CE	O	Y	0435	01548	Advance Directive Code
46	8	DT	O			01549	Patient Status Effective Date
				Y	0534		
47	26	TS	C			01550	Expected LOA Return Date/Time
48	26	TS	O			01841	Expected Pre-admission Testing Date/Time
49	20	IS	O			01842	Notify Clergy Code

PV2-3 Admit Reason (CE), Required but may be empty

450 The admission reason shall contain a coded description of the disease, injury or other reason for admission when known. Systems must be able to demonstrate the capability to populate this field, although it need not be sent in all cases.

PV2-7 Visit User Code (IS), Required but may be empty

The visit user code shall contain a coded description of the isolation needs of the patient when
455 these are known. This is used to indicate the isolation or other infectious disease prevention requirements for the patient. Systems must be able to demonstrate the capability to populate this field, although it need not be sent in all cases.

PV2-8 Expected Admit Date/Time (TS), Required but may be empty

The date and time of the expected admission must be provided when it can be estimated. This
460 value is used by bed management to prioritize allocation of beds and staff. Systems must be able to demonstrate the capability to populate this field, although it need not be sent in all cases.

PV2-9 Expected Discharge Date/Time (TS), Optional

The date and time of the expected discharge may be provided when it can be estimated. This value is used by bed management to project the need for beds and staff.

PV2-10 Estimated Length of Inpatient Stay (NM), Optional

The expected length of the stay may be provided when it can be estimated. This value is used by bed management to project the need for beds and staff.

PV2-27 Expected Discharge Disposition (IS), Optional

The expected discharge disposition may be provided when it can be determined. This value is used by bed management to project the need for beds and staff, and to facilitate discharge planning. For example, when a patient is admitted from a skilled nursing facility, early discharge activity is needed to ensure that a bed will still be available for that patient when they are discharged from the hospital.

PV2-33 Expected Surgery Date and Time (TS), Required but may be empty

When it is known that surgery is needed, the date and time of any expected surgery must be provided where it can be estimated. This value is used by bed management to prioritize allocation of beds and staff in the operating room setting. Systems must be able to demonstrate the capability to populate this field, although it need not be sent in all cases.

PV2-40 Admission Level of Care Code (CE), Required but may be empty

The admission level of care code shall be provided when it can be determined. It is also known as the patient acuity score, and provides an assessment of the level of care needed. This information is used to determine the kind of bed and staffing skills need to care for the patient. Systems must be able to demonstrate the capability to populate this field, although it need not be sent in all cases.

PV2-41 Precaution Code (CE), Required but may be empty

The precaution code shall be provided when it can be determined. This field is only to be used for non-clinical precautions. This information is used to determine the kind of bed and staffing skills needed to care for the patient (e.g., patients who are agitated may need a sitter). Systems must be able to demonstrate the capability to populate this field, although it need not be sent in all cases.

3.23.4.1.4 Expected actions – Admission Reporter

The actors in the role of Admission Reporter shall populate this message with information as described in Table 3.23.4.1.2-1 above. The actor shall include a PV2 Segment as described in the previous section. This includes information about Admit Reason, Visit User Code, Expected Admit Date/Time, Expected Surgery Date/Time, Admission Level of Care, and Precaution Code.

It may also include Expected Discharge Date/Time, Estimated Length of Inpatient Stay, and Expected Discharge Disposition.

3.23.4.1.5 Expected actions – Admission Tracker

Actors in the Admission Tracker role shall add this new visit to its database, adding the patient when necessary, and shall report the result of this operation (success / error) in an acknowledgment message returned to the sender.

3.23.4.1.6 Expected actions – Tracker

The Tracker shall acknowledge receipt of this message. It has no other expected actions defined by this profile.

3.23.5 Security Considerations

ADT Messages used in this transaction are typically communicated within an institution. The actors using this transaction may be grouped with a Secure Node or Secure Application Actor as defined in the IHE Audit Trail and Node Authentication (ATNA) Integration Profile.

3.23.5.1 Security Audit Record

When grouped with the Secure Node or Secure Application Actors from ATNA, actors in this profile must generate audit messages. This transaction is to be audited as "Patient Care Episode" event, as defined in ITI TF-2a: Table 3.20.6-1. The following tables show items that are required to be part of the audit record for this transaction.

3.23.5.1.1 Admission audit message

	Field Name	Opt	Value Constraints
Event AuditMessage/ EventIdentification	EventID	M	EV(IHE0004, IHE, "Patient Care Episode")
	EventActionCode	M	"C" (create)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("PCC-23", "IHE Transactions", "Patient Admission")
Source (ADT Patient Registration) (1)			
Destination (Emergency Department Information System or Tracker or both) (1..*)			
Audit Source (1)			
Patient (1)			

Where:

Source AuditMessage/ ActiveParticipant	*UserID*	*U*	*not specialized*
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	the machine name or IP address.

Destination AuditMessage/ ActiveParticipant	*UserID*	*U*	*not specialized*
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110152, DCM, "Destination")

	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	the machine name or IP address.

Audit Source AuditMessage/ AuditSourceIdentification	*AuditSourceID*	U	*not specialized*
	AuditEnterpriseSiteID	U	*not specialized*
	AuditSourceTypeCode	U	*not specialized*

Human Requestor (if known) AuditMessage/ ActiveParticipant	UserID	M	identity of the human that initiated the transaction.
	AlternativeUserID	U	*not specialized*
	UserName	U	*not specialized*
	UserIsRequestor	U	*not specialized*
	RoleIDCode	U	Access Control role(s) the user holds that allows this transaction.
	NetworkAccessPointTypeCode	NA	
	NetworkAccessPointID	NA	

Patient (AuditMessage/ ParticipantObjectIdentif ication)	ParticipantObjectTypeCode	M	"1" (person)
	ParticipantObjectTypeCodeRole	M	"1" (patient)
	ParticipantObjectDataLifeCycle	U	*not specialized*
	ParticipantObjectIDTypeCode	M	*not specialized*
	ParticipantObjectSensitivity	U	*not specialized*
	ParticipantObjectID	M	the patient ID in HL7 CX format (see ITI TF-2x: appendix E)
	ParticipantObjectName	U	*not specialized*
	ParticipantObjectQuery	U	*not specialized*
	ParticipantObjectDetail	M	Type=II (the literal string), Value=the value of message.id

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If a patient record is created or updated as a result of this admission the ADT Patient Registration must also record the Patient Record creation or Update event, and shall include the Source, Destination, Audit Source, Human Requestor and Patient as specified above.

|	**Field Name**	**Opt**	**Value Constraints**
Event AuditMessage/ EventIdentification	EventID	M	EV(110110, DCM, "Patient Record")
	EventActionCode	M	"C" (create), "U" (update)
	EventDateTime	M	*not specialized*
	EventOutcomeIndicator	M	*not specialized*
	EventTypeCode	M	EV("PCC-23", "IHE Transactions", "Patient Admission")
Source (ADT Patient Registration) (1)			
Destination (Emergency Department Information System or Tracker or both) (1..*)			
Audit Source (ADT Patient Registration) (1)			
Patient (1)			

525

3.24 Admission Order [PCC-24]

3.24.1 Scope

This transaction is used to notify other actors of proposed or actual admission orders.

530 ### 3.24.2 Actor Roles
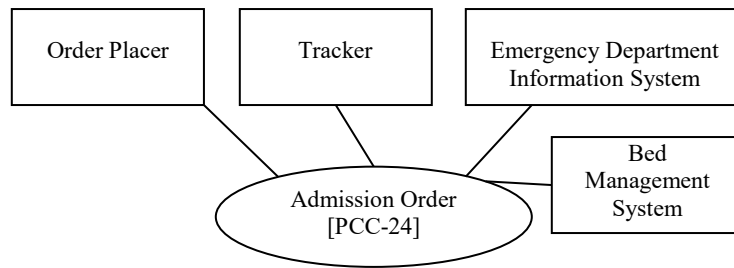
Figure 3.24.2-1: Use Case Diagram

Table 3.24.2-1: Actor Roles
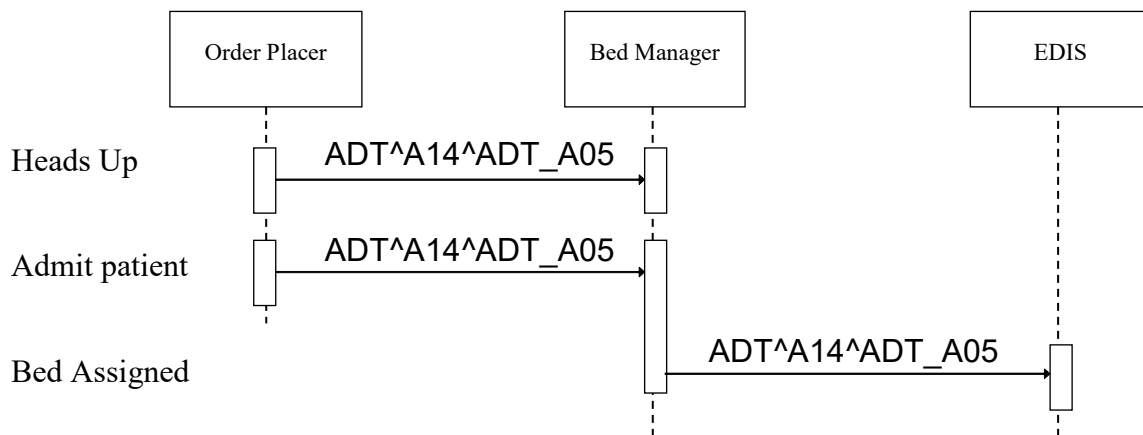
Actor:	Bed Manager
Actor:	Tracker
Actor:	Order Placer
Actor:	Emergency Department Information System

3.24.3 Referenced Standards

535 HL7 Version 2.5

3.24.4 Interaction Diagram

3.24.4.1 Admission Order

540 The Order Placer sends this message to notify the Bed Manager of a proposed (Heads Up) or actual admission order. The Bed Manager sends this message to the Emergency Department Information System to update information about the status of an assigned bed related to a previously sent order.

3.24.4.1.1 Trigger Events

545 When the healthcare provider orders an admission to an inpatient or observation ward, the Order Placer sends this message to the Tracker and the Bed Manager Actors.

When a provider suspects that a patient may need a bed, but is not yet certain, he or she may also communicate this information (a Heads Up notification), which is sent by the Order Placer to the Tracker and Bed Manager Actors.

550 When a bed is assigned to the patient, but the patient has not yet been formally admitted, the Bed Manager sends this message to communicate the location of the assigned bed to the Emergency Department Information System.

MSH-9 is valued **ADT^A14^ADT_A05**.

When used as a Heads Up notification, EVN-4 shall be valued with HU, indicating that this is a heads up notification, not an actual admission order.

555 #### 3.24.4.1.2 Message Semantics

Message semantics are as specified in Patient Encounter Management [ITI-31]as described in ITI TF-2b: 3.31.7.13 Pending Admit (ADT^A14^ADT_A05). The PV2 segment shall be populated as indicated in Section 3.23.4.1.3 of transaction [PCC-23] in this technical framework.

3.24.4.1.3 Expected Actions – Order Placer

560 The Order Placer shall populate this message with information as described in Patient Encounter Management [ITI-31] for the Pending Admit message. The actor shall include a PV2 Segment as defined in [PCC-23] in this technical framework. That segment shall include information about Admit Reason, Visit User Code (Isolation Requirements), Expected Admit Date/Time, Expected Surgery Date/Time, Admission Level of Care (Acuity), and Precaution Code when known.

565 The Order Placer may also include Expected Discharge Date/Time, Estimated Length of Inpatient Stay, and Expected Discharge Disposition.

3.24.4.1.4 Expected Actions – Bed Manager

The Bed Manager shall acknowledge receipt of this message, and take appropriate actions to initiate allocation of a bed based upon whether this is a heads up notification or an actual 570 admission.

The Bed Manager shall send this message to the Emergency Department Information System and the Tracker to notify these actors of the bed assignment.

3.24.4.1.5 Expected Actions – Tracker

The Tracker shall acknowledge receipt of this message. It has no other expected actions defined
by this profile.

3.24.4.1.6 Expected Actions – Emergency Department Information System

The Emergency Department Information System shall acknowledge receipt of this message. It
shall notify the ED staff that a bed is now available for the assigned patient.

3.24.5 Security Considerations

ADT Messages used in this transaction are typically communicated within an institution. The
actors using this transaction may be grouped with a Secure Node or Secure Application as
defined in the IHE Audit Trail and Node Authentication (ATNA) Integration Profile to secure
the communications.

3.24.5.1 Security Audit Record

When grouped with the Secure Node or Secure Application Actors from ATNA, actors in this
profile must generate audit messages. This transaction is to be audited as "Patient Care Episode"
event, as defined in ITI TF-2a: Table 3.20.6-1. The following tables show items that are required
to be part of the audit record for this transaction.

3.24.5.1.1 Admission audit message

	Field Name	Opt	Value Constraints
Event AuditMessage/ EventIdentification	EventID	M	EV(IHE0004, IHE, "Patient Care Episode")
	EventActionCode	M	"C" (create)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("PCC-24", "IHE Transactions", "Admission Order")
Source (Order Placer) (1)			
Destination (Bed Manager or Tracker or both) (1..*)			
Audit Source (1)			
Patient (1)			

Where:

Source AuditMessage/ ActiveParticipant	*UserID*	*U*	*not specialized*
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	the machine name or IP address.

Destination AuditMessage/ ActiveParticipant	*UserID*	*U*	*not specialized*
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	the machine name or IP address.

Audit Source AuditMessage/ AuditSourceIdentification	*AuditSourceID*	*U*	*not specialized*
	AuditEnterpriseSiteID	*U*	*not specialized*
	AuditSourceTypeCode	*U*	*not specialized*

Human Requestor (if known) AuditMessage/ ActiveParticipant	UserID	M	identity of the human that initiated the transaction.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	U	Access Control role(s) the user holds that allows this transaction.
	NetworkAccessPointTypeCode	NA	
	NetworkAccessPointID	NA	

| **Patient** (AuditMessage/ ParticipantObjectIdentification)	ParticipantObjectTypeCode	M	"1" (person)
	ParticipantObjectTypeCodeRole	M	"1" (patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	*M*	*not specialized*
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	the patient ID in HL7 CX format (see ITI TF-2x: appendix E)
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	M	Type=II (the literal string), Value=the value of message.id

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3.25 Patient Movement [PCC-25]

3.25.1 Scope

This transaction is used to notify actors of patient movement from one location to another.

3.25.2 Actor Roles
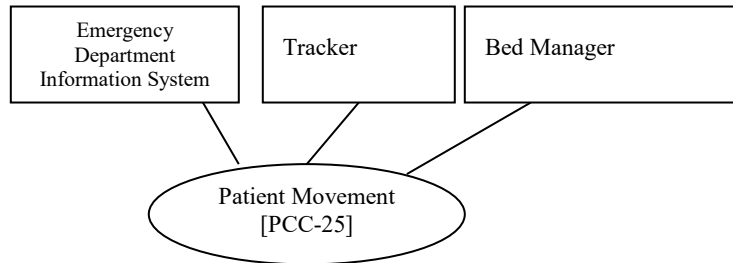
600

Figure 3.25.2-1: Use Case Diagram

Table 3.25.2-1: Actor Roles

Actor:	Emergency Department Information System
Role:	Patient Encounter Supplier
Role:	Patient Encounter Consumer
Actor:	Tracker
Role:	Patient Encounter Consumer
Actor:	Bed Manager
Role:	Patient Encounter Consumer
Role:	Patient Encounter Supplier

3.25.3 Referenced Standards

HL7 Version 2.5

605 ### 3.25.4 Interaction Diagram
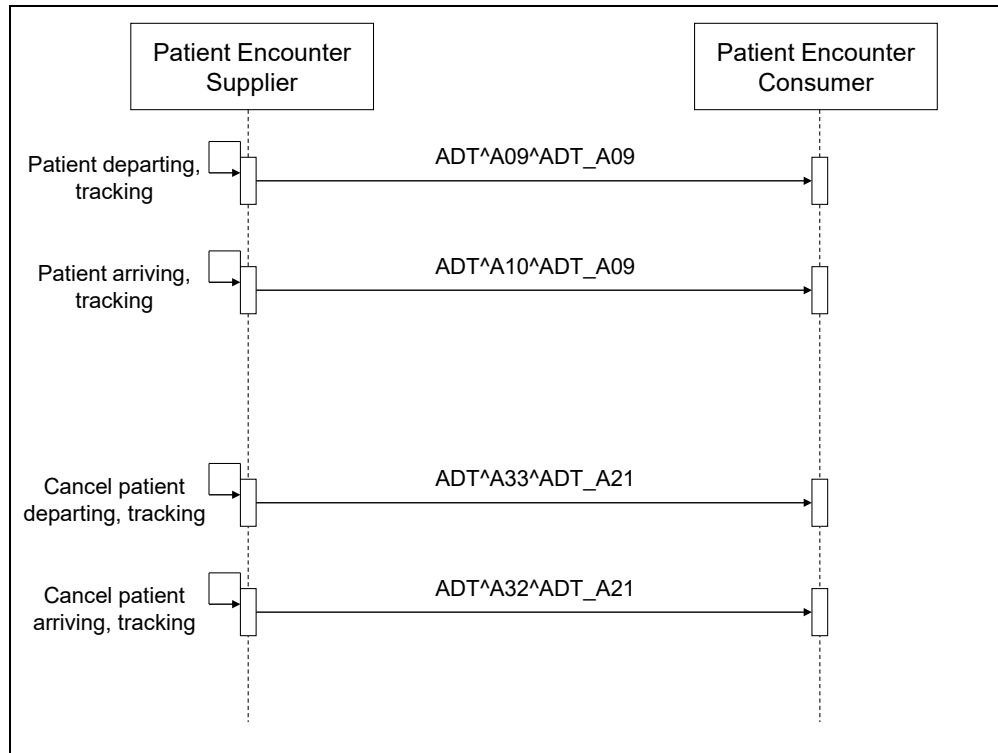
3.25.4.1 Patient Movement

The semantics, interactions, and expected actions, of the Patient Movement messages are as
610 specified in ITI TF 2b: 3.31.26-29 as described in the Patient Encounter Management [ITI-31]
transaction.

3.25.5 Security Considerations

ADT Messages used in this transaction are typically communicated within an institution. The
actors using this transaction may be grouped with a Secure Node or Secure Application Actor as
615 defined in the IHE Audit Trail and Node Authentication (ATNA) Integration Profile to secure
the communications.

3.25.5.1 Security Audit Record

When grouped with the Secure Node or Secure Application Actors from ATNA, actors in this
profile must generate audit messages. This transaction is to be audited as "Patient Care Episode"
620 event, as defined in ITI TF-2a: Table 3.20.6-1. The following tables show items that are required
to be part of the audit record for this transaction.

3.25.5.1.1 Admission audit message

	Field Name	Opt	Value Constraints
Event AuditMessage/ EventIdentification	EventID	M	EV(IHE0004, IHE, "Patient Care Episode")
	EventActionCode	M	"U" (update)
	EventDateTime	*M*	*not specialized*
	EventOutcomeIndicator	*M*	*not specialized*
	EventTypeCode	M	EV("PCC-24", "IHE Transactions", "Patient Admission")
Source (Order Placer) (1)			
Destination (Bed Manager or Tracker or both) (1..*)			
Audit Source (1)			
Patient (1)			

Where:

Source AuditMessage/ ActiveParticipant	*UserID*	*U*	*not specialized*
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110153, DCM, "Source")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	the machine name or IP address.

Destination AuditMessage/ ActiveParticipant	*UserID*	*U*	*not specialized*
	AlternativeUserID	M	the process ID as used within the local operating system in the local system logs.
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	M	EV(110152, DCM, "Destination")
	NetworkAccessPointTypeCode	M	"1" for machine (DNS) name, "2" for IP address
	NetworkAccessPointID	M	the machine name or IP address.

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Audit Source AuditMessage/ AuditSourceIdentification	*AuditSourceID*	*U*	*not specialized*
	AuditEnterpriseSiteID	*U*	*not specialized*
	AuditSourceTypeCode	*U*	*not specialized*

Human Requestor (if known) AuditMessage/ ActiveParticipant	UserID	M	identity of the human that initiated the transaction.
	AlternativeUserID	*U*	*not specialized*
	UserName	*U*	*not specialized*
	UserIsRequestor	*U*	*not specialized*
	RoleIDCode	U	Access Control role(s) the user holds that allows this transaction.
	NetworkAccessPointTypeCode	NA	
	NetworkAccessPointID	NA	

Patient (AuditMessage/ ParticipantObjectIdentification)	ParticipantObjectTypeCode	M	"1" (person)
	ParticipantObjectTypeCodeRole	M	"1" (patient)
	ParticipantObjectDataLifeCycle	*U*	*not specialized*
	ParticipantObjectIDTypeCode	*M*	*not specialized*
	ParticipantObjectSensitivity	*U*	*not specialized*
	ParticipantObjectID	M	the patient ID in HL7 CX format (see ITI TF-2x: appendix E)
	ParticipantObjectName	*U*	*not specialized*
	ParticipantObjectQuery	*U*	*not specialized*
	ParticipantObjectDetail	M	Type=II (the literal string), Value=the value of message.id