Point-of-Care Identity Management: Domain Analysis Notes

# Scope and Purpose

This is a working document on the results of analysis of the problem of accurate association of automatically collected device observations with particular patients. It discusses the use cases and work flows connected with the problem, and the domain entities and relationships helpful in the abstract analysis of the problem.

# Definitions

| Term | Definition |
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| PCIM | Point-of-Care Identity Management – IHE PCD project to define use cases and information exchanges to support accurate association of devices with patients |
| Strong Identity Factor | An identity factor designed to uniquely identify a person, device or other entity within the scope of this document |
| Weak Identity | An identity factored used to contribute to identifying an entity, by narrowing the domain of candidate identities without an expectation that the identification will be unique |
| Device-patient association | An association linking a patient with a device (more particularly, with a stream of measurements from the device) having a start and a finish, and hence a duration. |
| Identity assertion |  |
| Patient Demographic Supplier (IHE Profile Actor) | IHE abstract profile actor that can respond to a query giving one or more identity factors. The response is a list of candidate identities consistent with the identity factors in the query. For example, a query could give a pattern of SMI\* for patient last name, and the response would be a list of candidate patient identities beginning with the given letters, to be presented to a person in a pick list, for the purposes of verification. |
| Patient Demographic Consumer | IHE abstract profile actor querying a Patient Demographic Supplier and accepting the query response. |
| Point-of-care gateway | An intermediary system which may exist associated with a point-of-care that communicates with medical devices on the one hand, communicates observation data to a receiving system, typically an electronic medical record system. It may play a role in establishing and recording device-patient associations. |
| Electronic medical record system | Collects and organizes care data from clinicians and medical devices. It may play a role in tracking device-patient associations |
| Device-patient association broker | A system that receives and records data concerning the setup and breakdown of device-patient associations, and, acting according to defined business rules, serves as an authoritative source of device-patient association events, responds to queries on status. |
| Lost data due to DPA gap | In the case where there is a time gap between device data being validly collected, and the EMR beginning to record the data for a particular patient |
| Wrongly associated data due to DPA asynchrony | Device data may be wrongly associated with a patient if the EMR does not have accurate information about when valid data collection began or ended (for example, if one patient is disconnected from an monitor and another connected without the EMR getting timely information about the change, some of the second patient’s data may be wrongly added to the first patient’s record. |
| Retrospective verification | An operation by an authorized person at an EMR adjusting the beginning, the end, or both of an interval when device data were supplied, to exclude incorrectly associated data, or include incorrectly excluded data. |
| Multifactor identification | Combination of identity factors, some of which may be weak |

# Introduction

# Assumptions

## Hospital Information Systems as data sources

A typical hospital information systems is not designed to be perfectly synchronized and infallible about what patient actually was connected to all medical devices.

## Necessity of verification

Patient-device association cannot be safely carried out solely by automated observations without verification by an authorized person.

## Events and the problem of duration

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| Event | Limitation |
| Admission and discharge at central HIS | Not typically synchronized with the actual admission or the beginning of a valid observation stream from devices. Needs verification by an authorized person actually at the point-of-care. |
| Connection of device to a wired terminal point | May provide a clue for device-patient association, but must be verified. |
| RFID indication that the device and the patient are in proximity | May provide a clue for device-patient association, but must be verified. |

## Consumers of patient-device association data

Point-of-care Gateway – may play a role in the association of patient demographic information

Electronic medical record – should be informed that one or more device-patient associations have been confirmed. Data should also be verified at the EMR, to rule out asynchrony of the recording of the association, and the actual beginning (and end) of reliable data flow of observations from the device or devices.

Medical Devices – device itself

# Use Cases

1. Self-contained system sends PCD-01 with demographic information integrated (cf. Robert’s previous documents
2. Systems with gateway as integrator (nurse entering, editing data)

# Participating Actors

# Open Issues

## What are the differences for different device classes, e.g. infusion pumps & spot check devices?