2014 PCD Domain Update

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IHE PCD Technical Committee Co-Chair
Patient Care Device (PCD) Domain

Formed in 2005 to address issues related to integration of Point-of-Care Medical Devices

Mission – enable “Out of the Box”, Reliable, “Functionally Interoperable” solutions

Using IHE & PCD open Processes and open Standards

Technical Underpinnings

- HL7 version 2.6
- IEEE 11073 Standards
  - 10101 Standardized Nomenclature, 10201 – Standardized Information Model
- Wireless Communication Transfer Protocol (WCTP)
- IHE ITI domain Consistent Time (CT) profile – Network Time Protocol (NTP)

IHE PCD Co-sponsors

HIMSS  ACCE  AAMI
Patient Care Device (PCD) Domain

Focus is on devices associated with patients, including…

Patient monitors, vital signs monitors, pulse oximetry, ventilators,
Infusion pumps, syringe pumps, PCA pumps, etc.

• Collecting and reporting data from devices for immediate access and for retrospective storage and retrieval (EMR)

Device to Enterprise Communication (DEC) (leveraged by Continua Alliance for feeding data into health records)

Implantable Device - Cardiac Observation (IDCO)

Retrospective Data Query (RDQ)
Patient Care Device (PCD) Domain (contd.)

• Getting alerts (alarms & advisories) to staff (clinicians, clinical engineers, IT, etc.) on mobile & desktop devices

  Alert Communication Management (ACM) (formerly Alarm Communication Management)

• Improving infusion order safety (including a 6th right, right pump)

  Point of care Infusion Verification (PIV)

  Infusion Pump Event Communication/Event Communication (IPEC/EC)
Patient Care Device (PCD) Domain (contd.)

- **Harmonizing terminology**
  
  Rosetta Terminology Mapping (RTM)
  
  RTM Management System in conjunction with NIST

- **Waveform support**

  Waveform Content Module (WCM) communicating evidentiary data for storage and alerting

- **Medical Equipment Management**

  Device Management Communication (MEMDMC)

  Location Services (MEMLS)
The DEC profile allows a consuming system (DOC) to receive patient clinical information including vitals, demographics, settings, and location from a reporting device/system (DOR).

The Subscribe to Patient Data (SPD) option allows the consumer to filter the data by:

- Medical Record #
- Device Class
- Update Interval
- Start & End Times
- Parameter Class
- Patient Location
Alert Communication Management (ACM)

HL7 Messages per ACM and WCM profiles
- Parameters, waveforms, etc. as evidentiary data items
- Device specific graphics

Alert Information
- Source, Phase, State, Priority
- Patient
- Location
- Instance
- Alert text
- Callback
- Timestamp
- Evidentiary data

Dissemination Status
- Instance
- Accepted by AC
- Undeliverable
- Delivered
- Read
- Accepted
- Rejected
- Cancelled
- Callback start/stop

Alert Source
Point of care Infusion Verification (PIV)

Physician’s Order

Nurse Review

Pharmacist Review

BCMA to Pump (PCD-03)
Pump may provide data to EMR (PCD-01)

Nurse confirms 6 Rights:
• Right Patient
• Right Medication
• Right Dose
• Right Time
• Right Route
• Right Device

Infusion Pumps
Infusion Pump Event Communication (IPEC)

Infusion Pump Event Communication enables reporting of clinical and operational events from an infusion pump to a Bedside Computer-assisted Medication Administration (BCMA) system or EMR. Clinicians can then view and validate this information for infusion documentation.

**BCMA/EMR**

Prior to medication administration, nurse confirms the 6 Rights of administration using BCMA/EMR:
- Right Patient
- Right Medication
- Right Dose
- Right Time
- Right Route
- Right Device

Infusion-related events are displayed, validated, and/or recorded by the clinician using the BCMA/EMR.

Infusion order sent from BCMA/EMR to Pump (PCD-03)

Pump provides information on infusion-related events to BCMA/EMR (PCD-10) such as:
- Delivery Start
- Delivery Stop
- Delivery Complete
Implantable Device – Cardiac Observation (IDCO)

**IDCO profile** defines sending of pacemaker and Implantable Cardiology Defibrillator data.

**Collect device data from:**
- Device implant
- In-clinic visits
- Remote transmissions from patient’s home

**Includes data for:**
- Current device state
- Event/episode information
- Device-collected electrocardiograms

**Device Implant Procedure**

**In-clinic Follow-up**

**Patient Home Monitoring**

**Company Proprietary Formats**

**Company Processors**

**IDCO data transfer to EHR**

**Clinician views data in EHR**

**Forward raw data to company data processor systems**

**Process/convert data into XML format & PDF reports**

**Hospital, Other EHRs**
Retrospective Data Query (RDQ)

Supports retrospective query of PCD data from databases. Supports Use Cases such as Clinical Decision Support, back-filling of EMR databases, etc.
Device Management, Location Services

Profile based messages relay IV pump status including:
- Infusing
- Stopped

RTLS uses location to interpret asset status:
- Biomed (PM / Repair)
- CS (Cleaning)
- Clean Utility
- Patient Room (In Use)
- Dirty Utility

Combined data generates asset state:
- Available
- In Active Use
- Unavailable but Idle
- Unavailable (PM / Technical Assessment): Future based on CMMS Data

Drives workflow and analytics:
- Where can I find idle pumps to return to circulation and meet requests?
- How often are pumps sitting idle in patient rooms?
- What is my true utilization?
- Is the pump leaving the building running (with a patient) or idle (possible theft)?
- Do I have more inventory than I need? (And what is related maintenance cost? Replacement cost?)
Device Interoperability

CPOE/ Pharmacy
System

Barcode Med Admin
System

Anesthesia
Ventilation
and
Other Systems

Infusion
Pump

Physiologic
Monitoring
System

EMR/EHR
CIS
Interface
Systems

Clinical Decision
Support System

Implantable
Device

Home Based
Systems

Phones and
Other Devices for
Clinicians

Other Devices

CMMS and
RTLS Systems

ACM – Alert Communication Management
DEC – Device Enterprise Communication
DMC – Device Management Communication
EC – Event Communication
IPEC – Infusion Pump Event Communication
IDCO – Implantable Device – Cardiac – Observation
PIV – Point-of-Care Infusion Verification
RDQ – Retrospective Data Query
WCM – Waveform Content Module
NIST Testing Tools

Validation
- Test Management
- Test Services
- Test System Development Components

Test Harness
- Test Resources
- Test System Instance

Specification Constraints
- Standards Profile
- Domain Framework

- Terminology/Nomenclature
- Test Case/Value(s)

Based on Use Case(s)

Assertions
- HL7 Message Definitions
- Value Set Constraints

- IEEE / Rosetta Nomenclature
- Test Case Specific Assertions

Testable Assertions: IHE-PCD Validation Requirements Used by NIST Test Tools

Message E.g., HL7 V2

User / Device

Report
Current Efforts

• Alerts (alarms & advisories) & Events Rosetta Terminology Mapping
• Device Specializations – Pulse Oximeter, Infusion Device, Ventilator
• Medical Device Security Management
• PCD Profile Version Management
• FHIR Resources – general FHIR technology review to culminate in a whitepaper describing PCD terminology mapping to FHIR
• FDA UDI – Working with the HL7.org committees to advance UDI support in HL7 v2.
Optimized Message Syntax (OMS)

Optimized Message Syntax is an effort to adapt IHE PCD profiles for devices that have slow legacy RS-232 serial ports. OMS will optimize the PCD messages to reduce their size but still maintain consistency with mainstream PCD messages.
Future Efforts

Medical Device Technical Management
  Error logs, access to device logs
  Software & Hardware revisions

Medical Device Cyber Security

Medical Device to Device Communication

Medical Device Specializations

Improving device management, safety, and availability (DMC, RTLS)
  Utilization, Location, Failure alerts, Battery condition

Improved asset management (qty rented/purchased)
Role of Healthcare Organizations

Support the Mission of IHE PCD

Participate in IHE PCD

The voice of the users of what vendors produce – be heard

Plant the Seed

Support and Request IHE Interoperability

Encourage active IHE participation by vendors

Purchase IHE PCD compliant products

Request vendors to provide IHE Integration Statements

Specify IHE PCD compliant solutions in RFPs by profile/actor
## IHE PCD Compliant Systems

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>SYSTEM</th>
<th>SYSTEM TYPE</th>
<th>PCD PROFILES</th>
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<tbody>
<tr>
<td>Accent on Integration, Inc. (AOI)</td>
<td>Accelero Connect®</td>
<td>Medical Device Integration</td>
<td>DEC</td>
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<td>Amcom</td>
<td>Messenger</td>
<td>Alarm Manager</td>
<td>ACM</td>
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<td>B Braun</td>
<td>DoseTrac Infusion Management Software</td>
<td>Gateway software</td>
<td>DEC, ACM, PIV</td>
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<tr>
<td>BIOTRONIK SE &amp; Co. KG</td>
<td>Home Monitoring Service Center</td>
<td>Implantable Cardiac Device Observer System</td>
<td>IDCO</td>
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<td>Carefusion</td>
<td>CGW</td>
<td>Gateway</td>
<td>DEC</td>
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<tr>
<td>Cerner</td>
<td>CareAware iBus</td>
<td>Device Connectivity Platform</td>
<td>DEC</td>
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<tr>
<td>Epic</td>
<td>EpicCare Inpatient and associated modules</td>
<td>EMR/EHR</td>
<td>DEC, PIV, IDCO</td>
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<tr>
<td>GE HealthCare</td>
<td>CARESCAPE Gateway</td>
<td>Gateway</td>
<td>DEC</td>
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<td>Hospira</td>
<td>Hospira MedNet</td>
<td>Infusion pump gateway</td>
<td>PIV</td>
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<td>iMDsoft</td>
<td>MetaVision Suite</td>
<td>CIS, AIMS</td>
<td>DEC</td>
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<td>iSirona</td>
<td>DeviceConX</td>
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<td>DEC</td>
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<td>HL7 Gateway</td>
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<td>Anesthesia machine</td>
<td>DEC</td>
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<td>VEGA™</td>
<td>Gateway</td>
<td>DEC</td>
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<td>OZ Systems</td>
<td>eSP™</td>
<td>Interface</td>
<td>DEC</td>
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<td>IntelliSpace Event Management</td>
<td>Alarm Manager</td>
<td>ACM</td>
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<td>Philips Healthcare</td>
<td>Philips IntelliVue and Philips IntelliBridge SC200</td>
<td>Monitoring central station and gateway</td>
<td>DEC</td>
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<td>ScottCare</td>
<td>ScottCare OneView System</td>
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<td>IDCO</td>
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<td>St. Jude Medical, Inc.</td>
<td>Merlin.net MN5000</td>
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<td>Surgical Information Systems</td>
<td>SIS Periop</td>
<td>CIS, EHR, AIMS</td>
<td>ACM, DEC</td>
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<td>Welch Allyn</td>
<td>Connex VM</td>
<td>Vital Signs Monitor</td>
<td>DEC</td>
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Additional Resources

IHE PCD Getting Started – Tiny.cc/PCDStart
IHE PCD User Guide – Tiny.cc/PCDHandbook
IHE web site – www.IHE.net
  PCD web site – www.ihe.net/pcd/index.cfm
  PCD ftp site – ftp://ftp.ihe.net/Patient_Care_Devices/
  PCD wiki – wiki.ihe.net/index.php?title=Patient_Care_Devices

Test Tool web sites
  PCD Pre-Connectathon – tinyurl.com/NIST-PCDtt
  PCD Connectathon – tinyurl.com/NIST-PCDctt
  Rosetta Terminology – tinyurl.com/NIST-RTMMS