IHE | Integrating the Healthcare Enterprise

Patient Care Coordination 2017 Domain Update

Presented by:
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Amit Popat

Today's Presenters

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Epic

Learning Objectives

- Describe the history of the PCC domain.
- Explain the vision, mission, and strategic goals of PCC and its relevance in IHE and health IT.
- Describe the work accomplished by PCC over the most recent annual work cycle.
- Identify opportunities for your organization to participate in PCC domain activities and understand how to get engaged.

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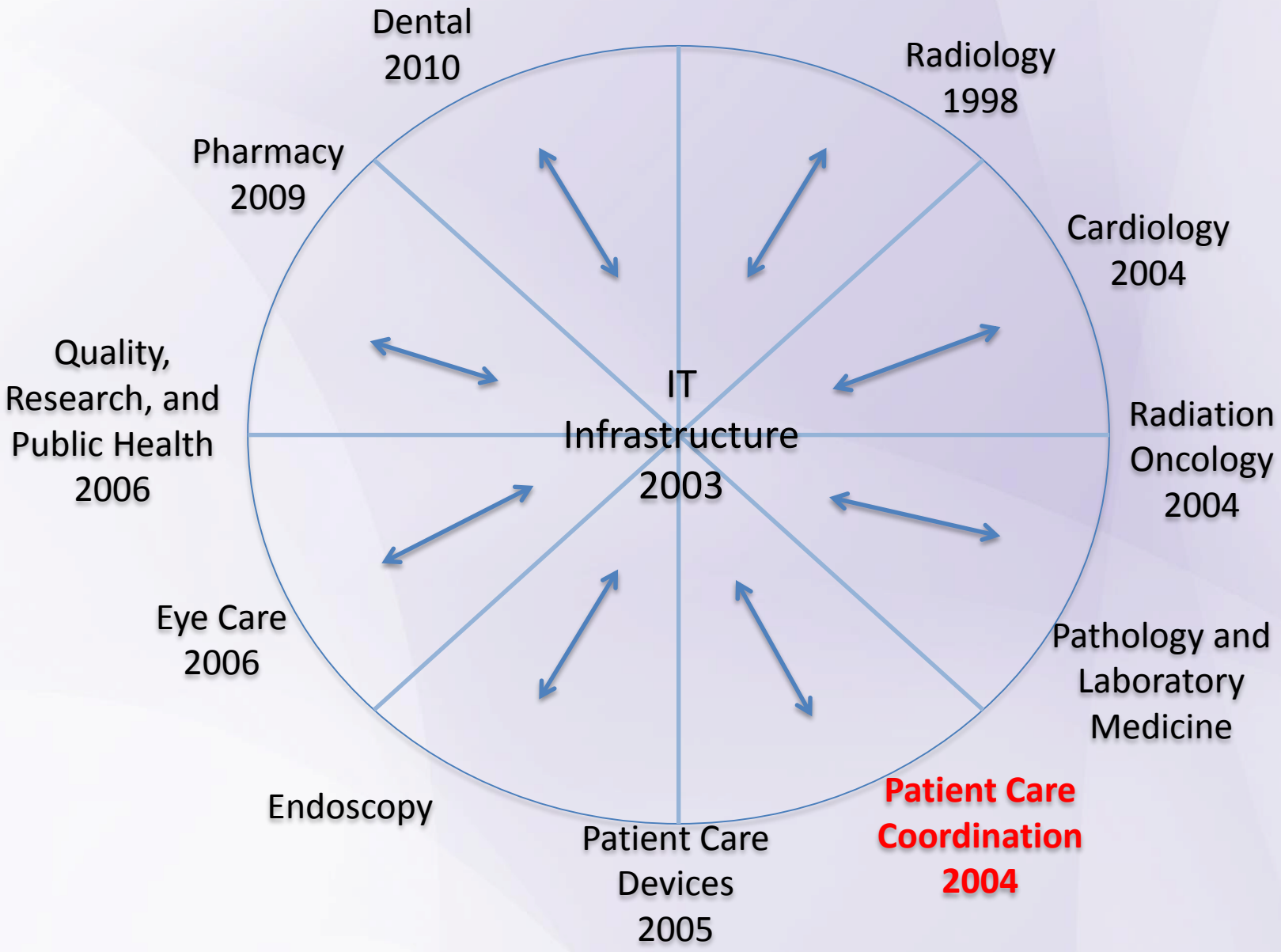
Today's Agenda

- Overview and History
- Vision and Mission
- Strategic Goals
- Profiles and Technical Frameworks
  - Key Existing Profiles
  - New Profiles
- How to Participate
- Q&A

12 IHE Domains



PCC History

- Formed in 2004
- Sponsors:
  - American College of Physicians (ACP)
  - Healthcare Information and Management Systems Society (HIMSS)
- Cross-Enterprise Sharing of Medical Summaries (XDS-MS)
  - First PCC profile and first IHE content profile
  - Delivered in 2005 for Trial Implementation
- Profiles delivered since:
  - 23 content profiles
  - 9 integration profiles
  - 7 workflow profiles

PCC Vision and Mission

- **Vision:**
  - To continually improve patient outcomes through the use of technology connecting across healthcare disciplines and care paths
- **Mission:**
  - To develop and maintain interoperability profiles to support coordination of care for patients where that care cross providers, patient conditions and health concerns, or time.

http://wiki.ihe.net/index.php?title=Patient_Care_Coordination

PCC Strategic Goals

- Content
  - Coordinate with external standards development organizations (SDOs) to develop and promote the use of content templates
  - Develop strategies to support multi-level content template guidance to benefit the global community
- Workflow
  - Develop new profiles by reaching outward to other IHE domains to coordinate workflows across care paths
  - Develop white papers exploring new areas that could benefit from standards-based interoperability guidance
- Nursing
  - Examine and understand the benefit of Ihe profile work in the nursing space by partnering with nursing organizations and initiatives
  - Develop profiles and white papers to support and explore various nursing specific workflows

http://wiki.ihe.net/index.php/PCC_Roadmap

PCC Scope

- General clinical care aspects
  - Order processing
  - Coordination with other specialty domains
  - Patient perspective
  - Clinician perspective
- Workflows and integration needs that are common to multiple specialty areas
  - Document exchange
  - Clinical message exchange
  - Clinical reconciliation

PCC National and International Presence

Region	Country	Roles	Additional Information
Europe	France	Implementer Developer	• http://esante.gouv.fr/en/actus • http://www.ihe.net/uploadedFiles/Content/case_study_france_ehr.pdf • Obestetric use cases, others
	Italy	Implementer Developer	• http://www.consorzioarsenal.it/web/guest • Workflow definition profiles (XDW-based)
North America	US	Implementer Developer	• http://www.siframework.org/ • https://www.healthit.gov/ • Data Access Framework National Extension, MU
	Canada	Developer	
Asia	China	Implementer	• http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3243277/
Middle East	Saudi Arabia	Implementer	• Medications, immunizations, eReferral

http://ihe.net/IHE_Worldwide/

Profiles and Technical Frameworks

Profiling Approaches

- Content
  - Structuring clinical or financial content
  - Uses Content Creator, Content Consumer actors
  - CDA, FHIR
- Integration
  - Interaction between two systems
  - Uses a variety of actors and transactions
  - HL7v3, FHIR, etc.
- Workflow
  - Interaction between a patient and multiple providers
  - Cross-domain

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Pink= Perinatal
Green = Emergency Care
Blue= Nursing and Care Coordination

Profiles and Technical Frameworks

23 Content Profiles

- **Antepartum Education (APE)**
- **Antepartum History and Physical (APHP)**
- **Antepartum Laboratory (APL)**
- **Antepartum Summary (APS)**
- **Composite Triage Note and Nursing Note (CTNN)**
- Cross-enterprise Sharing of Medical Summaries (XDS-MS)
- **ED Physician Note (EDPN)**
- **Emergency Department Referral (EDR)**
- **EMS Transfer Summary (EMS)**
- **eNursing Summary (ENS)**
- Immunization Content (IC)
- Interfacility Transport Summary (ITS)
- **Labor and Delivery History and Physical (LDHP)**
- **Labor and Delivery Summary (LDS)**
- **Maternal Discharge Summary (MDS)**
- Multiple Content Views (MCV)
- **Newborn Discharge Summary (NDS)**
- **Nursing Note (NN)**
- **Patient Care Plan (PCP)**
- **Patient Plan of Care (PPoC)**
- Personal Health Record (XPHR)
- **Postpartum Visit Summary (PVS)**
- **Triage Note (TN)**

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Profiles and Technical Frameworks

13 Integration Profiles

- **Bed Management (BED)**
- Clinical Mapping (CMAP)
- Guideline Appropriate Ordering (GAO)
- Query for Existing Data (QED)
- Query for Existing Data for Mobile (QEDm)
- Referral/Order Linking (ROL)
- **Dynamic Care Planning (DCP)**
- **Dynamic Care Team Management (DCTM)**
- **Reconciliation of Clinical Content and Care Providers (RECON)**
- Request for Clinical Guidance (RCG)
- Retrieve Clinical Knowledge (RCK)
- Point-of-care Medical Device Tracking (PMDT)
- Routine Interfacility Patient Transport (RIPT)

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Profiles and Technical Frameworks

7 Workflow Profiles

- **Cross-enterprise Basic eReferral Workflow Definition (XBeR-WD)**
- Cross-Enterprise Cardiovascular Heart Team Workflow Definition (XCHT-WD)
- Cross-enterprise TeleHome Monitoring Workflow Definition (XTHM-WD)
- Cross-enterprise Tumor Board Workflow Definition (XTB-WD)
- **Perinatal Workflow (PW)**
- Remote Patient Monitoring (RPM)
- **Care Management (CM)**

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Profiles and Technical Frameworks

Early Content Profiles

- Medical Summaries (XDS-MS)
  - Discharge and Referral Summaries exchanged between providers
  - EHR, HIS, HIE
  - Transitions of care between inpatient and ambulatory settings
- Emergency Department Referral (EDR)
  - Enhances XDS-MS to support “Heads-up” call to ED
  - EHR, EDIS, HIS, HIE
  - Provides critical data needed in ED visits
- Exchange of Personal Health Records (XPHR)
  - Exchange clinical summary data between patients and providers
  - EHR, PHR, Patient Portal
  - Ensures patients have updated lists of healthcare providers, problems, medications, allergies, immunizations, lab results, procedures, and encounters

Profiles and Technical Frameworks

Existing Clinical Decision Support Profiles

- Query for Existing Data (QED)
  - Access to clinical data
  - EHR, CDR, HIS, Registries
  - For use in quality measurement, reporting, clinical decision support, and research
- Care Management (CM)
  - Supports communication to specialized care delivery systems for disease management
- Request for Clinical Guidance (RCG)
  - Access to clinical decision support as a service
  - EHR, other HIT systems
- Retrieve Clinical Knowledge (RCK)
  - Interface for health IT systems, Personal Health Records, and HIEs to retrieve knowledge on a topic suitable for presentation to a clinician or patient

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Profiles and Technical Frameworks

Existing Cross Domain Profiles*

Profile	Domain	Description
Remote Patient Monitoring (RPM)	Patient Care Devices (PCD)	Standardizes measurements taken by personal healthcare devices in remote settings
Clinical Mapping (CMAP)	Patient Care Devices (PCD)	Manages nomenclature transformations mapping to and from clinical terminologies
Cardiovascular Heart Team Workflow Definition (XCHT-WD)	Cardiology (CARD)	Facilitates management of a dynamic Heart Team supporting decisions typically made in cardiology care
Perinatal Workflow (PW)	Radiology (RAD) Laboratory (LAB) Patient Care Devices (PCD) Quality, Research, and Public Health (QRPH)	Simplifies exchanges between various providers of perinatal care by utilizing profiles and transactions from several IHE domains to support the continuum of care of expectant mothers and newborns
Guideline Appropriate Ordering (GAO)	Radiology (RAD)	Provides appropriateness guidance to systems utilizing decision support interoperability

*Does not represent ALL profiles with cross-domain dependencies

New Profiles

2017 Patient Care Coordination

http://ihe.net/Technical_Frameworks/#pcc

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Point-of-Care Medical Device Tracking (PMDT)

PROBLEM

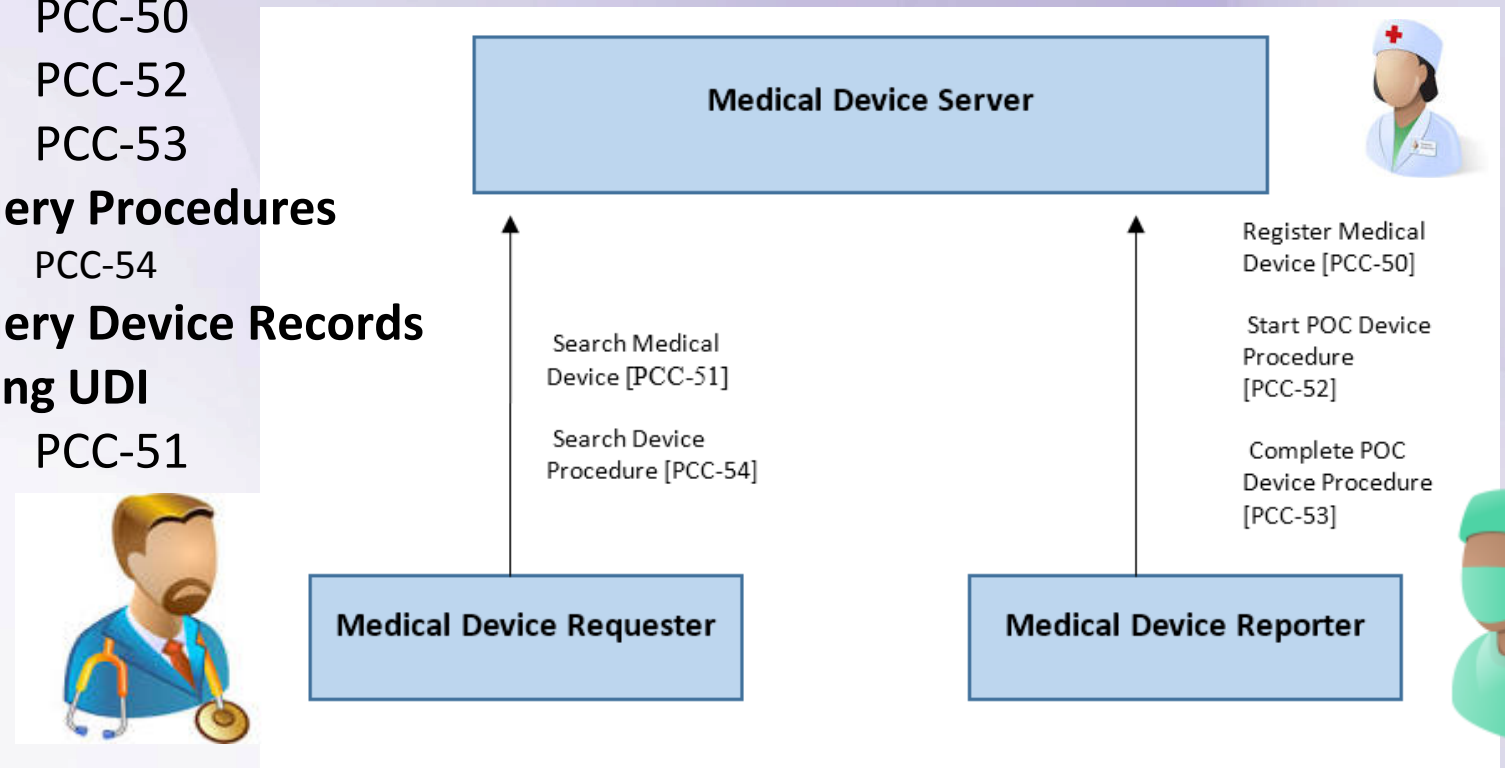
- **Implantable medical devices are costly and concerns about illegitimate (i.e., counterfeit, stolen) products has become a global issue**
- **Post-market surveillance of implantable medical devices can be challenging**
- **Implantable medical device adverse events and recalls pose a patient safety issue**
- **Acquiring medical device data used at the point-of-care is difficult to retrieve for reuse at a later time**

VALUE PROPOSITION

- **Closes the loop on data acquisition at the point-of-care to support reporting of medical device data**
  - Medical device data used for:
    - Continuum of care (e.g., Discharge Summary, Referrals)
    - Registries (e.g., Total Joint Registry)
    - Payers (e.g., government provided, private insurance)
  - Can associate a medical device used for monitoring a disease or symptom of a disease (e.g., vital sign monitors, pulse oximeters, blood glucose monitors) to a patient for querying the device or procedure using the UDI
- **Increase patient safety**
  - Traceability of medical devices (avoid use of counterfeit or illegitimate products)
  - Quality issues identified (e.g., recalls, adverse events)
- **Increase accurate medical device data capture at the point-of-care**
  - Eliminates human error from manual medical device data entry

Actors and Transactions

- **Tracking Implantable Medical Devices and Tissues (e.g., Orthopedic, Cardiovascular, etc.)**
  - PCC-50 + PCC-53
- **Track Procedures using a Medical Device (e.g., glucose monitor, vital sign monitor) at the point-of-care for accuracy**
  - PCC-50
  - PCC-52
  - PCC-53
- **Query Procedures**
  - PCC-54
- **Query Device Records using UDI**
  - PCC-51



PMDT Technical Highlights

- **Content Profiles use HL7 FHIR STU3 StructureDefinition Resources to record information about medical devices (including implantable/life-supporting/life-sustaining device and tissues that use US FDA UDI)**
  - Device Resource
  - Procedure Resource – to document procedures using focal devices and references to Patient
  - FHIR uses RESTful services (HITTP/HTTPS) to create/update and query records
- **Provides new capabilities to the point-of-care systems to enhance patient safety and effectiveness**
  - Tracking device use in the context of procedures and associating medical devices and POC procedures with the correct patient record
  - Managing identity information for devices and patients at the point-of-care
- **Supports US FDA UDI and transitions**
  - Both human-readable(i.e., manually entered or processed) and AIDC (i.e., scanned) using ASCII and extended character sets.

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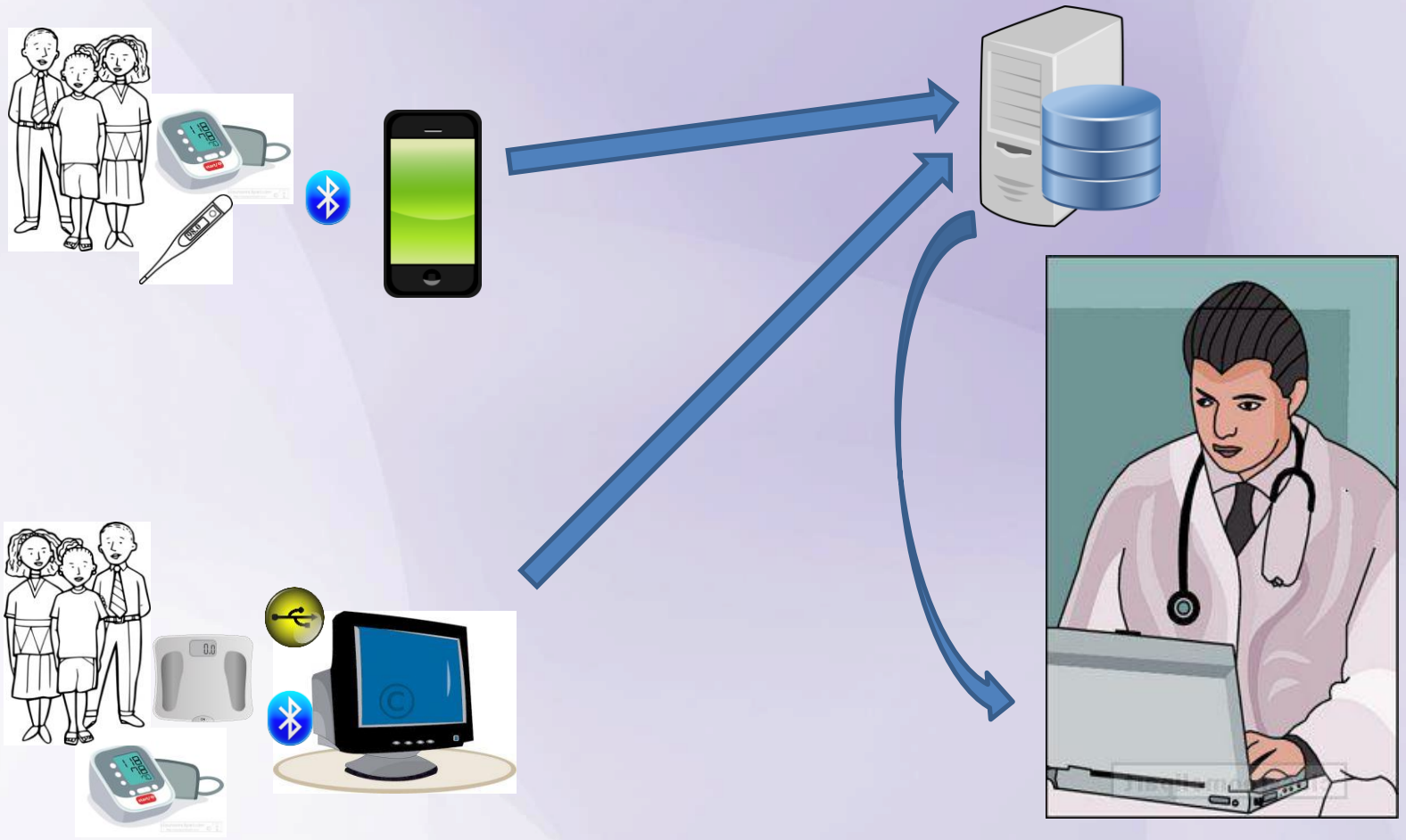
Remote Patient Monitoring

Allows Health Care Professionals to Monitor Patients from their Homes



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Standardized Medical Devices send measurements via local transports

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Standardized Local Gateways collect the measurements and optionally add some Patient Info

Mobile Phone

Personal Computer

Dedicated Settop Box

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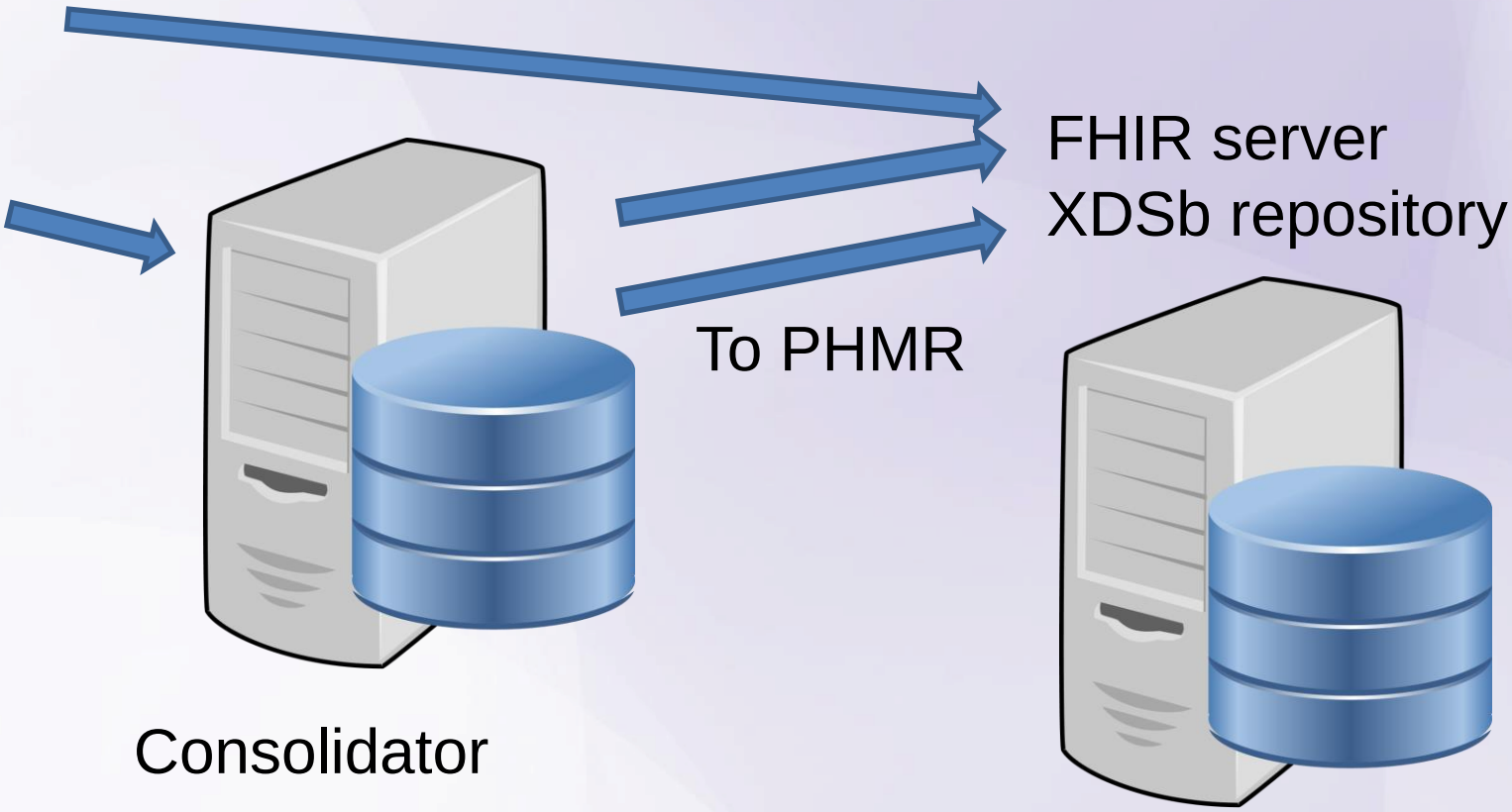
Gateways format the data to FHIR or PCD-01 and send to Backend Consolidator or direct to Repository



Health Care Professional Reads Data with a Remote Patient Monitoring application

Dynamic Care Team Management (DCTM)

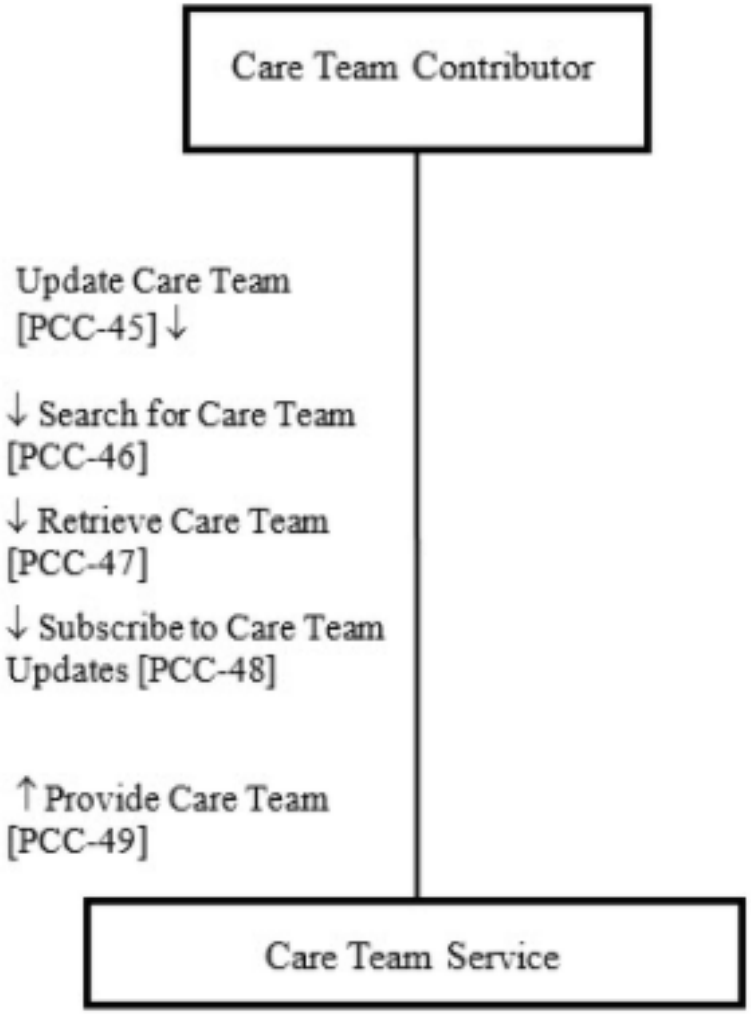
The Dynamic Care Team Management (DCTM) Profile provides a mechanism to facilitate system interactions to support care team membership:

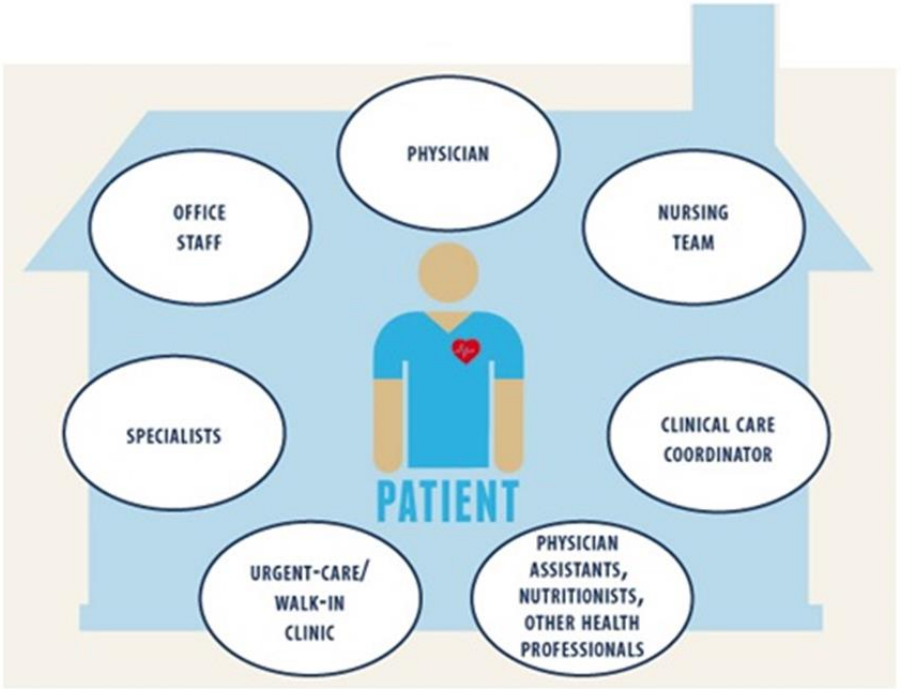
- Discovering Care Teams
- Creating/updating Care Teams
- Listing Care Teams

DCTM Details

- Provides the structures and transactions for care team management and sharing information about Care Teams that meet the needs of many, such as providers, patients and payers.
- Depicts how information about multiple care teams can be shared and used to coordinate care.
- Care Teams can be dynamically updated as the patient interacts with the healthcare system.
- A patient and providers may be associated with multiple types of care teams at any given time.
- Standards
  - HL7 FHIR CareTeam and Subscription resources
  - HL7 Coordination of Care Services (CCS) Functional Model

DCTM Actors and Transactions





QEDm Integration Profile

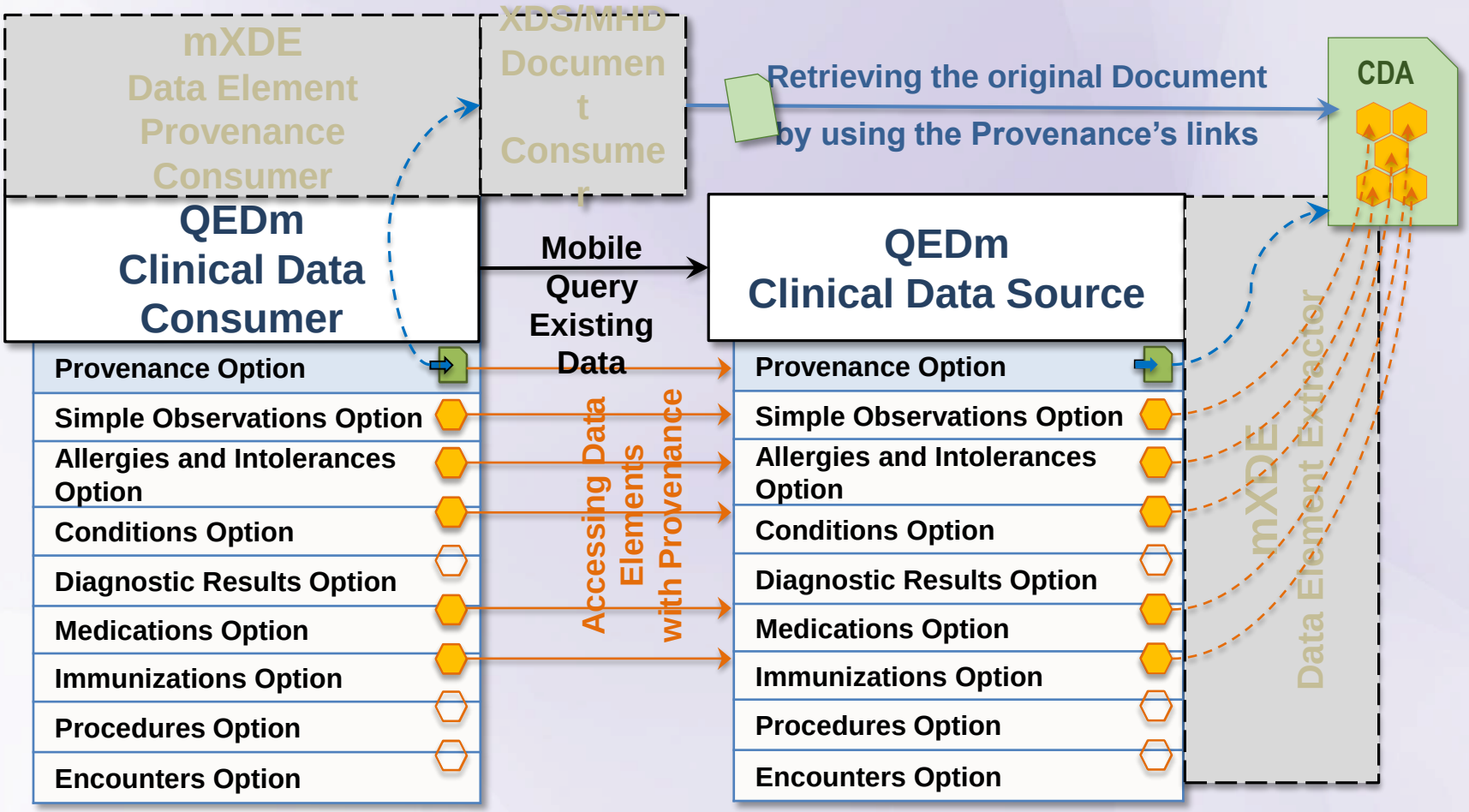
The **Query for Existing Data for Mobile (QEDm)** profile supports lightweight dynamic queries for clinical data elements including vital signs, problems, medications, immunizations, diagnostic results, procedures, visit history etc...

- The profile is conceived to be implemented by application specific to ‘mobile devices’.
- The solution is based on a standardized query interface to health (HTTP-based RESTful APIs) and the resulting transaction can be used to query for lists of specific data elements, represented as HL7 FHIR resources.
- QEDm may be used stand-alone or combined within mXDE (Mobile Cross-enterprise Document Data Elements Extraction).

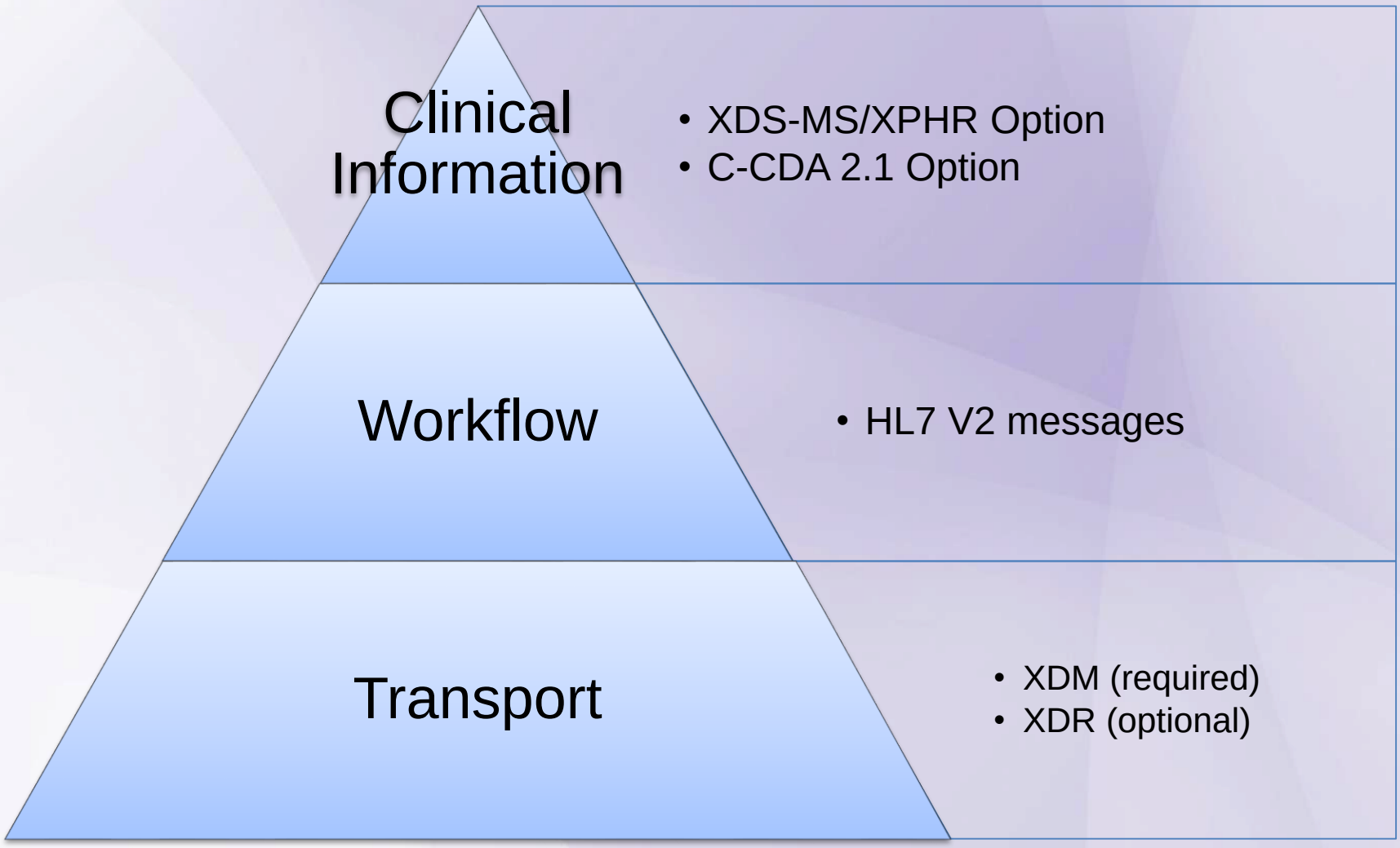
QEDm Actors

- No new actors (reusing existing Clinical Data Consumer and the Clinical Data Source):
- One new transaction **Mobile Query Existing Data [PCC-44]**:
  - It allows to query for clinical fine grained data elements that satisfy a set of parameters by using the HL7 FHIR query framework. The result of the query is a FHIR Bundle containing FHIR clinical data Resources that match the query parameters.
  - Based on the supported options, the Clinical Data Consumer may query and the Clinical Data Source may return data elements among: Allergies and Intolerances, Conditions, Diagnostic Results, Encounters , Immunizations, Medications, Observations, Procedures
  - With the Document Provenance option, the Clinical Data Consumer may fetch the FHIR clinical data Resource(s) together with Provenance Resources referencing(s) the original Document from which it was extracted (“one click access” to clinical context).

QEDm Actors and Transaction: Options & Flow when combined with mXDE



360 Exchange – Closed Loop Referrals (360X)



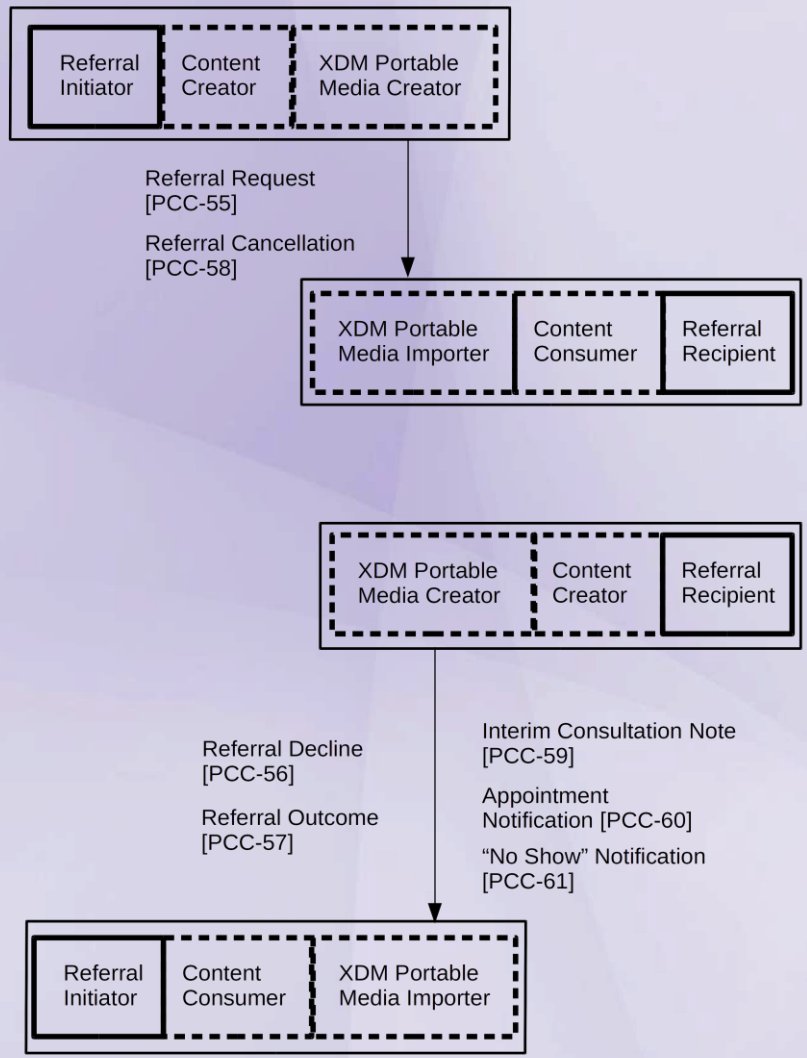
360 Exchange – Closed Loop Referrals (360X)

Actors:

- Referral Initiator
- Referral Recipient

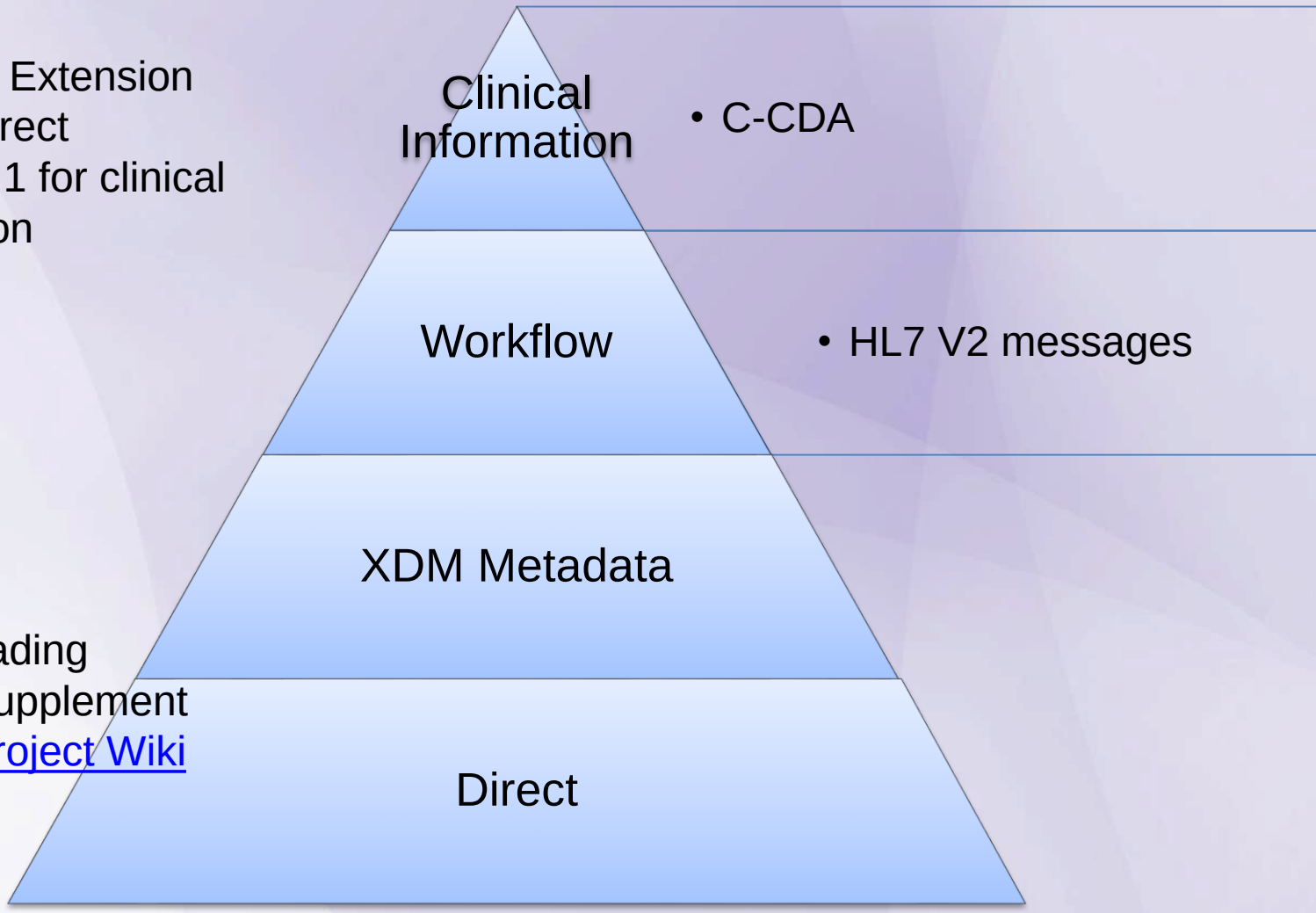
Transactions:

- Referral Request
- Referral Outcome
- Referral Decline
- Referral Cancelation
- Interim Consultation Note
- Appointment Notification
- No-Show Notification



360 Exchange – Closed Loop Referrals (360X)

US National Extension
- Use of Direct
- C-CDA 2.1 for clinical information



Further reading
- 360X Supplement
- 360X Project Wiki

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Routine Inter-facility Patient Transport (RIPT)

The Problem

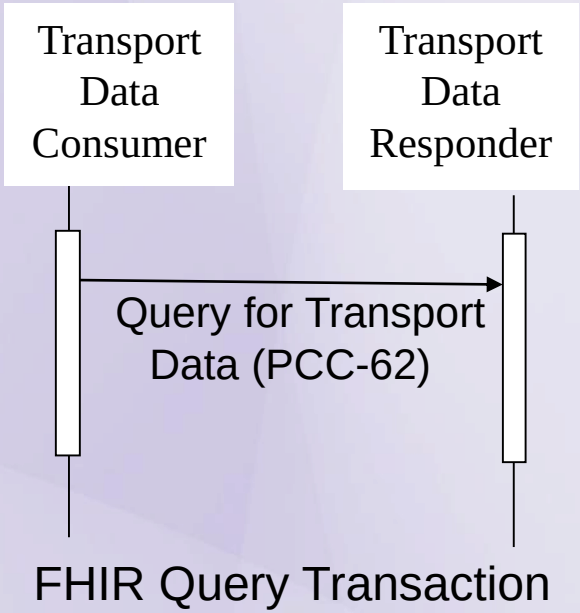
- Need to inform transport care team of important patient information
- Needs significant time to gather information needed for transport:
  - Verbal report
  - Signatures
  - Reading through extensive paper reports
- Need to populate transport care record manually

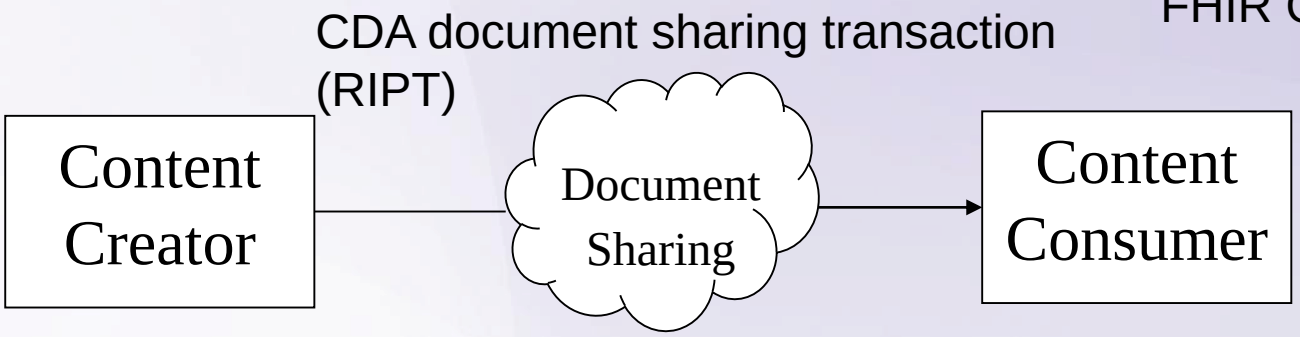
Value Proposition

- Benefit for both hospitals and EMS
- Decreases EMS time spent doing paper handoff on floor
- Increases bed availability
- Improving throughput for Emergency Department (ED)

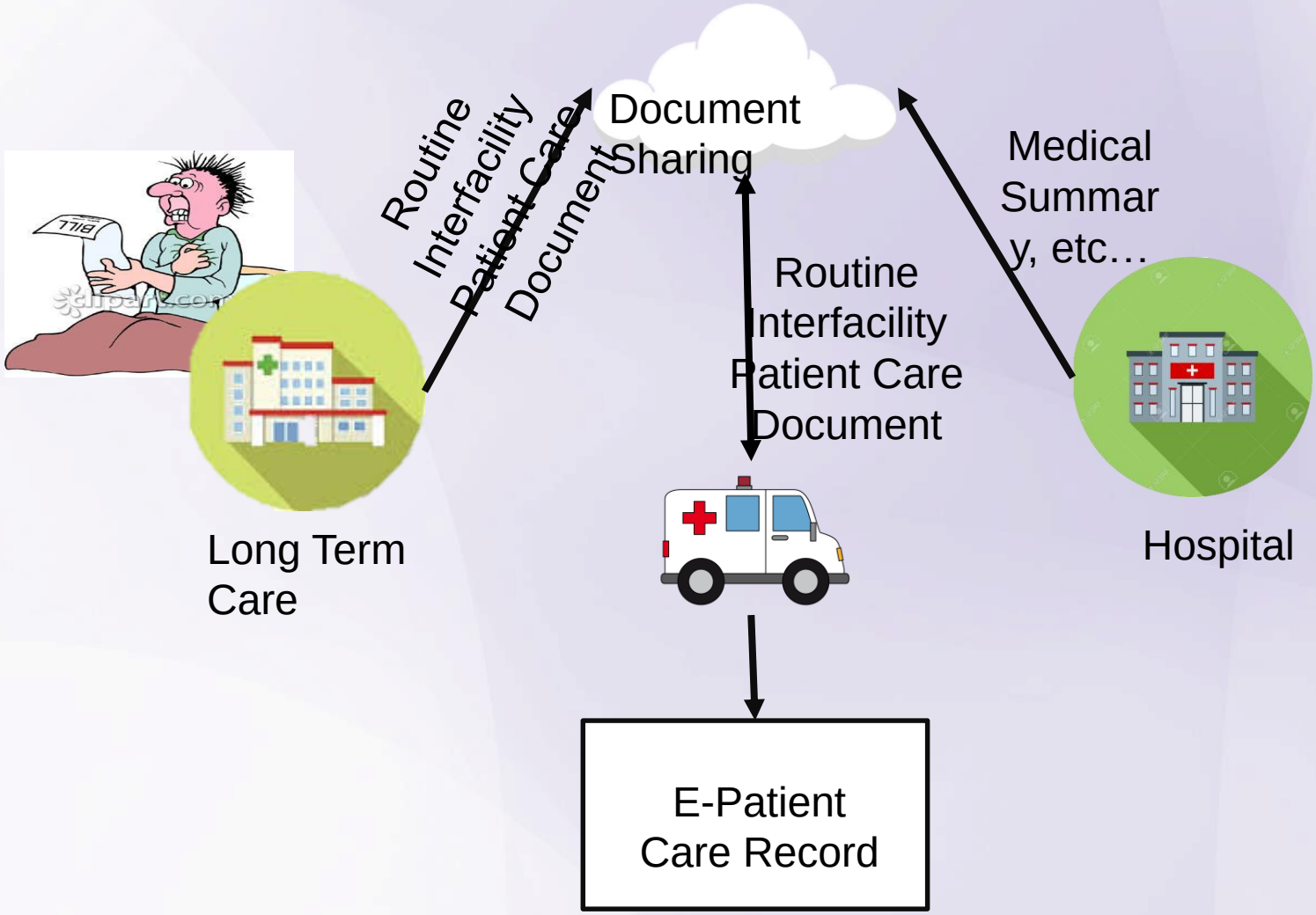
RIPT Technical Solution

- Two approaches
  - CDA
  - FHIR

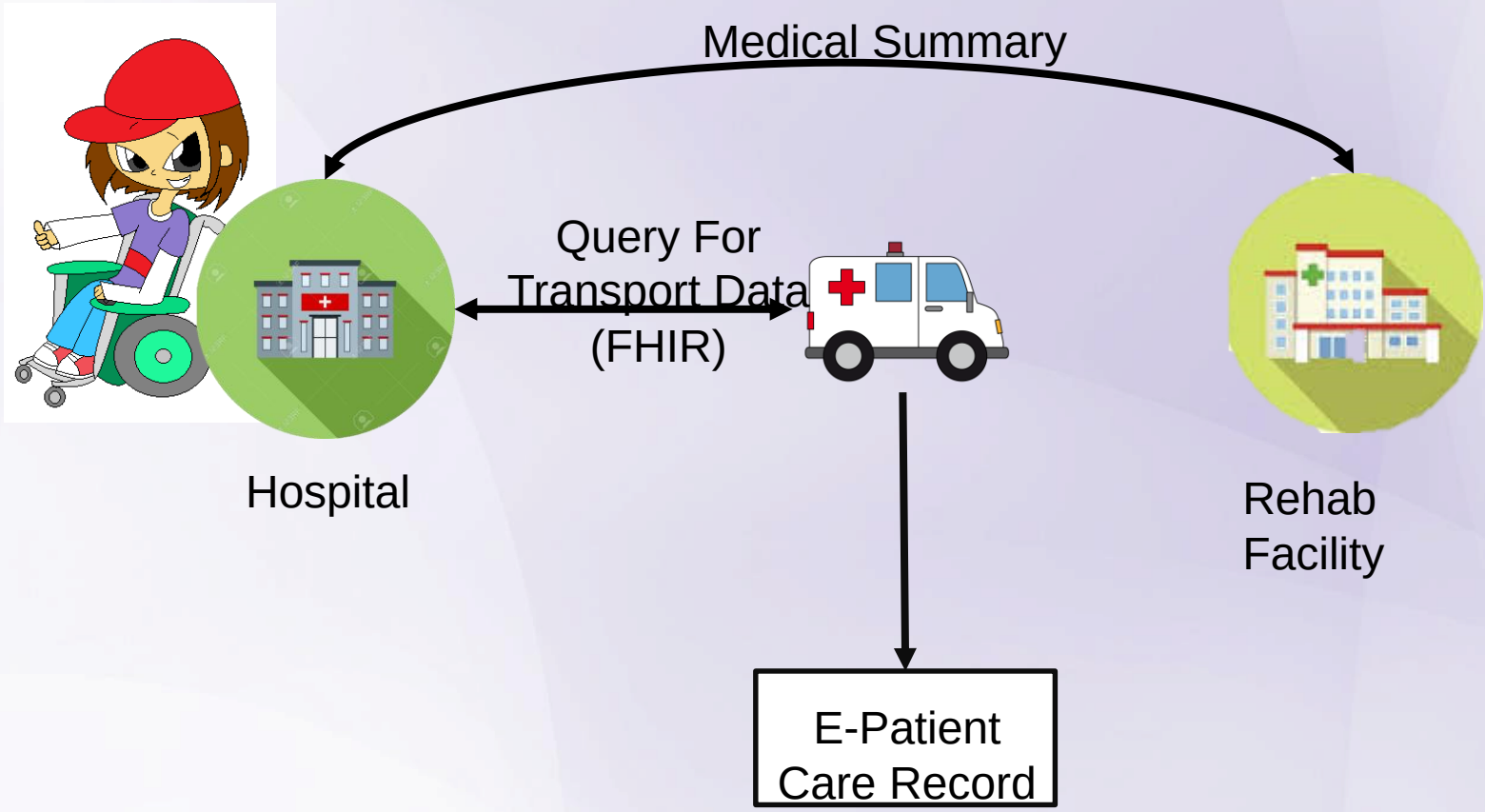




RIPT Using Document Sharing



RIPT Using Query (FHIR)



PCC Participation

IHE International Membership

- Apply for IHE International Organizational Membership
  - Membership information: http://ihe.net/join/
  - 180+ members: http://ihe.net/Member_Organizations/
  - Modest annual fee
- Participate in IHE Domains and Committees
  - IHE Organizational members only
  - 12 clinical and operational domains
  - Each domain has one planning and one technical committee
- Non-members may participate in comment periods and implement IHE Technical Frameworks

PCC Participation

PCC Planning Responsibilities

- Develops domain strategy and roadmap
- Identifies domain priorities and problems
- Recruiting new members
- Educating implementers
- Aligning industry initiatives
- Review and recommends IHE profile proposals

- ihe@himss.org
- Co-chair: Amit Popat
- Co-chair: Laura Langford (outgoing)
- Co-chair: Emma Jones (incoming)
- pccplan@googlegroups.com
- Wiki page:
  - http://wiki.ihe.net/index.php/Patient_Care_Coordination_Planning_Committee

PCC Participation

PCC Technical Responsibilities

- Development of IHE profiles
- Maintenance of IHE Profiles and Technical Framework
- Recruiting new members

- ihe@himss.org
- Co-chair: Denise Downing
- Co-chair: Emma Jones (outgoing)
- Co-chair: Gila Pyke (incoming)
- pcctech@googlegroups.com
- Wiki page:
  - http://wiki.ihe.net/index.php/Patient_Care_Coordination_Technical_Committee

PCC Participation

IHE Profile Development Cycle

- Eighteen (18) month cycle
  - Profile proposals
  - Profile development
  - Public comment
  - Trial implementation and profile testing
  - Feedback and adjustment from testing
- Domains have independent schedules
- Opportunity for members and non-members to participate
  - Profile development
  - Public comment
  - Testing and implementation
  - Change proposals
- Over of IHE Cycle (next slide) →

IHE Profiles Drafted & Revised

IHE Technical Framework Developed

Published For Public Comment

Trial Implementation Posted

months 6-13

Test at IHE Connectathons

months 14-18

Publish in IHE's Product Registry

Demonstrate at a HIMSS INTEROPERABILITY SHOWCASE

Install Interoperable products in Clinical Settings worldwide

IHE Improves, Safety, Quality and Efficiency in Clinical Settings

IHE Call for Proposals Opens

months 1-5

Profile Selection by Committees

PCC Participation

PCC Profile Development Schedule

IHE Profile Stage	Open Date	Close Date
Call for Proposals	Aug 2017	Sep 2017
Profile Proposal Review and Selection	Oct 16-17, 2017	Nov 15-16, 2017
Profiles Drafted in Technical Committee	Nov 2017	May 2018
Public Comment	Jun 2018	Jul 2018
Trial Implementation Published	Sep 5, 2017	
IHE Connectathon Registration	Sep 5, 2017	Oct 6, 2017
IHE Connectathon Testing	Jan 2018	

http://wiki.ihe.net/index.php?title=ITI,_PCC_%26_QRPH_Meetings

PCC Participation

IHE Connectathon

- IHE Connectathons are…
  - Held around the world
  - An unparalleled testing opportunities
  - Open for all to participate in
  - Held in Cleveland, OH for North America
- IHE North America Connectathon registration opens in September!
  - http://www.iheusa.org/connectathon-registration.aspx

PCC Participation

Links and Resources

Resource	Url
IHE.net	http://ihe.net/Patient_Care_Coordination/
Webinar series posted online	http://ihe.net/webinars/
Sign up for IHE International News	Email secretary@ihe.net
General PCC Questions	Email ihe@pcc.net
Google Groups (members only)	https://groups.google.com/forum/#!forum/pcctech https://groups.google.com/forum/#!forum/pccplan
Apply for IHE International Membership	http://ihe.net/join
IHE Technical Frameworks	http://ihe.net/Technical_Frameworks/#pcc
IHE PCC Profiles (wiki)	http://wiki.ihe.net/index.php/Profiles#IHE_Patient_Care_Coordination_Profiles
IHE Connectathon Registration	http://www.iheusa.org/connectathon.aspx

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Questions?