Teaching How to Represent Computable Data, Information and Knowledge in the Requirements for Interoperable Health IT Applications Using Business Process Modeling, FHIR Standards and Modeling Tools

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Goal: Build a proficient health workforce to
• Develop standards-based computable pathways (workflow & dataflow) at healthcare, public health and research organizations
• Implement standardized, computable clinical pathways in HIT products

APE Teaching Artifacts:
1-BPM+ methodology/IT project methodology (requirement elicitation)
2-Guidelines, best practices ➔ Business Case
3-Clinical pathways (workflow & dataflow requirements) ➔ Use Case
4-Computable Models (BPM+, UML, Data model(s), etc.)
5-Standards: HL7 FHIR resources, IHE Profiles, Data Standards (ICD, SNOMED, LOINC, etc.)
6-Content Management Tools
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Academic & Professional Education (APE) Committee
Business Process Management (BPM)+ Health
Object Management Group (OMG)

**Goal:** Build a proficient health workforce to
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• Implement standardized, computable clinical pathways in HIT products
Data, Information & Knowledge Sharing in Healthcare

CONTENT: Knowledge → Information → Data → Information → Knowledge

Clinical Guidelines & Best Practices → Clinical Pathways → Data Templates → Data Sets & Value Sets → Coded Data

Orlova AO. Informatics and HIM: Enabling Semantic Interoperability and Learning Health Systems. JAHIMA. 2015. 9:46-49
# Data, Information & Knowledge Sharing in Healthcare

## CONTENT: Knowledge → Information → Data → Information → Knowledge

### Care Delivery
- Healthcare Knowledge

### Clinical Documentation Improvement (CDI)
- Clinical Pathways Documents
- Case Definition Templates

### Coding
- Quality Data

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Data, Information & Knowledge Sharing in Healthcare

Guideline Manager

Practice Manager

Data Sources

Data Analytics

Health Organization Knowledge Artifacts

AAP

ADA

AMA

AHA

ANA

Data, Information & Knowledge Sharing in Healthcare

Integrating the Healthcare Enterprise (IHE). Patient Care Coordination Technical Framework. URL: www.ihe.net
Data, Information & Knowledge Sharing in Healthcare

1. Health Organization Knowledge Artifacts
   - AAP
   - AHA
   - ADA
   - ANA

2. Guideline Manager
   - Clinical Pathways
   - Standard Operational Procedures (SOP)
   - Updated Clinical Guidelines
   - New Knowledge

3. Practice Manager
   - Data Capture Templates
   - Quality Measures
   - Public Health Reports

4. Data Sources
   - Data Analytics
     - Decision Support Algorithms

5. Health Organization Knowledge Artifacts
   - Data, Information & Knowledge Sharing in Healthcare

Integrating the Healthcare Enterprise (IHE). Patient Care Coordination Technical Framework. URL: www.ihe.net
User Role in Information System Development Process: Requirement Elicitation

Elicit Reqs

Design
Develop
Test
Implement
Evaluate
Deploy Operate
BPM+ APE Teaching Artifacts

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4. Computable Models (BPM+, UML, Data model(s), etc.)
5. Standards: HL7 FHIR resources, IHE Profiles, Data Standards (ICD, SNOMED, LOINC, etc.)
6. Content Management Tools
BPM+ APE Business Cases

- Patient Registration
- Revenue Integrity
- Immunization
- Diabetes
- Patient Access to Health Information
- Electronic Public Health Reporting (see poster on Example of Child Sex Trafficking victims)
- COVID-19 in Trauma Settings
BPM+ APE Business Cases

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# Use Case Example: Patient Registration in Out-patient Setting

**Use Case Name:** Patient Registration

**Business Actors:** Patient (or patient’s legal representative), registrar, insurance verifier, billing staff, payor, clinician

**Technical Actors:** EHR; financial system, eg, HOST; payor system; registration document repository, eg OnBase

### Flow of Events:

1. Patient presents to Registrar.
2. Registrar identifies patient, validates/registers visit in the EHR.
3. EHR creates audit record of the encounter.
4. Patient completes necessary forms (paper/electronic) including consent forms.
5. Registrar or insurance verifier/billing staff verifies insurance information and generate bill and process payment or makes payment arrangements.
6. EHR communicates with the financial system to obtain/update patient insurance/billing information.
7. Registrar scans signed paper documents and any paper orders carried in by patient into the registration document repository.
8. Registrar validates/updates patient information in EHR, prints ID bracelet and barcoded documents, and signs the record with e-signature.
9. EHR updates audit record of the encounter.
10. Patient is sent to clinician.

### Data Categories

1&2. Patient, provider, facility, visit, demographics, reason for visit

3. Audit/Provenance visit record

4. Consents (treatment, info sharing), etc.

5&6. Insurance information, bill/payment, Advanced Beneficiary Notice (ABN)

7. Scanned documents

8 &10. Updated visit information

9. Updated Audit/Provenance visit record

8 &10. Updated visit information

### Pre-Conditions:

- EHR

### Post-Conditions:

- Registration Document Repository

### Preferred Timing:

- Daily updates
Content Management Tools: Visible Analyst

Visible Analyst: Modeling Components

Planning Statements = Business Processes/Requirements
- Specify: WHY (Policies, Values, Goals, Success Criteria)
  WHO (Actors)
  WHAT (Business Processes as Pathways (Workflow/Dataflow))

Business Processes Models
- Specify: HOW (Clinical Pathways Models)

Data Entities and Relationships
- Derive: Data Rules from Clinical Pathways
Visible Analyst: Planning Statement Models

Planning Statement Outline

1. PATIENT REGISTRATION (Business Event)
   Patient Registration Business Case defines work process (workflow) and data needs (dataflow) for registering a person for an episode of care in a healthcare organization.

1.1 WHY-Patient Registration Overview (Business Event)
   Patient Registration is the process of checking-in a person to initiate the episode of care that relies on (1) a standardized approach for patient registration (workflow) across various healthcare facilities and (2) standardized data elements in the patient registration process (dataflow).

1.2 WHY-Patient Registration Policy (Policy)
   Conduct patient registration across healthcare organization's departments according with the organizational policies and best practices supported by the professional organization(s), e.g.

1.3 WHY-Patient Registration Value Statement (Value Statement)
   Proper registration of the patient in the healthcare facility is a basis for reliable patient matching.

1.4 WHY-Patient Registration Goal (Goal)
   Improve completeness and correctness of patient information in EHR and ancillary systems/applications involved

1.5 WHY-Patient Registration Success Criteria (Critical Success Factor)
   1. Ensure identity of the person receiving care
   2. Ensure completeness of patient registration data
   3. Ensure correctness of patient registration data
   4. Ensure eligibility for healthcare services
   5. Ensure timely payment for healthcare services

1.6 WHO-Patient Registration Billing Staff (Business Actor)
   A person responsible for a verification of patient insurance information, b-generation of invoices for a visit, and c-obtaining payment (AO developed definition; to be verify with LW)

1.7 WHO-Patient Registration Payor (Business Actor)
   Insurers, including health plans, self-insured employer plans, and third party administrators, providing healthcare benefits to enrolled members and reimbursing provider organizations.

1.8 WHO-Patient Registration Insurance Verifier (Business Actor)
   A person responsible for
Visible Analyst: Business Process Models

Visible Analyst: Data Models

Visible Analyst: Standards

http://visibleanalyst.visiblesystemsCorp.com/Dashboard.aspx
Visible Analyst: Publishing

Invitation to Everyone:
Help to develop/validate Patient Registration Business Case at
BPM+ APE Business Cases

- Patient Registration
- Revenue Integrity
- Immunization
- Diabetes
- Patient Access to Health Information
- Electronic Public Health Reporting (see poster on Child Sex Trafficking Victims in Emergency Department)
- COVID-19 in Trauma Settings
Participate in the BPM+ Heath Academic and Professional Education (APE) Efforts

Join APE (and other BPM+ groups):
https://www.bpm-plus.org/working-groups/sign-up-form.htm

APE Website:
https://www.bpm-plus.org/working-groups/academic-professional-education.htm