Agenda

Why use BPM in an EHR architecture?

• EHR experience using BPM/SOA
• VistA Evolution and BPM

What are specific VE BPM gaps for MU/Care Coord.?

• VE ONC 2014 MU Care Coordination Transitions of Care Medication Reconciliation
Credential at a glance: Andalusia

- **8,424,102** patients
- **84,647** professionals
  - **28** Hospitals
- **1,517** Primary Care Centers

- **75,172,234** primary care medical visits
  - **9,140,545** emergencies received
- **10,574,420** specialized healthcare medical visits
  - **482,470** Surgical procedures.

Areas of SOA Governance covered by this project

1. Governance and Processes around Interoperability Management
2. Semantic Interoperability
3. Functional & Technical Interoperable EHR Deployment
Regional EHRs: SOA-Based Interoperability Architecture

Inter-Hospital Region Level

Hospital 1

Interoperability Platform

Interoperability Platform

Interoperability Platform

Intra-Hospital Enterprise Level

Client Portal

Shared Medical Record

Professional Portal

HIS Hospital EHR
LIS PIS
RIS PACS
Other Diagnostic Services
Diagnostic Devices
Dashboards
Performance Indicators
Disease Register

InterSystems ENSEMBLE

Error Handling
BPM Processes
Monitoring
Repository
ESB Services
Security

InterSystems ENSEMBLE

Centralized Interoperability Platform

Primary care
EMPI
LDAP
Datawarehouse
ERP

Andalusian Corporate Systems
Why add a business process management (BPM) service layer onto a SOA?

- Separate the business logic (which is very variable and changing) from the information systems
- Model the interactions between software from all the different vendors into your own business workflow
- As an orchestrator of processes at the technical level to ensure transactional integrity in ESB
- Have complete traceability for transactions and business processes
- To help automate many of the manual tasks and have automatic generation of alerts, alarms and scaled
- Enable simulation scenarios before putting into production of a process
- Provide a dashboard

To be complete, the BPM layer should include:

- Business process modeling (to model activities and functional tasks performed by
  that have a workflow and interaction with different information systems)
- Business process engine (BPM engine)
- Complex business rules engine (BPMR)
- Traceability and reporting module
- Interaction with the BPM engine module (set of interfaces and portal – web services, APIs, etc.)
How BPM Fits into VistA Evolution Program

- **Common service repository** is a key part of VistA to-be architecture, which provides robust SOA services as building blocks for functional orchestration & workflows.

- **BPM** is a business process modeling approach to driving out requirements for implementation of Common Services, Workflow, and Functional Orchestration.

- API Exposure 2.0 SOA Support is a part of VistA Transition Strategy to bring legacy APIs into SOA environment for less effort, but not able to realize full SOA benefit.

- As VistA Transition Progressing, functionality of API Exposure 2.0 Services will be absorbed into the Common Service Repository as needed.

VistA Shared Service Providers

- Common Services Repository
- API Exposure 2.0 of VistA T4
- Legacy VistA Applications with Web Service Wrapper
Clinical
Computerized Provider Order Entry (CPOE)
Drug-Drug/Drug-Allergy Interaction Checks
Demographics
Vital Signs
Problem List
Medication List
Medication Allergy List
Clinical Decision Support
Electronic Notes
Drug Formulary Checks
Smoking Status
Image Results
Family Health History
Patient List Creation
Patient-Specific Education Resources
Electronic Medication Administration Record (BCMA)
Advanced Directives

Care Coordination
Transition of Care/Referral Summary
• Receive-Display-Incorporate
• Create-Transmit
• Electronic Transmission
Outbound Electronic Prescribing
Clinical Information Reconciliation
Incorporate Lab Tests & Results
Transmission of Lab Tests & Results
Data Portability

Privacy/Security
Authentication, Access Control & Authorization
Auditable Events & Tamper-resistance
Audit Reports
Amendments
Auto Log-Off
Emergency Access
End-user Device Encryption
Integrity

Patient Engagement
View, Display, Transmit to 3rd Parties
Clinical Summary
Secure Messaging

Clinical Quality Measures
Capture & Export
Import & Calculate
Electronic Submission

Public Health
Immunization Information
Transmit to Immunization Registries
Transmit to Public Health Agencies
• Syndromic Surveillance
• Reportable Lab Results

Utilization
Automated Measure Calculation
Safety-enhanced Design
Quality Management System
To implement the **BPM baseline functional layer** in VistA Evolution enterprise environment, we use the methodology of BPM process and semantic modeling to achieve Stage 2 MU in a VA hospital facility.

Initially two use cases will be implemented in BPM platform, they are:
- Transition of Care
- Medication Reconciliation

**Methodology for Meaningful Use BPM Implementation**

1. Identify Key Operational Scenarios
2. Develop BPMN Process Models
3. Perform Gap Analysis
4. Configure BPM Infrastructure
5. Establish BPM Process Components
6. Integrate Workflow
7. Test and Deploy

**Sub-steps:**
- Identify Key Operational Scenarios
- Define Assumptions and Constrains
- Develop BPM Process Models in BPMN
- Map Activities into System Functions
- Identify Gaps in Functionality, Data, Business Rule, and Policy
- Provide Recommendations for Gaps Identified
- Define Information Exchanges (IE)
- Document the Findings
Transition of Care describes the movement of a patient from one setting of care to another. The setting of care may include hospital, ambulatory primary care practice, ambulatory specialty care practice, long-term care, home health, and rehabilitation facility.

Transitions of care – receive, display, and incorporate transition of care/referral summaries.

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(i) Receive. EHR technology must be able to electronically receive transition of care/referral summaries in accordance with:

(A) The standard specified in § 170.202(a).
(B) Optional. The standards specified in § 170.202(a) and (b).
(C) Optional. The standards specified in § 170.202(a) and (c).

(ii) Display. EHR technology must be able to electronically display in human readable format the data included in transition of care/referral summaries received and formatted according to any of the following standards (and applicable implementation specifications) specified in: §170.205(a)(1), §170.205(a)(2), and § 170.205(a)(3).

(iii) Incorporate. Upon receipt of a transition of care/referral summary formatted according to the standard adopted at § 170.205(a)(3), EHR technology must be able to:

(A) Correct patient. Demonstrate that the transition of care/referral summary received is or can be properly matched to the correct patient.
(B) Data incorporation. Electronically incorporate the following data expressed according to the specified standard(s):

(1) Medications. At a minimum, the version of the standard specified in § 170.207(d)(2);
(2) Problems. At a minimum, the version of the standard specified in § 170.207(a)(3);
(3) Medication allergies. At a minimum, the version of the standard specified in § 170.207(a)(3);

(C) Section views. Extract and allow for individual display each additional section or sections (and the accompanying document header information) that were included in a transition of care/referral summary received and formatted in accordance with the standard adopted at § 170.205(a)(3).
EXECUTIVE SUMMARY

1. INTRODUCTION
   1.1 Purpose
   1.2 Scope
   1.3 Assumptions
      1.3.1 Transition of Care
      1.3.2 Medication Reconciliation
   1.4 Approach to Gap Analysis
   1.5 Document Organization
   1.6 References

2. GAPS IDENTIFIED IN THE USE CASES
   2.1 Gap #1: Collect Patient Information
   2.2 Gap #2: Create Care Summary
   2.3 Gap #3: Transmit Care Summary
   2.4 Gap #4: Receive Care Summary
   2.5 Gap #5: Display Care Summary
   2.6 Gap #6: Incorporate Care Summary

3. USE CASE OPEN ISSUES

4. NEXT STEPS
   4.1 Common Service Identification
   4.2 Transition Strategy

APPENDIX A – BPM PROCESSES
APPENDIX B – Artifacts Derived
APPENDIX C – GLOSSARY
MU 2 BPM Operation Scenario: Medication Reconciliation

The medication reconciliation is a process of identifying the most accurate list of all medications that the patient is taking, including name, dosage, frequency, and route, by comparing the medical record to an external list of medications obtained from a patient, hospital, or other provider.

**Clinical information reconciliation.**

Enable a user to **electronically reconcile** the data that represent a patient’s active medication, problem, and medication allergy list as follows. For each list type:

1. Electronically and simultaneously display (i.e., in a single view) the data from at least two list sources in a manner that allows a user to view the data and their attributes, which must include, at a minimum, the source and last modification date.

2. Enable a user to create a single reconciled list of medications, medication allergies, or problems.

3. Enable a user to review and validate the accuracy of a final set of data and, upon a user’s confirmation, automatically update the list.
Gap Analysis for MU 2 Use Case: Results

1. Most of these issues are not explicitly resolved in the MU final rule language, need to resolve in EHR design using the BPM layer (gap analysis and consequent semantic models and process rules).

2. Transition of care summary
   - Needs workflow step to confirm no problems exist (frame problem)
   - Structure information presentation on top of raw data for Trans. of care summary – is raw CCDA ready for human consumption
   - Care coordination process / care plan – template derived from care plan over CCDA-based care summary – to tell the “story” of previous patient episode/encounter in care summary
   - For MU3, time limits on transitions of care report (w/in 2 hours), need tight workflow models

3. Clinical Information Reconciliation
   - common services needed for meds/allergy/problem list – display, reconcile, and merge
   - needs workflow validation of human reconciliation step and rule for enforcing this constraint

4. Automated Measures Calculation
   - Use BPM model of EHR for automated measures calculation model for all clinical MU measures
Recap

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