

## December 2013 EHR Work-Group (EHR WG) Cumulative FY14 Summary-Report

Last Updated on January 3, 2014 by SHufnagel@tiag.net, facilitator Edmond Scientific subcontractor to Veterans Health Administration/

## **EXECUTIVE SUMMARY** HL7 EHR-S and PHR-S FIM Release-3

This executive-summary specifically addresses EHR-S and PHR-S FIM capabilities and/or trends, which impact the VA, DOD and IPO "EHR Modernization" mission needs.



### Figure 1 EHR and PHR System Data-Management Mission-Needs

**INTRODUCTION: HL7 EHR-S FIM** (Function-and-Information Model) release-3 PSS (Project Scope Statement) #688 was approved in January 2012; where, '2017 EHR-S and PHR-S FIM release-3 (r3) follows an agile-process to formally-structure EHR functional-requirements and add data requirements-specifications to the '2014 release-2 EHR-S and PHR-S FM. Additionally, reusable business-process use-case, scenario and interoperability-specification capabilities, Meaningful-Use stage-2 criteria, implementation paradigms, such as V2 and V3 messaging, CCDA, SOA RLUS, International **FHIR** (Fast Health Care Interoperability Resources) and US Realm **FHIM** (Federal Health Information Model) are being incorporated into the EHR-S and PHR-S FIM Reference Model; where,

• EHR-S FIM capabilities are resident in the Sparx EA (Enterprise Architect) tool.

• HL7 EHR-S and PHR-S FIM r3 is being designed to directly support the Figure 1 EHR and PHR System Data-Management Mission-Needs.

The *purpose* of this report is to document the release-3 FIM Mission-Needs<sup>1</sup> (see Figure 1), EHR-S and PHR-S FIM development and related projects<sup>2</sup>; where following an agile methodology, monthly reportcontent is refined; until ultimately, EHR-S and PHR-S FIM profile requirements-specifications can be generated by the EHR-S FIM tool as a demonstration of the release-3 FIM "Easy-Button" Interoperability-Specification report-generation capability. All EHR WG release-3 FIM working-draft documents are published at <u>http://wiki.hl7.org/index.php?title=EHR\_Interoperability\_WG</u>.

### LEGEND:

- 1) <u>Capitalized and Underlined</u> nouns-and-adjectives are <u>Record-Entry</u> data-types aka data-model, which should be in the EHR-S FM data dictionary; and, *italicized* verbs are *manage* sub-types aka verb-hierarchy. See <u>www.skmtglossary.org</u> for standard healthcare data-dictionary / glossary.
- 2) Blue-Bold words are recommended -additions to original text.
- 3) Red-Bold words are recommended-deletions from the original text.
- 4) Highlighted Yellow words are issues-Actions and/or important new material for the main EHR WG to-review.

**GOAL:** The *goal* of the <u>Electronic Health Record (EHR) Work Group (WG)</u> is to support the HL7 mission of developing standards for EHR data, information, functionality, and interoperability. The Work Group creates and promotes appropriate and necessary standards.

EHR WG *objectives* include:

- 1) Functional-and-Information Requirements-Specifications for Electronic Health Records (EHR) and systems (EHR-S),
- 2) Functional-and-Information Requirements-Specifications for Personal Health Records (PHR) and systems (PHR-S),
- 3) Definition of a high-level framework to support the interoperability requirements-specifications and life cycles, and
- 4) Identification of existing and emerging information interoperability-requirements and related HL7 artifacts.
- A Jan 2012 Project #688 System Function-and-Information Model release-3 (EHR-S FIM r3) objective of the <u>EHR</u> <u>Interoperability WG</u> is an UML-specified EHR/PHR Concept-of-Operations (CONOPS), Reference Model (RM), setof Function Use-Cases with Conformance-Criteria Scenarios; where, EHR-S FIM r3 is to-be
  - $\circ$  create a clear, complete, concise, correct, consistent and easy-to-use; because,
  - **o** HL7 ballot-publishable from the Sparx Systems Enterprise-Architect tool
  - targeted for 3-to-5 years from now; because,
    - joint ISO-HL7 ballots are very challenging to manage and

• that are optimally-defined by the EHR-S FIM tool-and-processes;

 where, <u>EHR-SModemization processes</u> include data-related management, monitoring-and-compliance, governance, requirements-outreach, doctrine, organization, training, materiel, leadership-and-education, personnel-and-facilities (DOTMLPF).

- 1. RMES (Resource Management and Evidentiary Support)
- 2. MU2 (Meaningful Use stage 2)
- 3. Usability
- 4. PHR (Personal Health Record)

<sup>&</sup>lt;sup>1</sup> The EHR-S FIM MNS (Mission Needs Statement) identifies "EHR-S Modernization" lifecycle-needs,

where, the <u>EHR-S Modernization lifecycle</u> includes requirements-specifications, acquisition or development, test and certification and sustainment phases;

<sup>&</sup>lt;sup>2</sup> EHR-S FIM Related-profile-projects include:

# sufficient-time is needed to address the structural issues identified by the EHR-S FM r2 ballot; where, VA voted negative, due to inconsistency, non-intuitiveness and unnecessary-complexity/non-usability.

- A second-objective of the EHR Interoperability WG is to produce a Meaningful Use profile for EHR-S FM r2 and r3.
- The objective of the <u>Resource Management Evidentiary Support (RM-ES) project team</u> is to provide expertise to the EHR work group, other standards groups and the healthcare industry on records management, compliance, and data/record integrity for, EHR systems and related to EHR governance to support the use of medical records for clinical care and decision-making, business, legal and disclosure purposes.
- The *objective* of the <u>EHR Usability Project</u> is to translate existing, well established usability guidelines and health information management principles into functional conformance-criteria in the EHR-S FM standard.

## **SITUATION** EHR-S and PHR-S FIM Release-3 Preparation

An EHR/PHR Concept-of-Operation (CONOPS) is defined-and-refined into a System Reference-Model (RM); where,

- 1) System Functions are defined-by Use-Cases; where,
  - a) System-operations are verbs refined into a "manage verb-hierarchy" aka operation-type model,
  - b) System-entities are subject-and-object nouns refined into a "Record-Entry data-model" aka data-type model
  - c) Terminology value-sets are bound-to discrete-data-elements within each Record-Entry.
- 2) **Requirements** Conformance-Criteria are defined-by use-case scenarios; where,
- Scenarios define business-context and subject-verb-object-terminology bindings; where,
- 3) **Business-Context** defines pre, post and invariant conditions; where,
  - a) pre-condition are triggers, followed by
  - b) applicability; where,
    - i) "The System SHOULD or SHALL or MAY"
    - ii) "provide-the-ability-to-manage Record-Entries" or "directly-manage Record-Entries," where,
      - (1) a use-case constrained manage-hierarchy verb applies and
      - (2) a use-case constrained data-model noun applies; where,
  - c) post-condition Business-Rules are
    - "according-to scope-of-practice, organizational-policy, jurisdictional-law, and patient-preferences."
- 4) Information-Exchanges are defined-by scenarios mapped-to appropriate implementation-paradigms, such as
  - a) HL7 V2 and V3 message, RIM and CDA, SOA RLUS standards and related DAMS
  - b) FHIR (Fast Healthcare Interoperability Resource) specifications, for the International-Realm, profiled-with
  - c) FHIM (Federal Health Information Model) specifications, for the US-Realm, bound to
    - Terminology value-sets,
  - d) IHE information-exchange behavioral-protocols refined by,
    - SLA and DURSA (Service-level-agreement and Data-Use-and-Reciprocal-Support-Agreement ) and
    - **KPPs** (Key Performance Parameters).
    - **Cost** estimation factors
- 5) **EHR-S/PHR-S Profiles** are defined-by a set-of System-Function Use-Cases, with further constrained scenario' Applicability, business-context and subject-verb-object-terminology bindings.
- 6) Interoperability-Specifications are generated with the FIM r3 reporting-tool.
- 7) The Immunization Management Prototype was completed in December and a report and presentation are being prepared for the January 2014 Workgroup meeting in San Antonio See <u>http://wiki.hl7.org/images/f/fd/HL7\_EHR-S\_FIM\_Release-3\_Prototype\_Immunization-Management\_Use-Case\_Information-Models\_and\_Scenarios.pdf</u>

The benefit of this formally-specified **Concept-of-Operation** (CONOPS) and **Reference Model** (RM) approach is a clear, complete, concise, correct and consistent EHR-S and PHR-S Function-and-Information Model (FIM), profiles and resultant Interoperability-Specifications (ISs); where, ISs include appropriate implementation-paradigm specifications (V2 or V3 messaging, CDA, FHIR profiles, RLUS Data Services).

## **OPEN ISSUES & ACTIONS**

- 1. HL7 IP license vs. need for convenient access to EHR-S FIM versions-and-profiles.
- 2. www.hl7.org/EHR home-page for EHR-S FIM versions-and-profiles.
- 3. FHIR WG Coordination to integrate EHR-S FIM-FHIR into a joint Sparx Enterprise Architect (EA) model; where, EA can generate integrated EHR-S FIM-FHIR International-Realm interoperability requirements-specifications
- 4. FHIM Team Coordination to integrate EHR-S FIM-FHIR-FHIM into a joint Sparx Enterprise Architect (EA) model; where EA can generate integrated EHR-S FIM-FHIR-FHIM US-Realm interoperability requirements-specifications
- Call-for-Participation in EHR-S and PHR-S FIM r3 based on a common Reference Model, where, Six Full Time Equivalent (FTE) level-of-effort is estimated (2-FTEs per-year for three-years) Calls every-Tuesday, 1PM ET, + 1-770-657-9270, PC 510269# and please joint EHR Interoperability ListServer

#### POC POA&M Task # Start Done **Status-Risks-Mitigations** CONOPS 12-2013 12-2013 SH. GD Potential for minor changes in the future Reference Model 06-2013 Potential for minor changes in the future 12-2013 SH. GD manage operation-type 05-2013 FHRWG Verb-Hierarchy was part of r2 ballot Record-Entry data-types 01-2012 activ e SH. GD Data-Model to-be refined for each function HL7 IP for EHR-S FIM 01-2014 EHRWG **ISSUE:** Board approv al needed activ e www.HL7.org/EHR 12-2013 EHRWG **ISSUE:** PSS approv al needed active 01-2014 Implementation Paradigm Integration 1-2017 EHRWG **ISSUE:** Integrated or linked models? V2 and V3 messaging, CCDA, RLUS API 01-2014 EHRWG **RECOMMENDATION:** linked 1-2017 01-2014 1-2017 FHIR EHRWG **ISSUE:** shared gov ernance (CCB & CM)? EHRWG FHIM 01-2014 1-2017 **ISSUE:** shared governance (CCB & CM)? **Care Provision** 37 CP.1 Manage Clinical History pending 9 CP.2 Render Externally Sourced Information pending 2 CP.3 Manage Clinical Documentation 6 pending CP.4 Manage Orders 01-2012 SH, GD √ 2012 prototy pe → Todo w rt RM 7 inactiv e CP.5 Manage Results 2 01-2012 $\sqrt{2012}$ prototy pe $\rightarrow$ Todo w rt RM inactiv e SH, GD 01-2012 SH, GD √ 2012 prototy pe → Todo w rt RM CP.6 Manage Treatment Administration 3 01-2013 inactiv e **CP.6.1** Medication Management **CP.6.2** Immunization Management 10-2013 activ e $\sqrt{\text{Use case done, CCs in progress}}$ CP.7 Manage Future Care 3 pending CP.8 Manage Patient Education & 2 pending Communication CP.9 Manage Care Coordination & Reporting 3 pending **Care Provision Support** 67 CPS.1 Record Management 14 pending CPS.2 Support Externally Sourced Information 9 pending CPS.3 Support Clinical Documentation 13 pending CPS.4 Support Orders 10 pending CPS.5 Support for Results 1 pending CPS.6 Support Treatment Administration 5 pending

# Release-3 EHR-S and PHR-S FIM

## **Table 1 Plan-of-Actions & Milestones Dashboard**

POA&M Task	#	Start	Done	POC	Status-Risks-Mitigations
CPS.7 Support Future Care	2	pending			
CPS.8 Support Patient Education &	7	pending			
Communication					
CPS.9 Support Care Coordination & Reporting	6	pending			
Population Health Support	17				
POP.1 Support for Health Maintenance,	3	pending			
Preventive Care and Wellness					
POP.2 Support for Epidemiological	1	pending			
Investigations of Clinical Health Within a					
Population	1	nonding			
POP.3 Support for Nonitoring Decrease	1	pending			
Notifications Regarding a Specific Dationt's		pending			
Health					
POP 5 Donor Management Support	1	nendina			
POP 6 Measurement Analysis Research and	6	nending			
Reports	Ŭ	ponding			
POP.7 Public Health Related Updates	1	pendina			
POP 8 De-Identified Data Request	1	pending			
Management		p			
POP.9 Support Consistent Healthcare	1	pending			
Management of Patient Groups or Populations					
POP.10 Manage Population Health Study -	1	pending			
Related Identifiers					
Administration Support	22				
AS.1 Manage Provider Information	8	pending			
AS.2 Manage Patient Demographics, Location	1	pending			
and Synchronization					
AS.3 Manage Personal Health Record	3	pending			
AS 4 Manage Communication	5	pendina			
AS 5 Manage Clinical Workflow Tasking	5	pending			
AS.6 Manage Resource Av ailability	7	pending			
AS.7 Support Encounter/Episode of Care	6	pending			
Management	· ·	penang			
AS.8 Manage Information Access for	6	pending			
Supplemental Use					
AS.9 Manage Administrative Transaction	6	pending			
Processing					
Trust Infrastructure					
TI.1 Security	25	01-2012	Inactiv e	GD, SH	$\sqrt{2012}$ prototy pe $\rightarrow$ Todo w rt RM
TI.2 Audit	1	01-2012	inactiv e	GD, SH	$\sqrt{2012}$ prototy pe $\rightarrow$ Todo w rt RM
TI.3 Registry and Directory Services	1	pending			
11.4 Standard Terminology and Terminology	1	pending			
Services					
TLS Standards-Based Interoperability	6	pending			
TI.6 Business Rules Management	1	pending			
TL& Detabase Reakup and Recovery	1	pending			
TLO Custom Menagement Operations and		pending			
Performance		pending			
Record Infrastructure	<u> </u>				
RI 1 Record Lifecy cle and Lifespan	25		inactivo	CD SH	
RI 1 1 2 Record Entry Create	20	12-2012	Inactive	GD, 311	$\sqrt{2012}$ prototy pe $\rightarrow$ Todo wrt RM
RI2 Record Synchronization	1	pending			
RL3 Record Archive and Restore	1	pending			
	1	ponding			

## **WORKGROUP AND PROJECT LOGISTICS**

• HL7 List Server Registration:

http://www.hl7.org/myhl7/managelistservs.cfm

- HI7 Workgroup Call-Schedule:
- EHR WG Wiki:

http://www.hl7.org/concalls/default.aspx http://wiki.hl7.org/index.php?title=EHR

Health Level Seven – Electronic Health Record Work Group Weekly Teleconference Schedule Revised: 20 November 2013							
Day	Time US ET	Activity	Lead(s)	Dial-In	Screen Sharing	List Server (for agendas, announcements)	
Mon	1200	Records Management/ Evidentiary Support	Warner, Gelzer	1-877-668-4493 Code 927 002 088#	<u>Link</u>	EHR Legal	
Tues	1300	EHRS FM Release 3 Planning	Hufnagel, Dickinson	1-770-657-9270, Passcode 510269#	<u>Link</u>	EHR Interop	
	1400	Meaningful Use Functional Profile	Datta, Dickinson	1-770-657-9270, Passcode 510269#	<u>Link</u>	EHR Interop	
	1500	FULL EHR WG	Co-Chairs	1-770-657-9270, Passcode 510269#	<u>Link</u>	EHR WG	
Wed	1200	Personal Health Record WG	Ritter, Dickinson, Doo	1-770-657-9270, Passcode 510269#	TBA	EHR PHR	
	1300	EHR System Usability WG	Mon, Ritter, Rocca, Gartner	1-770-657-9270, Passcode 510269#	<u>Link</u>	EHR Usability	
Thur	Open						
Fri	0930	EHR WG Co-Chairs	Co-Chairs	1-770-657-9270, Passcode 510269#	ТВА	N/A	

• **EHR CCD to Blue Button Tool Project** defined the conversion of an HL7 Continuity of Care Document (CCD) to the Blue Button format via an XSLT style sheet tool.

Project contact: Lenel James and Keith Boone . List Service: EHRTeamCCD@lists.hl7.org

- **EHR-S FM Profile Tool Project** is sponsored by the HL7 Tooling Workgroup and is producing a (web-based and/or desktop) tool to create EHR-S FM profiles (starting with the EHR-S FM R2), with enforced profiling rules, and exports as documents, support for and XML interchange format for reuse across profile tool instances or for use in other tools. Project contact: John Ritter; <u>johnritter1@verizon.net</u>
- EHR Usability Project was launched to translate existing, well established usability guidelines and health information management principles into functional criteria in the EHR System Functional Model (EHR-S FM) standard.
  Project contact: John Ritter, Don Mon, Mitra Rocca and Walter Suarez
  List Service: ehrwgusability@lists.hl7.org
- **PHR Project WG** provides a reference list of functions that may be present in a Personal Health Record System (PHR-S). Project contact: John Ritter; johnritter1@verizon.net
- Diabetes Data Strategy Project focus is on the minimum data set and data standards in EHR systems for diabetes assessment in children in outpatient clinic settings, based on clinical and business requirements. Project contact: Don Mon; donmon@rti.org
- EHR Interoperability WG has two active projects
  - EHR-S FM Meaningful Use profile
  - EHR-S FIM Release-3 preparation is restructuring release-2; where, the benefit of this formally-specified EA tool-based Concept-of-Operation and Reference Model is a clear, complete, concise, correct and consistent EHR-S and PHR-S Function-and-Information Model, profiles and resultant Interoperability-Specifications (ISs); where, ISs include appropriate implementation-paradigm specifications (V2 or V3 messaging, CDA, FHIR profiles, web-services, RLUS Data Services).

## REFERENCE INFORMATION

### 1) Common Clinical informatics standards:

- SNOMED CT for problems, smoking status a)
- b) **DICOM** for radiology
- LOINC for laboratory anatomical pathology, LOINC tax onomy c) for document types for inpatient notes
- RxNorm for pharmacy d)
- CVX and MVX for immunology e)
- HITSP C32, HL7 CCD and CCDA-CCD for VLER Health data f)
- ICD9 CPT4/HCPCS ICD9PCS for TRICARE billing data. g) ICD-10 and SNOMED CT for outpatient visits, ICD-10 and h)
- LOINC for admissions encounter data
- CPT4 and HCPCS for procedures i)
- i) PDA-F for scanned paper reports
- k) **CDC** value set race codes for demographics
- D) **UCUM** for units of lab measures
- m) NUCC Health provider tax onomy for provider types

#### Common technical standards: 2)

- CTS or Common Terminology Service a)
- b) FHIR or Fast Healthcare Interoperability Resource with RESTful API.
- CDS or Clinical Decision Support API c)
- CCDA is Consolidated CDA d)
- VPR or Virtual Patient Record e)
- RDF or Resource Description Framework for semantic web f) applications
- RLUS or Retrieve Locate Update Service for heterogeneous g) database facades
- JSON or JavaScript Object Notation h)
- WS\* or Web Service Standards i)

#### EHR-S FM r2.0 Perspectives 3)

- a) Care Provision
  - CP.1 Manage Clinical History i)
    - ii) CP.2 Render Externally Sourced Information
    - iii) CP.3 Manage Clinical Documentation
    - iv) CP.4 Manage Orders
    - v) CP.5 Manage Results
    - vi) CP.6 Manage Treatment Administration
    - vii) CP.7 Manage Future Care
    - viii) CP.8 Manage Patient Education & Communication
    - ix) CP.9 Manage Care Coordination & Reporting

#### **Care Provision Support** b)

- CPS.1 Record Management
- ii) CPS.2 Support Externally Sourced Information
- iii) CPS.3 Support Clinical Documentation
- iv) CPS.4 Support Orders
- v) CPS.5 Support for Results
- vi) CPS.6 Support Treatment Administration
- vii) CPS.7 Support Future Care
- viii) CPS.8 Support Patient Education & Communication
- ix) CPS.9 Support Care Coordination & Reporting

### **Population Health Support** c)

- POP.1 Support for Health Maintenance, Preventive Care i) and Wellness
- ii) POP.2 Support for Epidemiological Investigations of Clinical Health Within a Population
- POP.3 Support for Notification and Response iii)
- iv) POP.4 Support for Monitoring Response Notifications Regarding a Specific Patient's Health
- POP.5 Donor Management Support v)
- vi) POP.6 Measurement, Analysis, Research and Reports

- vii) POP.7 Public Health Related Updates
- viii) POP.8 De-Identified Data Request Management
- ix) POP.9 Support Consistent Healthcare Management of Patient Groups or Populations
- POP.10 Manage Population Health Study-Related X) Identifiers

#### d) Administration Support

- AS.1 Manage Provider Information
- AS.2 Manage Patient Demographics, Location and ii) Synchronization
- iii) AS.3 Manage Personal Health Record Interaction
- iv) AS.4 Manage Communication
- AS.5 Manage Clinical Workflow Tasking v)
- vi) AS.6 Manage Resource Availability
- vii) AS.7 Support Encounter/Episode of Care Management
- viii) AS.8 Manage Information Access for Supplemental Use
- ix) AS.9 Manage Administrative Transaction Processing

#### Trust Infrastructure e)

- TI.1 Security i)
- ii) TI.2 Audit
- TI.3 Registry and Directory Services iii)
- iv) TI.4 Standard Terminology and Terminology Services
- TI.5 Standards-Based Interoperability v)
- vi) TI.6 Business Rules Management
- vii) TI.7 Workflow Management
- viii) TI.8 Database Backup and Recovery
- ix) TI.9 System Management Operations and Performance
- f) Record Infrastructure
  - RI.1 Record Lifecy cle and Lifespan i)
  - RI.2 Record Synchronization ii)
  - RI.3 Record Archive and Restore iii)
- FHIR (Fast Healthcare Interoperability Resources) 4)
  - FHIR Data Dictionary is at: http://www.hl7.org/implement/standards/fhir/

### **FHIR Administrative** h)

- i) Attribution: Patient, RelatedPerson, Practitioner, Organization
- Resources: Device, Location, Substance, Group ii)
- Workflow Management: Encounter, Alert, Supply, Order, iii) OrderResponse
- Financial: Coverage iv)
- FHIR Clinical c)
  - General: AdverseReaction, Allergy Intolerance, CarePlan, i) Family History, Condition, Procedure, Questionnaire
  - Medications: Medication, MedicationPrescription, ii) MedicationAdministration, MedicationDispense, MedicationStatement. Immunization. ImmunizationProfile
  - iii) Diagnostic: Observation, DiagnosticReport, DiagnosticOrder, ImagingStudy, Specimen
  - Device Interaction: DeviceCapabilities, DeviceLog, iv) DeviceObservation
- d) FHIR Infrastructure

Working-Document, Last-Updated: January 3, 2013

- i) Support: List, Media, Other, DocumentReference, (Binary)
- Audit: Provenance, Security Event ii)
- Ex change: Document, Message, OperationOutcome, iii) Query

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Conformance: Conformance, ValueSet, Profile iv)

### 5) Acronyms

- aka also known as
- ABSI American National Standards Institute
- ASC X12 Accredited Standards Committee X12 of ANSI
- CC EHR-S FIM Conformance Criteria
- CCB Change Control Board
- CDA Clinical Document Architecture
- CCDA Consolidated Clinical Document Architecture
- CIM Conceptual Information Model
- CIMI Common Informatics Modeling Initiative
- CM Change Management
- DD Data Dictionary
- CIM Conceptual Information Model
- CP Care Provision
- CPS Care Provisioning Support
- DFD Data Flow Diagram
- DMBOK Data Management Book of Knowledge
- EA Enterprise Architect
- EHR-S EHR System

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- EHR-S FIM EHR-S Function and Information Model
- FHA US Federal Health Architecture
- FHIM US Federal Health Information Model
- FHIR Fast Healthcare Interoperability Resources
- FIM Function and Information Model

- FIM (MU) FIM Meaningful Use profile
- FM Function Model
- FY Fiscal Year

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- IHE Integrating the Healthcare Enterprise
- IHTSDO International Health Terminology SDO
- IM Information Model
- IV&V Independent Verification and Validation
- MDHT Model Driven Health Tools
- MU US Meaningful Use objectives-and-criteria
- NIEM National Information Exchange Model
- OMG Object Management Group SDO
- ONC US Office of the National-Coordinator
- OHT Open Health Tools
- POA&M Plan of Actions and Milestones
- QA Quality Assurance
- R 2/3 Release 2 or 3
- RI Resource Infrastructure
- RIM (HL7) Reference Information Model
- S&I ONC Standards & Interoperability Framework
- SDLC Software Development Lifecycle
- SDO Standards Development Organization
- WBS Work Breakdown Structure
- WG Work Group

2	1	December 2013	0
3	2	November 2013	3
4	3	October 2013	3
E	1	September 2013	2
5	-		J
6			
7		MONTHLY SUMMARIES	
8		(Reverse Chronological Order)	
9	1 D	ecember 2013	
10	For deta	ails see: http://wiki.hl7.org/images/8/8a/Hufnagel - Dec-FY14 EHR-WG Summary-Report 2013-12-31.pdf	
11			
12		Executive Summary (extensively updated)	
13	The	anal of the Electronic Health Record (EHR) Work Group (WG) is to support the HI 7 mission of developing standards for	FHR
14	data, info	prmation, functionality, and interoperability; where, the Work Group and its projects create-and-promote appropriate-and-	
15	necessa	invision, standards. HL7 Project Scope Statement (PSS) #688 is for ISO/HL7 10781 r3:2017 EHR-S FIM; where, EHR-S Funct	tion-
16	and-Info	rmation Model Release-3 is planned for 2017 ballot. This report demonstrates 1-function of 150-functions remaining to-be	
17	done ov	er the next three-years.	
18			
19	The	vision is to restructure the '2014 EHR-S FM Release-2 into clear, complete, concise, correct, consistent and easy-to-use	;
20	functions	and conformance criteria within the '2017 UML-modeled EHR-S FIM Release-3 Easy-Button tool; where, the EHR-S FIN	Л
21	Enterpris	se Architect (EA) platform is capable-of managing specific-profiles (e.g., personal health record, behavioral health, long-ter	m
22	care, en	rergency department, inpatient, outpatient or individual-system); where, profile reports or web-sites can be automatically-	
23	generate	d, which include:	
24	1. Fun	ictional use-case entities, system-actions information-exchanges, conformance-criteria scenarios,	
25	acc	cording-to patient-preference, situation, scope-of practice, organizational-policy and jurisdictional-law	
26	2. Inte	roperability-specifications, including selectable implementation paradigms	
27	3. Rec	juirements litecycle-traceability and configuration-baselines.	
28	4. imp	ilementation-paradigm protile-additions; such as, those for messages, CDA documents, web-services, interface behavioral-	-
29	spe	cilications and realm-specific data-models with terminology-bindings can be added to produce a fully-qualified exchange-	oro
30 31	ai ci this	document contains an "Alleroy Intolerance and Adverse Reaction" related HI 7-Interpational East Healthcare Interpretable	ere, ilitv
32	Res	sources (FHIRs) and US-realm Federal Healthcare. Information Model (FHIM) classes examples to show how implementation	ייייע אר-
33	prof	file additions are included	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
34	P. •.		
35	The	E Linguistic-kiss Methodology hierarchically-constrains the UML-modeled EHR-S lexicon-of entities. actions and information	tion-
36	flows int	o function document-sections and sub-sections modeled-as use-case paragraphs of user-story scenario-sentences; wher	e,
37	these so	cenario-sentences are also known as conformance-criteria (CCs). As an example, the Immunization-Management function's	s
38	use-cas	e has 23 CC user-story scenarios, which can-be further constrained according-to patient-preference, situation, scope-of	
39	practice,	organizational-policy and jurisdictional-law.	
40			
41	The	"Easy-Button tool" is an EHR-informatics knowledge-repository and force-multiplier, which institutionalizes informatics-	
42	wisdom;	where, it empowers users to efficiently-and-effectively reuse informatics-knowledge in EHR-related areas such as	
43	• Bus	siness requirements, use-cases, user-story scenarios;	
44	<ul> <li>Plat</li> </ul>	form-independent (logical) architectural design-specifications	
45	<ul> <li>Plat</li> </ul>	form-specific (implementable) development, test and certification ISs, profiles, and guides.	

- The **benefit** of the recommended methodology-and-technology is that high-quality and low-cost EHR-S FIM profiled web-sites and reports can be generated in hours-or-days by one-person; where formerly, weeks-or-months were required by an integrated product team. Initial results may still require subject-matter-expert verification-and-validation (V&V) to identify special-needs and gaps; where, a capability approach proposal can be developed as-the-basis-of both strategic gap-mitigation and tactical investment-and-execution planning.
- The **benefit** of using Sparx Enterprise Architect (**EA**) as the underlying EHR-S FIM "Easy-Button" platform is the built-in support for enterprise-wide, full-lifecycle, model-driven, architecture-and-design solutions for visualizing, analyzing, simulating, testing and maintaining EHR-related systems, software, processes and architectures; where, EA.is a collaborative team-based modeling, design, management-and-documentation tool based on UML 2.4.1. EA's Standard XML Metadata Interchange (XMI) export capability allows the use of other tools, such as IBM's Rational Software/System Architect.
- 57 The estimated **cost** to bring the EHR-S FIM "Easy-Button" vision to fruition is 3-FTEs allocated for 2-years; where, 6-total 58 FTEs = 2-weeks per-function \* 150 functions = 5-hours per conformance criteria (CC) \* 2500 CC. And, adding specific implementation-59 paradigm capabilities requires additional resources.
  - In December, EHR Interoperability WG focused on

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- 62 1) *Developing* the Table 1 Plan-of-Actions & Milestones Dashboard.
- 63 2) Demonstrating FIM r3 EA tool generation of Immunization Mgmt requirements-specifications
- 3) *Refining* November-2013 models into grammatically-correct use-case and scenario "lexical" model; where, they are developed in Conceptual, Semantic, Syntactic, and Lexical stages; where, each stage is relatively easy-to-understand.
  - a. The <u>Conceptual Level</u> is when a user is working on an interactive EHR or PHR system and develops a mental-model; where, the user enters-in input to the system, and the system generates output based on that input. The <u>conceptual level</u> identifies the set of familiar task-oriented system-objects and system-actions the user needs to know about in order to use the system; where, the conceptual model in in terms of objects, relations between objects, actions on objects, attributes of objects and the context in which tasks are done.
  - b. The <u>Semantic level</u> describes the meanings between the input and output, where, the Semantic Level documents the Information-Exchange (IE) semantic-specification for each system-action identified in the EHR-or-PHR System-Function Use-Case Model, plus any other actions and constraints which are needed. The IE semantic-specification includes a description of the function, including its Information-and-terminology Model, transport protocol, and potential operational context-and-conditions.
  - c. The <u>Syntactic level</u> is a set of rules to create a sentence (e.g., EHR-S and PHR-s FIM Reference Model), which will give a set of system conformance criteria to complete a particular system function; where, the syntactic level identifies the use-case sequence of system "manage" action verbs plus <u>Record-Entry</u> type subjects and objects. A conformance-criteria scenario is a system-function sequence represented by the FIM reference-model grammar. The conformance-criteria scenarios define the set of rules for combining EHR and PHR <u>Record-Entries</u> into a system-function use-case. The output will include spatial and temporal factors, such as those specified in IHE profiles, FHIR, FHIM, CDC implementation guides, Consolidated CDA implementation guides, etc.
    - d. The <u>Lexical level</u> deals with Information Exchange (IE) dependencies to specify the exact syntax; where, there are nine key lexical interoperability factors.
- Figure 2 Information-Exchange Model identifies the three key technical areas and nine factors of consideration required in an Information Exchange Interoperability Specification (**IS**):
- Data Content The information being communicated between parties, in terms of syntax, semantics, and vocabulary. An IS
   could allow access to stored data directly (e.g., via a Retrieve, Locate, Update Service (RLUS) API, or data derived as the
   result of processing and transformation (e.g., message, service, or document).
  - 2. **Transport -** How the payload and related items (such as requests, confirmations, subscriptions, and error messages) are moving, inclusive of the technical means, services offered, communication sessions, and transmitting protocols

3. Security - How the communication is protected, how parties are positively identified, and determination and enforcement of rights to information.



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## Figure 2 Information-Exchange Model <sup>3</sup>

- Generally, Information Exchange Requirements (IERs) contain: 98
  - Need-line Identifier or Description indicating that one operational node depends on another for service(s) or information and • specifies the direction in which the service(s) or information flows; where, a need-line may represent many information exchanges or service dependencies.
    - IER Name and/or Identifier facilitating IER traceability across the architecture
    - Information Element Content, including Content name or identifier, Scope, Accuracy, Language, etc.
    - Producer including Sending Operational (Op) Node Name and Identifier Sending Op Activity Name and Identifier
    - Consumer including Receiving Op Node Name and Identifier Receiving Op Activity Name and Identifier .
  - Nature of Transaction, including Mission Scenario task exchange Type (CCD, encounter summary), Triggering Event, • Interoperability Level, Required Criticality, applicable standards
  - Performance Attributes, such as periodicity, timeliness, maximum latency. •
- 109 Information Assurance, such as Access Control, Availability, Sensitivity, Confidentiality, Dissemination Control, Integrity
- Security, such as Accountability, Protection (Type Name, Duration, Date), Classification/Sensitivity, classification caveat, 110 • such as VIP, duty type etc. 111
- Scope, Application, and Limitations: This lexical modeling approach creates a top-down framework, which is easy-and-113 convenient for analysts-and-developers; where, it allows the analysts/developer/implementer user to move from a real-world 114 concept analysis to a system implementation. The System Record-Entries and manage system-action concepts-and-functions 115 required to design and implement the EHR and PHR system are modelled and transcribed by use-cases and scenarios. Then the 116 designer can consider how the EHR and PHR concepts-and-functions are expressed at the system information-exchanges. For 117

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<sup>&</sup>lt;sup>3</sup> "VA-DOD Health Architecture Alignment Recommendations" made to the HARB, July 2013, MITRE Authors: Dr. Mark A. Kramer, Kevin Gunn, Sponsor: Department of Veterans' Affairs, Contract No.: VA791-P-0042, Project No.: 40134028-DA HL7 EHR-WG Summary Working-Document, Last-Updated: January 3, 2013 Page 12

- 118 each function, the use-case and its scenario model direct the analyst, developer and tester to requirements-specifications for the sequence of system-actions that need to be carried out to support a user's functional task, such as immunization management. 119
- CONCLUSION: EHR-and-PHR System Function-and-Information Model's ultimate success will come from the methodological 121 122 power resident in the EHR-S & PHR-S FIM tool's virtuosity of expression; where, it is from this methodological context -- combining the methodologies of discovery, invention, and design that the FIM Tool lays down the foundation for an analyst, developer or 123 tester to break down their specific problem into the conceptual, syntactic, semantic and lexical areas. 124
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<sup>&</sup>lt;sup>4</sup> According to the Organization for the Advancement of Structured Information Standards (OASIS) a reference model is "an abstract framework for understanding significant relationships among the entities of some environment, and for the development of consistent standards or specifications supporting that environment. A reference model is based on a small number of unifying concepts and may be used as a basis for education and explaining standards to a non-specialist. A reference model is not directly tied to any standards, technologies or other concrete implementation details, but it does seek to provide a common semantics that can be used unambiguously across and between different implementations."

<sup>&</sup>lt;sup>5</sup> As a rule of thumb, FHIR uses an 80/20 rule; where, elements should be included in a resource if they are catered-for / used-by 80% of the implementing systems; and where FHIR profiles define the 20% of specific -implementation elements. HL7 EHR-WG Summary Working-Document, Last-Updated: January 3, 2013 Page 13