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

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Health Informatics/ Office of Informatics & Analytics/ Knowledge Based Systems
The complete-and-latest version of the Summary-Report is available at:
http://wiki.hl7.org/images/0/0a/Hufnagel_-_FY2014_HL7-EHR-WG_Summary-Report.pdf

EXECUTIVE SUMMARY

This executive-summary and report specifically address potential EHR impacts and/or EHR trends, which are important for the VA, IPO and DOD to-be aware-of.

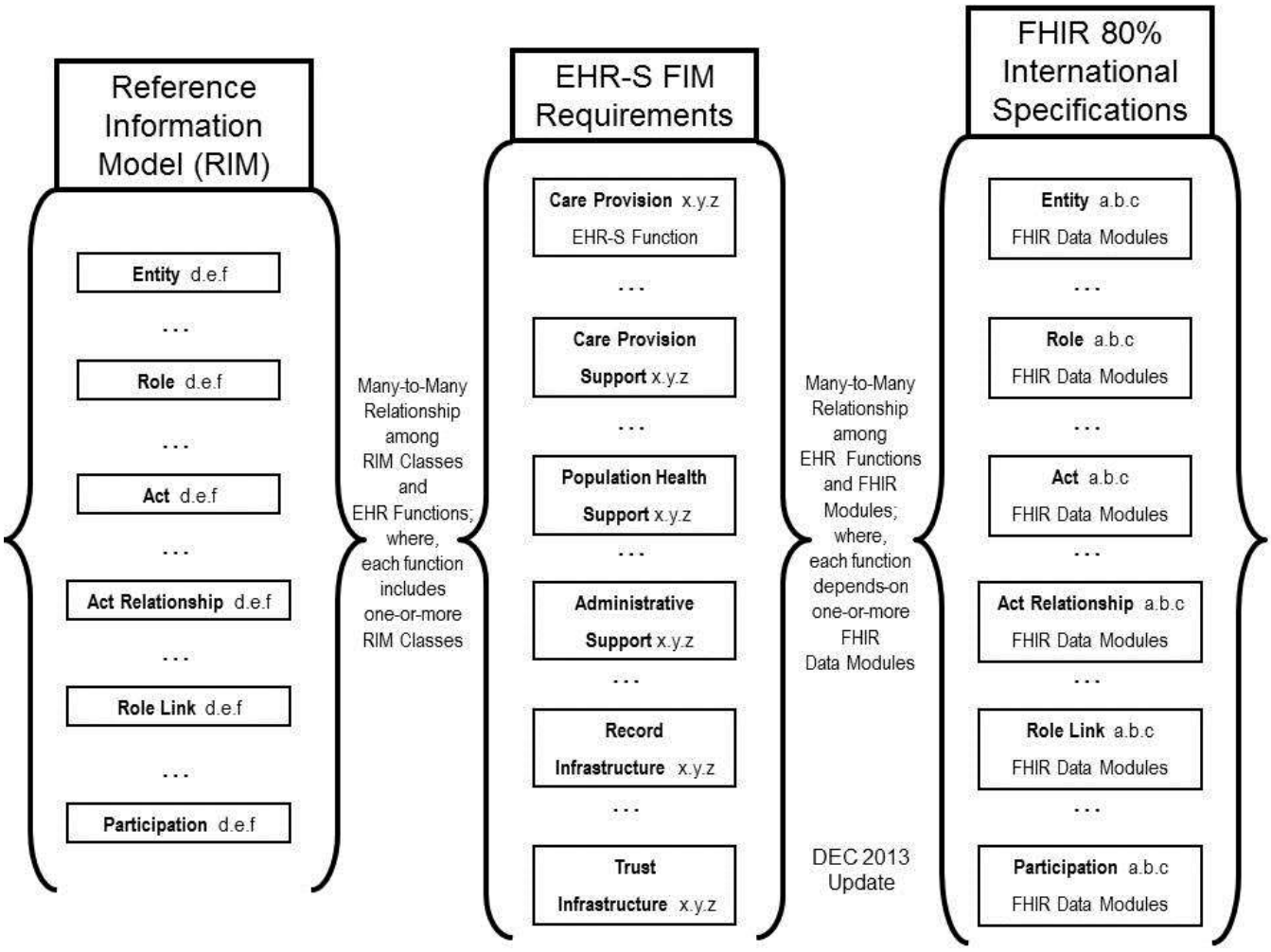

Figure 1 HL7 EHR-S FIM release-3 Relationship with HL7 RIM-and-FHIR [Jan 2012 PSS #688]

INTRODUCTION: the *purpose* of this report is to document the EHR and PHR System release-3 Function–and-Information-Model (FIM) development and related projects impacting the release-3 FIM. An agile approach is being followed, where monthly report-content is refined; until ultimately, the report can be generated by the Sparx Enterprise Architect tool as a demonstration of the release-3 FIM "Easy-Button" Interoperability-Specification (IS) report-generation capability. All EHR WG release-3 FIM documentation published at http://wiki.hl7.org/index.php?title=EHR_Interoperability_WG are working-drafts.

GOAL: The *goal* of the Electronic Health Record (**EHR**) Work Group (**WG**) 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. *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 EHR Interoperability WG is an **UML-specified EHR/PHR Concept-of-Operations (CONOPS), Reference Model (RM), set-of Function Use-Cases with Conformance-Criteria Scenarios; where, EHR-S FIM r3 is to-be**
  - create a clear, complete, concise, correct, consistent and easy-to-use; because,
  - **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**
    - **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 Resource Management Evidentiary Support (RM-ES) project team 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 EHR Usability Project 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/PHR **Concept-of-Operation** was defined-and-refined into a System **Reference-Model (RM);** where,

1) **System Function**s are defined-by **Use-Case** lexicons-of *system-operations* bound-to System-entities; where,
   a) System-operations are verbs refined into a "manage" operation-type-model (aka verb-hierarchy) and
   b) System-entities are subject-and-object nouns refined into a Record-Entry data-type-model (aka information model)
   c) Terminology value-sets are bound-to Record-Entry discrete-data-elements.
2) **Conformance Criteria** are defined-by a scenario-constrained use-case of
   a) business-context and
   b) subject-verb-object-terminology bindings; where,
3) **Scenario-Constrained Business-Context** is defined-by
   a) pre-condition triggers,
   b) applicability of
      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 verb-hierarchy applies and
         (2) a use-case constrained data-model applies; where,
   c) post-condition Business-Rules are "according-to
      - scope-of-practice, organizational-policy, jurisdictional-law, and patient-preferences."
4) **Information-Exchange** is defined-by a scenario subject-verb-object-terminology binding mapped to
   a) **FHIR** (Fast Healthcare Interoperability Resource), which is representative of the International-Realm,
   b) **FHIM** (Federal Health Information Model) US-Realm FHIR-profile or alternative-realm FHIR-profile,
   c) **Terminology** value-sets, appropriate to the selected-realm,
   d) **IHE information-exchange behavioral-protocols**, which may-be refined-or-replaced by,
      - **SLA-DURSA** *(*Service-level-agreement Data-Use-and-Reciprocal-Support-Agreement *) and*
      - **KPPs** (Key Performance Parameters).
      - **Cost** estimation facets
5) **EHR-S/PHR-S Profile** is defined-by a set-of System-Function Use-Cases, with further constrained scenario'
   a) applicability
   b) business-context
   c) subject-verb-object-terminology bindings.
6) **Interoperability-Specifications** are generated with the FIM r3 "Easy-Button" aka reporting-tool.

ACTIONS

1. **HL7 Board approval** of EHR-S FIM Release-3 open-IP; where, the EHR-S FIM home page is www.hl7.org/EHRSFIM
2. **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
3. **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
4. **Call-for-Participation** in EHR-S/PHR-S FIM r3 based on a common EHR-S/PHR-S RM (Reference Model), where,
   6 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

Plan-of-Actions & Milestones Dashboard

POA&M Task	Start	Done	POC	Comment
CONOPS	12-2013	12-2013	SPH	
Reference Model Conformance Criteria	06-2013	12-2013	SPH GD	RM Based on Gary D. Jul 2013 spreadsheet
manage operation-type		05-2013	EHRWG	Verb-Hierarchy was part of r2 ballot
Record-Entry data-types	01-2012		SPH	To-be refined for each function
Care Provision				
CP.1 Manage Clinical History				
CP.2 Render Externally Sourced Information				
CP.3 Manage Clinical Documentation				
CP.4 Manage Orders	01-2012		SPH	√ 2012 prototype → Todo wrt RM
CP.5 Manage Results	01-2012		SPH	√ 2012 prototype → Todo wrt RM
CP.6 Manage Treatment Administration CP.6.1 Medication Management CP.6.2 Immunization Management	 O1-2012 01-2012		SPH	√ 2012 prototype → Todo wrt RM √ Use case done, CCs in progress
CP.7 Manage Future Care				
CP.8 Manage Patient Education & Communication				
CP.9 Manage Care Coordination & Reporting				
Care Provision Support				
CPS.1 Record Management				
CPS.2 Support Externally Sourced Information				
CPS.3 Support Clinical Documentation				
CPS.4 Support Orders				
CPS.5 Support for Results				
CPS.6 Support Treatment Administration				
CPS.7 Support Future Care				
CPS.8 Support Patient Education & Communication				
CPS.9 Support Care Coordination & Reporting				
Population Health Support				
POP.1 Support for Health Maintenance, Preventive Care and Wellness				
POP.2 Support for Epidemiological Investigations of Clinical Health Within a Population				
POP.3 Support for Notification and Response				
POP.4 Support for Monitoring Response Notifications Regarding a Specific Patient's Health				
POP.5 Donor Management Support				
POP.6 Measurement, Analysis, Research and Reports				
POP.7 Public Health Related Updates				
POP.8 De-Identified Data Request Management				
POP.9 Support Consistent Healthcare Management of Patient Groups or Populations				
POP.10 Manage Population Health Study-Related Identifiers				
Administration Support				
AS.1 Manage Provider Information				
AS.2 Manage Patient Demographics, Location and Synchronization				
AS.3 Manage Personal Health Record Interaction				
AS.4 Manage Communication				

POA&M Task	Start	Done	POC	Comment
AS.5 Manage Clinical Workflow Tasking				
AS.6 Manage Resource Availability				
AS.7 Support Encounter/Episode of Care Management				
AS.8 Manage Information Access for Supplemental Use				
AS.9 Manage Administrative Transaction Processing				
Trust Infrastructure				
TI.1 Security	12-2012			√ 2012 prototype → Todo wrt RM
TI.2 Audit	12-2012			√ 2012 prototype → Todo wrt RM
TI.3 Registry and Directory Services				
TI.4 Standard Terminology and Terminology Services				
TI.5 Standards-Based Interoperability				
TI.6 Business Rules Management				
TI.7 Workflow Management				
TI.8 Database Backup and Recovery				
TI.9 System Management Operations and Performance				
Record Infrastructure				
RI.1 Record Lifecycle and Lifespan RI.1.1.2 Record Entry Create	12-2012		SPH	√ 2012 prototype → Todo wrt RM
RI.2 Record Synchronization				
RI.3 Record Archive and Restore				

WORKGROUP AND PROJECT LOGISTICS

- HL7 List Server Registration: http://www.hl7.org/myhl7/managelistservs.cfm
- Hl7 Workgroup Call-Schedule: http://www.hl7.org/concalls/default.aspx
- EHR WG Wiki: 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#	Link	EHR Legal
Tues	1300	EHRS FM Release 3 Planning	Hufnagel, Dickinson	1-770-657-9270, Passcode 510269#	Link	EHR Interop
	1400	Meaningful Use Functional Profile	Datta, Dickinson	1-770-657-9270, Passcode 510269#	Link	EHR Interop
	1500	FULL EHR WG	Co-Chairs	1-770-657-9270, Passcode 510269#	Link	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#	Link	EHR Usability
Thur	Open					
Fri	0930	EHR WG Co-Chairs	Co-Chairs	1-770-657-9270, Passcode 510269#	TBA	N/A

- **EHR CCD to Blue Button Tool Project Wiki** - This 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 Wiki** – This project, sponsored by the HL7 Tooling Workgroup, will produce 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; johnritter1@verizon.net
- **EHR Usability Project Wiki** This project has been 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 Wiki** The HL7 Personal Health Record System Functional Model provides a reference list of functions that may be present in a Personal Health Record System (PHRS).
  Project contact: John Ritter; johnritter1@verizon.net
- **Diabetes Data Strategy Project Wiki** The scope for this project is to focus 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

REFERENCE INFORMATION

1) Common Clinical informatics standards:

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

2) Common technical standards:

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

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

a) Care Provision
i) CP.1 Manage Clinical History
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

b) Care Provision Support
i) CPS.1 Record Management
ii) CPS.2 Support Externally Sourced Information
iii) CPS.3 Support Clinical Documentation
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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
x) POP.10 Manage Population Health Study-Related Identifiers

d) Administration Support
i) AS.1 Manage Provider Information
ii) AS.2 Manage Patient Demographics, Location and Synchronization
iii) AS.3 Manage Personal Health Record Interaction
iv) AS.4 Manage Communication
v) AS.5 Manage Clinical Workflow Tasking
vi) AS.6 Manage Resource Availability
vii) AS.7 Support Encounter/Episode of Care Management
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e) Trust Infrastructure
i) TI.1 Security
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iii) TI.3 Registry and Directory Services
iv) TI.4 Standard Terminology and Terminology Services
v) TI.5 Standards-Based Interoperability
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
i) RI.1 Record Lifecycle and Lifespan
ii) RI.2 Record Synchronization
iii) RI.3 Record Archive and Restore

4) FHIR (Fast Healthcare Interoperability Resources)

a) FHIR Data Dictionary is at: http://www.hl7.org/implement/standards/fhir/

b) FHIR Administrative
i) Attribution: Patient, RelatedPerson, Practitioner, Organization
ii) Resources: Device, Location, Substance, Group
iii) Workflow Management: Encounter, Alert, Supply, Order, OrderResponse
iv) Financial: Coverage

c) FHIR Clinical
i) General: AdverseReaction, AllergyIntolerance, CarePlan, FamilyHistory, Condition, Procedure, Questionnaire
ii) Medications: Medication, MedicationPrescription, MedicationAdministration, MedicationDispense, MedicationStatement, Immunization, ImmunizationProfile
iii) Diagnostic: Observation, DiagnosticReport, DiagnosticOrder, ImagingStudy, Specimen
iv) Device Interaction: DeviceCapabilities, DeviceLog, DeviceObservation

d) FHIR Infrastructure
i) Support: List, Media, Other, DocumentReference, (Binary)
ii) Audit: Provenance, SecurityEvent
iii) Exchange: Document, Message, OperationOutcome, Query
iv) Conformance: Conformance, ValueSet, Profile

e) Acronyms

- **aka** also known as
- **CC** EHR-S FIM Conformance Criteria
- **CDA** Clinical Document Architecture
- **DD** Data Dictionary
- **CIM** Conceptual Information Model
- **CP** Care Provision
- **CPS** Care Provisioning Support
- **EA** Enterprise Architect
- **EHR-S** EHR System
- **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** EHR-S Function and Information Model
- **FIM(MU)** EHR-S FIM Meaningful Use profile
- **FM** Function Model
- **FY** Fiscal Year
- **IHE** **Integrating *the* Healthcare Enterprise**
- **IM** Information Model
- **MDHT** Model Driven Health Tools
- **MU** US Meaningful Use objectives-and-criteria
- **ONC** US Office of the National-Coordinator
- **OHT** Open Health Tools
- **POA&M** Plan of Actions and Milestones
- **R 2/3** Release 2 or 3
- **RI** Resource Infrastructure
- **RIM** HL7 Reference Information Model
- **S&I** ONC Standards & Interoperability Framework
- **WBS** Work Breakdown Structure
- **WG** Work Group

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MONTHLY SUMMARIES

(Reverse Chronological Order)

LEGEND

1) Capitalized and Underlined nouns and adjectives are concepts, which should be in the EHR-S FM data dictionary; and, they should also correspond to ISO 13940 Continuity-of-Care "CONTsys" concepts. See www.skmtglossary.org for standard healthcare data-dictionary / glossary.
2) **Blue terms** are recommended terms to be added to the conformance criteria.
3) **Red terms** are recommended terms to be removed from the conformance criteria.
4) Highlighted Yellow Sections are issues and/or new material for the main EHR WG to-review and to-comment-on.

1 November 2013

For details see http://wiki.hl7.org/images/8/83/HL7_EHR-WG_Summary-Presentation_November_2013.pdf

1) **EHR WG** is waiting on the EHR-S FM Release-2 ISO ballot comments; where, the HL7 release-2 ballot-comments have already been reconciled. The ISO ballot closes on 3-Dec-2013; and then, the ISO-ballot-comments can be reconciled during December-and-January and EHR-S FM release-2 can be finalized in January 2014. The EHR WG has also been updating the EHR-S FM release-2 add-on to the Sparx EA-tool to support the creation of profiles.
2) **PHR WG** is waiting on the PHR FM Release-2 ISO ballot-comments, which close 3-Dec-2013 and will be reconciled during December-and-January; where, the HL7 release-2 ballot-comments have already been reconciled.
3) **EHR RMES WG** is discussing release authorization within the S&I Framework esMd group; where, esMD is analyzing the situation where healthcare-payers frequently request that providers submit additional medical-documentation for a specific claim, to support claims processing and other administrative functions, such as the identification of improper payments. Currently, Medicare Review Contractors request approximately 2 million medical documents per year by mailing a paper request letter via US Postal Service to healthcare providers. Until recently, providers had only two options for submitting the requested records: 1) mail paper or 2) send a fax. The manual paper process is costly, time consuming and can delay proper claims processing on both the senders' and receivers' end.
4) **EHR Usability WG** is collecting issues and mitigations into a reference library, which can be the basis of integrating usability into the release-3 EHR-S FIM.
5) **EHR Interoperability WG** focused on the May-2014 Meaningful-Use Profile for the EHR-S FM release-2 and preparation for release-3:2016; where, the November release-3 focus was to define Reference-Models for Concept-of-Operations, Function Information-and-Conformance-Criteria:
   - Figure 1 HL7 EHR-S FIM release-3 Relationship with HL7 RIM-and-FHIR [Jan 2012 PSS#688]
   - Figure 2 EHR/PHR Concept-of-Operations (CONOPS)
   - Figure 3 EHR-S/PHR-S RM
   - Figure 4 EHR/PHR-RM Operation-Types Model (Verb-Hierarchy
   - Figure 5 EHR/PHR-RM Data-Types Model
   - Figure 6 CP.6.2 Immunization-Management Use-Case
   - Figure 7 CP.6.2#01 Immunization-Management Conformance-Criteria
   - Figure 8 EHR-S FIM-FHIR-FHIM Requirements-Specification Relationship
   - Figure 9 Example EHR-S FIM-FHIR Requirements-Specifications
   - Figure 10 Example EHR-S FIM-FHIR-FHIM Requirements-Specification

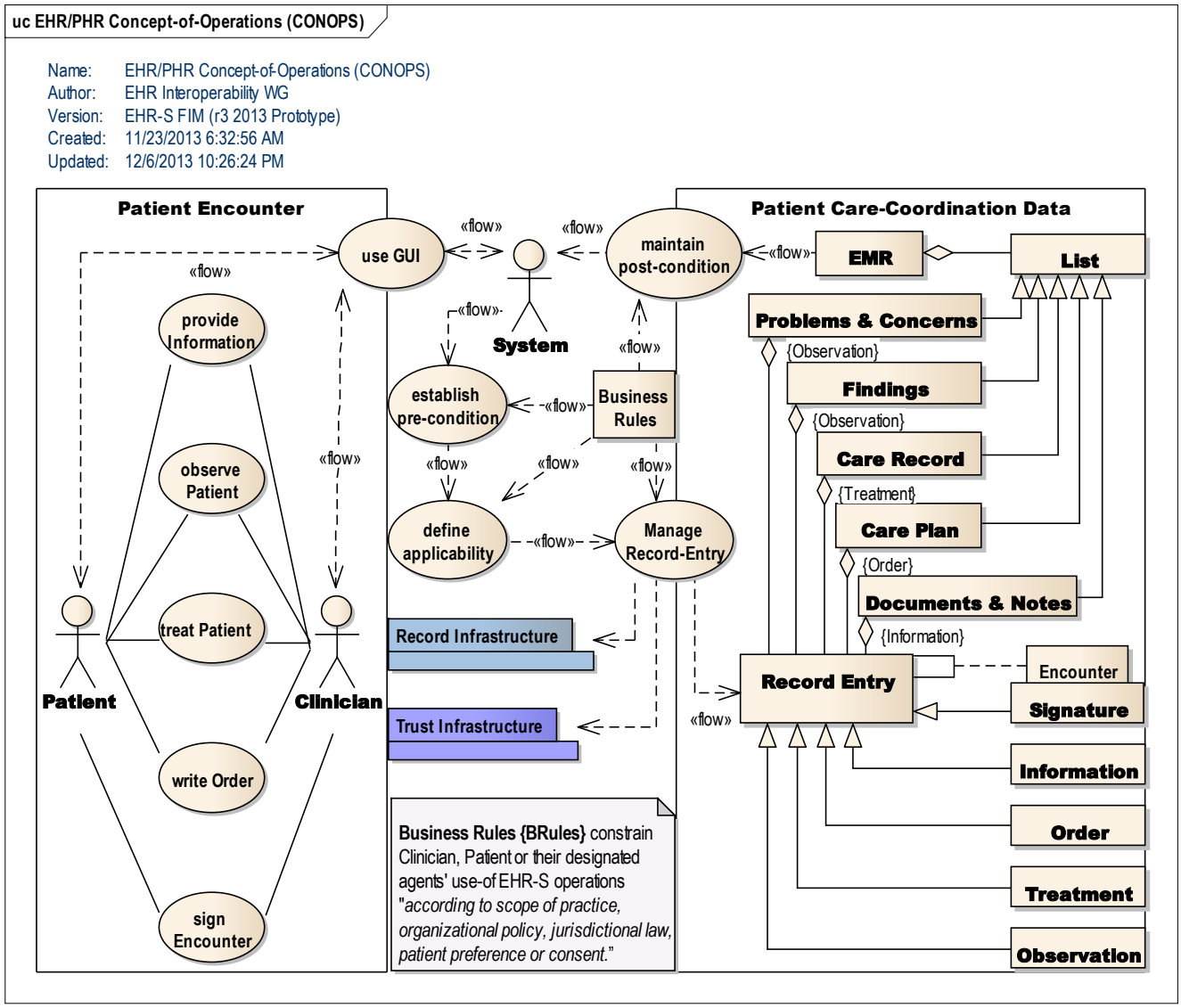

Figure 2 EHR/PHR Concept-of-Operations (CONOPS)

EHR-S Concept-of-Operations (CONOPS) Use-Case A Clinician and Patient and/or their designated Agents have Encounters; where, they *use* a System GUI (Graphical-User-Interface) to *manage* Record-Entries and EMRs (Electronic Medical Records); where,

- The System, based-on Business Rules,
  - *establishes pre-conditions to trigger information flow*
  - *determines (SHALL/SHOULD/MAY) applicability for the System to-provide-the ability-to-manage or directly-manage*
  - *maintains post-conditions* in accordance with
    - scope-of-practice, organizational-policy,
    - jurisdictional-law, and patient-preferences.
- The Clinician, Patient (or their designated agent) can
  - *review* the Patient EMR (Electronic Medical Record) and associated Information
  - *observe and treat the* Patient, *write Orders*, *document* the Encounter, *provide* Information

- *provide* patient-Information and educational-Information
- *enter* EMR Records and associated Information; where,
  - Record Entries are Orders, Treatments, Observations and associated Information
  - Lists are Care-Plans, Care-Records, Findings, Problems-and-Concerns, Documents & Notes
- *sign* Encounter by the Clinician(s) and/or the Patient

- Conformance-Criteria are Scenario threads-of-execution through the Use-Case or Model.

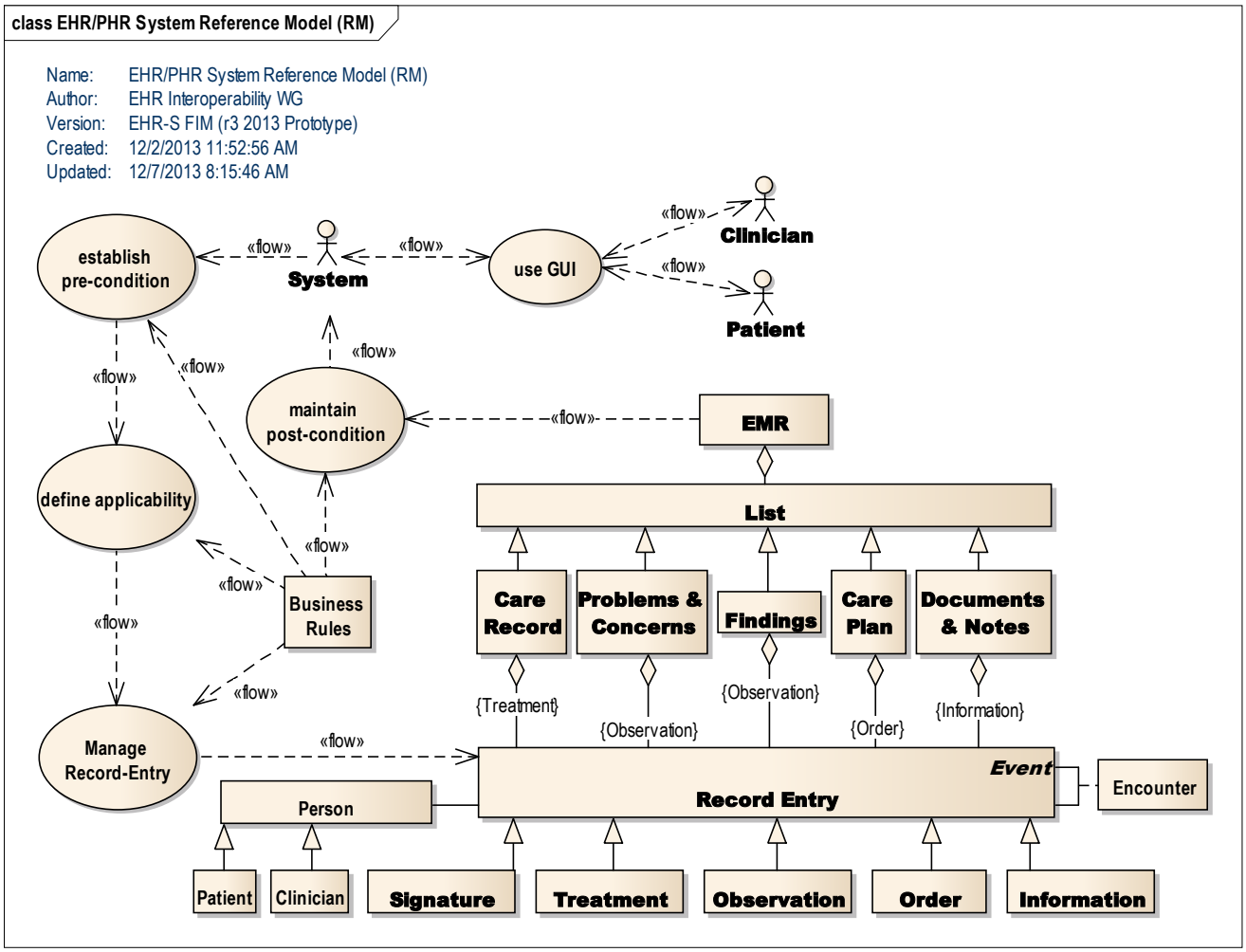

Figure 3 EHR-S/PHR-S RM

The EHR Reference-Model (RM)[1] **[based-on OASIS RM definition]**

1. Establishes pre-conditions
2. Defines applicability (The System SHALL/SHOULD/MAY "provide-the-ability to *manage*" or "directly-*manage*")
3. Structures **Record-Entry** relationships

[1] 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."

- defined-by system operation-and-data models; where,
- EHR/PHR system RM is based-on a functional-use-case constrained hierarchical-lexicon of
  - nouns (Record-Entry data-types) and noun qualifiers,
  - verbs (*manage* operation-types) and verb qualifiers with
  - conditions {Business Rules based on laws, policies, preferences}; where,
- Conformance Criteria (CC) are use-case scenario-threads (context and subject-verb-object bindings).

4. **Defines Conformance-Criteria syntax-and-semantics; where,**
   - Function Conformance-Criteria and their profiles constrain the *manage* sub-types, Record-Entry sub-types
   - Functions can-be linked-to Information Exchanges (IEs),
   - IEs can-be linked-to implementation standards-technologies-paradigms-and-patterns (e.g., FHIR, FHIM, IHE).
5. Maintains post-conditions; where,

A **System-Function (SF) Use-Case** is a constrained-scope and refined-detail System Reference-Model; where,
SF Conformance-Criteria are System-Action scenario-threads through the SF Use-Case Model containing:

1) **SF Invariant-condition** (context)
   a) System Identifier (EHR or PHR)
   b) System Function (SF) Identifier
   c) Profile Identifier
2) **SF CC Identifier** (Number)
3) **SF CC Pre-condition** (trigger)
   a) Pre-condition is a verb-clause.
   b) After a Human-Action or System-Action; then,
4) **SF CC Applicability**
   a) The System SHALL, SHOULD or MAY
      i) "provide-the-ability-to"
      ii) "directly"
5) **SF CC System-Action Bindings**
   a) Operation linked-to Data-Type; where, conditionally,
   b) the *System-Actions depends-on* other-SF
   c) Data-Type are *associated-with* other Data-Types
   d) Information Exchange(s) are *linked-to*
      i) International Interoperability-Standards (e.g., FHIR)
      ii) Realm Interoperability-Specifications (e.g., FHIM)
      iii) Implementation Guides (e.g., Consolidated CDA)
      iv) Behavioral Interoperability-Specifications (e.g., IHE)
      v) Service Level Agreement (e.g., local workflow)
6) **SF CC Post-Condition** (expected-outcome)
   a) Post-condition is a subordinate-clause.
   b) "where, the System-Actions are …"
7) **SF CC See Also**
   a) Supporting or related SFs (e.g., Infrastructure)

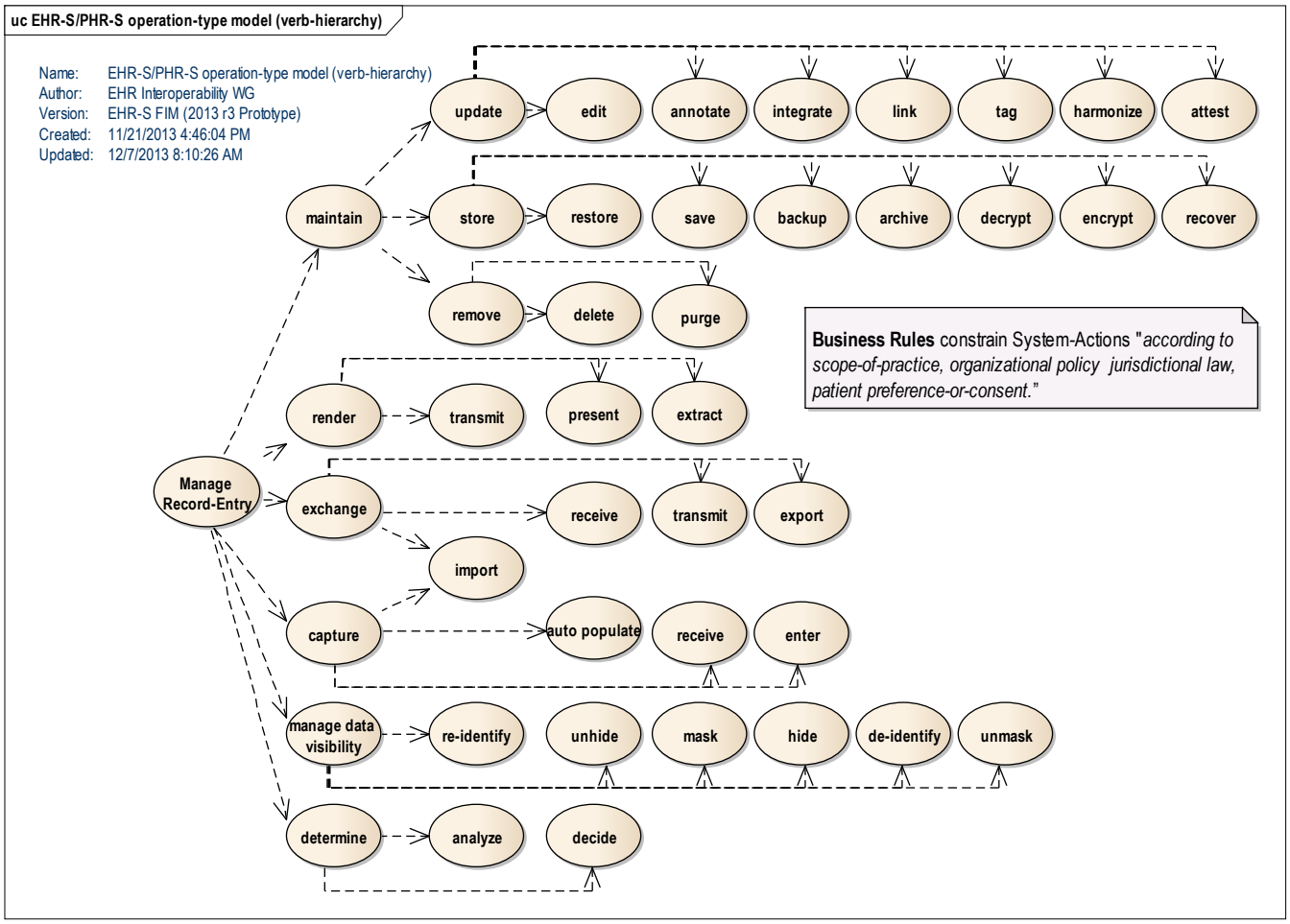

Figure 4 EHR/PHR-RM Operation-Types Model (Verb-Hierarchy)

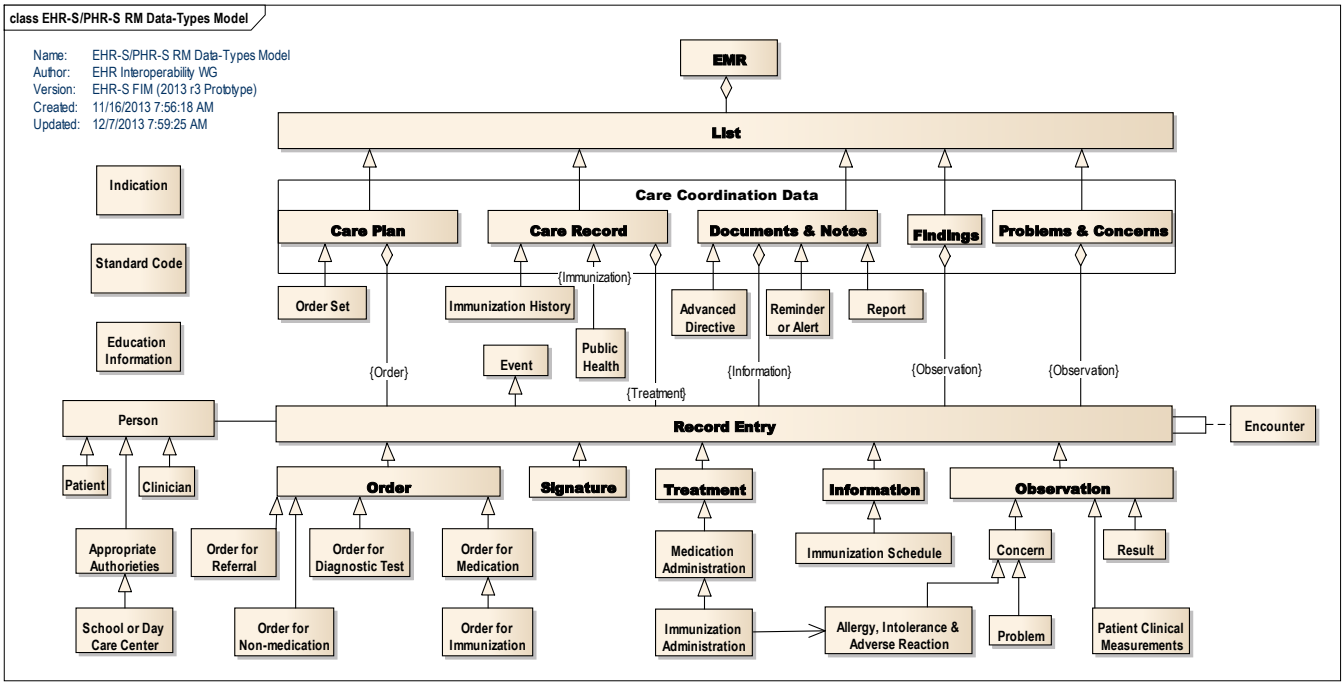

Figure 5 EHR/PHR-RM Data-Types Model

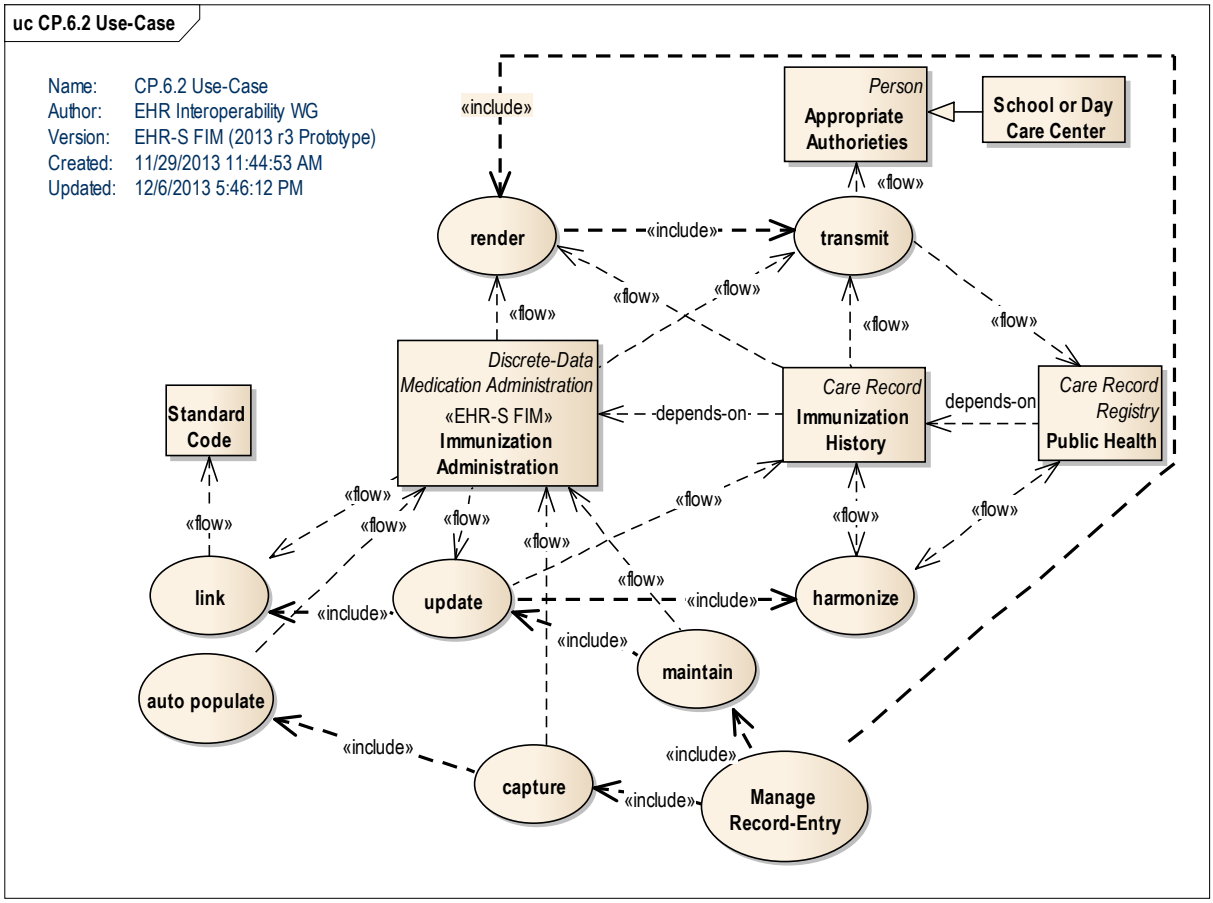

Figure 6 CP.6.2 Immunization-Management Use-Case

The Release-3 EHR System Immunization-Management Function Use-Case includes

1) **A Clinician *uses* the EHR-S, during an Encounter, to**
   a) *review* EMR, Alerts-and-Notifications
   b) *enter* Observations, Treatments, Orders and associated Documents and Notes
   c) *sign* the Encounter
   d) **Immunization Management involves the following:**
      i) **System-Actions:** *auto-populate, capture, determine, exchange, harmonize, link, maintain, manage, render, transmit, update; where,*
         (1) Immunization-Administration is
            (a) *linked* with Standard-Codes
            (b) *transmitted* to Population Health Registries
            (c) *auto-populated as* a by-product of verification of Administering-Provider, Patient, Medication, Dose, Route and Time.
         (2) Immunization-History is
            (a) Updated-with the Immunization-Administration Record-Entries
            (b) *harmonized* with Public-Health Registries
            (c) *rendered* and *transmitted; where,*
               (i) transmitted to Appropriate Authorities (e.g., Schools and Day Care Centers);
      ii) **Data:** Immunization-Administration, Immunization-History, Public-Health Registry

iii) **Associated Data**: Alerts-and-Notification, Allergy-Intolerance-or-Adverse-Event, Patient-Clinical-Measurement, Patient-Directive, Immunization-Schedule, **Patient**-Educational-Information, Signature.

e) Where all System-Actions are "according to scope-of-practice, organizational-policy, jurisdictional-law, patient preference-or-consent."

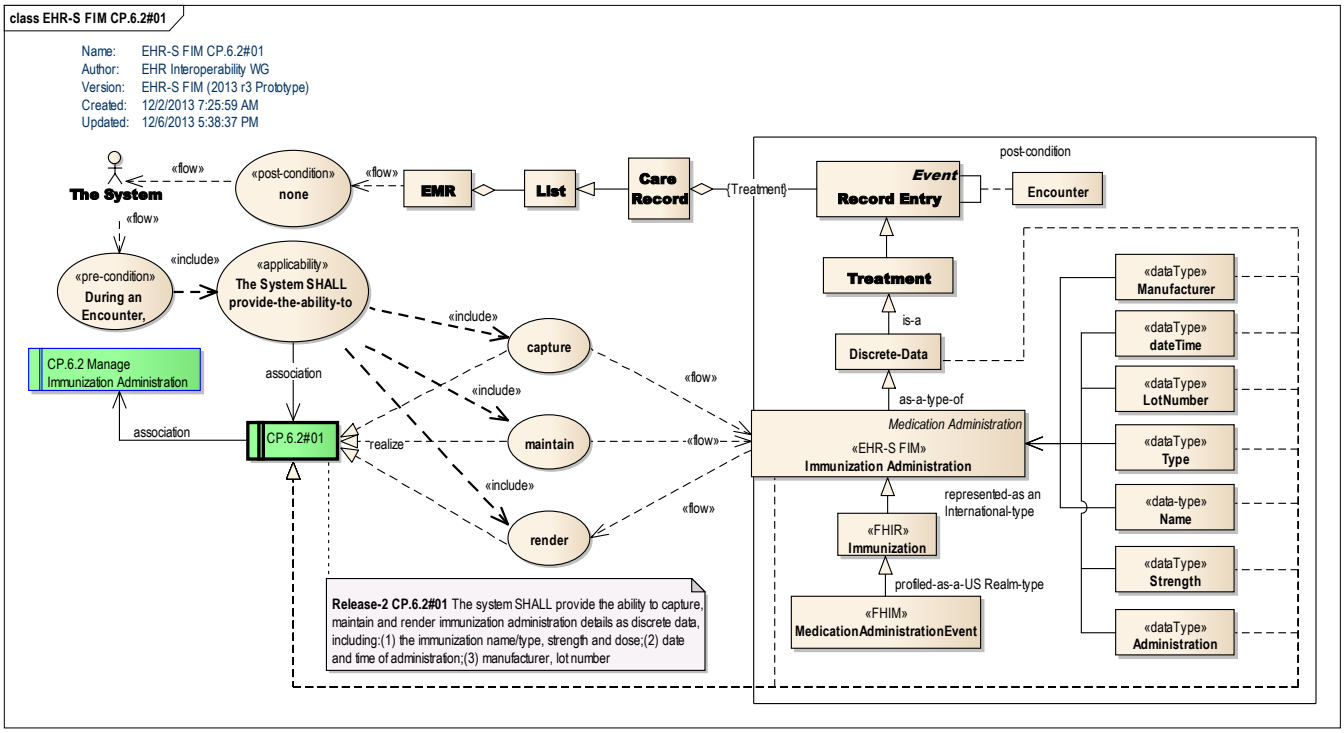

Figure 7 CP.6.2#01 Immunization-Management Conformance-Criteria

CP.6.2#01 During an Encounter, the system SHALL provide-the-ability-to *capture, maintain and render* Immunization Administration; where,

- Treatment Record-Entry details are as discrete-data, including
  - immunization name/type, strength and dose; date-and-time of administration;
  - manufacturer, lot number
- Immunization Administration can be realized-by FHIR; where,
  - Immunization-Administration is then associated with the following resources:
    - AdverseReaction and other Observations,
    - Patient , Practitioner, Organization, Location;
- Immunization-Administration can be realized-by FHIR-profiles based-on the US Realm FHIM Immunization and related Domains.

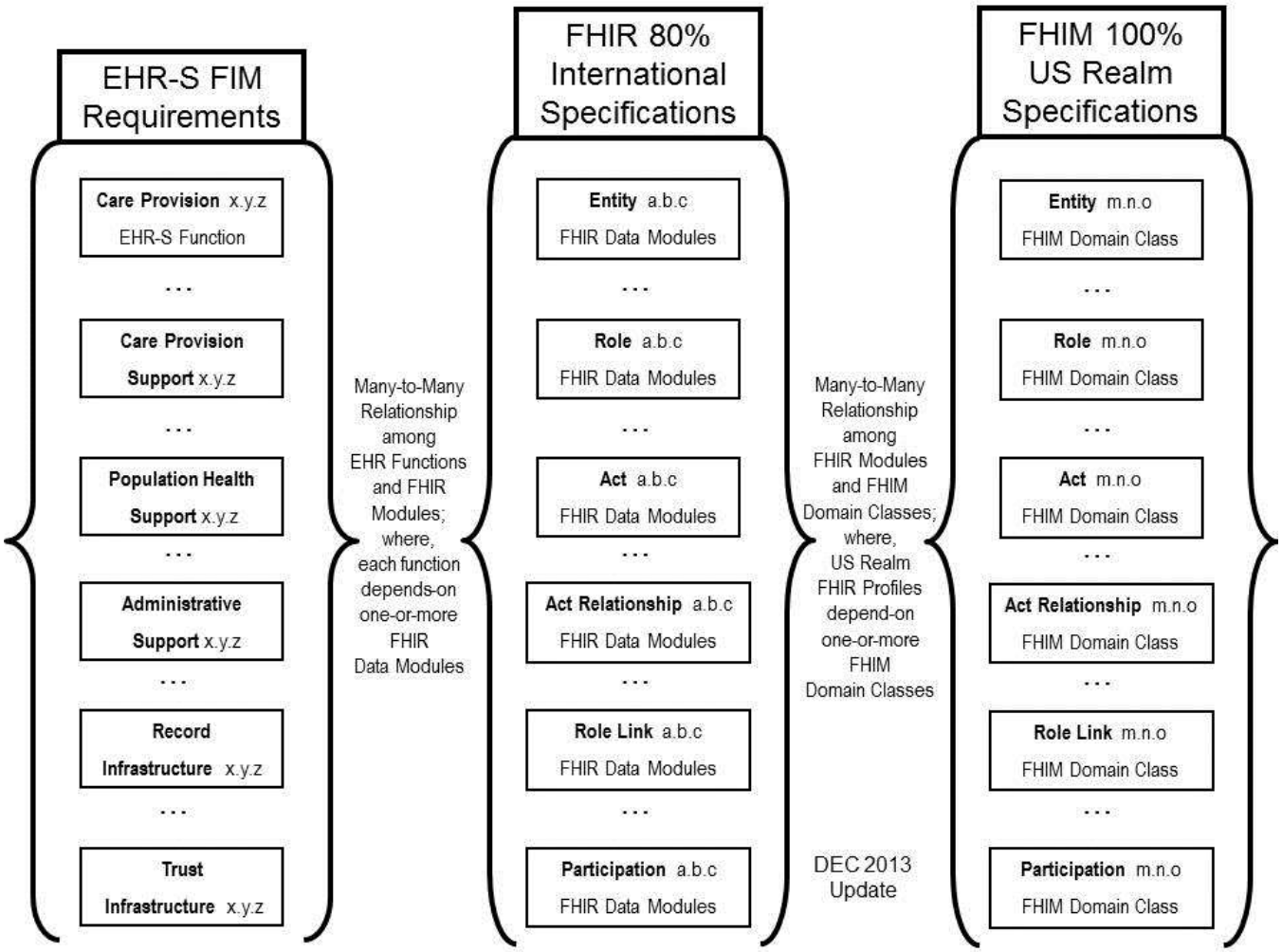

Figure 8 EHR-S FIM-FHIR-FHIM Requirements-Specification Relationship

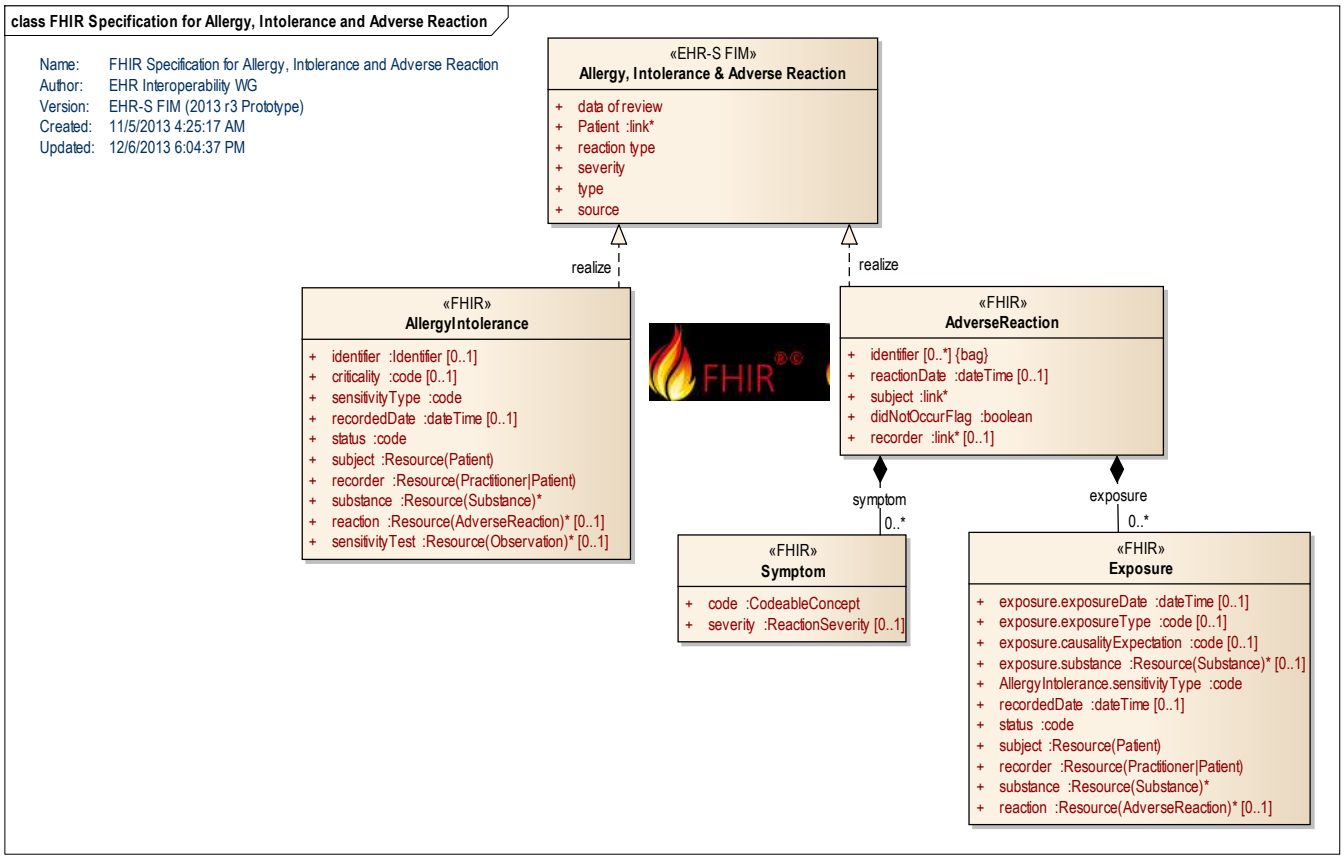

Figure 9 Example EHR-S FIM-FHIR Requirements-Specifications

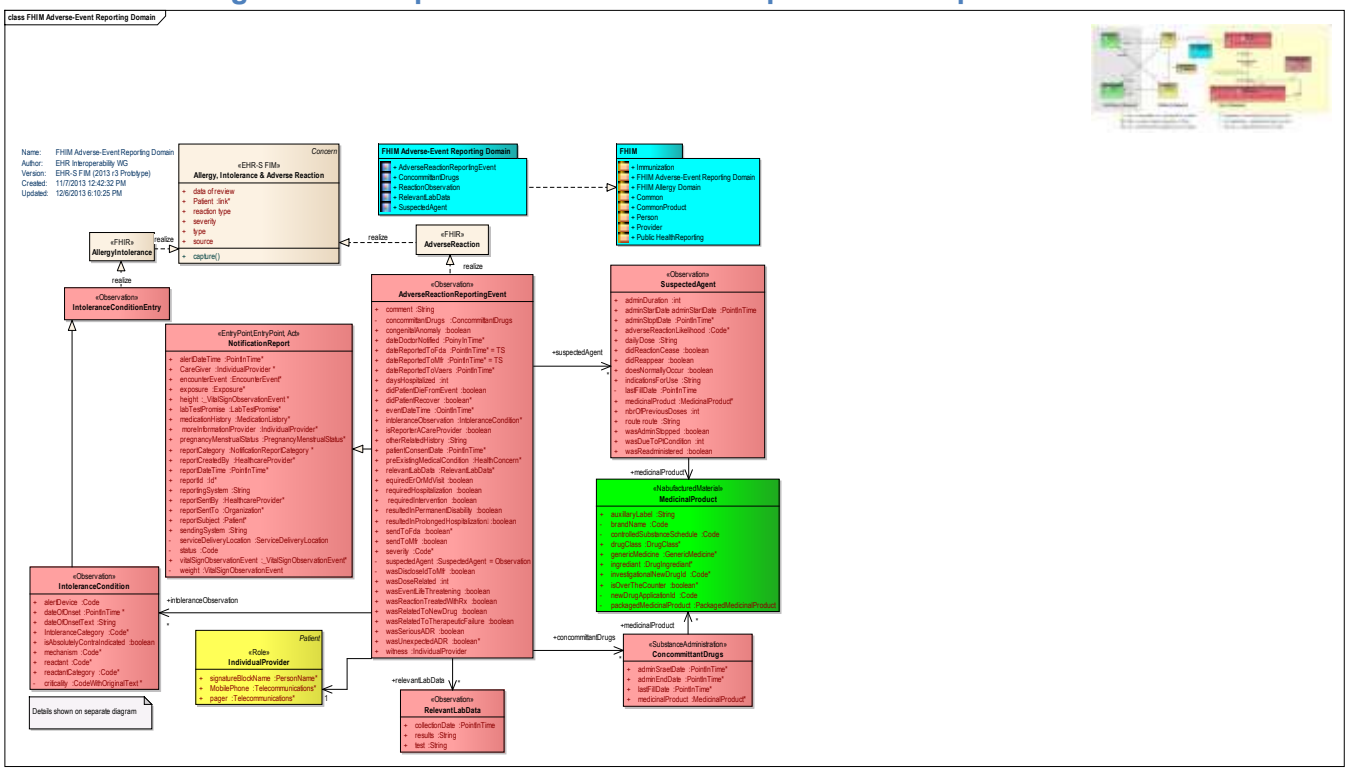

Figure 10 Example EHR-S FIM-FHIR-FHIM Requirements-Specification

CURRENT ISSUES-ACTIONS

5. **HL7 Board approval** of EHR-S FIM Release-3 open-IP; where, the EHR-S FIM home page is www.hl7.org/EHRSFIM
6. **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
7. **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
8. **Call-for-Participation** in EHR-S/PHR-S FIM r3 based on a common EHR-S/PHR-S RM (Reference Model), where,