Monthly Summary Briefing

HL7 EHR Work Group (EHR-WG)

by Stephen Hufnagel, Tiag subcontractor
to Edmund-Scientific VA support-contract
Shufnagel@tiag.net, 703-575-7912

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Edmond Scientific

VA HEALTH CARE Defining EXCELLENCE in the 21st Century

EHR-S FM
Executive Summary

This executive-summary specifically address potential mHealth impacts and/or mHealth trends, which are important for VA, IPO and DOD awareness.

- The goal of the Electronic Health Record (EHR) Work Group is to support the HL7 mission of developing standards for EHR data, information, functionality, and interoperability.
  - Functional and Information Requirements for Electronic Health Records (EHR) and systems (EHRS),
  - Functional and Information Requirements for Personal Health Records (PHR) and systems (PHRS),

- An objective of the EHR Interoperability WG team is to create a clear, complete, concise, correct and consistent EHR-S FIM r3.0 in Sparx Systems Enterprise Architect tool; where, it addresses the structural issues identified by the VA negative r2.0 ballot.

- A second objective of the EHR Interoperability WG is producing a Meaningful Use profile for r2.0.

- The objective of the Resource Management Evidentiary Support (RM-ES) project team is to provide expertise on records management, compliance, and data/record integrity and related to governance to support the use of medical records for clinical care and decision-making, business, legal and disclosure purposes.

NOTE: EHR-S FIM is NOT intended to imply a specific architecture or workflow!

EHR WG
Meeting Participation

Meeting	Time (ET)	Relevance
EHR-S FM Plenary	Every Tuesday 3:00 PM Eastern Phone: 770-657-9270, PC 510269# LiveMeeting	All things EHR, liaison with other WGs, ballot reconciliation, and development of WG documentation
EHR Interoperability EHR-S FIM r3.0 Meaningful Use	Every Tuesday 2:00 PM Eastern Phone: 770-657-9270, PC 510269# GoTo Meeting	Directly addressing EHR-S r2.0 Interoperability concern- and-needs
Resource Management and Evidentiary Support Standards Gap Analysis	Every Monday 12:00 Noon Eastern Phone: 650-479-3208 WebEx Code: 923-467-215, PC1519	Directly addressing EHR-S r2.0 RMES concerns and needs

EHR-S FM r2.0 Dimensions and Stakeholders

Care Provision

1. CP.1 Manage Clinical History
2. CP.2 Render Externally Sourced Information
3. CP.3 Manage Clinical Documentation
4. CP.4 Manage Orders
5. CP.5 Manage Results
6. CP.6 Manage Treatment Administration
7. CP.7 Manage Future Care
8. CP.8 Manage Patient Education & Communication
9. CP.9 Manage Care Coordination & Reporting

Care Provision Support

1. CPS.1 Record Management
2. CPS.2 Support Externally Sourced Information
3. CPS.3 Support Clinical Documentation
4. CPS.4 Support Orders
5. CPS.5 Support for Results
6. CPS.6 Support Treatment Administration
7. CPS.7 Support Future Care
8. CPS.8 Support Patient Education & Communication
9. CPS.9 Support Care Coordination & Reporting

Trust Infrastructure

1. TI.1 Security
2. TI.2 Audit
3. TI.3 Registry and Directory Services
4. TI.4 Standard Terminology and Terminology Services
5. TI.5 Standards-Based Interoperability
6. TI.6 Business Rules Management
7. TI.7 Workflow Management
8. TI.8 Database Backup and Recovery
9. TI.9 System Management Operations and Performance

Population Health Support

1. POP.1 Support for Health Maintenance, Preventive Care and Wellness
2. POP.2 Support for Epidemiological Investigations of Clinical Health Within a Population
3. POP.3 Support for Notification and Response
4. POP.4 Support for Monitoring Response Notifications Regarding a Specific Patient's Health
5. POP.5 Donor Management Support
6. POP.6 Measurement, Analysis, Research and Reports
7. POP.7 Public Health Related Updates
8. POP.8 De-Identified Data Request Management
9. POP.9 Support Consistent Healthcare Management of Patient Groups or Populations
10. POP.10 Manage Population Health Study-Related Identifiers

Administration Support

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

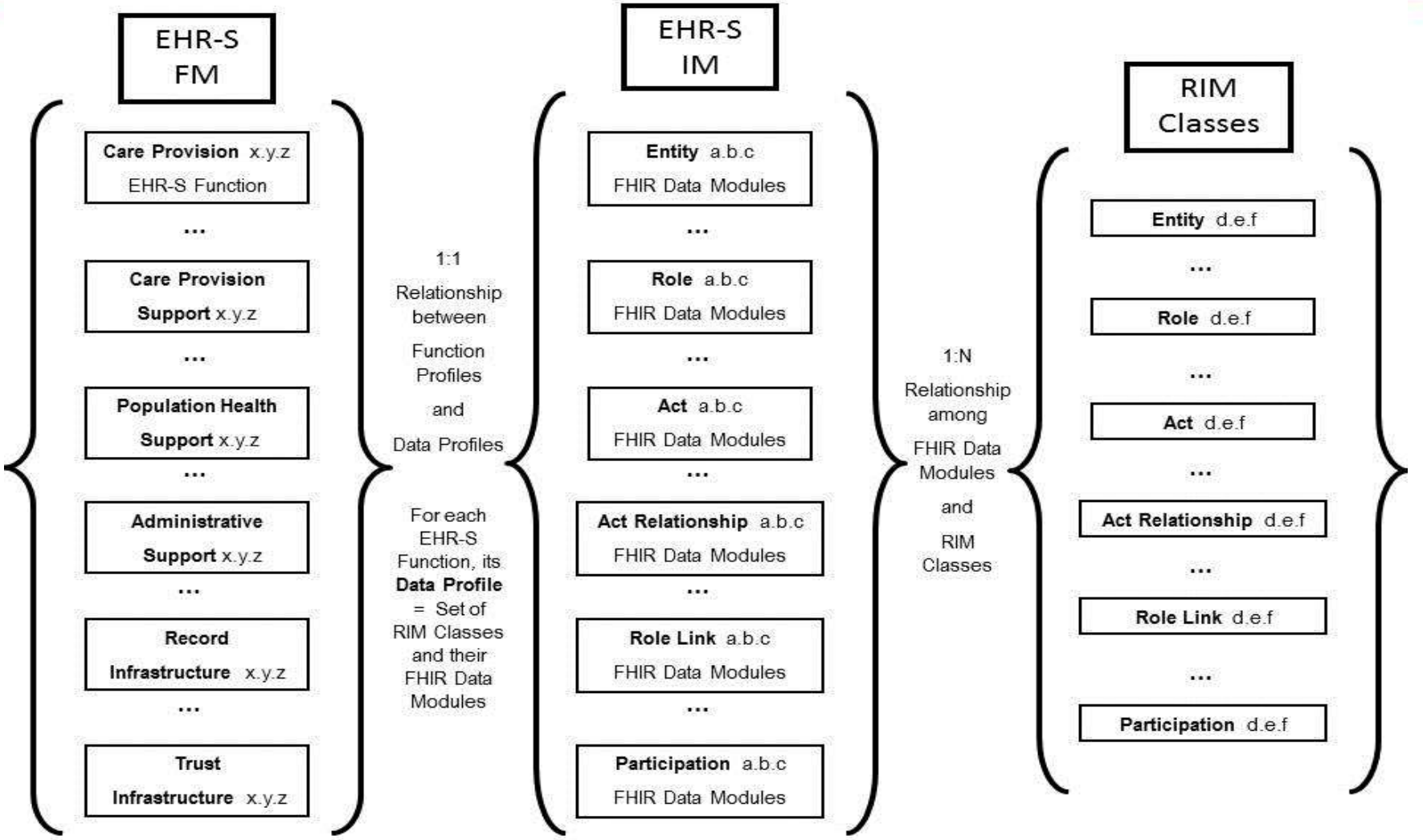
Record Infrastructure

1. RI.1 Record Lifecycle and Lifespan
2. RI.2 Record Synchronization
3. RI.3 Record Archive and Restore

EHR-S FIM Reference Information-Architecture

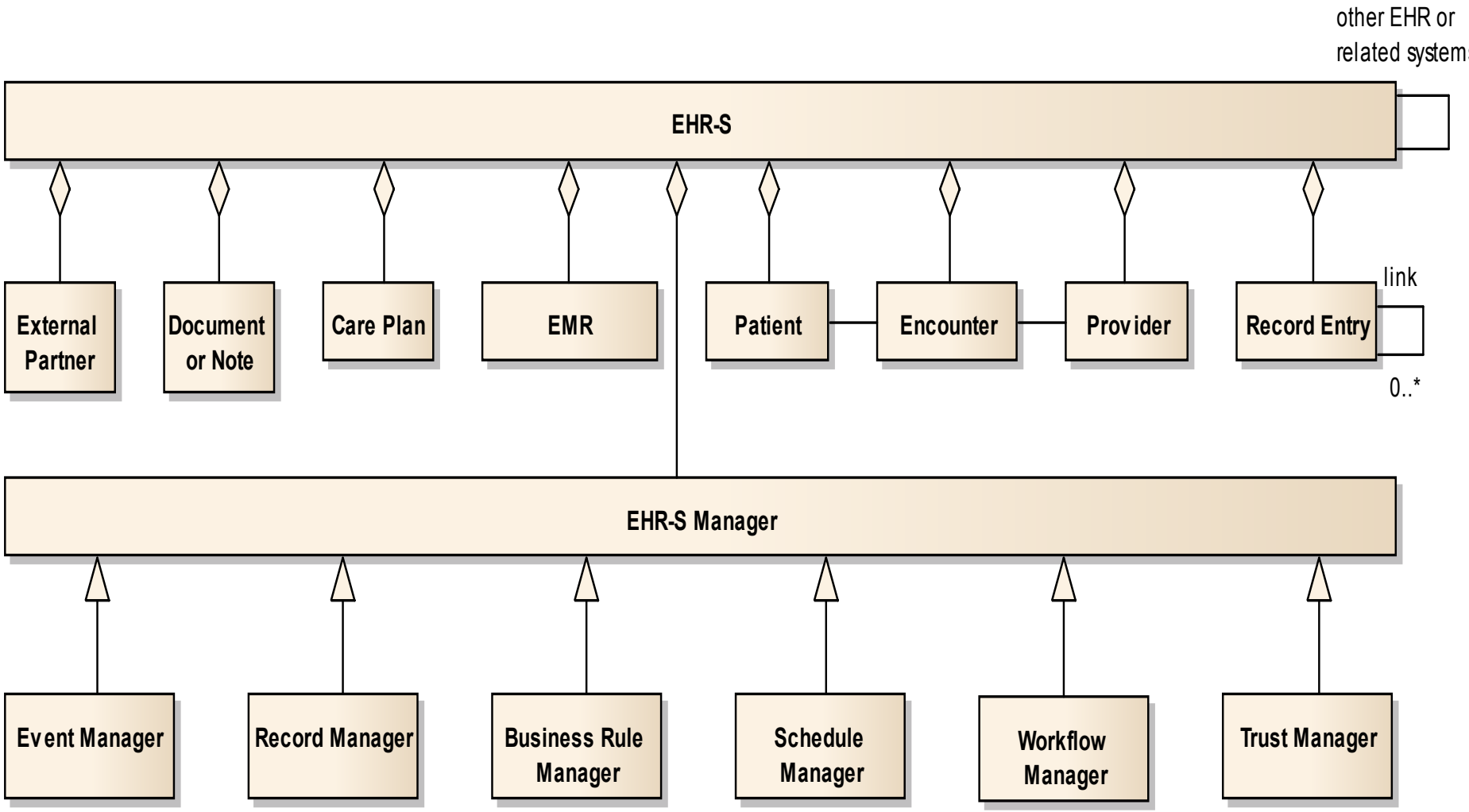
by Stephen Hufnagel PhD; where,

RIM is the HL7 reference Information Model, **FHIR** is Fast Health Interoperability Resource



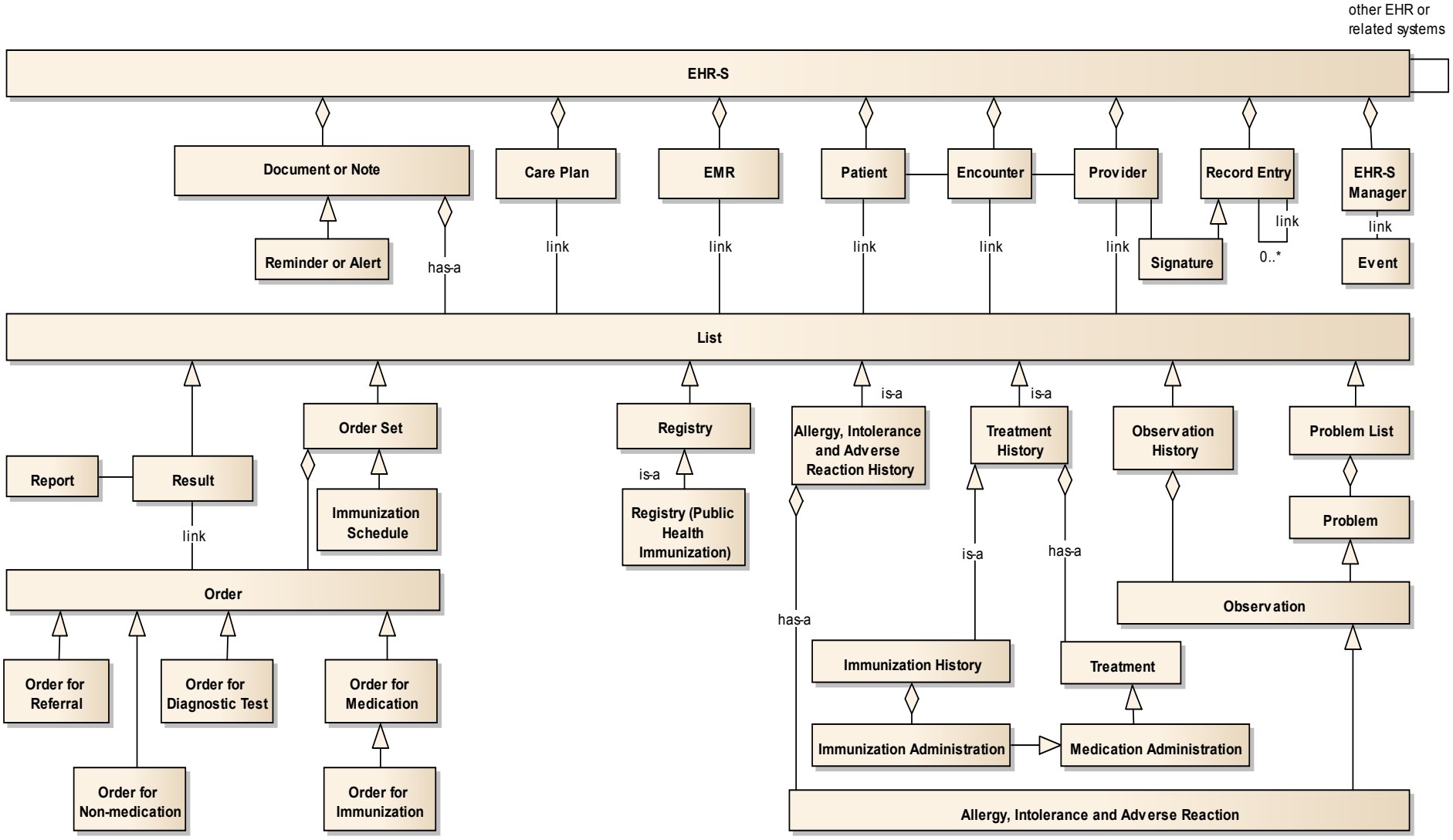
EHR-S FIM Anatomy
Conceptual Model (Level 1)

ISSUE: Currently, *Managers* do not consistently correspond to Data Entities



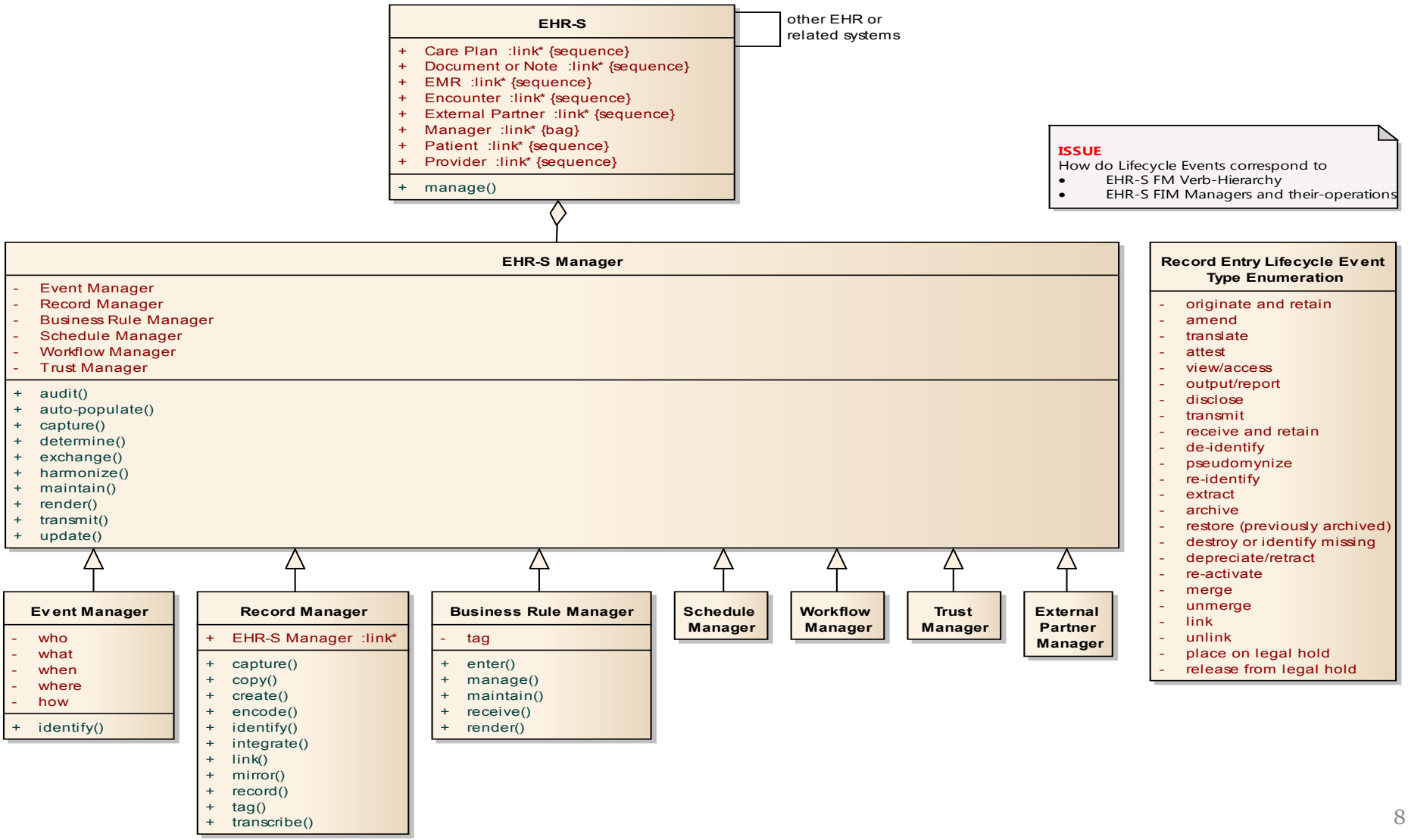
EHR-S FIM Anatomy
Conceptual Information Model (Level 4)

class EHR-S FIM Conceptual Information Model (4 Levels)



EHR-S FIM Anatomy
Logical Manager Model (Level-2)

ISSUE: Consistency of CC Verb-Hierarchy, EHR-S Managers, Record Lifecycle Events.

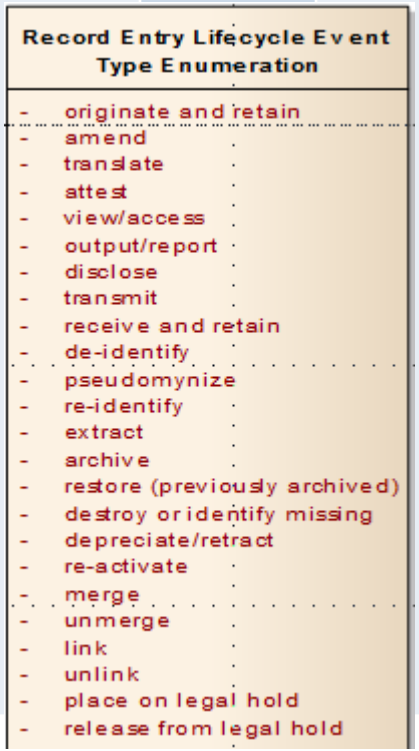


EHR-S FM Action Verb Hierarchy
Vs. EHR-S FIM Manager Operations
VS. Record Lifecycle Events

ISSUE: Consistency of CC Verb-Hierarchy, EHR-S Managers, Record Lifecycle Events.

Manage (Data)

Capture	Maintain			Render			Exchange	Determine		Manage-Data-Visibility
Auto-Populate **Enter** **Import** **Receive**	Store	Update	Remove	Extract	Present	Transmit	Export Import Receive Transmit	Analyze	Decide	De-Identify Hide Mask Re-Identify Unhide Unmask
	Archive Backup Decrypt Encrypt Recover Restore Save	Annotate Attest Edit Harmonize Integrate Link Tag	Delete Purge							

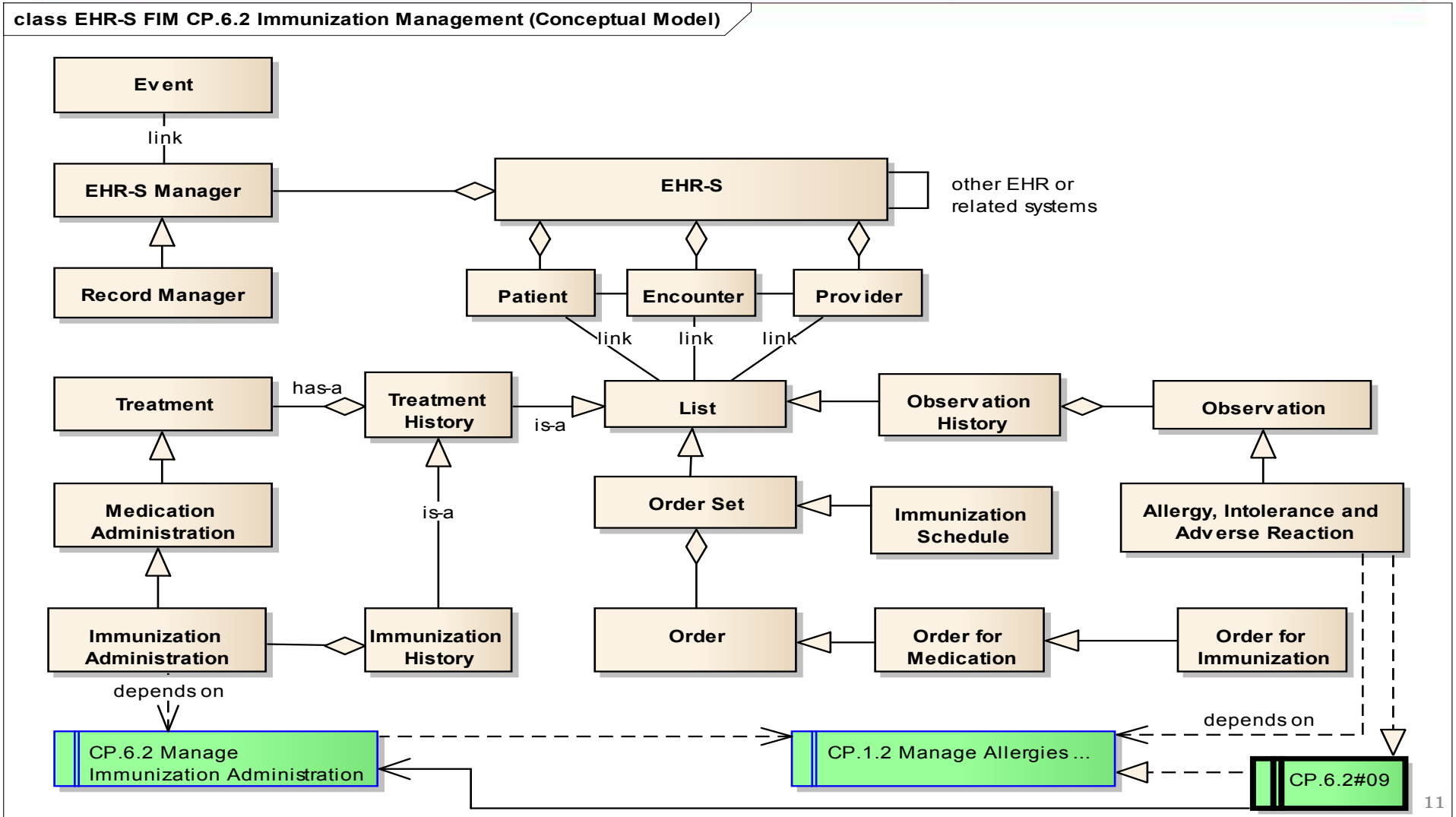


EHR-S FIM Anatomy "Structure"

INTERIM CONCLUSION

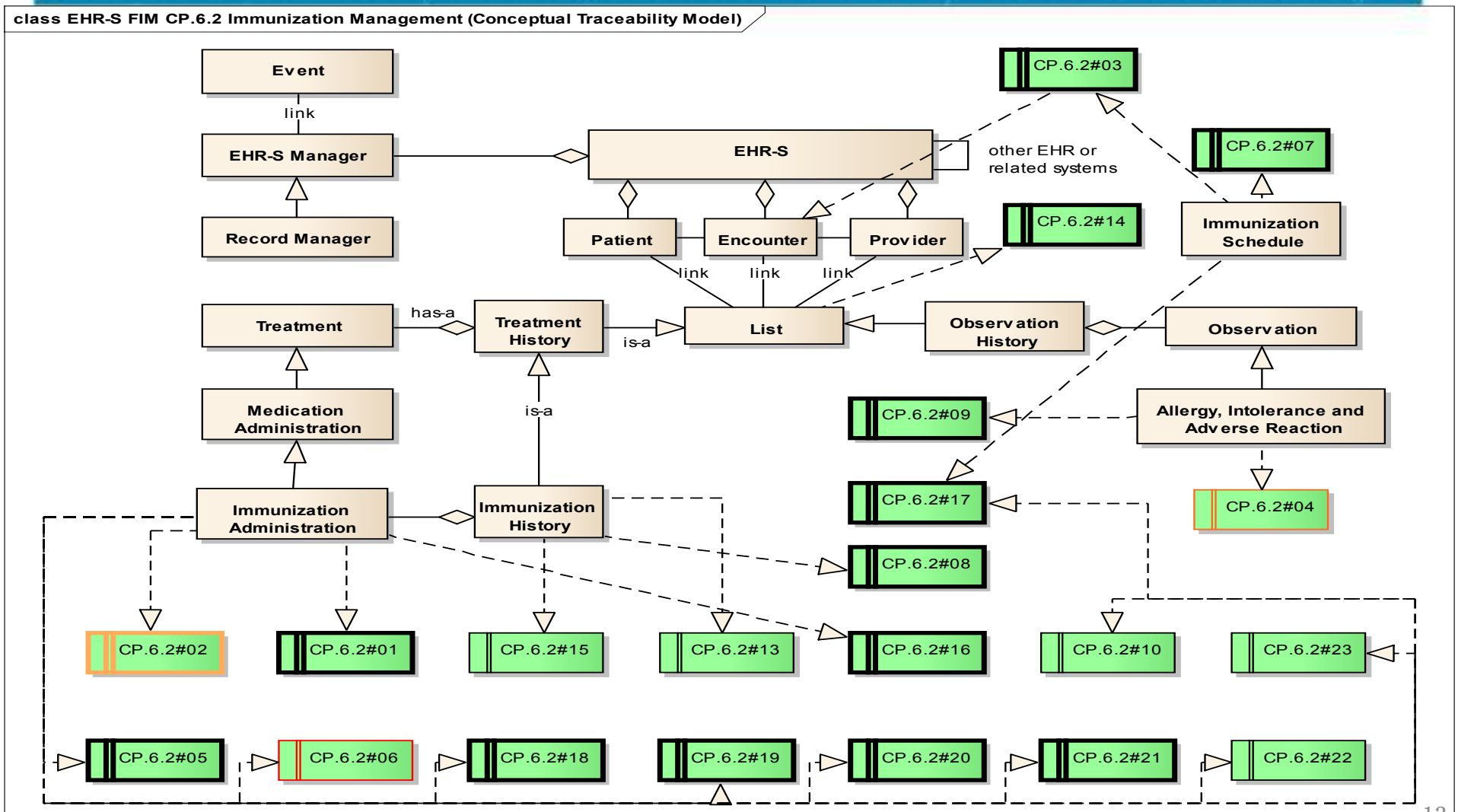
- We have looked at medication management, orders management and Immunization management.
- The EHR-S Conceptual Information Model (CIM) for CP.6.2 Immunization Management is generally applicable for all of the Care Provisioning (CP) section of the EHR-S FM; where,
  - minor CIM additions and modifications will likely occur as we analyze the rest of the CP section; but,
  - The Conceptual Manager Model remain to be substantially developed

EHR-S-FIM Physiology "Function" (Conceptual Model)
CP.6.2 Immunization Management

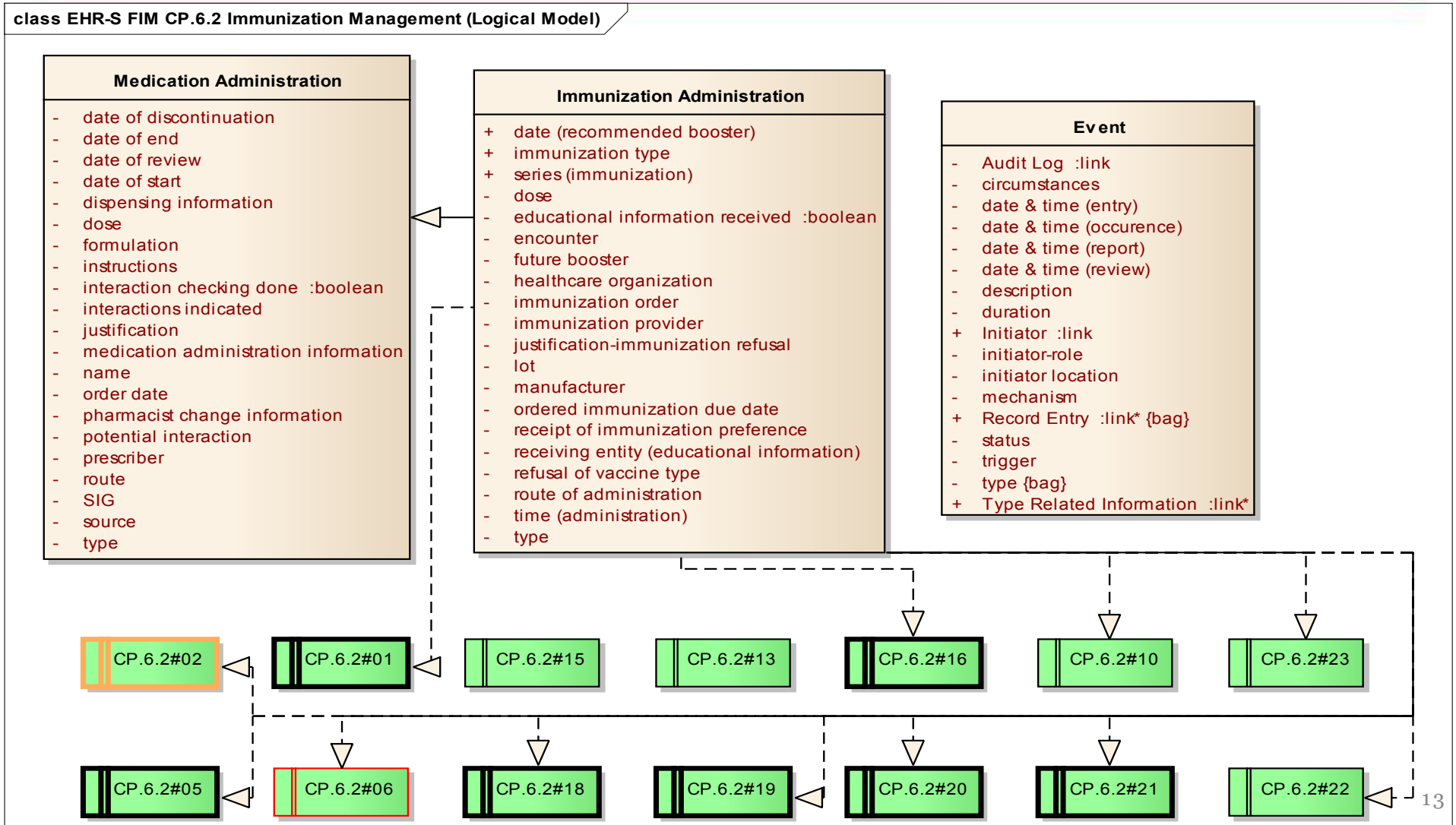


EHR-S-FIM Physiology "Function" (Traceability Model)

CP.6.2 Immunization Management

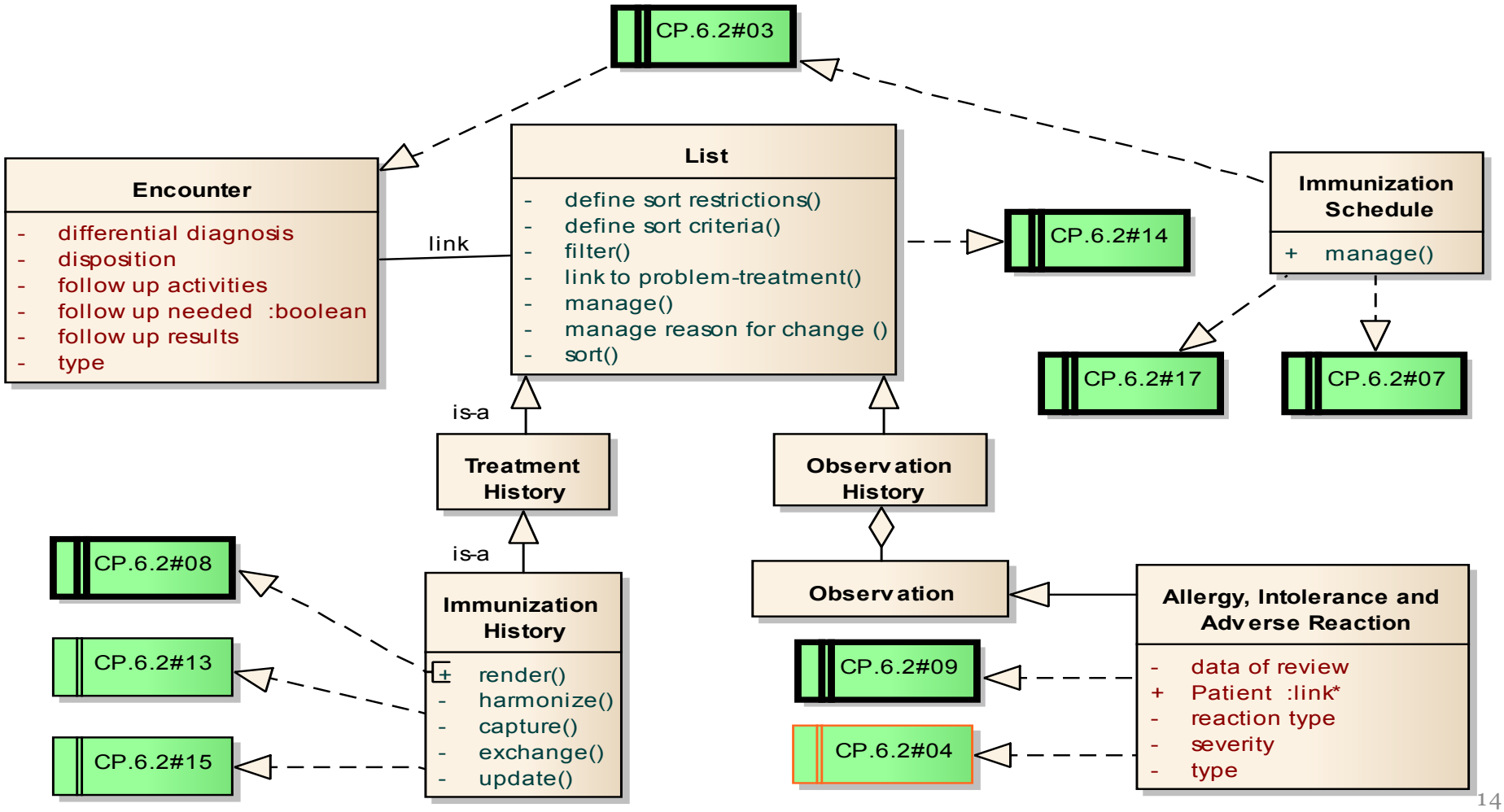


EHR-S FIM Physiology "Function" (Logical Model)
CP.6.2 Immunization Management



EHR-S FIM Physiology "Function" (Logical Model)
CP.6.2 Immunization Management

class EHR-S FIM CP.6.2 Immunization Management (Logical Model-2)



EHR-S-FIM Physiology "Function" (Traceability Model)

CP.6.2 Immunization Management Conformance Criteria

1. The system **SHALL** provide the ability to capture, maintain and render immunization administration details as discrete data, including:(1) the immunization name/type, strength and dose;(2) date and time of administration;(3) manufacturer, lot number, expiration date,(4) route and site of administration;(5) administering provider;(6) observations, reactions and complications;(7) reason immunization not given and/or immunization related activity not performed; according to scope of practice, organizational policy and/or jurisdictional law."
2. The system MAY auto-populate the immunization administration record as a by-product of verification of administering provider, patient, medication, dose, route and time according to scope of practice, organizational policy and/or jurisdictional law.
3. The system **SHALL** provide the ability to determine and render required immunizations, and when they are due, based on widely accepted immunization schedules, when rendering encounter information.
4. The system SHOULD provide the ability to capture, in a discrete field, an allergy/adverse reaction to a specific immunization.
5. The system **SHALL** conform to function CP.3.2 (Manage Patient Clinical Measurements) to capture other clinical data pertinent to the immunization administration (e.g., vital signs).
6. The system SHOULD provide the ability to link standard codes (e.g. NDC, LOINC, SNOMED or CPT) with discrete data elements associated with an immunization.
7. The system **SHALL** provide the ability to maintain the immunization schedule.
8. The system **SHALL** provide the ability to render a patient's immunization history upon request for appropriate authorities such as schools or day-care centers.
9. The system **SHALL** conform to function CP.1.2 (Manage Allergy, Intolerance and Adverse Reaction List).
10. The system SHOULD transmit required immunization administration information to a public health immunization registry according to scope of practice, organizational policy and/or jurisdictional law.
11. The system SHOULD exchange immunization histories with public health immunization registries according to scope of practice, organizational policy and/or jurisdictional law.

EHR-S-FIM Physiology "Function" (Traceability Model)

CP.6.2 Immunization Management Conformance Criteria

ISSUE: Consistency of Conformance Criteria (CC) across related functions, such as Medication-and-Immunization and Orders-and-Results Management.

12. The system SHOULD harmonize Immunization histories with a public health immunization registry according to scope of practice, organizational policy and/or jurisdictional law.
13. The system SHOULD capture and render immunization histories from a public health immunization registry.
14. The system SHALL conform to function CP.1.6 (Manage Immunization List).
15. The system SHOULD provide the ability to update immunization histories at the time of capturing an immunization administration.
16. The system **SHALL** provide the ability to render the immunization order as written (i.e., exact clinician order language) when rendering administration information.
17. "The system **SHALL** provide the ability to determine due and overdue ordered immunizations and render a notification. "
18. The system **SHALL** provide the ability to render a patient educational information regarding the administration (e.g., Vaccine Information Statement (**VIS**)).
19. The system **SHALL** provide the ability to capture that patient educational information (e.g., VIS) was provided at the time of immunization administration.
20. The system **SHALL** provide the ability to capture documentation that patient educational information (e.g., VIS) was provided at the time of immunization administration.
21. The system **SHALL** provide the ability to capture the receiving entity (e.g., patient, representative, organization) when patient education information is provided at the time of immunization administration.
22. The system SHOULD provide the ability to capture and maintain immunization refusal reasons as discrete data.
23. The system SHOULD provide the ability to capture patient preferences regarding receipt of immunization (e.g. refusal of certain vaccine types) at time of immunization administration.

EHR-S FIM Physiology "Function"
CP.6.2 Immunization Management

Resultant Description (Scenario):

- The System Manager can
  - *Capture, Auto-populate,*
  - *Maintain, Render,*
  - *Transmit, Exchange,*
  - *Harmonize, Update,*
  - *Determine*
- The applicable data modules are
  - Immunization Administrations
  - Events, Schedules, Plans and Educational Materials

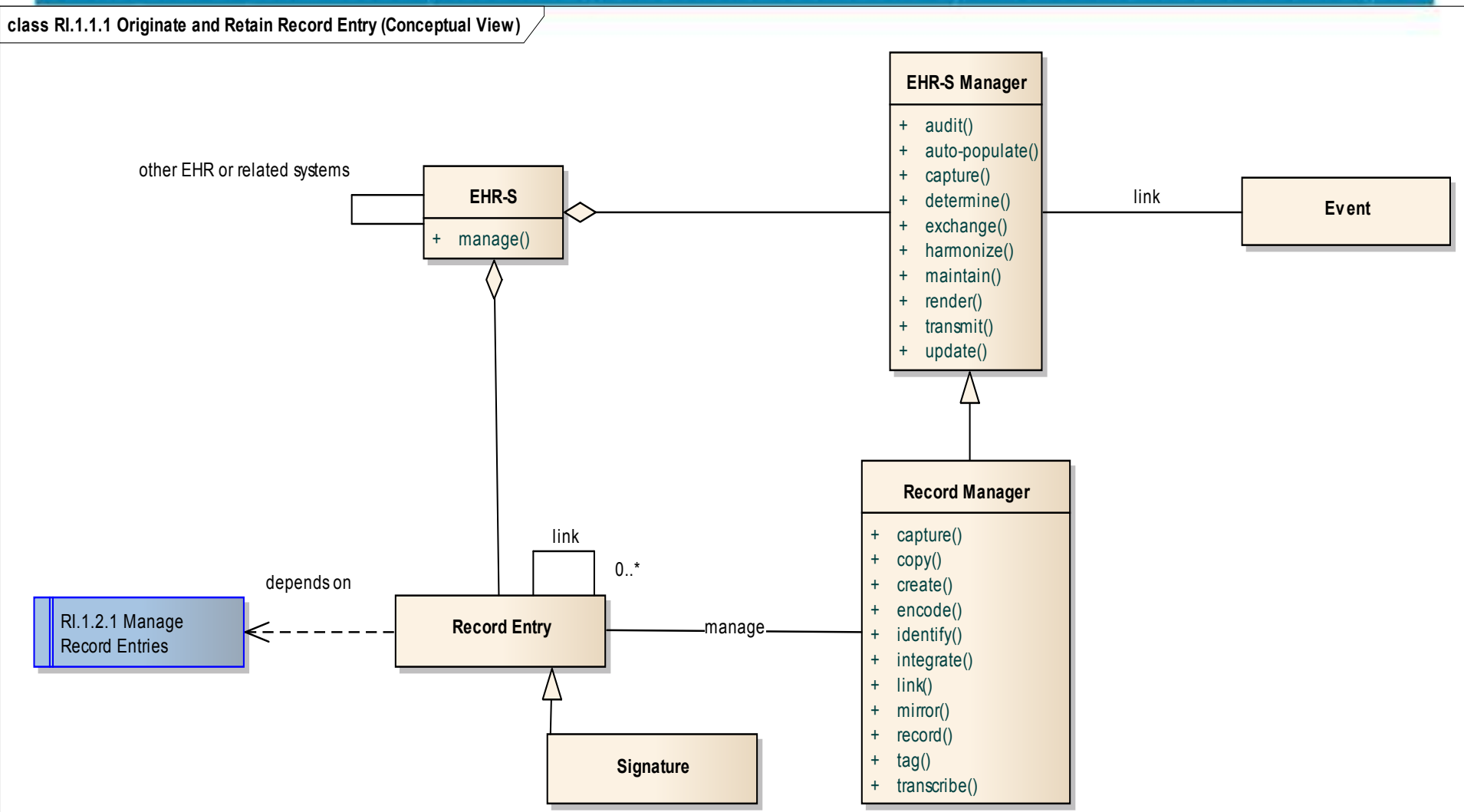
EHR-S FIM Physiology "Function"
CP.6.2 Immunization Management

INTERIM CONCLUSION

- Based on medication management, orders management and Immunization management functions we see a consistency-advantage in immunization-applicable data-elements
- A high level EHR-S Information Model is emerging as a set of
  - Patients, Providers, External Partners, Encounters, EMRs, Care Plans, Lists , Managers, Docs and Notes;
- A high level EHR-S Manager Model is emerging to
  - *Capture, Auto-populate, Maintain, Render, Transmit, Exchange, Harmonize, Update, Determine*

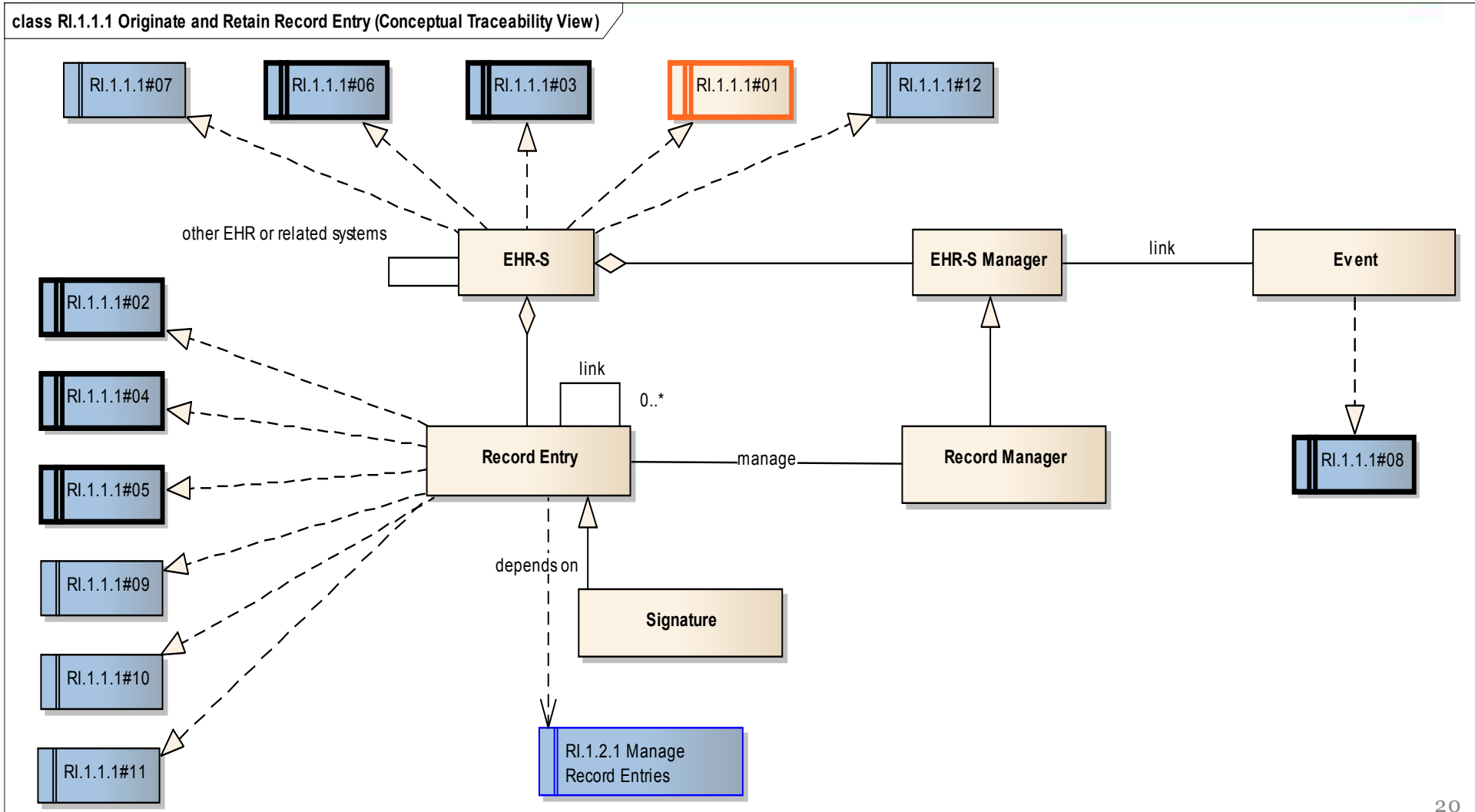
EHR-S FIM Physiology "Function" (Conceptual View)

RI.1.1.1 Originate and Retain Record Entry



EHR-S FIM Physiology "Function" (Conceptual Traceability View)

RI.1.1.1 Originate and Retain Record Entry

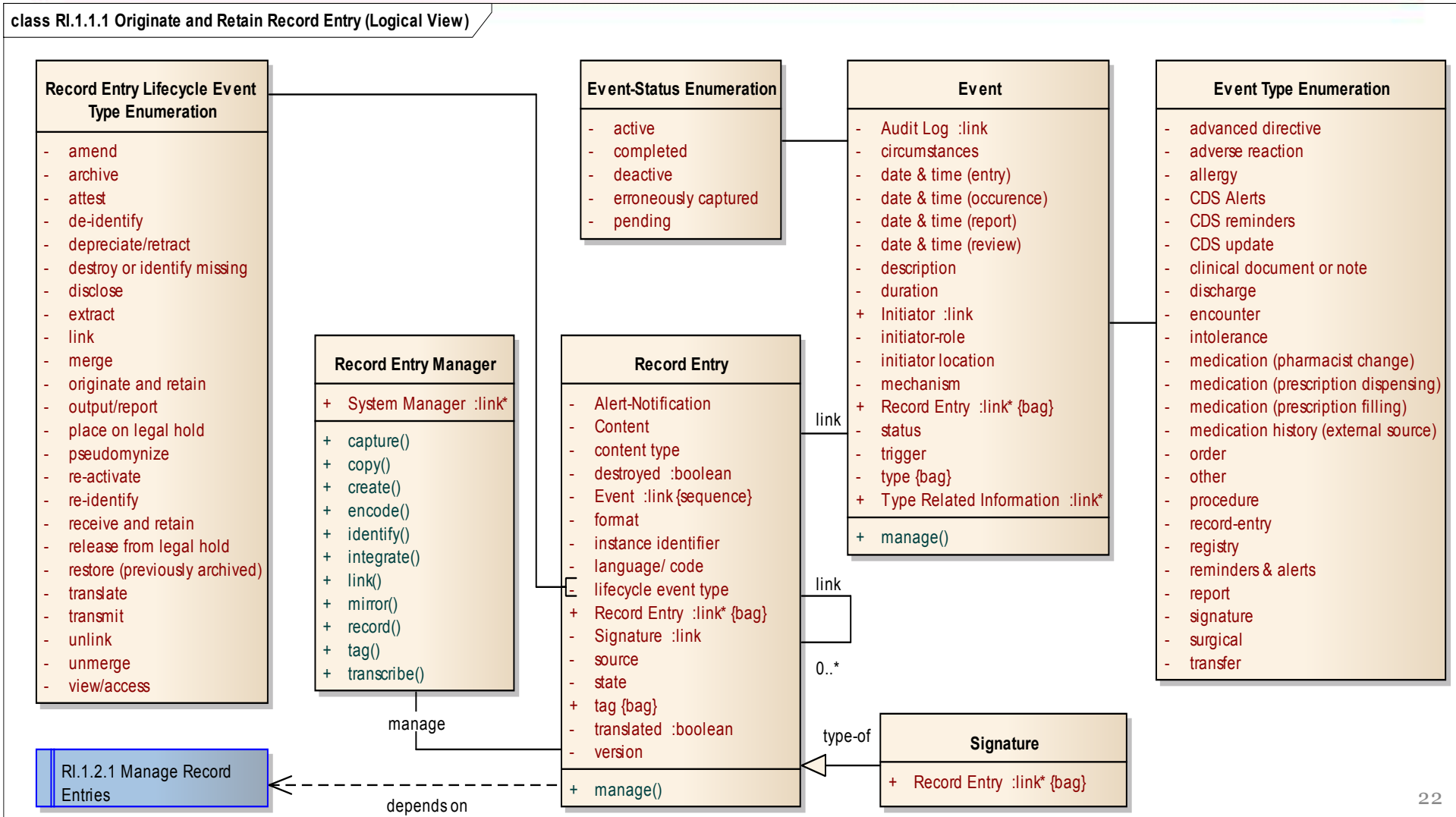


Conformance Criteria (CC)
RI.1.1.1 Originate and Retain Record Entry

1. RI.1.1.1#01 The system **SHALL** provide the ability to capture (originate) a Record Entry instance corresponding to an Action instance and context.
2. RI.1.1.1#02 The system **SHALL** capture a unique instance identifier for each Record Entry.
3. RI.1.1.1#03 The system **SHALL** conform to function TI.2.1.1.1 (Originate/Retain Record Entry Audit Trigger), including specified metadata.
4. RI.1.1.1#04 The system **SHALL** capture the signature event (e.g., digital signature) of the origination entry Author, binding signature to Record Entry content.
5. RI.1.1.1#05 The system **SHALL** provide the ability to capture both structured and unstructured content in Record Entries.
6. RI.1.1.1#06 The system **SHALL** provide the ability to capture Record Entries from information recorded during system downtime.
7. RI.1.1.1#07 The system SHOULD provide the ability to integrate Record Entries from Information recorded during system downtime.
8. RI.1.1.1#08 The system **SHALL** provide the ability to capture date/time an Action was taken or data was collected if different than date/time of the Record Entry.
9. RI.1.1.1#09 The system SHOULD capture metadata that identifies the source of non-originated Record Entry (e.g., templated, copied, duplicated, or boilerplate information).
10. RI.1.1.1#10 The system MAY provide the ability to tag unstructured Record Entry content to organize it according to need, for example, in a time-related fashion or by application-specific groups (such as photographs, handwritten notes, or auditory sounds)
11. RI.1.1.1#11 The system MAY capture and maintain a Record Entry encoded as a standards-based data object (e.g., HL7 Continuity of Care or other HL7 CDA R2 Document).
12. RI.1.1.1#12 The system MAY capture and maintain a standards-based data object to mirror (be duplicate and synchronous with) internal Record Entry representation.

EHR-S FIM Physiology "Function" (Logical View)

RI.1.1.1 Originate and Retain Record Entry



EHR-S FIM Physiology "Function"
RI.1.1.1 Originate and Retain Record Entry

Resultant Description (Scenario):

- The EHR-S System Manager can
  - *Capture, Create, Copy,*
  - *Record, Transcribe*, *Identify,*
  - *Link, Tag, Encode, Mirror, Integrate*
- The applicable data modules are
  - Record-Entry
    - structured or unstructured-data link-to associated
      - Event-Metadata and Signature

EHR-S FIM Physiology "Function"
RI.1.1.1 Originate and Retain Record Entry

INTERIM CONCLUSION

we have only looked at the RI.1.1.1 function; yet,

- we see that the emergence of common Record-Entries, Events, Record Entries and a Record Entry Manager
- which can *Capture, Create, Copy, Record, Transcribe, Identify, Link, Tag, Encode, Mirror, Integrate*
  - structured-data or unstructured-data and link-to
  - associated Event-Metadata and Signature.

EHR-S FIM NEXT-STEP
Traceability

ISSUE: EHR-S FM r2.0 traceability to UML Model Elements, FHIR & FHIM Is essential to guarantee a clear, complete, concise, correct and consistent EHR-S FIM r3.0

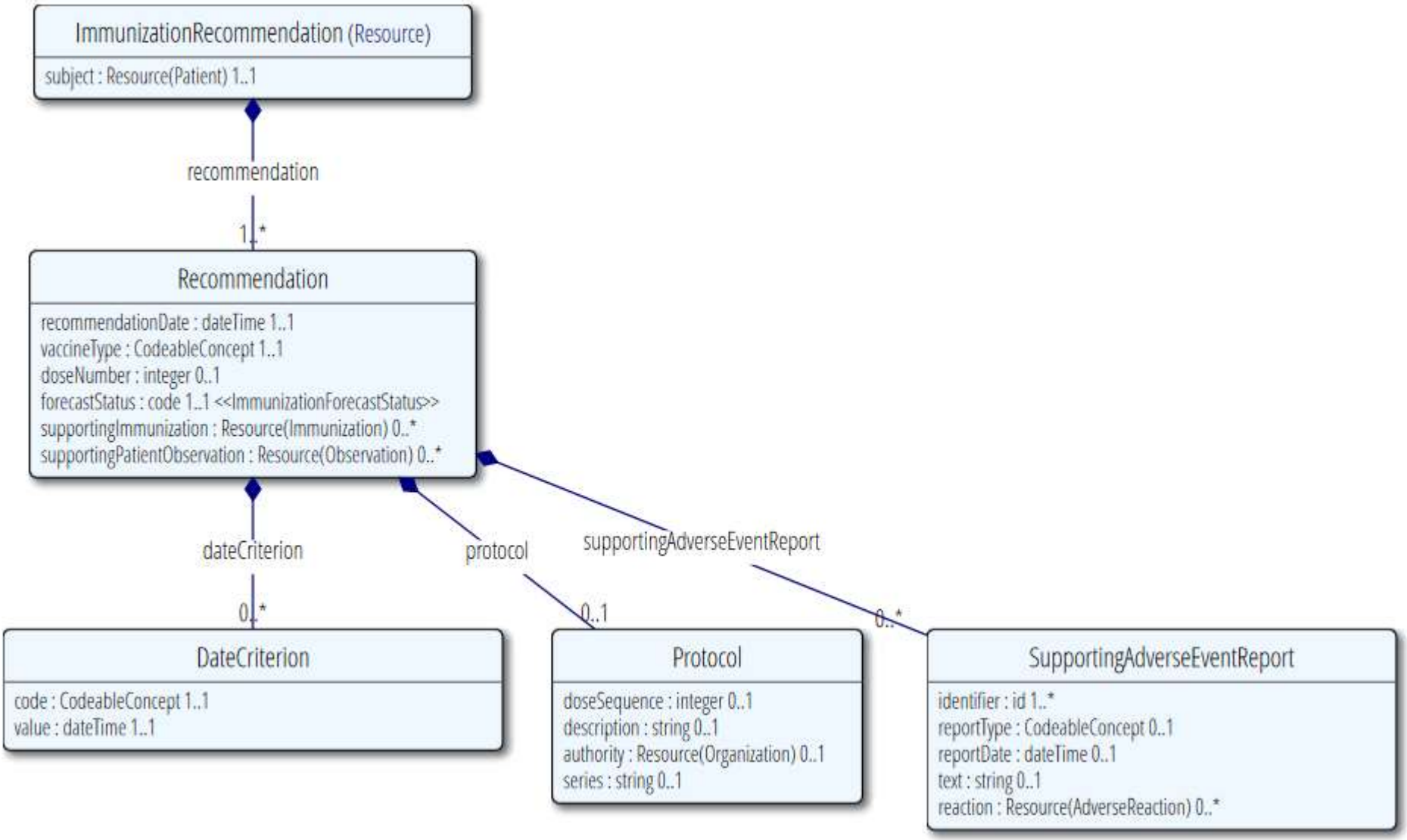
- **Workbook 1:** Class attributes & operations mapped-to EHR-S FM r2.0 Functions and LOCAL CCs
- **Workbook 2** Class attributes & operations mapped to EHR-S FIM r3.0 Functions and GLOBAL CCs
- **Workbook 3** EHR-S FM r2.0 Functions and CCs mapped-to EHR-S FIM r3.0 Functions and CCs
- **Workbook 4** EHR-S FM r2.0 Functions and LOCAL Conformance Criteria (CC)
- **Workbook 5** EHR-S FIM R3.0 Functions and UNIVERSAL Conformance Criteria (CC)
- **Workbook 6** EHR-S FIM UML-Model mapped-to FHIR (optional)
- **Workbook 7** EHR-S FIM UML-Model mapped-to FHIM (Federal Health Information Model) (optional)
- **Workbook 8** FHIR mapped-to FHIM (Federal Health Information Model) (optional)
- **Workbook 9** Master Data Dictionary (DD) (If we use FHIR or FHIM , they already have an DD)
- **ISSUE:** Can the Traceability-Matrices and DD be efficiently done directly in Sparx EA?

EHR-S FIM NEXT-STEP
FHIR (Fast Healthcare Interoperability Resources)

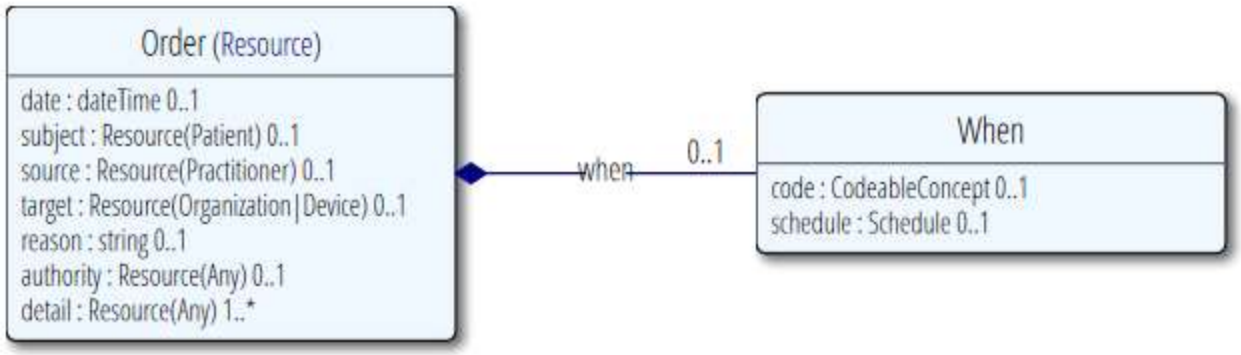
ISSUE: EHR-S FM r2.0 Implied Information Model is Ad-Hoc; where, FHIR & FIM Information Model & Data Dictionary are Configuration Managed.

- **FHIR Administrative**
  - Attribution: Patient, RelatedPerson, Practitioner, Organization
  - Resources: Device, Location, Substance, Group
  - Workflow Management: Encounter, Alert, Supply, Order, OrderResponse
  - Financial: Coverage
- **FHIR Clinical**
  - General: AdverseReaction, AllergyIntolerance, CarePlan, FamilyHistory, Condition, Procedure, Questionnaire
  - Medications: Medication, MedicationPrescription, MedicationAdministration, MedicationDispense,
  - MedicationStatement, Immunization, ImmunizationProfile
  - Diagnostic: Observation, DiagnosticReport, DiagnosticOrder, ImagingStudy, Specimen
  - Device Interaction: DeviceCapabilities, DeviceLog, DeviceObservation
- **FHIR Infrastructure**
  - Support: List, Media, Other, DocumentReference, (Binary)
  - Audit: Provenance, SecurityEvent
  - Exchange: Document, Message, OperationOutcome, Query
  - Conformance: Conformance, ValueSet, Profile

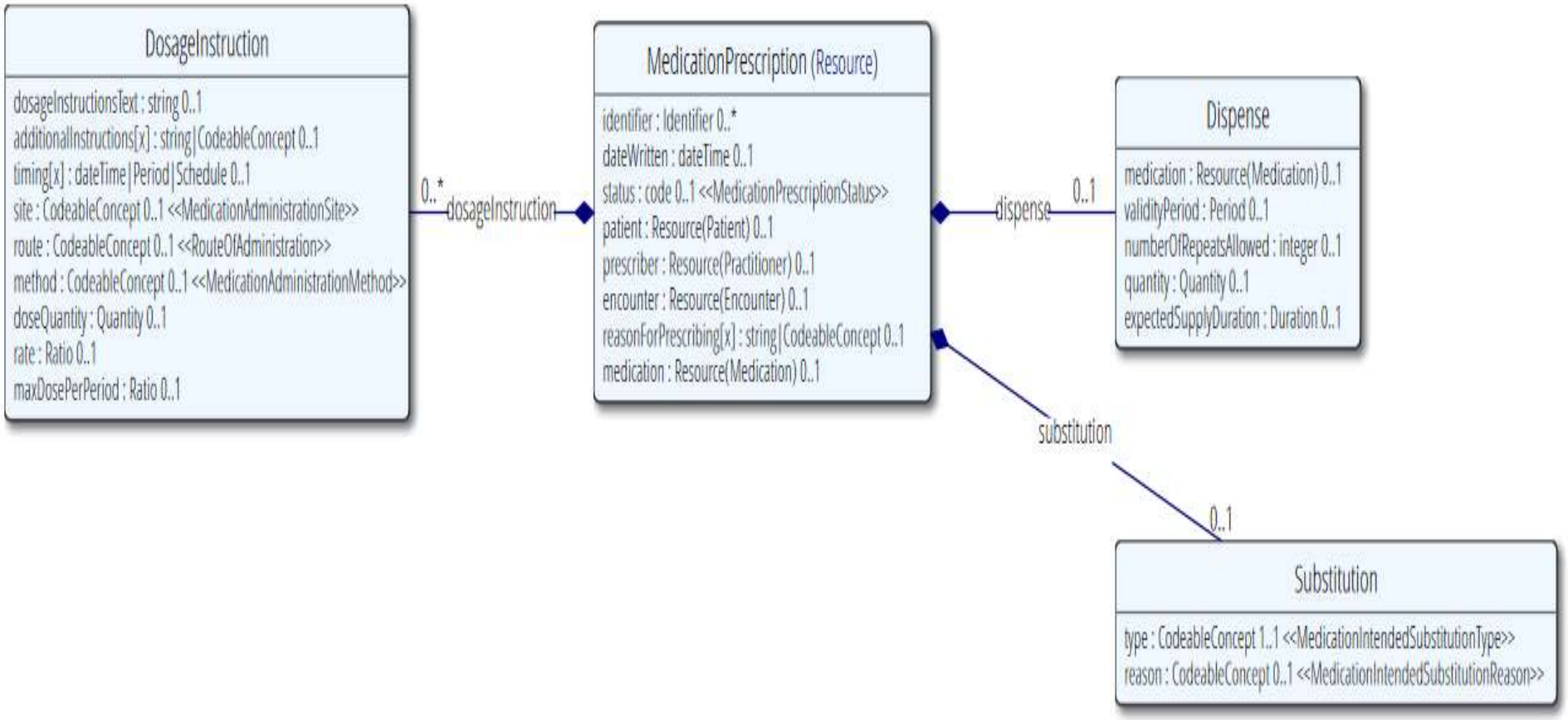
FHIR
Immunization Recommendation
http://www.hl7.org/implement/standards/fhir/



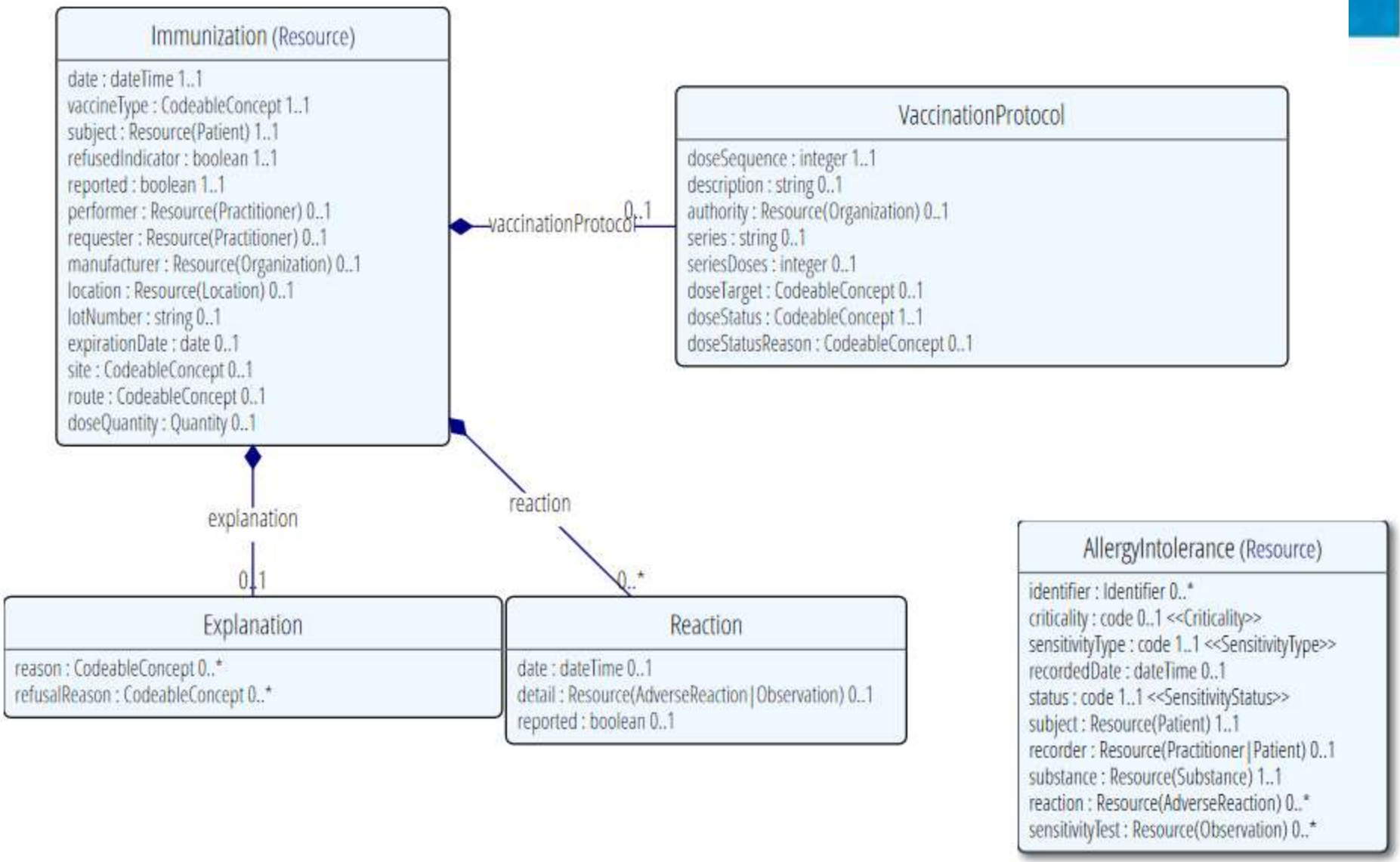
FHIR
Order Resource
http://www.hl7.org/implement/standards/fhir/



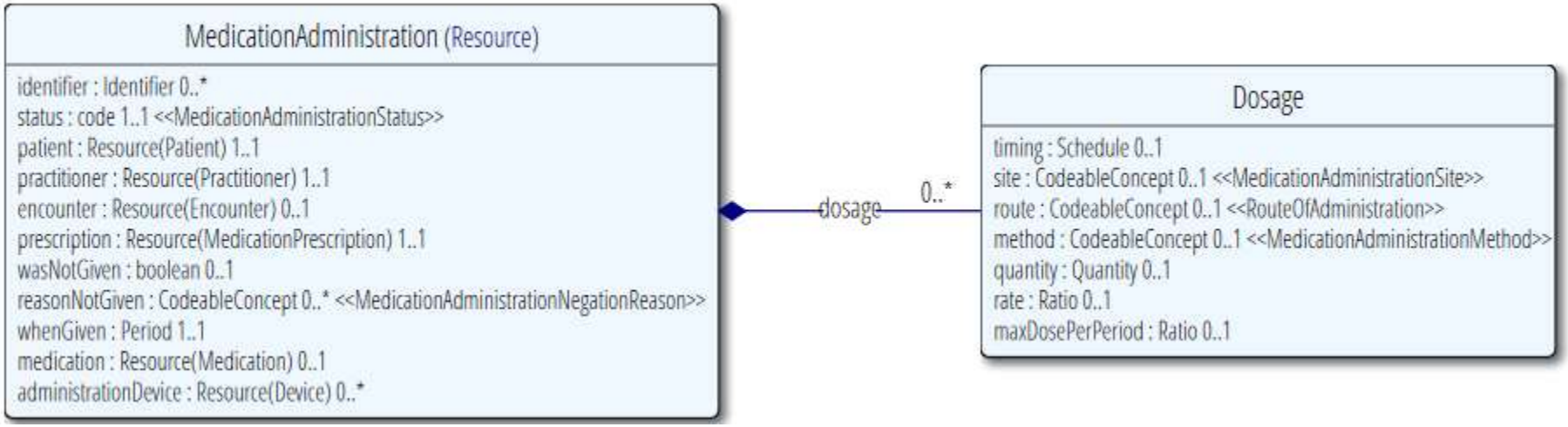
FHIR
Medication Prescription
http://www.hl7.org/implement/standards/fhir/



FHIR
Immunization Resource
http://www.hl7.org/implement/standards/fhir/



FHIR
Medication Administration
http://www.hl7.org/implement/standards/fhir/



Federal Health Information Model (FHIM)

http://www.fhims.org/content/420A62FD03B6_root.html