



EHR and PHR System Reference Briefing

HL7 EHR Work Group (EHR-WG)

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December 17, 2013 Complete-and-current working-drafts are at
http://wiki.hl7.org/index.php?title=EHR_Interoperability_WG



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Call for Participation



Schedule: <http://www.hl7.org/concalls/default.aspx>

List Server: <http://www.hl7.org/myhl7/managelistsevs.cfm>

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

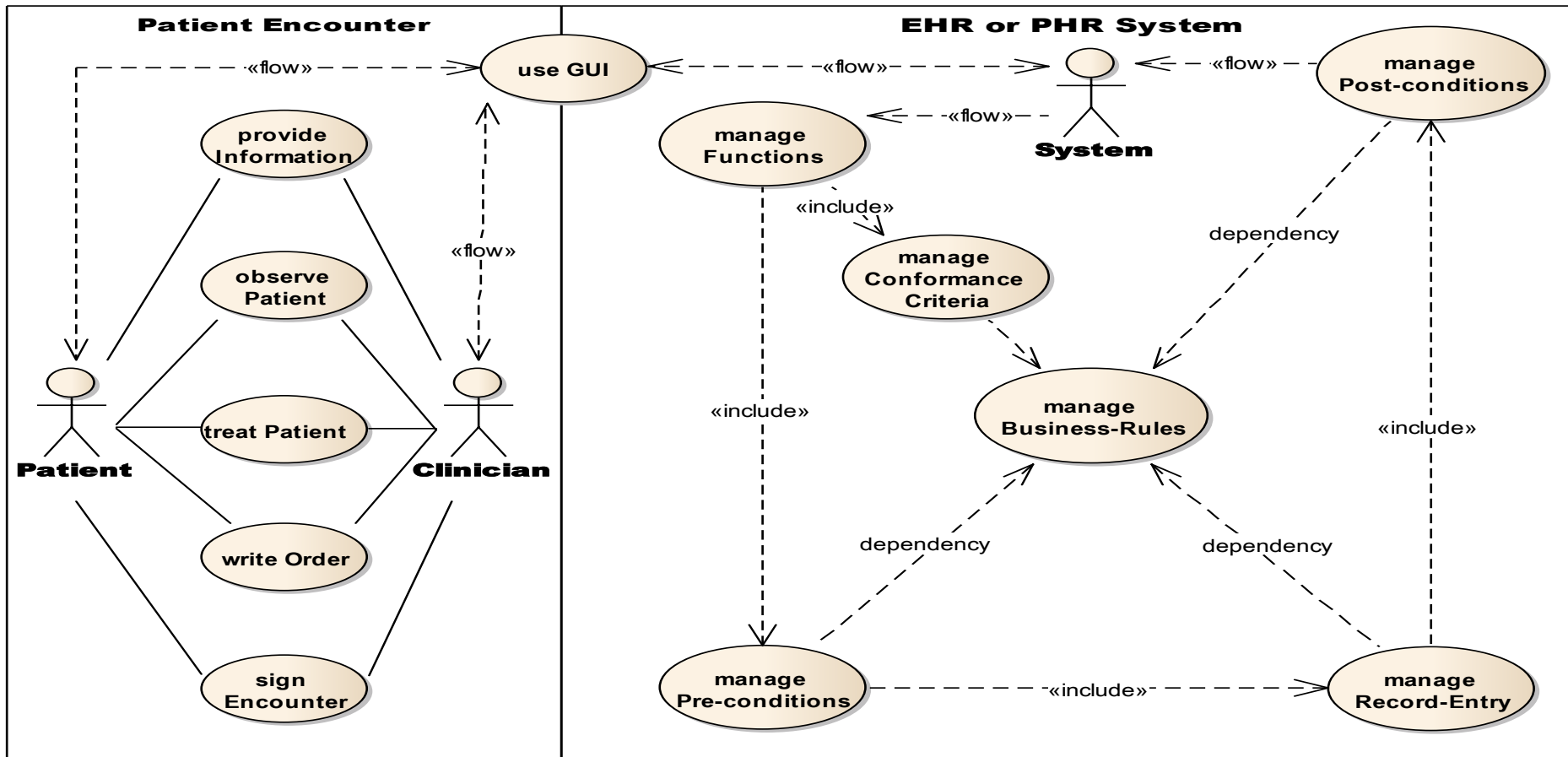
EHR-S & PHR-S RM Reference Model (RM)



uc EHR-S & PHR-S Reference-Model

Name: EHR-S & PHR-S Reference-Model
 Author: EHR Interoperability WG
 Version: EHR-S FIM (r3 2013 Prototype)
 Created: 12/14/2013 1:18:17 PM
 Updated: 12/16/2013 5:33:52 AM

Functions are modeled-as "*manage Record-Entry*" sub-type **Use-Cases**.
Conformance Criteria are modeled-as (subject, verb, object) **Scenarios**; where,
 • subjects-and-objects are **Record-Entry** sub-types
 • verbs are *manage* sub-types
Business Rules are "*according to scope of practice, organizational policy, jurisdictional law, patient preference or consent.*"



EHR-S & PHR-S Reference Model (RM)



The **EHR-S and PHR-S Reference Model** includes Functions and their Conformance-Criteria (CC); where,

- Functions are modelled as “*manage Record-Entry*” **Use-Cases**; where, use-cases contain multiple CCs.
- Conformance-Criteria (CC) are modelled as individual “*manage Record-Entry*” **Scenarios**
- Clinicians and Patient have Encounters; where, they use System-GUIs (Graphical-User-Interface); such that,

The Clinicians, Patients or their designated agent may

review the Patient EMR (Electronic Medical Record) and other types of Information

Observe, treat, write Orders and document the Patient-Encounter

provide Patient-Information and Educational-Information

sign Encounters

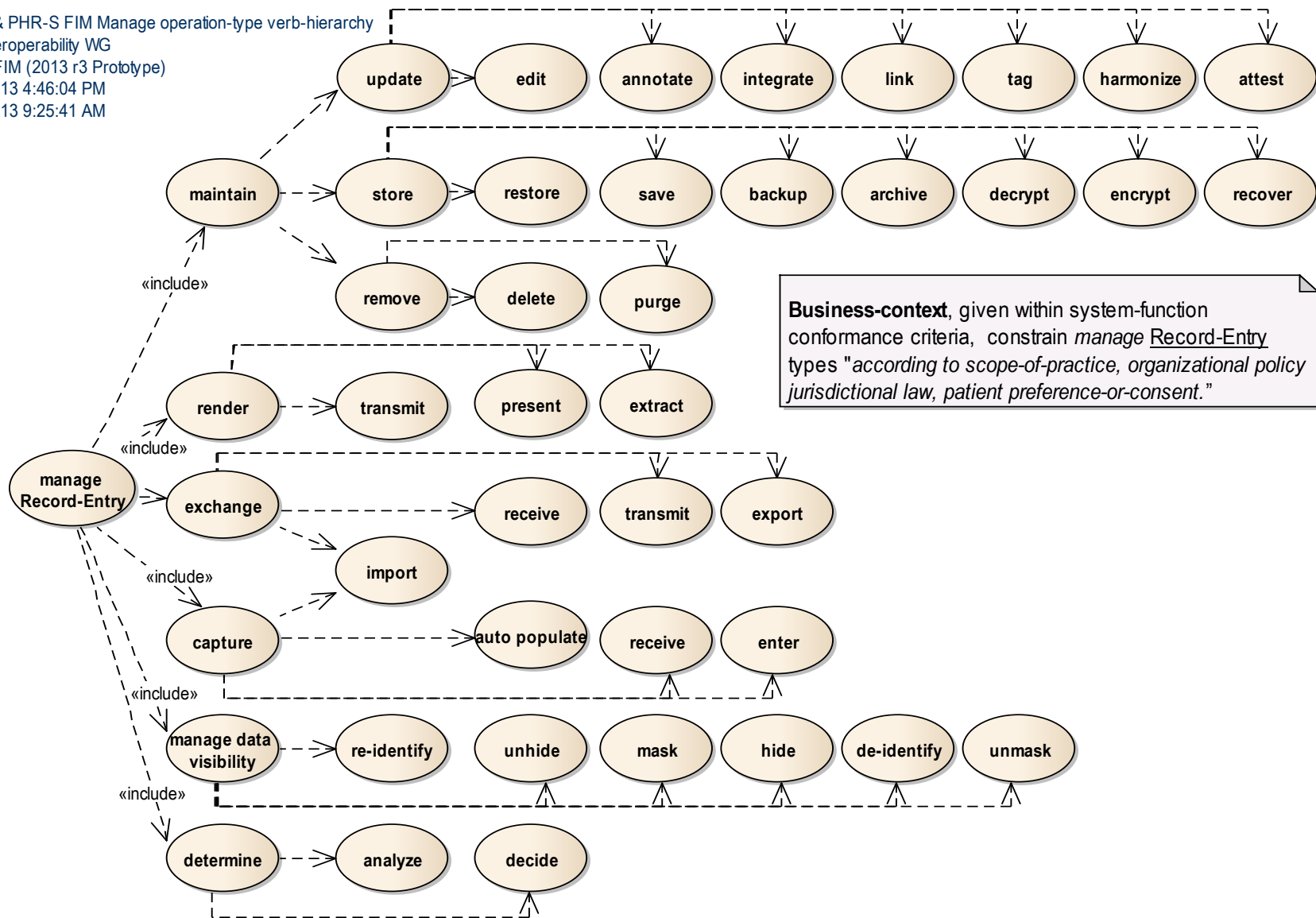
- Systems Functions include multiple *manage Record-Entry* Conformance Criteria (CC); where,
 - CC manage verb-sub-types and Record-Entry noun-sub-types are used
 - CC Pre-Condition Business-Rules manage entering-data-flows and data-context
 - CC Data-management Business-Rules manage applicability (SHALL/SHOULD/MAY)
 - CC Post-Condition Business-Rules manage exiting-data-flows and data-use
 - CC Business-Rules are in-accordance with
 - scope-of-practice, organizational-policy, jurisdictional-law, and patient-preferences.

EHR-S and PHR-S RM for “Manage” Verb-Type Hierarchy



uc EHR-S & PHR-S FIM Manage operation-type verb-hierarchy

Name: EHR-S & PHR-S FIM Manage operation-type verb-hierarchy
 Author: EHR Interoperability WG
 Version: EHR-S FIM (2013 r3 Prototype)
 Created: 11/21/2013 4:46:04 PM
 Updated: 12/16/2013 9:25:41 AM

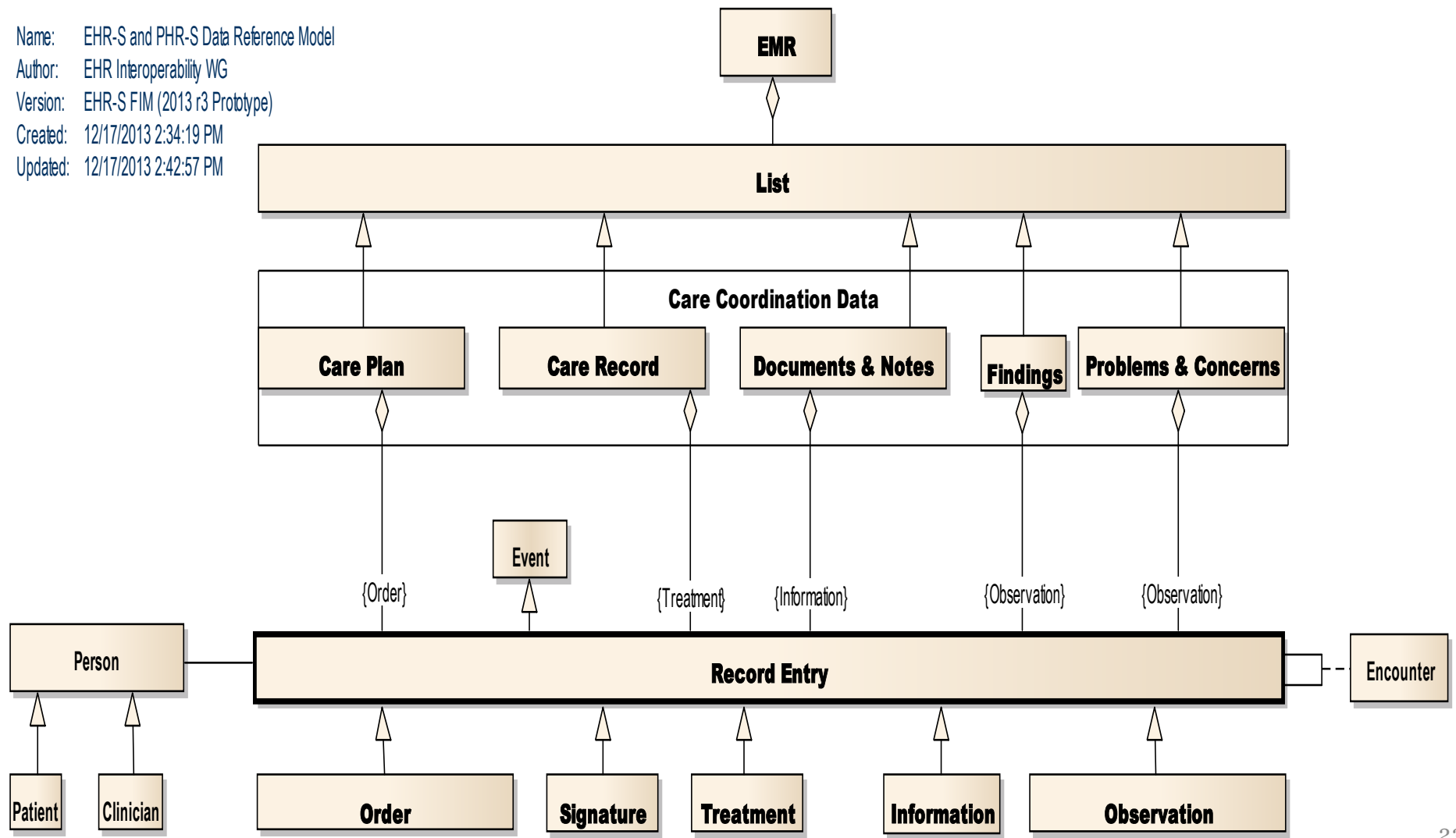


Business-context, given within system-function conformance criteria, constrain *manage Record-Entry* types "according to scope-of-practice, organizational policy jurisdictional law, patient preference-or-consent."

EHR-S and PHR-S RM for “Record-Entry” Data-Type Taxonomy

class EHR-S and PHR-S Data Reference Model

Name: EHR-S and PHR-S Data Reference Model
 Author: EHR Interoperability WG
 Version: EHR-S FIM (2013 r3 Prototype)
 Created: 12/17/2013 2:34:19 PM
 Updated: 12/17/2013 2:42:57 PM



EHR-S & PHR-S RM for Conformance Criteria

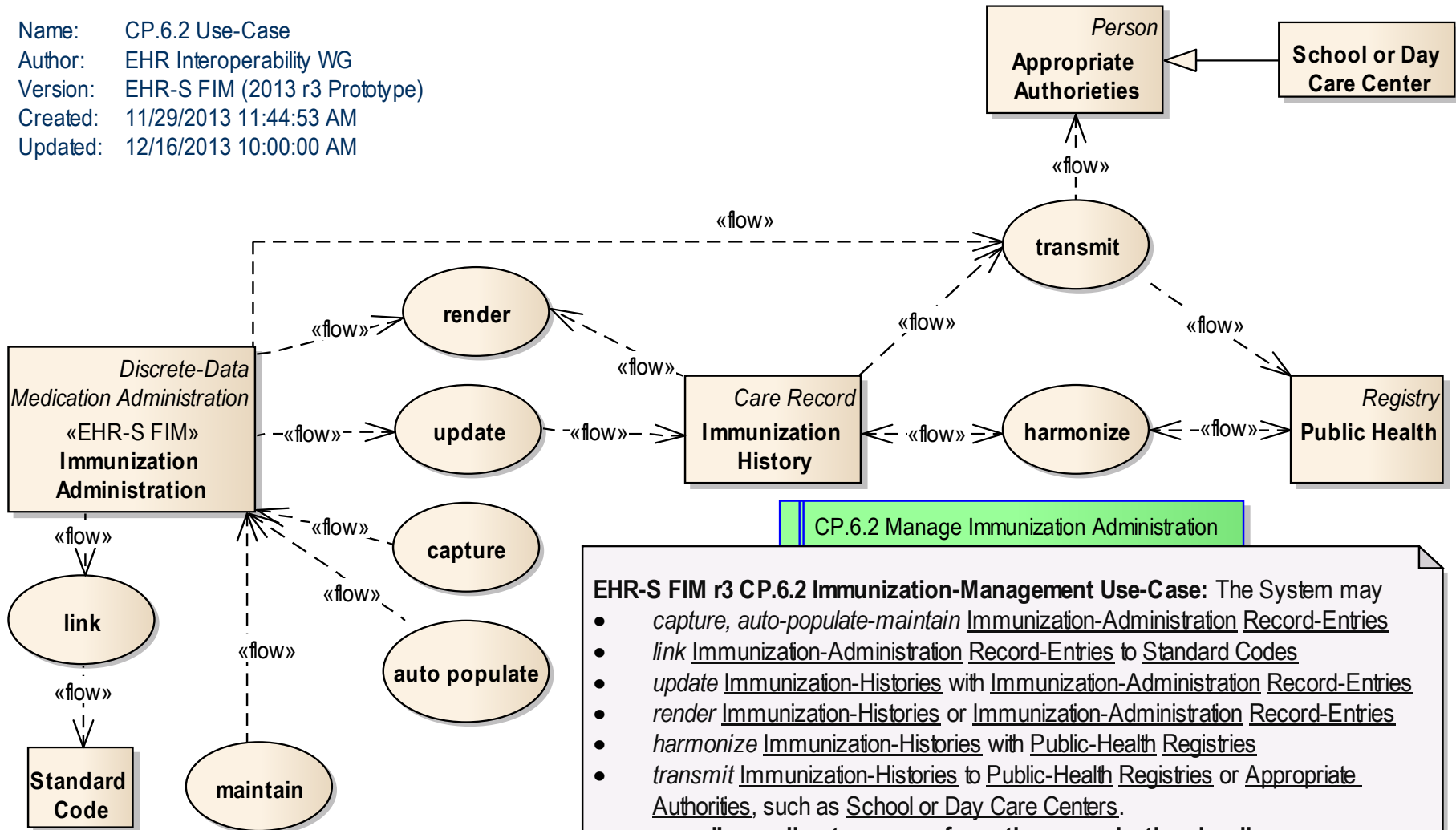
- **SF CC Invariant-condition** (context)
 - System Identifier (EHR or PHR)
 - System Function (SF) Identifier
 - Profile Identifier
- **SF CC Identifier** (number)
- **SF CC Pre-condition** (trigger)
 - Pre-condition is a verb-clause.
 - After a Human-Action or System-Action; then,
- **SF CC Applicability**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

Example RM-based Functional Use-Case

CP.6.2 Immunization Management

uc CP.6.2 Use-Case

Name: CP.6.2 Use-Case
 Author: EHR Interoperability WG
 Version: EHR-S FIM (2013 r3 Prototype)
 Created: 11/29/2013 11:44:53 AM
 Updated: 12/16/2013 10:00:00 AM



CP.6.2 Manage Immunization Administration

EHR-S FIM r3 CP.6.2 Immunization-Management Use-Case: The System may

- capture, auto-populate-maintain Immunization-Administration Record-Entries
- link Immunization-Administration Record-Entries to Standard Codes
- update Immunization-Histories with Immunization-Administration Record-Entries
- render Immunization-Histories or Immunization-Administration Record-Entries
- harmonize Immunization-Histories with Public-Health Registries
- transmit Immunization-Histories to Public-Health Registries or Appropriate Authorities, such as School or Day Care Centers.

"according to scope-of-practice, organizational-policy, jurisdictional-law, patient preference-or-consent."

Example RM Conformance Criteria Scenario

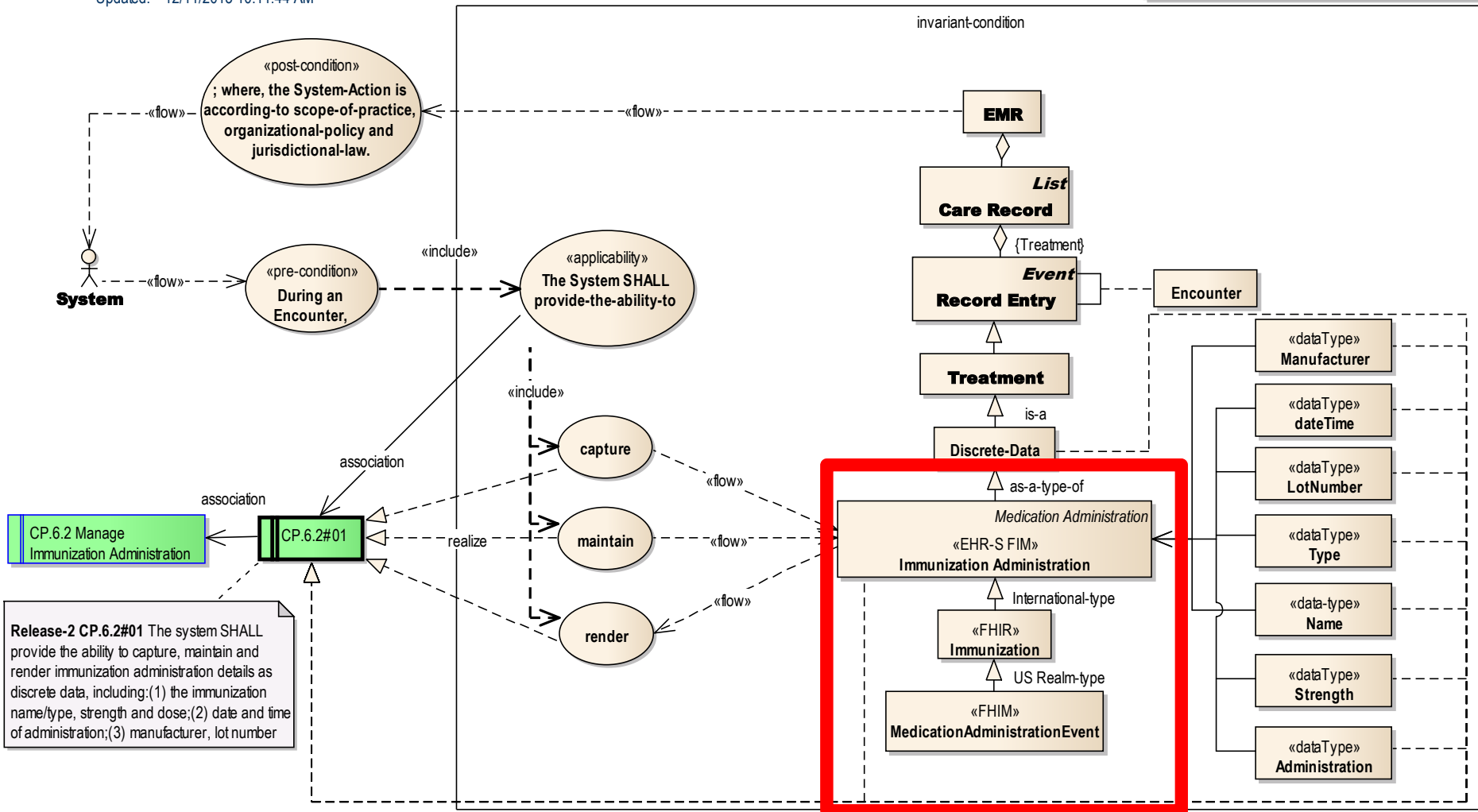
CP.6.2 CC#01 Immunization Management



class EHR-S FIM CP.6.2 CC#01 Scenario

Name: EHR-S FIM CP.6.2 CC#01 Scenario
 Author: EHR Interoperability WG
 Version: EHR-S FIM (2013 r3 Prototype)
 Created: 12/2/2013 7:25:59 AM
 Updated: 12/11/2013 10:11:44 AM

EHR-S FIM CP.6.2 Immunization Management



■ EHR-S & PHR-S FIM r3 Scenario

CP.6.2 CC#01 Immunization Management



The Release-3 EHR System Immunization-Management Function

- *captures, auto-populates, links, renders, transmits, maintains* Immunization-Administration Record-Entries; where,
 - the *links* are with Standard-Codes
 - The *transmission* is to Population Health Registries
 - The *auto-population* is as a by-product of verification of Administering-Provider, Patient, Medication, Dose, Route and Time.
 - updates Immunization-Histories from the Immunization-Administration Record-Entries
 - *harmonizes* Immunization-Histories with Public-Health Registries
 - *renders and transmits* Immunization-Histories
 - Where the *transmissions* are to Appropriate Authorities (e.g., Schools and Day Care Centers);
- and where, System-Actions are according-to scope-of-practice, organizational-policy and/or jurisdictional-law.

EHR-S & PHR-S FIM r3

Interim Conclusion

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

1. **System Functions** are defined-by **Use-Cases** of UML-modelled **System-Actions** on **Record-Entries**; where, nouns-and-verbs define a lexicon-of System-Action-type verb-hierarchy and Record-Entry-type data-model
2. **Conformance-Criteria** are System-Action Use-Case Scenario-threads; where, Scenario-Context is defined by
 - pre-condition triggers, and the
 - applicability of
 - SHOULD/SHALL/MAY plus
 - “provide-the-ability-to” manage Record-Entries or “directly” manages Record-Entries
 - post-condition Business-Rules, which are “according-to scope-of-practice, organizational-policy, jurisdictional-law, and patient-preferences”
3. **Information-Exchanges** are defined-by Conformance-Criteria Scenarios mapped to **FHIR** (Fast Healthcare Interoperability Resource) representative of the International-Realm, **FHIM** (Federal Health Information Model) representative of US-Realm FHIR-profiles, **IHE** information-exchange behavioral-protocols, refined by, **workflow** behavioral-protocols and associated **Key Performance Parameters (KPPs)**
4. **Profiles** are specified by sets-of System-Functions and their constrained-context
5. **Interoperability-Specifications** can-be generated from Profiles.