EHRS-FM R2 – Record Infrastructure
Record Entry Lifecycle Event Metadata on FHIR

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FHIR Resource Index

As of 22 September 2014

Clinical

General:
- AdverseReaction
- AllergyIntolerance
- Condition (aka Problem)
- CarePlan
- ReferralRequest
- Procedure
- Contraindication
- RiskAssessment

Medications:
- Medication
- MedicationPrescription
- MedicationAdministration
- MedicationDispense
- MedicationStatement
- NutritionOrder
- Immunization
- ImmunizationRecommendation

Diagnostics:
- Observation
- DiagnosticReport
- DiagnosticOrder
- ImagingStudy
- Specimen
- DeviceObservationReport

Data Collection:
- Questionnaire
- QuestionnaireAnswers
- FamilyHistory

Administrative

Attribution:
- Patient
- RelatedPerson
- Practitioner
- Organization

Entities:
- Device
- Location
- Substance
- Group

Workflow Management:
- Encounter
- Alert
- Supply
- Order
- OrderResponse

Scheduling:
- Appointment
- Appointment Response
- Availability
- Slot

Infrastructure

Support:
- List
- Media
- Other
- Provenance
- SecurityEvent
- (Binary)

Documents:
- Composition
- DocumentReference
- DocumentManifest

Exchange:
- MessageHeader
- OperationOutcome
- Query
- Subscription

Conformance:
- Conformance
- Profile
- DataElement
- OperationDefinition
- ValueSet
- Namespace
- ConceptMap

Lifecycle Events on FHIR

Targets

- ## 30 September 2014

    – RecordLifecycleEvent FHIR Profile Proposal

    – http://wiki.hl7.org/index.php?title=RecordLifecycleEvent_FHIR_Profile_Proposal

- ## 7 December 2014

    – Submit DRAFT Proposal

    – Ready for Comment Only Ballot

- ## Spring 2015

    – FHIR DSTU 2 Ballot

Now Underway

Mapping to FHIR

Requirements	Are Fulfilled by…
ISO/HL7 10781 EHR-S FM R2 Record Infrastructure (RI) → 24(+3) Record Lifecycle Events	Implementable FHIR Resources
<u>Basic Lifecycle Event</u>	• SecurityEvent
<u>Provenance Lifecycle Event</u> when Record Entry content is originated or updated	• SecurityEvent • Provenance • Other new/updated resource(s) → corresponding to Action Taken

↑ Resources may also be indivisibly and immutably bound by one or more digital signatures in a Record Entry.

EHR-S FM Record Lifecycle
Pre/Post Events 1-9

Pre Event State	Resource @ Event	Post Event State				
	SecurityEvent + Provenance	Added Event Evidence	Retained Pre Edition Unaltered	Added New Edition	Signed as Author	Signed as System
[none]	1 Originate/Retain	X		X	Opt	X
[Record Entry as persisted, indivisible and immutable since previous Lifecycle Event]	2 Amend	X	X	X	Opt	X
	3 Translate	X	X	X		X
	4 Attest	X	X		X	X
	5 Access/View	X				
	6 Output/Report	X				X
	7 Disclose	X				X
	8 Transmit	X				X
	9 Receive/Retain	X	X			

EHR-S FM Record Lifecycle
Pre/Post Events 10-18

Pre Event State	Resource @ Event	Post Event State				
	SecurityEvent + Provenance	Added Event Evidence	Retained Pre Edition Unaltered	Added New Edition	Signed as Author	Signed as System
[Record Entry as persisted, indivisible and immutable since previous Lifecycle Event]	10 De-Identify	X	X	X		X
	11 Pseudonymize	X				
	12 Re-Identify	X				
	13 Extract	X	X	X		X
	14 Archive	X				
	15 Restore	X				
	16 Destroy/Delete	X	[none]			
	17 Deprecate	X				
	18 Re-Activate	X				

EHR-S FM Record Lifecycle
Pre/Post Events 19-27

Pre Event State	Resource @ Event	Post Event State				
	SecurityEvent + Provenance	Added Event Evidence	Retained Pre Edition Unaltered	Added New Edition	Signed as Author	Signed as System
[Record Entry as persisted, indivisible and immutable since previous Lifecycle Event]	19 Merge	X	X	X		
	20 Unmerge	X				
	21 Link	X				
	22 Unlink	X				
	23 Add Legal Hold	X				
	24 Remove Legal Hold	X				
	25 Verify (new event)	X				
	26 Encrypt (new event)	X	X	?		
	27 Decrypt (new event)	X	X	?		

Pre/Post Entry Content and…
Record Entry Lifecycle

Lifecycle Starts: at Point of Origination/Creation as New Event

	Prior Event Added…	During Interval between Events Retains (at rest): Indivisibly+Immutably	PRE	At New Event Adds…	POST
Basic	1 SecurityEvent instance	1 or more SecurityEvent instances >> One per each prior Record Lifecycle Event	→	1 SecurityEvent instance	
w/Provenance	1 Provenance instance	1 or more Provenance instances >> One per each prior Record Lifecycle Provenance Event	→	1 Provenance instance	*Becomes Prior Event*
w/Provenance	1 or more other resource instance(s)	1 or more other FHIR resource instances > Corresponding to Action(s) Taken > As documented in Record Entry(ies)	→	1 or more other resource instance(s)	

Originate/Retain Record Entry

Vetted by RM-ES

With Event Evidence (RI.1.1.1.1)➔
↓ At Lifecycle Event Occurrence (RI.1.1.1)

1. The system SHALL provide the ability to capture (originate) a Record Entry instance corresponding to an Action instance and context.
2. The system SHALL capture a unique instance identifier for each Record Entry.
3. The system SHALL capture the signature event (e.g., digital signature) of the origination entry Author, binding signature to Record Entry content.
4. The system SHALL provide the ability to capture both structured and unstructured content in Record Entries.
5. The system SHALL provide the ability to capture Record Entries from information recorded during system downtime.
6. The system SHOULD provide the ability to integrate Record Entries from Information recorded during system downtime.
7. 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.
8. The system SHOULD capture metadata that identifies the source of non-originated Record Entry (e.g., templated, copied, duplicated, or boilerplate information).
9. 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), or by order of relative importance.
10. The system MAY capture and maintain a Record Entry encoded as a standards-based data object (e.g., HL7 Continuity of Care, other HL7 CDA R2 Document, ISO 13606 artifact).
11. The system MAY capture and maintain a standards-based data object to mirror (be duplicate and synchronous with) internal Record Entry representation.

Fulfilled by FHIR Resource Implementation ▬
Lifecycle Event Metadata (who, what, when, where, why) ▬
Others to consider ▬

1. The system SHALL audit each occurrence when a Record Entry is originated and retained.
2. The system SHALL capture identity of the organization where Record Entry content is originated.
3. The system SHALL capture identity of the patient who is subject of Record Entry content.
4. The system SHALL capture identity of the individual(s) who performed the Action documented in Record Entry content.
5. The system SHALL capture identity of the user who entered/authored Record Entry content.
6. The system SHALL capture identity of the system application which originated Record Entry content.
7. IF the source of Record Entry content is a device THEN the system SHALL capture identity of the device.
8. The system SHALL capture the Action as evidenced by Record Entry content.
9. The system SHALL capture the type of Record Event trigger (i.e., originate/retain).
10. The system SHALL capture date and time of Action occurrence as evidenced by Record Entry content.
11. The system SHALL capture date and time Record Entry content is originated.
12. The system MAY capture the duration of the Action evidenced by Record Entry content.
13. The system MAY capture the physical location of the Action evidenced by Record Entry content.
14. The system SHOULD capture identity of the location (i.e., network address) where Record Entry content is originated.
15. The system MAY capture the rationale for the Action evidenced by Record Entry content.
16. The system MAY capture the rationale for originating Record Entry content.
17. IF Record Entry content includes templates (boilerplate information) or copied (duplicated) information THEN the system SHOULD capture the source of such content.

Individuals have specific…

Action and Record Entry Roles

Action Roles	Record Entry Roles
• Subject • Performer • Witness	• Record Target • Author • Recorder (Enterer?) • Verifier • Attester • Informant • Source/Copy From

Action and Record Entry Metadata

	Action Metadata	Record Entry Metadata
Who	Action Subject (Patient) Johnny Walker Role: Subject	Entry Subject (Patient) Johnny Walker Role: Record Target
	Action Organization Bay City Medical Center	
	Action Practitioner/ Performer Doctor Sally Smith Role: Performer	Entry Source – Author or Scribe Nurse Janice Jones Role: Recorder
		Entry Source – System/Device Erstwhile EHR/Device XX123456

Action and Record Entry Metadata

	Action Metadata	Record Entry Metadata
What	Action Taken Medication Order for Ambien 20mg PRN	Entry Origination/Retention evidenced by SecurityEvent Provenance + FHIR Resources related to Medication Order MedicationPrescription, et al
When	Action Date/Time 22 Aug 2014 @ 1800	Entry Date/Time 22 Aug 2014 @ 1810
	Action Duration 3 Minutes	
Where	Action Physical Location Ward/Room B/12	Entry Location – IP Address 255.255.255.1
Why	Action Reason/Purpose To Induce Sleep	Entry Reason/Purpose <none entered>

EHR-S FM Record Infrastructure (RI) – Lifecycle Events
Plus… More Evidentiary Metadata

	Originate Retain	Amend	Attest	Translate
Lifecycle Event →				
Record Entry Unique ID	X			
Record Entry Content: Data, Document, Artifact ID(s)	X	X		
Digital Signature(s) – Individual(s)			X	
Digital Signature – Acting System/Device	Any/All			
Corresponding/linked Record Entry(ies)	X	X		
Pointer to Pre-Event Entry, if any: pre update/translation		X		X
Pointer to Post-Event Entry, if any: post update/translation		X		X
Amendment and/or Translation Sequence		X		X
Identity and version of Translation Tool(s), if any				X

Vetted by RM-ES.

Plus… More Evidentiary Metadata

	Lifecycle Event →	Originate Retain	Amend	Attest	Disclose Transmit
Vetted by RM-ES.	Source of Copied Content: if copy/paste, template or boilerplate	X	X		
	Event is Known Disclosure Indicator				X
	Permissions associated with Record Entry Content	X	X		X
	Entries in Event Transaction, if multiple	Set of Entries: • Accessed/Viewed • Transmitted • Received • Extracted • Archived/Restored • Destroyed/Deleted • On/Off Legal Hold …			

A Potential Solution for Action Metadata
Abstract Attributes

FHIR Resources: Care Plan, Procedure, MedicationPrescription, MedicationDispense, MedicationAdministration, Observiation, DiagnosticOrder, DiagnosticResult, ImagingSrudy, Specimen, FamilyHistory, Encounter, Appointment, etc...

Abstract Metadata Attributes for Action Taken

Who	What	When	Where	Why

Analysis, Comments and Proposals
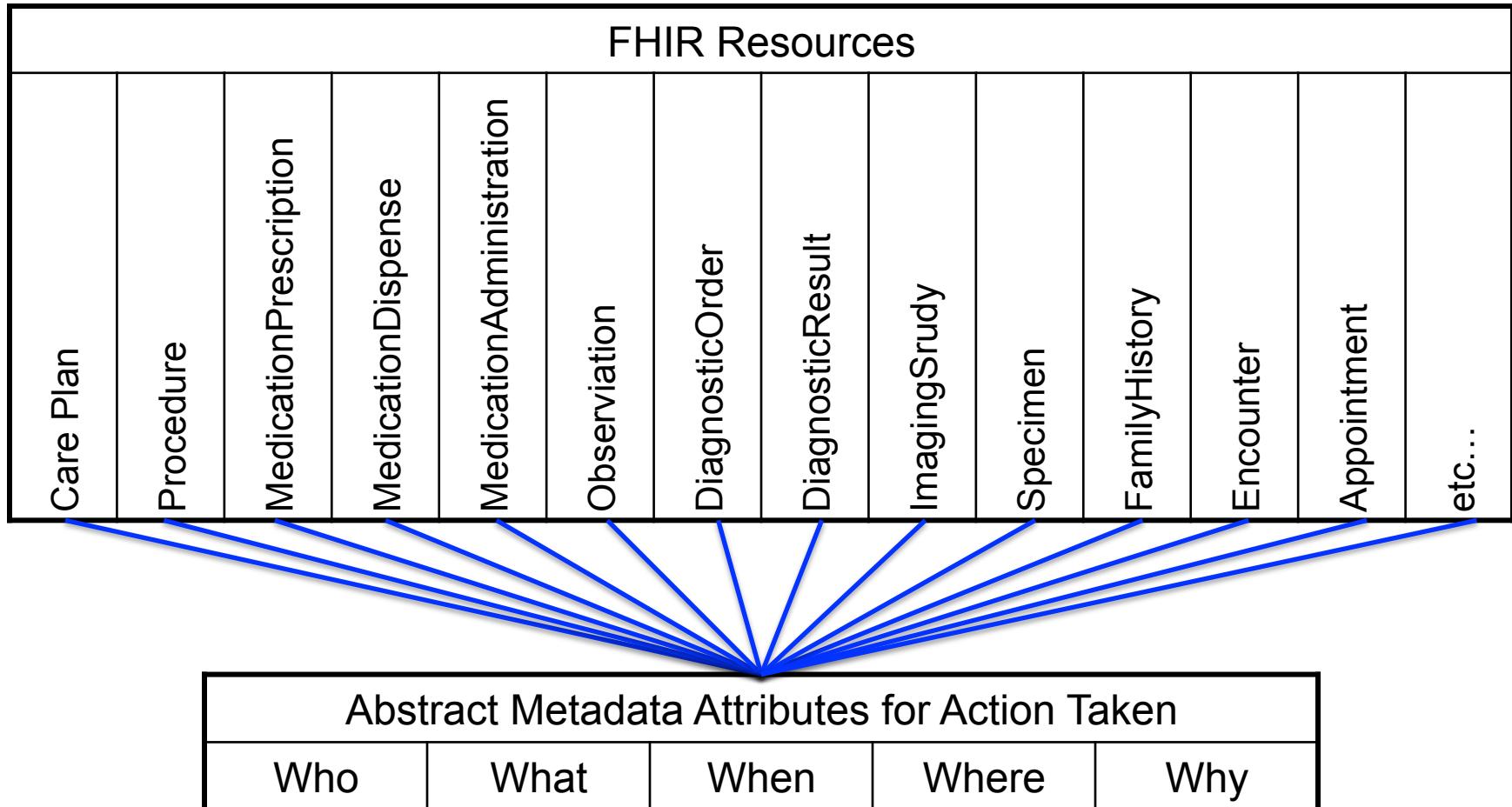
Upcoming Slides…

- <u>From the perspective of each Lifecycle Event:</u>
  - Basic Metadata:
    Who, What, When, Where, Why
  - Plus… More Evidentiary Metadata

Lifecycle Event Metadata
Who

Lifecycle Event Metadata	FHIR Resource	Resource Attribute(s)
Organization	Provenance	signature : string 0..*
	Provenance.Agent : 0..*	role : Coding 1..1 « ProvenanceAgentRole+ » type : Coding 1..1 « ProvenanceAgentType+ » reference : uri 1..1
Patient	Provenance	signature : string 0..*
	Provenance.Agent : 0..*	role : code 1..1 « ProvenanceEntityRole » type : Coding 1..1 « ProvenanceEntityType+ » reference : uri 1..1
	SecurityEvent.Participant : 1..*	role : CodeableConcept 0..* « DICOMRoleId+ » reference : Resource(Organization|Practitioner|Patient|Device) 0..1 requester : Boolean 1..1
Action - Performer	TBD	

Distinguish Action from Record Metadata. [See Medication Order Example]
Action-Performer not resolved.
Need to add RelatedPerson to Practitioner|Patient|Device choice (per Lloyd)?

Who, con't

Lifecycle Event Metadata	FHIR Resource	Resource Attribute(s)
Record - Author/ User	Provenance	signature : string 0..*
	Provenance.Agent : 0..*	role : Coding 1..1 « ProvenanceAgentRole+ » type : Coding 1..1 « ProvenanceAgentType+ » reference : uri 1..1
	SecurityEvent.Participant : 1..*	role : CodeableConcept 0..* « DICOMRoleId+ » reference : Resource(Practitioner|Patient|Device) 0..1 userId : string 0..1 requester : Boolean 1..1
Record - System/Device	Provenance	signature : string 0..*
	Provenance.Agent : 0..*	role : Coding 1..1 « ProvenanceAgentRole+ » type : Coding 1..1 « ProvenanceAgentType+ » reference : uri 1..1
	SecurityEvent.Participant : 1..*	role : CodeableConcept 0..* « DICOMRoleId+ » reference : Resource(Practitioner|Patient|Device) 0..1 userId : string 0..1 requester : Boolean 1..1

Note: Provenance.Agent.reference may resolve to a uri or Resource
Provenance.signature 0..* instead of 0..1

Lifecycle Event Metadata
What

Lifecycle Event Metadata	FHIR Resource	Resource Attribute(s)
Action - Taken	TBD	
Record - Lifecyle Event	SecurityEvent.Event : 1..1	type : CodeableConcept 1..1 « SecurityEventType+ » subtype : CodeableConcept 0..* « SecurityEventSubType+ » action : code 0..1 « SecurityEventAction » policy : uri 0..*
	SecurityEvent.Object : 0..*	identifier : Identifier 0..1 reference : Resource(Any) 0..1 type : code 0..1 « SecurityEventObjectType » role : code 0..1 « SecurityEventObjectRole » lifecycle : code 0..1 « SecurityEventObjectLifecycle »

Action Taken not resolved.
Add policy attribute to SecurityEvent.Event
[See Medication Order Example <corresponding set of Med Order resources>]

Lifecycle Event Metadata
When

Lifecycle Event Metadata	FHIR Resource	Resource Attribute(s)
Action - Date/Time	TBD	
Record - Date/Time	Provenance	recorded : instant 1..1
	SecurityEvent.Event : 1..1	dateTime : instant 1..1
Action - Duration/Elapsed Time	TBD	

Action Date/Time and Duration not resolved.

Lifecycle Event Metadata
Where

Lifecycle Event Metadata	FHIR Resource	Resource Attribute(s)
Action - Physical Location	TBD	
Record - Network Address	Provenance	location : Resource(Location) 0..1
	SecurityEvent.Participant.Network	identifier : string 0..1 type : code 0..1 « SecurityEventParticipantNetworkType »

Action Physical Location not resolved.
Add "location" to SecurityEvent.Event?

Lifecycle Event Metadata
Why

Lifecycle Event Metadata	FHIR Resource	Resource Attribute(s)
Action - Reason, Rationale, Purpose	TBD	
Record - Reason, Rationale, Purpose	Provenance	reason : CodeableConcept 0..1
		policy : uri 0..*
	SecurityEvent.Event : 1..1	reason : CodeableConcept 0..1

Action Reason not resolved
Reason or purpose of use (DICOM)
Add "reason" to SecurityEvent.Event?

Lifecycle Event Metadata
Evidentiary

Lifecycle Event Metadata	FHIR Resource	Resource Attribute(s)
Digital Signature(s)	Provenance	signature : string 0..*
Record Entry ID	SecurityEvent.Object : 0..*	identifier : Identifier 0..1 reference : Resource(Any) 0..1
Record Entry Content ID(s): data, docs, artifacts	SecurityEvent.Object : 0..*, one for each Content item	identifier : Identifier 0..1 reference : Resource(Any) 0..1
Corresponding/ linked Record Entry(ies)	SecurityEvent.Object : 0..*, one for each linked Record Entry	identifier : Identifier 0..1 reference : Resource(Any) 0..1
Amendment/ Translation Sequence	SecurityEvent.Object : 0..*	lifecycle : code 0..1 « SecurityEventObjectLifecycle »
Pointer to Pre Event Entry, if chained	SecurityEvent.Object : 0..*, one to previous instance	identifier : Identifier 0..1 reference : Resource(Any) 0..1

Shouldn't signature be 0..* (System/Device + Individual)?

Lifecycle Event Metadata
Evidentiary, con't

Lifecycle Event Metadata	FHIR Resource	Resource Attribute(s)
Source of Copied Content (e.g., copy/paste template)	SecurityEvent.Object : 0..*, one for each source	identifier : Identifier 0..1 reference : Resource(Any) 0..1 type : code 0..1 « SecurityEventObjectType » role : code 0..1 « SecurityEventObjectRole »
Event is known Disclosure	SecurityEvent.Object : 0..*	lifecycle : code 0..1 « SecurityEventObjectLifecycle », where lifecycle = "disclosure"
Record Entry Permissions	SecurityEvent.Participant : 1..*, one for each participant	role : CodeableConcept 0..* « DICOMRoleId+ » [for role-based] reference : Resource(Practitioner|Patient|Device) 0..1 userId : string 0..1 [for user-based permissions]
	SecurityEvent.Object : 0..*	sensitivity : code 0..1 «SecurityEvent.object.sensitivity »
Event Transaction Entries	SecurityEvent.Object : 0..*, one for each Record Entry	identifier : Identifier 0..1 reference : Resource(Any) 0..1 type : code 0..1 « SecurityEventObjectType »
Identifier/Version of Translation Tools	SecurityEvent.Participant : 1..*, one for each tool	role : CodeableConcept 0..* « DICOMRoleId+ » reference : Resource(Practitioner|Patient|Device) 0..1 userId : string 0..1

For SecurityEvent.Participant, role and identifier support role and user-based authorization/access control.

Analysis, Comments and Proposals

Upcoming Slides…

- <u>From the perspective of FHIR Provenance and SecurityEvent resources</u>:

  – Targeted Resource Attributes, some with Code/Value Sets

  – Resource Notes, Comments and Proposals

FHIR Resource
Provenance

Resource	Resource Attribute	Description	Value Set
Provenance	→	Who, What, When for a set of resources	
	target : Resource(Any) 1..*	Target resources (usually version specific)	
	period : Period 0..1	When the activity occurred	
	recorded : instant 1..1	When the activity was recorded/updated	
	location : Resource(Location) 0..1	Where the activity occurred, if relevant	
	reason : CodeableConcept 0..1	Reason activity is occurring	TBD
	policy: uri 0..*	Policy or plan the activity was defined by	

Provenance.Agent

Resource	Resource Attribute	Description	Value Set
Provenance. Agent		➔ Person, organization, records, etc. involved in creating resource	
	role : Coding 1..1 « ProvenanceAgentRole+ »		<confirm> Enterer, performer, author, verifier, attester, informant, source, cc, application, daemon
	type : Coding 1..1 « ProvenanceAgentType+ »		<confirm> Practitioner, organization, software, record, document
	reference : uri 1..1		

Provenance.Agent.reference may resolve to a uri or Resource (like others)
Review value sets for "role" and "type" [RM-ES]

SecurityEvent.Event

Resource	Resource Attribute	Description	Value Set
SecurityEvent.Event	➜ What was done		
	type : CodeableConcept 1..1 « SecurityEventType+ »	Type/identifier of event	<confirm> Rest + DICOM codeset
	subtype : CodeableConcept 0..* « SecurityEventSubType+ »	More specific type/id for the event	<confirm> Read, vread, update, delete, validate, create, history-instance, history-type, history-system, search-type, search-system, transaction + DICOM codeset
	action : code 0..1 « SecurityEventAction »	Type of action performed during the event	<confirm> C) Create; R) Read/view/print; U) Update; D) Delete; E) Execute.
	dateTime : instant 1..1	Time when the event occurred on source	
	reason : CodeableConcept 0..1	TBD	TBD
	policy : uri 0..*	Policy or plan the activity was defined by	

Review value sets for "type", "subtype" and "action".
Add "reason", "policy" attributes with value set for "reason".

FHIR Resource
SecurityEvent.Source

Resource	Attribute	Description	Value Set
SecurityEvent.Source	→	Application systems and processes	
	site	Logical source location within the enterprise	
	identifier	The id of source where event originated	
	type : CodeableConcept 1..1 « SecurityEventSourceType+ »	The type of source where event originated	<confirm> 1) User Device; 2) Data Interface; 3) Web Server; 4) Application Server; 5) Database Server; 6) Security Server; 7) Network Device; 8) Network Router; 9) Other.

[This sub-resource not currently referenced by Lifecycle Event metadata.] Review value set for "type" [RM-ES].

FHIR Resource
SecurityEvent.Object

Resource	Resource Attribute	Description	Value Set
SecurityEvent.Object	→	Specific instances of data or objects accessed	
	identifier : Identifier 0..1	Specific instance of object (e.g. versioned)	
	reference : Resource(Any) 0..1	Specific instance of resource (e.g. versioned)	
	type : code 0..1 « SecurityEventObjectType »	Object type being audited	\<confirm\> 1) Person; 2) System Object; 3) Organization; 4) Other.
	role : code 0..1 « SecurityEventObjectRole »	Functional application role of Object	\<confirm\> 1) patient; 2) location; 3) report; 4) resource; 5) master file; 6) user; 7) list; 8) doctor; 9) subscriber; 10) guarantor; 11) security user entity; 12) security user group; 13) security resource; 14) security granularity definition; 15) practitioner; 16) data destination; 17) data reposition; 18) schedule; 19) customer; 20) job; 21) job stream; 22) table; 23) routing criteria; 24) query.

For "type", need "EHR record entry" as specific value.
Review value sets for "type" and "role" [RM-ES].

FHIR Resource
SecurityEvent.Object, con't

Resource	Resource Attribute	Description	Value Set
SecurityEvent.Object	lifecycle : code 0..1 « SecurityEventObjectLifecycle »	Life-cycle stage for the object	<confirm> 1 OriginationCreation; 2) Import/ Copy from original; 3) Amendment; 4) Verification; 5) Translation; 6) Access/Use; 7) De-identification; 8) Aggregation, summarization, derivation; 9) Report; 10) Export/ Copy to target; 11) Disclosure; 12) Receipt of disclosure; 13) Archiving; 14) Logical deletion; 15) Permanent erasure/Physical destruction
	sensitivity : code 0..1 «SecurityEvent.object.sensitivity »	Policy-defined sensitivity for the object	<confirm> L) Low; M) Moderate; N) Normal; R) Restricted; U) Unrestricted; V) Very restricted.
	description : string 0..1	Instance-specific descriptor for Object	

SecurityEvent.Object.lifecycle must reference RI.1.1.1-27.
Review value sets for "lifecycle" and "sensitivity" [RM-ES].

SecurityEvent.Participant

Resource	Resource Attribute	Description	Value Set
SecurityEvent.Participant	→	A person, a hardware device or software process	
	role : CodeableConcept 0..* « DICOMRoleId+ »	User roles (e.g. local RBAC codes)	
	reference : Resource(Practitioner|Patient|Device) 0..1	Direct reference to resource	
	userId : string 0..1	Unique identifier for the user	
	requester : Boolean 1..1	Whether user is initiator	
	location : Resource(Location) 0..1	TBD	

Review value set for "role".

SecurityEvent.Participant.Network

Resource	Resource Attribute	Description	Value Set
SecurityEvent.Participant.Network	→	Logical network location for application activity	
	identifier : string 0..1	Identifier for the network access point of a user device	
	type : code 0..1 « SecurityEventParticipantNetworkType »	The type of network access point	<confirm>

Review value set for "type" [RM-ES].

Basics

Record Entry and FHIR Resources

- An EHR System manages a persistent EHR comprising Record Entries for
  - One or more provider organizations,
  - One or more individual practitioners, and
  - Many patients
- An EHR comprises
  - Many Record Entry instances
- A Record Entry instance may comprise
  - One or more FHIR Resource instance(s)
  - With signature bindings

Project Focus/Success Criteria
FHIR Enabled Lifecycle Events

Project Focus	Success Criteria
Binds (joins) FHIR Resource Instance(s) together in Record Entry Instance: • Including applicable Clinical, Administrative, Infrastructure Resources • Based on Action(s) Taken	• Complete specification of baseline Set of FHIR Resources applicable at each Record Lifecycle Event (1-27) and captured in the resulting Record Entry Instance • Allowing additional Resources to be bound in a Record Entry Instance, per Clinical, Administrative and/or other context
Includes Pre- and Post-Lifecycle Event Entry States • e.g., before/after amendment or translation	• Complete specification of how both pre- and post-lifecycle event states (of FHIR Resources) are captured and preserved in one or more Record Entries

Project Focus/Success Criteria
FHIR Enabled Lifecycle Events

Project Focus	Success Criteria
Includes Action/Event Metadata	• Complete specification of Action/Event Metadata (in FHIR Resources) per Record Entry
Includes Attestation and Content Binding • With/without Digital Signature	• Complete specification of: • Attestation and/or Digital Signature bound to Record Entry content

Dimensions of End-to-End Flow

Record Lifespan

1. Within Single System
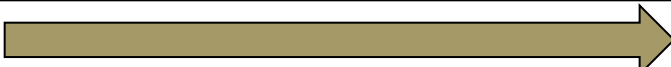
   – <u>Starting</u> at point of origination, in Source System

   – <u>Starting</u> at point of receipt, in Receiving System

   – <u>Ending</u> at point of deletion

2. Across Multiple Systems

   – <u>Starting</u> at point of origination, in Source System

   – <u>Traversing</u> one or more Points of Exchange

   – <u>Ending</u> at point of deletion, in each System

Record Lifespan – End-to-End
Within Single System

Record Lifespan		
Start	Intervening <u>Record Lifecycle Events</u> (0 to many)	End
<u>Source System</u> (1) Originate/ Retain Record Entry	(2) Amend (3) Translate (25,4) Verify, Attest (5) View/Access (6) Output/Report (7) Disclose (8) Transmit (10) De-Identify (11) Pseudo-nymize	(16) Destroy
<u>Receiving System</u> (9) Receive/Retain Record Entry	(12) Re-Identify (13) Extract (14,15) Archive, Restore (17,18) Deprecate/Retract, Re-Activate (19,20) Merge, Unmerge (21,22) Link, Unlink (23,24) Place, Remove Legal Hold (26,27) Encrypt, Decrypt	(16) Destroy

Record Lifespan – End-to-End
Across Multiple Systems

Record Lifespan			
Start	**Intervening Record Lifecycle Events (1 to many)**		**End**
Source/Sending System		Point of Exchange	Receiving System	
(1) Originate/Retain Record Entry	… (6) Output/Report (7) Disclose (8) Transmit	Point of Exchange	(9) Receive/Retain (5) View/Access (6) Output/Report (13) Extract …	(16) Destroy
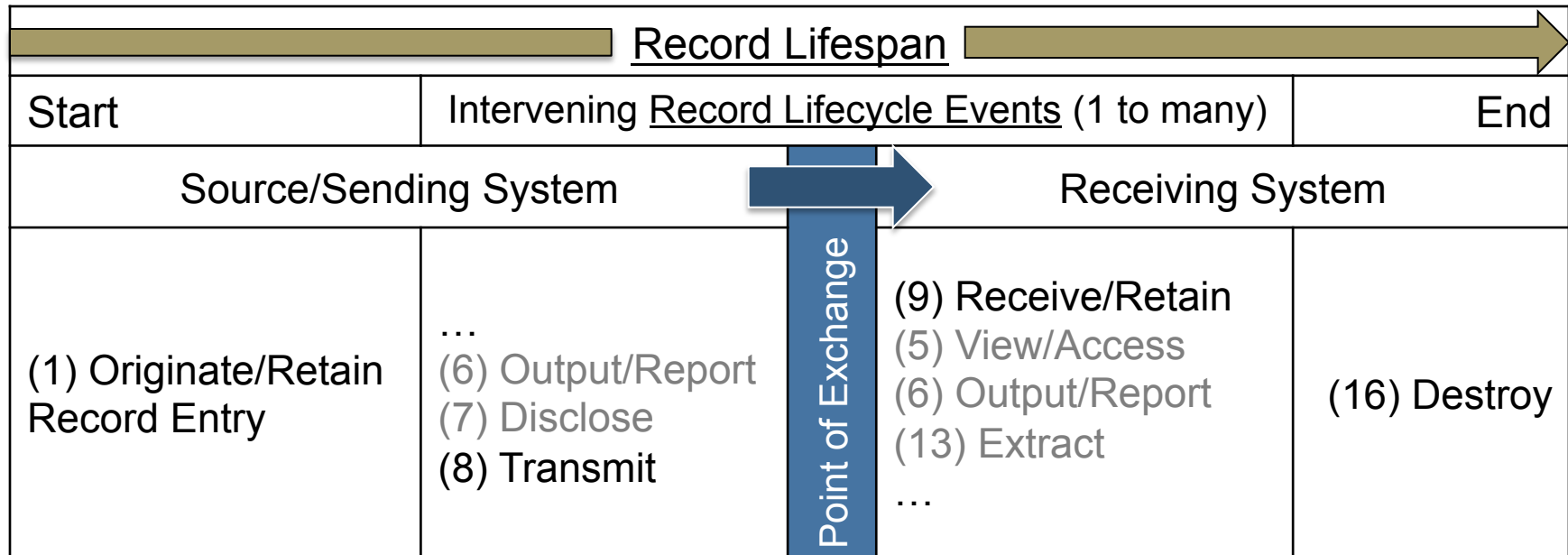
Repeated at each point of exchange…

Current/Emerging Projects Related to…

EHR-S FM Record Infrastructure

- EHR Record Lifecycle Event Metadata using HL7 Fast Health Interoperable Resources (FHIR) – this project
- S&I Data Provenance
- S&I esMD
- S&I Simplification
  - S&I Use Case Requirements Analysis
  - Use Case Authoring Tool (UCAT) Development
- HL7 Functional Model Framework
  - Next Releases of EHR-S FM (R3), PHR-S FM (R2), Lab FM (?)
- HL7 Vocabulary Harmonization: EHR, Security, CBCC WGs
- Functional Profile Development: RM-ES R2, MU FP, PH FPs
- ISO 21089 Revision, Trusted End-to-End Information Flows
- ISO 13606 Revision, EHR Communication

Record Lifecycle Event (EHR-S FM RI.1.1.x)	ISO TC215 – Stds. Infrastructure Frame In development	ISO 21089:2004 Trusted End to End Published TR	ISO 21089:2014 Trusted End to End In development	ISO/HL7 10781 EHRS FM R2:2014 Published	ISO/HL7 16527 PHRS FM R2 In development	ISO 19669 – Re-Usable Use Case In development	ISO 13606 – EHR Communication In Revision	HL7 EHR Lifecycle Model DSTU:2008 Published	HL7 RM-ES FP R2 In Development	HL7 Record Lifecycle on FHIR In Development	US S&I Simplification	US S&I Data Provenance
1 Originate/Retain Record Entry	X	X	X	X	X	X		X	X	X	X	TBD
2 Amend Record Entry	X	X	X	X	X	X		X	X	X	X	
3 Translate Record Entry	X	X	X	X	X	X		X	X	X	X	
4 Attest Record Entry	X		X	X	X	X		X	X	X	X	
5 View/Access Record Entry	X	X	X	X	X	X		X	X	X	X	
6 Output/Report Record Entry	X	X	X	X	X	X	X	X	X	X	X	
7 Disclose Record Entry	X	X	X	X	X	X	X	X	X	X	X	
8 Transmit Record Entry	X	X	X	X	X	X	X	X	X	X	X	
9 Receive/Retain Record Entry	X	X	X	X	X	X	X	X	X	X	X	
10 De-Identify Record Entry	X	X	X	X	X	X		X	X	X	X	
11 Pseudo-nymize Record Entry	X	X	X	X	X	X		X	X	X	X	
12 Re-Identify Record Entry	X	X	X	X	X	X		X	X	X	X	
13 Extract Record Entry	X	X	X	X	X	X		X	X	X	X	
14 Archive Record Entry	X	X	X	X	X	X		X	X	X	X	
15 Restore Record Entry	X		X	X	X	X		X	X	X	X	
16 Destroy Record Entry	X	X	X	X	X	X		X	X	X	X	
17 Deprecate/Retract Record Entry	X		X	X	X	X			X	X	X	
18 Re-Activate Record Entry	X		X	X	X	X			X	X	X	
19 Merge Record Entry	X		X	X	X	X			X	X	X	
20 Unmerge Record Entry	X		X	X	X	X			X	X	X	
21 Link Record Entry	X		X	X	X	X			X	X	X	
22 Unlink Record Entry	X		X	X	X	X			X	X	X	
23 Place Legal Hold on Record Entry	X		X	X	N/A	X			X	X	X	
24 Remove Legal Hold on Record Entry	X		X	X	N/A	X			X	X	X	
25 Verify Record Entry Content	X	X	X		X	X		X	X	X	X	
26 Encrypt Record Entry	X		X		X	X			X	X	X	
27 Decrypt Record Entry	X		X		X	X			X	X	X	
Applicable Lifecycle Events →	27	15	27	24	25	27	4	16	27	27	27	?

(Rows 6–9 grouped under "Exchange")

CRUDE per Record Lifecycle

	ISO/HL7 10781 EHRS FM R2 – Record Lifecycle Events																								New		
	1 Originate/retain	2 Amend	3 Translate	4 Attest/sign	5 Access/view	6 Output/report	7 Disclose	8 Transmit	9 Receive/retain	10 De-identify	11 Pseudomynize	12 Re-identify	13 Extract	14 Archive	15 Restore	16 Destroy	17 Deprecate	18 Re-activate	19 Merge	20 Unmerge	21 Link	22 Unlink	23 + Legal Hold	24 – Legal Hold	25 Verify	26 Encrypt	27 Decrypt
Create	X			X					X																		
Read					X																						
Update		X	X	X						X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Delete																X											
Execute																											
Pre			X	X						X	X		X													X	
Exchange						X	X	X	X																		
Post			X							X	X	X	X														X

Longer Term…
Project Segments/Leads

		Leads
1	ISO/HL7 10781 EHR-S FM R2 RI – Record Infrastructure RM-ES – Records Management/ Evidentiary Support	Gary Dickinson, Reed Gelzer, MD, Lloyd McKenzie, John Moehrke, Diana Warner
2	TI – Trust Infrastructure	TBD
3	CP – Care Provision	TBD
4	CPS – Care Provision Support	TBD
5	AS – Administrative Support	TBD
6	POP – Population Health Support	TBD
7	ISO/HL7 16527 PHR-S FM R1 PH – Personal Health S – Supportive II – Information Infrastructure	John Ritter, et al.

EHR-S FM Record Lifecycle Events on FHIR
Links

- HL7 EHR Interop Wiki:
    - http://wiki.hl7.org/index.php?title=EHR_Interoperability_WG