

## Section Interop.1 – EHR Interoperability Model – Assertions, Characteristics and Examples

Table Interop.1.A (following) describes, column by column:

A) Identifier

B) EHR Interoperability Assertion or Characteristic

Assertions state how health records document/evidence health and healthcare. Characteristics state expected behaviors of interoperable health records.

C) Elaboration

Further description and detail.

D) Example

Example(s) of specified characteristic.

E) Use Case Example

Narrative describing patient encounter and how the EHR record incorporates, represents or establishes the specified characteristic.

ID	EHR Interoperability Assertion/Characteristic	Elaboration	Example	Use Case Example
<b>Section 1 - Health(care) Delivery</b>				
1.1	Health(care) delivery occurs at points along a time continuum.	Health(care) delivery occurs over time and at specific points in time.		
1.2	The Health Record documents health(care) along the time continuum.	Documents = records, captures Health Record is a chronicle of health(care) over time and at specific points in time.		
<b>Section 2 - Health(care) Act</b>				
2	An Act is a discrete action, service or event occurring in the course of health(care) delivery.	Act = Action, Activity, Service or Event 1 Act instance = 1 discrete (single) Act	Order, Observation, Diagnostic, Therapy, Assessment, Care Plan, Registration, Admit, Discharge, Transfer, Referral...	Colonoscopy Ambulatory Office Visit Dr. Sally Smith, physician Ms. Helga Garcia, patient
2.1	An Act is an accountable unit of health(care) delivery.	1 Act = 1 Accountable Unit of Health(care) Delivery (a unit of service)		Colonoscopy, service ID = #####
2.2	Health(care) delivery is comprised of Acts.	Health(care) delivery = 1-n Act(s)		
2.3	An Act has associated facts, findings and observations.	1 Act has 1-n facts, findings and/or observations: Demographics, clinical, operational, financial, performance, quality	Demographics, results, vitals, meds, order detail, H&P, problems, plans, observations, assessments, care detail, resources (time, staff, equipment, supplies)...	
2.4	An Act is (one of):			
2.4.1	Patient related.	1 Act = 1 patient related action, activity, service or event	Order, Observation, Diagnostic, Therapy, Assessment, Care Plan, Registration, Admit, Discharge, Transfer, Referral...	Ms. Helga Garcia, patient ID #####
2.4.2	Not patient related.	1 Act = 1 non-patient related action, activity, service or event	Quality mgmt, epidemiological surveillance, housekeeping, med/supply mgmt, equip calibration and maintenance, travel, transport...	N/A

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2.5	An Act has Actor(s), in Roles, in Participations.	1 Act has 1-n Actor(s) Each Actor has a Role Each Actor has a Participation	Role = physician/specialist, nurse, pharmacist, therapist, clerk... Participation = performed, observed, recorded...	Dr. Sally Smith (physician/specialist, performer), Nurse John Jones (nurse, assistant)
2.6	An Act has one or more accountable Actor(s).	1 Act has 1-n accountable Entities: organization, business unit or individual	Single Practitioner or Team = physician, nurse...	Dr. Sally Smith and Nurse John Jones
2.7	An Act occurs at a specific date/time and has an elapsed time.	Date/time should be consistent with a Master Clock system and used according to scope of practice, organizational policy, or jurisdictional law.		Monday, 21 Feb 2010, at 1400 EST, for 45 minutes
2.8	An Act occurs at a specific physical location.			Dr. Smith's Office, Procedure Room 1
2.9	An Act may be an aggregation of other Acts.			
<b>Section 3 - Act Record</b>				
3	An Act is documented by an Act Record instance.	1 Act Record instance per 1 Act instance		
3.1	An Act/Act Record instance is uniquely identifiable.			
3.2	An Act Record is persistent legal evidence of Act occurrence.	Persistent = unalterable, indelible		
3.3	An Act Record is a unit of record of the Health Record.	1 Act Record = 1 Health Record unit (of record)		
3.4	An Act Record is comprised of multiple attributes (elements).	1 Attribute = 1 discrete fact, finding or observation 1 Act Record = 1-n attributes (elements)	[Per 2.3 above]	
3.5	An Act Record may contain attributes:			
3.5.1	Current to the Act		Current vitals, current meds...	Facts regarding the Colonoscopy: methods, measures, approaches, meds, findings...

ID	EHR Interoperability Assertion/Characteristic	Elaboration	Example	Use Case Example
3.5.2	Of an historical nature		Previous health history, allergies, family health history, previous meds...	Facts regarding Helga Garcia's allergies, problem history, family history...
3.6	An Act Record is (one of):			
3.6.1	Patient specific and patient identifiable.			Helga Garcia, Patient ID #####
3.6.2	Not patient specific.			N/A
3.6.3	Patient related but aliased.			N/A
3.6.4	Patient related but anonymized.			N/A
3.7	An Act Record is (one of):			
3.7.1	A non-attestable unit of the health record		Record containing summary list of values produced as an automated query response (e.g., medication list, problem list, allergy list)	
3.7.2	An attestable (signature specific) unit of the health record, which is (one of):	1 Act Record = 1 Attestable Unit of Record		
3.7.2.1	Attested by one or more Actor(s)/ Author(s)	1 Act Record has 1-n attesting Actors (Author(s)) Actor = individual		Dr. Sally Smith and Nurse John Jones, both attesters
3.7.2.2	Not yet attested		Record with unverified data values from automated device	
3.8	An Act Record has (may have):			
3.8.1	One or more originating Actor(s)/Author(s)	1 Act Record has 1-n originating Actor(s) (Author(s))		
3.8.2	One or more amending Actor(s)/Author(s)	1 Act Record has 1-n amending Actor(s) (Author(s))		
3.9	An Act Record is sourced by an originating application.	1 Act Record has 1 originating application		Dr. Sally Smith's EHR for Small Practice settings
3.10	An Act Record allows revision by additive amendment only.	1 Act Record may have 0-n amendments. Each amendment preserves previous content.		
3.10.1	Each Act Record amendment may include a reason for amendment	1 Act Record amendment = 1 reason for amendment		

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3.11	An Act Record is timestamped according to:			
3.11.1	Act Date/Time	Act occurrence time		Monday, 21 Feb 2010, 1400 EST
3.11.2	Act Duration	Length of time for act		45 minutes
3.11.3	Act Record Origination Date/Time	Time of Act Record creation		Monday, 21 Feb 2010, 1430 EST
3.11.4	Act Record Amendment Date(s)/Time(s)	Time(s) of Act Record amendment		Tuesday, 22 Feb 2010, 0910 EST
3.12	An Act Record is oriented to physical locations:			
3.12.1	Act Location	Physical location of Act		Dr. Smith's Office, Procedure Room 1
3.12.2	Act Record Origination Location	Physical location of Act Record Origination		Dr. Smith's Office, Procedure Room 1
3.12.3	Act Record Amendment Location(s)	Physical location of Act Record Amendment(s)		Dr. Smith's Personal Office
3.13	An Act Record is originated/amended at a specific device and network location.			Device ID ##### Network ID #####
3.14	An Act Record may contain uniquely identified multi-media elements.	1 Act Record may have 0-n multi-media elements		Colonoscopy video image
3.15	An Act Record may contain uniquely identified document elements.	1 Act Record may have 0-n document elements		Colonoscopy final procedure report
3.16	An Act Record may be signed or attested as complete, by declaration or by algorithmic measure.	Act Record may be attested as to its completeness.		Dr. Sally Smith attested complete Tuesday, 22 Feb 2010, 0910 EST
3.17	An Act Record may be designated as accurate, by declaration or by algorithmic measure.	Act Record may be attested as to its accuracy.		Dr. Sally Smith attested accurate Tuesday, 22 Feb 2010, 0910 EST
3.18	An Act Record may embed access controls to allow only permitted:	Access control: by user, by role, by context		

<b>ID</b>	<b>EHR Interoperability Assertion/Characteristic</b>	<b>Elaboration</b>	<b>Example</b>	<b>Use Case Example</b>
<b>3.18.1</b>	Record access/view			Dr. Sally Smith and her office clinical staff
<b>3.18.2</b>	Record creation/amendment			Dr. Sally Smith and Nurse John Jones
<b>3.19</b>	An Act Record has an embedded audit trail, tracing:			
<b>3.19.1</b>	Original record content along with each successive amendment, time stamped			
<b>3.19.2</b>	Point of record origination and initial retention			Monday, 21 Feb 2010, at 1430 EST
<b>3.19.3</b>	Point of record amendment			N/A
<b>3.19.4</b>	Point of record content translation			N/A
<b>3.19.5</b>	Point of record verification			N/A
<b>3.19.6</b>	Point record attested complete			Tuesday, 22 Feb 2010, 0910 EST
<b>3.19.7</b>	Point record attested accurate			Tuesday, 22 Feb 2010, 0910 EST
<b>3.19.8</b>	Point of record content access/view			Tuesday, 22 Feb 2010, at 1540 EST...
<b>3.19.9</b>	Point of record transmittal or disclosure (to external entity)			Monday, 28 Feb 2010, at 0810 EST, to Health Plan
<b>3.19.10</b>	Point of record receipt (from external source)			N/A
<b>3.19.11</b>	Point of record de-identification, aliasing			N/A
<b>3.19.12</b>	Point of record re-identification			N/A
<b>3.19.13</b>	Point of record archival			N/A
<b>3.19.14</b>	Point of record destruction or identified missing			N/A
<b>3.19.15</b>	Point of record deprecation			N/A
<b>3.20</b>	An Act Record may be:			
<b>3.20.1</b>	Part of a patient encounter			Helga Garcia's Office Visit, Encounter ID #####
<b>3.20.2</b>	Related to an identified patient problem			Diagnosis: Rectal Bleed due to Hemorrhoids

ID	EHR Interoperability Assertion/Characteristic	Elaboration	Example	Use Case Example
3.20.3	Related to a specific order or care plan			Dr. Sally Smith's Colonoscopy order
<b>Section 4 - Act Record Attributes</b>				
4	[Per 2.3 & 3.4] An Act Record is comprised of multiple attributes (elements).	1 Attribute = 1 discrete fact, finding or observation 1 Act Record = 1-n attributes (elements)	[Per 2.3 & 3.4 above]	
4.1	An Attribute is uniquely identifiable.			
4.2	An Attribute has a data type.	Text, numeric, date/time, frequency, coded element, bitmap...		
4.3	An Attribute is (one of):			
4.3.1	Computable	Numeric, date/time, frequency, coded element...		
4.3.2	Non-computable	Free text, facsimile (document) image...		
4.4	An Attribute may have (one or more):			
4.4.1	Unit of measure		cc, ml, gm, kg, mg...	
4.4.2	Reference range			
4.4.3	Expiration date/time or duration			
4.5	An Attribute may be encoded according to:			
4.5.1	Industry standard coding/classification scheme		LOINC, SNOMED, HL7, ICD, CPT...	
4.5.2	Local coding/classification scheme			
4.6	An Attribute may be translated from one code set to another with:			
4.6.1	Industry standard mapping scheme		Code translation during interchange	
4.6.2	Local mapping scheme		Code translation during interchange	

ID	EHR Interoperability Assertion/Characteristic	Elaboration	Example	Use Case Example
4.7	An Attribute may embed access control parameters to allow only permitted:			
4.7.1	Attribute access/view			
4.7.2	Attribute edit			
<b>Section 5 - Health Record</b>				
5	A Health Record is comprised of Act Record instances.	Health Record = 1-n Act Record instance(s)		
5.1	A Health Record may be:			
5.1.1	Patient specific & identifiable			Helga Garcia, patient ID #####
5.1.2	Not patient specific		Anonymized record for public health or clinical research	N/A
5.2	A Health Record is bounded within a timeframe, specifically:	Health Record encompasses Acts occurring or captured within known time bounds		
5.2.1	At point in time	Occurring at a single point in time	One-time diagnostic test record	N/A
5.2.2	Over one or more patient encounter(s)	Occurring within one or more encounters	Problem oriented record over multiple encounters	Helga Garcia, Encounter ID #####
5.2.3	Over a patient's lifetime	Occurring within or related to a patient's lifetime.		N/A
5.2.4	Within an arbitrary period of time	Occurring within an arbitrary period of time	A time determinant clinical trial record set	N/A
5.3	A Health Record may be patient specific:			
5.3.1	Patient Personal Health Record	Patient Personal Health Record = 1-n Act Record Instances Documents personal health information, services received	Record for individual patient, documenting personal health information, services received...	Entry in Helga Garcia's Personal Health Record: 21 Feb 2010, 1400 EST, Ambulatory Encounter, Dr. Sally Smith, Colonoscopy
5.3.2	Patient Encounter Record	Patient Encounter Record = 1-n Act Record Instances Documents Acts occurring during patient encounter(s)	Record for individual patient, documenting one or more patient encounters.	1) Helga Garcia, 21 Feb 2010, 1400 EST, Ambulatory Encounter, Dr. Sally Smith, Colonoscopy 2) Helga Garcia...
5.4	A Health Record may be provider oriented:			

ID	EHR Interoperability Assertion/Characteristic	Elaboration	Example	Use Case Example
5.4.1	Practitioner Service Record	Practitioner Service Record = 1-n Act Record Instances Documents health services rendered	Legal/business record of practitioner	21 Feb 2010, 1400 EST, Patient Helga Garcia, Colonoscopy
5.4.2	Provider Service Record	Provider Service Record = 1-n Act Record Instances Documents health services rendered	Legal/business record of provider organization	N/A
5.5	A Health Record may be population oriented:			
5.5.1	Population Health Record - Identifiable		Record of select patient population	N/A
5.5.2	Population Health Record - Anonymized		Record of select but anonymous population	N/A
<b>Section 6 - Patient Encounter Record</b>				
6	[Per 5] A Patient Encounter Record is comprised of Act Record instances.	Patient Encounter Record = 1-n Act Record instance(s)		Helga Garcia, 21 Feb 2010, 1400 EST, Ambulatory Encounter, Dr. Sally Smith Acts: Registration, History and Physical, Colonoscopy Order + Procedure + Report, Take Home Orders, Discharge
6.1	A Patient Encounter Record is persistent legal evidence of the encounter.	Persistent = unalterable, indelible		Dr. Sally Smith's EHR for Small Practice Settings retains the legal and persistent encounter record.
6.2	A Patient Encounter Record may be designated as complete, by declaration, by algorithmic measure or by declaration of agreement with algorithmic measure.			Encounter Record attested as to completeness by Randy Rand, Clinical Assistant
<b>Section 7 - Patient Summary Record</b>				

ID	EHR Interoperability Assertion/Characteristic	Elaboration	Example	Use Case Example
7	The Act of creating a summary record is in itself an Act and produces an Act Record	Act Record = Record of summary values	Creation of: <ul style="list-style-type: none"> <li>• A summary of care prepared by Provider A for the benefit of Provider B to whom a patient's care is being referred or transferred (e.g., ASTM CCR or HL7/ASTM CDA/CCD)</li> <li>• Patient medication history</li> <li>• Patient problem list</li> <li>• Patient allergy list</li> </ul>	Clinical Assistant Randy Rand prepares summary of care record for Patient Helga Garcia's next visit to consulting physician Dr. Jon Jonson. It includes patient demographics, known problems, allergies, medications, immunizations...
7.1	A Summary Record is (one of):			
7.1.1	Persistent		Summary Record resulting from query and retained in persistent Health Record.	
7.1.2	Non-Persistent		Summary Record resulting from query but not retained in persistent Health Record.	
<b>Section 8 - EHR Interoperability (In Summary)</b>				
8	EHR interoperability occurs via the interchange of Act Records			
8.1	<u>Technical</u> EHR Interoperability: Act Records are interchanged with secure and reliable transport.		See End-to-End EHR Record Flow, Columns H-L	
8.2	<u>Semantic</u> EHR Interoperability: Act Records are interchanged with content and meaning preserved.	Semantic Interoperability relies on Technical Interoperability	See End-to-End EHR Record Flow, Columns H-L	
8.3	<u>Process</u> EHR Interoperability: Act records are interchanged in the course of the healthcare delivery process and promote continuity of that process.	Process Interoperability relies on Semantic and Technical Interoperability	See Sections 1-3	