HL7 EHR-S Functional Model and Standard: Advanced Tutorial, Conformance & Profiles

Presented by:

R. Lenel James:
BlueCross BlueShield Association
HL7 EHR TC, Co-Lead Conformance
Co-Lead Publications

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Agenda

- Recap of the EHR-S Model and Intro to PHR-S FM
- Review of key conformance-related concepts
- Review of EHR-S Conformance Chapter
- Summary of current and in-process Profiles
- Registration of profiles
EHR vs. EHR-S

- **EHR**
  - The underlying single, logical patient record
  - The data elements comprising the record
  - Needs to serve as the legal record

- **EHR-S**
  - Software that provides functionality to:
    - Manage and maintain the record
    - Accomplish the various clinical, research, and business purposes of the record
  - Monolithic system or a system of systems
The Functional Model

Is Not…

- A messaging specification
- An EHR specification
- An implementation specification (not the “how”)
  - Does not prescribe technology
  - Does not dictate how functions must be implemented (e.g., via the user interface, database design)

Is…

- An EHR system specification
- A reference list of functions that may be present in an EHR-S (the “what”)
  - Enables consistent expression of functionality
  - Provides flexibility for innovation and product differentiation
  - Gold standard, sensitive to what can practically be done by a system, future system development
EHR-S Functional Model & Standard

- Normative (ANSI standard): Function names, statements & conformance criteria provide a reference list of functions that:
  - May be present in an EHR-S
  - Understandable from a user’s perspective
  - Enables consistent expression of functionality

- Reference (not balloted): Profiles (provide use cases for further explanation or understanding), How-To Guide, Glossary, Function Descriptions
Functions describe the behavior of a system in user-oriented language so as to be recognizable to the key stakeholders of an EHR System.

### EHR-S Functional Model at a Glance

<table>
<thead>
<tr>
<th>Direct Care</th>
<th>Supportive Care</th>
<th>Information Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1.0 Care Management</td>
<td>S1.0 Clinical Support</td>
<td>I 1.0 EHR Security</td>
</tr>
<tr>
<td>C2.0 Clinical Decision Support</td>
<td>S2.0 Measurement, Analysis, Research, Reporting</td>
<td>I 2.0 EHR Information and Records Management</td>
</tr>
<tr>
<td>C3.0 Operations Management and Communication</td>
<td>S3.0 Administrative and Financial</td>
<td>I 3.0 Unique identity, registry, and directory services</td>
</tr>
</tbody>
</table>

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Conformance to Profiles

- EHR-S conforms to derived profile
- EHR-S conforms to profile
- EHR-S conforms to profile
- EHR-S conforms to define your own

Implementations
Profiles

Functions
Conformance criteria
Rules for Profiles

EHR Functional Model
Draft Standard of functions to describe the behavior of a system in plain language so as to be recognizable to the key stakeholders of a PHR System
PH.2.5 Manage Current State Data Set

PH.2.5.3 Manage Test Results

Statement/Description: Capture, maintain and present the results of diagnostic tests including inpatient, ambulatory and home-monitoring tests.

Example: The results reporting list will display when the most recent EKG was done or ….

1. The system SHALL provide the ability to filter results by factors that supports results management, such as type of test and date range.
2. The system SHOULD indicate normal and abnormal results depending on the data source.
3. The system SHOULD provide the ability to filter lab results by range …
4. The system SHOULD display numerical results in graphical form and allow ….
5. The system SHALL provide the ability to group tests done on the same day.
6. The system SHOULD trigger decision support algorithms from the results
7. IF the system contains the electronic order, THEN the results SHOULD be linked to a specific order.
8. The system SHALL provide the ability for account holders to annotate a result.
9. The system MAY display a link to an image associated with results.
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- Profile Creation Exercises
Review of Conformance Concepts

The basics:
- Motivation – why care about conformance
- Definitions
- EHR-S FM Conformance Clause
Motivation

- What does it mean to “claim conformance”? 
  - Profiles, EHR system?
- What do they actually conform to?
- What criteria (requirements) are met?
  - Conformance Clause.
- How can a conformance claim be verified?
  - Test suites, test tools, testing and certification
Definitions: Fitting it all together

Certification
qualified bodies to do the testing and certification
control board - advisory and arbiter

Validation
Process - policy and procedures for testing

Conformance Testing
Test suite, Test tool
(test software, test scripts, test criteria)

Profile

Standard
Conformance clause, conformance criteria

We are concerned with
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EHR-S FM Chapter 2: Conformance Clause

- Normative chapter
- Defines conformance to the Functional Model

Contents:
- Concepts – conformance, profiles, derived profiles
- Structure of the FM
- Normative language
- Priorities
- Conformance Criteria
- Rules for profiles

Reference materials:
- Example use cases, sample conformance clauses
- Interpreting and understanding ‘dependent shall’ criteria
- Definitions
EHR-S FM Conformance Clause

- Concepts:
  - Profiles conform to the Functional Model
  - EHR-S conforms to 1 or more profiles
Reminder: profiles

- **Functional Profile (profile)**
  - ‘Subset’ of the EHR-S FM functions
  - Functionality required or desired for care setting, application, system or other purpose

Profiles can be derived from other profiles

- **Derived Profiles**
  - Functional profile created from 1 or more other profiles (i.e., base profiles)
  - Further specialization of base profile(s)
Profiles and derived profiles

EXAMPLES of possible derived profiles

- **Emergency Dept IS profile**
  - Nursing Documentation System
  - Discharge Instructions and Electronic Prescription writing

- **Child Health**
  - Neonatal ICU
EHR-S FM Conformance Clause

Normative Language – keywords
- **SHALL**: Mandatory requirement (‘is required to’)
- **SHOULD**: Optional, recommendation (‘is encouraged’)
- **MAY**: Optional, permissible action (‘is permitted’)
- Some profiles have added:
  - **SHALL NOT** – indicates a prohibited action (‘prohibited’)

Priorities –
- Assigned by profile to each function
- Timing of when a function gets implemented by the system
- 3 priorities
  - **Essential Now (EN)** – implementation of function is mandatory
  - **Essential Future (EF)** – optional now, mandatory at some time in future
    - Profile defines the time frame (date, time allotment, event)
    - Multiple time frames (e.g., EF-2008, EF-2009)
  - **Optional (O)**
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## Summary of current & in-progress Profiles (December 2007)

<table>
<thead>
<tr>
<th>Profile Name</th>
<th>Sponsor</th>
<th>Status</th>
<th>Type</th>
<th>Realm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Department Information Systems (EDIS)</td>
<td>American College of Emergency Physicians</td>
<td>Registered</td>
<td>Care setting Specialty (emergency medicine, emergency nursing)</td>
<td>US</td>
</tr>
<tr>
<td>Records Management and Evidentiary Support</td>
<td>AHIMA</td>
<td>Balloted</td>
<td>Specialty (legal) Ancillary</td>
<td>Universal</td>
</tr>
<tr>
<td>Child Health</td>
<td>HL7 Pediatric Data Standards SIG</td>
<td>Balloted</td>
<td>Specialty (child health)</td>
<td>US</td>
</tr>
<tr>
<td>Behavioral Health</td>
<td>US Health and Human Services (HHS) Substance Abuse &amp; Mental Health Services Admin (SAMHSA)</td>
<td>Balloted</td>
<td>Care setting</td>
<td>US</td>
</tr>
<tr>
<td>Electronic Health Records/Clinical Research</td>
<td>EClinicalForum</td>
<td>In-progress</td>
<td>Ancillary</td>
<td>Universal</td>
</tr>
<tr>
<td>Long term care</td>
<td>AHIMA</td>
<td>In-progress</td>
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Registration of FM Profiles

- What is “Profile Registration”?
  - Formal process described in How-To Guide
  - Functional profile with attestation of conformance to EHR-S FM standard.

- Why register?
  - Facilitate public awareness, adoption and reuse
  - Shows submitter believes it conforms to FM
  - Educational – used as examples
  - Getting a ‘status’ for the profile
HL7 Profile Registry

● Hosted by NIST
  – www.nist.gov/profileregistry

● Anyone can:
  – Search for registered profiles
  – View chapters of the EHR-S FM
  – Download the Questionnaire
  – Request an user account

● Users with accounts can:
  – Submit a profile for registration

● In the Future, use registry for
  – PHR profiles and Interoperability Model profiles
Welcome to the HL7 EHR-S Registry

The HL7 EHR-S Registry serves as a tool to automatically validate the attestation of conformance by the submitter of an EHR-S functional profile and as a repository of registered functional profiles. Registration of profiles that conform to the EHR-S Functional Model can facilitate the adoption of profiles by increasing public awareness and making it publicly available for use.

Users of this site can view or search for registered profiles as well as submit a profile for registration.

Use the above tool bar to:

- View all currently Registered Functional Profiles
- Search for Registered Functional Profiles
- Submit a Functional Profile for registration
- Get User Account (required for profile submission)
- Download the Registration Form
- View specific chapters of the EHR-S Functional Model