Data-Quality Specification Standard and Workflow Support for

Reconciled Medication List

Supporting management and exchange

An HL7 EHR Systems Standards Workgroup Initiative

HL7 Reducing Clinician Burden (RCB) Focus Team-Medication List Management and Reconciliation

November 1, 2021
Current Team (alphabetical)

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With special thanks for additional end-use requirements input from UAB’s Dr. James Willig, Alfredo Gonzales
The Opposite of Clinician Burden:

Science-Grade Clinical Care and Decision-Making requires

Science-Grade, Trusted, Accessible, and Fit-for-Use Data
Project Origination

Reducing Clinician Burden

• Challenge from CMS Representatives: Practical (utility and scale) project to address documentation burden

• Convened clinician interest group, reviewed options that met “utility and scale”

• Settled on “Trusted, accurate current medication list” as impactful
  • EHR “Medication Lists” are inconsistent, often out of date, untrustworthy
  • Extensive evidence that medication errors contribute to clinical errors, patient harms, costs
  • A lot of work and rework expended in curating current medications, value is lost as results are difficult to find or lost in EHRs

• Very high utility for clinical decision making

• Good starting point for incremental address of complex interoperability challenges that also cause extensive burden (ex: Problem List, integration into Problem-Oriented Health Record)
Problem

- 20% of admissions are medication-related
- High risk patients have 8 errors on admission medication lists.
- Only 5.3% of patients 65 year or older on >5 medications have accurate lists
- One third of inpatient orders have errors and 85% originate from the medication history
- Up to 59% of errors can cause harm
- Up to 80% of patients have at least 1 medication error at discharge

Solution

On admission, studies demonstrate increased accuracy of medication lists obtained by pharmacy staff vs usual care
- Accuracy rates: Nurses, 20%; Hospitalists, 50%; Technicians, 100%
- Nurses 14% vs pharmacy technicians 94% (p<0.0001)

At discharge, pharmacists identified errors in medication lists in 49% of patients and problems in an additional 16% vs usual care

Cost of Harm

- Cost of adverse drug event (ADE): $2,262 - $5,790
- Increased length of stay due to ADE: 3.1 days
- Cost/readmission ~ $12,300-13,800

Business Case

- 75% reduction in ADEs
- 41 minutes of nursing time saved/patient
- Cost-effective to utilize technicians for medication histories; $830,000
- Patients have an accurate medication list upon discharge
- Reduced readmissions
- Enables clinicians to practice at the highest level of their license and training

Recommendation: For high risk patients, pharmacy will ensure the accuracy of the medication list at admission and discharge
Original Research from Cedars-Sinai

“Improving admission medication reconciliation with pharmacists or pharmacy technicians in the emergency department: a randomised controlled trial”

Joshua M Pevnick, Caroline Nguyen, Cynthia A Jackevicius, Katherine A Palmer, Rita Shane, Galen Cook-Wiens, Andre Rogatko, Mackenzie Bear, Olga Rosen, David Seki, Brian Doyle, Anish Desai, Douglas S Bell

Conclusions Pharmacists and technicians reduced AMH errors and resultant AMO errors by over 80%. Future research should examine other sites and patient-centred outcomes.

Citation: Pevnick JM, Nguyen C, Jackevicius CA, et al. BMJ Qual Saf Published Online doi:10.1136/bmjqs-2017-006761

Note: A universally applicable/common data set and workflow will facilitate, the recommended “Future research examining other sites, outcomes.”
Progress to Date

• “Minimum necessary for utility, impact” parameters
  • Capturing initial scope inclusions, focusing on reducing burden,
  • Small scope expansion to illustrate a value-add element (MA scope of care correction)
  • Capturing “parking lot for next steps” Ex: Inpatient, Outpatient non-Rx/OTC meds)

• End-user/implementer business and clinical case representation adaptations (Thank you University of Alabama at Birmingham, HIV Clinic)

• Outreach to Federally Qualified Health Center constituencies in Alabama and Mississippi

• Basic environmental scan via participants’ experience with current systems

• User Scenario

• User Story Formalisms Framework (HL7 Use Case Format)

• Usability Factors Formalisms (Failure Mode and Effects Analysis-Thank you Dr. Segal)

• Revisions to Wireframe representation

• Incorporation of data element mapping in FHIR already done by joint HL7/NCPDP White Paper

• Presentation for Project status for NCPDP (November 4)
Incremental Lessons Reinforced

• Current systems capture useful, impactful clinical information that’s inaccessible, easier to re-do (over and over) than to find. Invested cognitive effort is substantially if not entirely lost

• “Re-work” is a huge drag on clinician uncertainty and morale, both rarely recognized or measured thus rendering these burdens partially invisible while also expanding risk

• The fact that correct information exists (ex: reconciliation notes) but un-accessed is readily discoverable and elevates institutional risk.

• **Commitment to “Closed Loop” modeling and execution is critical, effective**
  • An information requirement identified must be methodically managed to closure
  • “Truth” is dynamic, continuously maintained. Revalidation is required to assure continuous trust
  • Usability science captures these requirements, renders them actionable

• **Criticality of development of the Record Lifecycle Event (RLE) as means to represent accuracy and authenticity constructs from Data Quality Science**

• **HL7 institutional reluctance to expand its mission to include accurate data and authentic records in its “interoperability” constructs**
Aspiration: “Universal Source-of-Truth” Medication List

Working Model Programming

Objective: Translate the work into:

1. A FHIR 4.0 Implementation Guide (Conformance testable)
   a. Data specification designed for data normalization in local and exchange environments and incorporating conformance testing
      • Local-tests conformance, similar to local laboratory data quality assurance protocols, automated
      • Exchange: Sender and receiver each assert and confirm conformance with the reference specification Standard for universal trust, similar to CLIA operations, using the ISO 21089 Record Lifecycle Event (RLE) components expressed in FHIR 4.0
   b. Enablement of exchange infrastructure validating conformance (yes/no acceptance or conditional acceptance, similar to CLIA for lab results.)

2. A “pilot-suitable” Application Programming Interface (API) supporting workflow assuring reliability in data origination, retention, and rendering (outputs) and exchange, for demonstration and further testing purposes.

We are quite intrigued by NCPDP’s ResQ™ Project as a near-analog. It is designed to support a single, trusted resource for pharmacy credentialing data, as this project is designed to be a single, trusted source for a curated, data normalized representation of medication reconciliation events and their management over time.
Projects Current and Proposed Nexts

- Complete the integration of preliminary Usability Lab’s Usability Failure Mode and Effects Analysis (FMEA) into the “To Be” State representation in Wireframe and other modeling tools.

- Translating the Usability-Informed Use Case into a Conformance-testable FHIR IG.

- Identifying support resources to carry work forward after 1/1/2022
  - NCPDP
  - University of Nebraska’s new Center for Intelligent Health Care

- Creating, testing a rudimentary, interactive prototype version of the RML

- Implementing a pilot at UAB and/or Cedars-Sinai

- Continue networking with institutions developing “High Reliability” requirements for health care

- Update with CMS
Thank you

Questions, input welcome

Primary POCs are Reed Gelzer, Brooke Penney, and Lisa Masson

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HL7 Confluence Page: https://confluence.hl7.org/pages/viewpage.action?pageId=104568480#ReducingClinicianBurden(RCB)-HL7RCBProjectFocusTeam-MedicationListManagementandReconciliation