Workgroup Report 2019: Standards and Infrastructure (Appendix C of Roadmap)

The ACTS Infrastructure/Standards Workgroup* was charged with evaluating the current state landscape of health IT standards relevant to EBM to determine how to best support the future needs. At its core, the workgroup:

- Identified and inventoried existing industry standards or initiatives relevant to this remit
- Classified and categorized efforts to support downstream analysis work
- Identified extent of coverage and efficacy of this portfolio to address EBM needs
- Analyzed the standards portfolio to identify gaps
- Assessed results to make specific recommendations

Roadmap

- Future State
  - Recommendations

One principal outcome of the work was an interactive visual tool (Figure C-1. Standards Alignments) that depicts the interrelationships between EBM interventions and core standards. It improves discovery of related efforts, assists in finding gaps in industry work, and shows connection points among different EBM priorities.

Figure C-1. Standards Alignments

Currently efforts to establish industry standards lack cohesion and collaboration. Various efforts acting independently are resulting in efforts that don't address all of the gaps and will ultimately lead to the next generation of challenges in sharing medical data and knowledge.

The workgroup summed up their assessment to say "Missing from industry at present is a shared, broadly accepted vision for the target state standards future, resulting in piecemeal, disconnected, and overlapping activities underway in multiple different organizations, both within and beyond the United States:

- Lack of consistency in expressing evidence-based knowledge, in cataloging and discovery of knowledge-assets, and in distribution channels amplifies adoption burden
- Discovery and *comparison of available resources* is challenging, and no established framework exists to interrelate, analyze, and select assets appropriate to specific business needs
- Coordination among standards/industry activities is at best opportunistic and at worst outright conflicting"

Future State

The workgroup went on to describe the future state as "A robust tapestry of accessible, complementary, and readily consumable knowledge assets reduces implementation burden and facilitates adoption of assets, tools, and practices to support evidence-based care:

- A broadly accepted, consensus future state standards/infrastructure vision shapes industry investment and involvement and provides assets that are readily consumable leverageable to facilitate adoption
- Improved tooling allows for ready discovery and seamless acquisition of relevant content, fit-for-purpose based on business need
- A broad ecosystem of public and commercial knowledge assets that seamlessly interoperate supports patient needs spanning sites and institutions of care, fostering competition of interoperable products
- The EHR and health systems market readily embraces directly consumable knowledge assets, removing barriers to their adoption and evolution

- Common lingua franca and representation formalisms (e.g., FHIR, CQL, BPM+) foster convergence within the knowledge community, reducing variance in approaches and techniques and reducing implementation pain"

Recommendations

Finally, the workgroup provided their recommendations based on several stages of detailed analysis, considering:

1. The existing landscape of relevant EBM standards
2. The identified AHRQ ACTS interventional use cases framing the intended future state of practice applying EBM
3. An architectural breakdown of the use cases into core CSFs, and then the interrelationship among success factors into focus areas

The workgroup identified five focus areas:

- **Focus Area 1: Advancing Content Representation of Knowledge Pathways**

  Today, a wide variety of approaches are used to document clinical practices and represent medical knowledge, most of which are done in some form of natural language and distributed in paper or digital-document form. This content is often ambiguous with disparities across different disciplines or specialties; which makes it difficult to transform into computable (sharable) knowledge data.

  The workgroup recommended:

  - **Short Term (~12–18 months)**
    - Extend this ACTS report to include a detailed RACI analysis of identified standards initiatives in this focal area to emphasize activities that were classified as "high energy," including but not limited to BPM+ Health, CQL, and FHIR Profile Builder
    - Advance early adoption of identified priority work, engaging with both knowledge authoring and knowledge consuming organizations to determine coverage, usability, and efficacy of the formalisms identified
    - Evaluate current authoring, simulation, validation tooling to improve the accuracy and completeness of knowledge expression and reduce content creation and maintenance burden
    - Clarify relationships among BPM+ Health, CQL, and FHIRPath to address real or perceived overlaps, and document findings as a basis for thoughtful engagement within respective SDOs (OMG and HL7 respectively)

  - **Long Term (18+ months)**
    - Advance the supporting materials in 7, Additional Report Components to highlight how to bring together semantic and technical solutions in the form of further elaboration/expansion of the interventional actions and use case definitions
    - Establish specific incentives that target the applied use (adoption) of formal expression languages as alternatives to paper-only knowledge authoring
      - Encourage pilot activities within clinical professional societies to make clinical practice guidelines available
      - Establish incentives to encourage adoption of standards-based pathways, encouraging existing vendors to adopt these assets to drive checklists and decision-making support tools already available
      - Consider applying the America COMPETES Act (313) (314) to create a contest to advance open-source, commercially friendly tooling to address gaps in the knowledge authoring and life cycle management stack
    - Engage within the broader community (SDOs, developers, content providers, adopting organizations) to develop an accepted process to identify emerging standards; scope-adjust high-energy industry activities; address potential conflicts, overlaps, adverse impacts, or potential synergies of competing efforts; and deprecate standards that are no longer used /needed
      - Clarify and, if necessary, scope-adjust activities within BPM+ Health, CQL, and Adapting Clinical Guidelines for the Digital Age efforts
      - Engage with CIMI to define/refine data structures in support of identified pathways and foster harmonization path between richness of semantic content in CIMI and FHIR resources in U.S. Core

- **Focus Area 2: Improving Consumption of Evidence-Based Pathways**

  The workgroup recognized that the ability to consistently and easily share evidence-based knowledge is key to providing assistance with decision making in the clinical process. The ability to create, share, and apply evidence knowledge relies on advancing common standards. The workgroup recommends:

  - **Short Term**
    - Elaborate and extend the classification framework from this analysis for use in the knowledge marketplace (Appendix D, Marketplaces)
      - Expand upon the ability to tag metadata—including items such as intended use (CSF, focus area) and architectural role (semantic, systems/technical, functional)—to knowledge artifacts to improve the ability to classify, interrelate, and discover appropriate assets (See detailed work in A.7.1, EBM Standards Asset Inventory)
      - Select, extend, or define a maturity model for knowledge assets, considering maturity frameworks such as those in use by HL7 FHIR or the ONC Interoperability Standards Advisory
    - Initiate and foster an industry survey to determine the areas of greatest appetite for evidence-based knowledge adoption, and use the results of the survey to target efforts to specific implementation sandboxes, connectathons, and pilots to generate momentum and visible exemplars of the impacts of this work
    - Establish and convene a "tiger team" to look at the extent to which composability of knowledge assets and efficacy of existing standards (e.g., the HL7 Knowledge Artifact Specification) merits ongoing investment
    - Advance (or establish) communities-of-practice focused on adoption of EBM practices and assets, lessons learned, and implementation approaches
      - Endorse and engage within the emerging BPM+ Health and Clinical Guidelines for the Digital Age communities, and serve as an intermediary to assure that work of these communities is complementary and not competitive
      - Build an industry knowledgebase of IGs and practice patterns to reduce adoption hurdles

- **Long Term**
  - Advance AHRQ rule as a trusted steward of knowledge content by facilitating the maintenance and curation of knowledge assets, assuring artifact pedigree and discoverability, and promoting consistent application of the classification framework
    - Establish an inventory of knowledge artifacts known to effectively integrate (i.e., "play well" with one another)
  - Determine what tooling would be required to effectively advance testing and compliance around the knowledge asset adoption, both within health institutions and vendor offerings

- **Focus Area 3: Advancing the Data Landscape & Information Sharing**

  There are a number of ongoing efforts to advance the sharing of medical data; these efforts need to converge toward a cohesive effort. The workgroup recommends:

  - **Short Term**
    - Document expected use/needs requirement of the data substrate to effectively support evidence-based care
      - Assess and document specific gaps (extending the work from this phase of the ACTS effort) to determine specific remediation steps
      - Contribute those requirements into existing process, including but not limited to FHIR resources, CCD, and CIMI efforts
    - Continue efforts to align CIMI work with FHIR, with a focus on applied use
      - Encourage adoption pilots to determine/affirm relevancy
      - Collaborate with data modeling communities to determine effective transitions across representations (e.g., QUICK—CIMI—FHIR) patterns and approaches to improve consistency, with the intention of providing automated (or at least consistent, deterministic) transformation from among broadly accepted representations
    - Create a data representation and use "scorecard," identifying the implications, opportunities, and drawbacks of broadly used and emerging information constructs, helping implementers and adopters to make informed decisions about which data representations they use or encourage
      - Evaluate fitness-for-purpose of various formats for intended uses (e.g., CCDA for summary care information and not transactional processing)
    - Designate an AHRQ resource to actively participate in HL7 to surface use cases and harvest/educate on implications within AHRQ
    - Convene a focus group to address FHIR Profile divergence, particularly to mitigate industry divergence of unspecified portions of the standards profiling process (e.g., seek opportunities to apply content sources such as the FHIM in tooling to encourage reuse adoption)
    - Leverage marketplace work to establish a clearinghouse for the creation, curation, maintenance, and dissemination of mappings between disparate data sources/formats as industry assets

  - **Long Term**
    - Establish hackathon events to compare impact and efficacy of use of structured semantic data and unstructured data as relating to evidence-based care
      - Author findings in terms of recommended adoption patterns and implementation guidance
    - Establish pilots to provide for machine-based integration of health records from disparate sources, including automated intermediation of varied underlying semantic representations
    - Establish industry standards mapping and translation approaches and publish as industry assets, consistency, and accuracy
      - Provide funding support to advance open tooling with commercially friendly licensing to allow for automated transformation among representation formats and wire protocols, including work such as the HL7 Model-based Transformation Service (MBTS)
    - Extend the industry roadmap to define and prioritize anticipated needs (requirements) to influence the evolutionary path of FHIR behavioral aspects beyond base read/write capabilities
    - Continue to enhance CCDA on FHIR to better express more complex concepts
    - Continue to mature and expand FHIR's maturity and ability to capture short- and long-term clinical context as would be represented in clinical documents

- **Focus Area 4: Enhancing CDS**

  CDS manifests in a number of ways, with best practice positioning it as a set of tools (notifications, reminders, visual cues, and passive or active recommendations) seamlessly integrated into workflow to positively impact patients and clinical outcomes. The workgroup recommends:

  - Develop a RACI analysis to clarify roles and expectations between clinical pathways/workflows and CDS
    - Broadly speaking, both of these disciplines are often viewed as interchangeable, but standards are evolving that are more targeted to specific roles in this solution space
    - At a minimum this should include efforts such as CDS Hooks, CQL, BPM+ Health, FHIRpath
  - Align and evolve knowledge asset repositories with Marketplace activities; CDS Connect Repository
    - Apply metadata tagging to CDS assets to foster more effective discovery and intended use descriptors
  - Amplify investment to evolve legacy representation of CDS knowledge (e.g., KNARTs) to more broadly accepted representations, such as development of tooling and standardize processes to evolve from guidelines to executable forms (e.g., KNART-to-FHIR transforms)
    - Catalog and curate stable representations of computable knowledge
  - Conduct analysis and establish guidance around composability of clinical knowledge in support of CDS
    - Consider inclusion of an assessment model to determine readiness and fitness of assessed artifacts to be used in combination or composition
  - Consider workforce planning and other enablers to realize above

- **Focus Area 5: Care Coordination & Transfers of Care**

A set of core standards and industry initiatives are focused on providing an integrative, patient-centered view of their care management, including care planning, care coordination, transitions of care, patient goals, and so on. The challenge is a with a disconnected care delivery approach, any given provider has visibility and influence over a portion of that patient's experience and that does not always integrate a complete picture of what is happening with the patient. The workgroup recommends:

- **Short Term**
  - Perform RACI analysis to refine understanding and examine overlaps in SDO work in this space. Risk-mitigate findings, such as the following:
    - Conduct gap analysis between HL7 FHIR Care Plan Domain Analysis Model (DAM) and FHIR Clinical Reasoning to identify gaps and scope remediation plan to evolve FHIR work
    - Mine HL7 Care Coordination Service and advance behavioral components within HL7 FHIR, and align IHE care management projects with HL7 Workflow, FHIR API service definition, and BPM+ to advance dynamic system behavior interoperability
  - Develop an IG integrating standards efforts to consider FHIR Care Plan resource, HL7's Care Plan Domain Analysis Model (DAM), HL7 Coordination of Care Service Functional Model, FHIR Workflow, and other related activities
    - Expand guidance contextualizing which standards artifacts fill which roles within the usage stack
    - Note that there is an emerging project proposal within HSPC to address portions of this work
    - Determine approach for exposing sources of knowledge content to physician end users, considering provenance of the innate guidance, and improving visibility into the source logic to promote physician trust and adoption
  - Initiate an alignment activity to harmonize terminologies in use between clinical community and payer community
  - Create a distributed pilot exercising event-driven architectural concepts and standards (such as publish/subscribe) to improve efficacy of handoffs among distributed care teams

- **Long Term**
  - Establish a pilot project to determine viability of automated integration of care plans from disparate sources (e.g., different specialties and different care institutions)
    - Scope should include care plan integration and remediation
  - Assess industry efforts to automate health record integration, determining quality exposures resulting from differences in terminologies or structural representation, impacts of data transformation activities, impacts of product on EBM and CDS
  - Determine quality criteria and/or maturity model against which to assess care coordination and care transition efficacy based upon cross-institutional data and process flow
  - Assess existing HL7 Coordination of Care Service Functional Model against shared care plan requirements from AHQ to determine whether subsequent standards activities within HL7 or elsewhere are indicated
  - Record mediation/intermediation/observation: This is a critical element and relatively underrepresented by industry activities
  - Commission research work to examine the factors adversely impacting the composition and combination of processes from disparate disciplines to effectively integrate into patient-centric care management
  - Conduct industry summit to expose techniques, tools, and case studies around improved harvesting and mining of existing processes/workflows in support of clinical process improvement

Read the full report

View Workgroup Members

*The ACTS Workgroups formed in 2019 to analyze and report on specific areas of the Knowledge Ecosystem and LHS Cycle.