AMIA Perspectives on Laboratory Interoperability

AMIA represents thousands of healthcare professionals, informatics researchers, and thought-leaders in biomedicine, healthcare, and science. AMIA provides an unbiased, authoritative leadership viewpoint within the informatics community and the healthcare industry. Recently, for example, it has developed the Advanced Health Informatics Certification eligibility requirements for informatics professionals.

AMIA has also developed several core principles as part of their Public Policy, Principles, and Positions. I will now highlight relevant ones for laboratory interoperability in my talk today.

AMIA supports: “Using a wide range of technologies, (e.g., web-based portals, telemedicine, apps and APIs, mobile health, and social media)” and “Technology-enabled approaches that encourage patients to review and contribute directly to their record.”

So let’s review this in more detail.

AMIA believes that:

1. A good standard separates structure from meaning
2. Standards should be built on smaller building blocks to provide flexibility in use
3. Standards must include context

LOINC and SNOMED satisfy these points for some semantics of interoperability, but interoperability also needs API standards like SMART/FHIR for data conveyance.

SNOMED and LOINC have already transformed medicine and are critical for patient care today. Yet, there are places where they are better suited and others where they are not, and thus:

AMIA recommends “The evolution of HIT standards that are modular and substitutable, having clear boundaries for use.”

A key example of the need for such modularity and boundaries is emerging in laboratory medicine where centralized code-based databases cannot keep up with rapidly expanding fields, like precision medicine. For instance, it could prove especially hard for new codes to be coined and adopted quickly by the community.

A field such as clinical genomics, with an expanding set of underlying data with interrelated concepts, may prove very hard to code completely. For example, relationships may be hard to capture with individual codes and attempts to do so may begin to stray from the concept of “separating structure from meaning.” Even though one could conceive of adding structure to LOINC to express conceptual relationships to overcome this, it would be quite a retrofit. Finally, a further complication: mainstream coding systems, such as SNOMED and LOINC, overlap in certain areas. As a result, to resolve how they would used together in rapidly evolving fields, it will be imperative that we map the overlapping concepts and provide guidance for contexts to use one or the other.
AMIA recommends “The specification of standards using conventional tools and methods of the present web-economy, that can leverage prevalent information technology and communications infrastructure.”

Using these modern tools may further accelerate the design, acceptance, adoption, and use of LOINC and SNOMED.

AMIA recommends that “data sharing should preserve and protect patient and consumer privacy and autonomy.”

Recent work has highlighted that laboratory data can be used to identify patients. This is especially relevant for clinical genomic sequence-based data/HLA-typing and rare diseases. Even associating a small part of the genome with an ID publicly can potentially identify the patient. Thus, since LOINC and SNOMED define individual concepts in publicly accessible ways, we may need complementary approaches for certain patient-specific information.

AMIA supports: “Data sharing across the translational spectrum, from animal model bioinformatics to human health outcome data...”

The short version of this is that more semantic concepts will need to be encoded in LOINC and/or SNOMED, from ones in bioinformatics like next generation sequencing used in SMART/FHIR Genomics and GA4GH to others- like rare phenotypes in HPO.

AMIA believes in “The incorporation of the FAIR data principles (findable, accessible, interoperable and reusable) to optimize the use of resources and data.” And, “HIT standards should support human readability, simplicity, [and] parsimony.”

In short, standards that enable modern APIs, including clinical app development, also provide a powerful way to search by LOINC and SNOMED, which transcends what we can do with older messaging technologies.

AMIA seeks to “empower patients through access to, and control of, their personal health information.”

Very importantly, API-based technologies can give patients a way to access their EMR and lab data, as required under 2014 rules issued by CMS/CDC/OCR. And, parenthetically, they can also power public health reporting.

Finally, AMIA recognizes the “need [for] metrics to evaluate the costs, complexity, and quality of standards.”

So, how should metrics inform us about standards and standards development? Existing standards should have some advantages: their adoption costs are already largely sunk. For example, since v2 captures LOINC and SNOMED, if our metric is simply measuring the ease of using a new code, v2 handles that well. But the drawbacks we have shown should be measured, too. Can adding codes for the above cases be scaled for the emerging needs of fields like precision medicine? How do we account for addressing a growing need to satisfy the types of queries we need for informatics? We have identified today exactly the type of use cases where
a too simple metric will probably fail us in taking – or justifying – decisions. What AMIA says we should do is revisit what metrics we choose so that we can understand how MU3-based technologies can build our capacity to advance health care.

Thank you for hosting this wonderful workshop today and for letting us share these thoughts on facilitating lab interoperability.