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| Commitments, Calls to Action, and Milestone which CAN be met using the FHIM | | | |  |
| Category | 2015-2017 | 2018-2020 | 2021-2024 | FHIM Support |
| G1. Milestones | 1. ONC and industry-led testing and certification programs develop a standard set of best practices and policies that ensure consistency across testing and certification bodies. | 2. Providers are able to self-test their deployed health IT for core interoperability functions to ensure their systems operate as expected after implementation and to hold technology  developers and network service providers accountable. | 3. A comprehensive testing infrastructure exists for providers to continuously test  their health IT as new components are  added and old components are phased out to ensure their systems operate as expected after implementation and to hold technology developers and network service providers accountable. | Use of FHIM combined with MDHT and MDMI should be further leveraged to standardize best practices for certification and testing. MDHT does exactly what this is discussing. The value sets developed by FHIM directly align with meaningful use requirements. These value sets can and already are being used in testing and certification. |
| G2. Calls to  Action | 1. Technology developers, SDOs, government and other stakeholders should accelerate the development and availability of a suite of testing tools that can be used by technology users, not just developers, post-implementation to test and ensure interoperability while health IT is in use.  2. SDOs should release comprehensive schema and associated testing tools for each standard and implementation guide they release in order to support more stringent testing of standards by technology developers.  3. Existing industry certification programs should address interoperability functions that ONC’s program does not address, in a manner that is complementary to and not duplicative of ONC’s certification program, to ensure that different aspects of health IT support a range of interoperability needs.  4. Care providers and professional and trade associations involved in alternative payment models should collect and share ongoing feedback with ONC regarding health IT certification needs for EHRs and other health IT in support of new models of care delivery. | 5. Multiple industry-led health IT certification programs should exist to address stakeholder  needs, including post-implementation testing and surveillance.  6. More than 50% of the test tools approved for use by the ONC Health IT Certification  Program should be non-governmental.  7. More than 75% of the standards, or implementation guides, published by an SDO in this timeframe should include accompanying testing tools.  8. Technology developers, SDOs and government should maintain and update an ongoing suite of testing tools for technology  users and developers that support interoperability, including tools to test C-CDA,  Direct, SOAP and FHIR.  9. ONC and other industry-led certification programs should leverage more stringent testing, including in the field testing, to evaluate interoperability. | 10. Technology developers, SDOs and  government should maintain and update an ongoing suite of testing tools for technology users and developers to support interoperability.  11. ONC and other industry-led certification programs should continue to update certification criteria as needed to  support the learning health system’s  evolving needs.  12. More than 75% of the test tools approved for use by the ONC Health IT  Certification Program should be non-  governmental.  13. 100% of the standards, or  implementation guides, published  by an SDO in this timeframe should  include accompanying testing tools. | Use of FHIM combined with MDHT and MDMI can make tasks almost all of these tasks much easier to accomplish. MDHT supports the development of standards in parallel with executable code to test conformance, whatever the standard, as long as it can be represented in UML. This capability cannot govern #s 3, 4, 5, 8, or 11, but it supports the rapid development of tools per standard.In general, SDOs have no obligation to have standards that are even implementable let alone testable. In general, the SDO's would benefit from model driven architecture approaches to developing standards. HL7 and other SDOs have no budget for such tooling and expect outside support for tooling. If ONC really wants the SDOs to support such efforts, ONC will need to support tooling development for the various SDOs. MDHT could be leveraged for this purpose. Testing is the simple part, the standards need to support the providers and developers in creating content easily and correctly. This is where MDMI can play a role by providing semantically clear maps to the standards |
| G3.  Commitments | 1. ONC will work with NIST and the industry to develop more rigorous testing processes for critical interoperability standards, such as C-CDA.  2. ONC will consider approving non-governmental test tools within its certification program.96  3. ONC will make an extensive set of computable data about certified health IT products publicly available on the Certified Health IT Product List (CHPL). | 4. ONC, NIST and other health IT stakeholders will provide updated testing tools in support of ONC’s Health IT certification program. | 5. ONC, NIST and other health IT stakeholders will provide updated testing tools in support of ONC’s Health  IT certification program. | Use of FHIM combined with MDHT and MDMI can make tasks 1-3 much easier to accomplish. MDHT supports the development of automated and quantifiable test processes for compliance with any standard defined in the framework. MDHT is an open-source codebase. MDHT is already used in supporting testing processes related to C-CDA. |
| H1. Milestones | 1. Clinical care providers are able to collect data elements associated with priority data domains once and use them for a variety of purposes, including sharing with individuals, sending during referrals and leveraging for quality measurement. | 2. Health-related stakeholders  beyond the clinical care delivery system, including researchers, public health, human and community-based services, are able to appropriately access  and use relevant data elements associated with priority data domains. | 3. A comprehensive testing infrastructure exists for providers to continuously test their health IT as new  components are added and old components are phased out to ensure their systems operate as expected after  implementation and to hold technology developers and  network service providers accountable. | Use of an information model like FHIM and MDHT can make this task much easier to accomplish. FHIM already aligns/harmonizes content across the federal partners, S&I Framework initiatives and standards organizations to achieve consistent meaning and representation and supports the definition of commonly comprehensible elements. MDHT publishes data elements based on content, irrespective of source formalisms, supporting the easy identification of similar data in diverse circumstances. |
| H2. Calls to  Action | 1. Technology developers should provide accurate translation and adapter services where needed in order to support priority delivery system reform and learning health system needs.  2. Public and private stakeholders should work with SDOs to define a standard approach to federated distribution of centrally maintained code sets, including ongoing support for publicly available, API-enabled repositories like the Value Set Authority Center (VSAC).  3. SDOs should advance and accelerate semantic standards for laboratory orders, other orders and other priorities for a learning health system that require updated or new semantic standards  4. SDOs should advance consumer-friendly terminologies and mappings of accepted synonyms to coded terms.  5. Research and clinical trial communities should pilot the use of priority data elements associated with priority data domains for clinical research and precision medicine.  6. Health IT users should provide feedback to SDOs and other stakeholders, including government, regarding additional data elements and/or data domains that should be prioritized for semantic alignment.  7. NLM, FDA, CDC, CMS and other stakeholders should collaborate regarding approaches to promoting laboratory information exchange (especially through the use of LOINC, SNOMED-CT, UCUM and UDIs) between in vitro diagnostic devices and database systems, including laboratory information systems and EHRs.  8. CDC should encourage development of training aids to help laboratories use LOINC for laboratory test ordering and reporting in a structured format that includes data elements necessary to meet CLIA requirements. | 9. SDOs should develop a process for maintaining compatibility across  vocabularies, code sets and value sets in new standards and new versions of existing standards.  10. HHS should provide or endorse mapping and validation tools to help systems ensure data quality across terminologies and ensure compliance with program-related audits. | 11. SDOs should follow the developed process for maintaining compatibility across vocabularies, code  sets and value sets in new standards and new versions of existing standards. | Using an information model like the FHIM and MDHT provides a single authoritative repository for storing this information. Storing the information in the FHIM makes it easier to document how the information is aligned, makes it easier to update the information to support new uses and makes it easier to share and disseminate best practices to developers and providers. Also, FHIM started using the VSAC repository about six months ago to store value sets for FHIM information domains modeled since then. MDHT defines common elements, supporting translation among diverse formalisms in support of #s 1-3. Stakeholder groups can define sets of elements of interest, supporting #s 4 & 5. A common dictionary of elements will support consolidation of feedback on elements, per # 6. The combination of the FHIM model and MDHT tools supports common understanding of elements and their vocabularies, supporting #s 9-11. MDHT and FHIM provide ONC with both the governance process and the asset repository for aligning elements and their terminologies. |
| H3.  Commitments | 1. ONC will promote and participate in collaborative processes to align SDOs and technology developers on the implementation and use of vocabularies, code sets, value sets and structure necessary to consistently represent and maintain the meaning of data elements associated with priority data domains across systems. | 2. ONC will continue to promote and participate in collaborative processes to align SDOs and technology developers on the implementation and use of  vocabularies, code sets, value sets, and structure necessary to consistently represent and maintain the meaning of priority data elements associated with  priority data domains across systems. | Commitments will depend on what the health IT ecosystem needs are as we move towards the 10-year  timeframe. | Use of an information model like FHIM can make this task much easier to accomplish. FHIM already aligns/harmonizes content across the federal partners, S&I Framework initiatives and standards organizations to achieve consistent meaning and representation. |
| I1. Milestones | 1. By the end of 2017, SDOs align semantic standards (vocabulary, code set, value set, and structure where applicable) across electronic health information format standards with semantic standards adopted in ONC’s 2015 Edition for priority data domains and associated data elements (see Figure 7 in H. Consistent Data Semantics). | 2. By the end of 2020, SDOs agree on semantic standards (vocabulary, code set, value set, and structure where applicable) for priority data domains and associated data elements not defined in ONC’s 2015 Edition and align to those standards across electronic health information format standards. | 3. As new format standards are developed, SDOs  ensure harmony across all format standards, particularly for the priority data domains and associated data elements. | Use of an information model like FHIM can make this task much easier to accomplish. FHIM already aligns/harmonizes content across the federal partners, S&I Framework initiatives and standards organizations to achieve consistent meaning and representation. The FHIM model and its bindings to VSAC-defined value sets provide a forum in which SDOs can align semantic standards, and for informing the creation of new standards already in alignment with the standards of the realm. |
| I2. Calls to  Action | 1. SDOs, in coordination with ONC, should work together to align semantic standards (vocabulary, code set, value set, and structure where applicable) across health information format standards (starting with HL7 v2, C-CDA, QRDA, FHIR, and NCPDP SCRIPT) with semantic standards adopted in ONC’s 2015 Edition for priority data domains and associated data elements.  2. Provider and patient-facing technology developers should update their products and services to use format standards identified in ONC’s most recent finalized Interoperability Standards Advisory, starting with the most recent version of C-CDA.  3. States and other stakeholders across the ecosystem should further explore and determine the role that NIEM can serve in supporting health information interoperability across domains such as human services and justice.  4. SDOs and stakeholders should document best practices and guidance on methods for exchanging unstructured health information, such as physician notes, in an interoperable manner.  5. Technology developers and providers should use best practices and standardized methods for exchanging unstructured health information, such as physician notes, in an interoperable manner.  6. SDOs and ONC should identify necessary updates to format standards (HL7v2, C-CDA, QRDA, FHIR and NCPDP) to ensure priority data domains are not only required in those standards, but are also represented consistently across format standards.  7. ONC, NIST, CMS, CDC and FDA should collaborate to advance laboratory data interoperability, including specifications to ensure compliance with CLIA, state and local quality laboratory regulations. | 8. SDOs, in coordination with ONC, should work together to agree on semantic standards (vocabulary, code set, value set, and structure where applicable) for priority data domains and associated data elements not defined in ONC’s 2015 Edition and align to those standards across health information format standards.  9. SDOs should develop a process for maintaining compatibility across new format standards and new versions of existing standards.  10. Technology developers should implement updated format standards that reflect aligned semantic standards.  11. Technology developers and SDOs should work together to provide guidance on appropriate rules and testing for generating structured data from native unstructured data. | 12. Technology developers  should continue to  implement updated  format standards that  reflect aligned semantic  standards. | Using an information model like the FHIM provides a single authoritative repository for storing this information. Storing the information in the FHIM makes it easier to document how the information is aligned, makes it easier to update the information to support new uses and makes it easier to share and disseminate best practices to developers and providers. The FHIM provides a commonly accessible repository to support the use of harmonized elements in new standards, including C-CDA and NIEM packages, as well as tooling to record element definitions in a computable format. |
| I3.  Commitments | 1. ONC will promote and participate in collaborative processes to align semantic standards across format standards to consistently represent and maintain the meaning of data elements associated with priority data domains across systems. | 2. ONC will continue to promote and participate in collaborative processes to align semantic standards across format standards to consistently represent and maintain the meaning of data elements associated with priority data domains across systems. | Commitments will depend on what the health IT ecosystem needs are as we move towards the 10-year  timeframe. | Use of an information model like FHIM can make this task much easier to accomplish. FHIM already aligns/harmonizes content across the federal partners, S&I Framework initiatives and standards organizations to achieve consistent meaning and representation. FHIM activities include, as part of data element definition, identification of value sets sufficient to support these elements in all known use cases and standards specifications. The FHIM has already drafted semantic bindings for eight clinical domains with the participation of federal partner agencies and continues to advance.  The broader the agency (and other organization) participation and the more feedback from early adopters the better the FHIM content will become. |
| J1. Milestones | 1. Certification approaches that encourage the adoption of specific APIs or consistently functioning APIs in a manner that does not prevent the adoption of innovative new APIs are developed and implemented by ONC and other industry stakeholders. | 2. More than 50% of technology developers provide access to electronic health information through standard, public APIs. | 3. More than 75% of technology developers provide access to electronic health information through standard, public APIs. | Use of FHIM combined with MDHT and MDMI can make this task much easier to accomplish. MDHT supports the definition of APIs for general consumption and specification testing without binding the data definitions to any specific implementation. Future APIs can be defined using the data requirements already defined. |
| J2. Calls to  Action | 1. SDOs, through efforts such as the Data Access Framework (DAF), Argonaut Project and HEART initiative should provide technology developers with profiles, reference implementations, and implementation guides (IGs) to standardize APIs for querying  and retrieving priority data elements such as a C-CDA document and as discrete data elements.  2. Technology developers should implement standard APIs from the DAF, HEART and Argonaut projects and make them publicly available.  3. Technology developers should work with SDOs to develop standard APIs for interoperable medical devices.  4. ONC, NIST, CMS, CDC and FDA should collaborate to advance laboratory data interoperability, including the establishment of requirements for common application programming interfaces (APIs) that meet CLIA requirements for laboratory test ordering and reporting. | Calls to action will depend on what the health IT ecosystem needs are as we move towards the six-year timeframe. | Calls to action will depend on what the health IT ecosystem needs are as we move towards the 10-year  timeframe. | Use of FHIM combined with MDHT and MDMI can make tasks 1-4 much easier to accomplish. MDHT can help generate standard APIs. Once an API is defined, MDHT can produce computable realizations of the API that use data definitions documented for any API. If the data changes, the API changes, reflecting the requirements baked into its implementation. Tasks 1-4 primarily refer to FHIR and C-CDA implementations and MDHT can certainly help with both through supporting profiles and map generation from the FHIM that describes the efforts today. FHIM and MDMI can support some of these efforts by providing clarity across the multitudes of profiles. MDHT can be used to generate profiles. |
| J3.  Commitments | 1. ONC will support implementation of new API requirements in certification by working with industry stakeholders to develop and disseminate best practices and technologies to ensure that existing and emerging APIs facilitate interoperability in a secure way. | Commitments will depend on what the health IT ecosystem needs are as we move towards the six-year timeframe. | Commitments will depend on what the health IT ecosystem needs are as we move towards the 10-year  timeframe. | Use of FHIM combined with MDHT and MDMI can make this task much easier to accomplish. MDHT will support the publication of APIs in a form that supports iterative testing as well as compatibility with other APIs defined on the same requirements. |