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Interoperability Roadmaps

Compare and Contrast Summary

HIMSS Interoperability & Standards Committee

September 2015

Contents

Introduction

The HIMSS Interoperability & Standards Committee convened a workgroup to analyze existing and planned industry-wide interoperability roadmap efforts. The workgroup developed a matrix (Appendix: Interoperability Roadmap Matrix) and this corresponding summary document in order to appropriately compare and contrast the interoperability roadmaps published by the Office of the National Coordinator (ONC), The JASON Report by the MITRE Corporation, eHealth Initiative (eHI), and the Electronic Health Record Association (EHRA). The purpose of this effort is to provide ongoing visibility into current and emerging interoperability roadmaps and pathways as well as to provide HIMSS members a way to understand the key domains, or pillars, that make up the various roadmaps. This deliverable contains the workgroup's observations, including the similarities, differences and gaps, between the various roadmaps and the identified key domains.

Domain Focus

The key domains of focus for the compare and contrast matrix includes:

• Open Architecture	• Patient Centered Care	• Federal & State
• Infrastructure	• Patient Engagement	• Meaningful Use
• Vendor Neutral Applications	• Privacy & Security	• Research
• Data Aggregation	• Market Flexibility	• Incentives & Outcomes
• Data Exchange	• Private Sector	• Quality

Discoveries

All four roadmaps consistently address both the public and private sectors. The areas of focus-include input from public and private entities, clinical stakeholders, data exchange partners and organizations leading interoperability efforts. The goals of the roadmaps focused on building on existing infrastructure, defining progress measurements, developing a learning health system, ensuring privacy and security protections, defining costs and benefits, and leveraging the market. While each roadmap identifies a path forward to improve interoperability, there are gaps and inefficiencies that remain unresolved. Closing these gaps should include progress measurements, migrations of our healthcare system from a fragmented healthcare environment to a linked environment that engages patients in a

closed loop of care, state and federal regulations that align to enable data sharing across state borders, and investment and innovation that leverage and build upon the current market.

Data Standards

In order to foster a successful "learning health system" the industry should come to consensus on consistent standard data formats and interpretations of that data. This standardization should consider both primary and secondary data requirements. The ONC will annually compile a list of the best available standards and deem that SDOs should continue to maintain and improve upon these standards. In their roadmap, the eHI confirms their support of SDO management of standards development while ensuring involvement from the private sector. While the ONC has outlined critical actions for these consistent data formats and semantics, the eHI roadmap summarizes the building of consensus as a long-term goal. The EHRA roadmap and the JASON report focus more on the advancement of open APIs, which use existing standards; however, there is still an opportunity for improvement and further development of data standards. The ONC roadmap addresses the questions that eHI presented for data element needs. There is an overwhelming agreement that a common clinical data set based on a common taxonomy must be a near term goal and that ONC should provide guidance and sponsorship around a collaborative effort for this definition. Additionally, there is a recommendation from each of the roadmaps for moving from document-based standards to granular data element sharing with clear data provenance.

Infrastructure

Among the reviewed roadmaps, there was consensus to build upon the existing infrastructure with emphasis on using DIRECT-based capabilities, and push and query based transactions. Governance of this infrastructure should be non-government with local entities playing a more active role in data exchange solutions. The need for market coordination of technical, policy, legal, business and socio-technical issues to support the change would be essential for this robust infrastructure. One of the key points underscored by each of the roadmaps is the need to use and build upon the existing infrastructure. Part of the existing infrastructure includes healthcare information exchanges (HIE). In FY15, the HIMSS Interoperability & Standards and HIE Committees conducted a nationwide survey on Direct messaging to learn how the marketplace is using DIRECT infrastructure to facilitate health information exchange. The survey results and infographic provide insight into the use, benefits and challenges of DIRECT infrastructure in HIEs.

Patient Centeredness and Engagement

One noted goal, which emphasizes the push for consumer driven solutions for data interoperability, is a public campaign to provide awareness of a nationwide interoperable ecosystem. Coordination and collaboration among all healthcare settings are prerequisites for consumers to be able to manage their care with the associated healthcare teams. This would include access to in home-based settings and community based care settings as well as small and large providers. There is no doubt that a primary goal is for individuals to play a significant role in making informed decisions about their care. Education to enrich patient centered care will require support from appropriate tools, technology and data exchange services.

Certification Programs

There is some discrepancy as to whether the current certification programs provide efficiencies in moving interoperability forward. All four roadmaps reached a similar consensus that certification programs need to be further developed and frequently updated to reflect the best implementation guidelines. Current and future certification bodies should continue to develop plans, processes, and tools for the industry. One of the challenges of future certification processes is the uniform exchange of data and data specifications between the multitude of vendor products and across various care settings. This alignment is critical for the trust and confidence from all stakeholders.

Incentives & Outcomes

Appropriate incentives must continue to align data sharing. Incentives for long-term care, behavioral health and a clear focus on business and clinical drivers will help align data sharing across the continuum of care. Pilot projects will enhance the development of these alignments and help to reinforce government incentives for these areas. These funding and policy levers must echo the demand for clinical data from businesses and consumers. It would be ideal to pilot market-based solutions for interoperability, which would simulate “real-life” scenarios for the exchange and use of data. This underscores the need for broader participation in meaningful use cases that will drive exchange. Some of those use cases may emerge from secondary data uses.

Quality

Quality measures should be supportive of public health functions, case reporting, disease surveillance and disaster response. A driver of quality from a national landscape perspective is payment reform. Payment reform will require data aggregation for a value-based payment that rewards higher quality

care. Additionally, population health management and internal quality improvement within provider organization's processes is important for quality outcomes to be realized. Tactically there are a number of challenges discussed within all four roadmaps. Workflows need to be re-evaluated to ensure that communication channels, both internal and external, are adequately coordinated to meet quality metrics as well as adhere to new value-based payment models. An emphasis on standardized data to lessen the impact of qualitative and quantitative initiatives is essential.

Privacy & Security

Each of the roadmaps addressed privacy and security at a high level but avoided providing extensive details for this highly complex domain. Cybersecurity and encryption are currently work-in-progress domains. Creating appropriate regulations to address these issues is included as a necessary short-term action by all four roadmaps. ONC provided extensive, detailed commentary regarding privacy and security considerations. All of the roadmap documents accentuated the importance of addressing issues around privacy and security in order to advance interoperability. Near-term considerations included recommending consistent standards for data at rest and data in transit, although some standards for data were previously identified under Meaningful Use Stage 2. Data provenance at the document level should be addressed today, and at the data element level in the future. Creating consistent laws and regulations about data sharing between states or an overarching federal framework could pose as a more challenging and time consuming task. The EHRA identified the need for an application independent single sign-on solution (SSO) versus each vendor or organization needing to solve the multi-factor authentication problem independently. Requiring consistent levels of security across all devices used in healthcare is critical.

Conclusion

Based on the four roadmaps evaluated by this workgroup of the HIMSS Interoperability & Standards Committee, the near term interoperability goals of the various organizations are relatively consistent. The long-term goals vary in their emphasis and timing but *all* the roadmaps require the engagement of *all* stakeholders and put forth a call to action to make the necessary changes. Collectively, these roadmaps provide the industry with the path for moving to the next milestone with the ultimate realization of achieving a nationwide learning health system. A directive to improve coordination in the public and private sectors and an emphasis on the importance of input from all stakeholders are commonalities among all the roadmaps. The maturation of current standards and education about their use is significant for enabling a true interoperable data-sharing ecosystem.

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Appendix: Interoperability Roadmap Matrix

HIMSS Interoperability & Standards Committee - Interoperability Roadmaps Comparison 2015

	eHI Initiative 2020 Roadmap – Part 1	The JASON Report v2	ONC Interoperability Roadmap	EHRA Roadmap
Main Information				
Author Information	eHealth Initiative 818 Connecticut Avenue, NW, Suite 500 Washington, DC	JASON The MITRE Corporation 7515 Colshire Drive McLean, VA 22102-7508	The Office of the National Coordinator for Health Information Technology	HIMSS Electronic Record Association
Publication Date	October 2014	November 2014	January 2015	March 2009 Commentary on JASON Task Force January 2015 Anticipated Proposed Roadmap for 2015
Sectors Addressed	All (Administration, Congress, Private)	All (Administration, Congress, Private)	All (Administration, Congress, Private)	All (Administration, Congress, Private)
Areas of Focus	Business Clinical Interoperability Data Access and Use	Non Profit organizations Interoperability Data and use (data exchange) Modification to regulatory environment	Federal State Private	Actionable Realistic Plan Build upon the real-world achievements to date
Timeline	2020	Follows ONC 10 year vision (2015-2024)	2015 - 2024	2015-2020
Intended Audience	Multi-Stakeholder	Multi-Stakeholder	Multi-Stakeholder	Multi-Stakeholder
Publication Link(s)	eHealth Initiative 2020 Roadmap: https://www.ehidc.org/pages/resources%2F2020Roadmap	A Robust Health Data Infrastructure: http://www.healthit.gov/sites/default/files/ptp13-700hhs_white.pdf	ONC 10-year Vision: http://www.healthit.gov/sites/default/files/ONC10yearInteroperabilityConceptPaper.pdf A Shared Nationwide Interoperability Roadmap: http://www.healthit.gov/sites/default/files/nationwide-interoperability-roadmap-draft-version-1.0.pdf	2015-2020 Roadmap slide deck: http://www.ehrassociation.org/docs/EHRA%20Interoperability%20Roadmap%20and%20Response%20to%20Jason%20Task%20Force-Final.pdf EHRA Response to the ONC Roadmap: http://www.himssehra.org/docs/EHRA%20Response%20to%20ONC%20re%20Interoperability%20Roadmap.pdf Previous Roadmap (2009): http://www.himssehra.org/docs/EHRA_InteroperabilityRoadmap_20090310_v3.pdf

	eHI Initiative 2020 Roadmap – Part 1	The JASON Report v2	ONC Interoperability Roadmap	EHRA Roadmap
Commentary Links		http://motorcycleguy.blogspot.com/2014/04/right-almost-by-accident-jason-report.html		http://www.himssehra.org/docs/EHRA_Statement%20re%20Interop%20PR_Final.pdf
Goals	- Public education campaign about nationwide interoperable ecosystem - Define costs/benefits Identify/Prioritize Use Cases Gaps/Efficiencies of Infrastructure - Compile Resources for state consent and privacy laws Alignment of regulatory with non-regulatory approaches - Progress Measurements (Timelines and Action Steps)	Migration from a linear healthcare environment to a closed loop environment that migrates from healthcare of an individual to the health of individuals by development of a "full learning" healthcare eco-system	The ONC's plan has nine guiding principles: 1. Build upon existing health IT infrastructure 2. One size does not fit all 3. Empower individuals 4. Leverage the market 5. Simplify 6. Maintain modularity 7. Consider the current environment and support multiple levels of advancement 8. Focus on value 9. Protect privacy and security in all aspect of interoperability 10. Scalability and Universal Access	
Standards	- Supports universal data elements. - Minimum data requirements identified with ONC collaboration. Support for consensus based standards from both government and private sectors.	- Open API's - Follow the advice of ONC 10 year vision, Jason 2013 report and other reports that have been issued	1. Consistent Data Formats and semantics: Common formats are the bedrock of successful interoperability in a learning environment: Systems that send and receive information may or may not store standard values natively and therefore may rely on translation services provided at various points along the way 2. Standard, secure services: Services should be modular, secure and standards-based wherever possible 3. Consistent, secure transport technique(s): The fewest number of protocols necessary to fulfill the needs of learning health system participants is most desirable 4. Accurate identity matching: Whether aggregated in a repository or linked learning health system evolves, more than individual/patient-specific information from	- Accelerate FHIR® profile definitions to enable consistent implementation of interoperability and avoid one-offs - Reliable resource location: The ability to rapidly locate resources, including individuals, APIs, networks, etc. by their current or historical name

	eHI Initiative 2020 Roadmap – Part 1	The JASON Report v2	ONC Interoperability Roadmap	EHRA Roadmap
			health records will be matched and linked, including provider identities, system identities, device identities and others to support public health and clinical research Reliable resource location: The ability to rapidly locate resources, including individuals, APIs, networks, etc. by their current or historical name	
Key Characteristics				
Open Architecture	Support for public APIs	Public API's	- Standardized APIs (not just published vendor APIs) with modular service-oriented architecture health IT developers, SDOs, ONC and others should implement a coordinated approach to developing and standardizing a targeted set of public APIs for nationwide interoperability (SOA) - ONC and other certification bodies should develop approaches through certification that encourage the adoption of specific APIs or consistently functioning APIs - SDOs should advance and accelerate the development of standardized RESTful APIs	- Support for open APIs including FHIR - Support for building upon what is in use today, HL7 V2 Message, SOAP Services with CDA (IHE-XCA/XDS) - Different use cases may require different APIs - Coordinated Architecture to avoid silos - Use of three-phased approach 2015 -> 2020
Infrastructure	- Connection of all exchange service networks. - HISP to HISP connections and freely available provider directories. - Increase Direct-based capabilities, push and query-based transactions	Follow Jason 2013 model and build upon that model to develop a robust infrastructure that interoperates and allows for closed loop learning; infrastructure should be agnostic and robust.	- Build from existing health IT infrastructure non-government governance, states should play a more active role in developing their infrastructure for exchange - Supportive business, clinical, cultural and regulatory environments - Privacy and security protections for health information - Certification and testing to support adoption and optimization of health IT products and services	Rate-limiting, non-technical factors, as well as more formalized structures and processes for market coordination of technical, policy, legal, business and socio-technical issue need to support the change.

	eHI Initiative 2020 Roadmap – Part 1	The JASON Report v2	ONC Interoperability Roadmap	EHRA Roadmap
			- Core technical standards and functions	
Vendor Neutral Applications	Promote growth in this area for data access and aggregation.		Explicitly Listed as Vendor Neutral: 1. Ubiquitous, secure network infrastructure 2. Consistent, secure transport technique(s)	
Data				
Data Aggregation	Data must be standardized for use with primary and secondary purposes.		Technology developers should deploy innovative aggregation platforms and tools that allow individuals and caregivers to receive and compile health information from multiple sources in one place, send their data to a destination of their choice and find and use the information they need.	
Data Consumption	Data must be available to patients across the continuum of care regardless of location or institution.		- The right data available to the right people at the right time among disparate products and organizations in a way that can be relied upon and meaningfully used by recipients as well as the calculation of electronically specified clinical quality measures (eCQMs) - Creation of RESTFul web services (APIs) for accessing public information that will allows system to system connectivity and make the NPPES data easier to use by both the public and internal resource for HHS and CMS	
Data Exchange	Open, secure, standards-based exchange that has demonstrated value. Determine the granular data control that patients should/could have and cost/benefit analysis of such an approach.		1. Consistent data formats and semantics 2. ONC will annually publish and update a list of the best available standards and implementation guides supporting interoperability in order to enable priority functions in a learning health system, 3. Secure, standardized, modular services 4. Accurate individual data matching, preventing fragmentation and erroneous consolidation of information	- National programs should pull back on functional requirements and focus on interoperability and innovation. - Believe that document-based queries and exchanges will be important, as well as messages and services

	eHI Initiative 2020 Roadmap – Part 1	The JASON Report v2	ONC Interoperability Roadmap	EHRA Roadmap
			5. Reliable resource location, including individuals, APIs, networks, etc.	
Research	Assist researchers in developing evidence-based advances and the global data transfer for purposes of research.		Nationwide learning health system An array of interoperable health IT products and services that support continuous learning and improved health data aggregation for research Innovation and Generation of New Knowledge and Evidence for research	Research queries should not be considered fundamental.
Public Health	Support for public health surveillance and long term population health goals.	Support for public health and inclusion into closed loop ecosystem	Protect and promote public health and healthy, resilient communities Public health agencies should converge on the use of standardized web services to support data submission as well as data query from registries and other systems Requiring health information exchange infrastructure as a public health conduit	
Guiding Principles				
Patient Centered Care	Facilitate collaboration and coordination among providers in different clinical settings. Patients should have easy electronic access to their data regardless of healthcare location or organization.	More focused on health of individuals and not individual patients; need for health and wellness data to link/coordinate with care data and precede societal outcomes.	Person-centered health which will be transformed by an increasing number of care and services provided through community and home-based services needs to be a greater focus on incorporating patient-generated health data and ensuring the availability of tools for individuals to use this information to manage their health and make more informed health-related decisions.	
Patient Engagement	- Highly usable technologies and solutions that are personalized, socially networked, support patient-reported data and customized to an individual's unique genetic profile. - Consumers must consider the sharing of health care data to be a vital component in their care and that it	Patient is responsible for the management of their information, which is brought out in discussions of PHR and EHR's and need for linkage.	- Ability of individuals to access and use their health information electronically and to contribute health information about themselves serves as one of the cornerstones of nationwide efforts to increase individual engagement team-based care, strong care coordination and effective patient engagement are	

	eHI Initiative 2020 Roadmap – Part 1	The JASON Report v2	ONC Interoperability Roadmap	EHRA Roadmap
	increases the quality and effectiveness of healthcare. - Patient-consumers are engaged in making informed decisions and actions along with their healthcare providers thus creating a shared, team approach to their care plan.		fundamental to an efficient care delivery system. - Support growth of eHealth	
Privacy & Security	- Require secure interoperable systems. - There is a need to determine and resolve the variations in state privacy laws. - Data access and use must include consumer confidence in the privacy and security of their personal health data. - Consumers must also be assured that appropriate consents are acquired for the use of their data. - Organizations must have policies and procedures to protect the integrity, security and confidentiality of information. - Develop national, stakeholder supported Data Breach Policy Guidebook and Trust Framework.	Requires a secured environment and encryption of data at rest and in transit.	Clarify privacy and security requirements that will enable interoperability Covered Entities (CE) and Business Associates (BA) must have consistent understanding of the HIPAA rules and requirements HHS Office for Civil Rights can assist with this: 1. Ubiquitous, secure network infrastructure 2. Updated Security Risk Assessment tool 3. Promote and enhance the establishment of a single health and public health cybersecurity Information Sharing and Analysis Center finalize and publish the NIST Critical Infrastructure Cybersecurity Framework and Health Insurance Portability and Accountability Act (HIPAA) Security Rule Crosswalk 5. Uniform approach to enforcing cybersecurity in healthcare 6. Develop "at rest" standards for data encryption 7. Develop "in transit" standards for data encryption 8. establish common identity proofing practices at the point of care; require multi-factor authentication for all patient and provider access to health IT	- Has been largely addressed and should remain a high priority. Need approaches that are consistent across the various standards and implementation guides. - Privacy and security protections should apply to all system components involved in the Interoperability use case, not only to the EHRs, thus the Roadmap should clarify that the scope includes non-EHR system components. - Data provenance must not only be addressed to support personal choice (associate individual choice with data provenance), but to enable sufficient context for other uses as well. - Address data provenance and the ability to communicate this consistently across all potential use cases to substantially address this barrier. - Data provenance for documents is the best starting point where much experience exists. Then, in a second step, we should further deepen provenance for discrete data. - There is extensive variation across states with respect to the permission to collect, share, and use Identifiable health information. - Reducing such variations will reduce the costs

	eHI Initiative 2020 Roadmap – Part 1	The JASON Report v2	ONC Interoperability Roadmap	EHRA Roadmap
			systems in a way that aligns with what is required in other industries Based on FIPPS	of interoperability and simplify the management of trust frameworks to enable consistent, patient consent-based exchange of clinical data. - While not isolated to the healthcare industry, training and education need to be included to change behavioral and cultural understanding of the relevance of cybersecurity risks. - The decision to encrypt data at rest should be based on threat analysis. It is important to differentiate between data at rest on mobile and removable devices (i.e., high risk) and data at rest in fixed secured facilities (i.e., lower risk). In each case, the value of encryption as a security control is limited to providing protection from direct media access but provides little or no protection from improperly accessed applications or hacked user accounts. - We are concerned with the approach taken to an identity proofing process that requires that at least one of the two forms of identification must be a government-issued form of identification. The examples used may not be available to all, or be in a category that has limited support (e.g., social security number). However, utilizing a national unique identifier or other privately- managed unique identifier should be considered part of the authentication process, as well as other methods consistently used in other industries - Harmonization of standards is needed;

	eHI Initiative 2020 Roadmap – Part 1	The JASON Report v2	ONC Interoperability Roadmap	EHRA Roadmap
				however, lacking is any reference to SSO standards so that providers and patients can use one set of credentials and provide seamless integration of services. More research and discussion is needed. In a learning health system, providing seamless integration implies that the role of user authentication is not an application-specific requirement (such an EHR), but a system-level requirement that relies on external authentication systems/standards such as an enterprise LDAP systems, SAML, OAuth 2, OpenID HEART, and others.
Accreditation, Certification & Testing	Continue to develop plans, processes and tools for the industry.		1. ONC, NIST and other health IT stakeholders will provide testing tools necessary to support the criteria in ONC's certification program 2. ONC's desire to expand the scope of the certification program to support health IT used in a broader set of health care settings 3. ONC will annually publish and update a list of the best available standards and implementation guides supporting interoperability 4. "Provider and patient-facing technology developers will update their systems to align with the list of the best available standards	Disagree that certification in its current form is essential to make progress Current program does not achieve more efficient and effective strategies
Flexibility for Market	Interoperability will develop at different rates and in different ways across the market		In a country as large and heterogeneous as the U.S., it is not realistic to suggest that all health information needs will be met with a single electronic health information sharing approach. However, the health IT ecosystem must evolve to address each of these barriers in a lasting and meaningful way to achieve a learning health system market-based network development is critical to the achievement of nationwide interoperability Leverage the market. Demand for	Market-based approaches should drive the movement

	eHI Initiative 2020 Roadmap – Part 1	The JASON Report v2	ONC Interoperability Roadmap	EHRA Roadmap
			interoperability from health IT users is a powerful driver to advance our vision	
Private Sector Engagement	There is a need to define additional use cases and champions from the private sector to help drive development in interoperability. This will also help to identify the role of the private sector in this effort. The private sector would ideally be more engaged in testing, standards development and solutions to current challenges.	Engagement of non-profits to assist in development of broader information and robust model.	Public and private sectors must work together to identify and address operational issues that currently inhibit interoperability public and private sectors also must establish a mechanism for compliance and accountability to governance criteria.	Market-based exchange architecture needs to have clear governance and must be anchored in the broad stakeholder community to decide what is truly fundamental.
Government: Federal & State	Use of government purchasing power, certification requirements, levers of support. Government should continue to guide the industry and define benchmarks and building blocks to measure success against. Require compliance with ICD-10 by October 2015. Continue to understand how to accurately match data/patients. Evaluate frameworks and guidance from industry federal agencies.		Need for a common set of policies that can transcend to universal sharing need economic incentives to be provided by commercial payers.	Government should focus on establishing standards that will enable clear and common communication while having market-driven approaches drive growth in interoperability.
Meaningful Use (MU)				
MU Stages 1-2-3	Support for an extended period of time between MU2 and MU3. Leverage other innovative incentive models created by medical societies, boards, and other groups.	No real discussion but focus on MU 3.	No direct discussion, focused on using meaningful use to drive interoperability and patient centered care.	Align MU program to focus on expanding interoperability through the use of Public APIs. MU Stage 3 is too aggressive. Need piloting steps.
Performance				
Incentives & Outcomes	Design incentives to reduce inappropriate variations. Outcome measures should follow the direction of care, from individual point of care to population health.	Recommends that reimbursement benefits be provided to organizations that utilize an eco-system friendly EHR.	- Motivating the use of those standards through appropriate incentives aligning payment and other levers to advance and sustain a durable interoperable ecosystem enhance incentives for sharing electronic health information according to common technical standards, starting with a	- Offer incentives for interoperability - New governance: Market-Led "real" pilot projects recognized by ONC/CMS for MU and other incentives.

	eHI Initiative 2020 Roadmap – Part 1	The JASON Report v2	ONC Interoperability Roadmap	EHRA Roadmap
			common clinical data set - Migrate policy and funding levers to create the business imperative and clinical demand for interoperability and electronic health information exchange	
Reporting				
Quality/MU	Support for quality and health status measures that are consistent however the burden needs to be lowered and focus re-aligned to critical measures.		An interoperable health IT ecosystem should support critical public health functions, such as real-time case reporting, disease surveillance and disaster response, as well as data aggregation for research and value-based payment that rewards higher quality care, rather than a higher quantity of care.	