AIRA
AMERICAN IMMUNIZATION REGISTRY ASSOCIATION

IIS 3.0: 2021 AIRA National Meeting Roundtable Discussions

Summary Report

SEPTEMBER 2022

IIS 3.0: 2021 AIRA National Meeting Roundtable Discussion Summary

Table of Contents

Executive Summary

The purpose of this report is to summarize findings from the IIS 3.0 roundtable discussions at the 2021 AIRA National Meeting. Nearly 80 individuals participated in these discussions, held on August 5, 2021. The goal of the session was to gather input from the immunization information systems (IIS) community about the future of IIS to help inform a shared vision for development moving forward.

The roundtable format encouraged participants to self-select from six topics for further discussion: technical infrastructure; interoperability and FHIR messaging; data access, use and analytics; data quality; provider site management; and consumer access/vaccine credentialing. Table facilitators led participants through discussion of these topics using the strengths, opportunities, aspirations, and results (SOAR) framework.

This report summarizes discussion themes across the six topic areas and by SOAR categories. The following overarching strengths, opportunities, and aspirations/results were noted as themes throughout the session.

Strengths

- Strong engagement with provider organizations
- The extent of and progress made on:
    - Standards-based data exchange interfaces
    - Data quality improvement
    - Consumer access

Opportunities

- Improved technical infrastructure to support increased messaging volumes
- Increasing knowledge of FHIR and how FHIR can support immunization data exchange
- Improved provider organization identification and management
- Further analysis of IIS data to examine provider immunization practices
- Continued data quality improvement
- Expansion of consumer access/vaccine credentialing

Aspirations/Results[1]

- Functionality and data to support needs
- Coordination across partners
- FHIR as a messaging standard
- Automated processes
- Improved provider identification and management
- Improved IIS data quality and increased use of IIS data

[1] Given similarities in participants' discussion of the aspirations and results categories within the SOAR framework, notes from these were combined.

- Awareness of and advocacy for the value of IIS

In addition, several cross-cutting themes emerged in discussions across the topic areas. Participants cited a need to revisit privacy, confidentiality, and data governance given changes in the landscape (increased consumer access, data sharing with CDC, interjurisdictional exchange); a need to reduce manual processes; and a need for clarification of the future role of Health Information Exchange (HIE) in support of immunization data exchange. Finally, participants highlighted the value of AIRA guidance in supporting IIS activities. Specific requests included guidance on IIS technical infrastructure, working with EHR vendors and EHR products, and data quality standards.

Throughout this session, participants shared their perspectives on strengths to build on, and opportunities to explore to reach, aspirational goals and demonstrate tangible results regarding the future state of IIS. These findings support further IIS community discussions on the vision for IIS and identification of action steps to achieve this vision.

Introduction and Background

In August 2021, AIRA convened its 2021 National Meeting in Portland, Oregon, with some participants meeting onsite and others attending virtually. A total of 468 individuals participated, including 187 in-person attendees and 281 virtual attendees. Between in-person and virtual attendees, 50 of the 64 IIS jurisdictions (78%) were represented.

During the last day of this hybrid event, AIRA facilitated roundtable discussions on the future state of IIS, informally referred to as "IIS 3.0." The session was designed to gather information from the IIS community about their vision for the future of IIS. The National Meeting provided an opportunity to gather this feedback at a critical moment in time for IIS and public health. Given the elevated role of IIS in supporting response to the coronavirus pandemic and the related stressors placed on IIS, the discussion and feedback can inform vision-setting for IIS moving forward and plant seeds for downstream conversations. *This summary was generated after the meeting to document and share information gathered at that point in time.*

Roundtable discussions were organized according to the strengths, opportunities, aspirations, and results (SOAR) model. Like a SWOT analysis[2], SOAR strives to be forward-thinking to address the potential of the industry or organization. SOAR categories and their corresponding definitions are outlined below.

- **Strengths:** Encompasses areas where the community is strong and progress can be made
- **Opportunities:** Comprises areas for potential growth and possibilities for change
- **Aspirations:** Demonstrates what the industry or organization wants to be doing and whom it wants to serve; includes vision for the future
- **Results:** Defines the methods of identifying and tracking progress

Using the SOAR model as a framework for dialogue, topics of discussion included:

- Technical infrastructure (cloud hosting, hardware/software, processing power, etc.)
- Interoperability and FHIR messaging (HL7, standards, EHR-IIS interactions, etc.)
- Data access, use, and analytics (payor/large-provider access, data visualization, etc.)
- Data quality (business rules, implementation of protocols, etc.)
- Provider site management (facility identification, onboarding, enrollment, etc.)
- Consumer access/vaccine credentialing (patient access, digital credentials, QR codes, etc.)

Methodology

Participants in the IIS 3.0 session included in-person AIRA National Meeting attendees. Nearly 80 individuals participated in the discussions, including pre-selected moderators and note-takers. The session was organized around two 20-minute discussion periods.

[2] Used for strategic planning purposes, a SWOT analysis assesses internal and external strengths, weaknesses, opportunities, and threats.

During each these periods, participants were invited to self-select to a table to discuss a topic of interest. Between the discussion periods, participants were invited to change tables to discuss a different topic or discuss the same topic with other participants.

A moderator led each table using the SOAR categories as a framework to guide the conversation. Note-takers at each table recorded notes from the conversation using a provided template that aligned with the SOAR categories. The note-taking template also included an "everything else" section to record comments that did not fit within the SOAR categories.

Most tables continued discussion of the first topic into the second period; a handful of participants moved to a new table for round two. Overall, there were a total of 10 tables over the two discussion periods, with only two tables switching topics for round two. Tables averaged 8 participants (range: 6-11), including the moderator and note-taker. Table 1 shows the breakdown of tables and participants by topic.

Table 1: IIS 3.0 topics, tables, and participants

Topic	Round 1 No. of Tables	Round 2 No. of Tables	Total Tables (both rounds)	Total Discussion Participants[3]
Data Quality	3	4 (3 continued, 1 new)	7	31
Consumer Access	2	2 (continued)	4	20
Provider Site Management	2	1 (continued)	3	14
Interoperability/FHIR	2	1 (continued)	3	16
Technical Infrastructure	1	2 (1 continued, 1 new)	3	12
Data Access, Use, and Analytics	0	0	0	0

[3] Note the total number of discussion participants in this column is greater than the total number of session participants, as individuals who switched topics are counted twice.

To create this summary report, two AIRA staff members reviewed and analyzed the IIS 3.0 session notes and combined notes across topic areas. Comments were re-sorted, as needed, by topic area and within SOAR categories. Text was analyzed for key words and common themes. Given similarities in participants' discussion of the aspirations and results categories within the SOAR framework, notes from these were combined.

Additionally, there are several limitations to note, most significantly, the light attendance at the IIS 3.0 Roundtable session. This session occurred on the morning of the last day of the in-person meeting, commonly a time of lighter meeting attendance due to early departures, etc. The session was limited to in-person attendees; virtual attendees participated in a concurrent panel discussion on vaccination verification with SMART Health Cards. Due to varying travel restrictions across jurisdictions and comfort levels in attending in-person meetings, not all IIS jurisdictions or program roles were represented in these discussions.

Results

Topic area participation

Overall, across the two discussion rounds, data quality was discussed by the most tables (7), followed by consumer access (4) and provider site management, interoperability/FHIR, and technical infrastructure (3). In terms of total discussion participants, data quality topped the list at 31, followed by consumer access (20), interoperability/FHIR (16), provider site management (14), and technical infrastructure (12). No tables/participants opted to discuss the data access, use, and analytics topic.

Overall themes by topic

Top themes across each of the discussed topic areas are noted in Table 2. These themes reflect comments relayed by a minimum of three participants. This table is intended to provide a snapshot summary of the IIS 3.0 roundtable discussions. The following sections provide additional detail on these themes and the discussion related to each topic area.

Table 2: Top themes* across topics discussed

	Strengths	Opportunities	Aspirations/ Results
Technical infrastructure	• [No themes emerged]	• Improved capacity to handle messaging volume	• Functionality and data to support needs • Coordination across partners
Interop and FHIR messaging	• Quantity of bidirectional interfaces	• Strategic use of FHIR to exchange data in new ways	• Consumer access • FHIR as an immunization

	Strengths	Opportunities	Aspirations/ Results
	between IIS and EHRs	• Increased knowledge of FHIR	messaging standard
Provider management	• Engagement with providers • Analysis and visualization of provider information	• Improved provider identification and management • Further analysis of provider immunization practices	• Analysis and use of provider data • Improved provider identification and management • More automated processes
Data quality	• Ongoing data cleanup efforts • Pandemic elevating importance of IIS data quality • System enhancements	• More accurate race/ethnicity data • Improved provider/EHR reporting • Enhanced IIS reports • Certification of additional health IT systems	• Improved IIS reports/tools • Better data quality • Utilizing new sources of information • Clearer role for Health Information Exchanges (HIEs) and IIS • Additional standards and protocols • Provider training
Consumer access/vaccine credentialing	• Consumer access features	• Data quality • Further expansion of consumer access • Security/access • Opportunities for launching consumer access	• Consumer awareness and demand • Advocacy and policy • Greater use • Better functionality • Dedicated funding/resources

*Cited by at least three participants

Technical infrastructure

The technical infrastructure topic description referenced cloud hosting, hardware/software, and processing power. In discussing this topic across the SOAR categories, participants focused on future-oriented opportunities for growth and aspirations and results characterizing a future-state reality. Table 3 provides a summary of technical infrastructure themes that emerged from the IIS 3.0 discussions. These themes are further detailed below. Individuals' paraphrased comments are also provided in Table 8 of the Appendix.

Table 3: Technical infrastructure themes* across categories

Strengths	• [No themes emerged]
Opportunities	• Improving IIS capacity to handle increased/varied volume of messaging (6)
Aspirations/Results	• Functionality and data to support evolving needs (6) • Enhanced coordination (alignment, standardization) across partners (4) • Shared infrastructure (3) • Ensure business continuity (3) • Configurable functions and agile infrastructure (2) • Reduction in manual processes (2)

*Cited by more than one participant; (#) indicates frequency

Strengths and opportunities

No themes emerged from the discussion of strengths across participants, as there were no comments that echoed one another. Rather, there were singular mentions of two perceived strengths, including movement to cloud-based solutions and vendor-based platforms.

Overall, the top-cited technical infrastructure opportunity for IIS was improving IIS capacity to handle increased and varied messaging volume. In discussing this topic, participants cited "hitting roadblocks" due to the mismatch between the volume of messages sent and re-sent by provider organizations and what the IIS could accept and handle in terms of messaging volume. One participant noted that many IIS were created more than 20 years ago and were not designed to handle "big data."

Aspirations/results

Participants were eager to discuss perspectives on aspirations and results for improved IIS technical infrastructure. The top-cited theme in this category was the ability for IIS to provide functionality and data in a way that meets evolving needs. Participants noted flexibility in getting the "right information to the right people," including public health leadership, the Vaccines for Children program, consumers, and provider organizations "that haven't normally been involved." Ensuring business continuity was a related theme,

with participants citing the "ability to operate in disaster periods," "address hiccups," and ensure "failsafe systems."

Additional themes for aspirations/results for IIS technical infrastructure included enhanced coordination across stakeholders, shared infrastructure, configurable functions/agile infrastructure, and reduction in manual processes. Discussion related to coordination across stakeholders highlighted the need for alignment across the ecosystem and looking at "both sides of the equation" (e.g., IIS and providers/data submitters) to drive standardization. Comments that were related to shared infrastructure included reference to the IZ Gateway, "unified platforms," and solutions that "allow connectivity at the national level." Increased agility to "make changes on the fly" and operate with scalable infrastructure were also cited as goals for IIS. Finally, additional comments cited the need to move away from manual processes, given these are a "number-one complaint" and "no one has time to wait."

Additional technical infrastructure suggestions and considerations

The following additional suggestions and considerations were made with regard to technical infrastructure:

- Develop guidance for IIS technical infrastructure, like the AIRA security guidance.
- Revisit privacy, confidentiality, and data governance given changes in the landscape (increased consumer access, data sharing with CDC, interjurisdictional exchange).
- Consider the design of the application database.
- "Cloud-hosted" is an ambiguous term.

Interoperability and FHIR messaging

Themes related to interoperability and FHIR messaging focused on discussion of HL7, standards, and EHR-IIS interactions. Participant conversations related to this topic area highlighted the strength of existing IIS-EHR interfaces and opportunities as well as aspirations to use FHIR-based messaging. Table 4 provides a summary of interoperability and FHIR messaging themes from the IIS 3.0 discussions, with further detail on each provided below. See Table 9 in the Appendix for participants' paraphrased comments.

Table 4: Interoperability and FHIR messaging themes* across categories

Strengths	• Number and type of connections/interfaces in place between IIS and EHRs (4) • Broadly adopted data exchange standards and standardized interfaces (2) • Collaboration/trust among exchange partners (2)
Opportunities	• Strategic use of FHIR to exchange data in new ways (4) • Increasing knowledge of FHIR among IIS and exchange partners (3)

	• IZ Gateway (2)
Aspirations/Results	• FHIR as a standard in the immunization space (3) • Consumer access (3) • Provider follow-up on errors (2) • FHIR to support more efficient exchange (2) • Transition to FHIR: greater use, HL7 backwards compatibility (2)

*Cited by more than one participant; (#) indicates frequency

Strengths and opportunities

The top-cited strength within the interoperability topic area was existing interfaces between IIS and EHRs, with the number of interfaces as well as interfaces with bidirectional exchange mentioned. An IIS participant noted "most providers in the state" were connected, and an EHR vendor participant noted their system is connected to 46 registries. Standardization of these interfaces was another theme, as the discussion touched on use of the "same HL7 standards" and "consistency" across interfaces. Finally, trust and collaboration across partners supporting existing interfaces also emerged as a theme.

For areas of potential growth, the discussion focused on FHIR and the IZ Gateway. Overall, participants wanted to know more about FHIR, citing awareness and knowledge as opportunities across the community and the opportunity to be strategic in adopting FHIR to exchange data in new ways. For example, one participant indicated, "We don't just want to translate HL7 v2 into FHIR; we should look at what FHIR can do that adds value." Additionally, FHIR was cited as an opportunity for IIS to be "more proactive" and an opportunity for providers to access aggregate data from IIS in new ways. IZ Gateway was an additional opportunity theme, with a participant indicating that progress is underway but "a lot of connections [were] still to be made."

Aspirations/results

The focus on FHIR continued in the discussion of aspirations and results. FHIR was cited as a standard for more efficient immunization exchange, with participants envisioning a future where HL7 backwards compatibility leads to greater adoption of FHIR over time. Participants spoke to FHIR enabling "subscription capabilities to ping IIS," resulting in "refined data sharing." Additional guidance, "federal rules" and "more standards" for FHIR and immunization were cited as results indicative of progress on this front.

In addition to FHIR, multiple participants cited improvements in consumer access and proactive follow-up by provider organizations on messaging errors as aspirations.

Additional interoperability suggestions and considerations

The following additional suggestions and considerations were made with regard to interoperability:

- The role of HIEs in supporting immunization data exchange remains uncertain.

- Develop guidance for IIS on talking with EHR vendors about interoperability issues and helping IIS know what to expect with different EHR vendor products.
- Address data stewardship and data governance issues in relation to new messaging standards, entities, and data access points.

Provider management

The discussion of provider management was robust and varied, with the emergence of multiple themes within strengths, opportunities, and aspirations/results. Participants cited a strong relationship between IIS and provider organizations and an opportunity to build on this to support providers in their immunization practice. Maintaining accurate, current, and complete provider information in IIS is an opportunity for improvement. With this information, participants looked to a future state where use of this data continues to support immunization efforts across stakeholders. Themes from the provider management discussion are highlighted within Table 5, with results discussed below; see Table 10 in the Appendix for participants' paraphrased comments.

Table 5: Provider management themes* across categories

Strengths	• Engagement with providers (5) • Analysis and visualization of provider information (4) • Provider tracking within IIS (2) • Provider enrollment processes (2)
Opportunities	• Improved provider identification and management, e.g., provider type, provider contacts, provider denominator (6) • Better support for immunization practice, e.g., align vaccine distribution to match demand/use (4) • Reduced reliance on manual processes (2) • Increased collaboration across stakeholders, including Medicaid/Medicaid Management Information System (MMIS) (2)
Aspirations/Results	• Additional analysis and use of provider data (6) • Improved provider identification and management (4) • More automated processes (i.e., reduced reliance on paper and manual processes) (4) • Increased coordination between vaccine program enrollment and IIS enrollment (2)

*Cited by more than one participant; (#) indicates frequency

Strengths and opportunities

Participant comments that spoke to the engagement between IIS and provider organizations represented the most frequently cited strength; this included mention of IIS

outreach to providers via listservs and user groups and outreach from providers "reporting other providers that do not feed into the IIS." The discussion also highlighted analysis and visualization of provider information to "map provider enrollment" and to aggregate with other data to ensure coverage across geographic areas, for example. This type of analysis was supported by the ability of IIS to track provider information within the IIS, such as "flagging special project" providers, and consolidation of providers and facilities. A final theme within this category was provider enrollment processes—in particular, combining "COVID enrollment with registration" and completing enrollments quickly.

While use of provider information within the IIS allowed for analysis and visualization of this data, maintaining this information is an ongoing challenge. Improved provider identification and management was the top-cited area of opportunity, with participants mentioning the need to identify and maintain the "true provider denominator," appropriate provider contacts, and provider type information. Participants also spoke to opportunities to use "cleaned up" provider data to better support immunization practice, such as aligning vaccine distribution to demand. Two additional themes to emerge in this discussion were reduced reliance on manual processes and increased collaboration across stakeholders. Manual data entry and manual provider follow-up were cited as opportunities.

Opportunities for Improved Provider Information in the IIS:

- ✓ Better provider identification and management
- ✓ Understanding and maintaining a "true provider denominator"
- ✓ Identifying appropriate provider contacts
- ✓ Capturing provider type information

Aspirations/results

In considering the future state of provider management, the discussion turned back to additional analysis and visualization of provider data. This included reference to appropriate vaccine distribution to lessen the need for redistribution, better understanding of IIS enrollment and vaccination practice across a jurisdiction, and better understanding of vaccine transfers between providers, for example. Furthermore, improvements in provider identification and management to address previously identified opportunities were mentioned by several participants. From participants' perspective, this would result in "less confusion around facility sources," "improved provider communications regarding changes to their site," and having an accurate provider denominator.

The discussion of aspirations and results also indicated that multiple participants saw a future where there would be "less paper" and better integration of processes to reduce manual workloads. Finally, increased coordination across vaccine programs, e.g., COVID and VFC, was also referenced by multiple participants.

Additional provider management suggestions and considerations

The following additional suggestions and considerations were made with regard to provider management:

- Jurisdictions reported varied experiences in enrolling providers in their IIS due to COVID. One jurisdiction indicated that almost all providers were enrolled in the IIS prior to COVID; another indicated their IIS enrollment doubled after 600 new providers enrolled due to COVID.
- There is a need for "clarity" regarding multi-jurisdictional providers.

Data quality

Roundtable discussions on data quality strengths included ongoing IIS data cleanup efforts, the COVID-19 pandemic elevating the importance of IIS data quality, and IIS system enhancements to improve data quality. Opportunities included the importance of accurate race/ethnicity data capture, provider reporting of immunizations via EHRs, exploring alternative sources of data capture for use in the IIS (e.g., Department of Motor Vehicles data), certification of additional health IT systems and potential improvements, and IIS reports. Aspirations and results themes centered on improved data quality, sources of information, the role of HIEs and IIS, standards and protocols, and provider training. Table 6 provides a summary of data quality themes that emerged from the IIS 3.0 discussions. These themes are further detailed below. Individuals' paraphrased comments are also provided in Table 11 in the Appendix.

Table 6: Data quality themes* across categories

Strengths	• Ongoing data cleanup efforts (6) • Pandemic elevating importance of IIS data quality (4) • System enhancements (3) • Tools to address data quality (2) • Processes to address data quality (2)
Opportunities	• More accurate race/ethnicity data (5) • Improved provider/EHR reporting (6) • Enhanced IIS reports (4) • Certification of additional health IT systems (3) • Provider outreach/training (2) • Patient and vaccine deduplication (2) • New sources of data (2)
Aspirations/Results	• Improved IIS reports/tools (11) • Better data quality (6) • Utilizing new sources of information (4) • Clearer role for HIEs and IIS (4) • Additional standards and protocols (3) • Provider training (3) • Provider typing and facility mapping (2) • Community/collaboration (2)

*Cited by more than one participant; (#) indicates frequency

Strengths and opportunities

Discussions on IIS data quality strengths centered on data cleanup and monitoring of errors (noting patient and vaccine deduplication efforts, address cleansing, etc.); highlighted the role of the COVID-19 pandemic in elevating the importance of and focus on IIS data quality; addressed system enhancements such as ad hoc reports and new capabilities; mentioned various resources and tools focused on improving IIS data quality (CDC's Blueprint, PrepMod, AIRA's Data at Rest initiative); and incorporated processes to address data quality, including business rules and provider enrollment processes.

Opportunities that arose regarding data quality included a focus on improving race and ethnicity data, improving the quality of provider organization/EHR data submissions, and enhancing IIS reports to support data quality activities. Additionally, certification for EHRs, provider outreach and training, IIS data quality reports, patient and vaccine deduplication efforts, and new sources of data were cited as data quality opportunities.

Aspirations/results

Regarding aspirations and results, IIS reports and tools were mentioned frequently, with a focus on access to reports, ease of use, automated feeds from IIS to EHRs, and understandability and readability of reports. Improved data quality processes, such as provider flags, data validation, deduplication algorithms, and identification of data errors close to the source were noted as important aspirations. There appears to be uncertainty around the role of HIEs and IIS and how HIEs might be better leveraged for the improvement of IIS data quality. Similar to what was discussed for opportunities, using new sources of information (Master Patient Index, Department of Motor Vehicles, etc.) was noted as an aspiration, along with the development of IIS data quality standards and protocols.

Additional data quality suggestions and considerations

The following additional suggestions and considerations were made with regard to data quality:

- Develop easy to access, understandable, automated reports on IIS data quality.
- Utilize tools and new sources of information to improve IIS data quality.
- Implement processes and protocols to improve IIS data quality.
- Explore the role of HIEs in improving IIS data quality.

Consumer access

Roundtable discussions on consumer access strengths noted important attributes and benefits of IIS consumer access. Opportunities focused on data quality, consumer access portals that were not yet available or operational, security and access issues, and opportunities for launching/utilizing consumer access, including COVID-19 and leveraging work done in other states. Aspirations and results centered on consumer awareness and demand for access to immunization data, advocacy and policy, data use, consumer access

functionality, and funding/resources needed to launch and maintain consumer access. Themes from the consumer access discussion are highlighted within Table 7, with results discussed below; see Table 12 in the Appendix for participants' paraphrased comments.

Table 7: Consumer access themes* across categories

Strengths	• Consumer access features, e.g., access to data for consumer "self-help" (6)
Opportunities	• Further expansion of consumer access (7) • Data quality (5) • Security/access (3) • Legislative barriers (2) • Lack of awareness (2)
Aspirations/Results	• Consumer awareness and demand (6) • Advocacy and policy (4) • Use of consumer access portals (4) • Improved functionality (4) • Dedicated funding/resources (3) • Improved data quality (2)

*Cited by more than one participant; (#) indicates frequency

Strengths and opportunities

Strengths related to consumer access focused on attributes (accessible, affordable, interoperable) and benefits (reducing paper costs and processing requests, allowing consumers to serve themselves). Discussions on consumer access opportunities centered on opportunities to further expand consumer access and improve data quality. Multiple individuals noted that consumer access was not yet available or operational in their jurisdictions. Consumer access data quality comments referenced provider training, patient demographics, leveraging contact tracers, ensuring high data quality before consumers are given access, and allowing patients to review and resolve issues with their data. Others noted opportunities in terms of security and access to consumer portals; opportunities to leverage progress from other states and provide support to schools; legislative barriers; and lack of awareness among consumers and providers.

Aspirations/results

Conversations related to aspirations and results focused on marketing and legislative campaigns to drive consumer access and demand; advocating for political support and reduced policy barriers inhibiting consumer access; use of consumer access for schools, employers, and travel; and functionality, including improved consumer matching processes, vaccine forecasting, and QR codes, available as part of the SMART Health Cards Framework. Additionally, funding/resources were noted regarding the launch,

maintenance, and sustainability of consumer access portals, and data quality was mentioned in terms of improved patient phone and email data, along with process improvements to address data quality.

Additional consumer access suggestions and considerations

The following additional suggestions and considerations were made with regard to consumer access:

- Leverage work already done to make consumer access operational in all jurisdictions.
- Advocate for policies and legislation supporting consumer access.
- Drive consumer demand for access to IIS data through marketing campaigns.
- Address security and access issues.
- Support funding/resources for maintenance and sustainability.

Discussion

The IIS 3.0 roundtable discussions provided insight into the future of IIS from AIRA 2021 National Meeting in-person attendees. Participants shared their perspectives on strengths to build on, opportunities to explore, and steps toward the future state of IIS. These results can be used as an input to further conversations across the IIS community to envision and work toward IIS 3.0. Across all topic areas discussed—technical infrastructure; interoperability and FHIR messaging; data access, use, and analytics; data quality; provider site management; and consumer access/vaccine credentialing—certain themes emerged as pressing issues to address to move IIS into the future.

One such theme is utilizing lessons learned from the COVID-19 pandemic to propel IIS forward. Funding and resources needed for sustaining the systematic (e.g., IIS infrastructure) and programmatic (e.g., staff) improvements made during the pandemic are critical to ensuring that IIS remain a reliable source of immunization information for all end users, including Public Health, immunization providers, the public, and more.

Another cross-cutting theme that emerged is reliance on and trust in AIRA guidance. Roundtable participants requested additional AIRA guidance on the following topics: IIS technical infrastructure, working with EHR vendors/EHR vendor products, and data quality standards.

AIRA Guidance Requests

- ✓ IIS technical infrastructure
- ✓ Working with EHR vendors and EHR vendor products
- ✓ Data quality standards

To move into the next generation of IIS, it will be critical to implement automated processes. Reducing the reliance on manual processes, including manual data entry, paper forms, manual follow-up for providers, monitoring data interfaces, and SAS coding, will propel IIS into the future. Leveraging digital signatures; implementing accessible (via EHRs), understandable, and automated IIS reports; and utilizing tools and processes to improve IIS data quality are important considerations for automating and streamlining IIS.

Two content areas needing more education and clarification for IIS and immunization programs include FHIR and HIEs. FHIR is a major opportunity on the horizon for IIS, and jurisdictions want to know more about FHIR, how it would be used, and a timeline for moving forward with this technology. Additionally, the relationship between HIEs and IIS is misunderstood within the immunization community. Further education is needed on how HIEs can improve data capture and accuracy within IIS and what opportunities exist for collaboration with HIEs.

Exploring new or supplemental sources of data capture to improve patient demographics was a cross-cutting theme for several topic areas. Provider offices and immunization programs alone cannot capture all the demographic information necessary for identifying pockets of under-immunized individuals and responding to vaccine-preventable disease outbreaks. Novel sources of capturing information, such as using a Master Patient Index, and gathering data from alternative sources, such as the Department of Motor Vehicles, will improve the credibility and accuracy of IIS data, thereby improving Public Health's response to emerging threats.

In addition, the discussion also revealed a need to revisit privacy, confidentiality, data governance, and data stewardship topics, given the changing landscape of increased IIS data sharing and "access points." Along with these increased access points, there is a need for policies and legislation supporting IIS, specifically consumer access/vaccine credentialing, to remove the barriers to making these tools more widely available to constituents. Consumer awareness and demand for access to immunization information via IIS rose to the top as an important consideration for the future credibility of IIS.

In summary, the IIS 3.0 roundtable discussions helped to paint a future picture of IIS, setting IIS up as the source of truth for immunization information. This future depends on seizing the opportunities presented and lessons learned from the COVID-19 pandemic, ensuring adequate and sustainable funding for IIS, and seeking opportunities on the horizon, such as FHIR. Utilizing AIRA guidance and standards, moving from manual to automated processes, and exploring new sources of data capture will create a more streamlined, standardized approach to storing immunization information across the country. To continue to move into the next generation of IIS, it will be necessary to address data privacy and security issues, increased access points, and policies and legislation supporting IIS.

Appendix

Table 8: Technical infrastructure themes and corresponding paraphrased comments

Strengths

[No themes emerged]

Singular comments

- Movement to "cloud"
- Vendor-hosted platforms "easier to support" and allow for ability to scale

Opportunities

Capacity to handle messaging volume (6)

- Roadblocks because IIS couldn't handle volume; misalignment between how much data EHRs are sending versus what IIS could accept
- IIS asking for data but was not able to consume
- IIS were created 20+ years ago, before the need to handle big data
- Surge capacity has been an issue
- Opportunity to use elastic servers—open and close as needed
- Some pharmacy systems resubmitted data over and over

Singular comments

- Real-time insight into messaging outcomes ("data getting rejected and EHRs didn't know until it was too late")
- Access to technical staff/resources

Aspirations/Results

Functions and data to support needs (6)

- Vision/checklist across all stakeholders—make sure they get what they need
- Immediately accessible data
- Everyone wants data, and they want it their way
- Supporting providers who haven't normally been involved
- Supporting public health officials, e.g., race/ethnicity data
- Tools to monitor infrastructure

Coordination across partners (4)

- IIS can add requirements, but if not happening across ecosystem, it won't help
- Need EHRs up to speed, too
- E.g., race/ethnicity: need across all ecosystems, IIS data are only as good as the data being put in to the EHR
- Standardization needs to look at all sides of the equation—provider and IIS

Shared infrastructure (3)

- Need some unified platforms; IZ Gateway may help
- Tools that allow for connectivity at a national level

- Doesn't have to be competitive, don't need to wait for CDC, third party can come up with a solution

Business continuity (3)
- Operate in disasters
- Address hiccups, e.g., by switching servers behind the scenes
- Failsafe systems

Agile systems: configurable and responsive (2)
- Ability to make changes on the fly to respond to needs
- Run at 10-20% capacity with excess available when/if necessary

Reduced manual processes (2)
- Manual: number-one complaint of providers
- No one has time to wait for manual

Singular comments
- Integration across public health systems
- Alignment and standardization across IIS
- Improved capacity

Table 9: Interoperability and FHIR messaging themes and corresponding paraphrased comments

Strengths
Number and type of connections/interfaces in place between IIS and EHRs (4) • Sheer number of interfaces • Connected to 46 registries • The number of bidirectional interfaces • We have most providers in the state connected; providers are excited about the registry **Data exchange standards and standard interfaces (2)** • All the standardization! Old interfaces didn't follow standards; now there's consistency • Connections using the same HL7 standards **Collaboration/trust among exchange partners (2)** • Getting to a point where some registries trust us so much that they have an expedited onboarding process • Collaboration on HL7 and immunization messaging across providers, vendors, and IIS/Public Health **Singular comments** • IZ Gateway

Opportunities

Strategic use of FHIR to exchange data in new ways (4)

- We don't just want to translate HL7 v2 to FHIR; we should look at what FHIR can do that adds value. We've done a lot of shoehorning into v2 messaging, e.g., dose decrementing, inventory management. These could likely better be handled in FHIR.
- Bulk FHIR will allow providers to send one message and get aggregate data.
- IIS are reactive, but FHIR is an opportunity to be more proactive.
- Make FHIR as all-encompassing as possible but boil down to what's really important via better communication between systems.

Increasing knowledge of FHIR among IIS and exchange partners (3)

- Make sure hospitals and other systems know about FHIR
- Let the community know how close we are to making FHIR a standard
- Curious about FHIR

IZ Gateway (2)

- IZ Gateway is in progress; however, a lot of connections still to be made
- IZ Gateway is an opportunity

Singular comments

- Medicaid/MMIS data feed to IIS to inform future plans
- Schools remain an opportunity; schools have different software
- Current systems built for user interface rather than messaging; need a new paradigm

Aspirations/Results

FHIR as a standard for immunization exchange (3)

- Get federal rules to require FHIR
- Let EHRs know the cost of FHIR
- Standards for FHIR for immunization

Consumer access (3)

- Consumer access, public interface
- Want a validated history for consumers
- iPhones and Android will have capability to access immunization records

Provider follow-up on errors (2)

- A way to automatically notify provider about volume of messages and errors to create more accountability; reduce parental role of IIS
- Current difficulty for providers to act on errors

FHIR to support more efficient exchange (2)

- FHIR will enable subscription capability to ping IIS for just-in-time support
- Set amount of traffic systems can handle; FHIR would allow you to refine data sharing

Transition to FHIR: greater use, HL7 backwards compatibility (2)

- If a majority of states are using FHIR, this would compel some jurisdictions to start using it; let emergency medical records drive the decision
- FHIR is backwards-compatible and gives the option for providers to use HL7 and FHIR simultaneously

Singular comments

- Support for population health, i.e., standardized way for organizations to get data on their patients and/or employees

Table 10: Provider management themes and corresponding paraphrased comments

Strengths

Engagement with providers (5)

- Providers report other providers that do not feed into the IIS
- User group meetings throughout the state
- Provider education about storage and transfers
- Communications out to current provider listservs and out to pharmacy boards or other contact lists
- Local Public Health units were a critical partner

Analysis and visualization of provider information (4)

- SAS code to map provider enrollment and COVID enrollment
- REDCap data aggregation helped collaboration between teams
- Other ancillary systems to aggregate enrollment data with other provider data
- Ensuring rural areas have an enrolled provider or enough providers for appropriate coverage

Provider tracking within IIS (2)

- Consolidating organizations and their facilities within the IIS
- Previous methods for flagging special project providers from H1N1

Provider enrollment processes (2)

- Combined COVID enrollment with registration
- We were able to perform enrollments and quick responses in a short amount of time

Singular comments

- Use of SmartyStreets to filter through a provider list
- The MIROW guide for data quality was very valuable for consistency and setting parameters for providers

Opportunities

Improved provider identification and management (6)

- Identifying the true denominator

- Better communication when provider sites make changes
- Education on appropriate contacts (main org contact may be the CEO or high-ranking position, but this isn't the best person for the responsibilities)
- Clearer instructions about provider prioritizing and provider self-reporting of provider type
- Within hospitals/health systems, many new departments needed to be enrolled as specific data sources when previously they were sending data via a singular source
- Confusion about enrolling individual physicians within a single facility; enrollment should just be at the site level

Better support immunization practice, e.g., align vaccine distribution to match demand/use (4)

- Cleaning up list of providers that enrolled but did not administer COVID vaccinations
- A few instances of providers refusing vaccine shipments upon delivery, at which point there is essentially nowhere for it to go
- Package sizes changing constantly caused stress on distribution efforts
- Have IIS be the foundation of any vaccine supply system, IIS as infrastructure for all vaccination activities

Reduced reliance on manual processes (2)

- There was a lot of manual entry during the pandemic
- Manual follow-up of providers that received vaccine but were not enrolled

Increased collaboration across stakeholders (1)

- Coordination between all the players

Singular comments

- Limited IIS staff access to VTrckS; expanding could provide relief

Aspirations/Results

Additional analysis and use of provider data (6)

- Smaller package sizes would reduce redistribution; redistribution has been high, especially for rural areas
- Use IIS to identify where there's a lack of providers enrolled versus those who are giving vaccine
- Inventory discrepancies can indicate transfer activity between provider sites
- Prioritize providers based on priority vaccination groups
- Coverage rates throughout the state used to indicate provider reporting saturation
- Hoped to use flu pre-book for allocation efforts but had to transition because of limited quantities/prioritization as well as patient population/prioritization

Improved provider identification and management (4)

- A common way of identifying a new facility
- Hope to define the denominator

- Improve provider communications regarding changes to their site
- Less complex interfacing, less confusion regarding facility sources

More automated processes (i.e., reduced reliance on paper and manual processes) (4)

- More digital signature, fewer paper forms
- Less manual intervention on things like SAAS code
- Integrate provider enrollment into IIS—clinics are not good about submitting paperwork
- Reduced time spent getting provider through the process; had to do a lot of outreach and follow-up

Increased coordination between vaccine program enrollment and IIS enrollment (2)

- Focused on CDC requirements
- Identifying appropriate vaccine coordinator contacts, e.g., a specific contact being identified for COVID versus someone else identified for other vaccines

Singular comments

- Integrate provider training into the IIS website so users don't have to go outside the IIS system to find information
- Desire for no onboarding queue

Table 11: Data quality themes and corresponding paraphrased comments

Strengths
Data cleanup and monitoring of errors (6) • Vaccine deduplication does check if patients are getting too many doses of COVID. They had both those that had too many doses and those without doses, and some were showing when they were vaccinated though they weren't. Patient deduplication. • Reminder/recall helps to clean up the data. They sent letters to clean up data. They submit data to the United States Postal Service (USPS). They recently started data sharing with Department of Motor Vehicles to align with census. • Submit death data to Electronic Verification of Viral Events (EVVE). • I work queries to look for data issues like multiple birth dates, and they are there. We did refugee health before immunizations, and they would just record 1/1/XXXX and lots of nicknames. • We are amazed at how many people are just working on mistakes. • They are working on more connections. They have a PrepMod team that is monitoring the warnings and errors from PrepMod daily. **Pandemic elevating importance of IIS data quality (4)** • The strength is that IIS are centralized systems which allows you to create a source of truth

- Better data quality means better care for your patients
- Lucky to have some staff that has been around a while, with experience
- The pandemic and COVID are improving data quality

System enhancements (3)
- They are working with the states to enhance the system with features that may not be in the IIS
- They added ad hoc eligibility report, ability to pull by certain lot numbers, etc.
- Having the reports to find problems

Tools to address data quality (2)
- Having tools like Data at Rest (DAR)
- Reference the CDC Blueprint

Processes to address data quality (2)
- Strong business rules
- Information collected on providers via universal provider agreement from CDC uses the same data elements

Singular comments
- Standardization

Opportunities

More accurate race/ethnicity data (5)
- We are doing great on availability and timeliness. Race and ethnicity are an opportunity.
- Forever providers are used to sending with some kind of percentage of race, for example, and changing that percent is really hard to go back.
- Race and ethnicity—systems not set up to be required
- Including a refusal to respond as a race, not asked
- Race from community health system (CHS) or birth hospital when they are born

Improved provider/EHR reporting (6)
- Providers asking questions that could be answered by existing resources instead of meetings/calls.
- A lot of providers don't collect enough of the demographics.
- We should incentivize providers or EHRs to send.
- Race and ethnicity questions, EHRs sending only if are entered into chart—IIS not accepting data when practice decides not to send.
- We need a code for patients who choose not to answer for race and ethnicity. EHRs have the ability, but it's not being entered. The IIS sending a formal letter to providers could help.
- Certification for EHR—moving them to the front of the line.

Enhanced IIS reports (4)
- Automated data quality reports—send to providers

- Automated tools to identify providers that need to improve
- More population health reports
- Ability to report by Federal Information Processing Series (FIPS) code

Certification of additional health IT systems (3)

- Certification for EHR—moving them to the front of the line
- Universities reporting data—unfamiliar with immunization messaging, go through a certification process
- Small EHRs, uniformity—required a lot of handholding for non-certified EHRs

New sources of data capture (2)

- Lot number data warehouse—application programming interface (API) to validate the lot number name and not the extra demographics
- Go through Department of Motor Vehicles or other entities that have this data

Provider outreach/training (2)

- Providers asking questions that could be answered by existing resources instead of meetings/calls
- Better training, how to address data quality

Patient and vaccine deduplication (2)

- Decreasing duplicates—a lot of COVID shots just had
- People registering for COVID vaccines; use different names than in the IIS or use different names for each dose; patient matching

Singular comments

- Immigrant populations are hard because they do not have phone numbers or driver's license sometimes, and this is the same with the pediatric population.
- It's a rare time of opportunity to incentivize or invest in data modernization, and this is the time to try and move that forward.
- Funding to add additional staff
- National Standards for collecting data from mass vaccination sites
- Getting documentation (IGs) updated and accessible; conformance with ACTUAL system

Aspirations/Results

Improved IIS reports/tools (11)

- Standardized Data Quality Assessment (DQA) report that is automated; report should go to provider and EHR vendor
- Data quality reports
- Data exchange logs lists the errors, but it would be nice if it was more intuitive to see trends. The log overwhelms you with the information. It would be nice to have better reports to see the results.
- The provider could view their errors results directly within the EHR, not have to go to the IIS.
- Envision's dashboards with the Power BI was really user friends and helpful.

- Running data reports by provider to see if data quality has been lower
- National Institutes of Standards and Technology (NIST) tool; improved data quality
- A portal for providers to see their data quality
- Providers could check their results; they can slice and dice their own results
- Understandable DQA reports in production
- Data quality score via HL7 without having to go into the IIS

Better data quality (6)

- Decrease the errors in the data being sent in via HL7 (and not just because they stopped sending those values)
- Getting consistent data between providers
- The EHR should be doing more data validation to prevent the end user from entering bad data
- Deduplication algorithms
- Get the feedback/errors as close to the source as possible
- Providers could be flagged when they put in invalid data

Utilizing new sources of information (4)

- Get all the federal data
- Link to other sources to help in patient matching (Department of Motor Vehicles, taxes, etc.) or simply an e-Master Patient Index (MPI)
- National Patient Identifier to help reduce duplicates
- We need an MPI and vaccine verification will push this; real-time bidirectional data exchange

Clearer role for Health Information Exchange and IIS (4)

- How do HIEs play a role in this?
- HIEs seem to have a lot of money. How does that play a role? It seems like they should be useful for something. It seems like the current administration thinks HIEs will have a bigger role.
- The HIE used our IIS to even get going.
- They are just a pass-through.

Additional standards and protocols (3)

- Different needs require different standards of data quality requirements, e.g., do you require lot numbers and reject vax records without? How do you balance need for best quality data versus need for data?
- The ability to track data quality on a national level; realize that one system making a fix should help multiple jurisdictions
- Standard pharmacy protocols for pharmacies to report; pharmacy querying

Provider training (3)

- Explaining why data is collected; registries could let providers know
- IIS training for practices, recommendations for end-user training

- Pet peeve: use of last name of "test" when testing system. Some people actually have this last name. Ask providers and staff not to use!

Provider typing and facility mapping (2)

- Billing is different and provider typing
- Possibly facility mapping

Community/collaboration (2)

- Increase community between IIS and the provider and EHR
- The ability to track data quality on a national level; realize that one system making a fix should help multiple jurisdictions

Singular comments

- It will be helpful to get the SMART cards.
- We need better ways to incentivize providers to increase data quality. The only carrot we have is trying to put people back into test.
- Having enough staff to monitor the data quality and getting them up to speed in data quality monitoring is pretty hard. A good result would be fewer errors and warnings and being able to trend those.
- Use data for other purposes.
- Billing is different and provider typing.

Everything Else

- Race/ethnicity difficult to capture accurately, no gold standard
- Discussion focused on COVID and not the future of IIS
- Review PHII and AIRA resources for best practices

Table 12: Consumer access themes and corresponding paraphrased comments

Strengths

Consumer access attributes (6)

- Accessibility
- Affordability for consumer
- Interoperability between systems
- Having an option for consumer access is a huge step
- Consumer self-help
- Help reduce paper process requests, which are currently overwhelming

Singular comments

- Mandated reporting state for COVID and childhood vaccines; encourage reporting for adult
- Lottery programs encouraged people to utilize the consumer access portal
- Providers have onboarded because of COVID

Opportunities

Further expansion of consumer access (7)

- Some states don't have this option yet
- No consumer access
- Operationalize patient portal to get it up and running and staff in place; the functionality must be enabled with Envision platform
- No consumer access directly; analysis a few years back; process to get implemented is way too high; consumers want QR codes
- Schools are a large user base; have support from schools
- Identify other states use for certification and authentication to make the case for using consumer access
- COVID is a new opportunity

Improve data quality (5)

- Clean data before making the technology available
- Queues to look at patient records but having patients having eyes on their records will help with data quality; helps with data quality
- Help with resolving some data quality challenges
- We need to be sure our providers are putting in the correct information so we have good quality, correct phone numbers, updated demographics
- Utilize existing contact tracers to help with data quality and other opportunities

Security/access (3)

- Patient security is a barrier in some states
- Who should have access; technology looking to streamlined solution
- Make a family group

Legislative barriers (2)

- Legislation banning credentialing systems needs to be changed
- No passport laws have made consumer access difficult to provide

Lack of awareness (2)

- Should be driven by consumer demand, but many people don't know it exists
- Providers use EHRs so they don't have to go into IIS; they don't often go into registry to activate MyVaxIndiana

Singular comments

- Continue to use patient portal
- The system we have is not user friendly on the provider end
- Cost to provider to provide certain amounts of information via HL7

Aspirations/Results

Consumer awareness and demand (6)

- It is your right to your data, so have consumers advocate for this right

- Marketing—get campaign out; getting vaccinated will open economy; employers will have fewer sick days, consumers will be back out in the economy
- Messaging—What's in it for the people involved?
- Consumer marketing campaign to drive consumer demand
- More communication down to the public
- Increase consumer demand and push them to contact their legislators

Advocacy and policy (4)
- Use our partners/organizations to advocate for changes in legislation
- Resolve some policy barriers for consumer access
- Have political support for consumer access
- Political support for implementation; funding for maintenance and sustaining any systems or applications

Use of consumer access portals (4)
- Create demand by parents for school records
- For employment, can consumer access help with vaccination items for employers
- Has a school certificate; standard; school nurses and help desk have access; used by providers; easier to certify
- Travel record requests are not being accepted

Improved functionality (4)
- Make matching for consumer access easier
- COVID-only QR code
- QR codes
- Include forecast and provide information in reminder/recall style

Dedicated funding/resources (3)
- Funding and resources needed to help get consumer access up and running
- Worried about 2024 funding that is being provided as part of COVID supplemental (supporting HL7 onboarding); a negative impact on ability to maintain infrastructure
- Political support for implementation; funding for maintenance and sustaining any systems or applications

Improved data quality (2)
- Obtaining phone number and email information to help with data quality issues and patient deduplication
- Adding emails and phone numbers to records as requests for information come to their office

Singular comments
- Make it more secure
- Standards are needed for credentialing
- Take provider activation out of the equation
- Metrics and dashboard; would like both successful and unsuccessful data shared

Everything Else
• In a natural disaster if vaccination is received, opt-in is suspended, and reporting is required