



AIRA

AMERICAN IMMUNIZATION
REGISTRY ASSOCIATION

Decision Framework and Sustainability Plan

The Message Quality Evaluation (MQE) Tool

September, 2018

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Acknowledgements

The American Immunization Registry Association (AIRA) would like to thank the following individuals and organizations for their support and assistance with this important project:

- Individual subject matter experts (SMEs) who contributed their expertise through discussion and document review on the MQE Project Team:
 - **Glenda Anderson**, North Carolina Immunization Information System
 - **Noam Arzt**, HLN Consulting, LLC
 - **Jennifer Bednar**, DXC Technology
 - **Deb Belleau**, Montana Immunization Information System
 - **Aaron Bieringer**, Minnesota Immunization Information Connection
 - **Matthew Bobo**, Alaska Immunization Program
 - **Heather Crawford**, Oregon Immunization ALERT IIS
 - **Eric Dansby**, California CAIR2
 - **Katelyn Davis**, Strategic Solutions Group (SSG)
 - **Meghana Gangarapu**, Alabama Immunization Information System
 - **Terrie Gehrke**, Qvera
 - **Robin Holding**, Illinois Immunization Information System
 - **Therese Hoyle**, Michigan Care Improvement Registry
 - **Josh Hull**, Michigan Care Improvement Registry
 - **Aras Islam**, Philadelphia Immunization Information System
 - **Jenna Jaxheimer**, Philadelphia Immunization Information System
 - **Lita Jiminez**, New York City Citywide Immunization Registry
 - **Jacqueline Logan**, Tennessee Immunization Information System
 - **Rashid Malik**, Maryland Immunization Information System
 - **Erin Maurer O'Shea**, Tennessee Immunization Information System
 - **Jenne McKibben**, Oregon Immunization ALERT IIS
 - **Megan Meldrum**, New York State Immunization Information System
 - **Amy Metroka**, New York City Citywide Immunization Registry
 - **Jason Narine**, California CAIR2
 - **Michael Powell**, California CAIR2
 - **Linda Pursley**, Scientific Technologies Corporation (STC)
 - **Wojciech Rafalski**, New York City Citywide Immunization Registry
 - **Veronica Rodriguez**, Puerto Rico Immunization Information System
 - **Hari Silva**, Alabama Immunization Information System
 - **Monica Sull**, New York City Citywide Immunization Registry
 - **Mike Suralik**, HLN Consulting, LLC
 - **Hossam Tamri**, National Institute for Standards and Technology (NIST)
 - **Amber Tirmal**, Philadelphia Immunization Information System

- The Joint Development and Implementation (JDI) Advisory Workgroup, who provided oversight and review for the development and documentation effort:
 - **Noam Arzt**, HLN Consulting, LLC
 - **Aaron Bieringer**, Minnesota Immunization Information Connection
 - **Matthew Bobo**, Program Manager, State of Alaska Immunization Program
 - **Bill Brand**, Public Health Informatics Institute (PHII)
 - **Tricia Charles**, Massachusetts Department of Public Health
 - **Nicole Freeto**, Washington State Dept. of Health
 - **Aras Islam**, IIS Manager, Philadelphia Department of Public Health
 - **Judy Merritt**, Account Executive, Scientific Technologies Corporation
 - **Amy Metroka**, Director, Citywide Immunization Registry, New York City Department of Health and Mental Hygiene
 - **Steve Murchie**, CEO, Envision Technology Partners
 - **Brian Napier**, Immunization Program, Ohio Department of Health
 - **Teri Nicholson**, Illinois Immunization Information System
 - **Michael Powell**, California CAIR2
 - **Tina Scott**, State of Michigan
 - **Gary Wheeler**, DXC Technology
 - **Warren Williams**, IIS Support Branch, CDC
- The AIRA Board of Directors who provided input at various stages of the effort and/or reviewed and provided comment on the final documentation and project:
 - President • **Kim Salisbury-Keith**, Rhode Island Department of Health
 - President-Elect • **Amanda Harris**, Nevada Department of Health
 - Immediate Past President • **Michelle Hood**, Nebraska Department of Health and Human Services
 - Secretary • **Jenne McKibben**, Oregon Immunization ALERT IIS
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 - Director **Bridget Ahrens**, Vermont Immunization Registry
 - Director **Brandy Altstadter**, Scientific Technologies Corporation
 - Director **David McCormick**, Indiana State Department of Health
 - Director **Kevin Dombkowski**, University of Michigan
 - Director **Megan Meldrum**, New York State Immunization Information System
 - Director **Quan Le**, Louisiana Immunization Program
- The AIRA staff who contributed to the project and this document's development:
 - **Michelle Barber**, Independent Public Health Consultant
 - **Nathan Bunker**, AIRA Senior Technical Project Manager
 - **Mary Beth Kurilo**, AIRA Policy and Planning Director
 - **Maureen Neary**, AIRA Senior Project Manager

Purpose of this Document

In 2015, AIRA convened the Joint Development and Implementation (JDI) Advisory Workgroup to oversee and advise collaborative Immunization Information System (IIS) development efforts. The purpose of the JDI initiative is to guide the IIS community toward optimal collaborative development and tools to support shared products and services. This effort includes launching multiple collaborative projects. The Message Quality Evaluation (MQE) Tool project is the second project launched by the JDI Advisory Workgroup.

The MQE tool is an open source data quality product that is broadly available to the IIS community. The tool can work with any IIS platform, and can be installed as a stand-alone or fully integrated product, although the scope of this project focused on MQE as a stand-alone product. The tool can be used to evaluate the quality of incoming batches of HL7 files before moving the files into the IIS. The JDI project focused on fostering a community-driven process to further develop, document and launch an initial version of the MQE tool, along with the governance process to support it.

This document outlines the structure created and decisions made to support the development and maintenance of the MQE tool, and the sustainability plan to ensure it remains an ongoing resource for the IIS community.

The JDI Advisory Workgroup

The JDI Advisory Workgroup was brought together to represent the full IIS community generally, and to represent the most broadly used IIS systems/platforms specifically. The Workgroup is charged with creating and providing overall recommendations for joint development and implementation, collective prioritization, and knowledge transfer regarding best practices for IIS development.

Recommendations on JDI topics and projects are submitted for approval and action to the AIRA Board. The JDI Advisory Workgroup provides operational and project oversight to JDI projects.

The IIS community as a whole is moving toward more coordinated development and universal standards adoption to better support a nationwide network of interoperable IIS. To this end, there is a need for an Advisory Workgroup to identify, prioritize, and support JDI activities across the IIS community. Vendor and implementer support and engagement are critical for these efforts.

Selection of the MQE Tool Project as a JDI Project

The JDI Advisory Workgroup went through a lengthy selection process to select the MQE Tool project as the second JDI project. Initially, candidate projects were selected from across the JDI Advisory Workgroup membership. Key information on each project was presented and discussed, including project descriptions, clarification of deliverables and

products, estimates on level of priority, etc. Ultimately, four projects were selected for further evaluation:

- Development of the MQE Tool as an Open Source Tool (originally referred to as the Data Quality Assurance Tool)
- Support of a Centralized Data Entry Service
- Support of Interjurisdictional Exchange
- Development of Patient Matching Guidance and Tools

These four potential projects were articulated through Project Summaries and scored using the JDI Scorecard (see Appendix A). Ultimately the Project Summaries were further developed for the two frontrunning projects (Development of the MQE Tool as an Open Source Tool and Development of Patient Matching Guidance and Tools). Following extensive discussion, JDI members were surveyed on the selection between these two final projects and the MQE Tool was selected by a slight majority. The recommendation for selection of the MQE tool as the second JDI project was brought to the AIRA Board, and the Board voted unanimously to accept the project recommendation in September 2017.

Overview of the Message Quality Evaluation (MQE) Tool

The MQE tool was initially conceived as an open-source project managed by Dandelion Software and Research in 2012. The application, originally called the Data Quality Assurance (DQA) tool, has been available in the open source marketplace for several years and has been used by several IIS programs across the country. This project sought to enhance the tool itself, while also providing documentation to support its installation and use across IIS.

The core function of the MQE tool is to ingest HL7 v2 VXU messages and parse them to pull out and aggregate relevant data. The MQE tool can also process messages that meet different versions of the HL7 guide. The extensive data quality checks conducted by the MQE tool, coupled with the ability to adjust the weight given to issues discovered, adds significant value to the tool. Allowing adjustments of the weights gives the user control over how the reports work and how the information is scored.

MQE Project Community Governance

The JDI Advisory Workgroup has referred to the MQE project as a “found pilot”, since a certain amount of work was underway with the tool when it was developed into a JDI project. A small group of invested developers from across multiple jurisdictions has remained as a constant in informing the actions and decisions for the MQE tool.

Once launched as a formal JDI project, the MQE project has been overseen and informed by the MQE Project Team. This team is made up of technical developers and non-technical program representatives working on the tool, as well as representatives from the JDI Advisory Workgroup. A representative from the National Institute of Standards and Technology (NIST) have been involved in the MQE Project Team throughout the project as

well. This small working group of programmatic and technical experts was charged with developing, updating, and configuring the open source MQE Tool, as well as informing a structure and framework for decision-making to sustain the project going forward. A subgroup of technical developers and testers met on a more frequent basis to conduct sprints and move development on the tool forward.

A [webinar](#) to introduce the MQE Tool to the community was held in February, 2018. The goal of this webinar was to affirm, or if needed, expand the requirements in the initial version of the MQE tool, and to further engage members of the IIS community in this community-driven effort. Attendees were invited to engage in the tool in a variety of ways:

- Develop - Join the technical team and shape the tool
- Test - Make sure the tool works the way it's supposed to
- Use - Identify what you like and what you think can make it better
- Govern - Lead the project and prioritize what makes sense after AIRA steps aside

The webinar was attended by over 70 members from across the IIS community, and several attendees joined the MQE Project Team to become part of the MQE effort ongoing.

The MQE project Team meets monthly, and informs the development of documents and resources, oversees the sprint schedule, and provides input on other topics as they arise. Decisions are made through consensus across the group. Updates on activities are routinely provided to the JDI Advisory Workgroup, and additional information and input is sought.

All code for the MQE tool, as well as an [MQE Tool WIKI page](#) housing installation instructions and other documentation, exists on [GitHub](#). GitHub is a web-based hosting service that provides tools for version control and source code management of applications and software. The WIKI serves as a communication hub for development efforts for MQE.

The actual development of the MQE tool uses agile methodology and its concept of sprints, group enhancements and bug fixes over short periods of time. Throughout this project period, there were 6 technical resources representing AIRA, NIST, and 4 jurisdictions developing code within the initial version of the MQE Tool. The developers for the tool meet offline to work through details and actions regarding sprints.

[MQE Product/Tool Governance](#)

The MQE Project Team, made up of technical and non-technical resources, was responsible for both the governance and development of the MQE tool. Decisions around the development components of the MQE tool warrant specific discussion. This section describes the governance of the MQE code and tool development specifically. While the project and process should drive the functional requirements of the tool, the details of how the actual product will be enhanced and distributed is one component of that process.

Roles and Responsibilities Within the Project Team

Requirements are based on community input, so participants are expected to contribute to the ongoing requirements for the tool. Ideally, to use the tool, a jurisdiction must contribute resources of some type. Together, these resources form a team whose structure is based on the agile methodology.

Specific roles and responsibilities are defined below:

MQE Project Team: Collectively determines priorities for development by:

- Using the MQE tool to evaluate incoming data
- Identifying functionality that can help improve IIS workflow
- Finding bugs and inefficiencies that keep the tool from reaching its full potential
- Testing new or improved functionality following version releases
- Documenting issues, questions, and comments in GitHub as they are identified

Project Manager (May be AIRA administrative role): Maintains project schedule and timeline by:

- Ensuring that supporting documentation for the tool is in place, accessible, and up to date
- Setting long term and strategic vision for the project
- Maintaining availability of accurate and up to date information/documentation
- Sharing appropriate information vertically and horizontally
- Ensuring that the positions needed to keep the project afloat are filled
- Working with the MQE Project Team to set timelines for major releases of new or enhanced functionality
- Working with the Scrum Master to prioritize immediate deliverables
- Setting long- and short-term goals to sustain interest in the project
- Removing impediments and facilitating cooperation across the community

Scrum Master: Coaches and guides the development team by:

- Scheduling sprint cycle and daily scrums
- Assigning issue(s) to developers during sprint
- Ensuring that issues are assigned to the appropriate milestone
- Managing and driving the development process
- Fostering clear communication between team members and the rest of the project team. Providing pre- and post-Sprint reports to MQE Project Team
- Preparing for and moderating daily scrums
- Bringing together developers, testers, and others as needed
- Helping non-developers articulate their needs so that developers can build to their needs
- Helping developers articulate their work so that non-developers can understand why the tool works the way it does
- Working with the Project Manager to keep the project on track

- Helping the Project Team set realistic priorities and timeliness

Lead Developer: Ensures that the master code branch is protected by:

- Creating a default development branch is before each sprint
- Merging all new code to the Master Branch post Sprint
- Contributing to the coding efforts as articulated in the “Developer” role below

Developer: Improve the MQE tool technical functionality by:

- Building code in the open source workspace
- Expanding knowledge of the technologies and languages used by the MQE Project Team (i.e., Java)
- Attending pre- and post-Sprint meetings, monthly Project Team meetings, and daily scrums during Sprint cycles
- Documenting issues and bugs, including a meaningful description, requirements, developer notes with known constraints and assumptions, and adequate information for testing
- Helping to prioritize work in collaboration with MQE Project Team members and the Scrum Master
- Reviewing and improving upon code developed by others
- Assisting junior developers as needed
- Serving as secondary code reviewer for other developers (code reviewer must work for a different entity than the primary developer)

Tester: Ensure that the tool functions as intended by:

- Conducting thorough testing and documenting results
- Partnering with developers to ensure that the tool does what it is intended to do

End Users: Contribute to the ongoing maintenance and support of the tool by:

- Installing the tool and benefiting from its use
- Participating in a User Group
- Identifying issues and needed enhancements
- Identifying and reporting bugs
- Engaging with other users to propose best practices and novel use cases

Authoring Privileges

As an open source product, there are no restrictions on who has access to the published code or how that code might be accessed and modified locally. However, as an open source product used in the immunization community, the need to govern changes that affect the entire community must go through a vetting process. The lead developer, AIRA technical consultant, and scrum master are the only members of the development team that can grant authoring privileges in GitHub. As a self-organizing group, these three determine the level of contributing authors to the code base. At this time, all information on project practices is available in the GitHub repository.

The Role of AIRA During the Project Period

AIRA has played a large coordinating role and administrative role in the development of the MQE tool up until this point. AIRA hired a contractor (approximately .25 FTE) to be both the coordinator/scrumb master as well as the technical writer for the project. This person focused on planning and facilitating MQE activity and drafting planned documentation. Additionally, AIRA provided project management (approximately .2 FTE) and development staff time (approximately .1 FTE) to the effort.

Tool Development

Development of the MQE tool follows the Agile Methodology which is rooted in adaptive planning, early delivery and continuous improvement. Each development sprint will result in functional product that includes meaningful improvements to the core MQE application. At the end of each sprint, a new build of the MQE project will be created, and pushed out to the MQE GitHub repository. Specific details regarding project practices are delineated in the [GitHub repository](#).

A 2-week sprint cycle will typically follow a monthly MQE Project Team meeting. Developers are expected to attend daily scrums to provide status updates to the Team, solicit help when needed, and discuss any potential blockers to getting issue resolved within the Sprint window. Secondary code review is required before any code is merged into the mast branch that will be compiled for the release.

Codebase Project

An integrated but separate project from MQE is the Codebase Project. The Codebase Project is designed to support Immunization Information System (IIS) needs when processing immunization data. It is currently used by the [MQE Project](#) and the [Aggregate Analysis Reporting Tool \(AART\) Project](#).

Some vaccine code sets (CVX, MVX), as well as the mapping tables between vaccine code sets (CVX, MVX, NDC, etc.) are developed and maintained by the CDC National Center of Immunization and Respiratory Diseases (NCIRD). The data in these tables are provided for use in health information systems. Table descriptions and formatting are described in this [Technical Guidance](#) document. Additional metadata is gathered on vaccines to support MQE's analysis. These data are stored in XML and therefore are system architecture agnostic. The Codebase Project is designed to hold all the CDC defined concepts plus additional information necessary for data quality and testing purposes (i.e., metadata).

Because the Codebase Project products cross multiple projects, including the MQE Tool, and the core codes are managed by CDC, the governance of the expanded data in the Codebase Project resides with AIRA. Updates to the Codebase Project may be proposed by anyone and must be concurred by a second member of the community before the change is accepted. More information about Codebase Project resources can be found on the [GitHub Wiki](#).

AIRA is developing a more formal model for proposing and accepting changes but that process is not yet in place and the software is not yet complete.

Application and License Information

As previously mentioned, all code for the MQE tool, as well as an [MQE Tool WIKI page](#) housing installation instructions and other documentation, exists on [GitHub](#). GitHub is a web-based hosting service that provides tools for version control and source code management of applications and software. It also provides access control and collaboration features, including bug tracking, feature requests, and task management. It is a common platform for open-source software projects. It was recently acquired by Microsoft (June 4, 2018), but at this time, major changes in the platform are not expected.

All open source software must work under a license, and have a designated license owner. The MQE tool is licensed by AIRA under the [GNU Lesser General Public License](#) (LGPL), a free software license published by the Free Software Foundation. This version of the GNU LGPL incorporates the terms and conditions of version 3 of the GNU General Public License (GPL). The LGPL is more liberal than the GPL in allowing users to roll the licensed application into their own systems, regardless of whether those systems are free or proprietary.

Support and Maintenance

Following the release of the initial version, the MQE tool will be an IIS community resource that is freely available to all IIS programs and IIS vendors, as well as to the broader health information technology community. In addition to being used as a stand-alone project, it is available to be downloaded and integrated into commercial applications. The base code will continue to be supported and maintained by the MQE Project Team. As referenced above, three key resources within the MQE Project Team are authorized with authoring privileges to commit changes into the base code of the MQE Tool.

As part of this initial release, the original vision was that the MQE Project Team could take over both administration and coordination of support and maintenance of the tool completely, and that AIRA's role could be minimal moving forward. This minimal role would include an administrative role to 1) administer Github, 2) provide conferencing tools (Uber web and conference lines, etc.) for team meetings, and 3) provide some light administrative functions (minute-taking, etc.). However, it has become clear that a more expanded role will be necessary for the time being to ensure the success of the project. This expanded coordinating role will include meeting agenda planning, meeting facilitation, and ongoing recruitment of additional resources to further sustain the project.

Process of Updating Technical Development

The following section highlights the process to create a release point for the MQE libraries, and for MQE as a deployment. Step-by-step instructions are detailed and will be maintained in the GitHub repository.

Steps for release:

- Review, and resolve all pull requests. Make sure they've all made it into the dev branches
- Merge the dev branch into master for every project that has changes
- Make sure all the pom.xml files for projects that changed are using the current release version
- Switch to the DEV branch of the MQE project

The 'Release' concept in GitHub is utilized to create a copy of the code at a specific commit. This is completed for MQE when any parts of the project have changed.

Sustainability

The absence of a dedicated funding stream makes the ongoing sustainability of the MQE Tool extremely challenging. MQE development is reliant on volunteer/in-kind resources from members across the community; many members work in programs that are understaffed, and programs are unable to dedicate significant hours of staff time to a collective effort.

As articulated above, significant effort was made to encourage the community to both engage in and take ownership for the MQE tool. It was AIRA's hope that, following the launch of the initial project, the community would be able to self-manage the further development of the MQE tool, and that AIRA's role would be minimal from that point on. However, in the absence of clear requirements and a dedicated funding stream, this has proven to have limited success to date.

Since this transition to community ownership/leadership has not yet taken place, AIRA anticipates that it will continue to have a strong administrative role, as well as a lesser coordinating role, with the MQE project moving forward.

Resource Considerations

The immediate goal of the JDI project is for an initial public release of the MQE tool that can be deployed as a stand-alone application on a desktop or shared server. The minimum requirements for this release are described in the MQE Tool Overview and Functional Requirements Document. In addition to the application, this document, and the Overview and Functional Requirements document, the following documents will also support this effort: Implementation Guide, User Guide, Test Plan(s), and Evaluation Plan. Resources to achieve this initial release have largely been accounted for in the initial JDI Project Charter and include paid AIRA staff, a paid consultant, and existing in-kind resources that serve in both technical and advisory roles. Out of pocket financial costs to build, host, maintain and coordinate the MQE tool have been mitigated and are described in the Functional Requirements document. AIRA has committed to supporting a consultant and portions of three AIRA project staff through September 2018 to complete this initial release and associated documentation.

Phase I – Initial Implementation (Summer 2018)

During the first phase, resources required to complete the initial stand-alone public release version of the tool have been outlined and accounted for in the JDI Project Charter. The ultimate goal of the JDI initiative is to set the foundation for the community to adopt the stand-alone application (i.e. the initial release) and invest in its ongoing development and use by sharing responsibility for its technical development, user community, and governance. As stated, all administrative resources for JDI-specific deliverables are supported by AIRA through September 2018. This includes JDI Project Management, meeting coordination and facilitation, document creation, and the initial community release of the MQE tool. In-kind resources are provided by interested community members, including technical (development and testing), advisory, and governance roles. AIRA is also able to support a single in-person meeting to facilitate community engagement, co-development and testing, and as a launching pad for ongoing governance strategies.

Phase II – Community Adoption (2019)

AIRA's official commitment to ongoing MQE tool development ends in September 2018. However, for a successful transition from AIRA to community ownership, AIRA may be needed to provide some limited ongoing support. This could include ongoing meeting facilitation (i.e., webinar hosting), document hosting, and participation in governance activities if requested by the community. AIRA will not be responsible for application enhancements, overall project management, or Technical Team coordination after the conclusion of the JDI project period.

Phase III – Future Considerations (2020 and beyond)

The ultimate goal is for the community to take full responsibility for the ongoing maintenance, support, coordination, and documentation for the MQE tool. At this point, AIRA's later involvement is expected to be minimal and may include the continued role of a central repository for documentation and resources that the community maintains.

Because this is uncharted territory for AIRA and the community, there are many unknowns. Resources identified below assume community adoption and broad support for the ongoing use and enhancement of this tool.

Initial Version Launch

In Fall 2018, the MQE Project Team will launch its initial version of the MQE tool and supporting documents. This will involve finalizing all code in the initial version, collecting all related materials and documents, and launching them as a package via the AIRA repository and other communication vehicles.

Project Evaluation

Several layers of evaluation are planned following the launch of the initial version, including a process evaluation that explores the role of those community members involved in the

MQE tool, and an outcome evaluation that documents the number the sites that adopt and implement the tool, and the value and impact they associate with its use.

Limitations

There were several limitations that may have affected the current strength of the project, and may have an impact on the project's future viability. For one, the concept of a community-driven and community-owned open source product is new and mostly unfamiliar to the IIS network of potential participants. This may have contributed to reticence on the part of participants to fully step into a leadership role within the project. As a result, the sprints on the whole, although functional, seem to be underachieving, and the project has moved more slowly than originally envisioned.

A further limitation of the project may be related to the project's short timeline. Although the project was formally selected in Q4, 2017, AIRA spent the initial months organizing the project and working with the small team that was already participating with the MQE Tool. Once the larger community came together to affirm or revise the existing requirements, there may not have been adequate time within the year timeline to fully engage and collaborate with the larger community.

Finally, the Project Team discussed bringing the technical developers together early on in the project for an in-person meeting, to help the group coalesce and to accelerate the pace of the project. For a variety of scheduling reasons, the decision was made to fold the MQE in-person meeting in with the AIRA National Meeting, moving the schedule for the meeting out toward the end of the project period. In retrospect, an earlier in-person may have helped the project team more easily collaborate earlier in the project and may also have created momentum that lead to a greater investment in resources deployed to the project going forward.

Conclusion

The MQE project has seen some substantial successes, including successful sprints, an increased level of community engagement, and the impending launch of an initial version of the MQE tool that incorporates standardized code sets and data quality principles. However, the MQE Tool will need more time to be adopted by additional programs across the community. The development of this open source resource has been a learning opportunity for both AIRA and the MQE Project Team. Following the release of the initial version, moving into the maintenance period will certainly bring additional lessons learned that can be applied to this and other open source projects moving forward.

Appendices

Appendix A – JDI Scorecard



Reviewer's Name: _____

Candidate Project: _____

Scorecard: Evaluation Criteria for Selection of a Joint Development Project

Context: These criteria will be used to evaluate potential joint development projects. Some of the criteria are mutually exclusive, so it is not anticipated that any single project will meet all of these criteria. Similarly, some criteria are aspirational, so projections will need to be made based on the perceived likelihood of an event occurring. These criteria focus on initial project selection; potential participating parties will need to do a secondary level of evaluation to determine benefits and risks prior to participation. Suggested evaluation criteria for potential participating parties can be found at the end of this scorecard.

Criterion	Origins	Core/ Secondary	Response	Scoring Instructions	Score
The proposed project is seen as a priority by more than one IIS.	2014 JD Guidance	Core	<input type="checkbox"/> Yes <input type="checkbox"/> No	Non-scoring. If the response is no, the project does not qualify as a joint development project.	0
The initial project risks are identified and assessed to be manageable. These could include financial, legal, contractual or other risks.	2014 JD Guidance (modified)	Core	<input type="checkbox"/> Yes <input type="checkbox"/> No	Non-scoring. If the response is no, the project does not qualify as a joint development project.	0
The expectations for participation throughout the project lifecycle can be documented.	2015 JD Advisory Workgroup	Core	<input type="checkbox"/> Yes <input type="checkbox"/> No	Non-scoring. If the response is no, the project does not qualify as a joint development project.	0
The project addresses an Immunization Program priority, an IIS priority, or both.	2015 JD Advisory Workgroup	Secondary	<input type="checkbox"/> Immunization Program Priority <input type="checkbox"/> IIS Priority	Assign one point for each	___/2
The proposed project has the potential to be implemented broadly.	2015 JD Advisory Workgroup	Secondary	<input type="checkbox"/> Could cross 3 or more IIS programs <input type="checkbox"/> Could cross multiple IIS platforms/systems <input type="checkbox"/> Could be implemented by all IIS	Assign one point for each	___/3
Benefits to development time, cost, or quality are anticipated.	2014 JD Guidance (modified)	Secondary	<input type="checkbox"/> Development time is anticipated to be shortened <input type="checkbox"/> Development cost is anticipated to be decreased	Assign one point for each	___/3

			<input type="checkbox"/> Quality of output is anticipated to be more comprehensive		
Benefits to implementation time or cost are anticipated	2014 JD Guidance (modified)	Secondary	<input type="checkbox"/> Implementation time is anticipated to be shortened <input type="checkbox"/> Implementation cost is anticipated to be decreased	Assign one point for each	___/2
Relevant standards or other guidance exists to support the project.	2014 JD Guidance (modified)	Secondary	<input type="checkbox"/> Yes <input type="checkbox"/> No	Assign one point for yes	___/1
The project addresses a funded mandate.	2014 JD Guidance	Secondary	<input type="checkbox"/> Yes <input type="checkbox"/> No	Assign one point for yes	___/1
The project is anticipated to provide greater compatibility across programs/organizations.	2014 JD Guidance (modified)	Secondary	<input type="checkbox"/> Greater compatibility across IIS <input type="checkbox"/> Greater compatibility between EHRs and IIS	Assign one point for each	___/2
It is anticipated that the project will add to the IIS knowledgebase, community stability and/or continuity.	2014 JD Guidance	Secondary	<input type="checkbox"/> Yes <input type="checkbox"/> No	Assign one point for yes	___/1
Testing tools and/or test data are planned to be created or leveraged as part of the project.	2014 JD Guidance (modified)	Secondary	<input type="checkbox"/> Yes <input type="checkbox"/> No	Assign one point for yes	___/1
The product from the project will be available to IIS projects who did not participate in the initial development for implementation at a later time.	2015 JD Advisory Workgroup	Secondary	<input type="checkbox"/> Yes <input type="checkbox"/> No	Assign one point for yes	___/1
Total Score					___/17

Evaluation criteria for potential participating parties may include:

- The timeline for availability of required functionality, if relevant, is acceptable to all project participating parties.
- All project stakeholders are fully committed to supporting the joint development project lifecycle.
- Once implemented, contractual or service level agreement changes for ongoing support of the IIS are assessed to be reasonable.
- Post-implementation, the project has an approved support plan to maintain the functionality as applicable.

Appendix B – Acronyms and Definitions

Acronym	Term and/or Definition
AART	Aggregate analysis reporting tool
Agile	An approach to project management that is utilized in software development, using incremental, iterative work sequences commonly known as sprints.
AIRA	American Immunization Registry Association
BR	Business rules
CDC	Centers for Disease Control and Prevention
CDS	Clinical Decision Support
CDSi	Clinical Decision Support for Immunizations: Logic Specifications
CVX	Code Set for Vaccines Administered
DOB	Date of birth
DQ	Data quality
DQA	Data quality assurance
FTE	Full-time equivalent
GitHub	A web-based hosting service that provides tools for version control and source code management of applications and software
GNU	A recursive acronym for “GNU’s Not Unix”
GPL	General Public License
HL7	Health Level Seven International
IG	Implementation Guide (HL7)
IIS	Immunization information systems
IISB	Immunization Information System Support Branch, a branch within CDC’s Immunization Services Division
JDI	Joint Development and Implementation
LGPL	Lesser General Public License
MQE	Message Quality Evaluation Tool
MXV	Manufacturer Code Set for Vaccines
NCIRD	National Center of Immunization and Respiratory Diseases
NDC	National Drug Codes
NIST	National Institute of Standards and Technology
OGS	Operational Guidance Statements

PHII	Public Health Informatics Institute
Scrum	An agile framework for managing work with a small number (3-9) developers who break their work into actions that can be completed in set periods of time (see sprint)
Sprint	A set period of time during which specific work has to be completed and made ready for review
VXU	HL7 immunization update message

Appendix C – Full List of Related Documents

Several related documents have been created to further support the community's engagement with the MQE Tool:

MQE Functional Requirements and Overview: This document describes technical decisions made based on requirements gathered prior to JDI involvement, and serves as a living document that will include updated requirements as they are gathered from the community. It serves as a reference for IIS technical staff as well as IIS program and management staff that are interested in reviewing the more technical components of this application.

MQE Business Case: This document provides decision makers with a high-level use case that describes the value of the MQE tool when implemented as part of the overall IIS data quality assurance strategies.

MQE Implementation Guide: This document describes the use case and requirements for the stand-alone implementation of the MQE Tool.

MQE User Guide: This document describes routine use of the stand-alone implementation of the MQE Tool.

MQE Testing Guidance: The primary objective of this document is to describe routine testing that should be completed following any sprint. The secondary objective is to provide a detailed script that can be followed to test specific expected functionality.

MQE Resource Plan: The aim of this document is twofold: 1) to describe resources needed to complete the initial release and associated documentation, and 2) to provide an outline for resource planning to support ongoing enhancements and future releases that benefit the entire IIS Community.

Open Source Product Adoption Evaluation Worksheet: This worksheet is designed to help an Immunization Program evaluate an Open Source product for potential adoption.