



Interoperability for Public Health Agencies: A Self-Assessment Tool

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Acknowledgments

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Introduction

Interoperability is defined as the ability of information systems and software applications to communicate; to exchange data accurately, effectively, and consistently; and to use the information that has been exchanged.¹ While interoperability efforts often focus on technology, it is important to consider other factors. These can include organizational, political and economic drivers of and barriers to information exchange and the development of interoperable tools.

An adapted Capability Maturity Model (CMM) serves as the basis for this self-assessment. CMM is a framework developed at the Software Engineering Institute located at Carnegie Mellon University in Pittsburgh, Pennsylvania.² According to CMM, organizations progress through levels of process maturity as they adopt more standardized and defined operating procedures designed to achieve desired objectives. Initially, an organization's practices are ad-hoc and not well understood. Success results from isolated efforts from determined individuals. With time and effort, an organization becomes more familiar with its practices and seeks to make initial successes more routine by establishing policies and governance. With even more effort, an organization learns to monitor and evaluate its processes and acts on resulting information for quality improvement. Throughout this evolution, an organization is said to become more "mature" as its processes yield results that are increasingly predictable and controllable. The maturity levels for this assessment are described in Table 1.

Table 1. Capability Maturity Model (CMM) Levels (adapted)³

CMM Level Name	General Description
0 - Absent	No capability is evident; "starting from scratch."
1 - Initial	No organized, systematic efforts, only ad hoc efforts and isolated, individual heroics.
2 - Managed	Some organized efforts have begun or are completed but not systematically documented or institutionalized.
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¹ HIMSS *Dictionary of Healthcare Information Technology Terms, Acronyms and Organizations*, 2nd Edition, 2010, Appendix B, p190.

² Software Engineering Institute. (1993). *Capability Maturity Model for Software, Version 1.1*. Pittsburg: Carnegie Mellon University.

³ CMM is a registered service mark of Carnegie Mellon University.

Components of the self-assessment will address:

- Policies
The procedures and practices that enable systems to exchange information, capabilities and services.
- Infrastructure and Shared Services
The hardware, networking and staffing that enable system interaction.
- Levels of Automation
The levels at which systems communicate automatically utilizing information technology.
- Data Standards
The data formats and technical specifications that enable information exchange.

What the assessment activity entails

For each question, you and your team will select from the descriptions of response options that are based on six levels of capability maturity (see Table 1). These levels are adapted from the Capability Maturity Model (CMM) developed by the Software Engineering Institute at Carnegie Mellon University.^{4,5} The model describes the progressive stages an organization advances through as it adopts a new process. It is not uncommon for organizations, even successful ones, to be at relatively low levels of this model. This reflects the organizational challenges that are inevitable with formally establishing new ways of working and then rigorously evaluating that work.

To score the responses across the agency, the lowest score is used as the level of capability (the scores are not averaged).

This assessment is designed to be conducted at the agency level as policies; workforce and IT hardware and software policies and practices are often a part of the agency's overall governance framework. A separate assessment designed to be answered by individual programs is under development. In addition, the primary focus of this assessment is limited to *internal agency capability* for information exchange. Few questions focus on data exchange with external partners.

⁴ Paulk, Mark C.; Weber, Charles V; [Curtis, Bill](#); Chrissis, Mary Beth (February 1993). "[Capability Maturity Model for Software \(Version 1.1\)](#)". *Technical Report* (Pittsburgh, PA: Software Engineering Institute, Carnegie Mellon University). [CMU/SEI-93-TR-024](#) ESC-TR-93-177.

⁵ Mark Paulk, Charles Weber, Suzanne Garcia-Miller, Mary Beth Chrissis, & Marilyn Bush. *Key Practices of the Capability Maturity Model Version 1.1* (CMU/SEI-93-TR-025). Pittsburgh, PA: Software Engineering Institute, Carnegie Mellon University, 1993. <http://resources.sei.cmu.edu/library/asset-view.cfm?AssetID=11965>.

Part 1: Policy, Procedure and Practice

- Policy refers to the **written, formal guidance** related to a particular practice.
- Procedure refers to the **formal processes or methods** used to ensure the intent of the policy is fulfilled. Procedures may be thought of as step by step guidance to accomplish a particular task, and they are typically formally documented. Procedures may also be thought of as an established or official way of doing something.
- Practice refers to **what actually happens**. In practice, procedures may deviate from the established guidance. Although deviations in practice may result in reduced effectiveness, efficiency, or intended result, positive deviation may lead to identification of new “best practices” and innovations. Practice may also include informal methods or approaches.

Question 1.1 Governance

Do you have an established agency-wide governance structure that supports joint decision-making and accountability for interoperability projects and practices?

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Discussion prompts

Is there an established governance body that identifies priorities for informatics projects? If so, what are the responsibilities of that group? Is the authority of the group in alignment with the responsibilities?

Key concepts

Agreement must be reached on agency functions, activities and operations across programs and ultimately support enterprise-level interoperability. An informatics governance group may be vested with this decision-making responsibility or make recommendations to the organization’s executive leadership regarding policies, processes and activities related to achieving interoperability goals. Interoperability goals might include policies related to system upgrades, decisions about which transport protocols to support, the creation of a consistent agency-wide approach to data exchange and working with a Health Information Exchange. Such a group may also enable efforts that support collaboration and coordination across programs on issues related to the exchange of data between the organization and external stakeholders, including issues related to using national standards, best practices and workflow to achieve interoperability.

Question 1.2 Interoperability Strategic Plan

Do you have an agency-wide Interoperability Plan which includes strategy, goals, objectives and measures of success?

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Discussion Prompts

Is there any documentation of a strategy which supports improved interoperability? Is it mentioned in the agency's planning documents? Are most people aware of the agency's interoperability plans? If such documentation exists, are any metrics of success included?

Key concepts

An interoperability strategic plan would typically provide a description of interoperability-related activities within the health department from a strategic view point. Such a document could provide guidance about priority activities, workforce needs (such as training and recruitment strategies), resources and investment decisions (such as decisions related to information systems life cycle management including funding, maintenance and replacement of technology), and plans for addressing interoperability gaps. Such a document could also serve to inform standard operating procedures and guidance for tactical activities at the operational level.

Questions 1.3 Change Management

Is there evidence of organizational change management practices to support interoperability efforts within the agency?

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Discussion Prompts

Is there evidence of executive-level leadership and commitment to implement the changes required for interoperability initiatives to succeed? Does the agency have any staff members designated to lead change efforts related to technology innovations or adoption? If not, are program managers aware of change management models, processes or techniques? Is training on the topic available? If so, how many staff members have participated? At what level of the organization are change management practices or policies evident?

Key concepts

A common application of change management theory and practice is to support technology adoption. The term *change management* is used to describe the processes organizations proceed through to achieve alignment of the organization’s strategy to the launch and execution of change initiatives. An example of a well-researched change management approach is *John Kotter’s 8 Step Change Model*. This model includes components of creating sense of urgency; building a guiding coalition; forming a strategic vision and initiatives; enlisting a “volunteer army”; enabling action by removing barriers; generating short-term wins; sustaining acceleration; and instituting change.

Question 1.4 Internal Stakeholders

Do you have a coordinated process for programs to analyze their internal stakeholders' information needs/desires and readiness?

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Discussion Prompts

Have internal stakeholders been identified and engaged—that is, programs that wish to exchange information but currently do not? Do you have a process or practice that supports identification of needs/desires of each program area? Does the analysis address current status and future needs? Is there any documentation available from the analysis? For example, is an action plan created? Are requirements for both partners documented? What tactics exist to support increased capacity and capability for data exchange? Have they been shared broadly?

Key concepts

Interoperability needs assessment activities will make explicit what information exchange is required (i.e., specific content or data elements to be exchanged), system capabilities (e.g., database size and server capacity to handle volume), the ability to send and receive data electronically, and the automation of data validation.

Question 1.5 External Stakeholders

Do you have a coordinated process for programs to assess the interoperability needs and desires of external data exchange partners?

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Discussion prompts

Have key external data exchange partners been identified and engaged such as other public health agencies, providers, hospitals, health plans, laboratories, pharmacies, patients and citizens? Have the needs and/or desires of each group been identified and documented? Is there a written policy that guides programs related to data exchange with external partners? Has it been broadly shared? Is it widely known?

Key concepts

Data exchange partner refers to an entity that sends data to or receives data from the organization in the course of conducting business or meeting reporting requirements. Interoperability needs assessment activities will make explicit what information exchange is required (i.e., specific content and data elements), system capabilities and technical criteria. Elements of a needs assessment may include:

- Conducting an inventory of the data exchange partners for each of your information systems.
- Identifying stakeholders' needs for information and assess your availability of that information and your ability to share that information.
- Creating a data analysis plan to be sure that you will be collecting the data you need.
- Reaching agreement about data elements to collect and explicitly determine how the information collected will be used.

Question 1.6 Data Sharing Agreements

Do you have standard policies and processes in place to establish and monitor data sharing agreements?

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Discussion prompts

Have you adopted policies, procedures, and/or practices for creating, implementing and monitoring data sharing agreements? How formal are those practices? Are they widely known? Are they supported by training? Are they standardized across the agency? Are processes in place to monitor compliance? Is there a clear decision-making process for agency approvals of data exchange agreements? If so, how well does that process work?

Key concepts

Data sharing agreements are used to establish clear parameters for exchange between organizations or operational units within an organization. These are written agreements that may include:

- Descriptions of the purpose for the data exchange agreement.
- Identified data elements that will be exchanged and descriptions of allowable use of data.
- Responsibilities of the parties in the agreement.
- Description of the frequency of data exchange.
- Provisions for reporting violations of agreements, including breaches of privacy or security.
- Privacy provisions that describe the circumstances when personally identifiable information may be re-disclosed.
- Security provisions describing who is able to view data, access data or make modifications to data and how the organization ensures only authorized individuals have access.

Question 1.7 Data Quality

Do you have established processes related to data quality monitoring, assessment and remediation across programs?

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Discussion Prompts

Do you have policies, procedures, and/or practices in place to assess data quality? Are these documented? Are they consistently adhered to? Do you have staff dedicated to data quality assurance? Do policies apply only to incoming data, to data at rest (i.e., in the database) or to both? Have routine data quality checks been automated? Does the agency establish metrics for data quality? For example, if the agency has high quality data for 50 percent of programs, is that an acceptable level?

Key concepts

Data quality criteria can include timeliness, completeness and accuracy. Practices associated with data quality assurance include validating data entry, assessing data completeness and accuracy (e.g., use of proper codes, data in the right segment within an HL7 message, data seems appropriate given the source), and establishing and monitoring metrics for data quality.

1.8 Information Technology Standards

Do you have established processes related to identifying, adopting and using health IT standards for public health programs?

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Discussion Prompts

Is there a process in place that supports programs to identify and adopt relevant standards for their practice area? Does the agency provide guidance for programs wanting to learn about and use national standards for electronic data exchange? Are there activities to support consensus-building and decision-making to identify and adopt standards? Have you identified the data formats and technical specifications that enable information exchange? Do you have documented processes for working with system vendors and developers to ensure appropriate use of national vocabulary standards?

Key concepts

Standards for health IT can include vocabulary standards (how data are recorded), messaging standards (how data are packaged before sending to others), and transport protocols (how data are sent).

Question 1.9 Project Evaluation

Do you have metrics established for assessing your interoperability initiatives?

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Discussion prompts

To what degree are you using metrics to assess progress to increase interoperability capabilities? Are there established metrics designed to measure progress toward achieving interoperability goals? How is data collected and used to measure effectiveness? Are the results broadly shared and discussed with staff, partners and leadership?

Key concepts

Evaluation is the systematic collection of information about activities and characteristics of a program to make judgments about its effectiveness and to inform program decisions. Interoperability capability should be evaluated to determine whether those capabilities are effective in achieving established program or agency goals for information exchange.

Question 1.10 Buy vs Build Decisions

Do you have an established process to guide technology investment decisions at the agency and program levels?

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Discussion Prompts

Is guidance provided to programs to enable “buy versus build” decisions for technology investments? How are these decisions made now? Does a clear decision-making process exist? Are national standards considered for use as a part of that process?

Key concepts

Deciding whether to build an in-house solution (information system) versus buying or customizing a commercial off-the-shelf (COTS) product is generally a complex decision which may include validating the need for the technology, documenting business processes, understanding architectural requirements, estimating return on investments for alternatives and determining how the solution will be supported in the long run. “Buy or build” analyses should be conducted at both the strategic and operational levels. Variables considered at the strategic level may include how well the planned technology supports the agency’s long-term goals, identification of anticipated future trends which may impact the decision, impact of anticipated policy or regulatory changes, determining whether the agency can support a COTS solution, and determining whether an existing information system exists which could support another program’s needs. At the operational level, such guidance could address how to assess a COTS product, including whether there is adequate design documentation to inform decision-making (i.e., more than a demonstration); who and how will the product be supported; whether the system is scalable and can meet future needs; and the degree of customization required to meet the program’s needs.

Question 1.11 Leadership and Coordination

Do you have staff members dedicated to leading, implementing and maintaining interoperability projects?

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Discussion Prompts

Is there a designated individual or unit that has responsibility for interoperability projects within the agency? If so, do these individual(s) have other responsibilities in addition to interoperability? Is the scope of the activities limited to internal stakeholders, or does it extend to working with external organizations, such as health care providers and other governmental agencies?

Key concepts

Having experienced informatics professionals who have a demonstrated knowledge of interoperability concepts and standards is an important factor in achieving successful outcomes for interoperability projects. If interoperability is a shared responsibility across agency departments, the level of coordination and support from leadership also plays a significant role for success.

Part 2: Infrastructure and Shared Services

Infrastructure refers to **resources** the agency provides to programs to support data use and exchange. Resources include both human resources—such as access to specialized staff and training—and IT hardware and technology support that is provided at the agency level.

Shared or centralized services such as provider registries or master patient indices that are **leveraged across an agency** can allow programs to access resources and tools they would not otherwise be able to implement. Shared services can also facilitate a uniform and standards-based adoption of programmatic functions, while supporting common goals and processes.

Question 2.1 Access to IT Professionals and Services

Does the agency staff have access and receive support for desktop automation software such as email, Microsoft Office, etc.?

- | | | |
|--------------------------|---------------|---|
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Discussion prompts

Does agency staff have access to desktop software such as Microsoft Word, Excel, PowerPoint, and Access? Does agency staff have access to email? Are staff members able to access information technology professionals, such as network administrators and help desk professionals, on an “as needed” basis? Is availability and access to these professionals sufficient to meet the agency’s needs? Is there any written documentation that describes expectations and service agreements between programs and IT for human resource requirements? Is it clear when these positions should be embedded in programs versus IT providing an assigned resource to the program?

Key concepts

Agency personnel may be unable to access needed resources at a sufficient level to meet their needs. Examples of written documents which could support this capability include formal staffing plans or HR recruiting practices and/or service level agreements (SLA) between IT department and programs. SLAs may address access to key information technology professionals; acceptable wait and response times for service related incidents; what services are available to what customers; and the level of service or quality the customer can expect and how that service will be delivered and monitored.

Question 2.2 Access to IT Professionals and Services

Does the agency staff have access and receive support for custom or commercial programs that support public health programs such as registries, surveillance or other database applications?

- | | | |
|--------------------------|---------------|---|
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Discussion prompts

Does program staff have access to commercial or custom programs that support the program’s needs such as registries, surveillance systems or other database applications? Are program staff members able to access information technology professionals, such as network administrators, database administrators, programmers, business analysts and help desk professionals, on an “as needed” and timely basis? Is availability and access to these professionals sufficient to meet the program’s needs? Do assigned resources (information technology professionals) support the program’s needs and help them achieve program level goals and objectives? Is there any written documentation that describes expectations and service agreements between programs and IT for human resource requirements? Is it clear when these positions should be embedded in programs versus IT providing an assigned resource to the program?

Key concepts

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Question 2.3 Access to Program Expertise

Do you have workforce policies or practices to enable utilization of data for planning, decision-making, and resource allocation and population health improvement?

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Discussion prompts

Are program staff members able to access needed expertise for specialists such as epidemiologists, statisticians and informaticians, and communication specialists? Do staff members and the agency specialists have access to software applications tools such as mapping, statistical and other graphical software? Do most programs use these professionals to turn data into information? For programs that do not have these positions within their staff, what provisions are made to support effective use of data?

Key concepts

The ability to produce actionable information from data is a foundational public health capability. This question intends to assess the degree to which the agency staff members have access to needed expertise. To put data to use effectively—the key concept— programs need access to professionals who can turn data into actionable information useful for planning, decision making and evaluation.

Question 2.4 Training

Do staff members have regular and ongoing access to training for informatics or health information technology?

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Discussion prompts

Has any assessment of training needs of the workforce related to Health Information Technology (HIT) and/or informatics been conducted? How are training needs identified? Do metrics associated with the provision of training exist? Are policies in place to support professional development such as flexible schedules or reimbursement to attend training? How are agency staff members learning about interoperability?

Key concepts

Training for HIT and informatics may include topics such as terminology, electronic health record (EHRs) and their use within public health, meaningful use, roles and responsibilities in managing digital data, change management, project management, and orienting staff members to agency requirements for implementation of applicable policies and procedures. Additional informatics skills and competencies include business process analysis, requirements definition, and health information exchange.

Question 2.5 Test Environment

Do you support testing environment(s) for end users and program staff?

<i>Check Box</i>	<i>CMM Level Name</i>	<i>General Description</i>
<input type="checkbox"/>	0 - Absent	No capability is evident; “starting from scratch.”
<input type="checkbox"/>	1 - Initial	No organized, systematic efforts, only ad hoc efforts and isolated, individual heroics.
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<input type="checkbox"/>	3 - Defined	Systematic, ongoing efforts underway, but there is no overall method to measure progress or to ensure coordination.
<input type="checkbox"/>	4 - Measured	Systematic, ongoing efforts underway to measure progress and ensure coordination.
<input type="checkbox"/>	5 - Optimized	Systematic, ongoing efforts underway with quality improvement activities to align assessment results with guiding vision, strategies and performance metrics.

Discussion prompts

Does the agency support any type of environment in which non-technical staff can try out features of software prior to release or implementation? Are end users queried about preferences for the system design elements that affect or support users? Examples of such features may be user interfaces (how the screen appears to the user), use of drop-down menus, and graphical display of data or icons for shortcuts. Does the agency support testing of other technologies such as electronic message processing, text mapping of terminology, etc.?

Key concepts

A test environment is considered a best practice as part of information system design and is intended to be a collaborative process between the software developer, other members of the IT team, and the customers or end users. A typical software development process would provide a test environment (sometimes referred to as a “playground” or “sandbox”) in which end users or other members of the development team can safely try out features of the software prior to full-scale release or implementation. Such a practice allows errors in the code to be identified early, reducing risk of adversely affecting the program or agency during a large-scale implementation. In addition, developers may make modifications to the way the screens appear to users or how data is displayed. Increasingly workflow and user interface plays an important role in ensuring high quality data and outcomes.

Question 2.6 Record Matching

Do you have the ability to link patient records or aggregate information about a patient when legally authorized to do so?

<i>Check Box</i>	<i>CMM Level Name</i>	<i>General Description</i>
<input type="checkbox"/>	0 - Absent	No capability is evident; “starting from scratch.”
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Discussion prompts

Are there policies, processes and practices in place that support record matching so that, when appropriate, the agency is able to produce consolidated information about individuals who receive services from public health programs? Does the agency provide any technology or guidance to support program efforts, such as a master patient index or standardized guidance for record matching processes?

Key concepts

Record matching is a foundational capability associated with data integration and de-duplication of records. Specifically, the capability to uniquely identify individuals whose data are held in disparate data sources or information systems to produce linked data sets or merged records enables the health department to accurately describe who has received what services from the public health department. This capability would involve tools that allow the selection of variables to determine a match, the weighting of probability for the influence of the variable, the weighting for cultural considerations e.g. similar last names, and rules and policies of what to do when a match is made or not made for a particular purpose. Common programs that would utilize record matching are any service area in which individual care is provided by the health department (e.g., prenatal care, home visiting programs, HIV services or directly observed therapies). Many public health agencies do not provide direct patient care but may have individual data for mandated services which are provided by data sharing partners and reported to public health agencies. Such services may include immunizations, communicable diseases, STIs or newborn screening including hearing and metabolic testing.

Question 2.7 Enterprise Architecture/Shared Information Services

Do you support any enterprise-level shared services such as a provider or facility registry or master patient index across programs to facilitate information exchange?

<i>Check Box</i>	<i>CMM Level Name</i>	<i>General Description</i>
<input type="checkbox"/>	0 – Absent	No capability is evident; “starting from scratch.”
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<input type="checkbox"/>	4 – Measured	Systematic, ongoing efforts underway to measure progress and ensure coordination.
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Discussion prompts

Do you know how many programs are using some type of database or process for capturing services provided by programs? How are individual records managed at the program level across the agency, e.g. how many programs are managing data from hospitals, clinics, dental offices, pharmacies, other local health departments and others? Do you have processes or information systems/databases that document the location and types of facilities in the agency’s catchment area? How many of those systems exist? Are there any situations in which multiple programs utilize or share a database for this type of information?

Key concepts

The key concept of shared services contributes to the capability of an enterprise view of information and the technology supports to operationalize this concept. A provider or facility registry refers to a centralized registry of individual providers (such as physicians, nurse practitioners, audiologists, psychologists) and/or health care, social services and other facilities (restaurants, child care centers, nursing homes, mental health facilities, clinics or hospitals). A Master Patient Index (MPI) is a database that includes information about the individuals who have received services including contact information and specific services received. MPI and facility or provider registries enable integration of records that can serve public health departments to conduct surveillance, support emergency preparedness activities and track outbreaks.

Question 2.8 Enterprise Architecture/Shared Services

Do you provide any message or information integration services to programs?

Check Box	CMM Level Name	General Description
<input type="checkbox"/>	0 - Absent	No capability is evident; "starting from scratch."
<input type="checkbox"/>	1 - Initial	No organized, systematic efforts, only ad hoc efforts and isolated, individual heroics.
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<input type="checkbox"/>	4 - Measured	Systematic, ongoing efforts underway to measure progress and ensure coordination.
<input type="checkbox"/>	5 - Optimized	Systematic, ongoing efforts underway with quality improvement activities to align assessment results with guiding vision, strategies and performance metrics.

Discussion prompts

How are programs supported by the agency to process large volumes of data as part of data exchange? Has any assessment been conducted related to the number of type of message formats in use at the agency? Are any technology supports provided to programs that facilitate data exchange specific to sharing coded health data?

Key Concepts

Message integration services support the capability to enable the flow of information between disparate information systems. For example, programs may use institutional coding formats that would need to be translated to standard coding formats like LOINC, SNOMED or HL7 to send that data to a health care facility. An example of a message integration service could be an *interface engine*, a type of software that electronically scans messages and translates formats. Once the institutional codes are translated and the other parts of the messages are validated, the interface engine reconstructs each message for transmission to and from the data sharing partner. An interface engine may also include error detection and resolution mechanisms to handle those instances where source systems transmit invalid codes or make other common mistakes. Interface engines are typically needed to support the capability to process and parse large volumes of messages efficiently, support ease of mapping data elements and provide flexibility handle various messaging formats.

Question 2.9 Coordination of Shared Services

Do programs within the agency work independently when working with external data providers?

<i>Check Box</i>	<i>CMM Level Name</i>	<i>General Description</i>
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Discussion prompts

How are programs supported by the agency to onboard/implement external data providers? Is the process centralized within one unit of the agency? Is each program/department responsible for the process of onboarding? Are there interoperability subject matter experts within each program/department?

Key concepts

Shared services enables resources to be leveraged across the entire agency that can result in lower costs and higher stakeholder satisfaction. Onboarding refers to the process of identifying stakeholders, informing them of the option for data exchange, education, enrolling them into a defined process, receiving data from the external data provider into agency information systems, and resolving technical issues and barriers to exchange. An example of data exchange with an external partner is receiving electronic health record (EHR) data from emergency departments into an agency-wide syndromic surveillance system.

Part 3: Levels of Automation

Levels of automation refers to the level at which systems communicate automatically utilizing information technology. The levels are measured based on how electronic data is received by the agency and the amount of human-interaction that is necessary to make data usable by the agency.

Question 3.1 Data Exchange Partners

Have you completed an assessment that identifies existing or potential data exchange partners and their exchange readiness and capabilities?

<i>Check Box</i>	<i>CMM Level Name</i>	<i>General Description</i>
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<input type="checkbox"/>	5 - Optimized	Systematic, ongoing efforts underway with quality improvement activities to align assessment results with guiding vision, strategies and performance metrics.

Discussion prompts

Has the agency identified both existing and potential electronic data exchange partners? Which partners are external to the agency? Are the identified partners ready and willing to exchange data with the agency? Are the identified partners able to exchange data via commonly used data and transport standards?

Key concepts

Data exchange partner refers to an entity that sends data to or receives data from the agency in the course of conducting business or meeting reporting requirements. For the purpose of this question, consider data exchange partners both internal and external to the agency. Readiness refers to the level at which the partner is prepared and willing to exchange data with your agency. Capabilities refer to the data exchange partner’s ability to exchange data in a standardized way that will meet the business objectives or reporting requirements. Capability can also include the organization’s readiness, technical readiness, data/information readiness, and program lever readiness of the partner.

Question 3.2 Data Exchange Capability with Internal Partners

Do you have the capability to electronically exchange data with internal partners?

<i>Check Box</i>	<i>CMM Level Name</i>	<i>General Description</i>
<input type="checkbox"/>	0 - Absent	No capability is evident; “starting from scratch.”
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<input type="checkbox"/>	5 - Optimized	Systematic, ongoing efforts underway with quality improvement activities to align assessment results with guiding vision, strategies and performance metrics.

Discussion prompts

Is data exchanged with internal partners using electronic means or mainly via paper-based forms? If data is electronic, is there a high level of human interaction that is required for the data to become usable? Do the electronic messages received utilize established data code set standards, such as SNOMED-CT, LOINC, ICD-10? Do electronic messages receive utilize standard message structures, such as, HL7?

Key concepts

Internal data exchange partners refer to intra-agency providers. These partnerships include programs/departments within the same agency.

Capability refers to the ability of the agency to exchange data with partners via standards based electronic messages.

Question 3.3 Data Exchange Capacity with Internal Partners

Do you have established goals and metrics for achieving a high proportion of electronic data exchange with internal partners?

<i>Check Box</i>	<i>CMM Level Name</i>	<i>General Description</i>
<input type="checkbox"/>	0 - Absent	No capability is evident; “starting from scratch.”
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<input type="checkbox"/>	5 - Optimized	Systematic, ongoing efforts underway with quality improvement activities to align assessment results with guiding vision, strategies and performance metrics.

Discussion prompts

Has the agency established a goal for the percentage of data exchanged electronically with their internal partners? Does the agency measure based on established metrics the proportion of data exchanged via standards based electronic messages?

Key concepts

The defined goal for the proportion of electronic messages exchanged defines the capacity at which the agency sends and/or receives standards based electronic messages.

Question 3.4 Data Exchange Capability with External Partners

Do you have the capability to electronically exchange data with external partners?

<i>Check Box</i>	<i>CMM Level Name</i>	<i>General Description</i>
<input type="checkbox"/>	0 - Absent	No capability is evident; “starting from scratch.”
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<input type="checkbox"/>	4 - Measured	Systematic, ongoing efforts underway to measure progress and ensure coordination.
<input type="checkbox"/>	5 - Optimized	Systematic, ongoing efforts underway with quality improvement activities to align assessment results with guiding vision, strategies and performance metrics.

Discussion prompts

Is data exchanged with external partners using electronic means or mainly via paper-based forms? If data is electronic, is there a high level of human interaction that is required for the data to become usable? Do the electronic messages received utilize established data code set standards, such as SNOMED-CT, LOINC, ICD-10? Do electronic messages receive utilize standard message structures, such as HL7? Are there processes and policies in place that allow for the integration of data into agency applications? Are practices in place to return information to the sender if needed?

Key concepts

External data exchange partners refer to inter-agency providers. These partnerships can include external health care providers, other governmental agencies, health information exchanges, etc. External partners and those who need access to the information typically require a data use/data exchange agreement. **Capability** refers to the ability of the agency to exchange data with partners via standards based electronic messages.

Question 3.5 Data Exchange Capacity with External Partners

Do you have established goals and metrics for achieving a high proportion of electronic data exchange with external partners?

<i>Check Box</i>	<i>CMM Level Name</i>	<i>General Description</i>
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<input type="checkbox"/>	5 - Optimized	Systematic, ongoing efforts underway with quality improvement activities to align assessment results with guiding vision, strategies and performance metrics.

Discussion prompts

Has the agency established a goal for the percentage of data exchanged electronically with their external partners? Does the agency measure based on established metrics the proportion of data exchanged via standards based electronic messages?

Key concepts

The defined goal for the proportion of electronic messages exchanged defines the capacity at which the agency sends and/or receives standards based electronic messages.

Part 4: Data Standards to Achieve Interoperability

Standards refer to the data formats and technical specifications that enable information exchange. Part 4 utilizes the structure from the 2016 Interoperability Standards Advisory from the Office of the National Coordinator (ONC). The purpose of the Advisory is to coordinate the identification, assessment and determination of the “best available” interoperability standards and implementation specifications for industry use to fulfill specific clinical health IT interoperability needs.⁶

⁶ Office of the National Coordinator for Health IT. 2016 Interoperability Standards Advisory: Best Available Standards and Implementation Specifications. <https://www.healthit.gov/standards-advisory/2016>

Question 4.1 Evaluation of Standards

Do you have established processes to evaluate the applicability of standards to be utilized by the agency?

<i>Check Box</i>	<i>CMM Level Name</i>	<i>General Description</i>
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Discussion prompts

Do you have a process to evaluate the applicability of standards in terms of readiness and current adoption status? Is there a process to validate proposed recommendations on standards with subject matter experts within the agency? Can you reach a decision when there is more than one standard to be used internally and with community partners? Are there viable alternative standards? What state and national groups endorse the standards?

Key concepts

Standards should be evaluated for applicability for the agency to determine readiness and the current state of adoption within the industry. Considerations on the maturity of the standards and the extent the standard is currently being used or could be used can also be considered.

Activities include:

- Monitoring the landscape to identify standards and related activity like federal and national organization standards activity such as the ONC Interoperability standards advisory, CDC, NIST, CMS and others. Also from national standard development organizations such as HL7, NCPDP, SNOMED and LOINC.
- Monitoring of local public health needs when uniformity of value (code) sets or processes are needed but national standards do not exist OR multiple standards exist but local decisions on which one to use have not yet been decided.
- Analyzing and evaluating maturity, cost and other factors .
- Offering recommendations for specific standards for sharing and synchronizing patient information across interoperable electronic health record systems and across the continuum of care.

Example: <https://www.healthit.gov/sites/default/files/2016-interoperability-standards-advisory-final-508.pdf>

Question 4.2 Identify/Monitor Standards

Do you have established processes to identify and monitor relevant versions of IT standards that are currently in use within the agency?

<i>Check Box</i>	<i>CMM Level Name</i>	<i>General Description</i>
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Discussion prompts

To what degree do you have processes (i.e., strategy, timeline, and plan) to phase in new versions of standards and sunset old versions? Does the agency have a point person or group who is responsible for monitoring national standards activities or standards development organizations?

Key concepts

New and updated versions of standards, such as ICD, SNOMED, HL7, LOINC, and messaging services, are released periodically. The usage of outdated standards may affect an agency's ability to exchange data with its partners. Identification and analysis processes can also include analysis of existing standards for programmatic use, analysis of standards utilized by national program areas (i.e., Meaningful Use), and identifying tools and recourses that support implementation of standards. The process should transition issues such as the timing and when to allow use of a standard versus when to require the use of a standard. A communications strategy should also be developed for interacting with external partners on the timing and training of the new versions. A testing protocol should be used for rolling out the standards and a quality review process for identifying and addressing any roll-out issues.

Question 4.3 Standard Vocabularies/Code Sets/Terminology

Have you adopted standard vocabularies for clinical terms or classifications (e.g., LOINC, SNOMED-CT, ICD-10)?

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Discussion prompts

Do you utilize standard vocabulary/code sets/terminology for clinical data?

Key concepts

Vocabulary standards refer to the commonly accepted terminologies and code systems used by systems developers for the clear and efficient transmission of information between information systems. LOINC and SNOMED-CT are two commonly used vocabulary standards for laboratory observations and clinical terminology, respectively.

Question 4.4 Standard Message Content/Structure

Have you adopted message (or content) standards for health information (e.g., HL7 version 2, Clinical Document Architecture, etc.)?

<i>Check Box</i>	<i>CMM Level Name</i>	<i>General Description</i>
<input type="checkbox"/>	0 - Absent	No capability is evident; “starting from scratch.”
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Discussion prompts

Do you utilize standard message or content structure for data exchange? Are the choices clearly communicated to the programs? Are the implementation specifications for use cases (e.g., immunizations) known? Are the experts in messages known and the training materials published and assessable?

Key concepts

Message (or content) standards refer to commonly accepted structures for electronic messages used to exchange information between systems. Message standards specify how data elements (typically represented with standard vocabularies) should be arranged. Health Level Seven (HL7) is an organization that specifies message standards for health care. In public health contexts, most HL7 messages conform to Version 2 or the newer Version 3, which is based on HL7’s Clinical Document Architecture (CDA).

Question 4.5 Standard Message Services

Have you adopted standard message services/transport methods for electronic health information (e.g., Secure FTP, Direct, Web services, PHIN MS, NwHIN)?

<i>Check Box</i>	<i>CMM Level Name</i>	<i>General Description</i>
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Discussion prompts

Do you utilize standard messaging services for data exchange? Are the choices published and the training and implementations specifications known and available?

Key concepts

Message service/transport standards refer to the methods and approaches used by organizations to send and receive electronic messages. Transport standards are distinct from the actual content of the message and can vary in degrees of technological sophistication and approaches to security and encryption. Transport standards used in public health include, but are not limited to, Secure File Transport Protocol (SFTP), Direct (based on secure email), Public Health Information Network Messaging System (PHIN MS, which is provided by CDC and based on ebXML), and Web services used in service-oriented architectures.