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February 2019

**Building an Informatics-savvy Health Department:**

**A Self-assessment Tool**

**Acknowledgments**

PHII thanks all the agencies and individuals who contributed to developing the informatics-savvy health department resources available at www.phii.org/infosavvy. These include:

* Chicago Department of Public Health
* Dakota County (MN) Public Health
* Denver Public Health
* Detroit Health Department
* Minnesota Department of Health
* New Hampshire Division of Public Health Services
* Oregon Health Authority
* Puerto Rico Department of Public Health
* St. Louis County (MN) Public Health
* Tarrant County (TX) Public Health
* Tri-County (CO) Health Department
* Washington State Department of Health
* Whatcom County (WA) Health Department
* ASTHO and NACCHO

PHII wishes to particularly thank the following individuals:

* The Applied Public Health Informatics Fellows and the Informatics Training in Place Fellows who took the initiative to use the informatics-savvy self-assessment tool in their projects.
* Kari Guida, Minnesota Department of Health Office of e-Health and HIT, for creating the small group process described in this facilitator’s guide.
* Ed Baker, who made possible the series of Management Moment columns in the Journal of Public Health Management and Practice on informatics-savvy health departments.
* Martin LaVenture, Minnesota Department of Health Office of e-Health and HIT, who co-authored all the Management Moment columns mentioned above.
* Judy Lipshutz, CDC Office of State, Tribal, Local and Territorial Support for her financial and moral support from 2013-2018 for the informatics-savvy health department project.

Development and testing of the informatics-savvy health department toolkit was made possible through cooperative agreement no. 1U38OT000216-1 from the Centers for Disease Control and Prevention, Office of State, Tribal, Local and Territorial Support

# Introduction

Data and information have always been critical to the public health mission and operations. Receiving, managing, using and sending digital data, however, require a level of informatics capabilities that many health departments are still struggling to define and to build across the health department, especially in a coordinated way. This assessment was developed to assist in those efforts by both defining necessary informatics capabilities, and by enabling a self-assessment that aids in planning and priority setting.

But first, what do we mean by “informatics” and an “informatics-savvy health department”? We define public health informatics as the discipline that supports the effective use of information and information technology to improve public health practice and population health outcomes. We define an informatics-savvy health department as one which has three core elements:

* An overall vision and strategy for how it uses information and information technology as strategic assets.
* A workforce skilled in using information and information technology.
* Well-designed and effectively used information systems.

Each of those three elements in turn has several specific capabilities. This self-assessment instrument focuses on those specific capabilities, enabling you to identify where your health department falls on a continuum. It will highlight current strengths upon which you can build, as well as areas that are candidates for strengthening.

## What the planning activity entails

For each of the specific capabilities, you see a range of closed-ended response options that are based on six levels of capability maturity (see Table 1). These levels are adapted from the Capability Maturity Model developed by the Software Engineering Institute at Carnegie Mellon University. The model describes the progressive stages an organization advances through as it adopts a new process or practice. 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 across an organization and then rigorously evaluating that work.

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

| **CMM level name** | **General description** |
| --- | --- |
| 0 - Absent | No capability is evident; “starting from scratch.” |
| 1 - Initial | No organized, systematic efforts to build informatics capacity exist, only ad hoc efforts and isolated, individual heroics. |
| 2 - Managed | Some organized efforts have begun or been completed, but are not systematically documented or institutionalized. |
| 3 – Defined  | Systematic, ongoing efforts are underway, but there are no overall method to measure progress or to ensure coordination. |
| 4 - Measured | Systematic, ongoing efforts are underway to measure progress and ensure coordination. |
| 5 - Optimized | Systematic, ongoing efforts are underway with quality improvement activities to align results with guiding vision, strategies and performance metrics. |

For each question in this self-assessment instrument, a range of specific response options are provided. Only one response should be selected for each question.

Before you begin, you will need to decide if you are conducting this organizational self-assessment at a health department-wide, program or other level.

The greatest value in conducting such assessments is in the conversations that will occur among participants as you decide what answer to give for each capability. It may well be that this will be the first time that staff from across your health department or major program area will have discussed information and information technology as a shared and strategic asset, one of equal importance to all, yet one which may not have been previously approached in a systematic or coordinated way. The richest conversations will come from being inclusive in who you engage to be on the team. We recommend having senior decision makers, data users/analysts, users of information system (programmatic or administrative), IT staff (including from a central IT office), and whoever else could contribute to developing or supporting a shared informatics vision and strategy, a workforce skilled in using information and information technology, and effectively used information systems.

# Section 1: Vision, Strategy and Governance

**Question 1.1 Information Assets and Needs**

**Have we completed an assessment intended to describe our information assets and information needs?**

* Level 0 We have not undertaken this assessment.
* Level 1 We have made initial or periodic efforts to conduct this assessment.
* Level 2 We have made or are making a sustained attempt to conduct this assessment.
* Level 3 We have completed such an assessment.
* Level 4 We have completed an assessment and established a method to evaluate our information assets and needs.
* Level 5 We use evaluation findings to improve how we utilize information assets to meet our information needs.

**Key concepts**

**Information assets** refer to any definable piece or grouping of information which is managed and used to bring value to the organization. Typically, information assets are not easily replaceable without significant costs, skills, time and/or other resources. Examples include data sets from surveillance systems and registries, or from surveys or health statistics.

I**nformation needs** refer to the data and information that are required for public health practitioners to accomplish work goals and objectives. Examples of work goals for common public health functions might include: conduct analysis; inform decisions; perform surveillance activities; confirm a case; manage operations; etc.

**Discussion prompts**

1. Have needs or challenges been identified that could be met by informatics practices? Has our health department considered how to assess these needs? Do gaps between needs and assets or capabilities impact achievement of the vision or strategy?
2. Does the health department have sufficient informatics capability to meet current demands for information exchange with community partners? Across programs within the health department? Are there efforts to build internal capabilities in this area?

**Question 1.2** **Vision and Strategy**

**Do we have a documented informatics vision and strategy?**

* Level 0 We have not attempted to develop such a strategy.
* Level 1 We have made initial, but isolated, ad hoc efforts to develop a strategy.
* Level 2 We have made or are making a sustained attempt to develop a strategy.
* Level 3 We have a documented strategy.
* Level 4 We have a documented strategy and established a method to evaluate our implementation.
* Level 5 We evaluate strategy implementation and uses evaluation findings to improve information capabilities.

 **Key concepts**

**Informatics** **vision**refers to a statement of what the health department seeks to achieve as a result of establishing a high level of information capability. The term **strategy** refers to a written “plan of action” for achieving specific goals or outcomes related to the health department’s established information capability. **Information management** refers to the processes and practices that support acquisition, collection, storage, retrieval and use of data and information from multiple sources and formats, and the distribution of that information to multiple audiences, stakeholders and/or other users.

**Discussion prompts**

1. Does our health department have an “informatics vision”? Does our health department have a written strategy document that specifically seeks to achieve the informatics vision? If so, is that document widely distributed and known by most employees?
2. Does our health department have strategies and action steps that address workforce needs, funding, information technology infrastructure and partnership with both internal groups and external organizations?
3. Are there established metrics designed to measure progress toward goals? How are data collected and used to measure progress? Are the results broadly shared and discussed with staff, partners and leadership? Do metrics inform decisions and shape interventions?

**Question 1.3 Governance Process**

**Do we have an established governance process to guide major information and/or information system decisions?**

* Level 0 We have no such governance process.
* Level 1 We have made occasional efforts to govern major information and/or information system decisions.
* Level 2 We have made periodically established governance for specific information and/or information system decisions.
* Level 3 We have made sustained efforts to govern major information and/or information system decisions.
* Level 4 We have an ongoing process to govern information and information system.
* Level 5 We use evaluation findings to improve governance of information and information systems.

 **Key concepts**

**Governance process** refers to how decisions get made and approved. This may include a written plan which describes who participates in decision making, a governance structure such as a committee, descriptions of how decisions are made and who has approval authority for what levels of decisions.

**Major information and information systems decisions** might include: a formal information governance policy and standing committee; decisions around procuring a new system, migrating from an existing to a new system, or rolling out a major upgrade to an existing system; and a formal and consistent policy and procures for managing information requests from the media, researchers or other external parties.

**Discussion prompts**

1. Do you have a formal information governance plan for the health department?
2. Is a formal decision-making process for prioritizing, selecting, procuring and/or developing information systems documented?
3. Would a program embarking on a major system change know where and how to begin that process?

**Question 1.4 Funding Plan**

**Do we have a systematic, sustained approach to funding informatics strategy and/or activities?**

* Level 0 We have no specific process for funding informatics activities.
* Level 1 Our informatics funding is sporadic and not based on a plan.
* Level 2 We occasionally plan for informatics funding.
* Level 3 We routinely plan for informatics funding and can sustain critical informatics functions over time.
* Level 4 We have established a method to evaluate long-term informatics funding approaches.
* Level 5 We use evaluation findings to improve informatics funding.

**Key concepts**

A sustained approach to funding may include activities undertaken to identify the potential sources of revenue (where will money come from) and how the organization will seek the funds (state or local funds, CDC cooperative agreements, grants, partnerships, monetized services) to support informatics activities. An approach may include development of a **funding plan** that describes revenue goals and includes measurable objectives or benchmarks, as well as action steps related to the funding strategy. It may also include an analysis of the financial, physical facility and human resources (both staff and volunteer) needs.

**Discussion prompts**

1. What efforts have been made related to a comprehensive funding strategy with associated informatics activities? How effective have these efforts been? How do we ensure that the approach brings value to programs?
2. How stable are the identified funding sources? How diversified?
3. Are informatics activities sufficiently funded to achieve the operational goals and objectives? Are there currently or anticipated gaps in funding that require specific strategies?

**Question 1.5 Internal Data Exchange**

**Do we have a strategy to improve data exchange *internally—*that is, among our programs within the health department or within a broader health and human services agency?**

* Level 0 We have not developed such a strategy.
* Level 1 We have made isolated and ad hoc efforts to develop such a strategy.
* Level 2 We have developed/are implementing such a strategy.
* Level 3 We have developed and are implementing such a strategy and update it periodically.
* Level 4 We have established a method to evaluate our internal data exchange/sharing.
* Level 5 We use evaluation findings to improve internal data exchange/sharing and the strategy.

**Key concepts**

**An internal data exchange strategy** refers to a systematic, preferably health department-wide approach to optimize data available within the health department across programs. Examples include using birth registration records to create records on newborns for population-based registries (e.g., immunization registries, newborn screening), sharing immunization records with WIC or surveillance systems, or home water well testing data with home visiting programs. It also includes ways in which such internal exchange can be improved or increased to ultimately provide greater value to internal or external users of the information. This may require working through different confidentiality/consent/allowable use requirements.

**Discussion prompts**

1. Have all current data sharing arrangements been documented?

2. Have *desired* exchanges, those that don’t currently occur but which programs would like to see happen, been identified and documented, including the value of such exchanges to the health department, to external information users and/or the community?

**Question 1.6 External Data Exchange**

**Do we have a strategy to improve data exchange with *external* partners?**

* Level 0 We have not developed such a strategy.
* Level 1 We have made isolated and ad hoc efforts to develop such a strategy.
* Level 2 We have developed/are implementing such a strategy.
* Level 3 We have developed and are implementing such a strategy and update it periodically.
* Level 4 We have established a method to evaluate our internal data exchange/sharing.
* Level 5 We use evaluation findings to improve internal data exchange/sharing and the strategy.

**Key concepts**

**An external data sharing strategy** refers to a documented approach and plan for systematizing and optimizing data exchange between the health department and its various community partners such as healthcare providers, laboratories, the Medicaid program (if in any agency), and state-local health department exchanges. Such exchanges can include birth and death registration, laboratory results, bi-directional immunization record exchanges, continuity of care records with providers, data to health plans and payers, and other forms of electronic exchange, regardless of format (HL7, flat file) or transport (SFTP, SOAP, PHIN MS, etc.). It can include both individual/protected health information or summary data. Developing an external data sharing strategy may require working through different confidentiality/consent/allowable use requirements.

**Discussion prompts**

1. Does the strategy document how data exchange can improve clinical, public health or other decision-making?

2. Have all current data sharing arrangements with external partners been documented?

2. Have *desired* exchanges, those that don’t currently occur but which programs would like to see happen, been identified and documented, including the value of such exchanges to the health department, the eternal partner and/or the community?

**Question 1.7 Data Sharing Agreement Procedures**

**Have we adopted a standard procedure for establishing and renewing data sharing agreements?**

* Level 0 We have not adopted such a standard procedure.
* Level 1 We have begun documenting a standard procedure for establishing and renewing data sharing agreements.
* Level 2 We have a written data sharing agreement procedure; however, it is not followed consistently across the health department.
* Level 3 We have a written data sharing agreement procedure that is consistently followed across the health department.
* Level 4 We have established a method to evaluate compliance with procedure for data sharing agreements.
* Level 5 We use evaluation findings to improve data sharing agreements.

**Key concepts**

The concept here refers to *compliance to a procedure*, not *compliance to the* *terms* of the data sharing agreements. The term **procedure** is intended to cover the wide range of actions needed to ensure compliance with data sharing agreements. **Data sharing agreements** are used to establish clear parameters for exchange between organizations or operational units within an agency, and may include: descriptions of allowable use of data, responsibilities of the parties to the agreement, the legal authority or business reason to share data, frequency of data exchange, provisions for reporting violations of agreements, including breeches of privacy or security, privacy provisions and security provisions, and agreement of the purpose for the data exchange and agreement on specific data elements to be exchanged.

**Discussion prompts**

1. Do most staff members know about the procedures?
2. To what degree are they effectively used? Are staff members trained and supported to execute data sharing agreements?
3. Do staff have access to tools that can alert staff to expiring consents, data sharing agreements, etc.?

**Question 1.8 Confidentiality and Informed Consent Procedures**

**Have we established policies and procedures to ensure confidentiality and informed consent?**

* Level 0 We have not adopted such policies and procedures.
* Level 1 We have begun documenting policies and procedures for confidentiality and informed consent.
* Level 2 We have written policies and procedures for confidentiality and informed consent policies; however, they are not followed consistently across the health department.
* Level 3 We have written policies and procedures for confidentiality and informed consent policies, and they are generally followed consistently across the health department.
* Level 4 We have established a method to evaluate adherence to the policies and procedures.
* Level 5 We use evaluation findings to improve adherence to the policies and procedures.

**Key concepts**

The term **procedures** here is intended to cover the wide range of actions, defined and driven by written policy, needed to ensure privacy protections through appropriate confidentiality and informed consent practices. These mechanisms may include training, policies, procedures and optimized technology attributes to protect data in electronic environments.

**Discussion prompts**

1. Are enforceable practices in place to ensure confidentiality and informed consent? Are they adhered to?
2. Are processes or procedures in place that allow for measurement of compliance to policies in place? Are the data generated from these procedures used to improve practice?
3. Are the policies and procedures regularly reviewed and updated as needed?
4. Are staff aware of the jurisdiction’s security policies and requirements, and do they understand them? Do they know what to do if they suspect a breach?

**Question 1.9 Informatics Focal Point**

**Do we have an organizational focal point for informatics (e.g., an informatics unit, a Chief Informatics Officer, etc.) with cross-agency responsibility and authorities, including those related to the health department’s information vision, strategies and polices?**

* Level 0 We have no such organizational focal point.
* Level 1 We have at least one individual champion advocating for cross-departmental informatics capabilities and have made isolated, ad hoc efforts to organize them.
* Level 2 We have made sustained attempts at organizing or coordinating informatics capabilities across the organization.
* Level 3 We have established a funded organizational focal point for informatics.
* Level 4 We have established an organizational focal point and evaluate how well it guides informatics projects toward agency objectives.
* Level 5 We use evaluation findings to improve the health department’s informatics capabilities within and outside the organizational focal point.

**Key concepts**

**Informatics** is the science and discipline that supports effective use of information and information technology. Informatics as a practice is increasingly seen as critical to the future capability of health departments. Establishing a focal area dedicated to informatics is one way in which health departments are working to address agencies’ information needs.

**Discussion prompts**

1. If the health department has considered or is currently building informatics capability through establishing an informatics focal area, have key decisions been identified? What types of responsibilities are within the scope of informatics? How will/are informatics and IT efforts be coordinated?
2. If you have a designated individual or unit, are their responsibilities and authority clearly defined? Accepted by the program units? By senior leadership? IT services?
3. Is funding derived from more than one source so that the individual/unit is not beholden to a particular program or funding source?
4. Is the scope of activity only internal or does it extend to working with, for instance, the Medicaid program, health information exchanges or other entities eternal to the health department?

**Question 1.10 Centralized IT and Informatics**

**Do we have a strategy to support relationships with a centralized information technology (IT) unit or services provider (internal or external) to support achievement of informatics goals and objectives?**

* Level 0 We do not have an effective strategic relationship with an IT unit or service provider.
* Level 1 We have made isolated, ad hoc efforts to form a partnership with an IT unit or service provider.
* Level 2 We frequently partner with an IT unit or service provider.
* Level 3 We have established a strategic partnership with an IT unit or service provider.
* Level 4 We have established a strategic partnership with our IT unit and evaluate how well it supports agency informatics projects.
* Level 5 We use evaluation findings to improve a strategic partnership with an IT unit or service provider.

**Key concepts**

**Centralized IT unit** refers to what might be a separate local or state entity that supports all the other governmental entities, or a centralized IT office within the health department. Evidence of **effective relationships** may include: (1) formally-established agreements that outline the nature of services provided by the IT unit to program staff (such as service level agreements); (2) clear decision-making guidance practices described and followed for technology investments, or forums or processes for dispute resolution and other decision making; (3) evidence that each organizational unit is aware of and responsive to the strategies of the other; or (4) level and type of end-user engagement and satisfaction with IT services and practices.

**Discussion prompts**

1. Do programs and IT service providers have an agreement regarding roles/responsibilities, decision-making and service expectations? Do both parties benefit from the relationship? Are they aware of and responsive to each other’s strategies and goals? Are end users consulted or engaged in IT decision-making processes?
2. Is there a clear process by which agency program can define and communicate their business requirements to IT?
3. Do formal service level agreements exist? Are they widely known and adhered to?
4. Are metrics established to assess user satisfaction? Do the results inform changes in practices, procedures or services?
5. Is there a systematic approach to funding information system support, hosting and security?

**Question 1.11 Information Partnerships to Meet Population Health Goals/Objectives**

**Do we effectively collaborate with our community partners to use information for population health assessment and improvement?**

* Level 0 We do not collaborate in using information in this way.
* Level 1 We make rare, ad hoc efforts to collaboratively use information for population health assessment and improvement.
* Level 2 We collaborate but not systematically or in an ongoing way in using information for population health improvement.
* Level 3 We have ongoing established collaborative relationships to use information for population health improvement.
* Level 4 We have established collaborative relationships with such partners and evaluate how well these collaborations support population health improvement.
* Level 5 We use evaluation findings to improve our collective use of information to assess and improve population health.

**Key concepts**

**Collaborative** processes and relationships are those activities designed to achieve goals or outcomes that require significant contributions from multiple organizations, individuals or groups. Examples of **effective collaboration** may include joint development of and agreement to a set of common goals; shared responsibility for achieving the goals; sharing/pooling data for analysis; and sharing expertise and resources.

**Discussion prompts**

1. Do partners generally believe that collaborative relationships are working well and are effective? Are roles known and understood? Is there clarity around decision making?
2. Is collaborative work driven by information to identify needs/priorities and/or to measure progress?
3. Are there sufficient resources dedicated to collaborative work? For example, does the health department have staff dedicated to the collaboration?

# Section 2: Skilled Workforce

**Question 2.1 Workforce Strategy**

**Do we have a workforce strategy that describes needed informatics capabilities and/or positions and have plans for recruiting, hiring and/or developing existing staff to meet those needs?**

* Level 0 We have not attempted to develop such a workforce strategy.
* Level 1 We have made initial but isolated ad hoc efforts to develop such a workforce strategy.
* Level 2 We have made or are making a sustained attempt to develop a workforce strategy.
* Level 3 We have completed such a workforce strategy.
* Level 4 We have completed a workforce strategy and have established a method to evaluate implementation.
* Level 5 We evaluate our workforce strategy implementation and use evaluation findings to improve our informatics workforce.

**Key concepts**

Strategies and plans for workforce development often include health department-wide efforts to meet organizational performance needs. **Workforce strategy** may include assessment, recruitment, training and development, retention, and succession planning. For informatics, the workforce strategy may include creating new positions or, because that is not always possible or desirable, training existing staff who have the interest and aptitude in informatics.

**Discussion prompts**

1. Has any assessment of workforce development needs for informatics knowledge, skills and abilities been explored?
2. Is there a written plan for recruitment, training and development, and retention of staff educated or trained in public health informatics?

**Question 2.2 Job Classifications for Informatics Positions**

**Do we have appropriate job classifications, including position descriptions and pay scales, for informatics positions?**

* Level 0 We have not attempted to adopt such informatics job classifications.
* Level 1 We have made initial, isolated ad hoc efforts to adopt such informatics job classifications.
* Level 2 We have made sustained attempts to adopt such informatics job classifications.
* Level 3 We have adopted such informatics job classifications.
* Level 4 We have adopted such informatics job classifications and established a method to evaluate implementation.
* Level 5 We use evaluation findings to improve how it recruits and retains informatics professionals.

 **Key concepts**

Human resource departments typically have **job classification systems**, **position descriptions** and **pay scales** for all permanent hiring situations. Because informatics is an emerging discipline, many agencies struggle to establish these positions within existing classifications. A major challenge is defining the informatics competencies, duties and minimum requirements in ways that that clearly distinguish them from IT classifications.

**Discussion prompts**

1. Does the health department have classifications for informatics positions?
2. If so, do they support specific programs areas? The health department as a whole? Both?
3. Do their performance evaluations capture feedback from whatever scope of responsibility they have (programs, agency-wide, etc.)?
4. Is informatics recognized as a discipline distinct from IT? Do you have messages for how to effectively clarify the distinction?

**Question 2.3 Training**

**Do we support staff members across a broad range of job classifications to participate in informatics training?**

* Level 0 We provide no support for staff members to participate in public health informatics training.
* Level 1 Policies and practices exist that support staff members to receive informatics training; however, they are not known, are applied unevenly or are rarely used.
* Level 2 Policies and practices exist to support staff to participate in informatics training for a limited set of staff positions.
* Level 3 Policies and practices exist that support informatics training for a broad range of job classifications.
* Level 4 We evaluate the informatics training opportunities made available to staff members.
* Level 5 We use evaluation findings to improve informatics training opportunities for staff members.

 **Key concepts**

This question assesses the availability of informatics training for individuals in a variety of job classifications. These positions can include those that support informatics capacity directly, as well as other positions/classifications such as data analysts, epidemiologists, public health nurses, program managers, data quality specialists and IT staff**.**

**Discussion prompts**

1. Do we have a mechanism to identify current staff who have an interest and aptitude in informatics? Do our policies support training activities (for example, is reimbursement for training available?)
2. Have we conducted any assessment of training needs related to the practice of informatics? Have we identified training opportunities that match those needs?
3. Are “on the job” training opportunities provided, such as informatics fellowships?

**Question 2.4 Informatics Professionals**

**Do we have highly experienced or academically prepared informaticians in key roles at the health department and/or program levels, with backgrounds and training commensurate to their responsibilities?**

* Level 0 We have no academically prepared or highly experienced informaticians on staff.
* Level 1 We have at least one academically prepared or highly experienced informatician in a key role.
* Level 2 We have some academically prepared or highly experienced informaticians in key roles.
* Level 3 We have academically prepared or highly experienced informaticians in key roles at both the overall health department and at the programmatic levels.
* Level 4 We evaluate our needs for academically prepared or highly experienced informaticians at both the health department and programmatic levels.
* Level 5 We use evaluation findings to improve agency-wide and programmatic access to academically-prepared or highly experienced informaticians.

**Key concepts**

**Highly experienced informaticians**refer to those individuals that have the necessary combination of knowledge, demonstrated skills and abilities to successfully contribute to effective informatics policy and practice. While an **academically prepared informatician** may not be possible or feasible in many agencies, perhaps especially for local health departments, it is a good measure of informatics maturity within an agency. **Key roles**refer to the placement, availability and access of individuals with informatics experience.

**Discussion prompts**

1. If we have one or more informaticians in key roles, do they have access to senior leadership and management? Are they empowered to spearhead health department-wide informatics policy and strategy?
2. Have we evolved sufficiently in our informatics capacity building efforts that recruiting an academically prepared informatician is a next logical step? What competencies, knowledge and skills are we be looking for that we do not currently have?
3. Do staff have access to experts in specific areas of informatics, such as health IT vocabulary, messaging and transport standards? Are staff available with sufficient expertise to gather and assess national level standards for adoption and use by programs? Do staff have access to project managers and business analysts who understand program needs?

**Question 2.5 Informatics Knowledge and Skills (Program Level)**

**Do staff members at the program level (e.g., epidemiologists, data analysts, data quality specialists, public health nurses) have the skills to effectively use information systems and tools, including the knowledge of how to identify and document needed system improvements?**

* Level 0 Our users of information systems do not have such informatics knowledge and skills.
* Level 1 A few of our users have such informatics knowledge and skills.
* Level 2 Some users have such informatics knowledge and skills.
* Level 3 All users have such informatics knowledge and skills.
* Level 4 We evaluate the informatics knowledge and skills of our users.
* Level 5 We use evaluation findings to ensure our information systems are managed according to informatics principles, concepts and methods.

 **Key concept**

**Effective users of information systems** need to know when those systems are and are not meeting their needs, and be savvy enough to state or document their needs in sufficiently clear terms to serve as requirements for enhancements. Effective use means an optimal alignment of workflow processes and software use, and the ability to get information out of the systems for reporting and other purposes.

**Discussion prompts**

1. Are staff savvy in identifying when a system does not match their workflows, business needs or other requirements?
2. Can staff articulate or document their needs in terms of what the systems need to do to effectively support their work?
3. Can staff obtain the information they need out of the system?

**Question 2.6 Informatics Knowledge and Skills (Program Managers)**

**Do managers/supervisors of large information system programs have knowledge and skills of informatics principles, concepts, methods, and tools gained through education, training or experience?**

* Level 0 The managers/supervisors of large information systems do not have such informatics knowledge and skills.
* Level 1 At least one manager/supervisor of large information systems has such informatics knowledge and skills.
* Level 2 Some managers/supervisors of large information systems have such informatics knowledge and skills.
* Level 3 All managers/supervisors of large information systems have such informatics knowledge and skills.
* Level 4 We evaluate the informatics knowledge and skills of the managers/supervisors of our large information systems.
* Level 5 We use evaluation findings to ensure our large information systems are managed according to informatics principles, concepts and methods.

**Key concepts**

**Informatics principles, concepts, methods and tools** refer to the set of knowledge and skills necessary for managers to know what should be expected in terms of system performance, IT support, and the quality and value of the information contained in the system. For senior managers, it can mean understanding how requirements were gathered and vetted, whether end users were involved in the design, where the risks lie, and whether the system is delivering value. For those who manage the information system directly, it can include understanding the IT lifecycle, instituting sound requirements gathering and change control mechanisms, and being able to manage risks, problem solve and ensure quality information is produced to support meeting program objectives. **Examples of large information systems** include both programmatic and administrative systems such as WIC, immunization registries, EHR systems and billing systems.

**Discussion prompts**

1. Are senior managers appropriately engaged and knowledgeable about the information systems under their authority? Do they have the knowledge to ask “tough” questions of the systems managers, central IT or software vendors?
2. Do information system managers have the informatics knowledge and skill necessary to systematically identify system requirements for enhancements, and ensure appropriate change control and roll-out of those enhancements?
3. Do information system managers have the informatics knowledge and skill necessary to effectively manage IT support, whether internal or external?

# Section 3: Effectively Used and Well-Designed Systems

Question 3.1 Software Lifecycle Support

**Do we practice a standard software lifecycle support process for requirements definition, system design, implementation, change control and maintenance?**

* Level 0 We have not adopted a standard software development process.
* Level 1 We have made initial efforts to establish a standard software development process.
* Level 2 We frequently use a standard software development process.
* Level 3 We require a standardized software process to be used.
* Level 4 We have established a method to evaluate compliance with our software development process.
* Level 5 We use evaluation findings to improve how our software development processes enable effective information management and use.

**Key concepts**

A **standard software lifecycle support process** may include some or all components to support the lifecycle of software, including initiation and concept, planning, requirements definition, design and development, testing, training, and implementation, operations and maintenance, change control, and disposition. A detailed **requirements definition** is particularly essential, as it includes understanding what the information system must do to support the program to meet its objectives. The output of requirements definition identifies, in very granular detail, the new product to be built or how an existing system is to be enhanced.

Discussion prompts

1. Do we have a recognized *and documented* software lifecycle support process? Is the process standardized across our health department? Is the process understood and adhered to by all stakeholders, both within the programs and within information services/central IT?
2. Is the software development process used routinely and systematically?
3. Is the process adequately supported by knowledgeable project managers and business analysts?
4. Is there a method to measure how broadly the process is utilized? Are these findings shared and used for process improvement?

Question 3.2 Project Management

**Have we adopted and documented standard project management procedures for information system projects?**

* Level 0 We have not adopted any project management procedures for information systems projects.
* Level 1 We have made initial efforts to use project management procedures for information systems projects.
* Level 2 We routinely use project management procedures for information systems projects.
* Level 3 We require use of standardized project management procedures for information systems projects.
* Level 4 We have established a method to evaluate adherence to standardized project management procedures for information systems projects.
* Level 5 We use evaluation findings to improve standardized project management procedures for information systems projects.

Key concepts

In this context, **standardized** **project management procedures** refer to well-established and consistently-applied methods and strategies designed to accomplish information system project goals within established timelines and budgets. Typical project management components include initiation, planning, execution, monitoring/controlling and close-out. Project managers may also be responsible for coordinating or conducting stakeholder communication and vendor contract management. Adhering to a standardized methodology of project management can help to mitigate risk, maintain timelines and ensure success within a project. This is particularly critical when replacing one information system with another.

Discussion prompts

1. Do documented project management processes exist across the health department? Are they well-understood? Used routinely?
2. Are project management positions and resources (project managers, business analysts) available to the health department?
3. Is training available to prepare staff for rigorous project management approaches?
4. Is there an approval process for new informatics or IT projects? Is this process transparent and well-understood?

Question 3.3 Information Systems Inventory

**Have we conducted an inventory of our data sets, applications and information systems?**

* Level 0 We have not conducted an inventory data sets, applications and information systems.
* Level 1 We have made isolated, ad hoc efforts to inventory our data sets, applications and information systems.
* Level 2 We make regular attempts to conduct inventories of our data sets, applications and information systems.
* Level 3 We have established a process for routine inventories but do not evaluate the results.
* Level 4 We routinely evaluate the findings following inventories of our data sets, applications and information systems.
* Level 5 We use findings from inventories to improve the availability of information to meet health department goals.

Key concepts

A **data set** is a collection of related, discrete data elements, organized into some type of data structure, that together comprise a meaningful source of information to meet program or administrative purposes. Data sets can be large or small, and include immunization records, foodborne disease investigation records, survey data and financial records. **Applications** are typically developed in-house for a focused purpose, and are often spreadsheets and databases. **Information systems** are large, complex software systems with a wide variety of functions to meet different user needs. In considering an inventory, it will be important for the health department to develop a uniform definition of all three terms to know what to be include and count.

Discussion prompts

1. Should an inventory include assessing what data standards are used for elements such as gender and race, and address standardization for geo-coding?
2. With whom is inventory data shared? How is the inventory information used (e.g., for decision making, resource allocation, etc.)?

Question 3.4 Information System Usability

**Have we conducted an assessment of information system usability and effectiveness based on the needs of staff and programs?**

* Level 0 We have not conducted an assessment of information system usability and effectiveness based on user needs.
* Level 1 We have made isolated, ad hoc efforts to conduct such an information systems assessment.
* Level 2 We make regular attempts at conducting such an information systems assessment.
* Level 3 We have established a process for conducting such an information systems assessment.
* Level 4 We routinely conduct information system assessments of user needs.
* Level 5 We use findings from assessments to improve the usability and effectiveness of information systems in meeting user needs.

Key concepts

An **assessment** of information system usability and effectiveness is an important practice to ensure that the technology truly supports the work and workflows of staff. Evidence of poorly designed software includes inefficient processes, high levels of staff frustration and “work arounds.” The ability to conduct such an assessment implies that the *desired* workflows and practices are well documented (as opposed to current practices which may be dictated by limitations of the information system). This documentation establishes a standard against which the systems can be assessed.

Discussion prompts

1. Are information systems assessed for usability and effectiveness?
2. Have the ideal-state workflows and practices been documented through a collaborative process that engage relevant staff?
3. If usability assessments of information systems are conducted routinely, is the frequency appropriate to ensure timeliness and relevance?

Question 3.5 Standards Adoption and Implementation

Do our information systems use nationally recognized vocabulary, messaging and transport standards?

* Level 0 We have no information systems that use nationally recognized standards.
* Level 1 We have made isolated, ad hoc efforts to use nationally recognized standards.
* Level 2 We have several information systems that use nationally recognized standards.
* Level 3 Our information systems use nationally recognized standards but with no coordination across programs.
* Level 4 We measure and coordinate adoption of nationally recognized standards across the health department.
* Level 5 We use metrics and evaluation findings to improve standards adoption and implementation to meet department-wide goals.

Key concepts

**Vocabulary, messaging and transport standards** support efficient development and interoperability for health information exchange. Adopting nationally recognized standards where available can decrease the time and resources needed for software development and for building interfaces and supporting connectivity. Use of standards for data elements such as race and gender/ethnicity also make it easier to “pool” data sets for a more meaningful and larger picture of community health. Examples of nationally recognized standards for **vocabulary** include CVX, CPT, ICD, LOINC and SNOMED. **Messaging standards** like HL7 and CDA often call for the use of specific vocabulary standards; for electronic laboratory messages, LOINC and SNOMED codes are recommended for tests and results, while immunization messages recommend CVX and ICD codes for vaccines and administration methods. **Transport standards** direct how messages should be sent between systems, for example SOAP web-services, secure FTP or VPN, or direct secure messaging.

Discussion prompts

1. Are standards considered and, when possible, implemented for new systems or modules?
2. Does our health department support discussions or exchange of information about established and emerging standards, both locally and nationally? When the health department does adopt standards as described in standards organizations’ implementation guides, does the health department typically adhere to that guidance or deviate from it?
3. Is there a venue to explore the value and cost of incorporating nationally recognized standards for systems that are not currently using them?

Question 3.6 Data Exchange (Internal)

Do we have the capability to electronically send, receive and process data *internally* between information systems?

* Level 0 We have no capability to exchange data internally.
* Level 1 We rarely exchange data internally; a high level of manual effort is required to exchange and process these data.
* Level 2 We exchange data internally, but some manual effort is required to process these data.
* Level 3 We routinely exchange data internally; there is minimal manual effort required to exchange and process these data.
* Level 4 We evaluate our ability to exchange and process data internally between information systems.
* Level 5 We use evaluation findings to improve internal data exchange, information reuse and programmatic efficiency.

Key concepts

**Electronic exchange of data** refers to the ability to send, receive and process data that are electronically transferred from one information system to another. Generally, this does not include fax or email messages. Technical capabilities for electronic data exchange might include automated scripts for querying or extracting information from one system and securely transferring it to another. Internal data sharing might require enabling legislation, or cross-program data use agreements. In some cases, it may be technologically possible to exchange data internally, but policy or programmatic hurdles may exist. Electronically processing information may refer to the ability to accurately match and merge records, reconcile differences and automate de-duplication processes.

Discussion prompts

1. Are any existing data exchanges automated, or do they require significant human intervention?
2. What internal data exchanges would be a high priority, between which programs and for what value?
3. Does a routine process exist for initiating and operationalizing data exchange with internal partners? Do tools exist to support this exchange (e.g., standardized data use agreements, standard operating procedures, Master Person Index, record matching and merging tools, etc.)?

Question 3.7 Data Exchange (External)

Do we have the capability to securely send and receive electronic data sent with external partners?

* Level 0 We have no capability to send, receive or process electronic data with external partners.
* Level 1 We rarely send or receive electronic messages with external partners; a high level of manual effort is required.
* Level 2 We can send and/or receive electronic messages with external partners, but some manual effort is required.
* Level 3 We routinely send and/or receive electronic messages with external partners; minimal manual effort is required.
* Level 4 We routinely send and/or receive electronic messages, measuring our progress and the degree to which we are coordinated across the health department.
* Level 5 We evaluate our data exchange processes as part of ongoing performance metrics.

Key concepts

**Securely sending and receiving** data means that the data arrive at their intended destination without having been altered, lost or read by an unauthorized person. It also implies that the recipient is able to “read” or access the information contained in the message. Sending and receiving usually involves some processing as well, including the ability to sort and store the incoming data. It may also include validating that the information contained in the message conveys an expected or appropriate value. **External partners** include healthcare providers, laboratories, the Medicaid program, prisons or jails, or any other organization outside of the health department.

Discussion prompts

1. Which programs currently receive electronic data from external partners? What standards are used for such exchanges?
2. How many manual processes could be automated if sufficient support were available? How much of a priority would that be?

Question 3.8 Data Management and Quality Assurance

Have we adopted procedures for data management and quality assurance**?**

* Level 0 We have not adopted procedures for data management or quality assurance.
* Level 1 We have made initial attempts at documenting procedures for data management and quality assurance.
* Level 2 We have documented procedures for data management and quality assurance; however, they are not followed consistently.
* Level 3 We have documented data management and quality assurance procedures that are consistently followed across our health department.
* Level 4 We have established a method to evaluate compliance with our procedures for data management and quality assurance.
* Level 5 We use evaluation findings to continually improve data management and quality assurance.

Key concepts

Robust **data management** procedures include systematized plans and processes to collect, retain, protect and enhance the value of data. Security and confidentiality protocols, data use agreements, and applicable statutes or rules may all inform or be included in data management procedures. **Data quality assurance** procedures include protocols to assess and ensure the accuracy, completeness and timeliness of incoming and existing data.

Discussion prompts

1. Are data management and data quality assurance procedures documented? If so, are they fully implemented? Are these procedures standardized and shared across the health department?
2. Are the processes for data handling evaluated consistently across the health department? Are these findings used to improve upon and expand data management and data quality procedures? Do these findings influence programmatic, operational or IT development decisions?
3. Does an information governance plan exist for the health department that establishes clear principles, procedures and accountability for managing information?

Question 3.9 Shared Services

Do our programs share relevant services across the health department, such as an integrated provider registry, master person index, integration engine or other applicable services?

* Level 0 Our programs do not share any services across our health department.
* Level 1 Our programs are considering sharing services across our health department.
* Level 2 Our programs are in the process of implementing key shared services across our health department.
* Level 3 Our programs are actively sharing services across our health department.
* Level 4 We have established a method to evaluate shared services.
* Level 5 We use evaluation findings to continually improve the quality and utility of shared services.

Key concepts

**Shared or centralized services** such as provider registries or master patient indexes that are leveraged across an agency can allow programs access to 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.

Discussion prompts

1. Do shared services exist across our health department? Are programs across our health department represented in design and development discussions?
2. Do standardized processes exist for updating and sharing these services centrally? Are standardized processes adhered to?
3. Are shared or centralized services supported financially and operationally across the health department?
4. Does a process exist to evaluate the degree to which the shared service meets end users’ needs? Are the evaluation findings used to direct future enhancements or expansions of shared services?

# References

1 Mark Paulk, William Curtis, Mary Beth Chrissis and Charles Weber. *Capability Maturity Model for Software* (Version 1.1) *(CMU/SEI-93-TR-024). Pittsburgh, PA: Software Enginnering Institute, Cargenie Mellon University, 1993.* [*http://resources.sei.cmu.edu/library/asset-view.cfm?AssetID=11955*](http://resources.sei.cmu.edu/library/asset-view.cfm?AssetID=11955)

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