

Competencies for Public Health Informaticians 2009



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American Medical Informatics Association (AMIA)
Association of Schools of Public Health (ASPH)
Association of State and Territorial Health Officials (ASTHO)
Council of State and Territorial Epidemiologists (CSTE)
National Association of County and City Health Officials (NACCHO)
National Association for Public Health Information Technology (NAPHIT)
Public Health Informatics Institute (PHII)

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This document is available online at <http://www.cdc.gov/InformaticsCompetencies> and at <http://cphi.washington.edu/resources/competencies.html>.

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Competencies for Public Health Informaticians

Executive Summary

Public health informatics is the systematic application of information, computer science, and technology to public health practice, research, and learning. However, the definition of the knowledge, skills, and abilities of those working in the discipline has not been thoroughly described. Training resources have been developed that address one or more aspects of informatics, but these resources have been developed in relative isolation without consensus regarding specific competencies that public health informaticians should have. A previous group, under the auspices of the Centers for Disease Control and Prevention (CDC) and the University of Washington, had defined informatics competencies for the general public health professional. This effort, however, did not define competencies for those with a core identity and expertise in informatics. To address this concern, CDC formed a new working group consisting of public health professionals, informaticians, and educators from representative governmental, nongovernmental, and academic organizations to define the competencies for public health informaticians.

During 2006–2007, this second working group created a formal definition of a public health informatician (PHI) and developed a consensus set of core competencies. After completion, these competencies were validated through an external review by subject-matter experts and a period of public comment. The two-tiered set of 13 competencies and underlying subcompetencies described in this document include setting strategic direction; knowledge management; use of informatics standards; meeting user needs and requirements; supporting Information systems development; IT project and program management; communication; evaluation; public health informatics research; development of interoperable systems to integrate clinical, environmental and population health; information security; and education and training.

The competencies presented in this report should provide a useful starting point for developing learning resources for public health informatics professionals. Proficiency in these competencies will enable today's public health professionals to leverage the power of modern information technology in the science and practice of public health.

Introduction

A. Background

All persons working in the field of public health require knowledge of information technology (IT), whether they serve as administrative assistants or as agency directors. The level of knowledge necessary depends on the demands of the position each person occupies. For example, a sanitarian needs the knowledge and skills to use data to make programmatic decisions; a chief information officer needs IT knowledge and skills to ensure that a public health agency is implementing information systems that effectively support existing and future public health programs.

Since public health informatics is a relatively new field, the corresponding competencies should incorporate the knowledge, skills, and abilities to organize information for public health purposes, leveraging technology within the public health setting.

In 2002, a Public Health Informatics Competencies Working Group, led by Patrick O'Carroll, MD, MPH, articulated the informatics competencies necessary for all persons working within public health, regardless of position. The resulting competencies addressed (a) use of information *per se* for public health practice, (b) use of IT to increase personal effectiveness as a public health professional, and (c) management of IT projects to improve the effectiveness of the public health enterprise (e.g., a state or local health department).²

This 2002 competency development effort did not address the competencies needed for those who work in specialized technical roles on public health information systems or do public health informatics research. Public health agencies at all levels seek staff with expertise in both public health programs and information systems to help design, implement, and manage computer applications that support public health goals. However, workforce development in this field has not met the growing demand for public health informaticians (PHIs), hampered in part by the fact that no clear understanding or national consensus exists regarding PHIs' role and the competencies that workers need to fill this role. Although the 2002 effort established a solid framework for public health informatics competencies for the general public health professional, more technical, specific, and measurable competencies are needed to support PHI development.

In response to this emerging need, the Centers for Disease Control and Prevention (CDC) Office of Workforce and Career Development (OWCD), through a cooperative agreement with the Association of Schools of Public Health (ASPH), funded the University of Washington (UW) to convene a working group to define PHI competencies, with subject-matter experts from local, state, and federal public health organizations, professional associations, and academia. During 2006–2007 this panel created formal definitions of PHI roles and responsibilities to build a consensus on a set of core competencies for public health informaticians.

B. Definitions

In broad terms, today's public health professionals should be able to use information effectively, to use IT effectively, and to manage IT projects effectively. Ideally, public health leaders also should have the skill and vision to apply science and technology to reengineer certain elements of public health practice altogether when such fundamental changes are appropriate and made feasible by modern IT practice.

1. Public health informatics: We use the definition of public health informatics provided by Yasnoff et al.,¹ "[Public health informatics is defined as] the systematic application of information and computer science and technology to public health practice, research, and learning."

2. Competencies: We define a public health informatics competency as a public health worker's observable or measurable performance, skill, or knowledge related to the systematic application of information and computer science and technology to public health.

3. Public health informatician: We define the term as a public health professional who works in either practice, research, or academia and whose primary work function is to use informatics to improve population health. This project considers the PHI role to be more expert in informatics than a highly functional public health professional who assists with informatics-related challenges or supports personal productivity with IT.

Developing Competencies for Informaticians

The Working Group to Define Competencies for Public Health Informaticians started by examining previous efforts and the results of other competency development initiatives. Because of the intent to create competencies that can be used by both public health agencies and academic centers, the working group decided to work within the context of the *Core Competencies for Public Health Professionals*, developed by the Council on Linkages Between Academia and Public Health Practice (COL).³ The COL divides public health core competencies into the following 8 domains:

Box. Council on Linkages core competency domains for public health professionals

- Analytic/Assessment Skills
- Policy Development/Program Planning Skills
- Communication Skills
- Cultural Competency Skills
- Community Dimensions of Practice Skills
- Basic Public Health Sciences Skills
- Financial Planning and Management Skills
- Leadership and Systems Thinking Skills

Source: Council on Linkages Between Academia and Public Health Practice. Core Competencies for Public Health Professionals [Homepage on the Internet]. Washington, DC: Public Health Foundation; 2008. Available at: <http://www.phf.org/link/corecompetencies.htm>. Accessed April 14, 2009

Although these eight domains in the Council on Linkages' document were applicable to PHIs as well as to all public health professionals (Box) the working group believed that these domains do not sufficiently incorporate specific informatics competencies. Therefore, the working group elected to create an additional domain, focusing totally on public health informatics competencies.

Because public health informatics is such a new field, the working group agreed that a key first step would be developing a PHI definition of roles. The definition is intended to capture the range of knowledge and skills PHIs should have as well as the types of roles PHIs play in different public health agencies. As the working group's efforts evolved, the members

recognized that at least two tiers of PHIs are employed in public health agencies. The first includes researchers, scientists, project managers, and program advisers, often more narrowly focused in their work scope. The second includes more experienced persons functioning as senior agency personnel (e.g., chief information officers or public health informatics officers). The working group created definitions for both tiers of PHIs, and crafted language that differentiates these positions from a more traditional IT specialist. Through this process, the working group clarified competency language to help personnel and public health agencies distinguish between the different tiers.⁴

Using specific definitions and drawing on prior work, the working group drafted a set of core competencies for both PHIs and senior PHIs (SPHIs). The competencies are similar, varying by the level of expertise and responsibilities expected of a person serving in either a PHI or SPHI role. The working group revised the language during 2006 and sought input from a broad spectrum of public health informatics experts. (A list of participating technical experts appears on page 15.) The group incorporated contributions from these consultants into a new draft that was made available for public comment. An Internet survey was created to help determine whether the proposed competency set was consistent with and supportive of public health informatics practice.

To invite participation in the survey, working group members presented sessions at the 2006 PHIN and American Medical Informatics Association meetings. Requests for participation were also sent to major public health professional associations, including the Association of State and Territorial Health Officials, the National Association of County and City Health Officials, the National Association for Public Health Information Technology, and the American Public Health Association. Among the 126 who responded to the survey, 61 completed the entire survey. The reviews were overwhelmingly supportive and validated the importance and relevance of the competencies through both qualitative and quantitative evaluation. Analysis identified two competencies requiring further discussion, 6B-c and 9-a (although approval ratings were still above 80% of respondents for these two): Competency 6B-c — Monitors and ensures adequacy of IT operations managed by external organization, and 9-a — Conducts or participates in applied public health informatics research for new insights and innovative solutions to health problems. The concern raised regarding Competency 6B-c was the potential

overlap with the competency expected of an IT specialist. With respect to Competency 9-a, certain public health partners expressed concern that all PHIs might be expected to conduct research. The working group considered these and other comments for incorporation into the final competency set. To further differentiate roles of IT specialists from PHIs and SPHIs, the working group added the description of role PHIs and SPHIs might play. In response to the concern about research, the preface language was revised to emphasize that not all roles for PHIs would use all competencies. These additional revisions were circulated and reviewed for consistency within the competency framework.⁴ The product is a widely validated set of competencies available for use by public health agencies and academic centers.

Intended Use and Role Definitions

A. Intended Use

Public health informatics is a relatively new field, and the PHI's role is often misunderstood. These competencies for PHIs are intended to reflect best practices and set expectations of knowledge for staff in this field. For more established fields, competencies are about what workers actually do. For the new field of public health informatics, competencies reflect what personnel should be doing, and as such, these competencies help to define the field.

PHIs may have a variety of roles including research scientists, project managers, or chief information officers who are developing or testing new informatics methods or overseeing implementation of information systems, or they might serve in an advisory role to IT specialists or public health program managers. Regardless of their specific role, PHIs must have extensive knowledge of IT systems, informatics, and public health practice.

The competencies are intended to aid public health agencies in defining needed skills for PHIs; to provide a roadmap for evaluating, measuring, and promoting employees; to support creation of career ladders; and to provide educational guidelines for academic programs. Further, the competencies are intended to guide PHIs as they expand their own skills and expertise. The competencies are intended to expand the boundaries of what is expected of PHI roles; however, not all PHIs will be equally proficient in each of the competencies.

B. Tiers of PHIs

The Working Group defined competencies for two tiers of PHIs, described below. Because the field of public health informatics is relatively new, these descriptions are not absolute and the different tiers overlap somewhat. The expectations for and differentiation between tiers will change with time.

1. PHIs should be capable of developing innovative applications of technology and systems that address public health priorities by analyzing how information is organized and used and evaluating how this work contributes to the scientific field. Although such specialists might develop expertise in a given public health program area, all PHIs should have core competencies in both informatics and public health. Examples of PHIs include project managers for IT implementations

in public health settings, program managers with primary responsibility for operation and maintenance of major public health information systems, and researchers working to develop innovative information systems and informatics methods to support public health activities.

2. SPHIs serve as policy advisers and leaders at the highest levels of a public health agency, bringing specialized knowledge and skills in the areas of information architecture, information resource management planning, enterprise-level information systems development and integration, and organizational change management. The major difference between PHIs and SPHIs is judgment and experience. SPHIs' experience allows them to oversee or make recommendations on complex, agencywide IT projects, policies, and concerns. SPHIs lead strategic planning to manage data and IT systems, oversee implementation and operation of IT projects and systems, and manage agency IT resources. In an academic setting, SPHIs conceive of and implement innovative research projects to apply emerging informatics principles and IT systems to public health problems. SPHIs might have such job titles as strategic information specialist, standardized vocabulary specialist, health informatics scientist, or professor of public health informatics.

In developing these competencies, the working group focused on the unique roles of informaticians in public health. We sought to differentiate PHIs from IT specialists — those with strong IT backgrounds but limited experience in public health. The focus of IT is to implement and operate information systems (hardware and software) that meet programmatic needs. In contrast, PHIs have a more strategic view of how information systems and technology can impact public health, such as how information systems can support public health decision making. Unlike IT specialists, PHIs work within the larger context of how information systems function within the political, cultural, economic, and social environment and evaluate their impact within the broad sphere of public health. Thus, PHIs are in the unique position to understand how information systems can improve the practice and science of public health while contributing to the evidence-based practice of public health informatics.

PHIs might serve in the same roles of chief information officer or project manager, with support from IT specialists, or they might have completely separate roles (e.g., chief of health informatics or chief of public health information) that focus on the science and development of public health information systems rather than simply system maintenance and support.

Conclusion

The Working Group to Define Competencies for Public Health Informaticians developed these competencies with public input. The results reflect the understanding of and expectations for PHIs. However, these competencies are intended to be dynamic and should evolve as the field evolves. Competencies have also been developed in other fields, including nursing⁵ and epidemiology,⁶ that might be relevant to the field of public health informatics. These efforts are not being conducted in isolation; therefore, they will influence the PHI competencies. Likewise, many of the competencies included in this document can be mapped to one of the eight domains in the Council on Linkages core competencies,³ however, until such a rigorous mapping occurs, they are listed here separately.

The working group is particularly interested in having these competencies used in the development of public health training programs. Although the CDC Public Health Informatics Fellowship Program (at <http://www.cdc.gov/phifp>)⁷ and some public health informatics academic programs.⁸⁻¹⁴ are beginning to fill the training gap, such training should be more widespread and standardized to ensure that a person with recognized programmatic training in public health informatics is competent in specific areas. A challenge to developing public health informatics training is widespread topic areas covered in public health informatics projects and research and the highly variable skills needed for different levels of informatics expertise. PHIs are experts in developing, applying, and testing informatics best practices — the science of informatics. By developing these professionals, we can fill the gaps that exist in public health agencies and academia.

This version and future drafts of these competencies will be hosted online on CDC's Internet site at <http://www.cdc.gov/InformaticsCompetencies> and at <http://cphi.washington.edu/resources/competencies.html>. In addition, we plan to post position descriptions, training curricula, and other useful materials to share with public health partners and others.

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Competencies Framework

The competency statements for the positions of public health informatician and senior public health informatician (PHI and SPHI) are related but differ on the basis of expectations for knowledge and ability.

The competencies have been developed using the following framework:

- A. Competency statement
 - 1. Subcompetency statement
 - a. Sub-subcompetency statement

The competency statements describe the knowledge, skills, and abilities at a high level, and the lower level statements provide more detail to clarify the intent and the specific skills and abilities desired. The 13 core competencies A–M, listed on the next page, are detailed in the appendix.

Core Competencies for Public Health Informaticians

Public Health Informatician

- A. Supports development of strategic direction for public health informatics within the enterprise.
- B. Participates in development of knowledge management tools for the enterprise.
- C. Uses informatics standards.
- D. Ensures that knowledge, information, and data needs of project or program users and stakeholders are met.
- E. Supports information system development, procurement, and implementation that meet public health program needs.
- F1. Manages IT operations related to project or program (for public health agencies with internal IT operations).
- F2. Monitors IT operations managed by external organizations.
- G. Communicates with cross-disciplinary leaders and team members.
- H. Evaluates information systems and applications.
- I. Participates in applied public health informatics research for new insights and innovative solutions to health problems.
- J. Contributes to development of public health information systems that are interoperable with other relevant information systems.
- K. Supports use of informatics to integrate clinical health, environmental risk, and population health.
- L. Implements solutions that ensure confidentiality, security, and integrity while maximizing availability of information for public health.
- M. Conducts education and training in public health informatics.

Senior Public Health Informatician

- A. Leads creation of strategic direction for public health informatics.
- B. Leads knowledge management for the enterprise.
- C. Ensures use of informatics standards.
- D. Ensures that knowledge, information, and data needs of users and stakeholders are met.
- E. Ensures that information system development, procurement, and implementation meet public health program needs.
- F1. Ensures IT operations are managed effectively to support public health programs (for public health agencies with internal IT operations).
- F2. Ensures adequacy of IT operations managed by external organizations.
- G. Communicates with elected officials, policymakers, agency staff, and the public.
- H. Ensures evaluation of information systems and applications.
- I. Conducts applied public health informatics research for new insights and innovative solutions to health problems.
- J. Ensures that public health information systems are interoperable with other relevant information systems.
- K. Uses informatics to integrate clinical health, environmental risk, and population health.
- L. Develops solutions that ensure confidentiality, security, and integrity while maximizing availability of information for public health.
- M. Contributes to progress in the field of public health informatics.

References

1. Yasnoff WA, O'Carroll PW, Koo D, Linkins RW, Kilbourne E. Public health informatics: improving and transforming public health in the information age. *J Public Health Manag Pract* 2000;6:67–75.
2. O'Carroll PW, Public Health Informatics Competency Working Group. *Informatics Competencies for Public Health Professionals*. Seattle, WA: Northwest Center for Public Health Practice; 2002.
3. Council on Linkages Between Academia and Public Health Practice. *Core Competencies for Public Health Professionals* [Homepage on the Internet]. Washington, DC: Public Health Foundation; 2008. Available at: <http://www.phf.org/link/corecompetencies.htm>. Accessed April 14, 2009.
4. Miner K, Kurz W, Alperin M, Cioffi J, Hunt N. The MACH Model: from competencies to instruction and performance of the public health workforce. *Public Health Rep* 2005;120:9–15.
5. Kaminski J. *Nursing Informatics Competencies* [Homepage on the Internet]. 2008. Available at: <http://nursing-informatics.com/niassess/competencies.html>. Accessed April 14, 2009.
6. Centers for Disease Control and Prevention (CDC). *Competencies for Applied Epidemiologists in Governmental Public Health Agencies (AECs)* [Homepage on the Internet]. Atlanta, GA: US Department of Health and Human Services; CDC; 2008. Available at: <http://www.cdc.gov/AppliedEpiCompetencies/>. Accessed April 14, 2009.
7. Centers for Disease Control and Prevention (CDC). *Public Health Informatics Fellowship Program* [Homepage on the Internet]. Atlanta, GA: US Department of Health and Human Services; CDC; 2009. Available at: <http://www.cdc.gov/phifp>. Accessed April 14, 2009.
8. Columbia University. *Biomedical Informatics* [Homepage on the Internet]. New York, NY: Columbia University, [undated]. Available at: <http://www.dbmi.columbia.edu/publichealth/>. Accessed April 14, 2009.
9. Children's Hospital Informatics Program. *Children's Hospital Informatics Program (CHIP)* [Homepage on the Internet]. Boston, MA: Harvard Medical School, Children's Hospital of Boston; 2009. Available at: <http://www.chip.org/>. Accessed April 14, 2009.
10. University of Illinois at Chicago. *Public Health Informatics: Online Master's Degree and Online Certificate Program* [Homepage on the Internet]. Chicago, IL: University of Illinois; 2009. Available at: <http://www.uic.edu/sph/phi/>. Accessed April 14, 2009.
11. Johns Hopkins University Applied Physics Laboratory. *APL Helps County Prepare Pandemic Plans* [Homepage on the Internet]. Baltimore, MD: Johns Hopkins University; 2008. Available at: <http://www.jhuapl.edu/newscenter/stories/st080801.asp>. Accessed April 14, 2009.
12. University of Utah. *The University of Utah: Biomedical Informatics* [Homepage on the Internet]. Salt Lake City, UT: University of Utah, School of Medicine; 2009. Available at: <http://www.bmi.utah.edu>. Accessed April 14, 2009.
13. University of Washington. *Biomedical and Health Informatics*. Seattle, WA: University of Washington, Department of Medical Education and Biomedical Informatics; 2009. Available at: <http://www.informatics.washington.edu>. Accessed April 14, 2009.
14. University of Washington School of Public Health. *Public Health Informatics*. Seattle, WA: University of Washington, Center for Public Health Informatics; 2009. Available at: <http://www.cphi.washington.edu>. Accessed April 14, 2009.

Glossary

AMIA: American Medical Informatics Association.

APHA: American Public Health Association.

APHL: Association of Public Health Laboratories.

ASPH: Association of Schools of Public Health.

ASTHO: Association of State and Territorial Health Officials.

CDC: Centers for Disease Control and Prevention.

CDC PHIFP: CDC Public Health Informatics Fellowship Program.

chief information officer: a technology professional with a role focused on information systems including hardware and software.

CIA: confidentiality, integrity, and availability (triad).

CIA triad: a benchmark for evaluation of information systems security focusing on confidentiality, integrity, and availability of information.

CIO: chief information officer.

CISO: chief information security officer.

Council on Linkages: Council on Linkages Between Academia and Public Health Practice.

CPHI: Center for Public Health Informatics, University of Washington.

CSTE: Council of State and Territorial Epidemiologists.

Cut-over: The process of replacing an old hardware or software system with a new one.

HIPAA: Health Insurance Portability and Accountability Act.

information systems: software and hardware systems that support data-intensive applications.

information technology: use of computers and software to manage and process information.

ISDS: International Society for Disease Surveillance (<http://www.syndromic.org>).

IT: information technology.

MPH: master of public health degree.

MSPH: master of science in public health degree.

NACCHO: National Association of County and City Health Officials.

NAHDO: National Association of Health Data Organizations.

NAPHIT: National Association for Public Health Information Technology.

NAPHSIS: National Association for Public Health Statistics and Information Systems.

NEDSS: National Electronic Disease Surveillance System.

NIH: National Institutes of Health.

OWCD: Office for Workforce and Career Development, Centers for Disease Control and Prevention.

PHDSC: Public Health Data Standards Consortium.

PHI: Public Health Informatics or Public Health Informatician.

PHIFP: Public Health Informatics Fellowship Program.

PHII: Public Health Informatics Institute (<http://www.phii.org>).

PHIN: Public Health Information Network.

public health: study and management of a community's health concerns through disease prevention and education.

Public Health Code of Ethics: A statement of the key principles of the ethical practice of public health encompassing the physical, mental, and social well-being of a society's citizens (http://www.publichealth.columbus.gov/Asset/iu_files/Public_Health_Code_of_Ethics.pdf).

public health enterprise: a state or local health department.

public health informatician: a public health professional who works in practice, research, or academia and whose primary work function is to use informatics to improve the health of populations.

public health informatics: systematic application of information and computer science and technology to public health practice, research, and learning.

public health informatics competencies: public health worker's observable or measurable performance, knowledge, skills, and abilities to organize information and use it for public health purposes, leveraging technology within the public health setting.

RFP: request for proposal.

RHIO: regional health information organization.

risk management: a structured approach to dealing with uncertainties and threats.

sanitarian: a specialist in environmental health who enforces government regulations and advises and educates clients.

SCAMC: Symposium on Computer Applications in Medical Care (former term for the AMIA Fall Symposium).

senior public health informatician: a professional who serves at the senior level as policy adviser and leader at the highest level of a public health agency, bringing special expertise in the areas of information architecture, information resource management planning, enterprise-level information systems development and integration, and organizational change management.

SPHI: senior public health informatician.

UW SPHCM: School of Public Health and Community Medicine, University of Washington.

Competencies for Public Health Informaticians

Public Health Informaticians

Senior Public Health Informaticians

A. Supports development of strategic direction for public health informatics within the enterprise

A. Leads creation of strategic direction for public health informatics

1. *Leads public health informatics planning for a project or program*

- a. Works with users to identify the goals and objectives for a project or program
- b. Works with users to identify target outcomes for programmatic informatics projects
- c. Works with program managers to identify informatics needs and priorities of the different organizations affected by the project or program
- d. Aids in construction of an informatics vision for the enterprise
- e. Creates a program-specific IT plan that coordinates with the enterprise strategic plan
- f. Aids in the definition of a timeline for the informatics strategic plan for the program and enterprise
- g. Aids in the definition of a risk management strategy for the enterprise
- h. Aids in defining a timeline for the risk management strategy for the program and enterprise
- i. Designs program architecture requirements within the context of the enterprise architecture requirements
- j. Documents program architecture clearly for implementation and evaluation
- k. Applies the enterprise IT security structure to specific projects or program information systems

1. *Leads public health informatics planning for the enterprise and the community*

- a. Works with executive leadership to identify enterprise goals and objectives
- b. Identifies target outcomes and integration opportunities for enterprise informatics projects
- c. Works with program managers to coordinate informatics needs and priorities among different organizations in the enterprise
- d. Constructs an informatics vision for the enterprise
- e. Creates an enterprise strategic plan for informatics that extends into the future and takes into account planning and decisions of entities outside of the enterprise that can influence programs and operations
- f. Defines a timeline for the informatics strategic plan for the enterprise that ensures program needs will be met
- g. Works with the chief information systems officer (CISO) to define a risk management strategy for the enterprise
- h. Works with the CISO to define a timeline for the risk management strategy for the enterprise
- i. Works with the CISO to design overall enterprise architecture requirements that support the informatics strategic plan
- j. Documents enterprise architecture clearly for implementation and evaluation
- k. Works with the CISO to ensure information needs are balanced with security needs of the enterprise and reflected in the enterprise IT security structure

Public Health Informaticians

2. ***Recommends public health informatics strategic decisions for a project or program***
 - a. Researches existing and emerging IT standards and methods
 - b. Recommends whether and when to build, modify, buy, or retire software or services for the project or program within context of the enterprise informatics strategic plan
 - c. Estimates programmatic impacts of technology modifications
 - d. Establishes a resource repository of people and their skills, software, and productivity tools for each managed project or program
 - e. Manages a portfolio of systems, projects, and associated human resources
 - f. Determines needed IT resources for one or more projects or programs
 - g. Identifies appropriate best practices and methodologies for systems development, testing, implementation, and operation in one or more projects
 - h. Develops a security requirements document for projects or programs within the context of enterprise security requirements
 - i. Works with jurisdictional resources to ensure projects or programs are consistent with constraints and benefit from compatible solutions

3. ***Contributes to all strategic decisions for the programs, projects, and the enterprise***
 - a. Collaborates with other PHIs and program managers to achieve strategic goals
 - b. Offers informatics insights into decisions (e.g., opportunities for process improvement or knowledge management)
 - c. Makes recommendations to the SPHI on applying IT and information management policies to improve the effectiveness of strategic decisions for the enterprise

Senior Public Health Informaticians

2. ***Recommends public health informatics strategic decisions for the enterprise***
 - a. Researches existing and emerging IT standards and methods
 - b. Recommends whether and when to build, modify, buy, or retire software or services within context of the enterprise informatics strategic plan and organizational vision
 - c. Estimates public health practice impacts of enterprise technology modifications
 - d. Establishes a resource repository of people and their skills, software, and productivity tools relevant to public health informatics for the enterprise
 - e. Oversees multiple portfolios of systems, projects, and associated human resources
 - f. Recommends needed IT resources for the enterprise
 - g. Recommends best practices and methodologies for systems development, testing, implementation and operation in the enterprise
 - h. Participates in development of an enterprise security requirements document for each category of application (e.g., intranet, extranet, or Internet) and record- or data-type (e.g., vital records or communicable disease reports) that optimizes security while meeting access requirements
 - i. Incorporates larger jurisdictional resources and constraints (e.g., a jurisdiction's IT management agency and policies) into enterprise planning

3. ***Participates in all senior-level strategic decisions for the enterprise***
 - a. Collaborates with other executive-level leaders to achieve strategic goals
 - b. Offers informatics insights into decisions (e.g., opportunities for process improvement or knowledge management)
 - c. Makes recommendations on applying IT and information management policies to improve the effectiveness of strategic decisions for the enterprise

Public Health Informaticians

- 4. *Develops IT and information management policies for programs in accordance with enterprise policies***
- a. Identifies needed IT and information management policies
 - b. Identifies best practices for policies in IT and information management to support public health programs
 - c. Provides input into information systems policy development
 - d. Supports development of IT and information management policies that meet the needs of the enterprise and are consistent with informatics best practices
 - e. Assists in drafting rules, regulations, and legislation for implementation, funding, and promotion of public health initiatives involving informatics activities
 - f. Assists in creating procedures for conducting evaluations of the impact of IT architectures and projects on public health programs

Senior Public Health Informaticians

- 4. *Participates in development of IT and information management policies for the enterprise***
- a. Anticipates needs for IT and information management policies
 - b. Evaluates best practices for policies in IT and information management to support public health programs
 - c. Involves enterprise stakeholders in information systems policy development
 - d. Leads in developing IT and information management policies that meet the needs of the enterprise and are consistent with informatics best practices
 - e. Leads in drafting rules, regulations, and legislation for implementation, funding, and promotion of public health initiatives involving informatics activities
 - f. Leads in creating procedures for conducting evaluation of the impact of IT architectures and projects on public health programs

B. Participates in development of knowledge management tools for the enterprise

- 1. *Collaborates with other public health professionals to determine core knowledge required by groups within the enterprise***
 - a. Assists in assessing core knowledge possessed by groups within the enterprise
 - b. Assists in identifying knowledge needed for groups to meet enterprise goals and objectives
- 2. *Assists in identifying solutions for information access***
 - a. Works with other public health professionals to identify knowledge sources
 - b. Identifies mechanisms for organizing and accessing information that satisfy user requirements for cost, timeliness of access, currency, and breadth and depth of information

B. Leads knowledge management for the enterprise

- 1. *Determines core knowledge required by groups within the enterprise***
 - a. Assesses core knowledge possessed by groups within the enterprise
 - b. Identifies knowledge needed for groups to meet enterprise goals and objectives
- 2. *Identifies solutions for information access***
 - a. Oversees identification of potential knowledge sources internal and external to the enterprise
 - b. Identifies mechanisms for organizing and accessing information that satisfies user requirements for cost, timeliness of access, currency, and breadth and depth of information

Public Health Informaticians

3. *Assists in identifying or creating a knowledge repository*
 - a. Assists in defining an appropriate information model that stores, indexes, and versions information required by the enterprise
 - b. Assists in identifying or creating collation and dissemination methods for information resources
 - c. Assists in specifying an update process and policy for information and knowledge maintenance
 - d. Supports implementation of effective systems for knowledge display (e.g., dashboards)
 - e. Supports implementation of collaborative workspaces to share staff knowledge and generate new knowledge
 - f. Supports implementation of rule-based decision support systems that describe limitations of information and are based on public health evidence, enterprise policies, and best practices within the enterprise
 - g. Supports implementation of data and information reuse to produce new knowledge sources (data mining)

Senior Public Health Informaticians

3. *Identifies or creates a knowledge repository*
 - a. Defines an appropriate information model that stores, indexes, and versions information required by the enterprise
 - b. Identifies or creates collation and dissemination methods for information resources
 - c. Specifies an update process and policy for information and knowledge maintenance
 - d. Oversees implementation of effective systems for knowledge display (e.g., dashboards)
 - e. Oversees design and implementation of collaborative workspaces to share staff knowledge and generate new knowledge
 - f. Oversees implementation of rule-based decision support systems that describe limitations of information and are based on public health evidence, enterprise policies, and best practices within the enterprise
 - g. Oversees implementation of data and information reuse to produce new knowledge sources (data mining)

C. Uses informatics standards

1. *Communicates the origin and role of standards relevant to informatics projects and information systems within the enterprise*

C. Ensures use of standards

1. *Communicates to staff the origin and role of standards relevant to informatics projects and information systems within the enterprise*

Public Health Informaticians

2. *Uses informatics standards in all projects and systems, where relevant standards exist*
 - a. Provides information for those developing a framework for adoption and use of standards that support system interoperability within the enterprise and between relevant organizations
 - b. Identifies relevant standards to support programmatic needs, including vocabulary and terminology standards, information content standards, information exchange standards, identifier standards, privacy and security standards, functional standards, and others as needed
 - c. N/A
 - d. Specifies relevant standards in the information system requirements
 - e. Implements selected standards according to approved implementation guides
 - f. Leverages standardized data and messaging for data reuse and workflow automation
 - g. Supports upgrades in standards for all data sources when changes in standard specifications or versions make this necessary
3. *Contributes to standards development efforts*
 - a. Participates in standards development and standards profiling organizations
 - b. Participates in development of use cases for standards development efforts
 - c. Identifies gaps and overlaps in existing standards and develops recommendations for gap and overlap resolutions
 - d. Advocates use of standards at the program level
 - e. Evaluates standards to provide feedback to standards development organizations
4. *Supports orderly migration to a standards-based framework*
 - a. Identifies mechanisms to migrate systems to a standards-based framework while minimizing disruption to established systems and practices
 - b. Follows plans for migrations that will minimize disruption to established systems and practices

Senior Public Health Informaticians

2. *Ensures use of informatics standards in all projects and systems, where relevant standards exist*
 - a. Establishes framework for use of standards that supports system interoperability within the enterprise and between relevant organizations
 - b. Selects relevant standards for use within the enterprise, including vocabulary and terminology standards, information content standards, information exchange standards, identifier standards, privacy and security standards, functional standards, and others as needed
 - c. Maintains relevant standards and implementation guides in a centralized resource for use by enterprise staff
 - d. Ensures relevant standards are specified in the information system requirements
 - e. Ensures implementation of selected standards according to approved implementation guides
 - f. Ensures that standardized data and messaging are leveraged for data reuse and workflow automation
 - g. Manages upgrades in standards for all data sources when changes in standard specifications or versions make this necessary
3. *Contributes to standards development efforts*
 - a. Represents agency or program needs at the standards development organizations and national standards harmonization activities
 - b. Participates in development of use cases for standards development efforts
 - c. Participates in the standards gap and overlap resolutions process
 - d. Advocates use of standards within the enterprise and with partner organizations
 - e. Aggregates evaluations of standards from across the enterprise to provide feedback to standards development organizations
4. *Oversees orderly migration to a standards-based framework*
 - a. Plans for migrations that will minimize disruption to established systems and practices
 - b. Implements migrations that will minimize disruption to established systems and practices

Public Health Informaticians

Senior Public Health Informaticians

D. Ensures that knowledge, information, and data needs of project or program users and stakeholders are met

- 1. Analyzes user and stakeholder information, knowledge, and data needs*
 - a. Models business processes and workflow within projects or programs with input from program level staff
 - b. Helps affected stakeholders develop use cases for potential applications or systems
 - c. Models the information flow, access, and retention needs of projects or programs associated with one or more business processes

D. Ensures that knowledge, information, and data needs of users and stakeholders are met

- 1. Analyzes user and stakeholder information, knowledge, and data needs*
 - a. Models business processes and workflow within the enterprise with input from management and program level staff
 - b. Ensures development of use cases for potential applications or systems
 - c. Models the information flow, access, and retention needs of the enterprise associated with all business processes

Public Health Informaticians

2. *Works with program staff and stakeholders to design information systems that meet user needs*
 - a. Engages user in business process analysis to negotiate changes to user workflows to improve processes
 - b. Incorporates usability research findings (e.g., human-computer interaction or interface design) in system design
 - c. Identifies technical solutions that meet the social and physical needs of users, including support for disabilities and alternative languages
 - d. Ensures that information disseminated to users is useful and accessible (dissemination medium, format, and tools)
 - e. Performs use audits to track use of and satisfaction with the information system
 - f. Solicits feedback from users and stakeholders of information systems in programs or projects
 - g. Modifies program or project systems in response to post-implementation feedback and audit findings
 - h. Seeks to identify and implement reuse of information to the greatest extent practical
 - i. Identifies legal, confidentiality, security, open records, and other concerns that affect information collection, storage, and access
 - j. Applies user-centered design (as opposed to technology or agency-centered design) that takes into account how users do their jobs and involves users in definition of design requirements
 - k. Applies approved methods for identification, indexing, and de-duplication of clinical data
 - l. Applies de-identification methods when necessary to protect personal privacy and to comply with local, state, or federal laws
 - m. Conducts formative and summative evaluation to assess the effectiveness of the information system
 - n. Develops plans for continuity of operations in the event of system failure or unavailability

Senior Public Health Informaticians

2. *Ensures design of information systems that meet user and stakeholder needs*
 - a. Establishes policies and standard processes evaluating business processes and negotiating changes to user workflows to improve processes
 - b. Establishes enterprise standards for incorporating usability research findings (e.g., human-computer interaction or interface design) in system design
 - c. Ensures that identified technical solutions meet the social and physical needs of users, including support for disabilities and alternative languages
 - d. Ensures adherence to standards of information usefulness, accessibility, and accuracy (dissemination medium, format, and tools)
 - e. Reviews results of use audits for enterprise information systems
 - f. Solicits feedback from users and stakeholders of enterprise systems
 - g. Modifies enterprise systems in response to post-implementation feedback and audit findings
 - h. Ensures an information system design that identifies and implements reuse of information to the greatest extent practical
 - i. Ensures that legal, confidentiality, security, open records, and other concerns affecting information collection, storage, and access are addressed
 - j. Ensures that design and development projects within the enterprise apply user-centered design (as opposed to technology or agency-centered design)
 - k. Ensures that identification, indexing, and de-duplication of clinical data are implemented according to approved methods
 - l. Ensures de-identification when necessary to protect personal privacy and to comply with local, state, or federal privacy laws
 - m. Oversees the formative and summative evaluations of all enterprise information systems to assess their effectiveness
 - n. Ensures development of plans for continuity of operations in the event of system failure or unavailability

Public Health Informaticians

Senior Public Health Informaticians

E. Supports information system development, procurement, and implementation that meet public health program needs

1. *Integrates public health system requirements into information systems development, procurement, and implementation*
2. *Ensures that acquisitions associated with projects meet their public health requirements*
 - a. Assesses buy, build, and modify options for each project
 - b. Follows best practices and enterprise policies for developing a request for proposal (RFP)
 - c. Follows enterprise policies for issuing and making decisions regarding RFPs for information systems and technology
 - d. Identifies recent or upcoming changes in information standards, technologies, and product support that will maximize the cost effectiveness and lifespan of information systems whether bought, built, or modified
 - e. Performs research on potential vendors to understand history, performance record, capacity, ongoing commitment to and development of the product line, and feedback from other users
 - f. N/A
 - g. Anticipates future budgeting needs related to hardware and software maintenance and life-cycle upgrades
 - h. Documents all aspects of the acquisition process and makes them transparent to the public

E. Ensures that information system development, procurement, and implementation meet public health program needs

1. *Ensures that public health requirements are integrated into information system development, procurement, and implementation*
2. *Ensures that acquisitions associated with projects meet the public health requirements of the enterprise*
 - a. Reviews results of buy, build, and modify decisions for projects within the enterprise
 - b. Provides input into best practices and enterprise policies for developing information system RFPs, within the framework of the purchasing requirements of the enterprise
 - c. Provides input into enterprise's policies for issuing and making decisions regarding RFPs, working within the framework of the purchasing requirements of the enterprise
 - d. Considers and anticipates recent and upcoming changes in information standards, technologies, and product support that will maximize the cost effectiveness and lifespan of information systems whether bought, built, or modified
 - e. Assists in developing processes and provides training to ensure that project managers research existing and potential vendors, including feedback from other users, their history, performance record, capacity, ongoing commitment to and development of the product line
 - f. Establishes relationships with vendors, determines levels of support, defines scope, and addresses concerns of intellectual property
 - g. Ensures that future budgeting needs related to enterprise hardware and software maintenance and life-cycle upgrades are addressed
 - h. Ensures that all aspects of the acquisition process are well-documented and are transparent to the public

Public Health Informaticians

3. ***Manages information system projects supporting public health programs***
 - a. Assesses available resources, including personnel
 - b. Creates and monitors project plan, promptly identifying and acting on deviations from the plan or budget, and advising senior leadership
 - c. Assembles resources (e.g., funding, personnel, equipment, and supplies)
 - d. N/A
 - e. Delineates responsibilities for team members
 - f. Manages team members
 - g. Manages project budget

4. ***Creates a clear project or operating framework***
 - a. Creates a charter for each project by following enterprise charter template
 - b. Implements projects for program areas by using standard enterprise charter framework
 - c. Establishes life-cycle and upgrade management for hardware and software
 - d. Ensures that resources, including funding, are available on an ongoing basis for project maintenance
 - e. Develops an organizational plan and resources for user training and ongoing user support
 - f. Defines a change control process for the project
 - g. Conducts continuous quality improvement by using iterative performance measurement, analysis, and design changes

Senior Public Health Informaticians

3. ***Ensures that information system project portfolios are managed to meet public health program needs***
 - a. Validates assessment of available resources for enterprise projects
 - b. Tracks compliance with project plan for projects within the enterprise, ensuring that deviations from plan or budget are promptly corrected
 - c. Ensures that resources are available for the projects within the enterprise
 - d. Ensures that appropriate team members and managers are assigned to teams
 - e. Delineates responsibilities for teams
 - f. Provides input to project managers
 - g. Ensures that project budgets are managed

4. ***Ensures establishment of standard framework for management of public health information system projects within the enterprise***
 - a. Provides input into standard charter templates, including the purpose and objective statements for projects, alignment with enterprise strategic and technology plans, use requirements, governance and project development
 - b. Ensures that projects within the enterprise follow the standard enterprise project management framework
 - c. Assists in establishing a template for management of hardware and software associated with projects in the enterprise
 - d. Ensures that resources, including funding, are available on an ongoing basis for maintenance of projects within the enterprise
 - e. Ensures delivery of user training and ongoing user support
 - f. Assists in establishing a standard framework for change control within projects in the enterprise
 - g. Ensures continuous quality improvement of enterprise communication systems by using iterative performance measurement, analysis, and design changes

Public Health Informaticians

5. *Minimizes impact on ongoing operations when changing or implementing information systems*
 - a. Uses enterprise change-control process when modifying or implementing information systems
 - b. N/A
 - c. Uses IT systems development environment designed for testing new products and developing new applications without risking the production environment
 - d. Uses a cutover plan from development to production environment that considers all stakeholders
 - e. Solicits user feedback, especially from primary users, to identify disruptions or need for additional changes
 - f. Monitors projects and programs to assess whether, when, and how disruptions occur
 - g. Responds to and implements action plans that use corrective measures to address disruption of operations

Senior Public Health Informaticians

5. *Ensures a smooth transition for ongoing enterprise operations when information systems are changed or implemented*
 - a. Assists CISO in defining standard enterprise processes for change-control process when implementing or modifying information systems
 - b. Ensures that change-control processes are being implemented and followed
 - c. Provides input into establishing an IT system development environment designed for testing new products and developing new applications without risking the production environment
 - d. Ensures usage of a cutover plan from development to production environment that considers all stakeholders
 - e. Reviews user feedback, especially from primary users, to identify disruptions or need for additional changes
 - f. Monitors enterprise operations to assess whether, when, and how disruptions are occurring
 - g. Provides input into development of action plans to correct situations that led to disruption of operations

F1. Manages IT operations related to project or program (for public health agencies with internal IT operations)

1. *Manages project or program resources*
 - a. Operates the project or program within the scope of the allotted budget and in the context of human resource policies
 - b. Seeks methods to bridge across programs with reusable resources and economies of scale
 - c. Leverages agency-wide IT resources effectively to minimize additional costs for a project or program
 - d. Transmits and translates version-control process to users
 - e. Uses hosting option that is aligned with the resources available to the project or program

F1. Ensures IT operations are managed to effectively support public health programs (for public health agencies with internal IT operations)

1. *Evaluates agency resources*
 - a. Identifies personnel, funds, and technology necessary for ongoing IT operations while being sensitive to the organization's budget, human resource policies, and emerging technologies
 - b. Assesses availability of a jurisdiction's IT resources
 - c. Provides input into prioritizing resources to support the enterprise's portfolio, including all systems and applications
 - d. Provides input into hosting options for information systems and applications
 - e. N/A

Public Health Informaticians

2. ***Manages user support for projects or programs***
 - a. Ensures user training and support for projects or programs
 - b. Ensures that information systems and applications are marketed to users within and outside the enterprise
 - c. Ensures user support and technical assistance is provided and is consistent with the importance and time sensitivity of each information system (i.e., prioritized appropriately)

3. ***Manages risks to information systems and applications***
 - a. Maintains security, including confidentiality, integrity, and availability (CIA) of information system projects
 - b. Ensures availability of systems and applications 24 hours/day, 7 days/week, when necessary to support the project or program
 - c. Ensures backup and recovery strategies are developed and applied

4. ***Follows enterprise operational policies***
 - a. Identifies best practices for operational policies
 - b. Provides input on proposed policies
 - c. Assists in development of necessary operational policies
 - d. Assists in development of processes for changing policies

Senior Public Health Informaticians

2. ***Ensures effective user support across the enterprise***
 - a. Ensures user training and support for all projects and programs within the enterprise
 - b. Ensures that information systems and applications are marketed to users internal and external to the enterprise
 - c. Ensures user support and technical assistance is provided and is consistent with the importance and time sensitivity of each information system (i.e., prioritized)

3. ***Ensures that risks to information systems and applications are managed***
 - a. Ensures confidentiality, integrity, and availability for all information system projects within the enterprise
 - b. Ensures that all information systems across the enterprise requiring availability 24 hours/day, 7 days/week are meeting those requirements
 - c. Ensures development and application of backup and recovery strategies

4. ***Participates in developing operational policies***
 - a. Identifies best practices for operational policies
 - b. Seeks input from enterprise members on proposed policies
 - c. Provides input into developing necessary operational policies
 - d. Provides input into defining processes for changing policies

F2. Monitors IT operations managed by external organizations

1. ***Provides information on IT operational needs of the public health enterprise***

2. ***Provides information on the performance of the external IT management organization in supporting the operations of the public health enterprise***

3. ***Ensures optimal management of IT operations by subcontracted entities, recognizing deviations from or need to amend contracts***

F2. Ensures adequacy of IT operations managed by external organizations

1. ***Participates in negotiating IT operational support with the organization that manages the IT resources based on the needs of the public health enterprise***

2. ***Ensures that IT operational needs are being met***

3. ***Ensures best practices in the negotiation and management of subcontracted IT operations***

Public Health Informaticians

Senior Public Health Informaticians

G. Communicates with cross-disciplinary leaders and team members

1. *Communicates effectively with staff across enterprise disciplines*
 - a. Explains IT in nontechnical terms when needed, but competently interprets technical language
 - b. Translates user needs into systems requirements language
 - c. Develops communications strategy targeted to specific audiences
 - d. Uses multiple communication media, including presentations, written articles, and white papers
 - e. Assists in periodically assessing staff understanding of informatics communications
2. *Advocates within the agency for the value of informatics and IT as well as best practices to promote acceptance and adoption by enterprise staff*
 - a. Educates users on the value of informatics and IT to public health
 - b. Engages and communicates directly with stakeholders regarding their needs and interests
 - c. N/A
 - d. Communicates both public health and economic return-on-investment for systems, technologies, and best practices in the enterprise
3. *Negotiates within the department or programs to ensure maximal reuse of software resources and to promote cross-program benefits, including cost-efficiencies and interoperability*

H. Evaluates information systems and applications

1. *Assists in developing an evaluation framework for public health information systems*
2. *Assists in developing an evaluation framework for the implementation process for information systems and applications*

G. Communicates with elected officials, policymakers, agency staff, and the public

1. *Communicates effectively with staff across enterprise disciplines as well as with elected officials, policymakers, and the public*
 - a. Explains IT in nontechnical terms when needed, but competently interprets technical language
 - b. Translates user needs into systems requirements language
 - c. Adapts message to particular target audience
 - d. Uses multiple communication media, including presentations, written articles, and white papers
 - e. Periodically assesses staff understanding of informatics communications
2. *Advocates for the value of informatics and IT as well as best practices to secure resources and promote acceptance and adoption by the organization and its partners*
 - a. Synthesizes available information on the value of informatics and IT to public health
 - b. Identifies key stakeholders and their interests and influence (stakeholder analysis)
 - c. Identifies opportunities for advocacy (influential persons or groups, strategic meetings)
 - d. Communicates both public health and economic return-on-investment for systems, technologies, and best practices in the enterprise
3. *Negotiates with technical peers in other agencies on informatics concerns, including reuse of code and interoperability*

H. Ensures evaluation of information systems and applications

1. *Establishes an evaluation framework for public health information systems that addresses cost-effectiveness, completeness and quality of data, conformance to enterprise architecture, conformance to specified functions and usability requirements, scalability, and ability to meet public health objectives*
2. *Establishes a framework for evaluating the implementation process for information systems and applications*

Public Health Informaticians	Senior Public Health Informaticians
<p>3. <i>Evaluates information systems according to established frameworks</i></p>	<p>3. <i>Ensures that all information systems in the enterprise are evaluated according to established frameworks</i></p>
<p>I. Supports applied public health informatics research for new insights and innovative solutions to health problems</p>	<p>I. Conducts applied public health informatics research for new insights and innovative solutions to health problems</p>
<p>1. <i>Assists in maintaining infrastructure to support applied public health informatics research</i></p>	<p>1. <i>Creates and maintains applied public health informatics research infrastructure within the enterprise and/or through partnerships</i></p>
<p>2. <i>Supports applied informatics research to determine how IT can change and improve public health practice</i></p> <ol style="list-style-type: none"> a. <i>Contributes to development of research questions</i> b. <i>Performs literature reviews</i> c. <i>Contributes to development of study protocols and processes</i> d. <i>Contributes to writing proposals</i> e. <i>Participates in conduct of studies</i> f. <i>Assists in analysis and synthesis of data</i> g. <i>Reports findings under SPHI's direction</i> 	<p>2. <i>Directs applied informatics research to determine how IT can change and improve public health practice</i></p> <ol style="list-style-type: none"> a. <i>Develops research questions</i> b. <i>Performs literature reviews</i> c. <i>Develops study protocols and processes</i> d. <i>Writes proposals</i> e. <i>Conducts studies</i> f. <i>Analyzes and synthesizes data</i> g. <i>Reports findings</i>
<p>3. <i>Supports development of new insights into potential uses of public health informatics for programs</i></p> <ol style="list-style-type: none"> a. <i>Assesses uses and value of different types of data to answer public health questions</i> b. <i>Applies concepts at SPHI's direction (e.g., semantic mapping and network associations) to improve program practice through decision support, modeling and simulations, and visualization</i> c. <i>Applies new evidence and knowledge within programs, translating research into practice under SPHI's direction</i> 	<p>3. <i>Develops new insights into potential uses of public health informatics for programs</i></p> <ol style="list-style-type: none"> a. <i>Explores uses and value of different types of data to answer public health questions</i> b. <i>Identifies new concepts (e.g., semantic mapping and network associations) to improve public health practice, including public health decision support, modeling and simulations, and visualization, analysis, and alerts</i> c. <i>Applies new evidence and knowledge within the enterprise, translating research into practice</i>
<p>4. <i>Stays informed and contributes to local, national, and international public health informatics research agendas and participates in revising and setting these agendas</i></p>	<p>4. <i>Stays informed and contributes to local, national, and international public health informatics research agendas and participates in revising and setting these agendas</i></p>
<p>5. <i>Collaborates with other informatics researchers in related areas</i></p>	<p>5. <i>Collaborates with other informatics researchers in related areas</i></p>
<p>6. <i>Disseminates findings and contributes to science</i></p>	<p>6. <i>Disseminates findings and contributes to science</i></p>

Public Health Informaticians

7. *Attends national informatics meetings (e.g., American Medical Informatics Association and Public Health Information Network) and other forums that support knowledge exchange and collaboration*
8. *N/A*

Senior Public Health Informaticians

7. *Represents the organization at national informatics meetings (e.g., American Medical Informatics Association and Public Health Information Network) and other forums that support knowledge exchange and collaboration*
8. *Mentors subordinate PHIs in the conduct of applied public health informatics research*

J. Contributes to development of public health information systems that are interoperable with other relevant information systems

1. *Identifies interoperability concerns*
2. *Determines whether interaction with other relevant information systems (e.g., clinical, environmental, or emergency response) is necessary for information systems being developed*
 - a. *Describes basic functions and standards of other information systems*
 - b. *Identifies opportunities to leverage information from other systems for public health*
 - c. *Participates in identifying opportunities to leverage public health information to improve healthcare, personal health, and other systems*
 - d. *Identifies solutions to interoperability problems between potential partner organizations*
 - e. *N/A*
 - f. *Identifies public health needs and operationalizes methods to enhance participation in regional information exchange activities (e.g., regional health information organizations [RHIOs] or health information exchanges)*
 - g. *Represents public health information needs in national initiatives related to exchange of clinical, environmental, or other data*
3. *Identifies available clinical data for potential use by public health programs*
 - a. *N/A*
 - b. *Implements technical solutions for electronic sharing of clinical data*
 - c. *Solicits feedback on technical solution implementation to ensure results are satisfactory to the clinical data producer and public health program user*

J. Ensures that public health information systems are interoperable with other relevant information systems

1. *Ensures that staff have the ability to identify interoperability concerns within the enterprise and through partnerships*
2. *Identifies opportunities for interaction with other relevant information systems (e.g., clinical, environmental, or emergency response)*
 - a. *Describes basic functions and standards of other information systems*
 - b. *Identifies opportunities to leverage information from other systems for public health*
 - c. *Identifies opportunities to leverage public health information to improve healthcare, personal health, and other systems*
 - d. *Identifies interoperability needs and drivers of potential partner organizations*
 - e. *Defines bilateral benefits of a potential information sharing collaboration between public health and other organizations*
 - f. *Identifies public health opportunities to participate in or lead regional health information exchange activities (e.g., RHIOs or health information exchanges)*
 - g. *Identifies opportunities to participate in national initiatives related to exchange of clinical, environmental, or other data*
3. *Ensures relevant clinical data are available automatically and electronically to public health organizations*
 - a. *Establishes data-sharing agreements with clinical data producers*
 - b. *Identifies technical solutions for electronic sharing of clinical data*
 - c. *Ensures that technical solutions are implemented in ways that are satisfactory to both the clinical data producer and the public health organization*

Public Health Informaticians

4. *Implements and supports systems that electronically receive environmental data*
 - a. Implements data-sharing agreements with environmental data producers
 - b. Implements technical solutions for electronic sharing of environmental data
 - c. Collects information on implementation of technical solutions to determine whether the implementation is satisfactory to both the environmental data producer and the public health organization

5. *Supports efforts to harmonize public health informatics with other informatics domains (e.g., bioinformatics, human genomics, clinical informatics, consumer health informatics, nursing informatics, laboratory information systems, veterinary informatics, dental, pharmaceutical, or environmental)*
 - a. N/A
 - b. N/A
 - c. N/A

Senior Public Health Informaticians

4. *Ensures relevant environmental data are available automatically and electronically to public health organizations*
 - a. Establishes data-sharing agreements with environmental data producers
 - b. Identifies technical solutions for electronic sharing of environmental data
 - c. Ensures that technical solutions are implemented in a manner satisfactory to both the environmental data producer and the public health organization

5. *Harmonizes public health informatics with other informatics domains (e.g., bioinformatics, human genomics, clinical informatics, consumer health informatics, nursing informatics, laboratory information systems, veterinary informatics, dental, pharmaceutical, or environmental)*
 - a. Remains familiar with developments in other informatics domains
 - b. Identifies features or changes in these domains that might be relevant to existing or future public health informatics practices
 - c. Collaborates with peers across the public health system to create and maintain consistency in the practice of public health informatics and harmonization with other informatics domains

K. Supports use of informatics to integrate clinical health, environmental risk, and population health

1. *Supports use of informatics to promote disease prevention at the clinical, environmental, and personal health interfaces*
 - a. Supports systems that supply public health and environmental risk information to clinicians to facilitate clinical decision support
 - b. Supports systems that augment personal health and electronic medical records with public health and environmental risk information
 - c. Supports systems that enable community health situational awareness (including environmental risks) using public health and environmental health information
 - d. Supports systems that supply environmental agencies with public health information for public policy development

K. Uses informatics to support integration of clinical health, environmental risk, and population health

1. *Uses informatics to promote disease prevention at the clinical, environmental, and personal health interfaces*
 - a. Creates systems that supply public health and environmental risk information to clinicians to facilitate clinical decision support
 - b. Creates systems that augment personal health and electronic medical records with public health and environmental risk information
 - c. Creates systems that support community health situational awareness (including environmental risks) using public health and environmental risk information
 - d. Creates systems that supply environmental agencies, including land use planning, agricultural, and environmental protection agencies with public health information for public policy development

Public Health Informaticians

2. ***Supports use of informatics to extend and make clinical care more effective in the community***
 - a. Supports use of electronic health surveys, risk assessments, and other tools to help clinicians target specific health problems in the community
 - b. Supports creation of registries to track major health problems in the community
 - c. Supports creation of targeted public health messages based on results of assessments and decision support systems that are useful to clinicians when delivering care

3. ***Supports establishment of systems to improve public health through access to clinical care information***
 - a. Supports systems for public health decision support that use clinical care information
 - b. Supports systems that enable public health situational awareness based on clinical care information
 - c. Supports surveillance systems that use clinical care information

Senior Public Health Informaticians

2. ***Uses informatics to extend and make clinical care more effective in the community***
 - a. Uses electronic health surveys, risk assessments, and other tools to help clinicians target specific health problems in the community
 - b. Defines reusable systems to create registries from clinical data to track major health problems in the community
 - c. Creates targeted public health messages based on results of assessments and decision support systems that are useful to clinicians when delivering care

3. ***Establishes systems to improve public health through access to clinical care information***
 - a. Establishes systems for public health decision support that use clinical care information
 - b. Establishes systems that support public health situational awareness based on clinical care information
 - c. Establishes surveillance systems using clinical care information

Public Health Informaticians

Senior Public Health Informaticians

L. Implements solutions that ensure confidentiality, security, and integrity while maximizing availability of information for public health**L. Develops solutions that ensure confidentiality, security, and integrity while maximizing availability of information for public health****1. Protects personal health information**

- a. Adheres to local, state, and federal privacy laws, rules, and regulations (including the Health Insurance Portability and Accountability Act of 1996 [HIPAA])
- b. Supports confidentiality and security with policies, data-use, and data-sharing agreements, de-identification or anonymization practices, training, audits, hardware and software management practices, security exercises, and prompt action to address deficiencies
- c. Communicates the commitment and practices of public health related to confidentiality and security to the public and other stakeholders
- d. Implements policies, plans, and procedures related to privacy and security
- e. Establishes data sharing agreements with business partners and other organizations
- f. Follows approved authorization, authentication, and audit practices for each type of system and record
- g. Follows risk communication and corrective action strategies when a system is compromised

2. Complies with human subjects protection (appropriate use of institutional review boards), animal subjects protection when applicable, and the Public Health Code of Ethics**3. Monitors integrity of public health information systems**

- a. Documents data quality of information received, stored, and transmitted
- b. Documents the physical protection of public health information systems
- c. Documents continuity of operations of mission-critical public health information systems
- d. N/A

1. Ensures protection of personal health information

- a. Ensures adherence to local, state, and federal privacy laws, rules, and regulations (including HIPAA)
- b. Ensures implementation and support of confidentiality and security with policies, data-use, and data-sharing agreements, de-identification or anonymization practices, training, audits, hardware and software management practices, security exercises, and prompt action to address deficiencies
- c. Creates enterprise commitment to confidentiality and security practices and conveys that commitment to the public and other stakeholders
- d. Defines and manages consistent implementation of privacy and security policies, plans, and procedures
- e. Ensures establishment of data sharing agreements with business partners and other organizations
- f. Ensures appropriate authorization, authentication, and audit practices for each type of system and record
- g. Creates risk communication and corrective action strategies for when a system is compromised

2. Ensures compliance with human subjects protection (appropriate use of institutional review boards), animal subjects protection when applicable, and the Public Health Code of Ethics**3. Assesses integrity of public health information systems**

- a. Assesses data quality of information received, stored, and transmitted
- b. Assesses the physical protection of public health information systems
- c. Assesses continuity of operations of mission-critical public health information systems
- d. Provides recommendations to CISO for enhancements or changes to improve integrity of public health information systems

Public Health Informaticians**Senior Public Health Informaticians****M. Conducts education and training in public health informatics****M. Contributes to progress in the field of public health informatics**

1. *Integrates knowledge about informatics into the organization*
 - a. Educates agency staff about public health informatics
 - b. Provides information about public health informatics to enterprise stakeholders

2. *Advances the profession of public health informatics*
 - a. Mentors others regarding the public health informatics profession
 - b. Promotes the public health informatics profession
 - c. Participates in public health informatics advocacy organizations
 - d. N/A

3. *Advances personal knowledge of public health informatics by staying current with the literature, attending conferences, and participating in continuing education activities*

1. *Integrates knowledge about informatics into the organization and among community partners*
 - a. Educates members of the organization and the community about public health informatics
 - b. Provides information about public health informatics to enterprise stakeholders and community partners

2. *Advances the profession of public health informatics*
 - a. Mentors others regarding the public health informatics profession
 - b. Promotes the public health informatics profession
 - c. Participates in public health informatics advocacy organizations
 - d. Serves as a reviewer for public health informatics publications and grant proposals

3. *Advances personal knowledge of public health informatics by staying current with the literature, attending conferences, and participating in continuing education activities*