Public Health Informatics Competencies

Class 1: Use of Information Technology for individual professional effectiveness

Topical Area	COMPETENCY	PH Workforce Segment	Example Learning Objectives (person/participant will be able to…)	Related *Council on Linkages'* Core Comp.'s
Digital literacy	1. Utilizes personal computers and other office information technologies at least at a basic level for working with documents and other computerized files	Entire PH workforce (incl. clerical and administrative staff)	► recognize and understand the function of the main components of a computer ► launch a computer application ► save work to a computer file, and locate and open a file on a computer disk drive ► print a file ► copy a file for use on another computer ► use a standard word processing program to create and edit a formatted document using tables and graphics ► use a fax machine to send a facsimile copy of a document	► All (indirectly)
Electronic Communications	2. (Basic) Utilizes modern information technology tools for at least basic electronic communication	Entire PH workforce (incl. clerical and administrative staff)	► send and receive e-mail (using appropriate e-mail etiquette) ► open and save binary attachments to incoming e-mail messages, and attach files to outgoing e-mail messages	► All (indirectly)
	2. (Advanced) Utilizes modern information technology tools for the full range of electronic communication appropriate to one's programmatic area.	All PH Professionals	► send and receive e-mail (using appropriate e-mail etiquette) ► open and save binary attachments to e-mail messages, and attach files to outgoing e-mail messages ► collaborate electronically with peers, e.g., by identifying, subscribing to, and participating in program-appropriate electronic "lists" (e-mail-based discussion groups) ► send health alerts to pre-established groups using e-mail, broadcast fax, and other appropriate technologies	► All (indirectly) but especially: ► Communication ► Cultural Competency ► Community Dimensions of Practice ► Leadership and Systems Thinking

Topical Area	COMPETENCY	PH Workforce Segment	Example Learning Objectives (person/participant will be able to…)	Related *Council on Linkages'* Core Comp.'s
On-line information access	3. (Basic) Utilizes modern information technology tools to retrieve on-line information	Entire PH workforce (incl. clerical and administrative staff)	► use browser software to navigate the World-Wide Web ► use general-purpose on-line search engines to search the Web	► Analytic/Assessment ► Policy Development/ Program Planning ► Basic PH Sciences
	3. (Advanced) Utilizes modern information technology tools to identify, locate, access, assess, and appropriately interpret and use on-line public health-related information and data.	All PH Professionals	► use browser software to navigate the World-Wide Web ► use general-purpose on-line search engines to search the Web ► identify special-purpose search engines (e.g., *PubMed, CDC WONDER*) relevant to their specific program, and use those search engines to retrieve public health-specific information and data ► assess the validity, authoritativeness, and appropriate uses of data and information retrieved from on-line sources	► Analytic/ Assessment ► Policy Dev't/ Program Planning ► Cultural Competency ► Basic PH Sciences ► Financial Planning and Management ► Leadership and Systems Thinking
Data and System Protection	4. Utilizes information technology so as to ensure the integrity and protection of electronic files and computer systems	Entire PH workforce (incl. clerical and administrative staff)	► appropriately use and maintain virus-scanning software installed at their organization ► make timely and appropriate back-ups of important electronic files ► use data verification and validation procedures as necessary when doing data entry/editing	► All (indirectly)
	5. Applies all relevant procedures (policies) and technical means (security) to ensure that confidential information is appropriately protected.	Entire PH workforce (incl. clerical and administrative staff)	► describe the confidentiality policies associated with each data source for which the user has access ► explain the officially approved (i.e. departmental) procedures for assuring that the confidentiality of restricted information resources is not breached ► use security tools and procedures appropriately and effectively to protect access to restricted information (e.g., adequate length, non-dictionary, non-proper-name passwords)	► All (indirectly) but especially: ► Analytic/Assessment ► Policy Development/ Program Planning ► Communication ► Cultural Competency ► Basic PH Sciences ► Financial Planning and Management ► Leadership and Systems Thinking

Topical Area	COMPETENCY	PH Workforce Segment	Example Learning Objectives (person/participant will be able to…)	Related *Council on Linkages'* Core Comp.'s
Distance Learning	6. Utilizes modern distance-learning technologies to support life-long learning appropriate to programmatic needs	All PH Professionals	► discover available on-line learning opportunities ► identify the public health distance learning coordinator for their state ► find, register for, and participate in both synchronous and asynchronous Internet-based learning opportunities ► participate in satellite broadcast-based learning at or near their work-site	► All (indirectly)
Strategic use of I.T. to promote health.	7. Utilizes modern information science and technology as a strategic tool to promote public health (e.g., through community education, behavior modification, collaborative policy development, issue advocacy and community mobilization).	Sr.-level Technical & Sup./Management Staff	► design and deploy an agency/organization Web site that helps users find health-related information (e.g., disease/injury prevention recommendations, vaccination schedules, community health statistics, etc.). ► develop strategies to design and target prevention messages to specific populations. ► employ information technologies (e.g., e-mail, Web, listservs) to broadcast health-related news, alerts, and advisories to community members, legislators and other policy makers, news media, and others. ► employ collaborative information technologies to broaden input into the policy-making process (e.g., e-mail discussion lists among public health leaders, and web-based input from community members on pending policy decisions)	► Policy Development/ Program Planning ► Communication ► Cultural Competency ► Community Dimensions of Practice ► Financial Planning and Management ► Leadership and Systems Thinking
Information and knowledge development	8. Combines data and information from multiple sources, to create new information to support public health decision-making	Senior-level Technical Staff	► identify the wide array of information sources that are potentially relevant to public health (e.g., clinical, labor, police and criminal justice, environmental, and social services data) ► find on-line data and information from multiple sources ► appropriately combine and utilize data and information from multiple sources to create new information and knowledge	► Analytic/Assessment ► Policy Development/ Program Planning ► Basic PH Sciences

Topical Area	COMPETENCY	PH Workforce Segment	Example Learning Objectives (person/participant will be able to…)	Related *Council on Linkages'* Core Comp.'s
Selection and use of I.T. tools	9. Appropriately selects and utilizes state-of-the-art software tools in support of public health data acquisition, management, analysis, planning, and reporting.	Senior-level Technical Staff	► describe the utility of GIS to public health data analysis and display, and demonstrate at least basic familiarity with at least one GIS software system. ► describe the common applications of statistical software to public health practice, and demonstrate at least basic familiarity with one or more statistical software packages.	► All (indirectly) but especially: ► Analytic/Assessment ► Communication ► Basic PH Sciences ► Financial Planning and Management

Topical Area	COMPETENCY	PH Workforce Segment	Example Learning Objectives (person/participant will be able to…)	Related *Council on Linkages'* Core Comp.'s
Class 2: Development of information systems to improve the effectiveness of the public health enterprise				
System development	10. Recognizes the appropriate roles and domains for computer scientists, epidemiologists, policy makers and programmers and other IT specialists in information system development	Sr.-level & Sup./Management Staff	► describe the function of each of the disciplines in a multidisciplinary project team developing a public health information system ► explain the critical importance of using interdisciplinary teams to develop I.T. projects, and of ensuring good communications between technical and program staff	► Financial Planning and Management ► Leadership and Systems Thinking
	11. (Sup/M'ment Staff): Leads and advocates for the development of integrated, cost-effective public health information systems within their public health enterprise, and ensures that new applications and information systems are built in conformance with a larger (enterprise-level) information architecture.	Supervisory and Management Staff	► recognize and explain the costs and benefits of information systems ► describe the elements of information architecture ► explain the value of an information architecture to the public health enterprise ► develop and implement a process by which an organization develops a coherent information architecture ► describe proven organizational models for effective management of I.T. projects	► Communication ► Financial Planning and Management ► Leadership and Systems Thinking
	11. (Sr.-level Technical Staff): Actively participates in and supports the development of a integrated information systems at the enterprise level, and ensures that new applications and information systems are built in conformance with the enterprise information architecture	Senior-level Technical Staff	► describe the elements of information architecture ► explain the value of an information architecture to the public health enterprise ► describe the process by which an organization develops a coherent information architecture	► Communication ► Financial Planning and Management

Topical Area	COMPETENCY	PH Workforce Segment	Example Learning Objectives (person/participant will be able to…)	Related *Council on Linkages'* Core Comp.'s
	12. (Sup/M'ment Staff): Applies accepted models and processes for developing information systems and for managing information resources	Supervisory and Management Staff	► Manage a requirements specification process, ensuring that all appropriate stakeholders are actively involved throughout the process ► Promote the use of rapid prototyping as a tool for requirements specification and development ► Manage the informed development of business, information, and information technology models in support of information resource management planning ► Apply standard elements (e.g., broadly accepted users interfaces, communications protocols, etc.) whenever possible in system development	► Financial Planning and Management ► Leadership and Systems Thinking
	12 (Sr.-level Technical Staff): Recognizes and participates in accepted approaches and processes for developing information systems and for managing information resources	Senior-level Technical Staff	► describe the nature of requirements specification, and explain its importance in systems development ► define the role of functional decomposition as it relates to building business models; explain how these models relate to building information systems specifically and to information resource management planning generally ► Understand the importance of applying standard elements (e.g., broadly accepted users interfaces, communications protocols, data formats, etc.) whenever possible in system development ► recognize when expertise from other disciplines is needed in the development process	► Financial Planning and Management ► Leadership and Systems Thinking

Topical Area	COMPETENCY	PH Workforce Segment	Example Learning Objectives (person/participant will be able to…)	Related *Council on Linkages'* Core Comp.'s
Cross-disciplinary communication	13. Actively, effectively engages and communicates with information technology specialists as well as public health colleagues regarding proven information technologies and their potential application to public health practice.	Sr.-level & Sup./Management Staff	► describe at a basic level the fundamentals of computer networking, including the cost and support implications of various networking solutions ► describe at a basic level the essential underpinnings of the Internet and the World Wide Web ► describe at a basic level common technologies employed to ensure computer systems' security, and the meaning of the terms authentication, encryption, non-repudiation, and other concepts basic to computer security ► describe nascent information technologies (e.g., personal digital assistants and wireless networking), and consider how they might be employed to improve public health practice. ► name the main technologies currently available for delivering high-bandwidth distance learning materials to the learner, and describe the relative advantages and (local) feasibility of each.	► Communication ► Leadership and Systems Thinking
Databases	14. Participates in the development of new and enhanced databases for public health, and applies principles of good database design	Sr.-level & Sup./Management Staff	► explain the basics of commonly employed computer database management systems, and define common relational database concepts such as entity, relationship, instance, attribute, domain, and normalization ► understand the nature and purpose of good database design, and how to participate in that design process ► interpret entity-relationship diagrams ► define appropriate roles for those involved in database design and development, including the public health scientist and other subject matter experts, systems analyst; programmer; database administrator; project manager; et al.	► Analytic/Assessment ► Communication ► Financial Planning and Management ► Leadership and Systems Thinking

Topical Area	COMPETENCY	PH Workforce Segment	Example Learning Objectives (person/participant will be able to…)	Related *Council on Linkages'* Core Comp.'s
Standards	15. Utilizes (or ensures the utilization of) data standards for storage and transmission, and appropriately engages with public health-relevant standard-setting bodies	Sr.-level & Sup./Management Staff	► describe the basic purposes of public health-relevant communications standards (e.g., HL-7) and data standards (e.g., LOINC and SnoMed) ► explain how utilization of such standards contributes to effective information systems development and integration	► Policy Development/ Program Planning ► Communication ► Financial Planning and Management ► Leadership and Systems Thinking
Confidentiality and Security Systems	16. Applies and participates in developing confidentiality and privacy policies for the enterprise, and ensures the development of adequate security systems to support the implementation of those policies.	Sr.-level & Sup./Management Staff	► describe the relationship between confidentiality/privacy policies and computer security ► define a security system, including both technological and non-technological components ► list and explain the principles of Fair Information Practices ► describe HIPAA and its likely impact on the public health enterprise	► Policy Development/ Program Planning ► Communication ► Cultural Competency ► Community Dimensions of Practice ► Basic PH Sciences ► Financial Planning and Management ► Leadership and Systems Thinking

Topical Area	COMPETENCY	PH Workforce Segment	Example Learning Objectives (person/participant will be able to…)	Related *Council on Linkages'* Core Comp.'s
Project management	17. Utilizes proven informatics principles and practices when managing information technology projects	Sup./Management Staff	► define the array of different kinds of expertise needed for various information systems development projects ► describe the importance of *teams* to information system development, and how to manage teams of people with diverse skill sets and professional cultures ► ensure that end users are consistently involved in systems development from beginning to end ► manage expectations systematically throughout system development ► "over-communicate" progress among staff, potential users, and other stakeholders ► select proven technologies, avoid proprietary solutions ► build in the potential for evaluation of the impact of new information technologies ► advocate for and institute ongoing **user training** to ensure appropriate use of new information systems ► etc., etc.	► Policy Development/ Program Planning ► Communication ► Financial Planning and Management ► Leadership and Systems Thinking
Human resources management	18. Utilizes proven informatics principles and practices when managing information technology staff and other IT specialists.	Sup./Management Staff	► hire staff with appropriate skills for appropriate tasks; look for proven expertise ► describe strategies for ensuring adequate I.T. support given the difficulty in providing market-level compensation in the public health sector ► describe when and how to consultants in systems development ► ensure that technical staff explain issues in terms comprehensible by non-technologists ► handle "technical obfuscation" constructively ► plan for loss (to outside market) of technically competent staff ► insist on demonstrations of progress, and clear documentation of code ► etc., etc.	► Communication ► Cultural Competency ► Financial Planning and Management ► Leadership and Systems Thinking

Topical Area	COMPETENCY	PH Workforce Segment	Example Learning Objectives (person/participant will be able to…)	Related *Council on Linkages'* Core Comp.'s
Procurement	19. Procures appropriate cost-effective, information technologies for the public health enterprise.	Sup./Management Staff	► make rational assessments of and decisions about procurement of modern information technologies ► phase large procurements in a manner that allows for "early warning signs" of potential problems.	► Financial Planning and Management
Accountability	20. Uses information technology to assure openness of public health agency processes and responsiveness to the electorate and the public	Sup./Management Staff	► use the Web to communicate agency policies, invite public comment, share information about agency actions in the community, and so forth.	► Communication ► Cultural Competency ► Community Dimensions of Practice ► Financial Planning and Management ► Leadership and Systems Thinking
Research	21. Monitors informatics research findings and public health information systems development efforts, and applies these findings and experiences as appropriate to public health practice.	Sr.-level Technical & Sup./Management Staff	► identify the major information systems development efforts currently under way that are likely to impact public health practice. ► discuss how certain leading-edge technologies (such as hand-held computers (PDAs), wireless networking, automated environmental sensors, software agents, et al.) might be applied to support public health field work.	► Analytic/Assessment ► Policy Development/ Program Planning ► Leadership and Systems Thinking
Class 3. Use of Information (*per se*) for individual professional effectiveness				
(Note: Competencies in this section were drawn *verbatim* from the Council on Linkages' *Core Competencies for Public Health Professionals.* These competencies may be thought of as informatics competencies as well, and thus are included here.				
Use of Information for public health research and practice	Determines appropriate uses and limitations of both quantitative and qualitative data	All PH Professionals	n/a	n/a
	Evaluates the integrity and comparability of data and identifies gaps in data sources	All PH Professionals	n/a	n/a

Topical Area	COMPETENCY	PH Workforce Segment	Example Learning Objectives (person/participant will be able to…)	Related *Council on Linkages'* Core Comp.'s
	Applies ethical principles to the collection, maintenance, use, and dissemination of data and information	All PH Professionals	n/a	n/a
	Partners with communities to attach meaning to collected quantitative and qualitative data	All PH Professionals	n/a	n/a
	Makes relevant inferences from quantitative and qualitative data	All PH Professionals	n/a	n/a
	Obtains and interprets information regarding risks and benefits to the community	All PH Professionals	n/a	n/a
	Applies data collection processes, information technology applications, and computer systems storage/retrieval strategies	All PH Professionals	n/a	n/a
	Recognizes how the data illuminates ethical, political, scientific, economic, and overall public health issues	All PH Professionals	n/a	n/a