Public Health 101 Series

Introduction to Public Health Informatics

Instructor name
Title
Organization

Course Topics

Introduction to Public Health Informatics

1. A Public Health Approach
2. Public Health Informatics Definition, Components, and Functions
3. Creating a Public Health Information System
4. At the Intersection of the Informatician, the Public Health Official, and the Information Technologist

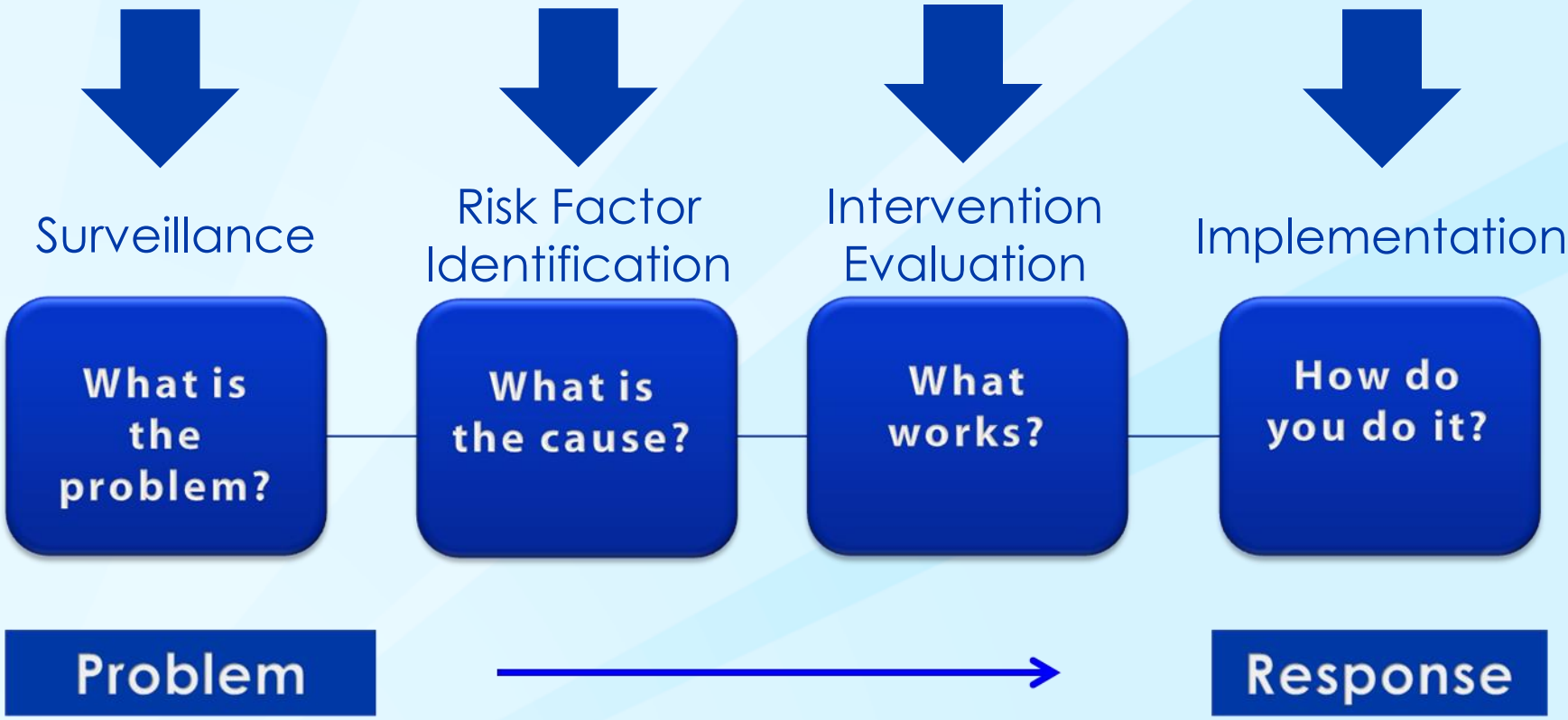
Learning Objectives

After this course, you will be able to

- explain the importance of informatics to the public health mission
- describe the role of the informatician in public health practice
- differentiate between public health informatics and information technology

Topic 1
A Public Health Approach

A Public Health Approach



Public Health Core Sciences

Topic 2

Public Health Informatics Definition, Components, and Functions

The Public Health Mission

CDC provides crucial scientific information that protects our nation against dangerous and costly health threats

Public Health Informatics — Defined

Public health informatics is the systematic application of information, computer science, and technology to public health practice, research, and learning

Yasnoff WA, O'Carroll PW, Koo D, Linkins RW, Kilbourne EM. Public health informatics: improving and transforming public health in the information age. J Public Health Manag Pract 2000;6:67–75.
Riegelman R, ed. Public health 101: healthy people—healthy populations. Sudbury, MA: Jones & Bartlett Learning; 2010: 40.

Building Your Dream Home

Electrician

Developer/Architect

Brick Layer

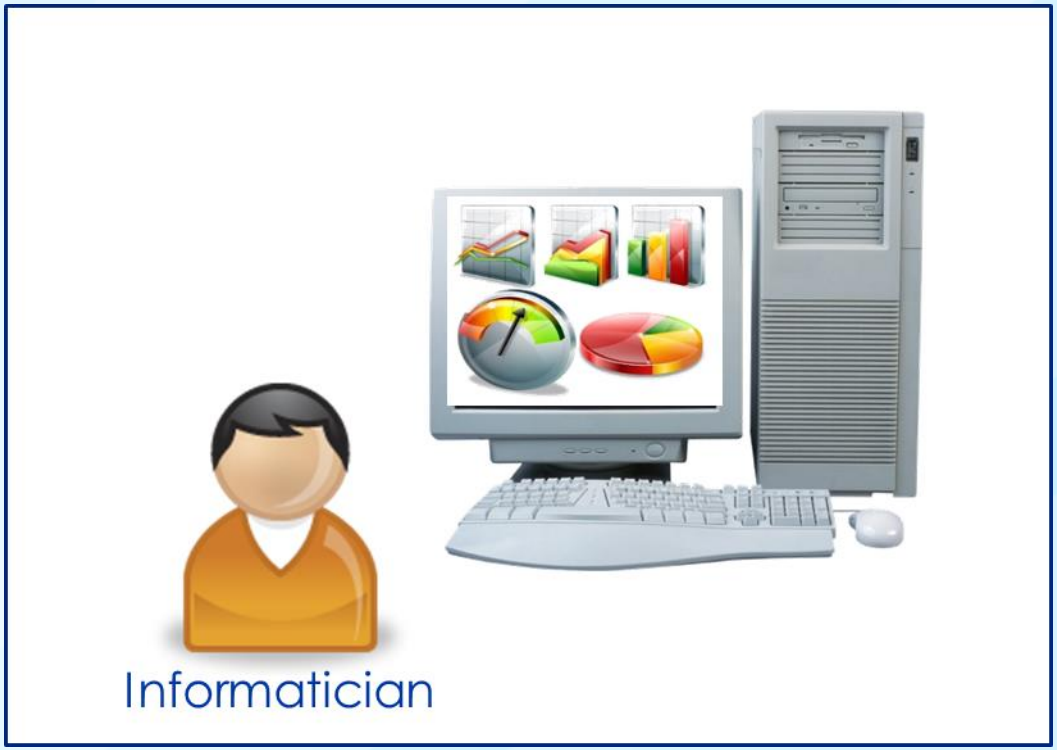
Framer

Painter

Plumber

Building Your Public Health Information System

Programmer



Informatician

Web Designer

Database Administrator

Network Administrator

Security Specialist

Knowledge Check

A tuberculosis outbreak has occurred in 10 states across the country. To increase knowledge of the health threat, CDC uses computer science, technology, and applied information methods that will inform the nation's population about important _____.

A. research

✓ B. health information

C. security measures

Knowledge Check

Informatics uses public health knowledge to

A. broaden the public health knowledge base through learning

B. improve population health in daily practice

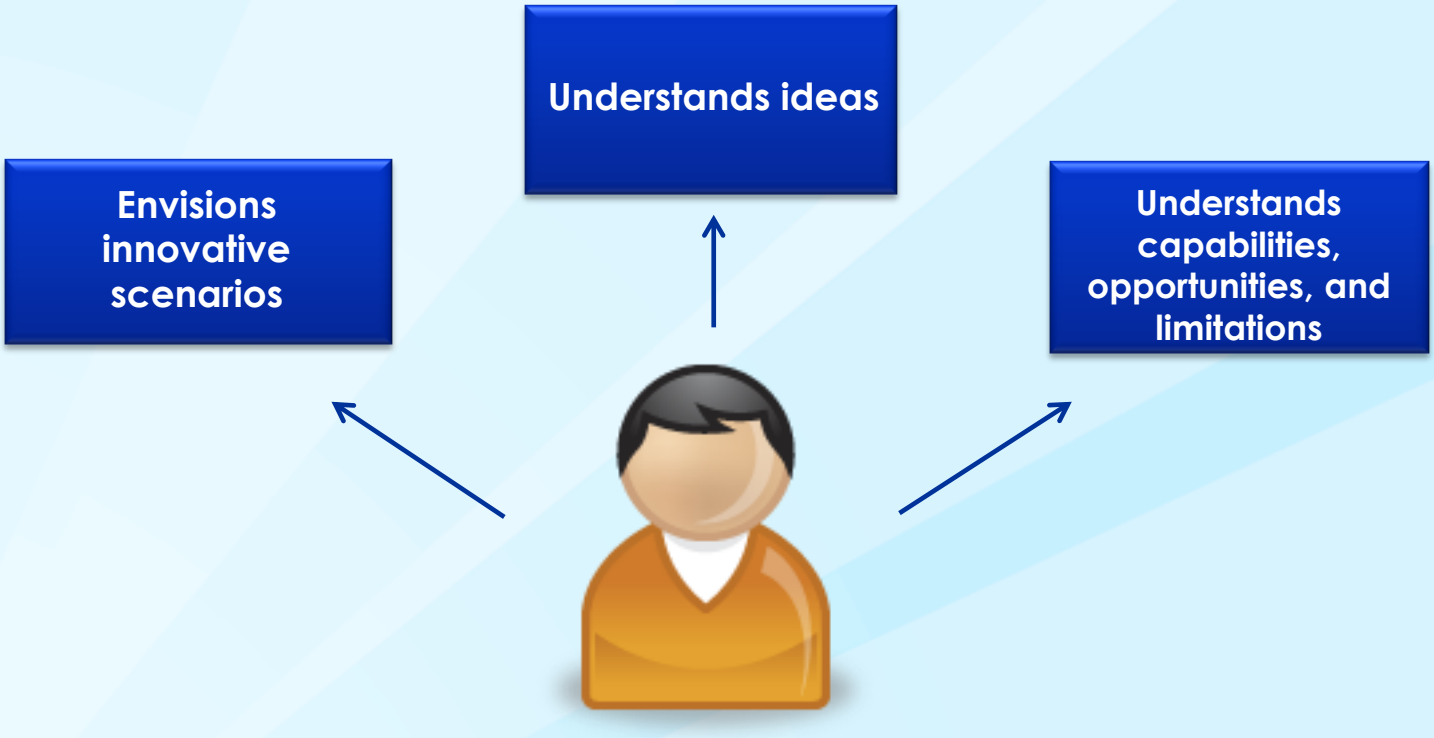
C. further knowledge in public health research

✓ D. all of the above

Topic 3

Creating a Public Health Information System

The Informatician



Security

Data Standards

Policy

Creating a Public Health Information System

Creating a Public Health Information System	Public health official	Informatician	Information technology professional
Step 1 — Vision and System Planning			
Envision solutions, opportunities, and application of information technology in public health	Broad knowledge of public health practice, proficiency in information technology, and capacity for innovation		
Step 2 — Health Data Standards and Integration			
Define and design health data standards and transformation (e.g., HL7, ICD, SNOMED) and health domain integration (e.g., ELR, EHR, CMS, HIE, surveillance, demographics, social media)	Expertise in health data standards, database design, and data linking and integration across health systems		
Design and implement databases, tables, columns, data formats, and keys for linking tables and data to support defined health data standards and integration		Expertise in relational/SQL databases and unstructured data design and management	
Step 3 — Data Privacy and Security			
Define and implement health data privacy and HIPAA regulations	Knowledge of health data privacy		
Implement and enforce data, systems, and communication security		Understanding information technology security functions	
Step 4 — Systems Design and Implementation			
Define and design methods for public health functions, data elements, data flow, case definitions, and message mapping		Expertise in health systems and data interoperability	
Implement information technology for defined functions, data elements, data flow, and case definitions			Expertise in managing information technology systems development
Step 5 — Visualization, Analysis, and Reporting of Health Data	Expertise in public health practice, business intelligence, decision making, and use of analytic software		

CMS = Centers for Medicare and Medicaid Services; EHR = electronic health record; ELR = electronic laboratory record; HIE = health information exchange; HIPAA = Health Insurance Portability and Accountability Act; HL7 = Health Level 7; ICD = *International Classification of Diseases*; SNOMED = Systematized Nomenclature of Human Medicine; SQL = structured query language.

Step 1 — Vision and System Planning

Hardware

Software

Communication Technology

Step 2 — Health Data Standards and Integration

Health data standards and integration are required when defining the data.

Centers for Disease Control and Prevention (CDC). Meaningful use—introduction. Atlanta, GA: US Department of Health and Human Services, CDC; 2012. http://www.cdc.gov/ehrmeaningfuluse/introduction.html.

Step 3 — Data Privacy and Security

Data privacy and security must be identified, prescribed, and implemented throughout the data lifecycle.

Step 4 — Systems Design and Implementation

- Define or design methods for public health functions, data elements, data flow, case definitions, and message mapping
- Implement information technology for defined public health functions, data elements, data flow, case definition, and similar needs

Step 5 — Visualization, Analysis, and Reporting of Health Data

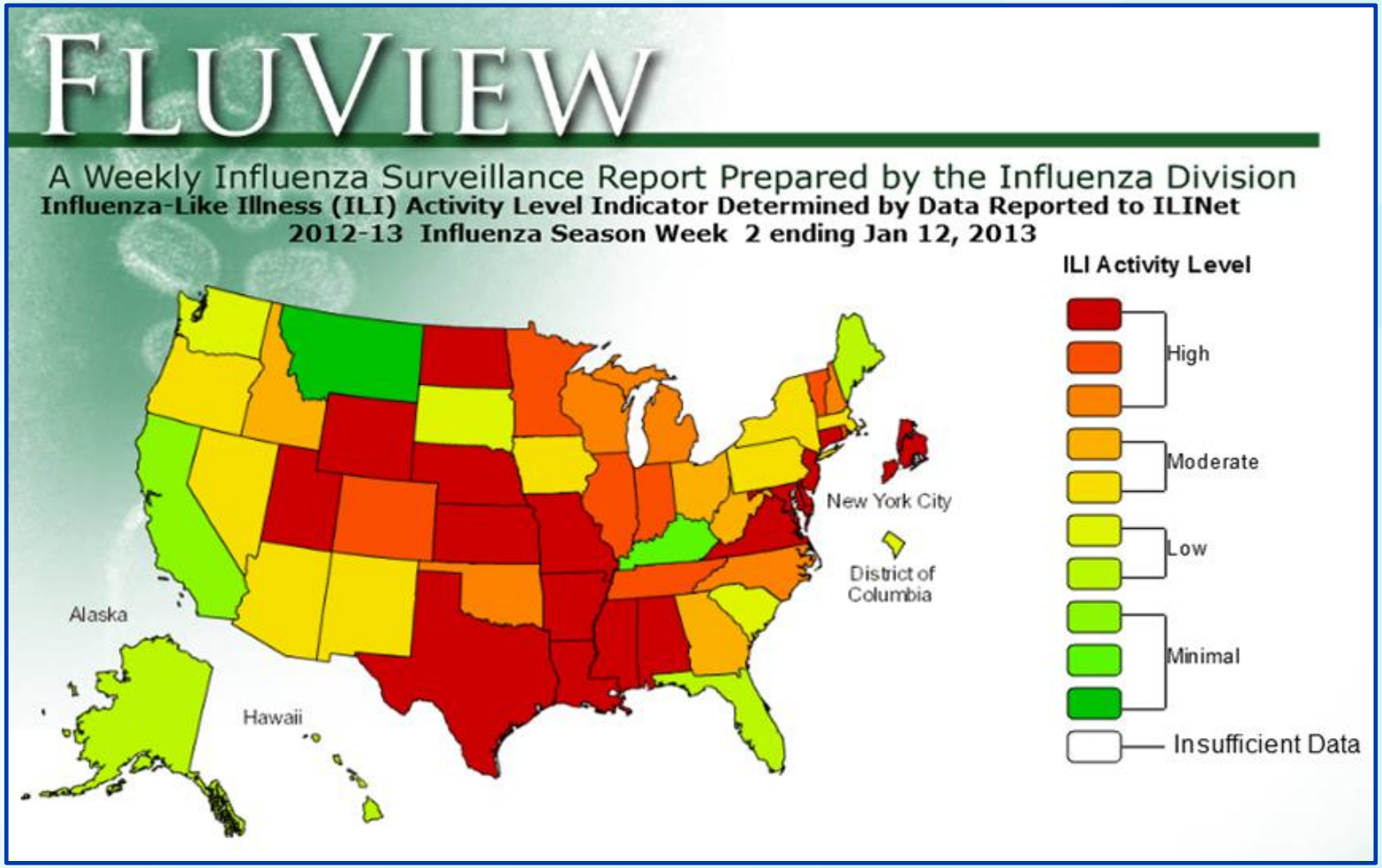
Visualization and implementation of the required analysis, reporting, and meaningful use of the data collected and managed by the system.

Informatics in Action — CDC's FluView

A clear-cut way to share national influenza data was needed by

- the public health community,
- clinicians,
- scientists, and
- the general public

Informatics in Action — FluView



Centers for Disease Control and Prevention (CDC). FluView. Atlanta, GA: US Department of Health and Human Services, CDC; 2013. http://gis.cdc.gov/grasp/fluview/main.html.

Knowledge Check

On the basis of what you have learned about creating a public health information system, which of the following does an informatician consider first when identifying technologies to use for sharing national malaria data?

A. Health data standards and integration

✓ B. Vision and systems planning

C. System design and implementation

Knowledge Check

Informatics is used to create a program such as CDC's FluView. Which of the following three disciplines must work together to visually represent the data in an effective method?

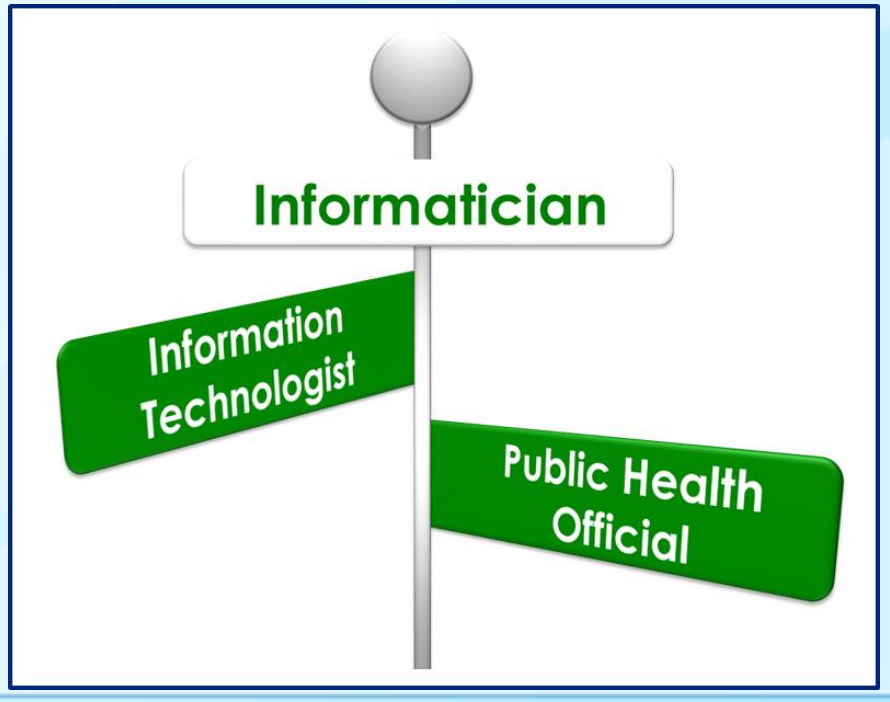
A. Computer science, epidemiology, and public health

✓ B. Technology, computer science, and applied information methods

C. Technology, surveillance systems, and epidemiology

Topic 4

At the Intersection of the Informatician, the Public Health Official, and the Information Technologist



Common Knowledge and Skills

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Step 4 — Creating a Public Health Information System

Creating a Public Health Information System	Public health official	Informatician	Information technology professional
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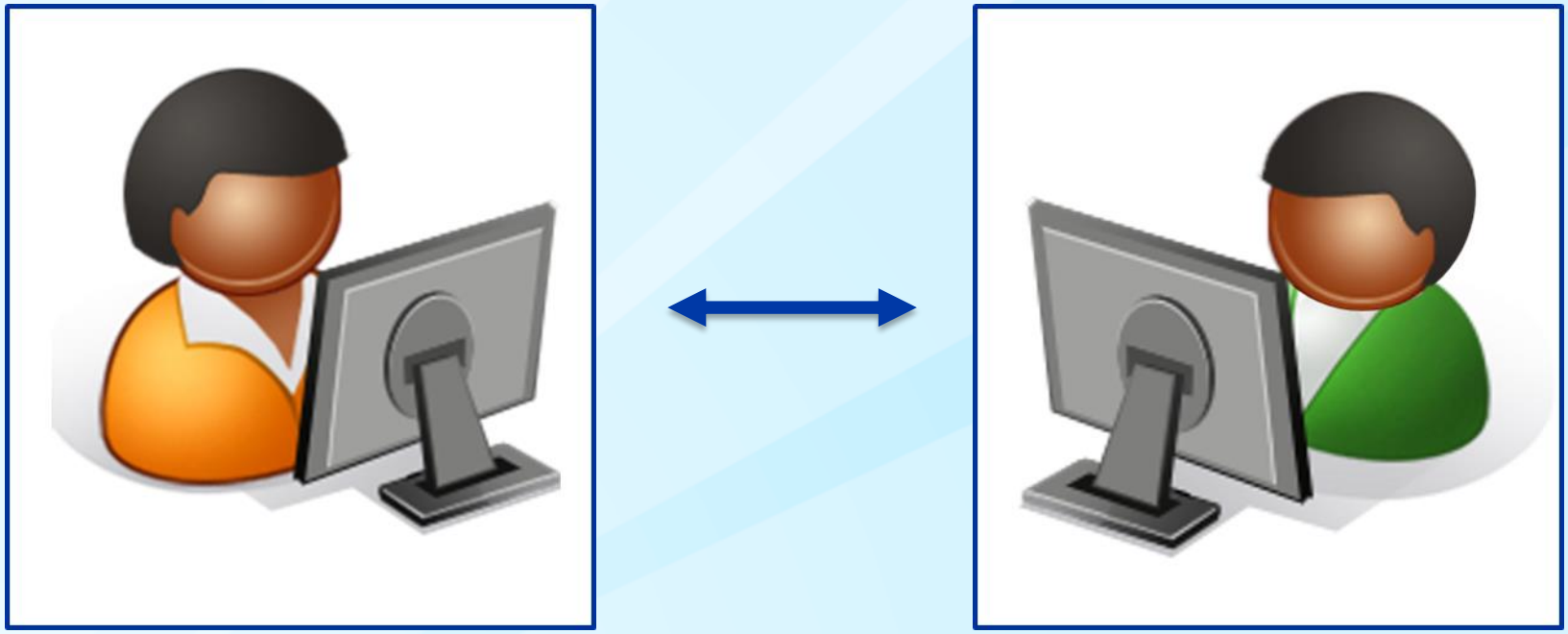
Combined Disciplines — The Informatician and the Information Technologist



The Role of the Informatician in Public Health

- Plans, designs, and defines functional requirements for public health information systems
- Evaluates the application and impact of information systems in support of health goals
- Serves as a liaison between multidisciplinary teams
- Uses data standards to support interoperability of data between systems
- Ensures confidentiality, security, and integrity standards
- Is knowledgeable about health data standards, sources, and meaningful use of health data

Centers for Disease Control and Prevention (CDC). Public health informatics competencies. Atlanta, GA: US Department of Health and Human Services, CDC; 2009. http://www.cdc.gov/informaticscompetencies/.

The Role of the Information Technologist in Public Health

- Plans technology projects and milestones, develops software, and maintains and operates systems
- Evaluates the performance and availability of information systems
- Designs, implements, and administers database architecture, privacy, security, and backup procedures

Centers for Disease Control and Prevention (CDC). Public health informatics competencies. Atlanta, GA: US Department of Health and Human Services, CDC; 2009. http://www.cdc.gov/informaticscompetencies/.

Knowledge Check

One of the United Nations' Millennium Development Goals is to substantially reduce infant mortality worldwide. A system has been developed that will display the data and track the progress of attaining this goal.

Which of the following professionals works with health data standards and sources and ensures the integrity and security of the standards?

A. The information technologist

✓ B. The informatician

Knowledge Check

Which of the following is NOT a function of a public health informatician?

A. Uses data standards to support interoperability of data between systems

B. Ensures confidentiality, security, and integrity standards

✓ C. Designs, implements, and administers database architecture, privacy, security, and backup procedures

D. Is knowledgeable about health data standards, sources, and meaningful use of health data

Learning Objectives

During this course, you learned to

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QUESTIONS?

Resources and Additional Reading

- Yasnoff WA, O'Carroll PW, Koo D, Linkins RW, Kilbourne EM. Public health informatics: improving and transforming public health in the information age. J Public Health Manag Pract 2000;6:67–75.
- Riegelman R, ed. Public health 101: healthy people—healthy populations. Sudbury, MA: Jones & Bartlett Learning; 2010: 40.
- Centers for Disease Control and Prevention (CDC). Public health approach. Atlanta, GA: US Department of Health and Human Services, CDC; 2008. http://www.cdc.gov/ViolencePrevention/overview/publichealthapproach.html.
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- Centers for Disease Control and Prevention (CDC). FluView. Atlanta, GA: US Department of Health and Human Services, CDC; 2013. http://gis.cdc.gov/grasp/fluview/main.html.
- Environmental Protection Agency (EPA). Data standards. Washington, DC: EPA; 2013. https://iaspub.epa.gov/sor_internet/registry/datastds/home/whatisadatastandard/.
- Centers for Disease Control and Prevention (CDC). Youth violence: state statistics; Texas. Atlanta, GA: US Department of Health and Human Services, CDC; 2011. http://www.cdc.gov/ViolencePrevention/youthviolence/stats_at-a_glance/TX.html.

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For more information, please contact the Centers for Disease Control and Prevention

1600 Clifton Road, NE, Atlanta, GA 30333
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