CDC Science Ambassador Workshop 2014 Supplemental PowerPoint

Public Health Surveillance

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The Science Ambassador Workshop is a career workforce training for math and science teachers. The workshop is a Career Paths to Public Health activity in the Division of Scientific Education and Professional Development, Center for Surveillance, Epidemiology, and Laboratory Services, Office of Public Health Scientific Services, Centers for Disease Control and Prevention.

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Intended Use

- This supplemental PowerPoint was created as an introduction to public health surveillance for use in conjunction with the 2014 Science Ambassador Workshop lesson plan entitled Epidemiology: I Have a Gut Feeling.
- It may also be used with other epidemiology and public health science-related teaching materials as an introduction to public health surveillance.

Public Health Defined

- Public health can be defined as
  - An approach to health that aims to improve the health of an entire nation
  - The way in which the United States monitors, analyzes, and draws conclusions about health concerns
- Things that can pose a threat to public health range from
  - infectious disease outbreaks (e.g., influenza or Ebola viruses), to
  - chronic illnesses (e.g., heart disease, cancers, or diabetes), to
  - environmental disasters (e.g., hurricanes, tornadoes, or earthquakes), to
  - biologic or chemical terrorism.

What is Public Health Surveillance?

- The ongoing, systematic collection, analysis, and interpretation of health data, essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination to those who need to know

- Surveillance provides the information for descriptive epidemiology, which is
  - Person (age, sex, description)
  - Place (where)
  - Time (dates, hours, days, months, years)

Who Performs Public Health Surveillance?

- Epidemiologists
- Medical professionals (doctors, nurses, clinics)
- Pharmacies
- Health insurance providers
- Emergency responders (9-1-1 centers, emergency management technicians)
- Public health departments (local, state, federal)

Why Do We Use Public Health Surveillance?

- Because it can
  - estimate the size of a health problem
  - determine where an illness is occurring geographically
  - portray the natural history of a disease
  - detect epidemics or define a problem
  - generate hypotheses in research
  - monitor changes in infectious agents
  - detect changes in health practices
  - facilitate emergency planning

Where Do We Get Public Health Surveillance Data?

- Vital records
  - Hospital records, death certificates, birth records
- Surveys
  - Schools, doctors, insurance companies
- Environmental monitoring systems
  - Water or air quality
- Animal health data
  - Veterinarians, farms, food manufacturing

How Are Public Health Surveillance Data Collected?

- Voluntary reporting
  - Individual persons reporting (a person, doctor, or hospital)
  - Media reports
  - Unusual health occurrences
    - Higher purchases of specific pharmaceuticals; excessive school absences
- Public health initiated surveys
  - Calling, completing forms, reviewing public records

Adapted from: Centers for Disease Control and Prevention, Public Health 101 Series. Introduction to Surveillance. Available at: http://www.cdc.gov/publichealth101/instructors.html.

How Are Public Health Surveillance Data Collected? con't.

- Mandatory reporting
- Some diseases are required to be reported to the local and state health departments (**reportable diseases)**.
  - Highly communicable (transmittable) diseases
    - E.g., chickenpox
  - High morbidity or mortality rates
    - E.g., Ebola virus disease
  - Strong public interest
    - E.g., methicillin-resistant *Staphylococcus aureus* (often referred to as MRSA)

Public Health Surveillance Types

- Different ways of collecting surveillance data fall into 3 categories
  - Passive
  - Active
  - Syndromic

Passive Surveillance

- Laboratories, physicians, or others regularly report cases of disease or death to the local or state health department

- Examples
  - A doctor's office reports 2 cases of measles
  - A nursing home reports an unusual number of older patients with unexplained rashes

Active Surveillance

- Local or state health departments initiate the collection of information from laboratories, physicians, health care providers, or the general population
  - Achieves more complete and accurate reporting than passive surveillance
  - Example: Youth Risk Behavior Surveillance surveys

Syndromic Surveillance

- The ongoing, systematic collection, analysis, interpretation, and application of ***real-time indicators*** for disease that allow for detection before public health authorities might otherwise identify them
- Example: Hospital admittance records

What Does an Ideal Surveillance System Look Like?

- Simple
- Timely
- Representative
- Flexible
- Sensitive
- Strong predictive value
- Acceptable to
  - The public
  - Health care providers
- Cost-effective

What Does an Ideal Surveillance System Look Like? Con't.

- **Sensitivity**
  - Few if any missed cases
  - Increased by having broad case definitions
- **Positive predictive value**
  - Almost all case reports received for illnesses meet the surveillance case definition
  - Increased by adopting a more restrictive case definition

Purposes of Public Health Surveillance

- Surveillance has been used for the following types of outbreaks:
  - Food poisoning
  - Cancer clusters
  - Health threats after natural or human-made disasters
    - Cholera in Haiti after the 2010 earthquake
    - Air quality after the September 11, 2001, attacks

Purposes of Public Health Surveillance, con't.

- Infectious disease outbreaks
  - Ebola
  - Malaria
  - Influenza
  - Severe acute respiratory syndrome (SARS)
  - Chronic health problems
  - Obesity
  - Cardiovascular diseases
  - Asthma

Please send questions and comments to scienceambassador@cdc.gov.

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