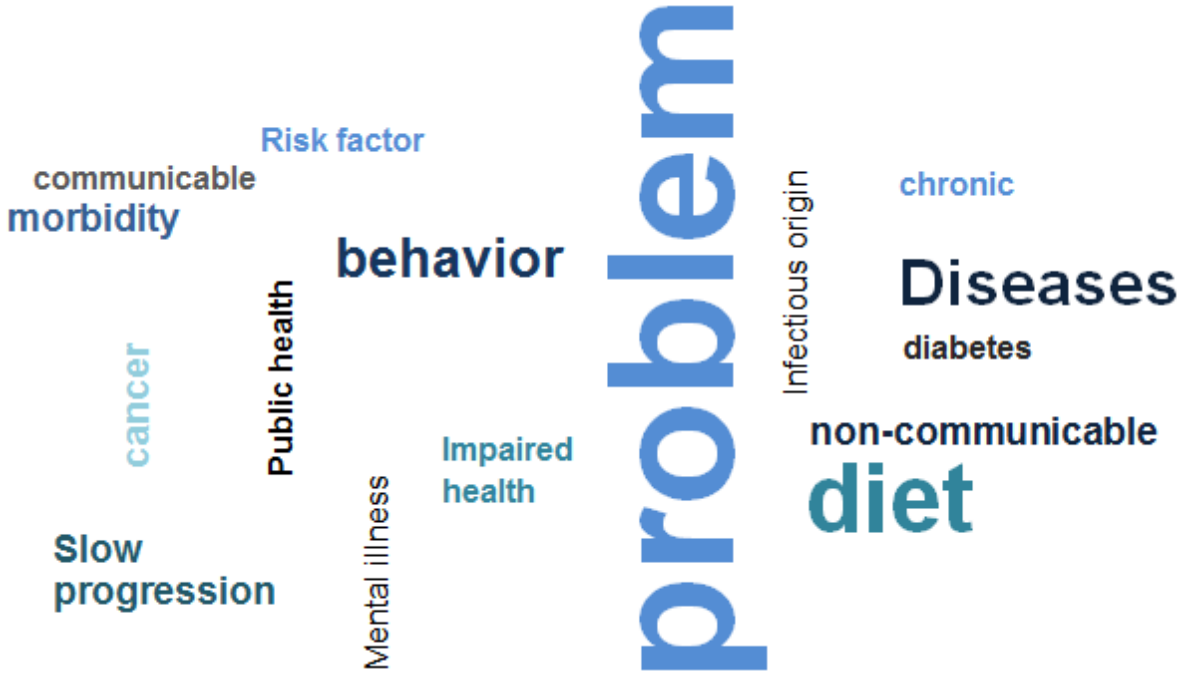
PARTICIPANT GUIDE



Analyze and Interpret Surveillance Data

Created: 2013

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Analyze and Interpret Surveillance Data

LEARNING OBJECTIVES

At the end of the training, you will be able to:

- Describe data to collect based on the objective of a surveillance system.
- Identify how to present surveillance data.
- Interpret surveillance data, including trends and patterns.
- Identify groups and geographic areas to be targeted for interventions, based on surveillance data.

ESTIMATED COMPLETION TIME

- 3 hours, 30 minutes (1 hour, 50 minutes interactive lecture; 1 hour 40 minutes skill assessment)

REFERENCES AND RESOURCES

- CDC Global Youth Tobacco Surveillance, 2000–2007. MMWR Surv Summ. Jan 25, 2008;57 Suppl 1:1–32.
- CDC QuickStats: Death Rates for the Three Leading Causes of Injury Death–United States, 1979–2007. MMWR Weekly Report. Aug 6, 2010;59(30):957.
- Central America FETP Basic and Intermediate Curriculum
- Conducting Surveillance
- Organizing and Presenting
- Surveillance Interpretation and Analysis
- Moorman JE, Rudd RA, Johnson CA, et al. National surveillance for asthma–United States, 1980–2004. MMWR Surveill Summ. Oct 19 2007;56(8):1–54.
- Remington RP, Brownson RC, Wegner MV, eds. Chronic Disease Epidemiology and Control. 3rd ed. Washington DC: American Public Health Association; 2010.
- Teutsch SM, Churchill, R. Elliot, eds. Principles and Practice of Public Health Surveillance. 2nd ed. New York: Oxford University Press, Inc.; 2000.
- WHO Global Health Risks. http://www.who.int/healthinfo/global_burden_disease/global_health_risks/en/index.html
- WHO Global Infobase. https://apps.who.int/infobase/Comparisons.aspx
- WHO International Classification of Diseases (ICD). http://www.who.int/classifications/icd/en/
- WHO Non-communicable Disease Profile, United Republic of Tanzania. https://apps.who.int/infobase/CountryProfiles.aspx
- WHO The Global Burden of Disease: 2004 Update. http://www.who.int/healthinfo/global_burden_disease/2004_report_update/en/index.html

MODULE CONTENT

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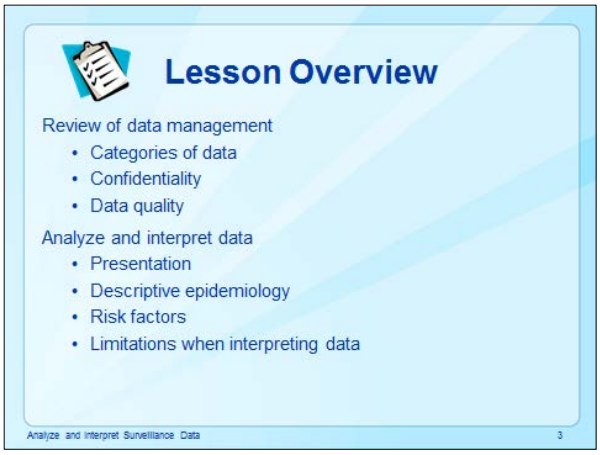

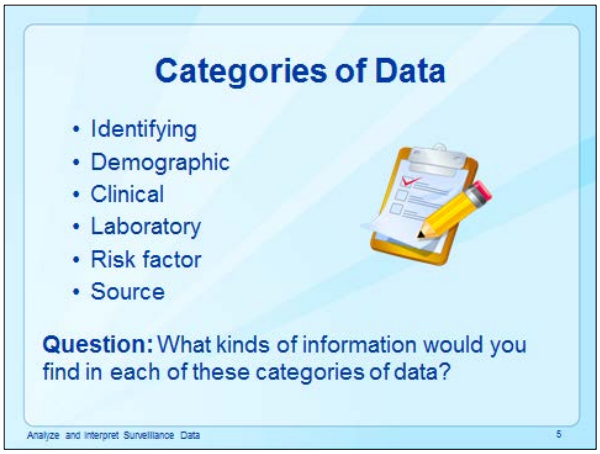

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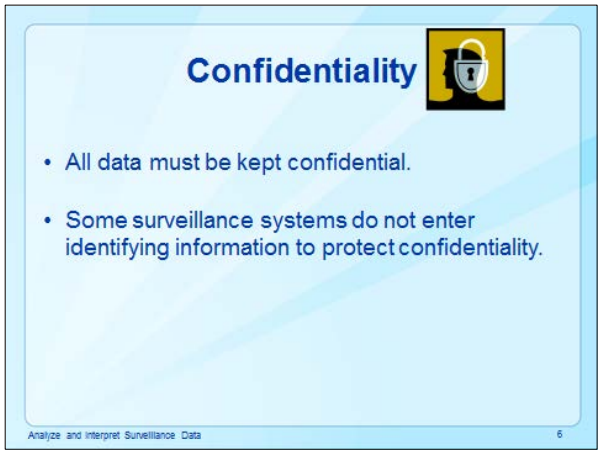

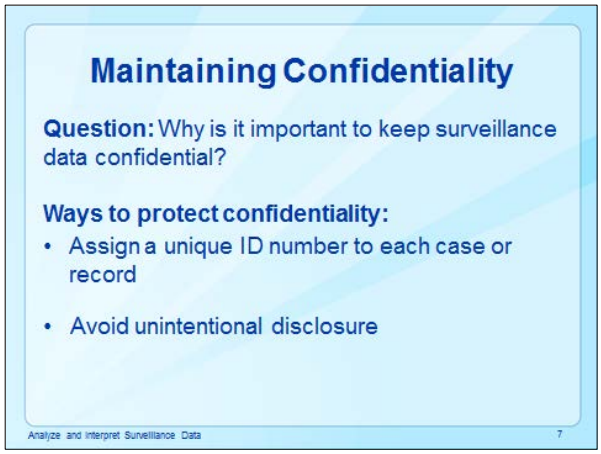

Key Point: Data should be of high quality and complete.

Slide	Notes

Question: Completeness

Table 1. Diabetes

Sex	n	%
Male	491	49.1
Female	423	42.3
Missing	86	8.6
Age	**n**	**%**
Median	38 years	n/a
Missing	173	17.3
Total	1000	100

Table 2. Asthma

Sex	n	%
Male	921	46.0
Female	874	43.7
Missing	205	10.3
Age	**n**	**%**
Median	35 years	n/a
Missing	129	6.4
Total	2000	100

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Data Quality: Validity

- Validity refers to the accuracy of the collected data.
- Sources of errors:
  - Respondent provides inaccurate information
  - Data recorded inaccurately when collected
  - Data entered inaccurately into database

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Key Point: Missing or low quality data can and will change the interpretation of a study.

Question: Validity

Name	Sex	Date of Birth	Date of Diagnosis	Date of Death	Age at Death
Person A	Female	15/07/1954	16/03/2006	03/12/2008	47
Person B	Male	28/04/1963	24/09/2004	27/07/2009	46
Person C	Both	02/09/1948	30/02/2005	18/10/2008	60
Person D	Male	08/11/1943	05/06/2009	11/04/2009	65
Person E	Male	21/01/1792	19/10/2006	09/09/2010	38

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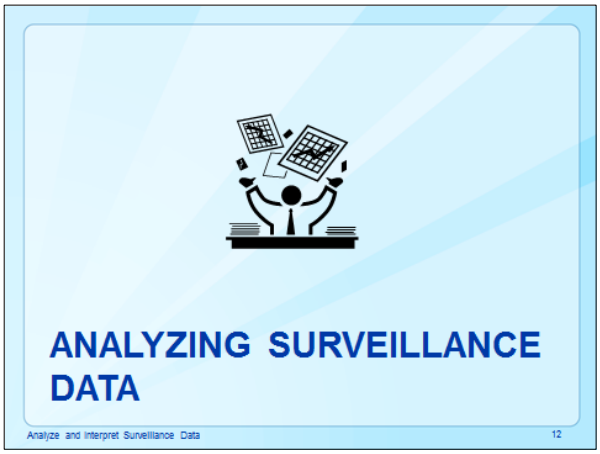
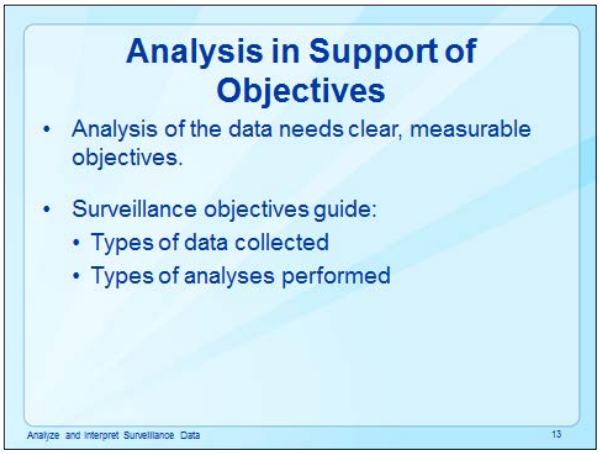
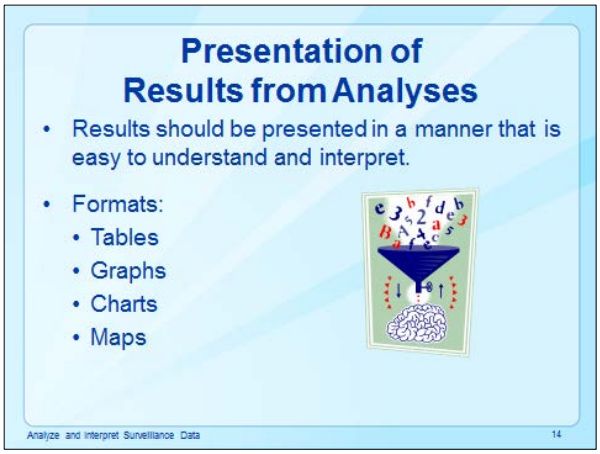
Slide	Notes







Key Point: Always remember who your audience is and keep your presentation simple

Slide	Notes

Descriptive Epidemiology

- Data used to describe the distribution of a health condition or event in a community.
  - Person – who?
  - Place – where?
  - Time – when?

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Person

Who?

- Age
- Sex
- Marital status
- Occupation

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Question: Person

Prevalence of obesity (body mass index ≥ 30 kg/m^2) among men aged 18-59 years old, Brazil, 2006

Age (years)	Prevalence (%)	95% Confidence Interval
18-25	4.3	3.1, 5.5
26-32	10.9	8.3, 13.6
33-40	14.9	12.7, 17.1
41-48	14.1	12.0, 16.3
49-59	16.5	13.9, 19.2

Source: Moura EC, Claro RM. Estimates of obesity trends in Brazil, 2006-2009. Int J Public Health. 2011 May 26.

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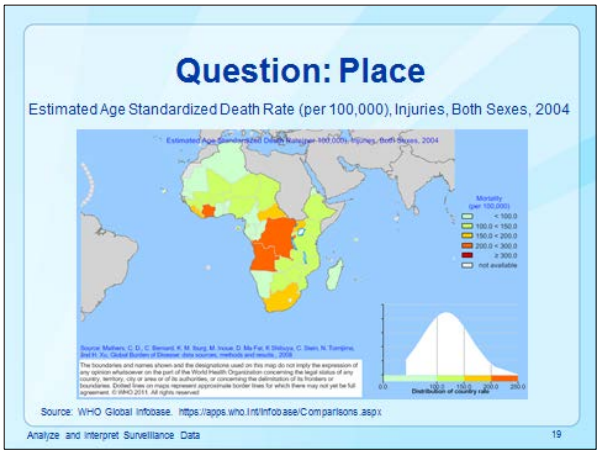
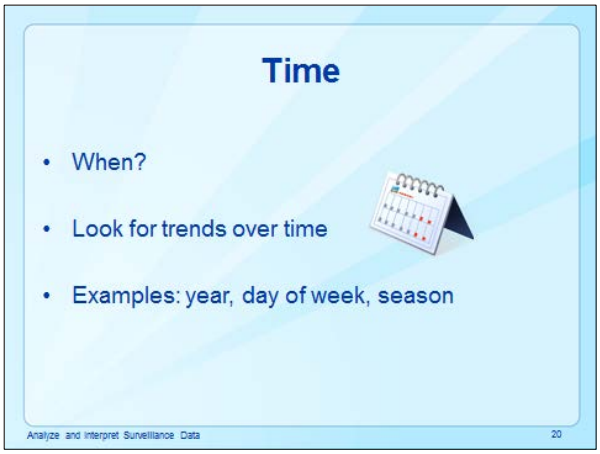
Key Point: Data related to place mean that they are a factor because of geography of a population.





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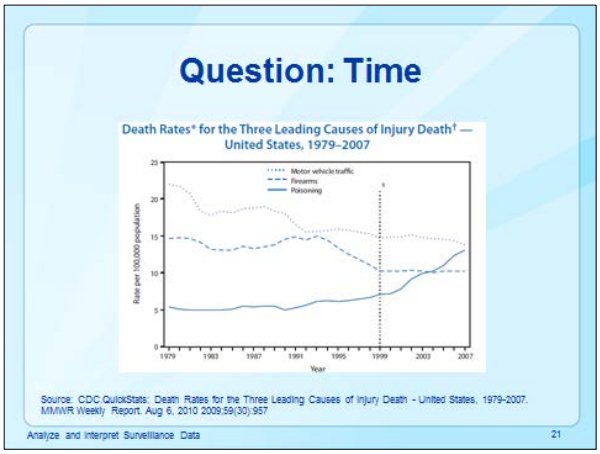
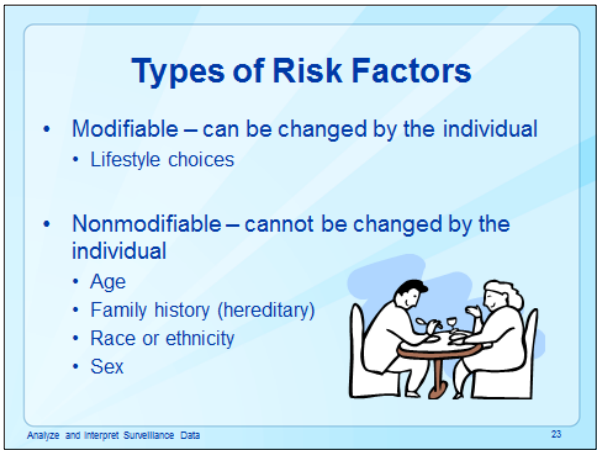


Key Point: NCDs are non-communicable chronic diseases.



Slide	Notes

Question 1: Risk Factors

Adapted from Chronic Disease Risk Factors Among Participants in Medical Examination, by Selected Demographic Characteristics

High Blood Pressure	Age Groups				
	18-34 % (SE)	35-49 % (SE)	50-64 % (SE)	≥ 65 % (SE)	Total
Self-reported	2.5 (0.095)	11.3 (1.87)	35.9 (4.05)	34.1 (6.82)	15.2 (1.52)
Measured	9.4 (2.30)	28.3 (3.53)	55.2 (3.78)	61.4 (5.52)	30.2 (1.83)

Source: Zindah M, Belbeisi A, Walke H, Mokdad AH. Obesity and diabetes in Jordan: findings from the Behavioral Risk Factors Surveillance System, 2004. Prev Chronic Dis, 2008;5(1). http://www.cdc.gov/pcd/issues/2008/jan/06_0172.htm. Accessed June, 1, 2012.

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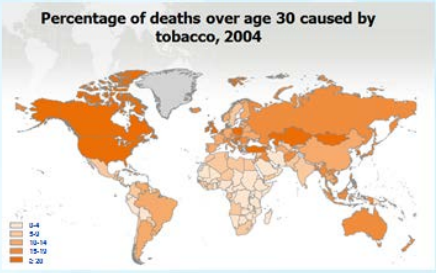
Key Point: In this chart, a relationship between high blood pressure and age group exists.

Question 2: Risk Factors



Source: WHO Global Health Risks. Accessed on January 13, 2011 at http://www.who.int/healthinfo/global_burden_disease/global_health_risks/en/index.html

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Interpreting Modifiable Risk Factor Data

- Individuals choose to engage in modifiable factors.
- Recommendations often encourage people to change behavior and make better health-related decisions.

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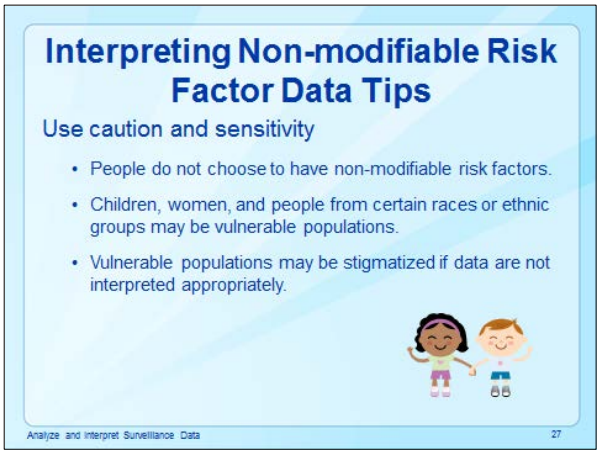
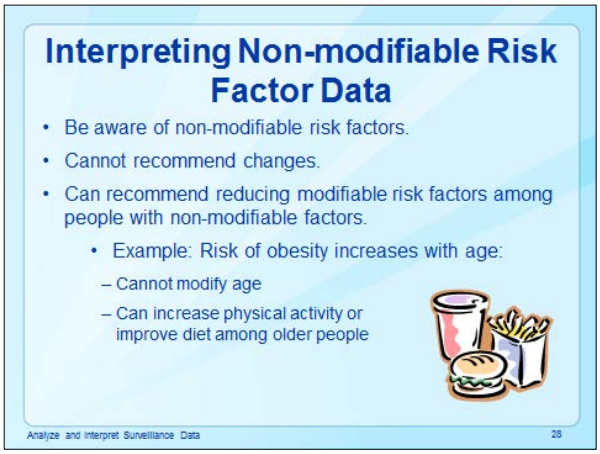
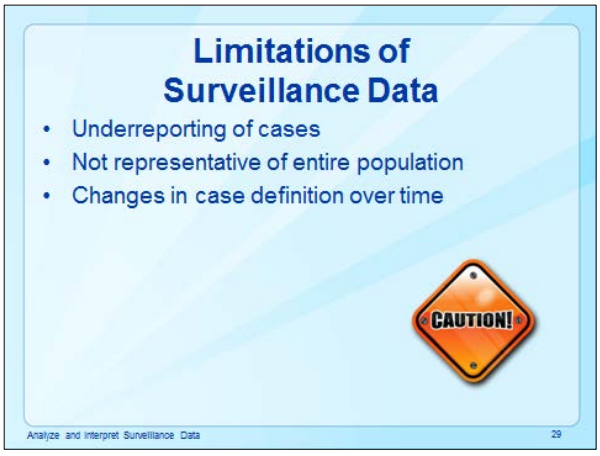
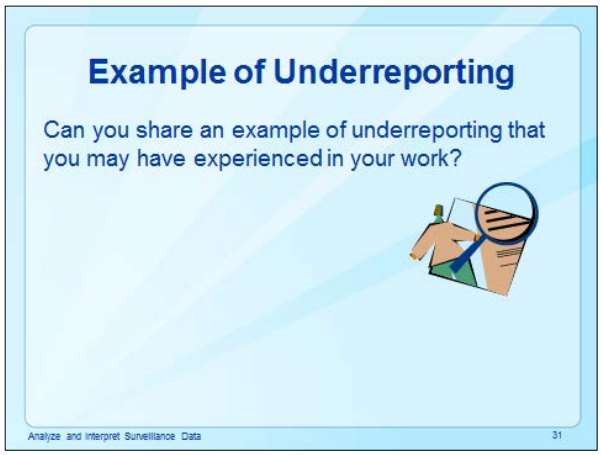


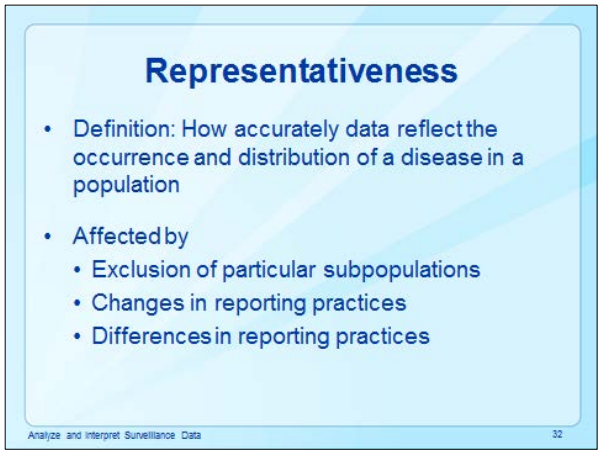




Key Point: The key to interpreting surveillance data accurately is to know the limitations of your data.

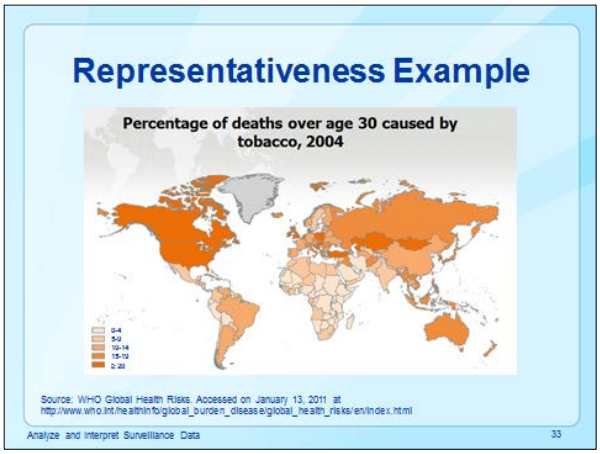
Slide	Notes

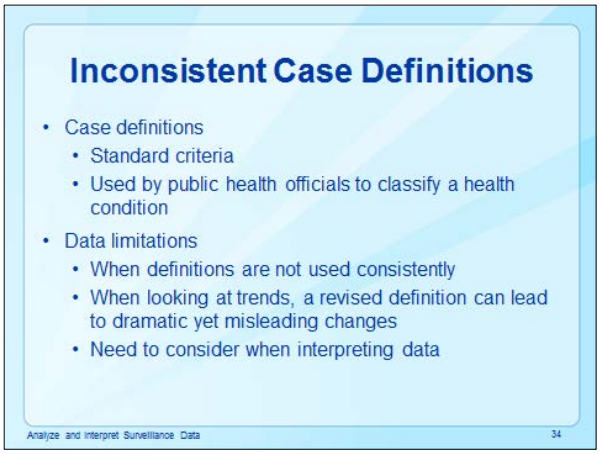




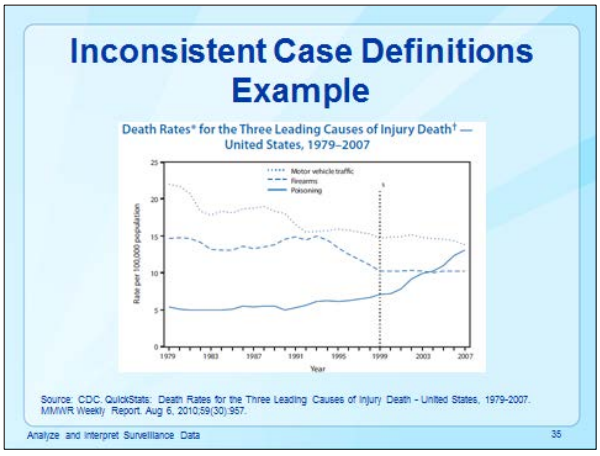
Key Point: Surveillance data should be representative of the true distribution of a disease, so that health officials can effectively reduce the disease.

Slide	Notes





Key Point: If different case definitions are used for many studies (without acknowledgment), then trends in data may be interpreted incorrectly.



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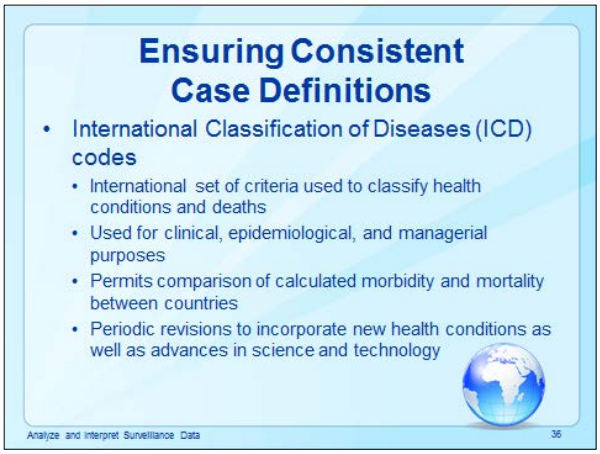


Review Notes

SKILL ASSESSMENT

Instructions:

1. You will work in small groups to complete the assessment.
2. Select a member of your group to record your responses.
3. There are four parts to this assessment. Groups will have 75 minutes to complete the assessment.
4. At the end of the assessment, one member from the group will share your findings and recommendations with the class. (25 minutes)

Part 1. Background (10 minutes)

For this skill assessment, you will be examining CVD mortality and obesity.

1. If the objective of a surveillance system is to characterize and monitor trends in obesity in the US, what categories, and specific data within each category, should be collected?

2. In general terms, how would you present the data you collected in Question 1?

Part 2. Select Heart Disease-specific Mortality Counts and Rates in the US (20 minutes)

3. Using Figure 1, describe the trend observed in CVD-related mortality among males and females from 1979-2007.

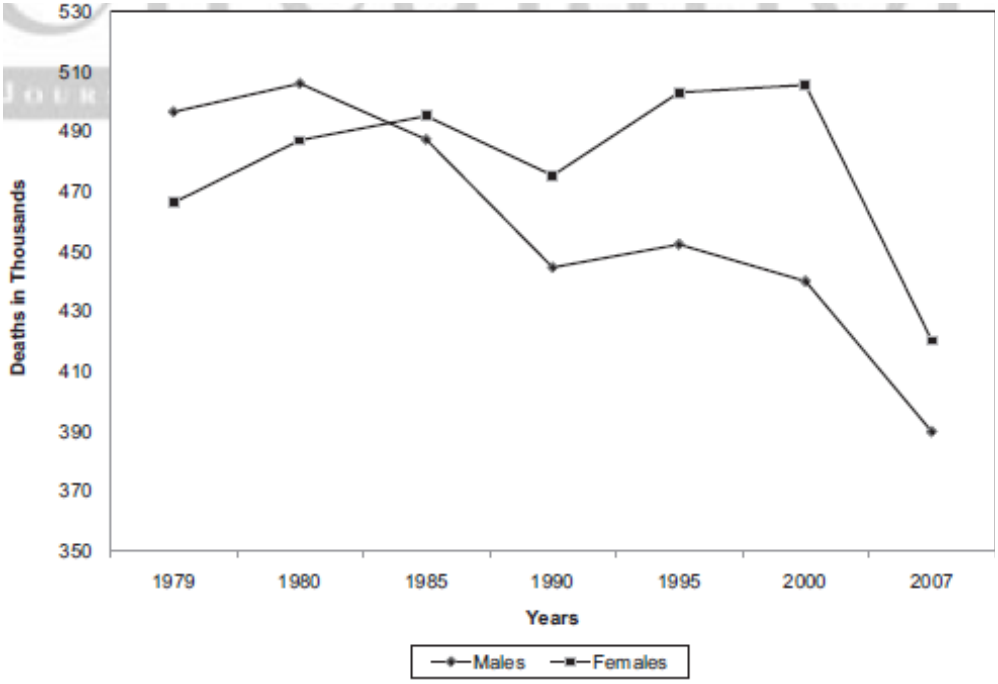


Figure 1. CVD mortality trends for males and females (United States: 1979-2007.) The overall comparability for cardiovascular disease between the ICD 9th revision (1979-1998) and International Classification of Diseases, 10th revision (1999-2007) is 0.9962. No comparability ratios were applied. Source: National Center for Health Statistics.

4. Figure 1 summarizes the number of CVD deaths in males and females in the US. Why would it be better if Figure 1 showed rates of CVD mortality instead of just the number of CVD deaths?

5. In the title of Figure 1, there is a description about the change in the ICD 9th revision to the 10th revision. Does the change in the case definition affect your answer to Question 1? Why or why not?

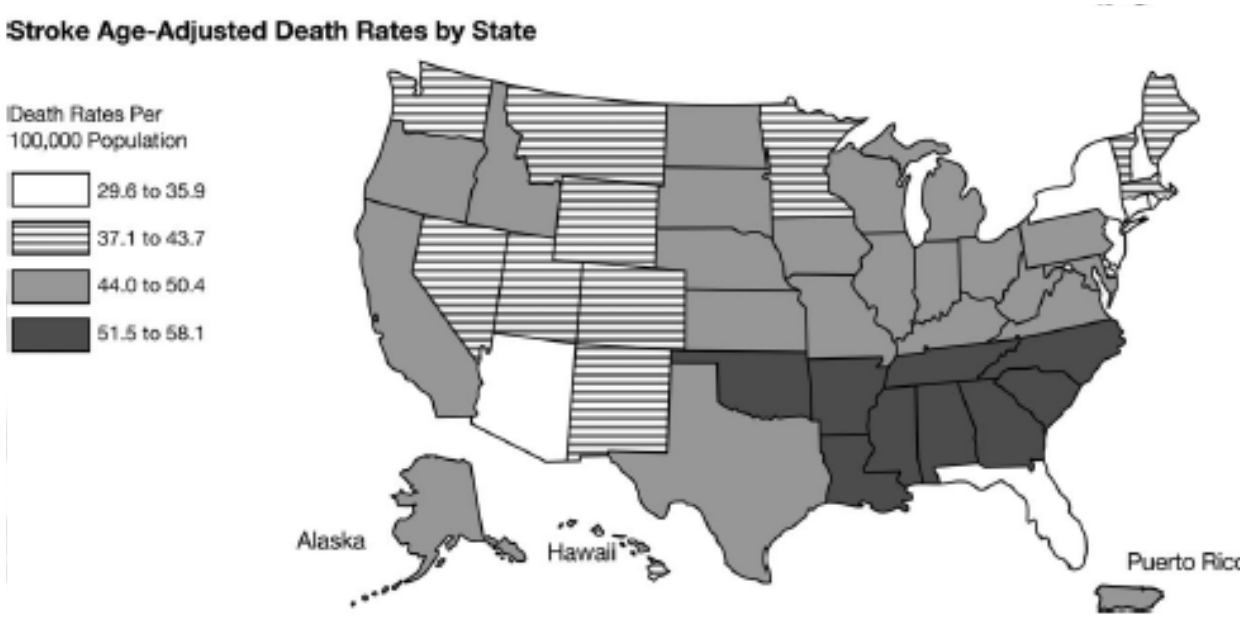


Figure 2. US map of age-adjusted death rates for stroke by state (including the District of Columbia) in 2007.

6. What observations do you have about Figure 2 concerning the death rates of stroke in the US?

Part 3. Risk Factor: Self-reported Obesity in the US (25 minutes)

Table 1. Self-reported prevalence of obesity* among adults, by sex and selected characteristics – Behavioral Risk Factors Surveillance System, US, 2009.

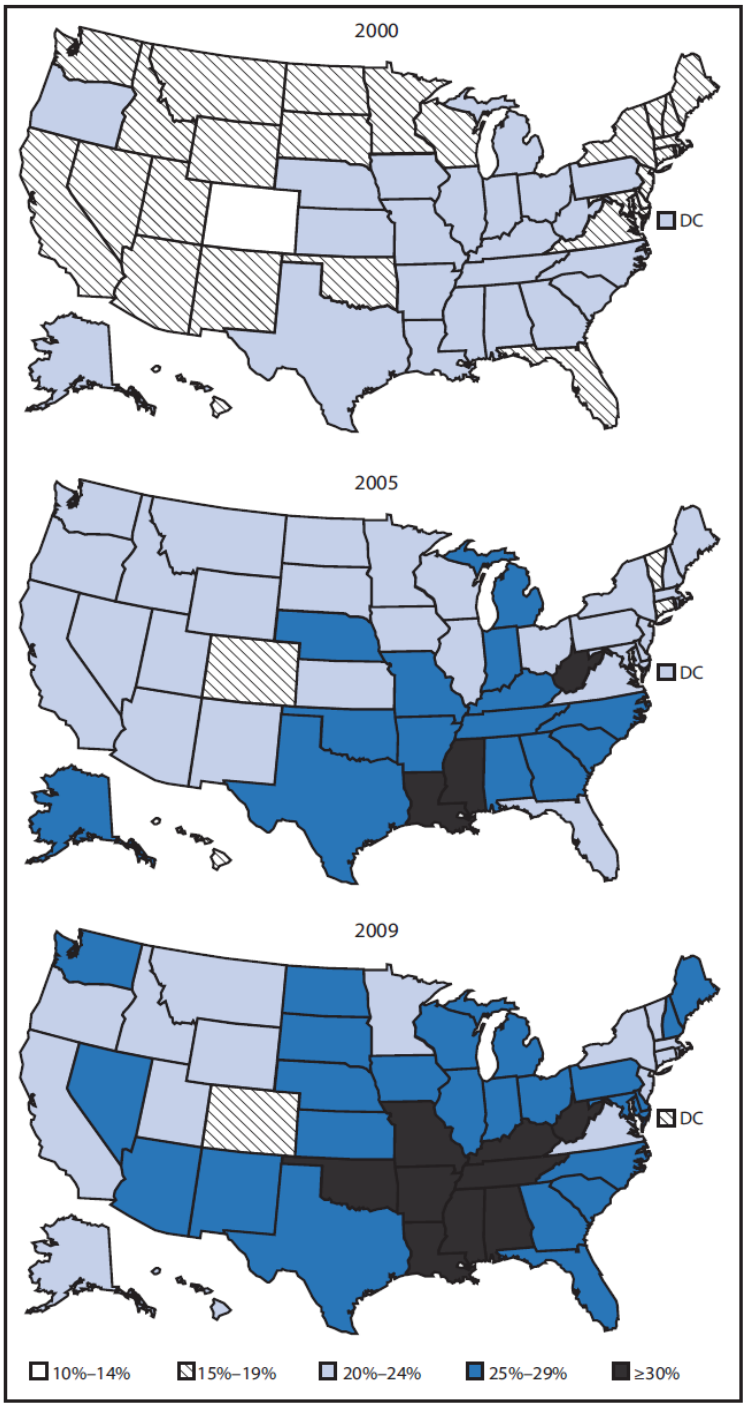
	Overall (N = 405,102)		Men (n = 158,455)		Women (n = 246,647)	
Characteristic	%	(95% CI†)	%	(95% CI)	%	(95% CI)
Total	**26.7**	**(26.4–27.0)**	**27.4**	**(26.9–27.8)**	**26.0**	**(25.7–26.4)**
Age group (yrs)						
18–29	20.3	(19.5–21.2)	20.1	(18.8–21.4)	20.6	(19.5–21.7)
30–39	27.8	(27.1–28.6)	29.4	(28.2–30.7)	26.2	(25.3–27.1)
40–49	29.4	(28.8–30.1)	31.0	(30.0–32.0)	27.8	(27.0–28.6)
50–59	31.1	(30.6–31.7)	31.9	(31.1–32.8)	30.3	(29.6–31.0)
60–69	30.9	(30.3–31.5)	30.4	(29.6–31.3)	31.3	(30.6–32.1)
≥70	20.5	(20.0–21.0)	19.8	(19.0–20.5)	21.0	(20.4–21.6)
Race/Ethnicity						
White, non-Hispanic	25.2	(24.9–25.5)	27.1	(26.6–27.6)	23.3	(23.0–23.7)
Black, non-Hispanic	36.8	(35.7–37.9)	30.9	(29.2–32.8)	41.9	(40.5–43.2)
Hispanic	30.7	(29.5–31.9)	30.6	(28.7–32.5)	30.8	(29.4–32.2)
Other race	16.7	(15.5–18.0)	16.9	(15.2–18.8)	16.5	(15.0–18.1)
Educational level						
Less than high school graduate	32.9	(31.8–34.0)	29.6	(27.9–31.4)	36.4	(35.1–37.8)
High school graduate	29.5	(29.0–30.1)	29.5	(28.6–30.4)	29.5	(28.9–30.2)
Some college	29.1	(28.6–29.7)	30.6	(29.6–31.5)	27.9	(27.2–28.5)
College graduate	20.8	(20.4–21.2)	22.9	(22.2–23.5)	18.6	(18.2–19.1)
Census region§						
Northeast	24.3	(23.6–24.9)	25.2	(24.2–26.2)	23.4	(22.6–24.2)
Midwest	28.2	(27.7–28.7)	29.2	(28.4–30.1)	27.2	(26.5–27.9)
South	28.4	(27.9–29.0)	28.8	(28.0–29.7)	28.1	(27.5–28.7)
West	24.4	(23.8–25.0)	25.1	(24.2–26.0)	23.7	(22.9–24.4)

* Body mass index (BMI) ≥30.0; BMI was calculated from self-reported weight and height (weight [kg] / height [m]^2).
† Confidence interval.
§ Additional information available at http://www.census.gov.

7. Look at the different risk factors for obesity in Table 1.
    a. Which are modifiable risk factors?

    b. Which are non-modifiable risk factors?

8. Using Table 1, describe the prevalence of obesity in the US by person and place. Which groups have the highest prevalence of obesity in the US?



*Body mass index (BMI) ≥30.0; BMI was calculated from self-reported weight and height (weight [kg] / height [m]^2).

Figure 3. Self-reported prevalence of obesity* among adults – Behavioral Risk Factor Surveillance System, US, 2000, 2005, and 2009.

9. Using Figure 3, describe the time trend in obesity prevalence from 2000-2009.

10. BMI was calculated based on self-reported weight and height using the formula:

$$BMI = \frac{\text{Weight (kg)}}{\text{Height (m)} \times \text{Height (m)}}$$

How do you think the prevalence would be affected if survey respondents said they weighed 2 kg less than their true weight?

Part 4. Recommendations for Interventions (20 minutes)

Using the information from Parts 1-3, consult your findings and use them to provide specific recommendations on a national program that will be designed to continue reducing CVD-specific mortality rates in the US by targeting the prevalence of obesity in the US. The recommendations should include priorities for specific geographic areas and subpopulations. For example, for which group should an intervention be targeted? *Note: Assume that height and weight were reported accurately.*

Description of Data Used in this Skill Assessment:
The CVD-related deaths were calculated using data from the National Center for Health Statistics and the United States Census Bureau. Mortality data are based on the underlying cause of death as reported on death certificates filed with the vital statistics office and compiled by the National Center for Health Statistics.
Data on obesity prevalence in the US was obtained through the Behavioral Risk Factor Surveillance System, which is a national telephone survey that collects information on behaviors and health conditions, particularly non-communicable diseases. Body mass index (BMI), used to classify individuals as overweight or obese, was calculated from self-reported weight and height.

References:
CDC Vital Signs: State-Specific Obesity Prevalence Among Adults — United States, 2009. *MMWR Morb and Mort Wkly Rep*. Aug 6, 2001;59(30):951–955.
Roger VL, Go AS, Lloyd-Jones DM, et al. Heart Disease and Stroke Statistics–2011 Update: A Report from the American Heart Association. *Circulation.* (epub) Dec 15 2010.