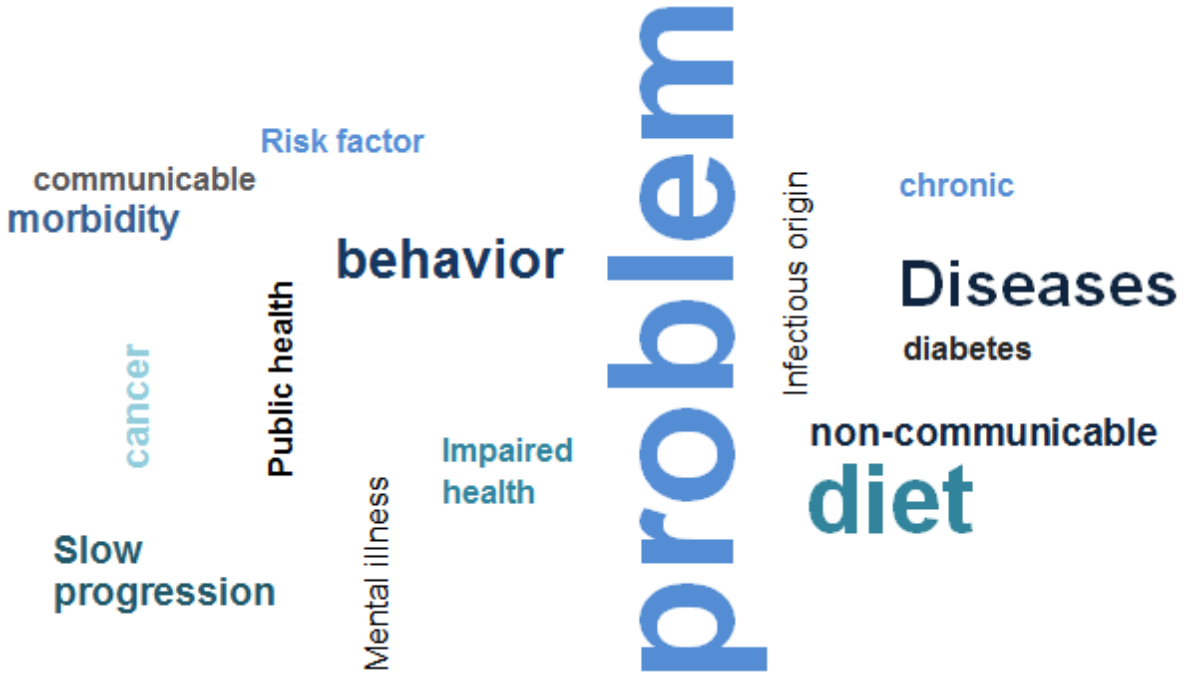
FACILITATOR GUIDE



Analyze and Interpret Surveillance Data

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Analyze and Interpret Surveillance Data

Learning Objectives

At the end of the training, participants 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.

Estimated Completion Time

- 3 ½ hours (2 hours presentation; 1 ½ hours skill assessment)

Training Techniques

- Content and examples will be presented using lectures and group discussion. Skill assessment will be in small groups.

Prerequisites

- Introduction to NCD Epidemiology
- NCD Burden of Disease
- NCD Surveillance in Public Health
- Descriptive and Analytic Studies

Materials and Equipment

For the Facilitator:

- PowerPoint file for presentation

For the Participant:

- Participant Guide

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

PREPARATION CHECKLIST

The following are action items to be completed by the facilitator prior to training:

___ Review slides

FONT GLOSSARY

The following fonts are used in this guide:

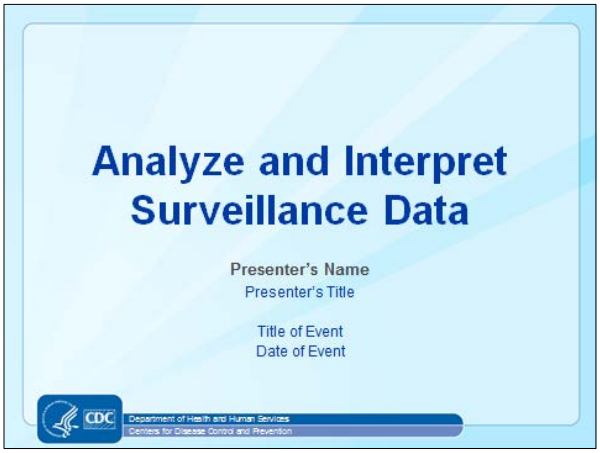
Font Type	Font Meaning
Plain	Script
Bold	**Instructions**
Italics	*Answers*

ICON GLOSSARY

The following icons are used in this guide:

Image Type	Image Meaning
 Activity Icon	Small group exercise.

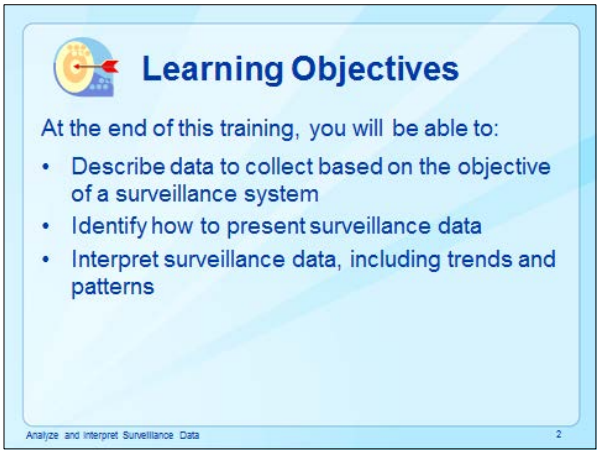
Image Type	Image Meaning
 Flip Chart Icon	Write responses during facilitator-led discussions or debriefs.
 Question Icon	Question for facilitator to ask participants.

Duration/ Slide-Number	What To Do/What To Say
5 minutes	
Question	• **Welcome participants.** • **Introduce yourself if you are a new facilitator.** • **Explain that this lesson gives an overview of analyzing and interpreting surveillance data on NCDs.** • **Ask participants if they have experience analyzing and interpreting surveillance data.** • **Briefly discuss how the skills and knowledge they learn in this module will help them at their jobs. For example:** o To understand the burden of an NCD in a community and to monitor its trend over time, it is important to also understand the causes of NCDs: behavioral, environmental, and social factors. o NCD surveillance systems collect information on these factors. • **Explain that this lesson will take approximately 3 ½ hours to complete.** • **Explain that after learning the lesson, participants will complete a skill assessment in small groups.**

Duration/ Slide-Number	What To Do/What To Say

1 minute

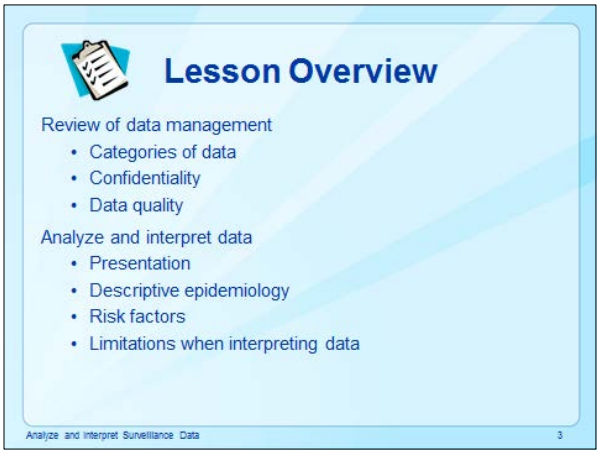
Slide 2



- **Read the slide.**

2 minutes

Slide 3



- **Explain that this is an overview of the topics to be discussed today.**
- **Read the slide.**

Duration/ Slide-Number	What To Do/What To Say

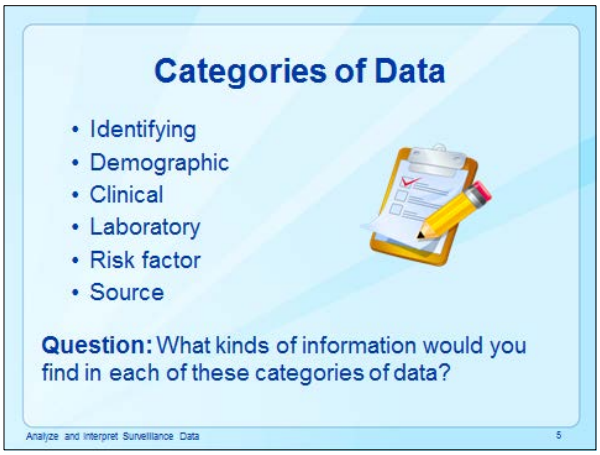
1 minute

Slide 4

- **Tell participants that you will now discuss data management, which includes categories of data, confidentiality and data quality.**

5 minutes

Slide 5



- **Explain that in general, there are 6 categories of information collected as part of NCD surveillance activities.**
- **Read slide.**

Question

- **Ask:** What kinds of information would you find in each of these categories of data?
- **Possible answers:**
  - *<u>Identifying information:</u> an individual's name and parent or guardian if younger than 18 years old, address, and phone number.*
    - *You should not collect this data at any level of the system unless you plan to follow up to intervene to*

Duration/ Slide-Number	What To Do/What To Say

help the respondent.

- *Identifying information will be discussed on the next slide about confidentiality.*

- *<u>Demographic data:</u> age, sex, race or ethnicity*
- *<u>Clinical data:</u> diagnosis, signs, symptoms, and physical measurements such as blood pressure, weight, and height*
- *<u>Laboratory information</u> (tests and results): for example, chest X-rays and measured glucose values*
- *<u>Risk factor information</u> includes, for example, family history of a health condition, diet, and smoking status*
- *<u>Source information</u> includes name of reporting physician, clinic, hospital or laboratory; date of report: This data may be collected from busy hospital and clinic personnel; however, it is a lot of data for survey staff to enter.*

- **Explain any concepts or types of information that participants missed when answering the question.**
- **Explain that we will discuss risk factors in more detail later in the presentation.**

2 minutes

Slide 6

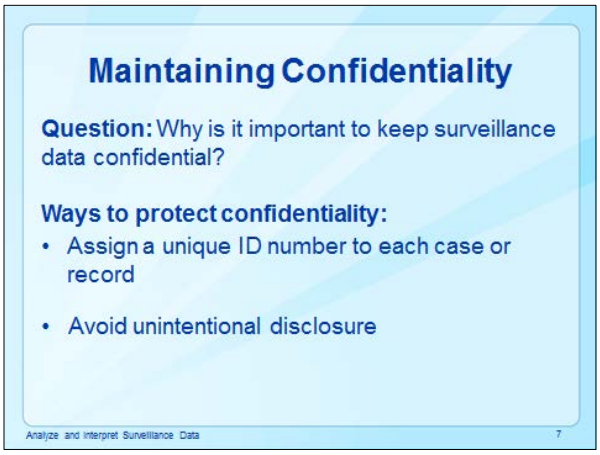
- **Say:** One of the keys to data management is confidentiality. Public health professionals must ensure that all data collected as part of public health activities are kept confidential. Some surveillance systems (e.g., vital-event registries and case-based disease registries) collect identifying information. In other systems, such as surveillance based on surveys, identifying information is usually not entered into a database, ensuring

Duration/ Slide-Number	What To Do/What To Say

confidentiality.

3 minutes

Slide 7



Question

- **Ask:** Why is it important to maintain confidentiality?
- **Possible answer:** *People's health status is private, and only they have the right to share the information with others. Also, surveillance activities often collect information which could cause harm to the person if the information were disclosed. For example, a person may not want to disclose a health condition to an employer.*
- **Click to show ways to protect confidentiality.**
- **Say:** There are many ways to prevent identifying data from being disclosed. One of the most effective is to assign a unique combination of numbers and letters to each case or record. The identification number may be assigned before the data are collected. When the data are entered into a computer database, the identification number is entered but no identifying information is entered.

  In some circumstances (e.g., if a health condition is rare or an individual lives in a small rural village), non-identifying information may be enough to infer the identity of the affected individual. This situation causes "unintentional disclosure".

  It is always important to review any data that will be shared with the public to ensure steps are taken to prevent unintentional disclosure. One way is to withhold information on the number of individuals with a particular health condition if that number is less than 5.

Duration/ Slide-Number	What To Do/What To Say

3 minutes

Slide 8

- **Explain: Completeness of data is important to the quality of the data collected as part of a surveillance system.**
- **Say:** Completeness can refer to many things.

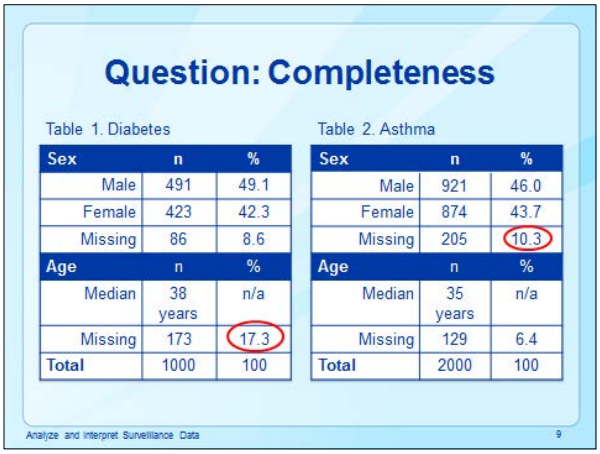
  First, it can refer to the completeness of collected data in the surveillance system, or "how much missing information is there in the surveillance data"? Generally, when more than 10% of the information is missing, investigators are concerned about the ability to accurately interpret the data because they are not confident that the available data are representative of the true distribution of the health condition (or risk factor) in the population. Missing data often requires contacting the individual again, which is not always possible.

  It can also refer to the completeness of reporting. The ability of a surveillance system to acquire all records of an event under surveillance also influences the quality of the data. For example, if infants born at home are not registered with appropriate government offices, their information will not be captured by vital events registration data. This will lead to an underestimation of births in an area.

Duration/ Slide-Number	What To Do/What To Say

5 minutes

Slide 9



- **Explain: These tables show the completeness of data collected by two surveys, one on diabetes and one on asthma in Tanzania. The diabetes survey had 1,000 respondents. The asthma survey had 2,000 respondents.**
- **Say:** Take a look at these two tables.

Question

- **Ask:** Are you concerned that the data missing from Table 1 will affect your interpretation of diabetes by sex or age? If yes, why?
- **CLICK once to show percents for the diabetes table. The percent missing is circled for age because it is higher than 10%.**
- **Possible answer:** *The missing information on sex is unlikely to affect the interpretation of findings related to diabetes because only 8.6% of the data are missing. However, 17.3% of data on age are missing. Therefore, the interpretation of findings for diabetes related to age may be limited.*

Question

- **Ask:** Are you concerned that the data missing from Table 2 will affect your interpretation of asthma by sex or age? If yes, why?
- **CLICK again to show percents for the asthma table. The percent missing is circled for sex because it is higher than 10%.**
- **Possible Answer:** *More than 10% of the data are missing for sex. Even though we noted that missing data greater than 10% could limit the interpretability, this is not a strict rule. Hence, it is possible that missing data on sex would not affect the interpretation of the association between asthma and sex. One quick way to see if the data in the survey are*

Duration/ Slide-Number	What To Do/What To Say

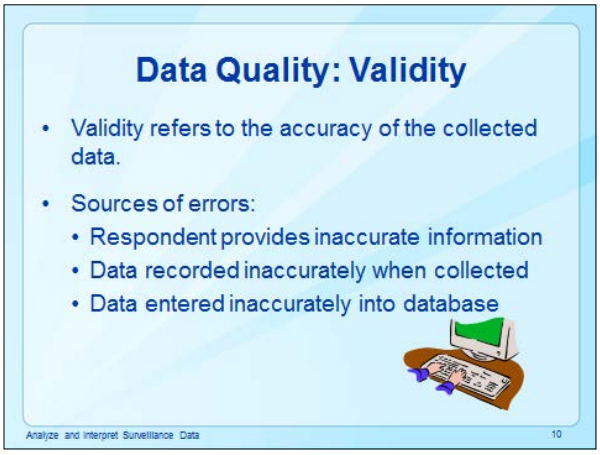
similar to the source population, the population from which individuals were selected for the survey, is to compare the distribution of sex in the survey to the source population. For instance, if the survey was conducted among residents of Morogoro, you could compare the sex distribution in your survey with that of Morogoro. If the proportions are similar, then the missing data are not likely to affect your findings. However, if they are different, the 10% of missing information on sex may limit interpretation of your findings.

- Explain: In order to see if your sample population has a similar distribution for a variable missing more than 10%, you need to assess how different your sample estimate is from the general population. If the sample estimate is more than 10% different than the estimate seen in the source population, then you need to explore ways to deal with the missing data in your sample because your original estimates may be too high or too low. Relying on this flawed information may lead to inappropriate allocation of funds for interventions that don't address the true needs of your population.

  Remember, further examination into missing data should be done when approximately 10% or more of the data are missing. Since there is only about 6.5% of the data missing for age in Table 2, missing information is unlikely to affect interpretations about how age impacts asthma in your sample.

3 minutes

Slide 10



Question

- **Say:** Like completeness, lack of validity also affects the quality of data, thereby hindering interpretation of the data.
- **Ask:** What are some sources of errors that can threaten

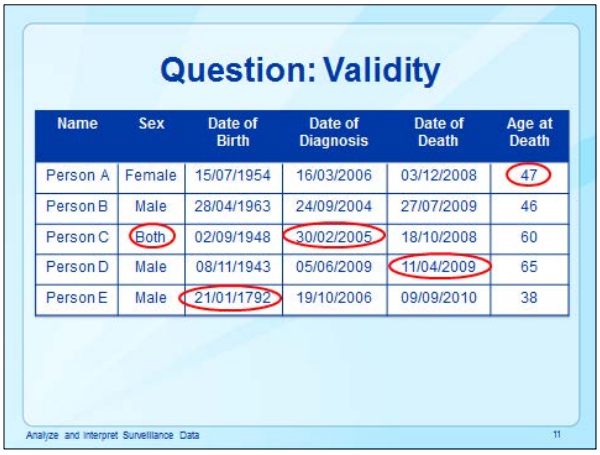
Duration/ Slide-Number	What To Do/What To Say

validity?

- **Click to show answers.**
- **Possible Answers:**
  - *Survey respondents provide inaccurate information. This often occurs when the topic or issue is sensitive and a 'socially desirable response' is clear. For example, someone may say he seeks monthly medical evaluations for his diabetes when, in reality, he may not have sought medical attention in years.*
  - *Data are recorded erroneously when they are being collected. For instance, the data collector might inadvertently record a respondent's year of birth as 1997 instead of 1957.*
  - *Errors may occur when data are entered into a computer database.*

5 minutes

Slide 11



- **Explain: One approach to assessing the validity of data is to look for improbable values. Improbable values are highly unlikely or impossible values and are generally a result of logic errors.**
- **Say:** This table showing data on five individuals with diagnosed lung cancer has five improbable values.
- **Ask:** What are the five improbable values in this line list?
- **CLICK each time you want to make a red circle appear around an answer. They will appear in the order they are listed below.**

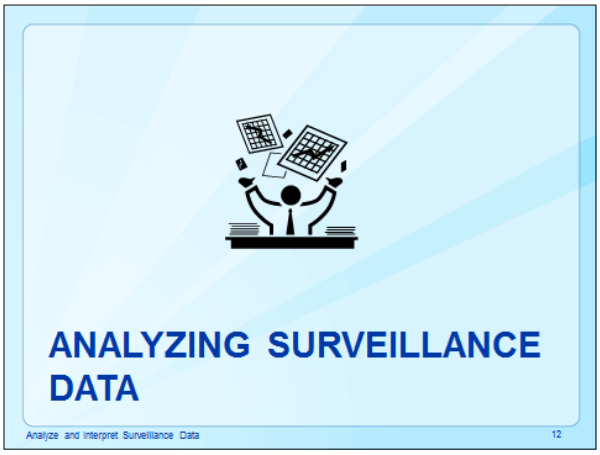
Question

Duration/ Slide-Number	What To Do/What To Say

- **Possible answers:**
  1. *Person A was 54 years old when she died, not 47 years old (assuming the dates of birth and death are correct).*
  2. *Person C cannot be both a male and female. Sex refers to an individual's biological attributes, whereas gender refers to the way a person self-identifies.*
  3. *Person C could not have received a diagnosis on 30/02/2005 since February never has 30 days.*
  4. *Person D could not have died before his diagnosis date.*
  5. *Person E could not have been born in 1792.*

1 minute

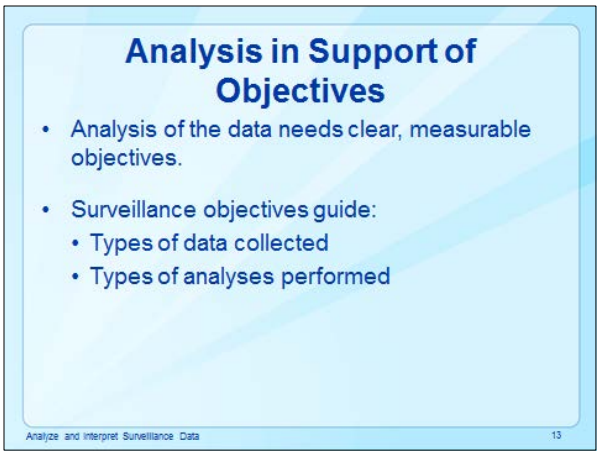
Slide 12



- **Tell participants that you will now discuss analyzing surveillance data. Explain that analysis using statistical software is <u>not</u> the focus of this lesson.**

2 minutes

Slide 13



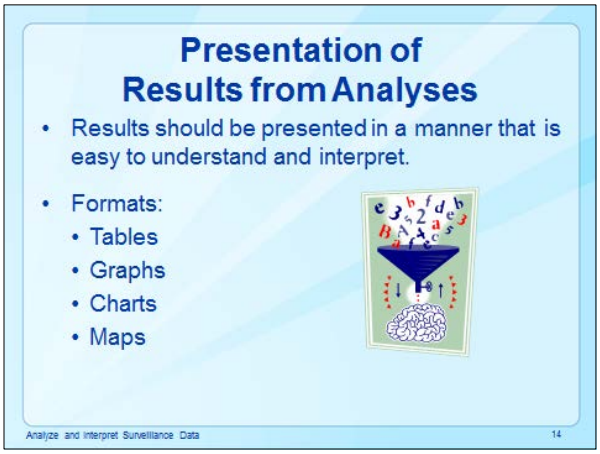
- **Read the slide.**

Duration/ Slide-Number	What To Do/What To Say

- **Say:** Knowing the goals of surveillance before data collection begins will guide both the types of data which are collected and the kinds of analyses to be performed. Before analyzing surveillance data, it is important to make sure the analytic approach you take will be able to address the surveillance objective.

2 minutes

Slide 14



- **Say:** The results of surveillance data analysis describe the distribution and occurrence of NCDs in populations.

  Surveillance data should be summarized and presented in a manner that is easy for the audience to understand and interpret. The audience can include program managers and other decision makers.

  Analytic results can be presented in tables, graphs, charts, and maps.

- **Ask:** Why is it important for decision makers to understand the analysis results?

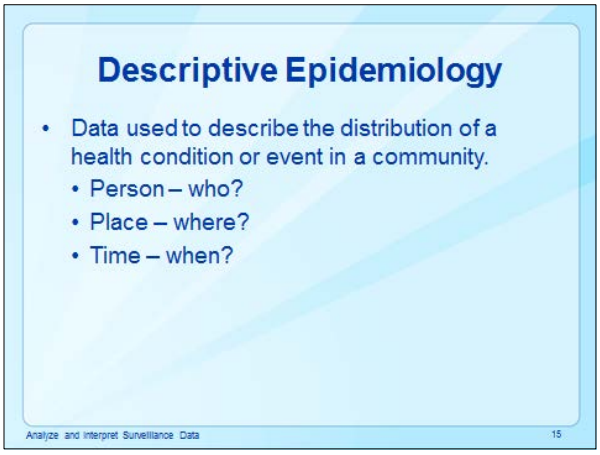
- ***Possible answers:*** So that the recommendations will be implemented; so that the surveillance findings will be used; so that results will be disseminated.

- **Explain: Participants will see all of these forms of presentation as we move through the next section discussing analysis of data.**

Duration/ Slide-Number	What To Do/What To Say

1 minute

Slide 15



- **Explain:** Surveillance data are used to describe the distribution of a health condition or event in a community by person, place, and time. This is referred to as descriptive epidemiology.

2 minutes

Slide 16

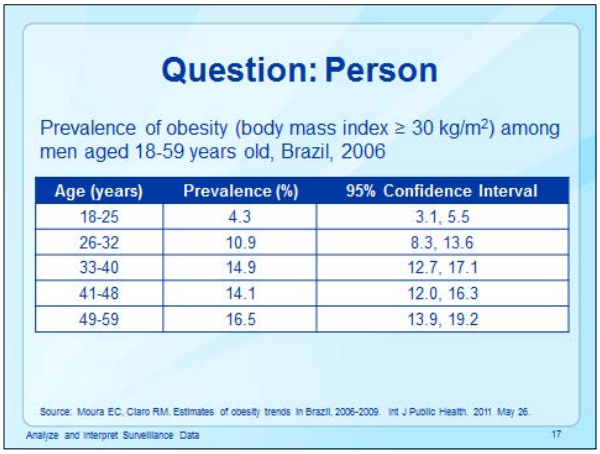
Question

- **Say:** "Person" is the individual who is affected by a health condition or event. You may recall that one category of data collected in surveillance systems is demographic information.
- **Ask:** What are some examples of person-related data?
- **Click to show possible answers (others are possible):**
- **Explain: Analyzing surveillance data by person provides further information on the groups of individuals affected, permitting identification of subpopulations that may be at high risk for NCDs.**

Duration/ Slide-Number	What To Do/What To Say

3 minutes

Slide 17



Question

- **Say:** This table summarizes the prevalence of obesity among men aged 18-59 years old in Brazil in 2006.
- **Ask:** What conclusions would you make about obesity prevalence in young men compared with the prevalence in older men in this sample?
- **Answer***: In general, the prevalence of obesity increases with age among men in Brazil in 2006, and men aged 49-59 have nearly four times the prevalence of obesity compared to men aged 18-24.*

3 minutes

Slide 18

Question

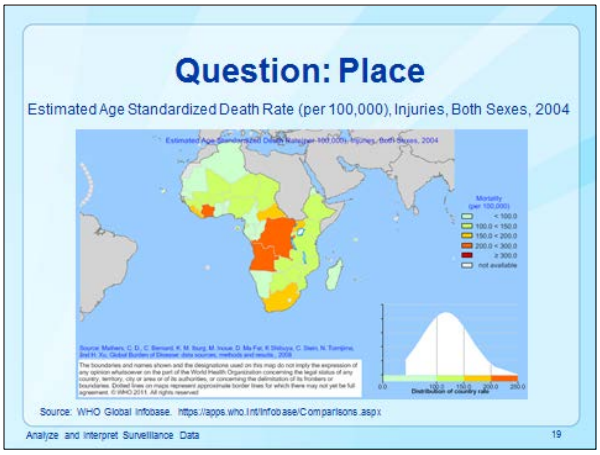
- **Say:** "Place" refers to geography-related factors of the affected population.
- **Ask:** What are examples of data related to place?
- **CLICK once to make Possible Answers appear on the slide.**

Duration/ Slide-Number	What To Do/What To Say

- **Possible Answers:**
  - *Place of residence*
  - *Workplace*
  - *Place of exposure*
  - *Place where an individual sought diagnosis or treatment*

3 minutes

Slide 19

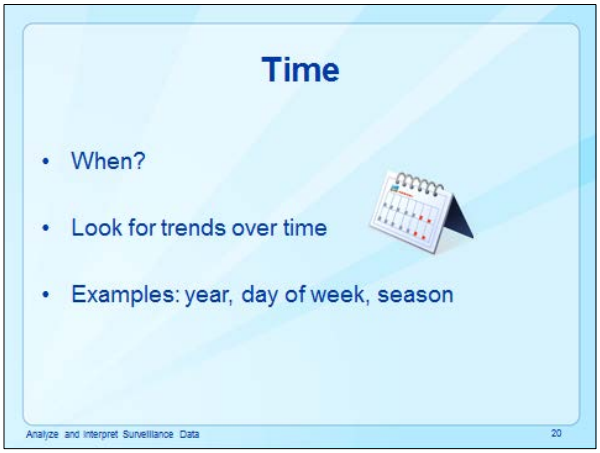


Question

- **Read the title of the map.**
- **Point out S. Africa and ask participants:** What is the estimated, age-standardized death rate due to injuries in 2004 in S. Africa?
- **Possible Answer:** *From 150 to fewer than 200 deaths per 100,000 people per year.*

2 minutes

Slide 20



- **Say:** Time refers to the period when an event occurred (e.g., exposure to a risk factor, symptom onset, diagnosis, report to

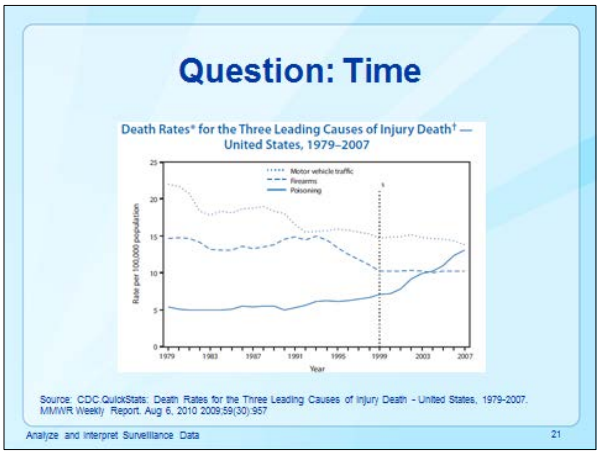
Duration/ Slide-Number	What To Do/What To Say

public health officials). Investigators look for changes in rates of health conditions over time (trends).

- **Ask:** What are some examples of time?
- **CLICK on the slide to show examples.**

3 minutes

Slide 21



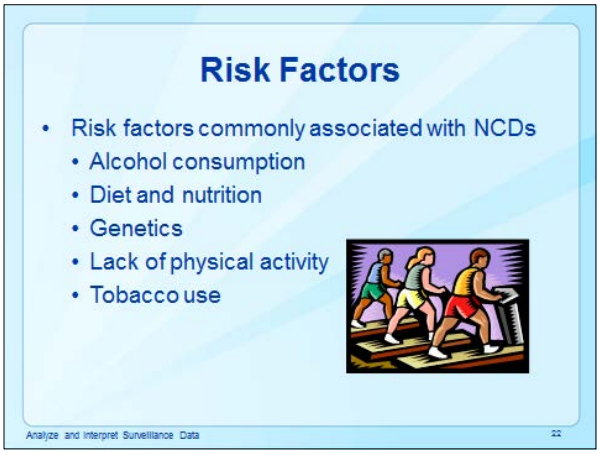
Question

- **Say:** This graph shows the rates for the three leading causes of injury-related death for persons over 18 years old.
- **Ask:** What conclusions can you draw about the death rates due to motor vehicle traffic, firearms, and poisoning?
- **Possible Answers:**
  - *The death rate due to poisoning increased from approximately 5 deaths per 100,000 in 1979 to approximately 14 deaths per 100,000 in 2007.*
  - *The death rate due to motor vehicle traffic decreased from approximately 22 deaths per 100,000 in 1979 to 15 deaths per 100,000 in 2007. (***Ask participants for the potential cause for this decrease.)**
  - *The death rate due to firearms decreased from 15 deaths per 100,000 in 1979 to approximately 11 deaths per 100,000 in 2007, although the death rate increased slightly in the early 1990s. (***Ask participants for the potential cause for this decrease.)**

Duration/ Slide-Number	What To Do/What To Say

3 minutes

Slide 22

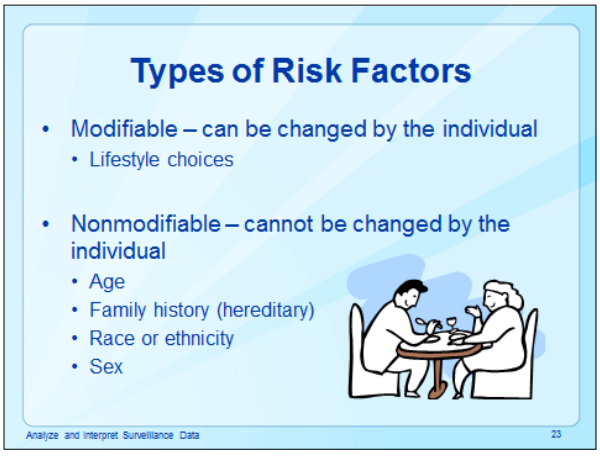


Question

- **Say:** It is important in NCD surveillance to describe potential risk factors. Unlike infectious diseases where specific pathogens cause specific diseases, NCDs are often the result of a number of risk factors.
- **Ask:** What are examples of some risk factors?
- **CLICK to make answers appear.**
- **Read the answers.**

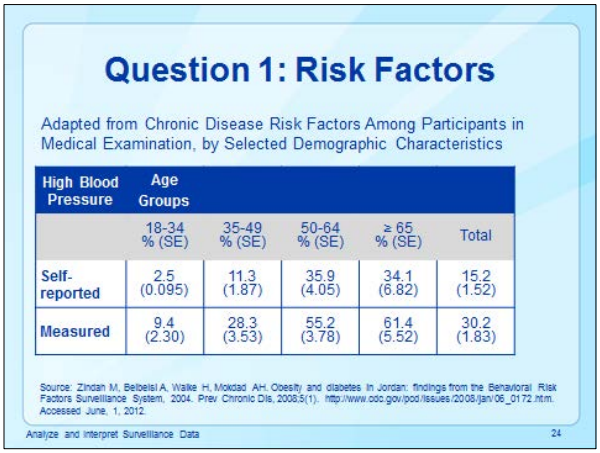
2 minutes

Slide 23



Question

- **Say:** Risk factors are either modifiable or non-modifiable.
- **Ask:** Can you give an example of a modifiable behavior?
- **CLICK to show the answer:** *lifestyle choices.*
- **Explain: Modifiable risk factors can be changed. Usually they are associated with lifestyle choices, such as the**

Duration/ Slide-Number	What To Do/What To Say
	extent of physical activity and choice of diet.
Question	• **Ask:** What are examples of non-modifiable behaviors? • **CLICK to show possible.** • **Explain: Non-modifiable risk factors cannot be changed. Age, family history (hereditary), race or ethnicity, and biological sex are examples. An example of a hereditary, non-modifiable risk factor is a mutation on the BRCA1 or BRCA2 gene, which increases risk for breast cancer.**
5 minutes **Slide 24**	
Question	• **Say:** Here is an adapted table from a study of risk factors in Jordan that shows the relationship between age groups and high blood pressure (self-reported and measured). • **Ask:** What modifiable risk factor might impact the data shown on this chart? • **Possible answer:** *People can modify their eating habits or specifically salt intake, which can impact high blood pressure.*
Question	• **Ask:** What non-modifiable risk factor is shown on this chart? • **Possible answer:** *Age.* • **Ask:** What is another non-modifiable risk factor that may affect high blood pressure? • **Possible answer:** *Sex*

Duration/ Slide-Number	What To Do/What To Say

then the prevalence drops at ages 45-49.

5 minutes

Slide 25

Question

- **Say:** This map shows the percentage of 2004 deaths caused by tobacco use worldwide among people older than 30 years.
- **Ask:** What conclusions would you draw about the percentage of deaths caused by tobacco use among people older than 30 years?
- **Possible answers:**
  - *The percentage of deaths due to tobacco use is low in Africa and relatively low in South America as well.*
  - *The percentage of deaths due to tobacco use is highest among US, Canada, UK, and several countries in Europe and Asia.*
  - *There does not appear to be an association between death by tobacco use and whether the country is developed or developing.*

Question

- **Say:** As you may recall, surveillance data are also useful for generating hypotheses or research questions.
- **Ask:** What questions or hypotheses might you have after looking at this map?
- ***Possible answers:***
  - *What diseases (and therefore deaths) were deemed to have been "caused by tobacco"?*
  - *Why is the percentage of death caused by tobacco low in African countries compared to the rest of the world? Is there lower tobacco use in Africa?*
  - *Why is the percentage of deaths due to tobacco in*

Duration/ Slide-Number	What To Do/What To Say

Kazakhstan, Mongolia, and Turkey so high?

2 minutes

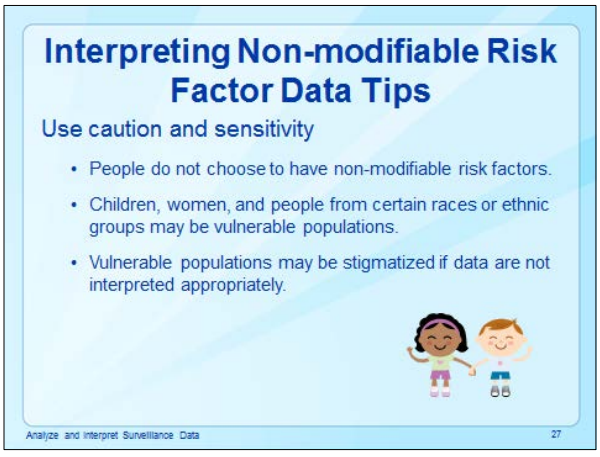
Slide 26

- **Say:** Interpreting data about modifiable risk factors is easier than non-modifiable risk factors. Recall that modifiable risk factors are those associated with lifestyle choices, such as exercise and smoking.

  Recommendations about modifiable risk factors often encourage people to change their behaviors to make better health-related decisions.

2 minutes

Slide 27



- **Say:** Non-modifiable risk factors include age, family history, race and ethnicity, and sex.
- **Read the slide.**
- **Explain: For example, if you find that diabetes is most prevalent among people with O negative blood type in your sample, an inappropriate way to interpret this trend**

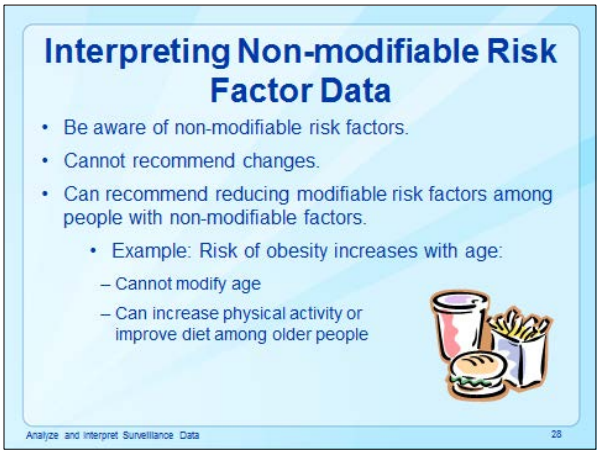
Duration/ Slide-Number	What To Do/What To Say

is that having O negative blood type causes diabetes. Publicizing this wrong interpretation would imply that simply having O negative blood is synonymous with disease and could stigmatize people in this group.

An appropriate interpretation might be that higher rates of diabetes are seen among those who have O negative blood in your sample, and any number of factors may cause higher rates of diabetes in this group. The implications of this interpretation are that perhaps additional information about diabetes could be available to people with O negative blood types at blood drives to help connect them to care.

1 minute

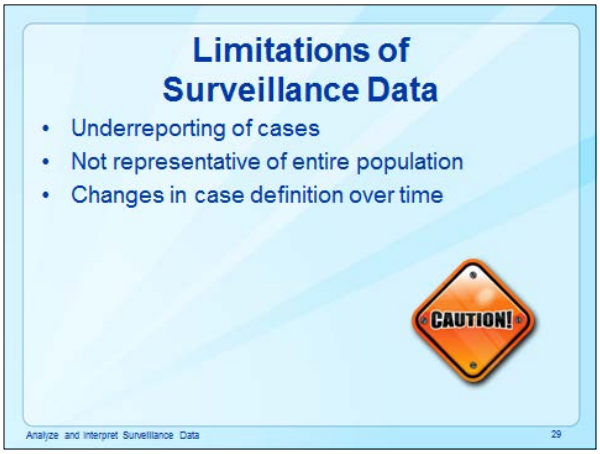
Slide 28



- **Read the slide.**

2 minutes

Slide 29



Duration/ Slide-Number	What To Do/What To Say

- **Say**: Earlier you were asked to interpret tables, graphs, charts, and maps. However, interpreting surveillance data is not always easy or straightforward.
- **Explain: The key to interpreting surveillance data accurately is to know the limitations of the data being used. The most common limitations to surveillance data are underreporting, representativeness and changes in case definition. These will be discussed further in the next slides.**

2 minutes

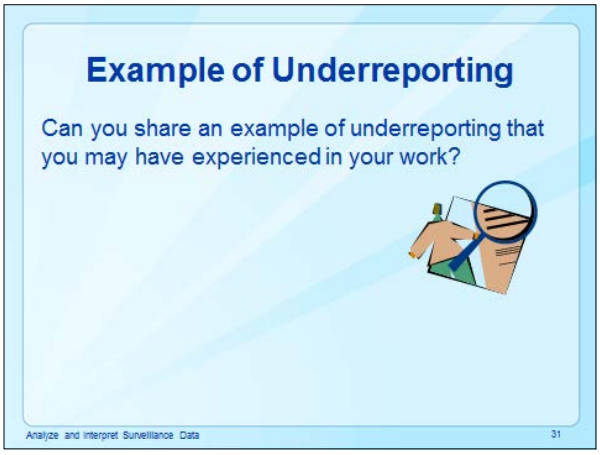
Slide 30

- **Read the information on the slide.**
- **Explain: For notifiable (mandatory reporting) health conditions, it is the responsibility of the diagnosing physician or medical facility to report. These physicians may not be aware, or may just not participate. In addition, parents or families are responsible for reporting vital events (such as births, deaths) that occur outside of medical facilities.**
- **Say:** Periodic education should be conducted to raise awareness on the responsibilities of reporting.

Duration/ Slide-Number	What To Do/What To Say

2 minutes

Slide 31

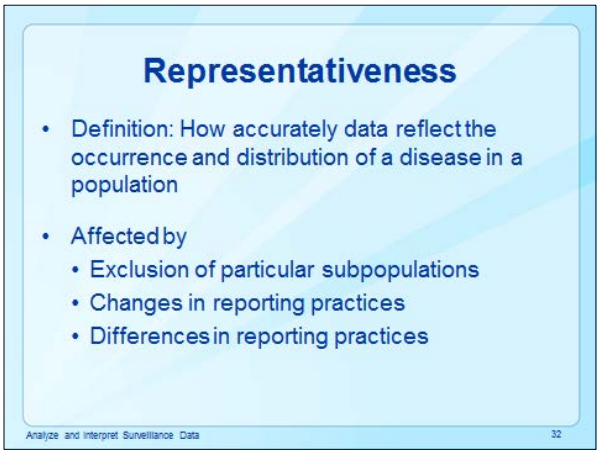


Question

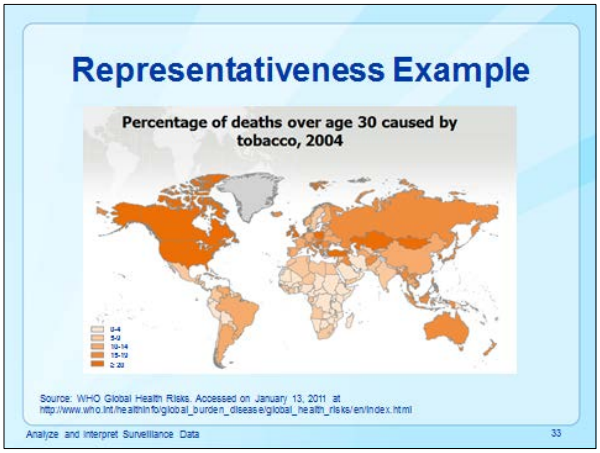
- **Ask:** Can you share an example of underreporting that you may have experienced in your work?
- **Explain that you may see different reporting rates from hospitals than from private physicians, and this may result in an underrepresentation of specific groups in your results.**

3 minutes

Slide 32



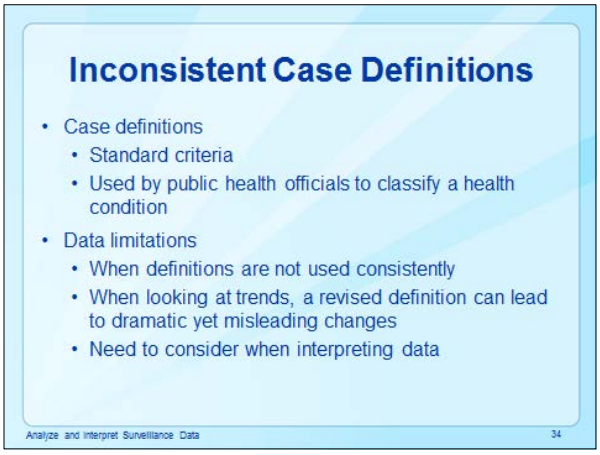
- **Read the first bullet.**
- **Explain that one of the goals of collecting surveillance data is to be able to generalize findings to the source population.**
- **Surveillance data that are representative of the true distribution of a disease in a population permit public health authorities to take effective measures to reduce the burden of NCDs.**
- **When data are not representative of the true occurrence**

Duration/ Slide-Number	What To Do/What To Say
	and distribution of disease in a population, estimated statistics, such as prevalence and rates, may overestimate or underestimate the true burden of disease. This may lead to implementation of prevention and control measures that may be excessive or inadequate. • **Read the second bullet and sub-bullets.** • **Explain that collecting data from a variety of sources can help improve representativeness.**
3 minutes **Slide 33**	
Question	• **Say**: You may remember this map of deaths due to tobacco use from earlier in the presentation. • **Explain: The data used to create this map were collected from mortality surveys conducted only in the capitals of each country.** • **Ask:** Do you think the percentages in the map are representative of the true occurrence of deaths caused by tobacco in each country? Why or why not? • **Possible answer:** *It is highly unlikely that data are representative of the true occurrence of deaths caused by tobacco in each country. Tobacco use, and a variety of contributory factors related to tobacco use, differs between large urban centers like capital cities and rural villages and towns. The percentages shown in the map may be an underestimation or overestimation of the true occurrence of tobacco related deaths in each country.*

Duration/ Slide-Number	What To Do/What To Say

2 minutes

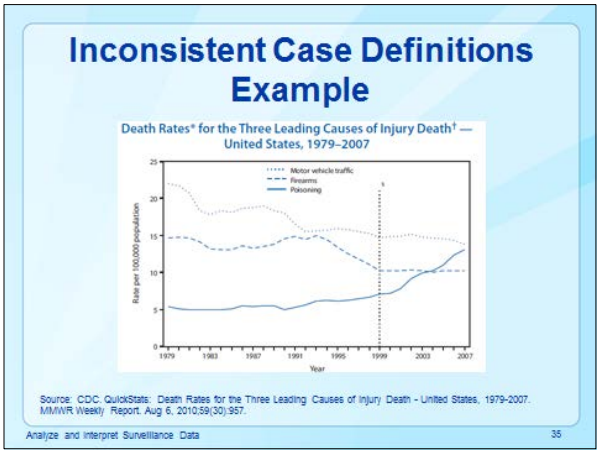
Slide 34

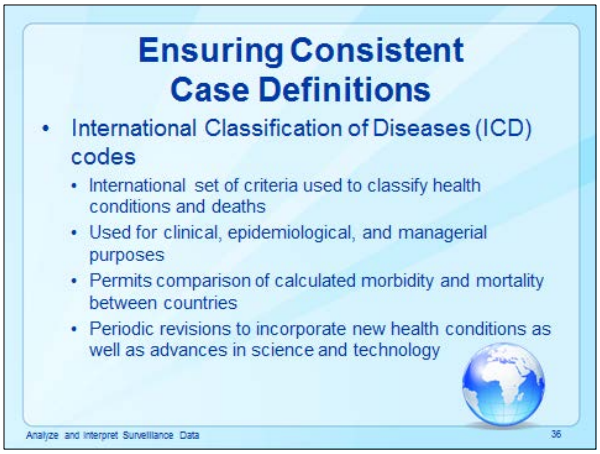


- **Say:** Case definitions use a standard set of criteria used to ensure that all disease reporters are reporting the same condition. These definitions are periodically updated by public health officials; for example, a new test or technology may be available to diagnose a condition, and that could be included as a method of disease confirmation in the case definition.
- **Explain: If public health officials review trend data and are unaware of changes in the case definition, they may erroneously conclude that the rate or prevalence of a health condition or disease was increasing (or decreasing) during a certain period when, in fact, the seeming change in rate was due to changes in the case definition.**

3 minutes

Slide 35



Duration/ Slide-Number	What To Do/What To Say
	• **Say:** We're looking again at the three leading causes of injury-related death in the US. It looks as if the death rate for poisoning is increasing over time, and is decreasing for firearms and motor vehicle crashes. Take a look at the black vertical dotted line in 1999. This dotted line represents a change in the case definitions for the ICD codes for deaths resulting from poisoning, firearms, and motor vehicle crashes.
Question	• **Ask:** Now that we know that the case definition has changed, how might this have impacted the rates for each cause of injury death?
	• **Possible answer:** *As a result, deaths caused by poisoning increased more steeply, whereas deaths caused by motor vehicle crashes decreased. There was little change in the rate for firearms, and it continued to follow the previous downward trend. We can't be sure if these increases or decreases were solely due to the new ICD codes or was also the result of true changes in the death rate in the population.*
	• **Say:** As you may recall from earlier in this presentation, we found that the rate of deaths due to poisoning increased from 5 deaths per 100,000 in 1979 to 14 deaths per 100,000 in 2007.
Question	• **Ask:** Knowing that there was a change in case definition in 1999, how might that impact the change in rates that we discussed earlier?
	• **Possible answer:** *The increase we see in the poisoning death rate may not be as dramatic as depicted in the graph. With this new case definition, perhaps more cases are being coded as poisoning deaths.*
2 minutes **Slide 36**	

Duration/ Slide-Number	What To Do/What To Say

- **Explain how ICD codes can be used to ensure consistent case definitions.**
- **Read the slide.**

10 minutes

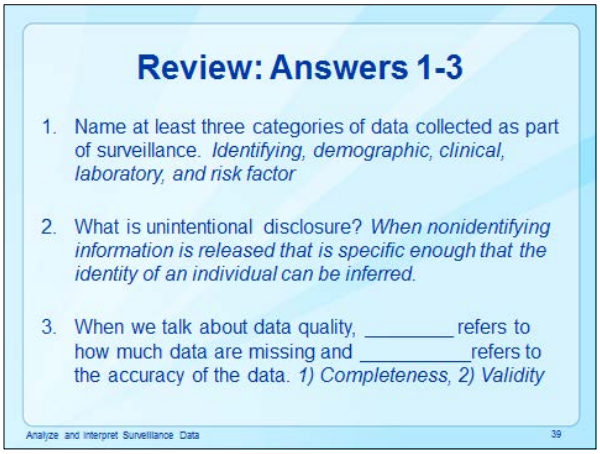
Slide 37- 43

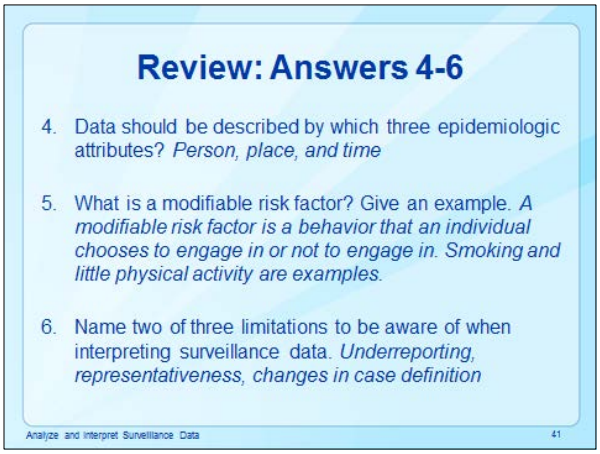
Flip Chart

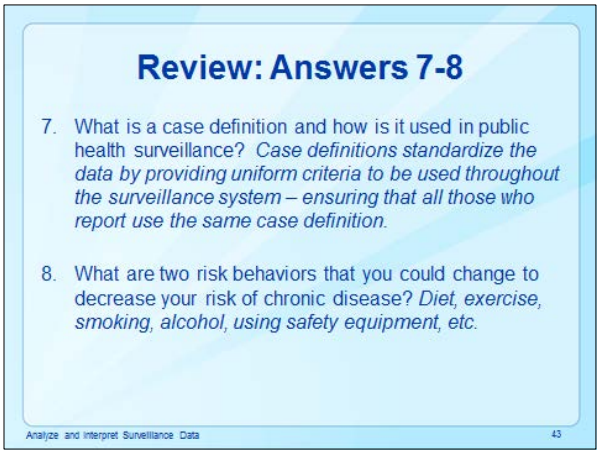
- **Tell participants you will now have a fun, review game of what they learned in the lesson.**
- **Note: Adjust number of questions depending on number of tables and teams. If participants are already at small tables, you may keep them together as a team. Otherwise, divide the class into teams of four or five participants.**
- **After participants are in their teams, ask each team to (quickly) give you a team name. Record team names on a flip chart.**
- **Tell participants to discuss answers in their teams before providing them out loud. Correct answers will receive two points. You may give one point for partially correct answers.**
- **Begin by clicking on the following slides, one question at a time.**
- **To reveal the answers, click on the slide after the question appears (and participants answer the question).**
- **Record points on flip chart.**

(Optional) Provide a prize to winning team.

Duration/ Slide-Number	What To Do/What To Say





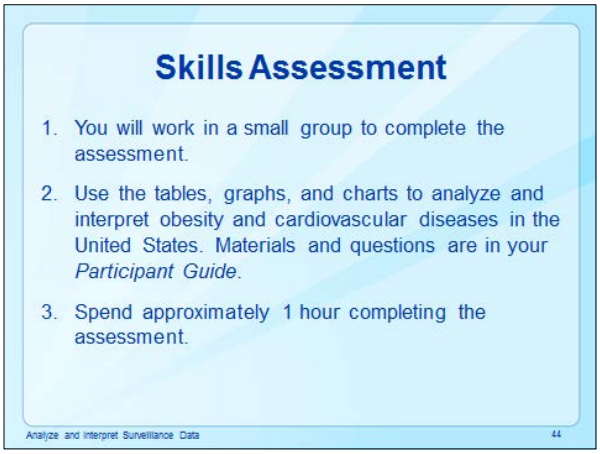


Duration/ Slide-Number	What To Do/What To Say

1 ½ hours (1 hour assessment; 30 minutes review)

Slide 44

Activity



- **Instructions: For this assessment, participants will break into small groups to work together to complete the assessment. Materials to complete the assessment may be found in the Participant Guide.**
- **Read the instructions to the participants. After finishing, ask participants if they have any questions or need any clarification.**
- **Tell participants they have approximately 1 hour to complete the assessment.**
- **Review participants' responses to the assessment by asking each group to answer 1 or 2 questions.**

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 3 parts to this assessment. Groups will have approximately 1 hour to complete the assessment.
4. At the end of the assessment, one member from the group will share your answers with the class. (30 minutes)

Part 1. Background (10 minutes)

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

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

Answer: Note: The following is a suggested list of data within each category; it is not exhaustive and participants should be encouraged to share items not listed below. Information to collect includes identifying, demographic, clinical, and risk factor. There is no laboratory data to collect.

- *Identifying: At the very least, the person's city or town of residence should be collected.*
- *Demographic: Age, sex, race/ethnicity, and occupation should be collected. Other information may include education, and socioeconomic status.*
- *Clinical information: Height and weight can be collected as self-reported but measured would be preferred.*
- *Risk factors: Information to be collected includes diet and physical activity.*

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

Answer: Data should be described by person, place, and time. It would be helpful to summarize demographic and risk factor information in tables and figures. A map would be useful to visualize where obesity is prevalent. Finally, a line graph showing the obesity trend over time would also be informative.

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.

Answer: Before 1985, the number of CVD deaths in females was lower than males. However, since 1985 the number of CVD deaths in females has been higher than males. Overall, the number of CVD deaths in females increased from 1979-2000, although there was a slight decline from 1985-1990. Since 2000, there has been a dramatic drop in CVD-specific deaths among females. Overall, the number of CVD deaths in males has decreased over time, with a slight increase from 1979-1980 and 1990-1995, with a large drop in CVD deaths from 2000-2007.

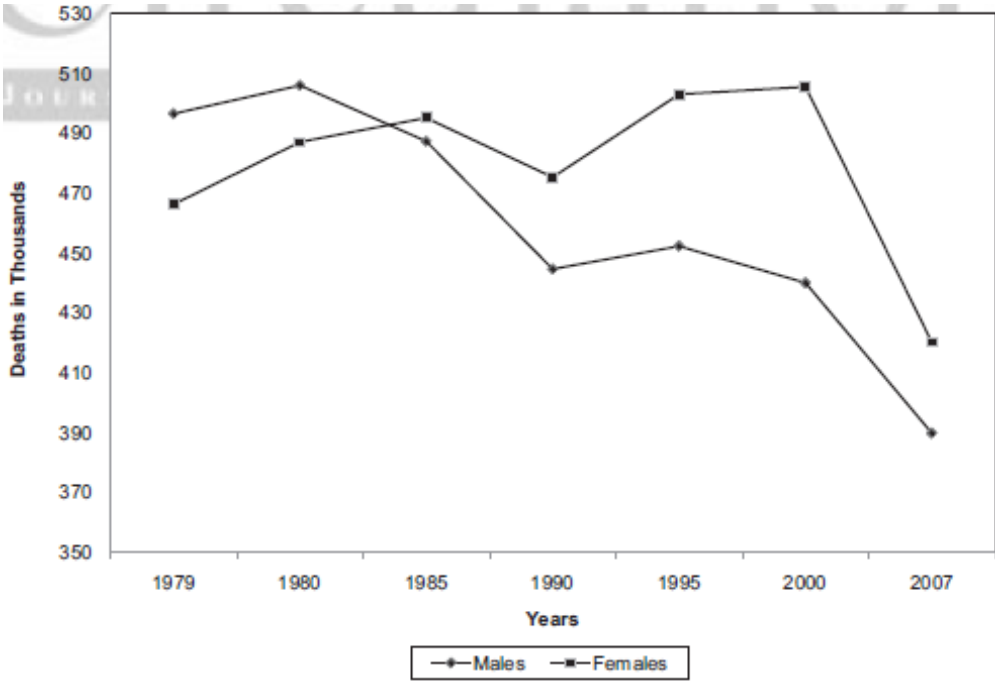


Figure 1. CVD mortality trends for males and females (United States: 1979-2007.) The overall comparability for cardiovascular disease between the ICD 9th revision (1979-1998) and International Classification of Diseases, 10th revision (1999-2007) is 0.9962. No comparability ratios were applied. Source: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

Answer: Rates provide a more accurate depiction of morbidity and mortality in a population than counts. Therefore, the use of rates allows for a more meaningful comparison between groups. For example, in Figure 1, if the population of males is smaller than females, then the CVD-related mortality rate in males would be higher than females. Hence the use of counts to examine CVD-related mortality would have led us to falsely conclude the burden of CVD-related deaths was higher in females than males.

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?

Answer: No, the case definitions did not change dramatically between the revisions to affect our earlier response. The comparability ratio of 0.9962, which is very close to 1.0, supports our conclusion.

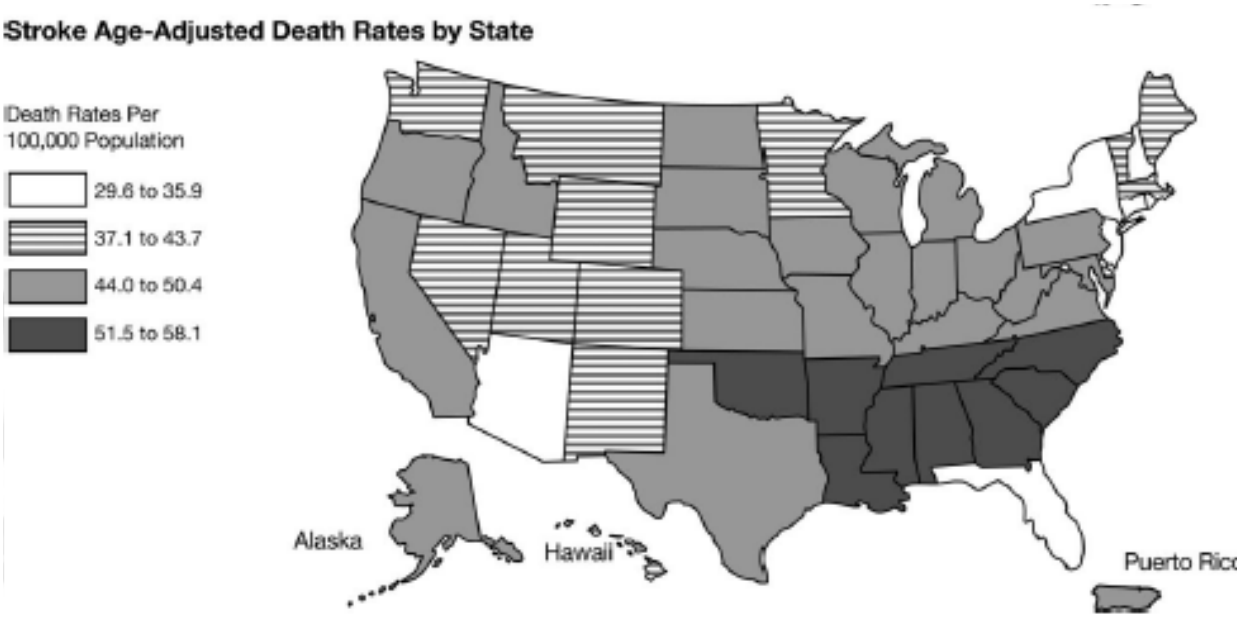


Figure 2. US map of age-adjusted death rates for stroke by state (including the District of Columbia) in 2007.

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

Answer: The highest rates of death are in the southeastern states. The lowest rates of death occur in the western states.
In the US there is an area of the country known as the "stroke belt". The stroke belt includes Alabama, Arkansas, Georgia, Indiana, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia. In the past, there have been reported age-adjusted stroke mortality rates > 10% higher than the national average.
Though this trend has been evident for years, research has yet to identify specific causes for the elevated incidence of stroke in this region. However, there are a number of possible factors, such as diet, smoking, low SES, hypertension, cultural norms, healthcare quality, tobacco use, and infections.

Part 3. Risk Factor: Self-reported Obesity in the US (30 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.

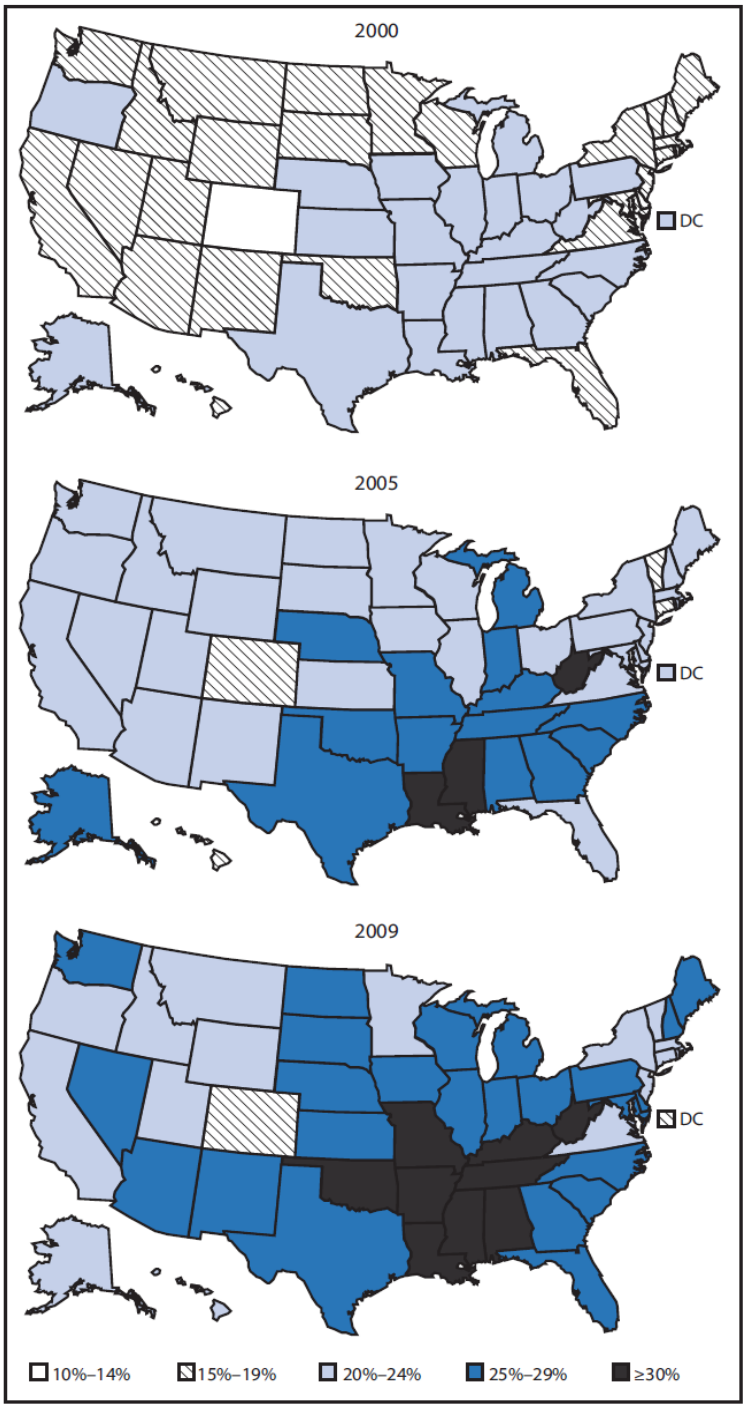
7. Look at the different risk factors for obesity in Table 1.
    a. Which are modifiable risk factors?
    b. Which are non-modifiable risk factors?

Answer: Age and race/ethnicity are non-modifiable risk factors. Educational level and census region are 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?

Answer: The prevalence of obesity in the US is 26.7%.
Sex: The prevalence of obesity is slightly higher in males (27.4%) than females (26.0%).
Age: Overall, the highest prevalence of obesity is in individuals 50-59 (31.1%) and 60-69 years old (30.9%). When stratified by sex, the highest prevalence in males is among 50-59 years old (31.9%), while in females it is 60-69 years old (31.3%).
Race/ethnicity: Overall, the highest prevalence of obesity is among black, non-Hispanics (36.8%) although 30.7% of Hispanics are also obese. Black, non-Hispanic (30.9%) and Hispanic (30.6%) males had the highest prevalence of obesity. Black females had the highest prevalence of obesity (41.9%).
Educational level: Overall, individuals who did not graduate from high school had the highest prevalence of obesity (32.9%). There was no real difference in the prevalence of

obesity among males who did not graduate from high school education and those who had some college education. However, among females, those who did not graduate from high school had the highest prevalence of obesity (36.4%), and there appeared to be a decreasing trend in obesity prevalence with increasing educational level.
Census region: Overall, the highest prevalence of obesity was in the South (28.4%), and Midwest (28.2%). This was true for males and females.



*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.

Answer: The prevalence of obesity increased across the US from 2000-2007. In 2000, there were 28 states with a prevalence of obesity that was <20%; however, in 2009, only two locations had an obesity prevalence that was <20%. In 2009, most states had a prevalence of obesity over 25%.

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?

Answer: This would lead the true BMI to be underestimated. Hence the prevalence of obesity may be underestimated in the US.

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.