



Tutorial: Principles of epidemiology

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Exercise 1: (5 minutes)

Below are three key terms taken from the definition of epidemiology, followed by a list of activities that an epidemiologist might perform. Match the term to the activity that best describes it. You should match only one term per activity.

- A. Distribution
- B. Determinants
- C. Application

B 1. Compare food histories between persons with Staphylococcus food poisoning and those without

B 2. Compare the frequency (rates) of brain cancer among different anatomists in the general population to identify the risk factors

A 3. Mark on a map the residences of all children born with birth defects within 2 kilometers of a hazardous waste site

A 4. Graph the number of cases of congenital syphilis by year for the country

C 5. Recommend that close contacts of a child recently reported with meningococcal meningitis receive Rifampicin

A 6. Tabulate the frequency of clinical signs, symptoms, and laboratory findings among children with chickenpox in Cincinnati, Ohio

Exercise 2: (5 minutes)

Using the data in Tables 1 and 2, describe the death rate patterns for the "Unusual Event." For example, how do death rates vary between men and women overall, among the different socioeconomic classes, among men and women in different socioeconomic classes, and among adults and children in different socioeconomic classes? Can you guess what type of situation might result in such death rate patterns?

Table 1. Deaths and Death Rates for an Unusual Event, by Sex and Socioeconomic Status

Sex	Measure	Socioeconomic Status			Total
		High	Middle	Low	
Males	Persons at risk	179	173	499	851
	Deaths	120	148	441	709
	Death rate (%)	67.0%	85.5%	88.4%	83.3%
Females	Persons at risk	143	107	212	462
	Deaths	9	13	132	154
	Death rate (%)	6.3%	12.6%	62.3%	33.3%
Both sexes	Persons at risk	322	280	711	1313
	Deaths	129	161	573	863
	Death rate (%)	40.1%	57.5%	80.6%	65.7%

Table 2. Deaths and Death Rates for an Unusual Event, by Age and Socioeconomic Status

Age Group	Measure	Socioeconomic Status		Total
		High/Middle	Low	
Adults	Persons at risk	566	664	1230
	Deaths	287	545	832
	Death rate (%)	50.7%	82.1%	67.6%
Children	Persons at risk	36	47	83
	Deaths	3	28	31
	Death rate (%)	8.3%	59.6%	37.3%
All Ages	Persons at risk	602	711	1313
	Deaths	290	573	863
	Death rate (%)	48.2%	80.6%	65.7%

Men (see Table 1) and adults (see Table 2) were more likely to die than were women and children. Death rates for both women and men declined as socioeconomic status increased (see Table 1), but the men in even the highest socioeconomic class were more likely to die than the woman in the lowest socioeconomic class. These Data, which are consistent with the phrase "Women and children first," represent the mortality experience of passengers on the Titanic.

Exercise 3: (5 minutes)

For each of the fractions shown below, indicate whether it is an incidence proportion, incidence rate, prevalence, or none of the three.

- A. Incidence proportion
- B. Incidence rate
- C. Prevalence rate
- D. None of the above

A

1.
$$\frac{\text{number of women in Study A who have died through last year from heart disease}}{\text{number of women initially enrolled in Study A}}$$

B

1.
$$\frac{\text{number of women in Study A who have died through last year from heart disease}}{\text{number of person-years contributed through last year by women initially enrolled in Study A}}$$

C

1.
$$\frac{\text{number of women in town A who reported having heart disease in recent health survey}}{\text{estimated number of women residents of Study A during same period}}$$

A

1.
$$\frac{\text{number of women in Study A newly diagnosed with heart disease last year}}{\text{number of women in Study A without heart disease at beginning of same year}}$$

C

1.
$$\frac{\text{estimated number of women smokers in State A according to 2004 Survey}}{\text{estimated number of women living in State A on July 1, 2004}}$$

D

1.
$$\frac{\text{number of women in State A who reported having heart disease in 2004 health survey}}{\text{estimated number of women smokers in State A according to 2004 Survey}}$$

Exercise 4: (5 minutes)

Classify each of the following studies:

- A. Experimental
- B. Observational cohort
- C. Observational case-control
- D. Observational cross-sectional
- E. Not an analytical or epidemiologic study

D 1. Representative sample of residents were telephoned and asked how much they exercise each week and whether they currently have (have ever been diagnosed with) heart disease.

B 1. Occurrence of cancer was identified between April 1991 and July 2002 for 50,000 troops who served in the first Gulf War (ended April 1991) and 50,000 troops who served elsewhere during the same period.

C 1. Persons diagnosed with new-onset Lyme disease were asked how often they walk through woods, use insect repellent, wear short sleeves and pants, etc. Twice as many patients without Lyme disease from the same physician's practice were asked the same questions, and the responses in the two groups were compared.

A 1. Subjects were children enrolled in a health maintenance organization. At 2 months, each child was randomly given one of two types of a new vaccine against rotavirus infection. Parents were called by a nurse two weeks later and asked whether the children had experienced any of a list of side-effects.

Exercise 5: (10 minutes)

In a study concerned with the possible effects of air pollution on the development of chronic bronchitis, the following data were obtained. A population of 9,000 men aged 45 years was examined in January 2010. Of these, 6,000 lived in areas where they were exposed to air pollution and 3,000 did not. At this examination, 90 cases of chronic bronchitis were discovered, 60 among those exposed to air pollution. All the men initially examined who did not have chronic bronchitis were available for subsequent repeated examinations during the next 5 years. These examinations revealed 268 new cases of chronic bronchitis in the total group, with 30 among those unexposed to air pollution.

1. The prevalence of chronic bronchitis in January 2010:

- A. 0.05%
- B. 1%
- C. 2%
- D. 3%

2. The incidence (per 1,000) of chronic bronchitis for the 5 years among those exposed to air pollution:

- A. 30.1
- B. 10.0
- C. 10.1
- D. 40.1

3. The incidence (per 1,000) of chronic bronchitis for the 5 years among those unexposed to air pollution:

- A. 30.0
- B. 10.0
- C. 10.1
- D. 40.1

4. The incidence (per 1,000) of chronic bronchitis for the 5 years in the total population:

- A. 30.1
- B. 10.0
- C. 10.1
- D. 40.1

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441 ☐ ☐



Team Leaders:

Shahad Alaskar
Reema Alquraini
Lina Alyahya

Qusay Alsultan
Hassan Alabdullatif



The amazing Members:

Farah alhalafi
Sara almajed
Norah Alrashoud
Hoor aloraini
Mohammed Alzeer
Shahad Albukhari
Walaa AlMutawa
Meznah alshammari
deema alqahtani
Fatima halawi
raghad alkhodair
Amani Alotaibi
Nouf Aldhalaan
Reema AlJabarin
Reema Alhussien

Sarah Alzahrani
Raid almadi
Rayan alahmari
Mayssar Alshobaki
Kadi aldossari
nora bin hammad
Mayssam Aljaloud
Rahaf Almotairi
Lana Alhumaidhi
Jana Alhazmi
Yazeed Alsanad
Safia Aldkhyyl
Haifa Almuddahi
Omar Kadhi
Saad Alsahli