

## Chapter 6 Exercises

1. A study was conducted to evaluate the association between benzene exposure and leukemia. Employment records identified 10,000 workers who were occupationally exposed to benzene in the 1980s and 14,000 workers who were not occupationally exposed to benzene. These records were subsequently linked with cancer registries to identify cases of leukemia from 1990 to 2000. During this time there were 250 cases of leukemia among the benzene-exposed workers and 120 cases among the unexposed workers.

	Leukemia	No Leukemia	Total
Benzene			
No Benzene			
Total			

- What kind of a study is this?
- Fill in the above table.
- What is the risk of leukemia among workers who were exposed to benzene?
- What is the risk of leukemia among workers who were not exposed to benzene?
- Calculate the risk ratio.
- Calculate the 95% confidence interval for the risk ratio.
- Interpret the finding in one sentence.
- Calculate and interpret the risk difference and its 95% confidence interval in the above example.

2. In Nairobi, Kenya, a study of mother-to-infant transmission of HIV during breastfeeding was conducted. Researchers recruited a group of 500 mother-infant dyads who were breast-fed and 500 mother-infant dyads who were formula-fed. Two years later, the children were tested for HIV. 190 of the breast-fed infants had seroconverted (became HIV-positive), while 100 formula-fed infants had seroconverted. The 500 breast-fed dyads contributed 450 person-years of observation and the 500 formula-fed dyads contributed 600 person-years of observation.

	Infant HIV+	Infant HIV-	Total # subjects	Total PYO
Breast-fed				
Formula-fed				
Total				

- a. What kind of a study is this?
- b. Fill in the above table.
- c. What is the risk of HIV transmission among the breast-fed infants?
- d. What is the risk of HIV transmission among the formula fed infants?
- e. Calculate and interpret the risk ratio and its 95% confidence interval.
- f. Calculate and interpret the rate ratio and its 95% confidence interval.
- g. Which measure is a better estimate of the actual association between breastfeeding and HIV transmission and why?

h. Calculate and interpret the rate difference and its 95% confidence interval.

3. A case-control study was conducted to assess the relationship between multiple sex partners and Kaposi's sarcoma, a cancer transmitted by human herpesvirus 8. Cases were men age 24 to 40 who had been diagnosed with Kaposi's sarcoma during the six months prior to study recruitment. A group of men who had never been diagnosed with Kaposi's sarcoma were selected as controls.

		Cases	Controls	Total
Multiple sex partners	Yes	201	109	310
	No	116	344	460
	Total	317	453	770

- a. What are the odds of exposure among cases?
- b. What are the odds of exposure among controls?
- c. Calculate and interpret the exposure odds ratio for these data.
- d. Calculate and interpret the disease odds ratio for these data.
- e. Calculate and interpret the 95% confidence interval for the above odds ratios.
- f. Based on these data, would 3.75 be a reasonable estimate of the odds ratio of Kaposi's sarcoma comparing men who have multiple sex partners with men who do not? Why or why not?
- g. Why can't we calculate a risk ratio in this study?

4. In the following example, we will explore when the odds ratio will approximate the risk ratio.

Cohort study A:

	Diseased	Not Diseased	Total
Exposed	5	195	200
Unexposed	10	790	800
Total	15	985	1000

- a. Calculate the risk ratio
- b. Calculate the odds ratio
- c. Does the odds ratio do a good job of approximating the risk ratio?

Cohort study B:

	Diseased	Not Diseased	Total
Exposed	100	100	200
Unexposed	200	600	800
Total	300	700	1000

- d. Calculate the risk ratio
- e. Calculate the odds ratio
- f. Does the odds ratio do a good job of approximating the risk ratio?
- g. What changed from Cohort A to Cohort B?
- i. When does the OR do a good job of approximating the RR?