

KINE 6410
Assignment 3

Please answer the questions below by referring to the article by Freudenheim J et al. "Exposure to breastmilk in infancy and the risk of breast cancer". *Epidemiology* 1994;5:324-331.

1. What is the study design? State 2 advantages and 2 disadvantages of this study design.
2. What is the dependent variable? What is the independent variable?
3. Find an example from the paper for each of the following (quote enough of the words to identify the point or passage)
 - a) A finding from a migrant study or studies
 - b) A finding from descriptive epidemiological study
 - c) An association from an ecologic study.
4. In this study, controls were selected by a random process from residents of the two counties. Describe a reason for preferring community controls over hospital-based controls for this study.

To answer the question below; you will need to know the information below:

The term validity: Relates to whether the test measures what it is supposed to measure.

Below is an example:

TEST RESULT	DISEASE STATUS		
	+	-	TOTAL
+	a 80	b 90	a+b 170
-	c 20	d 810	c+d 830
TOTAL	a+c 100	b+d 900	a+b+c+d 1000

a is referred to as true positive

b is referred to as false positive

c is referred to as false negative

d is referred to as true negative

The validity measures that are usually calculated are the following:

Sensitivity

- The probability that the test will be positive if the disease is present.
- = $a/a+c = 80/100=80\%$

Specificity

- The probability that the test will be negative if the disease is truly absent.
- = $d/b+d = 810/900= 90\%$

Positive predictive value

- The probability of truly having the disease when a screening test is positive.
- $a/a+b = 80/170 = 47\%$

Negative predictive value

- The probability of truly not having the disease when the screening test is negative
- $d/c+d = 810/830 = 98\%$

5. Assume this hypothetical validation study that assessed the validity of self-report of being breastfed as an infant: presence of a newly discovered antibody that indicates whether a person was breast fed as an infant. So, this antibody is referred to as “gold standard” meaning that it is the correct true categorization of whether a person was breast fed as an infant or not). Testing for the presence of this new antibody is very expensive and was done only on the 204 cases age 40-50 (table 1). Data from this validation study showed the following: the breastfed antibody was found in 73.5% cases. 80 self-reports were false negative
Construct an appropriate 2x2 table. Calculate the sensitivity, specificity, positive predictive value, and negative predictive value.
6. Indicate if the statement below is TRUE OR FALSE and state in one line the reason:
 - a. By matching the controls to the cases on age, the authors have ensured that age will not be a confounding variable for the relation under study.
 - b. Frequency matching by age did not work because of the fact that premenopausal controls who had been breastfed were somewhat older than controls who had not (page 325, bottom of col. 2).
 - c. Selection bias from the low response rates for cases and controls might have biased the absence of an association between age and breast cancer in tables 1 and 2.
 - d. The variables included in the logistic regression model (page 325, middle of column 2) are examples of effect modifiers tested in this model.
7. Suppose that cases who refused to participate in this study were less likely to have been breastfed as infants than those who participated in the study. Whereas controls who refused to participate were similar to the control group in terms of breast feeding exposure. Would you be able to predict how the observed OR would be compared to the true OR? If yes; explain what you expect.