

435 PHCL

Lab Activity 6: Medical surveillance and disease outbreak

Group name: -----

Q1: Through December 31, 1999, 12 students started using albuterol 3 months into the study, and 18 students started using albuterol 6 months into the study. Of the remaining students in the study, 300 drop out after 4 months, and 600 drop out after 8 months.

- Calculate the incidence rate in person-time unit.
- What does your answer means?

$$IR = \frac{30}{(12 \times 3 \text{ months}) + (18 \times 6 \text{ months}) + (300 \times 4 \text{ months}) + (600 \times 8 \text{ months}) + (1770 \times 12 \text{ months})}$$

$$IR = \frac{30}{27,384 \text{ person-months}}$$

$$= 0.0010955$$

$$= 0.11\% \text{ of students develop asthma per person-month}$$

To get the person-years equivalent, multiply 0.0010955 by 12 months per year, 0.013 students develop asthma per person-year.

$$IR = \frac{30}{2282} \text{ person-years} = 0.013$$

For every 100 person-years of observation, 1.3 students at college X develop asthma.

Q2: In the past month, Town A reported five new cases of HIV/AIDS. This brings the total number of HIV/AIDS cases this year to 26. In Town B, there were 10 new cases and over 100 total cases during the same time periods.

- Which town has more HIV/AIDS disease?
- Would the answer change if they were told the total population in Town A was 10,000 and Town B was 10 million?
- **Town A= 5/26=19%**

$$\text{Town B= } 10/100=10\%$$

- **After changing= prevalence= A= 26/10000=26%**
- **B= 100/1000000= 10%**

Q3: Five new cases of HIV/AIDS were reported. This brings the total number of active HIV/AIDS cases this year (2006) to 56; total population is 100,000 and population at risk of HIV/AIDS is 20,000

Suppose the actual time at risk for any one individual is estimated at 183 days per year (= 0.5 years per individual).

- Calculate Prevalence rate.

- What is the Cumulative Incidence for one year?
- what is Incidence Rate for person-years?
- Prevalence rate (P) = 56 active HIV/AIDS cases /100,000 total population
P = 56 per 100,000 (in 2006)
- Use 5 new cases and 20,000 at-risk individuals CI = 5/20,000 (=25/100,000)
- Use 5 new cases in numerator;
 - Adjust denominator: $20,000p \times 0.5y/p = 10,000$ person-years
 - IR = 5/10,000 (=50/100,000)

Q4: In the study of diabetics, 100 of the 189 diabetic men died during the 13-year follow-up period.

- Calculate the risk of death for these men.

Numerator = 100 deaths among the diabetic men

Denominator = 189 diabetic men

$$10^n = 10^2 = 100$$

$$\text{Risk} = (100/189) \times 100 = 52.9\%$$

Q5: The diabetes follow-up study included 218 diabetic women and 3,823 nondiabetic women. By the end of the study, 72 of the diabetic women and 511 of the nondiabetic women had died. The diabetic women were observed for a total of 1,862 person years; the nondiabetic women were observed for a total of 36,653 person years.

- Calculate the cumulative incidence and incidence rates of death for the diabetic and non-diabetic women.

For diabetic women, numerator = 72 and denominator = 1,862

Person-time rate = $72/1,862$

$$= 0.0386 \text{ deaths per person-year}$$

$$= 38.6 \text{ deaths per 1,000 person-years}$$

For nondiabetic women, numerator = 511 and denominator = 36,653

Person-time rate = $511/36,653 = 0.0139$ deaths per person-year

$$= 13.9 \text{ deaths per 1,000 person-years}$$

Q6: Using same university X as an example.

Assume that 3000 students are enrolled. 300 students have asthma before starting the year. Of the 2700 remaining students, 1400 students live in the city and 1300 students live in the country.

Of the students who live in the city, 200 develop asthma during the school year.

Of the students who live in the country, 100 students develop asthma during the school year.

- Calculate the cumulative incidence using 2 x 2 contingency table.
- Draw the table, and specify A, B, C and D.

Table 6-2. 2 x 2 Contingency Table Comparing City Living versus Country Living and the Development of Asthma

		ASTHMA		Total
		Yes	No	
LIVE IN THE CITY	Yes	200	1200	1400
	No	100	1200	1300
		300	2400	2700

First, to calculate the cumulative incidence of asthma in the exposed group (students who live in the city)

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$$CI_{\text{exposed}} = \frac{A}{A + B}$$

$$CI_{\text{exposed}} = \frac{200}{1400}$$

$$= 0.1428$$

= 14.28% of students living in the city develop asthma per year

Next, to calculate the cumulative incidence of asthma in the unexposed group (students who do **not** live in the city)—

$$CI_{\text{unexposed}} = \frac{C}{C + D}$$

$$CI_{\text{unexposed}} = \frac{100}{1300}$$

$$= 0.0769$$

= 7.69% of students living in the country develop asthma per year