

Epidemiology: HLSC 2003  
In-Class Group Assignment 1

Group ID: \_\_\_\_\_

Group Members in Attendance (\*do not include names of those who are absent from class\*)

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_

1. Based on attached document "Tuberculosis: An Overview," **and** your understanding of Tuberculosis, what would be some of the key **determinants** affecting the spread and outcomes of this infectious disease? Please describe at least one determinant from each of the four determinant categories (4 marks)

Biologic – Latent infections – duration and potential activation, multi-drug resistance, co-infections, airborne and remain suspended for several hours, difficult treatment

Environmental – Crowded housing, lack of surveillance of TB, globalization, poor air quality, no access to diagnostics and treatment options,

Individual – understanding of the spread of disease, individual choices around screening and prevention, susceptibility (lack of immunity/HIV), age, history, ethnicity,

Social – poverty, cultural views on medical treatment, family support, social housing (living in large groups together), high levels of TB in community. Immigrant status, homelessness,

2. For each of the following ratios, indicate whether it is a measure of cumulative incidence, incidence rate, or prevalence.

- a. 
$$\frac{\text{\# of women in a study who died from COPD during the study period}}{\text{\# of women who were initially enrolled in the study}}$$

ANSWER: Cumulative Incidence

- b. 
$$\frac{\text{\# of women in survey population who reported having COPD}}{\text{\# of women in the entire population surveyed}}$$

ANSWER: Prevalence

- c. 
$$\frac{\text{\# of women diagnosed with COPD in the population in the year}}{\text{Population on July 1<sup>st</sup> of that same year}}$$

ANSWER: Incidence Rate (using routine data)

Answer the following questions using the table below:

	Population Size	Regular Alcohol Drinkers
Males	104,919	59,300
Females	112,855	44,373

3. a) What percentage of regular alcohol drinkers are women? (1 mark)

$$59300 + 44373 = 103673 \text{ regular drinkers}$$

$$44373 / 103673 \times 100 = \mathbf{42.8\%}$$

b) What is the prevalence of regular alcohol consumption among men?

$$\text{Men} = 59300 / 104919 = 0.5652 \times 100 = \mathbf{56.5\%}$$

c) What proportion of the entire population are regular drinkers of alcohol?

$$\text{Total population} = 103673 / 217774 = 0.4761 \times 100 = \mathbf{47.6\%}$$

4. The population of Metroville was **3,187,463** in 2012. During the period Jan 1, 2012 - Dec 31, 2012 a total of **4,367** city residents were documented as being infected with HIV. This included **768** new cases of HIV diagnosed in 2012.

a) Calculate the prevalence of HIV per 100,000 in Metroville in 2012. (1 mark)

- $4367 / 3187463 = 0.00137 \times 100,000 = \mathbf{137 \text{ per } 100,000 \text{ persons (OR } 13.7 \text{ per } 10,000 \text{ OR } 1.4 \text{ per } 1000)}$

b) Calculate the cumulative incidence of HIV in Metroville per 100,000 in 2012. (1 mark)

- $4367 - 768 = 3599 \text{ diagnosed before 2012 and not at risk of acquiring HIV in time period identified.}$

- $\text{Denominator} = 3,187,463 - 3599 = \mathbf{3,183,864}$

- $\text{Cumulative incidence} = 768 / 3,183,864 = 0.00024 \times 100,000 = \mathbf{24 \text{ per } 100,000 \text{ persons}}$

c) Based on the above information, 17.5% of the total number of prevalent cases in 2012 were diagnosed in 2012. Knowing that HIV has a life-time prevalence, how might you explain the large number of diagnosed cases within that year (give two potential answers)? (2 marks)

- Introduction of a screening program for HIV/AIDS
- HIV/AIDS epidemic (various reasons for this)
- Increase public awareness and attention (surveillance)
- In-migration of refugees infected with HIV

5. In 2003, a study tested 4000 men and found 100 already had an endocrine neoplasm (an abnormal mass of tissue growing on one of the endocrine glands). Ten years later all 4000 men were again tested, and another 200 had developed an endocrine neoplasm.

- a) Assuming 43 of the original 100 who had the disease in 2003 were cured, what was the **prevalence** of endocrine neoplasm in this sample in 2013? (2 marks – calculation & interpretation)

Calculate numerator  $100 - 43 = 57$  (from those originally diagnosed) + 200 additional cases  
Denominator = 4000 (all were retested)  
Prevalence =  $257 / 4000 = 6.4\%$  or 64 per 1000 people

- b) What was the cumulative incidence of endocrine neoplasm in this sample in 2013? (1 mark)

$200 / 3900 = 51$  cases of neoplasm per 1000 people

- c) Assume that, on average, each of the 200 men who developed an endocrine neoplasm during the study did so half-way through the 10-year follow-up period. What was the incidence rate of endocrine neoplasm in this study? (2 marks)

Step 1: Calculate the Denominator

- 200 men who developed an endocrine neoplasm x 5 yrs = 1000 p-ys
- 3900 men at risk during time period – 200 who developed disease in 5 years =  $3700 \times 10$  yrs = 37,000 p-ys
- $37,000 + 1000 = 38,000$  p-ys

Step 2: Calculate Incidence Rate

- $200 / 38,000 \text{ p-ys} = 0.00526 \times 1000 = 5.26$  cases of male endocrine neoplasm per 1000 person-yrs.

6. What effect would the following have on incidence and prevalence within a population over time (increase, decrease, or no change)?

Action	Incidence	Prevalence
The introduction of a new drug that prolongs survival but does not cure a fatal disease.	No change	increase
The introduction of a new vaccine that prevents people from acquiring the disease.	Decrease	Decrease

Adoption of a health-behaviour within a population that contributes to chronic disease	Increase	Increase
The introduction of a new drug that cures a previously incurable but non-fatal chronic disease.	No change	decrease