

### Exam

#### Key terms:

Crude Rate = total # of events ÷ population size (not adjusted).  
 Limitation: Does not consider age, sex, or other differences.  
 Adjusted Rate = rate modified for a factor (like age) to allow fair comparison. Specific Rate = rate for subgroup (e.g., age-specific, cause-specific).

#### Data Presentation:

Tables: rows/columns with cases + totals. Graphs: histogram, line graph, pie chart. Epidemic Curve: shows outbreak start, peak, decline.

#### Study Desing:

Cohort Study → gives incidence & RR. Case-Control → gives OR.  
 Cross-Sectional → gives prevalence.

#### Standardization of Rates:

Needed to fairly compare groups (ex: young vs. old populations).  
 Crude rate: overall, unadjusted. Specific rate: subgroup (age-specific, sex-specific). Adjusted rate: mathematically corrected (direct/indirect standardization).

#### Key Notes:

High prevalence, low incidence → disease lasts long. Low prevalence, high incidence → short disease duration or fast death/cure.  
 Rates help show risk factors, prevention targets, health priorities.

Incidence = Incoming cases Prevalence = Present cases Mortality = Memory of deaths

#### Descriptive vs Analytic Epidemiology

Descriptive epidemiology = Who, what, when, where. → describes distribution of health events (person, place, time). → Helps generate hypotheses. Analytic epidemiology = Why, how → studies determinants and risk factors. → Tests hypotheses.

#### Prevalence-

Focus: existing cases of disease. Tells how common disease is in a population. Two types: Point prevalence (specific time point)  
 Period prevalence (time interval, ex: last year).

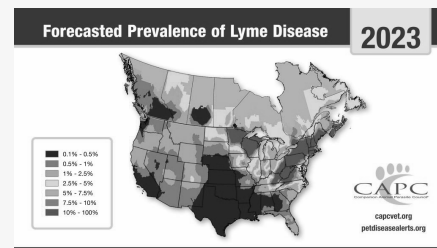
#### Ecological Fallacy:

Definition: Making wrong conclusion about individuals based on group data. Example: Countries with more doctors per person have lower mortality. But not every individual in that country sees a doctor.

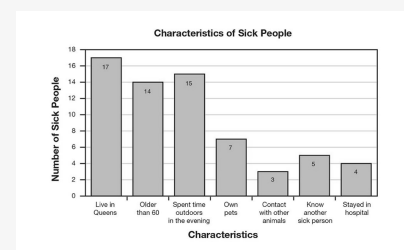
### Exam (cont)

(Study), What It Does--Strength--Weakness (Case Report), One patient unusual disease--Fast, simple--Cannot generalize (Case Series), Many cases same disease--Detect patterns--No comparison group (Cross-Sectional), Snapshot of exposure + disease--Cheap, shows prevalence--Cannot tell cause-effect (Ecologic), Group-level data compare (e.g., country rates)--Easy, large data--Ecologic fallacy (group ≠ individual)

#### Spot/Area Map:



#### Histogram



#### Incidence Rate (IR):

$IR = \frac{\text{New cases} + \text{Population at risk}(\text{overtime})}{\text{New cases} + \text{Population at risk}(\text{overtime})}$  → shows risk of getting disease. Cumulative Incidence: Proportion of people who develop disease during time period. Prevalence (P):  $P = \frac{\text{Existing cases} + \text{Total population}}{\text{Existing cases} + \text{Total population}}$  → shows burden of disease. Mortality Rate (MR):  $MR = \frac{\text{Deaths} + \text{Population}}{\text{Deaths} + \text{Population}}$  → describes severity of disease. Person-Time: Accounts for different lengths of follow-up. Example: 100 people followed for 1 year = 100 person-years.

#### chronic conditions and their risk factors

Osteoporosis- Estrogen

Respiratory/asthma- Asbestos

Dermatologic- Arsenic



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### Obesity tied to several health problems

Heart disease

Depression

Type 2 Diabetes

Stroke

Colon Cancer

### What is?

Host- the living thing that germs use to survive. example: If a person catches the flu, that person is the host because the flu virus is living and growing inside their body.

Agent- the "troublemaker" that starts the sickness. example: The influenza virus, which causes the flu

Environment- everything around us that helps or blocks disease spread. example: Warm climate + presence of mosquitoes + stagnant water

### References

Rothman, K. J., Greenland, S., & Lash, T. L. (2021). Modern Epidemiology (4th ed.). Wolters Kluwer.

Merrill, Ray M. Introduction to Epidemiology. 9th ed., Jones & Bartlett Learning, 2022.

Class Chapter 4 Quiz(12 Q)

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