PREVENTIVE MEDICINE REVIEW

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PLE

Time	Day 1	Day 2	Day 3	Day 4
8:00 –10:00 AM	Biochemistry	Physiology	Pharmacology	Pediatrics & Nutrition
10:00 –11: AM	BREAK			
11:00 AM – 1:00 PM	Anatomy & Histology	Legal Medicine & Jurisprudence	Internal Medicine	Obstetrics & Gynecology
1:00 – 2:00 PM	BREAK			
2:00 – 4:00 PM	Microbiology & Parasitology	Pathology	Surgery	Preventive Medicine & Public Health

SCOPE OF PREVENTIVE MEDICINE

- Epidemiology and biostatistics
- Public Health and Preventive medicine
- Research Methodology
- Family and Community Health Care
- Environmental Sanitation
- Occupational Health Practice
- Herbal medicine and nutrition

PREVENTIVE MED REFERENCES

- Foundations of Statistical Analysis for Health Sciences by Ophelia Mendoza, Maridel Borja, Caridad Ancheta. Ofelia Saniel. Jesus Sarol
- Research Methods in Health and Medicine (Philippine Council for Health Research and Development), Department of Science and Technology, Volume I by F.S. Sanchez, S.I. Morelos, J.C. Baltazar
- Reading in Preventive Medicine II (UST, Dept. of Preventive and Social Medicine)
- Bioethics by A. Angles Tan-Alora, MD
- The Implementing Rules And Regulations of the National Health and Insurance Act of 1995.
- Epidemiology Manual by Dr. Rosa Santos-Carreon (UST)
- Lectures and manuals on Preventive Medicine from different Philippine Medical Schools

OBJECTIVES

- Discuss basic concepts of biostatistics and classical epidemiology
  - Reporting population characteristics
  - Methods in documenting disease frequency
  - Graphical representation of variables
  - Research designs on distribution and determinants of diseases
- Enumerate techniques in evaluating the validity and results of research findings
  - Conduct of statistical testing
  - Evaluation of systematic errors: confounding and biases
  - Evaluation of random errors
- Provide a summary on preventive medicine in a public health context
  - Different levels of prevention
  - Model of causation in disease prevention and control

1. A rise in the median age of the population is attributed to:

a. Demographic transition

b. Demographic aging

c. Demographic instability

d. Demographic momentum

DEMOGRAPHY

Scientific study of human populations – size, composition and distribution – and the process by which populations change

Three major operators:

1. Natality
2. Mortality
3. Immigration/ Emmigration

POPULATION SIZE

Sources of data:

- Population Census: total process of collecting data at a specified time, to all persons in a delimited territory

- Vital Registration Systems: governmental machinery setup for legal reporting of vital events

POPULATION COMPOSITION

- Median Age
- Age-dependency ratio
- Sex ratio

MEDIAN AGE

- Age that divides the population into two numerically equal groups
- Half of the people are younger than this age and the other half are older
- The lower the median age, the younger is the population
- Most developing countries have lower median age

MEDIAN AGE

Interpretation:

Fifty percent of the population in _____ is _____ years old or younger while the other 50% is older than _____

Median Age of Selected Asian Countries, 2015

Country	Median
Japan	46.54
Hong Kong	43.22
South Korea	40.46
Singapore	38.68
Thailand	37.97
Brunei	31.14
Vietnam	30.73
Indonesia	28.35
Malaysia	28.25
Cambodia	25.01
Philippines	23.41
Laos	22.04

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POPULATION COMPOSITION

Age dependency ratio

- People aged 15-64 years old are considered economically productive
- Dependent segment:
  - Children (0-14 y.o.)
  - Elderly (≥65 y.o.)
- Calculation:

$$\frac{(no.\,of\ persons\ 0-14 y.o. + no.\,of\ persons\ \geq 65 y.o)}{number\ of\ persons\ 15-64\ y.o}$$

- Indicator of age-induced economic drain on human resources

Sex ratio

- Computed by dividing the number of males by the number of females using a factor of 100
- Interpreted as the number of males for every 100 females

POPULATION DISTRIBUTION

Common indicators

- % Distribution in urban areas
- Population density
- Crowding index

2. The following rates use the estimated total mid-year population as the denominator, EXCEPT:

a. Crude birth rate
b. Sex-specific mortality rate
c. Crude death rate
d. Cause-specific death rate

TYPES OF HEALTH INDICATORS

- **Crude rates**
  - Rate describes the total population, which is used as the denominator
- **Specific rates**
  - Rate describes only a specific subgroup if the total population being considered, hence the denominator includes only those belonging to a specific age, sex, occupation group etc

EXAMPLE OF CRUDE & SPECIFIC RATES

Health Indicator	Equation
Crude death rate	$\frac{total\ number\ of\ deaths\ (all\ cause)}{total\ population} x100$
Cause-specific death rate	$\frac{total\ number\ of\ deaths\ (due\ to\ dengue)}{total\ population} x100$
Crude birth rate	$\frac{total\ number\ of\ live\ births}{total\ population} x100$
Sex specific death rate	$\frac{total\ number\ of\ male\ deaths\ (all\ cause)}{total\ males} x100$

2. The following rates use the estimated total mid-year population as the denominator, EXCEPT:

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b. Sex-specific mortality rate
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d. Cause-specific death rate

3. Coronary Artery Disease (CAD) occurred at a rate of 131/1000 in a population of males aged 50-59 who had no previous CAD. This is an example of?

a. Prevalence rate
b. Case fatality rate
c. Incidence rate
d. Point prevalence rate
e. Crude disease rate

MEASURES OF DISEASE FREQUENCY: INCIDENCE AND PREVALENCE

Attribute	Incidence	Prevalence
Question being answered	How many people developed the disease?	How may people have the disease?
Events in numerator	Number of new cases of a disease	Number of existing (old + new) cases of a disease
Calculation	$\frac{no.\,of\ new\ cases\ that\ developed\ during\ the\ period}{population\ at\ risk\ during\ the\ period} x100$	$\frac{no.\,of\ individuals\ with\ the\ condition}{population\ size\ at\ that\ point\ in\ time} x100$

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4. A prolonged outbreak of varicella among students was declared. This began in September and continued through December of 2018. To calculate the probability of risk illness among the students, which denominator would you use?

a. Number of susceptible at the end of the period (ie. June)
b. Number of susceptible at the midpoint of the period (late October/early November)
c. Number of susceptible at the beginning of the period (ie. September)
d. Average number of susceptible students during the outbreak

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c. Number of susceptible at the beginning of the period (ie. September)
d. Average number of susceptible students during the outbreak

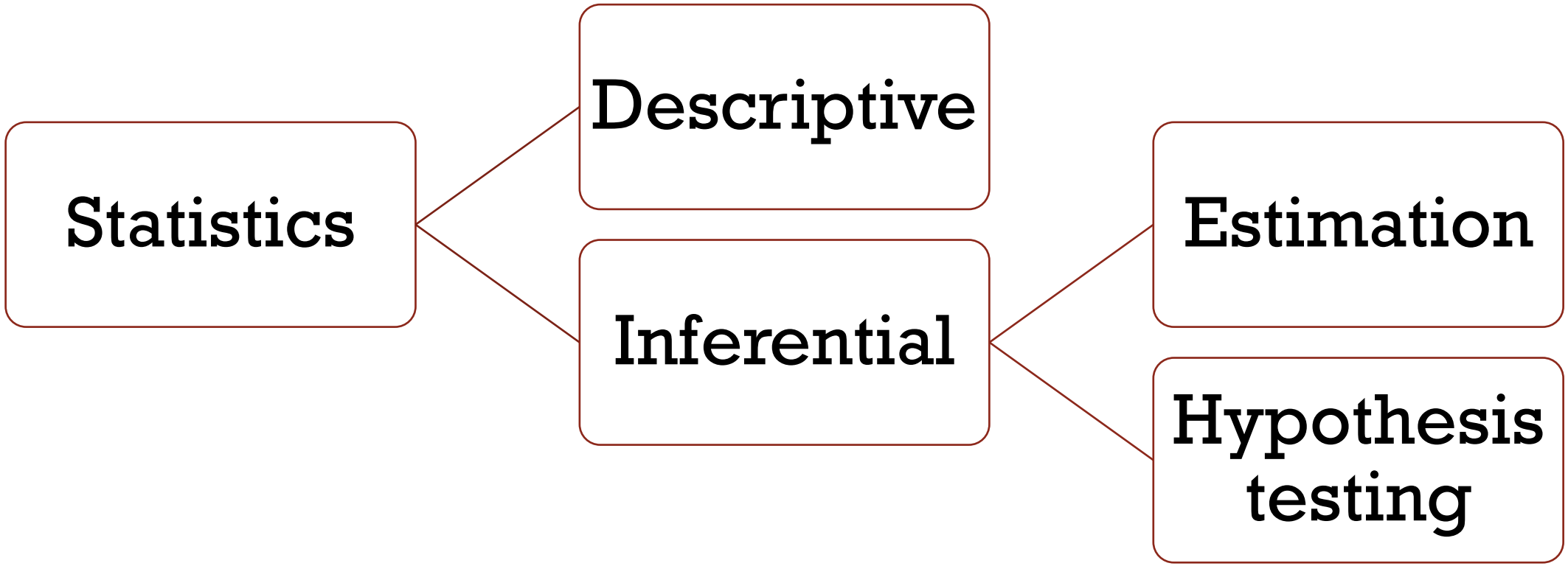
5. The mean of a sample is:

a. Always equal to the mean of the population
b. Always smaller to the mean of the population
c. Computed by summing all the data values and dividing the sum by the number of items
d. None of the above

BIOSTATISTICS

statistics	The systematic collection, processing, summarization, analysis, and interpretation of data
Biostatistics	Application of statistics in the life sciences

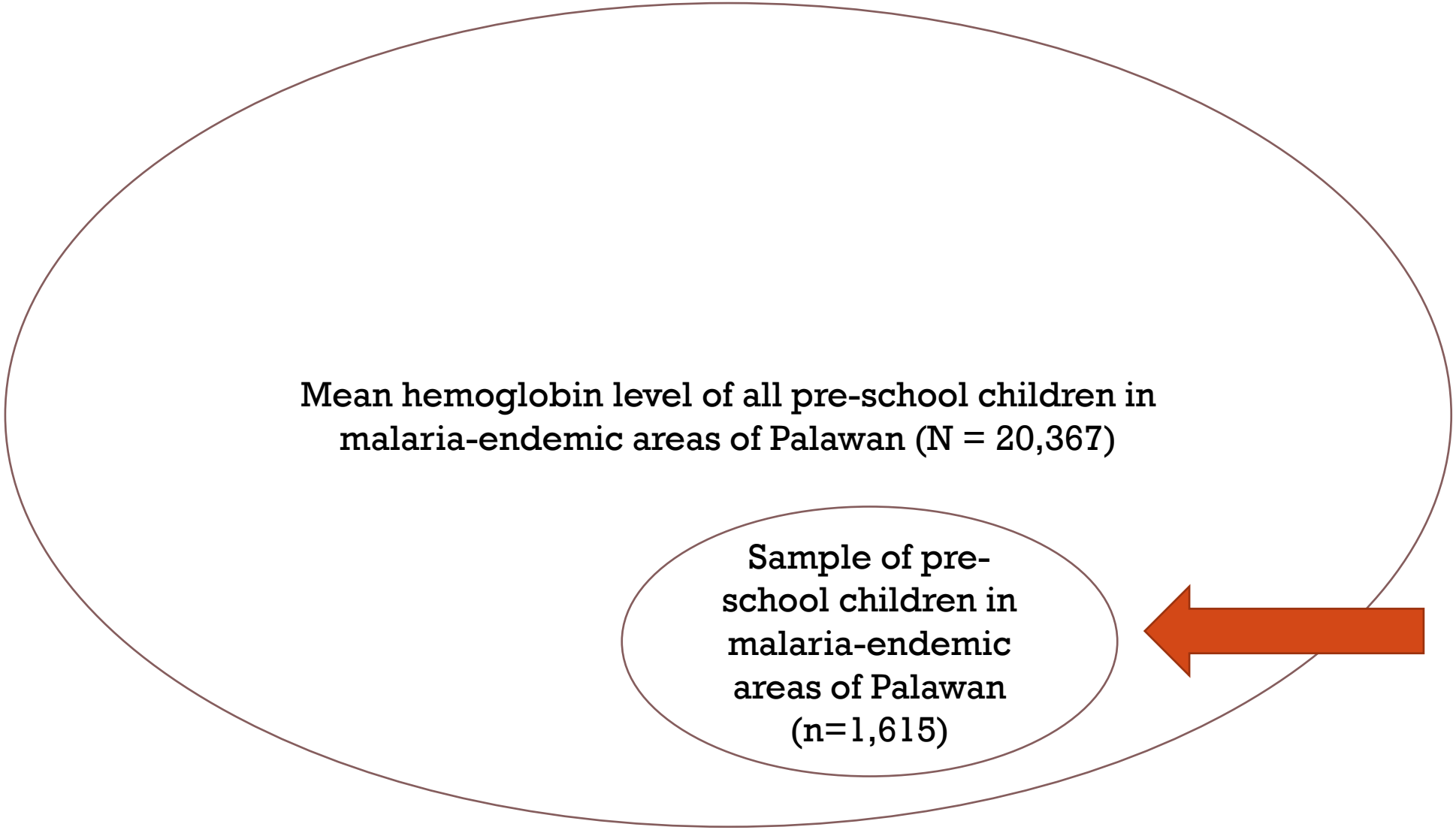
BRANCHES OF STATISTICS



BRANCHES OF STATISTICS

- Descriptive
  - Statistical techniques for summarizing and presenting data
  - E.g. summary measures (mean, frequencies), tables, graphs
- Inferential
  - Methods concerned with making generalizations and conclusions about a target population

Example: to determine the mean hemoglobin levels of pre-school children in malaria-endemic areas of Palawan



Use to infer to the target population

MEASURES OF CENTRAL TENDENCY

- Mean
- Median
- Mode

MEAN

$$\overline{X} = \frac{\sum_{i=1}^{n} x_i}{n}$$

Sum of observations (x_i) from the first to the nth observation

Number of observations

X_n	Weight
1	60
2	49
3	46
4	58
5	57
6	48
7	45
8	58
9	45
10	47

$$X = \frac{60 + 49 + 46 + 58 + 57 + 48 + 45 + 58 + 45 + 47}{10}$$

X = 51.3 kg

Interpretation:
The average weight of students is 51.3 kg

MEDIAN

The value that divides the set of data into two equal parts

Weight
60
49
46
58
57
48
45
58
45
47
49

Weight
45
45
46
47
48
49
49
57
58
58
60

Since the number of observations is odd, the median is the middlemost value in the arranged array of values

Interpretation:
50% of the students have weights ≥ 49 kg, while the other 50% have weights <49kg

MODE

Value which occurs most frequently

X_n	Address
1	Quezon City
2	Makati
3	Quezon City
4	San Mateo, Rizal
5	SJDM, Bulacan
6	Quezon City
7	SJDM, Bulacan
8	Quezon City
9	Quezon City
10	Quezon City
12	Antipolo

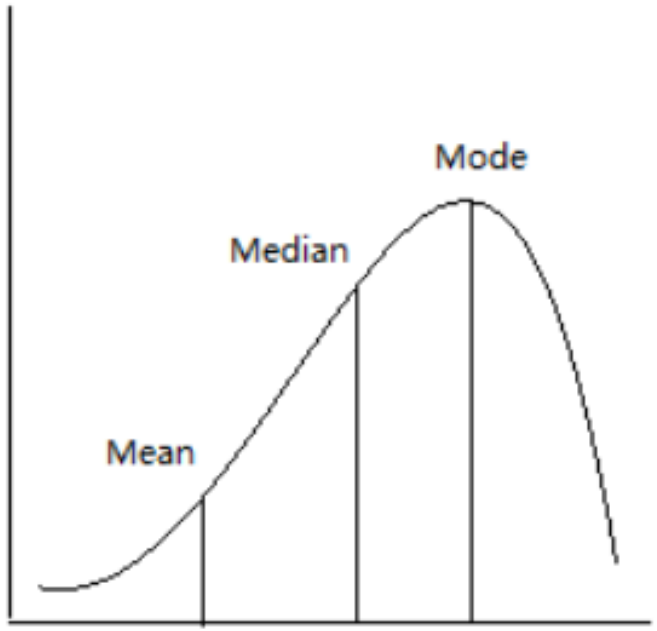
The most common (or most usual) address of students is Quezon City (6/11)

5. The mean of a sample is:

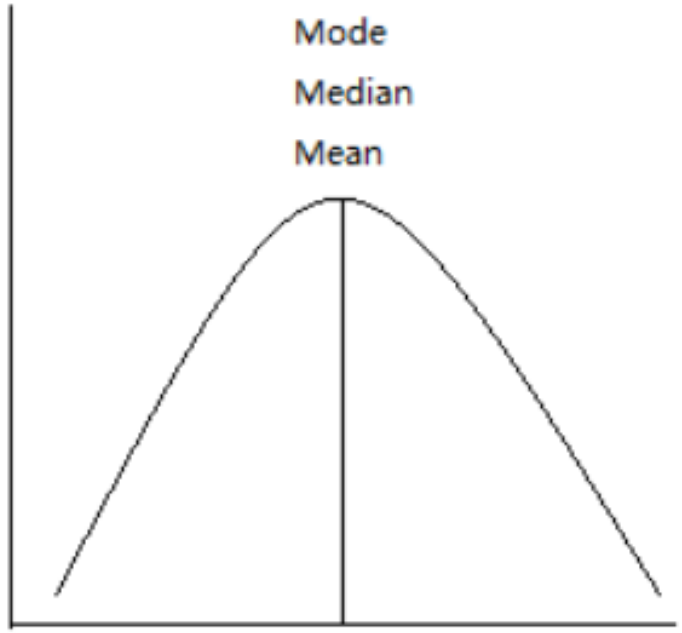
a. Always equal to the mean of the population
b. Always smaller to the mean of the population
c. Computed by summing all the data values and dividing the sum by the number of items
d. None of the above

6. Since the mode is the most frequently occurring data value, it

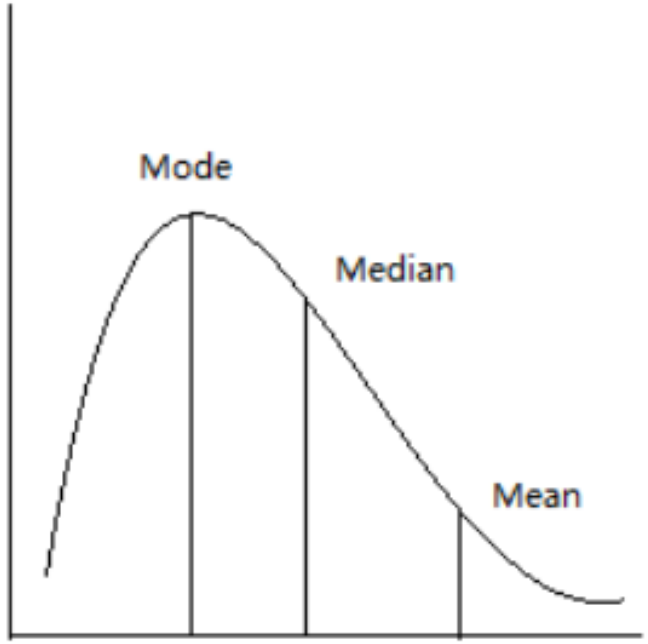
a. Can never be larger than the mean
b. Is always larger than the mean
c. Is always larger than the median
d. None of the above



Left skew



Normal Distribution



Right skew

7. The relationship between variance and standard deviation is that

a. The standard deviation is the square root of the variance
b. The variance is the square root of the standard deviation
c. The standard deviation is the variance divided by the square root of n
d. The variance is the standard deviation divided by the square root of n

MEASURES OF DISPERSION

Dispersion refers to the variety (or spread) exhibited by a set of observations

	Description	Equation
Range	Difference between largest and smallest value in a set of observations	$Range = max - minim\ value$
Variance (s^2)	Relate the scatter of values of a set of data to the mean	$s^2 = \frac{\sum(x - \bar{x})^2}{n - 1}$
Standard deviation (s)	Obtained by taking the square root of the variance	$s = \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}}$

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a. <u>The standard deviation is the square root of the variance</u>
b. The variance is the square root of the standard deviation
c. The standard deviation is the variance divided by the square root of n
d. The variance is the standard deviation divided by the square root of n

8. Two types of errors associated with Hypothesis testing are type I and type II. Type II error is committed when?
    a. The null hypothesis is rejected when the alternative hypothesis is true
    b. The null hypothesis is rejected when it is true
    c. Null hypothesis is not rejected when it is not true
    d. None of the above

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HYPOTHESIS TESTING

Hypothesis chosen	True state of nature	
	H_o	H_a
H_o	Correct decision	False negative decision (Type II error)
H_a	False positive decision (Type I error)	Correct decision

9. A study was conducted to investigate the relationship between birthweight (kg) and head circumference (cm) of neonates. A random sample of 88 newborns was weighed and simultaneously had their head circumference measured. The following statements are correct, EXCEPT:

a. A scatter diagram should be used to present the data
b. Head circumference measurements is a categorical variable
c. Simple linear regression could be used to describe the straight line relationship between birthweight and head circumference
d. Birthweight can be predicted by measuring head circumference as long as the relationship between these variables is linear

TYPES OF VARIABLES

Quantitative variables

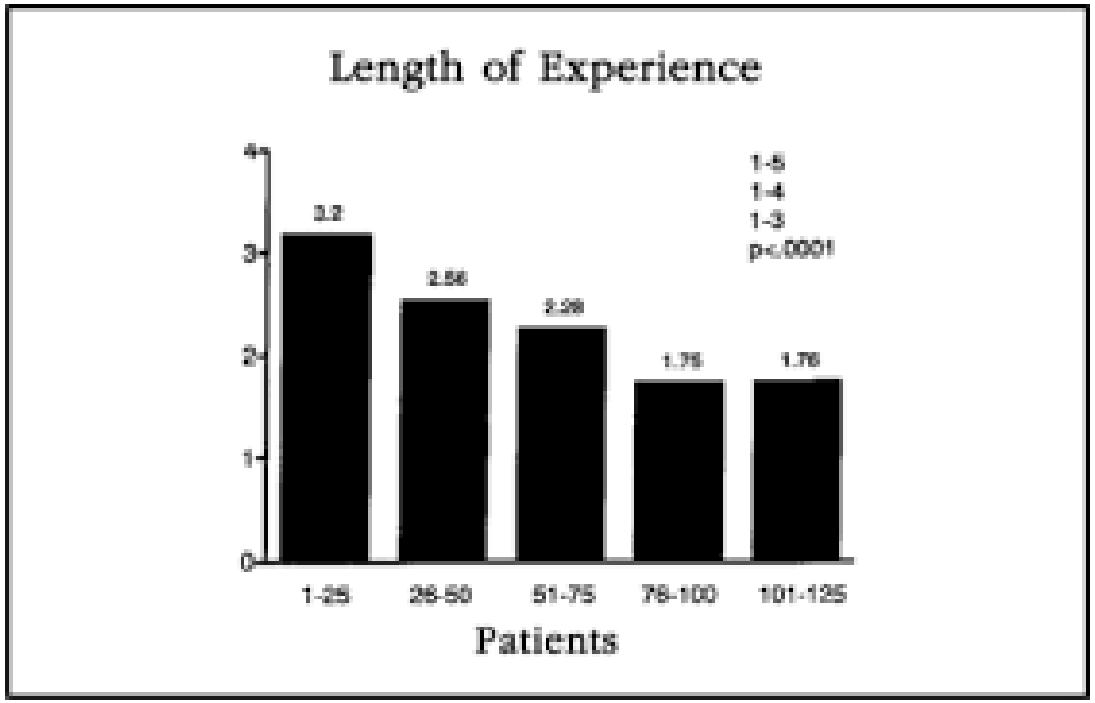
- Variables with numerical values
- Examples: Weight (kg), Height (cm), HbA1c, BP

- Qualitative (aka. Categorical variables)
  - Variables without numeric values, only categories
  - Examples: Sex, religion, Hair color, blood type

DATA PRESENTATION

- Bar graph
- Pie graph
- Line graph or time-series
- Scatter plot

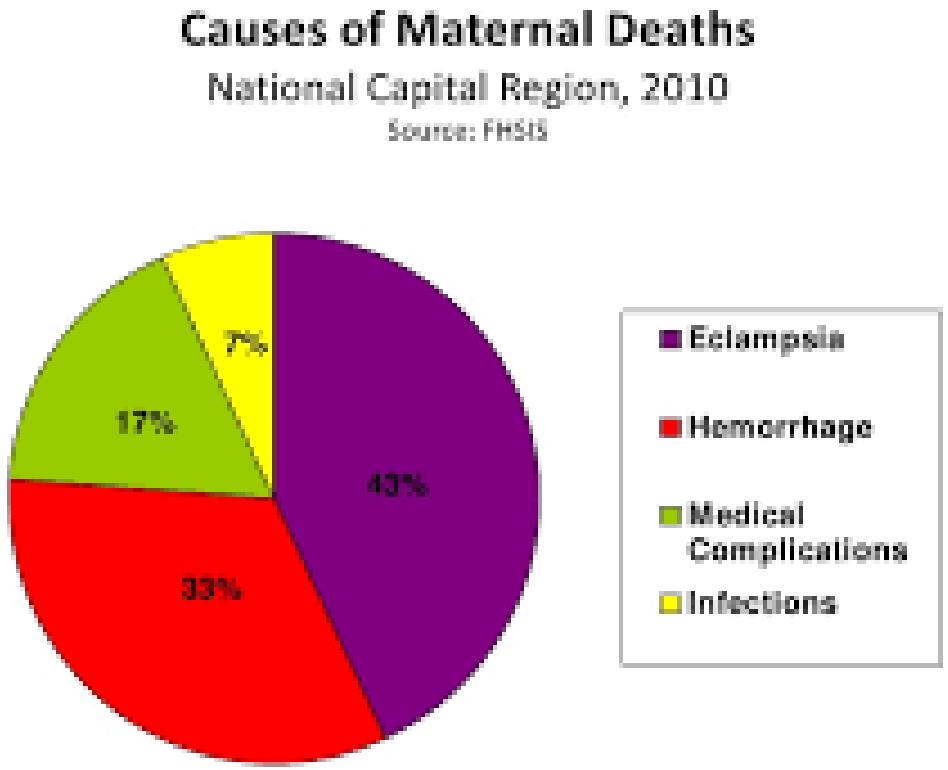
GRAPHICAL PRESENTATION: BAR GRAPH



Used to portray *quantitative measurements across categorical variables*

Consists of bars drawn vertically with gaps between them to *emphasize discontinuities*

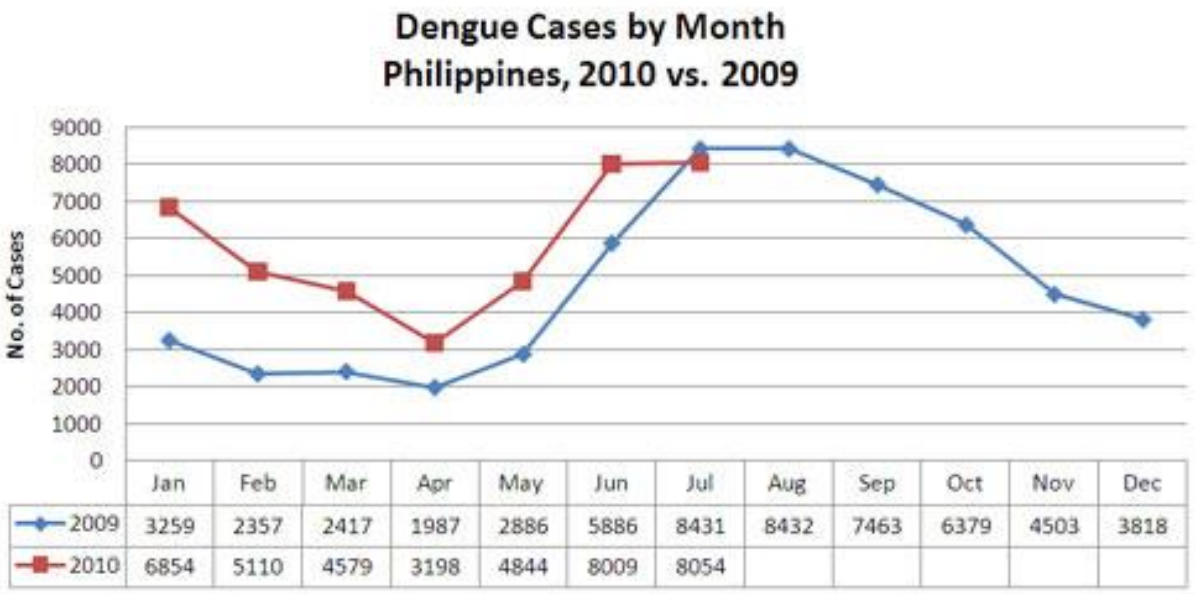
GRAPHICAL PRESENTATION: PIE GRAPH



Circular graph partitioned into several slices to represent the percentage of the total number of observations falling into each of the categories of the qualitative variable

Sum of all proportions must be equal to 100%

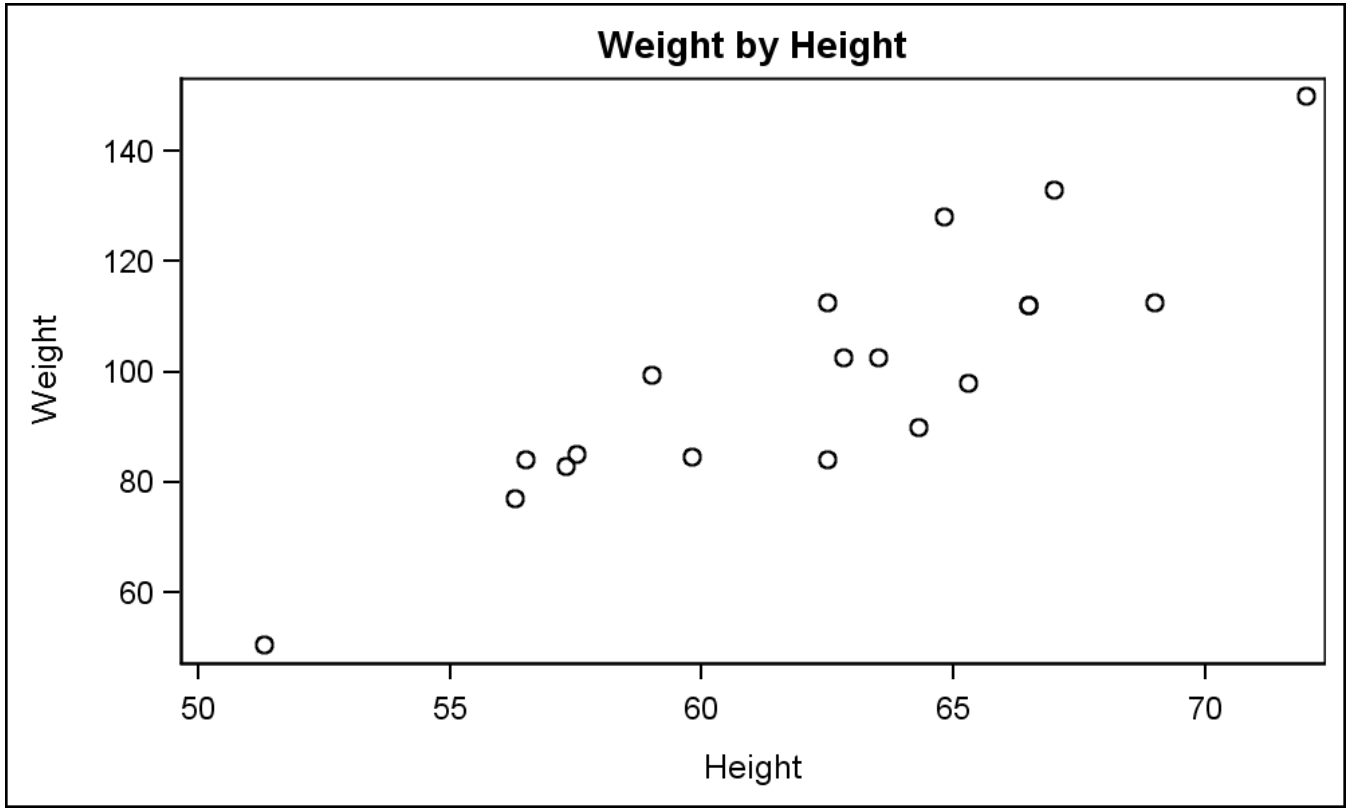
GRAPHICAL PRESENTATION: LINE GRAPH



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	3259	2357	2417	1987	2886	5886	8431	8432	7463	6379	4503	3818
2010	6854	5110	4579	3198	4844	8009	8054					

Sequential sequence of dots representing values of a *quantitative variable* over a *period of time* connected by a line depicting trends over time

GRAPHICAL PRESENTATION: SCATTERPLOT



Useful to display the relationship between two continuous quantitative variables

SELECTING A STATISTICAL TEST

Objective	Level of measurement		
	Interval/Ratio	Ordinal	Nominal
Describe one group	Mean, SD	Median, IQR	Proportion
Compare 2 unpaired groups	Unpaired t-test	Mann-Whitney test	Chi-square test
Compare 2 paired groups	Paired t-test	Wilcoxon test	McNemar's test

SELECTING A STATISTICAL TEST

Objective	Level of measurement		
	Interval/Ratio	Ordinal	Nominal
Compare 3 or more groups	One-way ANOVA	Kruskal-Wallis test	Chi-square test
Determine the correlation/ Association	Pearson correlation Linear regression	Spearman correlation	Chi-square test Logistic regression
Predict the value of the outcome based on factors	Linear regression	Nonparametric regression	Logistic regression

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10. A scatter plot is a graph of choice for plotting which data?

a. Systolic BP by eye color (brown, blue, green, other) measured in each person
b. Number of cases of dog bites by breed of the dog
c. Anabolic steroid levels measured in both blood and urine among a group of athletes
d. Mean cholesterol levels over time

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11. Which of the following study designs is the most appropriate for estimating the population prevalence of a disease?

a. Cohort study
b. Randomized controlled trial
c. Case-control study
d. Cross-sectional study

EPIDEMIOLOGY

*"The study of the **distribution** and **determinants** of **health-related states** and events in **specified populations**, and the application of this study to the **prevention and control** of health problems"*

Last (1988). *Dictionary of Epidemiology*

EPIDEMIOLOGY

DESCRIPTIVE

- **Distribution** of health-related states
  - Identifying the pattern of disease as to person, time, and place

ANALYTIC

- **Determinants** of health-related states
  - Understanding the causes or risk factors that led to the disease

EPIDEMIOLOGIC STUDY DESIGNS

Descriptive

Case report/ case series
Prevalence survey
Ecological studies

Characterize a phenomena

Analytical

Observational
- Cross-sectional study
- Case-control study
- Cohort study

Experimental
- Randomized controlled trials
- Field trials
- Community trials

Test a hypothesis on the relationship between an exposure(s) and an outcome(s)

ANALYTICAL STUDIES

Observational

- Cross-sectional study
- Case-control study
- Cohort study

→ Without manipulation of exposure variable

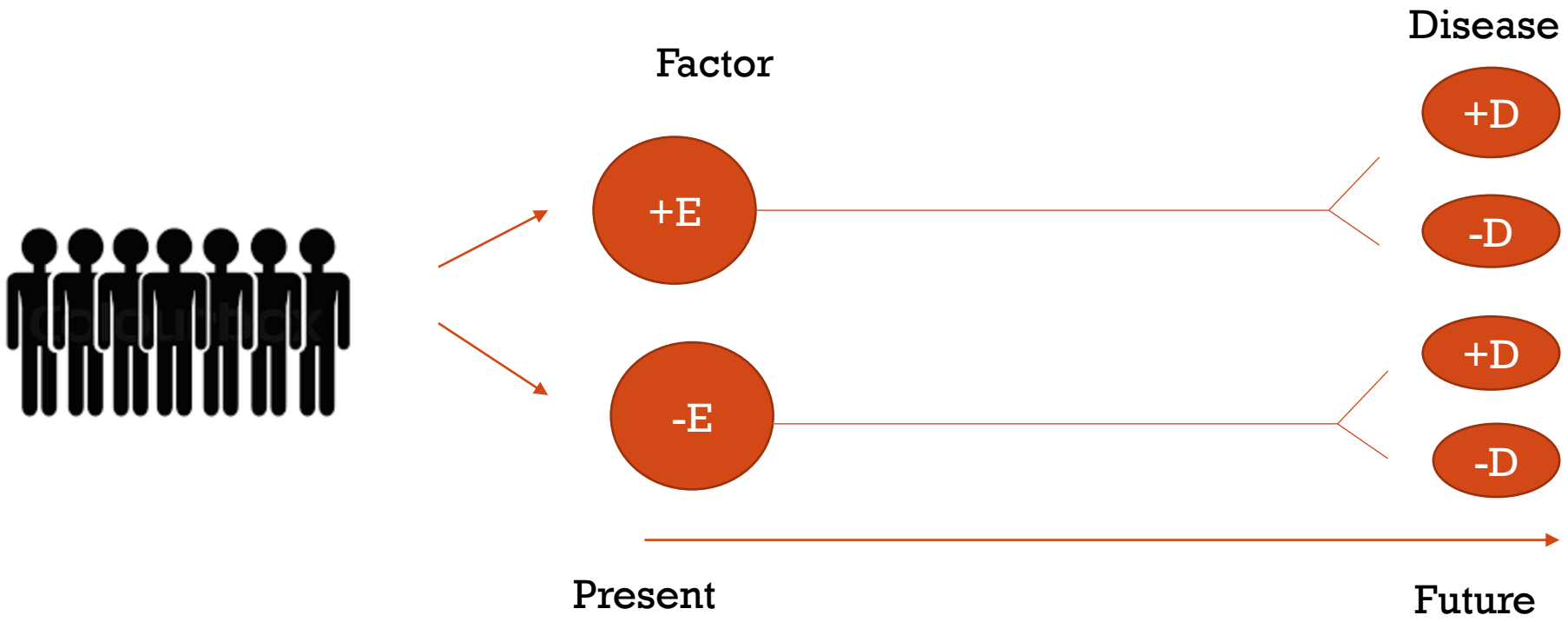
Experimental

- Randomized controlled trials
- Field trials
- Community trials

→ With manipulation of exposure variable

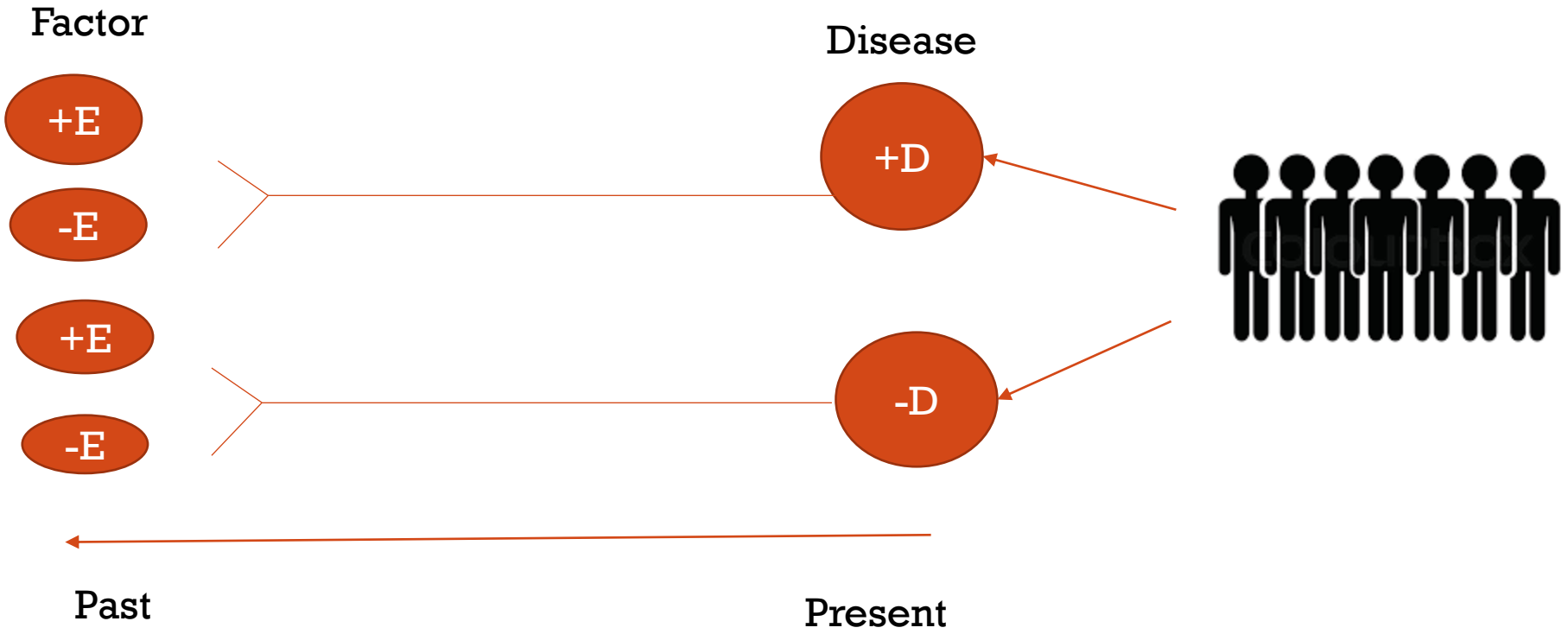
COHORT STUDY

	Classification
Hypothesis testing?	Analytic
Manipulation of exposure?	Observational
Direction of inquiry	Prospective
Time points of assessment of factor and outcome	Longitudinal



CASE-CONTROL (TROHOC) STUDY

	Classification
Hypothesis testing?	Analytic
Manipulation of exposure?	Observational
Direction of inquiry	Retrospective
Time points of assessment of factor and outcome	Longitudinal



CROSS-SECTIONAL STUDIES

	Classification
Hypothesis testing?	Analytic
Manipulation of exposure?	Observational
Direction of inquiry	N/A
Time points of assessment of factor and outcome	One point in time

+E
+D

+E
-D

-E
+D

-E
-D

11. Which of the following study designs is the most appropriate for estimating the population prevalence of a disease?

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12. A company physician plans to evaluate an exercise program offered to male employees at a large company. After its introduction, the rates of ischemic heart disease (IHD) events were compared between those who joined the program and those who did not. These events were ascertained via regular voluntary checkups that included comprehensive cardiovascular investigation. What study was employed? What would be the appropriate measure to quantify the risk?

a. Cross-sectional study using incidence proportion
b. Cohort study using incidence ratio
c. Cohort study using odds ratio
d. Case-control study using relative risk
e. Case-control study using odds ratio

DATA FOR ANALYSIS (2X2 TABLE)
MEASURE OF ASSOCIATION: RATIO MEASURES

	Case	Non-Cases	
Exposed	a	b	a+b
Unexposed	c	d	c+d
Total	a+c	b+d	n

Interpretation of ratio measures:

1: no association

>1: association present

<1: association present

ANALYSIS

Study Type	Association Measurement	Equation
Cohort	Incidence Rate Ratio	$\frac{a/(a+b)}{c/(c+d)}$
Case-control	Odds Ratio	ad/bc
Cross-sectional	Prevalence Ratio	$\frac{a/(a+b)}{c/(c+d)}$

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12b. The results of the study are shown in the table below. Compute for the appropriate measure to quantify the risk:

a. 0.13
b. 0.25
c. 7.5
d. 1.07

	(+)IHD	(-)IHD	
Exercise	5	30	35
No Exercise	25	20	45
	30	50	80

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Exercise	5	30	35
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	30	50	80

$$\text{IRR} = \frac{a/(a+b)}{c/(c+d)}$$

$$\text{IRR} = \frac{5/35}{25/45}$$

$$\text{IRR} = 0.257$$

12c. Which of the following would be the strongest reason to question the validity of this study?

a. Selection bias could have occurred
b. Only males were included
c. Only one company was involved
d. The end point was inappropriate

VALIDITY

Internal validity

- Validity within the study
- Estimate if effect measure is accurate
- Not due to systematic error (bias and confounding)

External validity

- Validity beyond the study
- Generalizability to the target population
- Not due to random error (chance)
- Internal validity is a pre-requisite

BIAS

- Selection Bias
  - Non-representative sample ($n \neq N$)
  - Results from errors in selecting individuals to be part of the study
  - Examples: attrition bias, response bias, self-selection
- Information bias
  - Inaccurate information

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b. Not good for studying rare diseases
c. Relatively long time required to complete study compared to a cohort
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a. Comparison between a new SSRI drug and Venlafaxin
b. Compare the difference between random sampling and alternate sampling methods for assessing the efficacy of ICT and psychotherapy as a treatment for depression patients with psychotic depression
c. Document a cluster of Wegener's granulomatosis cases that have recently appeared in your area
d. Evaluate the effects of Team-Based Learning versus didactic lecture

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15. A cohort study differs from a case-control study in that:

a. Subjects are enrolled or categorized on the basis of their exposure status in a cohort study but not in a case-control study
b. Subjects are asked about their exposure status in a cohort study but not in a case-control study
c. Cohort studies require many years to conduct, but case control studies do not
d. Cohort studies are conducted to investigate chronic diseases, case-control studies are used for infectious diseases

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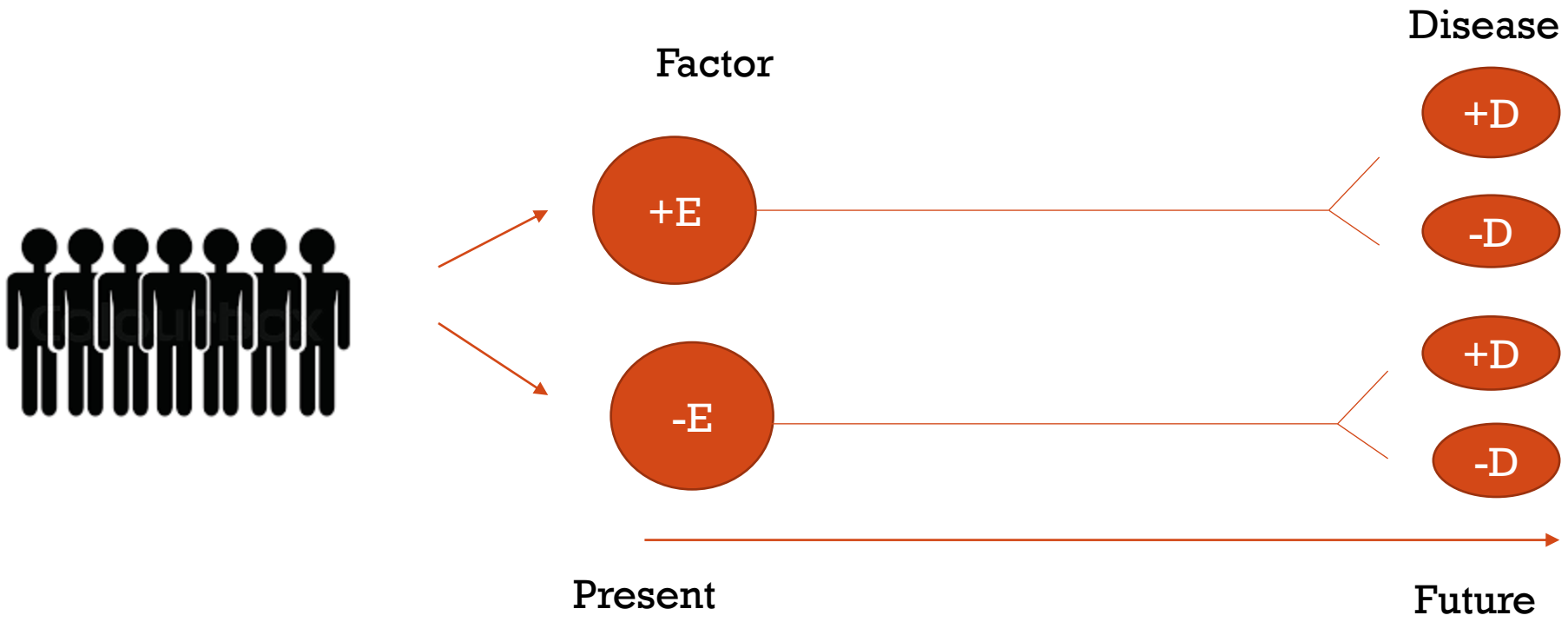

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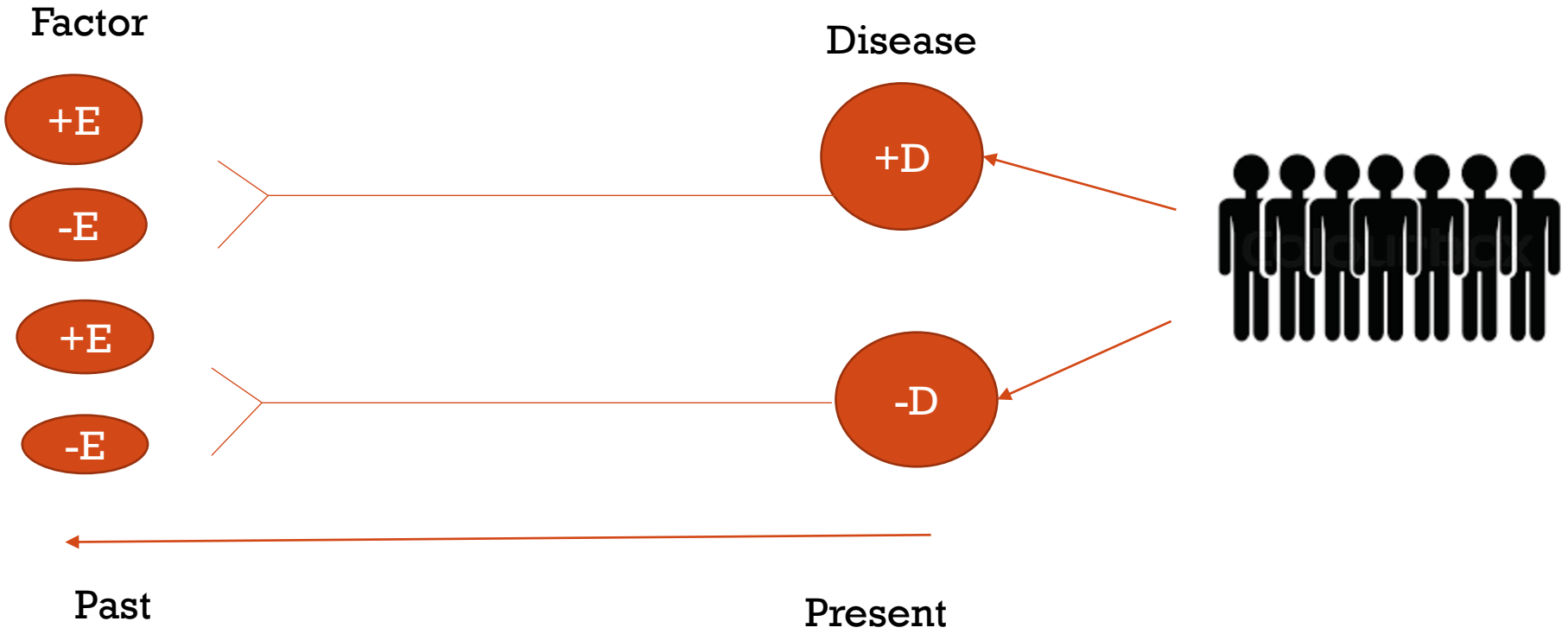
Direction of inquiry	Retrospective
Time points of assessment of factor and outcome	Longitudinal



15. A cohort study differs from a case-control study in that:

a. Subjects are enrolled or categorized on the basis of their exposure status in a cohort study but not in a case-control study
b. Subjects are asked about their exposure status in a cohort study but not in a case-control study
c. Cohort studies require many years to conduct, but case control studies do not
d. Cohort studies are conducted to investigate chronic diseases, case-control studies are used for infectious diseases

16. In a cohort study, the risk ratio of developing diabetes was 0.86 when comparing consumers of tea to those who did not drink tea (unexposed). Which one statement is correct?

a. Tea drinkers have lower risk of developing diabetes
b. Tea drinkers have higher risk of developing diabetes
c. We cannot tell if the observed association is due to chance
d. The risk ratio is close to one, so there is no difference in disease risk

EVALUATING RANDOM ERRORS: CHANCE

Decision	Hypothesis testing	Estimation (CI of RR, OR, PR)
Significant	p-value < 0.05	Not within CI (does not contain 1)
Not significant	p-value > 0.05	Within CI (contains 1)

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17. A study in which children are randomly assigned to receive either a newly formulated vaccine or the currently available vaccine, and are followed to monitor for side effects and effectiveness of each vaccine, is an example of?

a. Experimental
b. Observational
c. Cohort
d. Case-control

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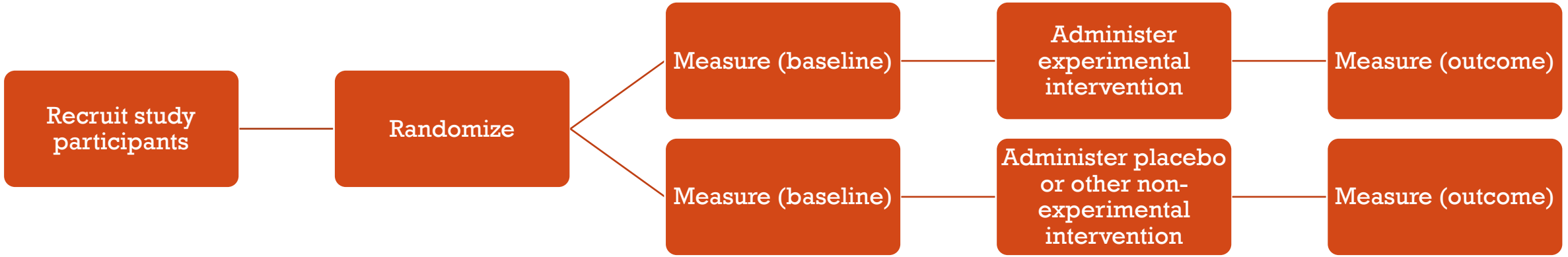
EXPERIMENTAL STUDY: SCHEMA



RCT: DATA ANALYSIS

Group	% with (+)D
Experimental	Rt
Control	Rc

- Assess baseline comparability of groups:
  - T-test for quantitative variables (for 2 groups)
  - ANOVA for quantitative variables (for > 2 groups)
  - Chi-square test for qualitative variables
- Determine if treatment has any effect:

$$RR = Rt/Rc$$

$$ARR = (Rc-Rt)$$

17. A study in which children are randomly assigned to receive either a newly formulated vaccine or the currently available vaccine, and are followed to monitor for side effects and effectiveness of each vaccine, is an example of?

a. Experimental
b. Observational
c. Cohort
d. Case-control

18. Randomization in experimental studies ensures that:

a. Treatment and control groups will have equal numbers
b. Bias is eliminated in the observations
c. Assignment occurs by chance alone, so the groups should be equivalent
d. The two groups are representative of the population from which they were drawn

18. Randomization in experimental studies ensures that:

a. Treatment and control groups will have equal numbers
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19. The purpose of double-blinding in an RCT is to:

a. Achieve greater comparability of cases and controls
b. Avoid placebo effects
c. Avoid objective and subjective bias
d. Reduce the effect of sampling variation
e. Reduce the effect of losses to follow-up

BLINDING

Done to eliminate:

- Investigator bias
- Subject bias (Hawthorne effect)
- Evaluator bias

Types

- Single: patient
- Double: patient and investigator
- Triple: patient, investigator and data analyst are blinded

19. The purpose of double-blinding in an RCT is to:

a. Achieve greater comparability of cases and controls
b. Avoid placebo effects
c. Avoid objective and subjective bias
d. Reduce the effect of sampling variation
e. Reduce the effect of losses to follow-up

20. A study was made of a clinician's ability to diagnose streptococcal throat infection in 150 patients coming in the ER. His diagnosis of 50 strep throat cases were compared to results of throat swabs cultures. Forty (40) patients had positive cultures. 35 of these cultures were diagnosed by the doctor as having strep infection. What is the specificity of the clinical exam of the physician alone?

A. 86. 36%
B. 77.8%
C. 70.0%
D. 90%
E. Cannot be determined

DIAGNOSTIC EXAMS: SENSITIVITY & SPECIFICITY

Test/Exam	Disease Present	Disease Absent	Total
Positive	TP	FP	TP+FP
Negative	FN	TN	FN + TN
Total	TP + FN	FP + TN	TP + FP + FN + TN

SENSITIVITY AND SPECIFICITY

Test/Exam	Disease Present	Disease Absent
Positive	TP	FP
Negative	FN	TN
	↓ Sensitivity	↓ Specificity

Sensitivity

- Percentage of people with the disease who are detected by the test
- = (TP/(TP+FN)) x 100%

Specificity

- Percentage of people without the disease who are correctly labeled by the test as not diseased
- = (TN/(TN+FP)) x 100%

PREDICTIVE VALUE OF TESTS

Test/Exam	Disease Present	Disease Absent	
Positive	TP	FP	→ PPV
Negative	FN	TN	→ NPV

Positive Predictive Value

- Likelihood that the individual with a positive test has the disease
- %PPV = TP (TP/(TP + FP)) x 100%

Negative Predictive Value

- Likelihood that the individual with a negative test does not have the disease
- %NPV = TN (FN/(FN + TN)) x 100%

LIKELIHOOD RATIOS

Likelihood Ratio (+)

$$= \frac{(+)in\ disease}{(+)in\ non-diseased} = \frac{Sensitivity}{1 - Specificity}$$

Likelihood Ratio (-)

$$= \frac{(-)in\ disease}{(-)in\ non-diseased} = \frac{1 - Sensitivity}{Specificity}$$

20. A study was made of a clinician's ability to diagnose streptococcal throat infection in 150 patients coming in the ER. His diagnosis of 50 strep throat cases were compared to results of throat swabs cultures. Forty (40) patients had positive cultures. 35 of these cultures were diagnosed by the doctor as having strep infection. What is the specificity of the clinical exam of the physician alone?

A. 86. 4%
B. 77.8%
C. 70.0%
D. 90%
E. Cannot be determined

Exam	Disease Present	Disease Absent	Total
Positive	35	15	50
Negative	5	95	100
Total	40	110	150

$Sp = (TN/(TN+FP)) \times 100\%$
$Sp = 95 / 110 \times 100\% = 86.4\%$

$Sn = (TN/(TN+FN)) \times 100\%$
$Sn = 35 / 40 \times 100\% = 87.5\%$

21. What is the Positive Predictive Value of the test?

A. 85.7%

B. 77.8%

C. 70.0%

D. 90.0%

E. Cannot be computed

Exam	Disease Present	Disease Absent	Total
Positive	35	15	50
Negative	5	95	100
Total	40	110	150

PPV = TP (TP/(TP + FP)) x 100%
PPV = 35/50 x 100%
PPV = 70.0%

22. What is the likelihood ratio of a negative test?

a. 4.67%

b. 1.30%

c. 14.5%

d. 7.0%

Exam	Disease Present	Disease Absent	Total
Positive	35	15	50
Negative	5	95	100
Total	40	110	150

Sp = 95 / 100 x 100% = 86.4%

Sn = 35 / 40 x 100% = 87.5%

$$LR(-) = \frac{(-)in\ disease}{(-)in\ non-diseased} = \frac{1-Sensitivity}{Specificity} = \frac{1-0.875}{0.864}$$

LR (-) = 14.5%

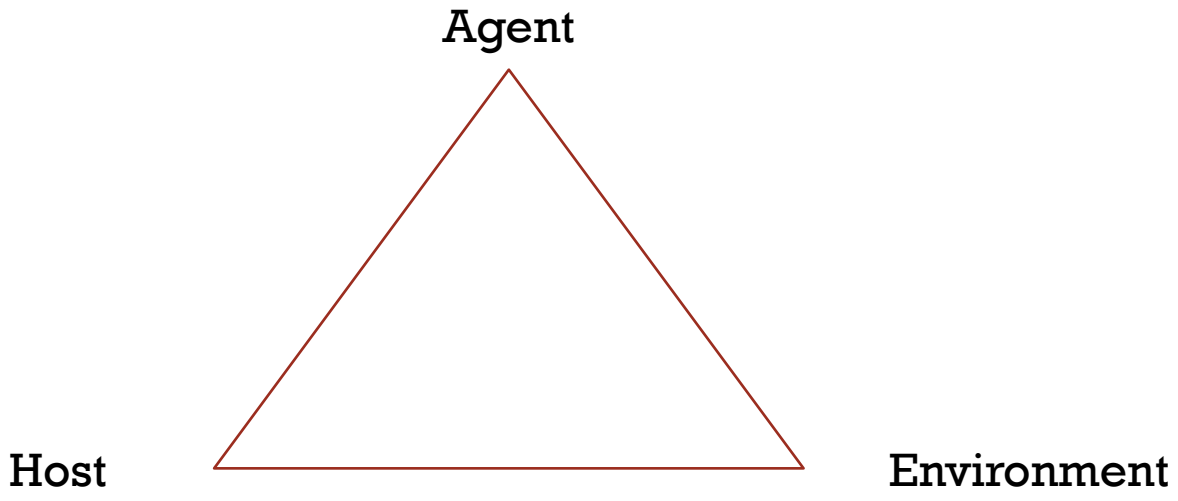
23. An example of "epidemiologic triad" would be:

a. Nurse, tuberculosis bacteria, immune status
b. 2-year old child, hepatitis A virus, daycare center
c. Drug addict, hepatitis B virus, heroin
d. Prostitute, gonococcal bacteria, condom
e. Obstetric intern, HIV virus, latex gloves

MODELS FOR DISEASE CAUSATION

Epidemiologic triad

- Usually applied for communicable diseases
- Disease is a result of interaction of the three factors



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d. Prostitute, gonococcal bacteria, condom
e. Obstetric intern, HIV virus, latex gloves

24. In 2000, there were 199 confirmed cases of meningococcal meningitis occurred in Baguio, with an incidence rate of 2.2 cases per 100,000 population. There were 20 deaths, and the rest were non-fatal cases. What is the case fatality rate for meningococcal meningitis in this scenario?

a. 0.02%
b. 0.002%
c. 6%
d. 10%
e. 80%

EPIDEMIOLOGIC CHARACTERISTICS OF BIOLOGICAL AGENTS

Infectivity	Ability to invade host	Attack rate
Pathogenicity	Ability to cause disease	Pathogenicity rate
Virulence	Ability to cause death	Case fatality rate

EPIDEMIOLOGIC CHARACTERISTICS OF BIOLOGICAL AGENTS

Indicator	Equation
Attack Rate	$\frac{\#\ of\ individuals\ who\ got\ the\ disease}{\#\ of\ susceptible\ individuals}\ x\ F$
Pathogenicity rate	$\frac{\#\ of\ individuals\ with\ clinical\ disease}{\#\ of\ individuals\ with\ the\ disease\ (clinical\ \&\ subclinical)}\ x\ F$
Case Fatality Rate	$\frac{\#\ of\ individuals\ with\ the\ disease\ who\ died}{\#\ of\ individuals\ with\ clinical\ disease}\ x\ F$

*All measures are computed within a certain time period
*When F is 100, all measures may be interpreted as percentages

24. In 2000, there were 199 confirmed cases of meningococcal meningitis occurred in Baguio, with an incidence rate of 2.2 cases per 100,000 population. There were 20 deaths, and the rest were non-fatal cases. What is the case fatality rate for meningococcal meningitis in this scenario?

a. 0.02%
b. 0.002%
c. 6%
d. 10%
e. 80%

$$CFR = \frac{\#\ of\ individuals\ with\ the\ disease\ who\ died}{\#\ of\ individuals\ with\ clinical\ disease}\ x\ F$$

CFR = 20/199 x 100%
CFR = 10%

25. A nurse referred a patient with Cystic Fibrosis to a center that has a support group and provides information about community resources. This is an example of what level of prevention?

a. Primordial Prevention
b. Primary Prevention
c. Secondary Prevention
d. Tertiary Prevention

PREVENTION

Primary Goals of Public Health

- Protect and promote health
- Restore health
- Prevent disease disability and premature death

LEVELS OF PREVENTION

Primordial	Primary	Secondary	Tertiary
Prevent risk factors	Prevent disease development	Early detection and treatment	Minimize disease progression
Reduce incidence	Reduce incidence	Reduce prevalence and/or severity	Reduce prevalence and/or improve survival
Alters societal structures: policies	Alters exposures (e.g. vaccination)	Early detection: screening	Limit disability & rehabilitation

25. A nurse referred a patient with Cystic Fibrosis to a center that has a support group and provides information about community resources. This is an example of what level of prevention?

a. Primordial Prevention
b. Primary Prevention
c. Secondary Prevention
d. Tertiary Prevention

25. Which of the following best describes the pattern of occurrence of the three diseases noted to be in a single area?

Disease A: usually 40-50 cases per week; last week, 48 cases

Disease B: fewer than 10 cases per week; last week, 1 case

Disease C: usually no more than 2-4 cases per week; last week, 13 cases

a. Disease A is ENDEMIC; Disease B is SPORADIC; Disease C is an OUTBREAK
b. Disease A is SPORADIC; Disease B is PANDEMIC; Disease C is an OUTBREAK
c. Disease A is an OUTBREAK; Disease B is ENDEMIC; Disease C is SPORADIC
d. Disease A is PANDEMIC; Disease B is an OUTBREAK; Disease C is ENDEMIC

EPIDEMIC DISEASE OCCURRENCE

- ENDEMIC: constant presence and/or usual prevalence of a disease in a population within a geographic area
- SPORADIC: disease that occurs infrequently and irregularly
- EPIDEMIC: an increase, often sudden, in the number of cases of a disease above what is normally expected in the population in the area
- OUTBREAK: same definition of epidemic, but is often used for a more limited geographic area
- PANDEMIC: refers to epidemic that has spread over several countries or continents, usually affecting a large number of people

26. Which of the following best describes the pattern of occurrence of the three diseases noted to be in a single area?

Disease A: usually 40-50 cases per week; last week, 48 cases

Disease B: fewer than 10 cases per week; last week, 1 case

Disease C: usually no more than 2-4 cases per week; last week, 13 cases

a. Disease A is ENDEMIC; Disease B is SPORADIC; Disease C is an OUTBREAK
b. Disease A is SPORADIC; Disease B is PANDEMIC; Disease C is an OUTBREAK
c. Disease A is an OUTBREAK; Disease B is ENDEMIC; Disease C is SPORADIC
d. Disease A is PANDEMIC; Disease B is an OUTBREAK; Disease C is ENDEMIC

27. Sambong leaf decoction benefits as:

a. Anti-urolithiasis
b. Anti-helminthic
c. Antitussive
d. Antitussive

27. Sambong leaf decoction benefits as:

a. Anti-urolithiasis
b. Anti-helminthic
c. Antitussive
d. Antitussive

28. The following are part of the 10 prescribed medicinal plants of the DOH through the Philippine Institute of Traditional and Alternative Health Care (PITAHC), except:

- A. Ulasimang bato
- B. Oregano
- C. Yerba Buena
- D. Akapulko

Common name	Scientific name	Use
Akapulko	*Cassia alata*	Scabies, tinea, ringworm, athlete's foot
Ampalaya	*Momordica charantia*	Anti-diabetes
Bawang	*Allium sativum*	Lowers cholesterol level
Bayabas	*Psidium guajava*	Dizziness, fainting spells, aromatic bath, diarrhea, swollen gum, inflammation, wound & vaginal wash
Lagundi	*Vitex negundo*	Fever, headache, toothache, cough, asthma
Niyog-niyogan	*Quisqualis indica*	Ascariasis
Sambong	*Blumea balsamifera*	Urolithiasis
Tsaang gubat	*Carmona retusa*	Abdominal pain
Ulasimang bato	*Peperonia pellucida*	Uric acid lowering
Yerba buena	*Mentha cordifolia*	Gaseous distention, rheumatism

29. The acceptable 8-hour noise level for unprotected factory workers, pump-boat operators and tricycle drivers is only up to:

a. 50 dB
b. 70 dB
c. 90 dB
d. 110 dB

OCCUPATIONAL HEALTH

- promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations by preventing:
  - departures from health
  - controlling risks
  - adaptation of work to people, and people to their jobs.

WHO/ILO, 1995

OCCUPATIONAL HEALTH AND SAFETY

- Cross-disciplinary area concerned with protecting the safety, health and welfare of people engaged in work

- Goal: to foster a safe and healthy work environment
  - As secondary effects, it may also protect coworkers, family members, employers, customers, suppliers, nearby communities, and other members of the public

DEFINITION OF RELEVANT TERMS IN OH/IH

- **Hazard:**

  Anything that has the potential to cause harm (Ali, 2001)

- **Risk:**

  The likelihood that the harm from a particular hazard is realized

- **Safety:**

  The likelihood that the harm from a particular hazard is not realized

OHS DEFINITIONS

Risk = Hazard + Exposure

No Hazard, No Exposure
= No Risk

With Hazard, No Exposure
= Minimal Risk

Hazard

+

Exposure

OCCUPATIONAL HAZARDS

- Health hazards
  - Chemical hazards
  - Physical hazards
  - Biologic hazards
  - Ergonomic hazards
- Safety hazards
  - Unsafe acts
  - Unsafe conditions

OCCUPATIONAL HAZARDS

Chemical

HEALTH HAZARD
The potential to cause harm to health

Psychological

Physical

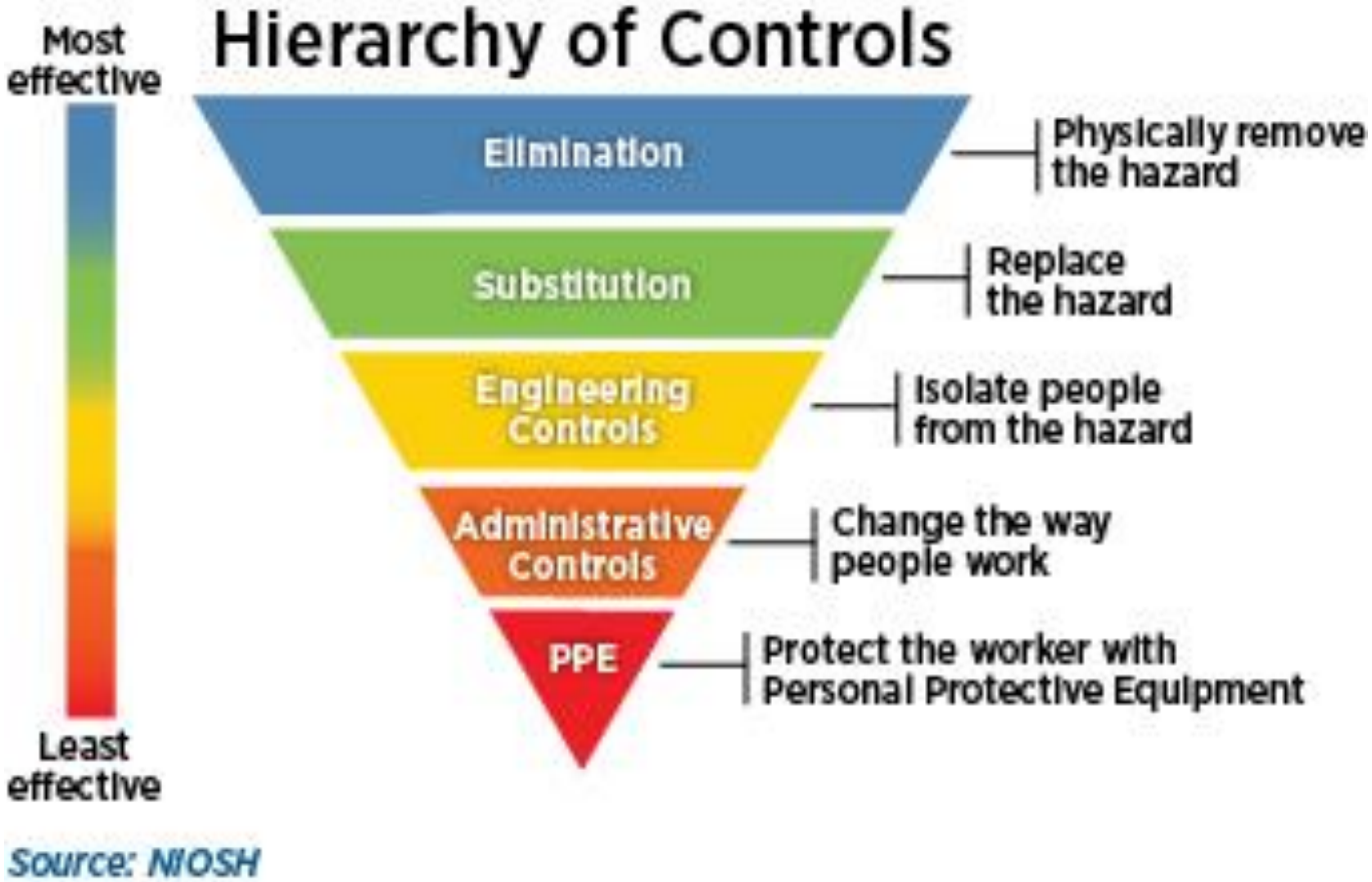
Biologic

Ergonomic

OCCUPATIONAL HEALTH HAZARDS

Physical	Chemical	Biologic	Ergonomic	Psychosocial
• Noise • Vibration • Radiation • Lighting • Health • Cold • Barometric pressure	• Fumes • Gases • Aerosols • Mists • Liquids • Dusts	• Bacteria • Fungi • Insects • Viruses	• Manual handling • Repetitive movement • Restrictive working area • Prolonged exertion	• Job stress • Job monotony • Unsociable hours • Job organization • Violence/ harassment

HIERARCHY OF CONTROL



OSHA sets legal limits on noise exposure in the workplace based on a worker's time weighted average

Permissible exposure limit (PEL) for an 8-hour work: **90 dBA**

NIOSH lowers it further to **85 dBA** as significant noise-induced hearing was noted even at 90 dBA

Noise Level	Exposure Limit
90 dBA	8.0 hours
92 dBA	6.0 hours
95 dBA	4.0 hours
97 dBA	3.0 hours
100 dbA	2.0 hours
102 dBA	1.5 hours
105 dBA	1.0 hours
110 dBA	30 minutes
115 dBA	15 minutes

Table 1. OSHA's Permissible Noise Exposure Limits.

29. The acceptable 8-hour noise level for unprotected factory workers, pump-boat operators and tricycle drivers is only up to:

a. 50 dB
b. 70 dB
c. 90 dB
d. 110 dB

30. Nena was evaluated during pre-employment and was deemed employable but with minor defects (dental carries, overweight). What is her pre-employment class

- Class A
- Class B
- Class C
- Class D

1967.01: PRE-EMPLOYMENT/ PRE-PLACEMENT PE

(3) At the completion of the examination, the applicant shall be rated as:

CLASS A	Physically fit for any work
CLASS B	Physically under-developed or with correctible defects, (error of refraction, dental caries, defective hearing, and other similar defects) but otherwise fit to work
CLASS C	Employable but owing to certain impairments or conditions, (heart disease, hypertension, anatomical defects) requires special placement or limited duty in a specified or selected assignment requiring follow-up treatment/ periodic evaluation
CLASS D	Unfit or unsafe for any type of employment (active PTB, advanced heart disease with threatened failure, malignant hypertension, and other similar illnesses).

SCOPE OF PREVENTIVE MEDICINE

- Epidemiology and biostatistics
- Public Health and Preventive medicine
- Research Methodology
- Family and Community Health Care
- Environmental Sanitation
- Occupational Health Practice
- Herbal medicine and nutrition

Questions?
Email: ldcarpio2@up.edu.ph

Good luck! Thank you!