PREP XI RR

STUDY NOTES

PSM

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PREMIUM STUDY MATERIAL

PREP XI RR

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1. INTRODUCTION TO EPIDEMIOLOGY

BIG QUESTION 1: What is Epidemiology, and what are its key components and tools?

Broad Answer:

Epidemiology, as defined by John M Last, is the study of the frequency, distribution, and determinants of disease or health-related states and events in a specified population, along with the application of this knowledge for disease prevention and control. It focuses on understanding how often diseases occur, where and in whom they occur, and why they occur. Epidemiologists use tools like rate, ratio, and proportion to measure and express disease occurrences accurately.

DETAILED QUESTIONS:

Q1.1: Who defined Epidemiology and Health Education?

Answer:

- John M Last defined both epidemiology and health education

Q1.2: What are the three main components of epidemiology?

Answer:

- Disease frequency
  - Frequency means the number of cases of a disease
  - New cases: Incidence
  - Existing cases: Prevalence
- Disease distribution
  - How is the disease distributed in terms of time, place, and person?
  - What time of the year is the disease occurring?
  - Is it more seen in winter or summer?
  - Is it more affecting males, females, children, or the elderly?
  - Example: In November 2019, COVID-19 came, but as epidemiologists, we were calling it pneumonia of unknown origin, which was seen in Wuhan, China, during the winter months, affecting the male population working in the bird market.
- Disease determinants
  - The determinant is given by why and how
  - To understand analytical epidemiology

Q1.3: What are the tools of measurement used in epidemiology?

PYQ: FMGE 2020

PYQ: NEET PG 2018

Answer:

- Proportion
  - To express the frequencies
  - Each of these has a numerator and a denominator
  - The numerator is part of the denominator
  - The multiplier is always 100

- Rate
  - The numerator is part of the denominator.
  - Multiplier can be 1000, 10,000, or one lakh.
- Ratio
  - The numerator is not a part of the denominator
  - Sex ratio = Number of females per 1000 number of males
  - So, the numerator is not a part of the denominator

BIG QUESTION 2: What is the difference between Incidence and Prevalence in epidemiology, and how are they applied in disease monitoring?

Broad Answer:

	Incidence	Prevalence
Definition	New cases	New cases + Old cases (total caseload)
Expressed as	Rate	Proportion
Calculated as	Cohort study	Cross-sectional study
Effect of duration	No effect	Increases with duration
Purpose	For prevention and control of disease	Administrative and planning purposes

DETAILED QUESTIONS:

Q2.1: What is the formula and unit for calculating incidence?

Answer: Incidence = $\frac{\text{Total number of new cases of any disease occurring in a community in a year}}{\text{Total population at risk in a year in that particular community}} \times 1000$

- The multiplier in incidence is 1000
- Incidence is the rate

Q2.2: What is the formula and unit for calculating prevalence?

Answer: Prevalence = $\frac{\text{Total number of existing cases (new + old)}}{\text{Total population of the community}} \times 100$

- The multiplier in prevalence is 100
- Prevalence is a proportion

Q2.3: What is the relationship between prevalence and incidence?

Answer: Prevalence = Incidence × Duration

Q2.4: The following is true about prevalence and incidence

A. Both are rates
B. Prevalence is a rate, but incidence is not
C. Incidence is a rat,e but prevalence is not
D. Both are not rates

Answer: C. Incidence is a rate, but prevalence is not

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- Incidence → Measures new cases occurring in a population over a period of time → involves time, hence it is a rate.
- Prevalence → Measures all existing cases (new + old) at a given point or period → does not involve time in the numerator, so it is a proportion, not a rate.

Q2.5: What happens in the following scenarios W.R.T Incidence and Prevalence?

1. Effective treatment for the disease
2. New treatment prevents death but does not cure the disease
3. New treatment cures the disease
4. Easily curable or fatal disease
5. New prevention modality

Answer:

	Incidence		Prevalence
1. Effective treatment (cures the disease)	Same	P=I x D	↓ ses as D ↓ ses
2. New treatment prevents death but does not cure the disease (a person will live longer with disease e.g. ART)	Same	P=I x D	↑ ses as D ↑ ses
3. New treatment cures the disease	Same	P=I x D	↓ ses as D ↓ ses
4. Easily curable or fatal disease	Same	P=I x D	↓ ses as D ↓ ses
5. New prevention modality (e.g. New vaccine in the market)	Decreases	P=I x D	↓ ses

Q2.6: If the prevalence is very low compared to the incidence of a disease, it implies

A. Disease is very fatal and /or easily curable
B. The disease is non-fatal
C. Calculation of incidence and prevalence is wrong
D. Nothing can be said as they are independent

Answer: A. Disease is very fatal and /or easily curable

- Prevalence≈Incidence×Duration. If the prevalence is very low, but the incidence is relatively high, it means the "duration" of the disease is very short.
- A short duration implies that people either: Die quickly from the disease (it's very fatal). Recover quickly (it's easily curable).

Q2.7: A new drug has been introduced into the market, which is found to decrease mortality, but it does not cure the disease. Which of the following a true statement regarding prevalence and incidence?

A. Decrease in incidence
B. Decrease in prevalence
C. Increase in incidence
D. Increase in prevalence

Answer: D. Increase in prevalence

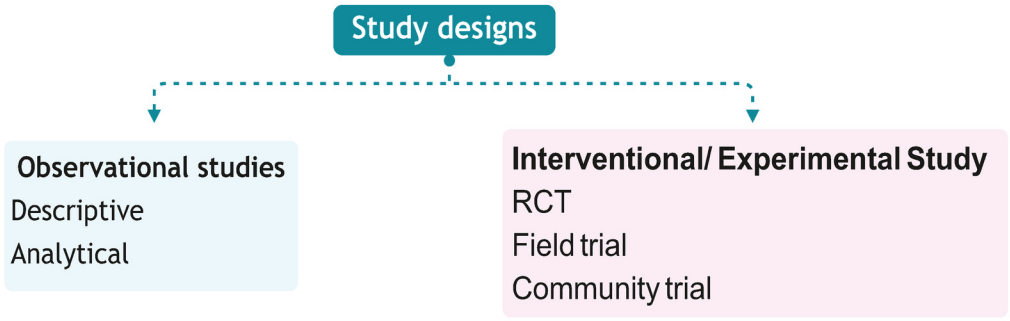
Prevalence is the total number of existing cases. By decreasing mortality, the drug allows people with the disease to live longer. This means the pool of people living with the disease at any given time gets larger, leading to an increase in prevalence.

2. CLASSIFICATION/COHORT STUDY

BIG QUESTION 1: How are epidemiological study designs classified?

PYQ: FMGE 2019
PYQ: INICET 2021

Broad answer:



DETAILED QUESTIONS

Q1.1: What are descriptive study designs, and what do they focus on in epidemiology?

Answer:

- A descriptive study design describes a disease in terms of time, place, and person, i.e. studies the distribution of a disease
- Example
  - Case report- A case report is an individual case study
  - Case series- An aggregation of case reports
- In descriptive, the buzzword is distribution
- No comparison group

Q1.2: What is the main focus of analytical study designs, and what are some examples?

Answer:

- Analytical study design studies the reason why and how disease occurs, i.,e studies determinants of a disease
- E.g.
  - Cohort study
  - Case-control study
  - Cross-sectional study
  - Ecological study
- In analytical, the buzzword is determinant
- Comparison group is always present

Q1.3: Name the types of interventional or experimental study designs with examples.

Answer:

- Randomized Control Trial (RCT) - Drug trials
- Field trials - Vaccine trials
- Community trials - Preventive trials

Q1.4: What is a hypothesis, and what are the steps involved in hypothesis testing in epidemiology?

Answer:

- An assumption yet to be verified
- Three steps:
  - Formulation of hypothesis: Descriptive epidemiology
  - Test hypothesis: Analytical epidemiology
  - Confirm hypothesis: Experimental and interventional epidemiology

Q1.5: What are the different types of observational study designs? Explain them along with their synonyms and units of study?

Answer:

OBSERVATIONAL STUDIES		
Types of studies	**Synonyms**	**Unit of study**
Ecological	Correlation, geographic, aggregate	Populations
Cross sectional	Prevalence	Individuals
Case control	Case reference	Individuals
Cohort	Follow-up	Individuals

Q1.6: What are the different types of experimental study designs, explain along with their synonyms and units of study?

Answer:

EXPERIMENTAL STUDIES		
Types of studies	**Synonyms**	**Unit of study**
Randomized control trials	Clinical trials	Patients
Field trials	Vaccine trials	Healthy people
Community trials	Community studies	Communities

Q1.7: Studying the distribution of disease or health-related characteristics in the human population and identifying characteristics with which disease seems to be associated is.

A. Descriptive epidemiology
B. Experimental epidemiology
C. Analytical epidemiology
D. Interventional epidemiology

Answer: A. Descriptive Epidemiology

A descriptive study design describes a disease in terms of time, place, and person, i.e., studies the distribution of a disease.

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Q1.8: Which of the following is an example of a longitudinal, observational and analytical study?

A. Case-control study

B. Cohort study

C. Randomized controlled trial

D. Ecological study

Answer: B. Cohort study

Explanation:

A cohort study is:

- **Longitudinal:** It follows a group of individuals over time.
- **Observational:** Researchers do not intervene; they simply observe.
- **Analytical:** It is used to test hypotheses about associations between exposures and outcomes.

Q1.9: What is the unit of study for different types of study designs?

Answer:

TYPE OF STUDY	UNIT
ECOLOGICAL/CORRELATION	Population
CROSS-SECTIONAL	Individual
CASE-CONTROL/CASE REFERENCE	Individual
COHORT	Individual
RANDOMIZED CONTROL TRIALS	Patients
FIELD TRIAL	Healthy individuals
COMMUNITY TRIAL	Community

Q1.10: What are the key steps to identify the type of study design in epidemiological research?

Answer:

- Identify exposures and outcomes
- Start of study
- Direction of study
  - Forward
  - Backward
  - Same point in time
- Comparing groups
  - Exposed vs non-exposed
  - Diseased vs non-diseased
- Buzzwords: Distribution, descriptive, history, follow-up, matching
- Rare exposure, Rare diseases, Rare individuals

BIG QUESTION 2: What is a cohort study, and what type of epidemiological study does it represent?

Broad answer:

- A cohort study is a type of observational study design to investigate the relationship between an exposure and an outcome.
- Type - observational analytical study.

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DETAILED QUESTIONS

Q2.1: What does cohort mean? Explain with examples.

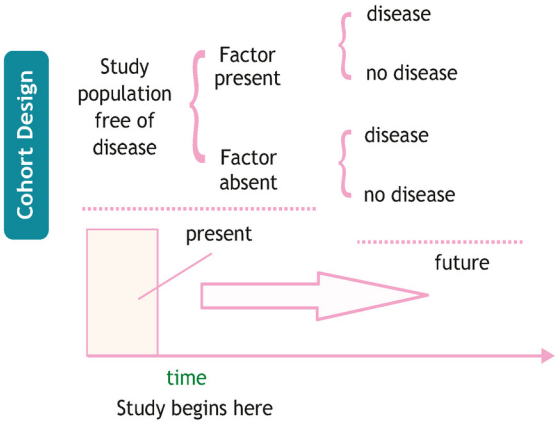
Answer:

- A cohort means a group of individuals who share a common characteristic
- For example:
  - Birth cohort - all children are born in a particular hospital in Delhi today
  - Marriage cohort - all those who are getting married together

Q2.2: What is the basic design of a cohort study in terms of timing, comparison groups, and direction of study?

Answer:

- When is the study starting?
- What are you comparing / whether we have a comparison group or not?
- Direction of study
  - Are we going forward?
  - Are we standing at the same point
  - Or are we going backwards?
- E.g., Now it is 2023 when the study begins - present time
  - With a study population that does not have a disease
  - Let's say a group of medical college students who are admitted in the 2023 first year
  - Dividing them into factor present and factor absent, i.e., the exposed group and the non-exposed group
  - Factor present means exposed/risk factor present
  - Factor absent means no risk factor
  - E.g., if we were studying alcohol
    - → Factors present: alcohol consumption present
    - → Factor absent means no alcohol
- The study is going forward
- We are looking at the outcome - the occurrence of disease in the exposed group and no disease in the non-exposed group
- Basic design: comparison of exposed v/s non-exposed groups

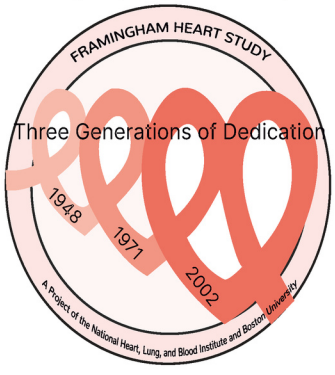


Q2.3: What are some common synonyms used for a cohort study?

Answer:

- Moving forward with time → prospective cohort study
- Moving with time → concurrent study
- Cause-to-effect
- Moving from risk factor to outcome → risk factor to disease
- Exposure to an outcome
- Follow-up study
- Forward-looking study
- Incidence study

Largest prospective study



Q2.4: Which is the largest prospective cohort study?

Answer:

- The Framingham Heart Study

Q2.5: What are the steps involved in the cohort study?

Answer:

- Selection of study subjects
- Obtaining data on exposure
- Selection of comparison group (non-exposed)
- Follow-up
- Analysis

Q2.6: Which measures of association are commonly used in the analysis of a cohort study?

Answer:

- The analysis is a measure of the strength of association in the form of relative risk, attributable risk, and population-attributable risk

Q2.7: What are the advantages of a cohort study?

Answer:

- Establishes temporality
  - o Temporality means that cause precedes effect
    - → Before lung cancer, the person had smoked
    - → Before CVD happened, the person was drinking
- Most important of Hill's criteria of causality
- Calculates the incidence of a disease
- It studies multiple outcomes
- Direct estimate of relative risk
- Rare exposures (occupational studies)
- Minimizes bias (recall bias)

Q2.8: What are the disadvantages of a cohort study?

Answer:

- Time taking
- Expensive
- Large sample size
- Common administrative problems
- Not suitable for rare disease
- Hawthorne bias
  - o Subjects modify their behaviour upon being observed
  - o Example - smokers quit smoking in between
- Attrition bias - loss to follow-up

Q2.9: All of the following are advantages of a cohort study except.

A. Almost no recall bias
B. Presence of the Hawthorne effect
C. Temporarily can be studied
D. Incidence can be calculated

Answer: B. Presence of the Hawthorne effect

Q2.10: What are the types of cohort study?

PYQ: AIIMS 2019

PYQ: FMGE 2021

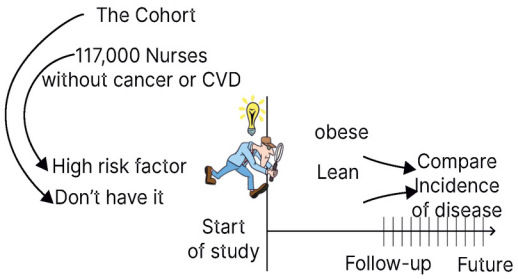
Answer:

- Prospective cohort study
  - Concurrent- moving forward with time
- Retrospective cohort study
  - Non-concurrent study
  - We are moving at the opposite time
- Mixed cohort study
  - Both retrospective + prospective

Q2.11: Explain a prospective study with an example.

Answer:

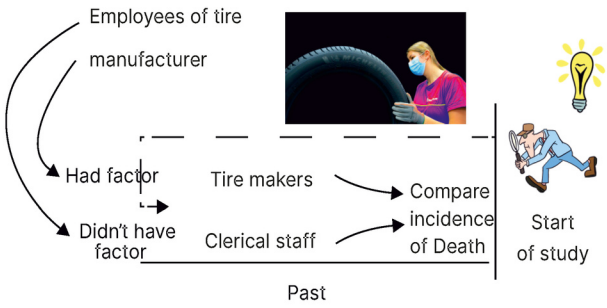
- A group of nurses who do not have cancer or CVD - cohort
- A cohort study always compares the exposed with the non-exposed
  - Obesity is exposed - a high-risk factor
  - Lean - non-exposed
- The study is going forward → This is a prospective cohort study



Q2.12: What is a retrospective cohort study, and how is the comparison between groups made?

Answer:

- Cohort - Employees of a tire manufacturer
  - Tire makers - exposed
  - Clerical staff - non-exposed
- It is cohort as it compares exposed and non-exposed and looks at the incidence
- We start at the present and retrospectively analyze



Q2.13: What are the steps followed in a retrospective cohort study?

PYQ: INICET 2021

Answer:

- Start from the present date
- Use historical data
- A factory register of a group of workers in 2010
- Based on historical data, divide the cohort into exposed and non-exposed
  - Exposed-tiremakers
  - Non-exposed-clericalstaff
- Come forward
- The outcome is determined at the time the study begins
- Note: Be it prospective or retrospective, cohorts always compare exposed with non-exposed

Q2.14: What are the advantages of a retrospective cohort study?

Answer:

- Saving money and time
- No loss to follow-up - reduce attrition bias
- No Hawthorne bias
- Calculates incidence

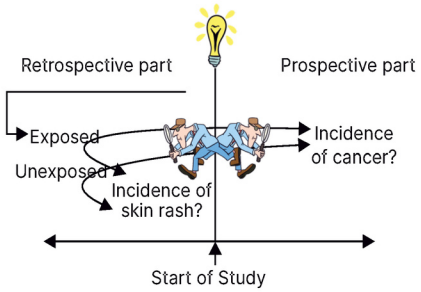
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- Establish temporality.
- A retrospective cohort is much better than a prospective cohort
  - In case-control outcome has already occurred
  - We are comparing diseased and non-diseased

Q2.15: What is a mixed cohort study, and how does it combine both retrospective and prospective components?

Answer:

- Bidirectional
- Also called Ambispective cohort
- Example.
  - We start the study in 2023
  - We go back into the past - historical data
  - Divided the cohort into exposed and non-exposed
  - We come forward and look at the incidence of skin rash at the time the study started
  - This part is a **retrospective cohort study**
  - Now we have two groups- those who have a skin rash and those who do not
  - They are followed into the future to see how many go on to develop cancer and how many don't
  - This part is a **prospective cohort study**



Q2.16: In a study begun in 1965, a group of 3000 adults in Baltimore was asked about alcohol consumption. The occurrence of cancer was studied in the group between 1981 and 1995. Which type of study is this?

Answer:

- This is a prospective cohort study as the study moves forward and compares exposed and non-exposed (alcohol)
- This is a horizontal study design as the study moves forward
- When the outcomes are looked at fixed time intervals (every 6 months or every year), it is called a Longitudinal Study
  - A longitudinal Study is a type of cohort study (prospective)

Q2.17: 500 women aged 40 - 54 who present for routine checkups are asked about their meat consumption. 20% of the women turned out to be vegetarians. During the ensuing five years, five vegetarians and 43 non-vegetarians developed colorectal cancer. Which type of study is this?

Answer:

- Here, exposure is vegetarian/non-veg
- Outcome - colorectal cancer
- Follow-up of 5 years
- So, this is a prospective cohort study

Q2.18: A study is being conducted to find the association between aniline dye exposure and bladder cancer among workers who have worked in he factory for >20 years. For the study purpose, two groups were formed. One group directly handling dyes and another group involving office workers, not directly exposed to dye. Years of occupation, including other exposure details, were collected by examining past records of the factory. What type of study is this?

Answer:

- Retrospective cohort study

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Q2.19: After a retrospective cohort study, if another study is done in the forward direction for another 15- 20 years, it is known as?

Answer:

- A mixed cohort study or an ambispective cohort study

BIG QUESTION 3: What are the measures used to assess the strength of association in a cohort study?

Broad answer:

- The measure of the strength of the association of the cohort study
  - Relative risk (Risk Ratio)
  - Attributable risk
  - Population Attributable Risk (PAR)

DETAILED QUESTIONS

Q3.1: What is relative risk? Explain with an example.

PYQ: NEET PG 2018,2020,2021,2022

PYQ: FMGE 2020,2022

Answer:

- Relative risk or risk ratio

$$RR = \frac{\text{incidence among exposed}}{\text{incidence among non-exposed}}$$

  - Incidence among exposed = a / a+b
  - Incidence among non-exposed = c / c+d
- Association between smoking and CVD

	Outcome- CVD		
Risk Factor -Smoking	**YES**	**NO**	**Total**
YES	a	b	a+b
NO	c	d	c+d

Q3.2: How to interpret relative risk?

Answer:

- Relative risk
  - >1 - positive association (risk factor)
  - =1 - no association
  - <1 - negative association
- Suppose the relative risk is 4.5 - that means those who smoke are at 4.5 times higher risk of developing CVD
- Positive association means it is a risk factor
- Negative association means an inverse association, or it is a protective factor
- In a study, the association between herbal tea and diabetes was studied, and the risk ratio was found to be 0.8
  - RR <1 → This means herbal tea is a protective factor for diabetes

Q3.3: What is attributable risk, how is it calculated, and what does it signify in epidemiological studies?

PYQ: NEET PG 2018, 2020

Answer:

- Attributable risk:

$$AR\% = \frac{I_e - I_u}{I_e} \times 100$$

- Ie = incidence in exposed
- Iu = incidence in unexposed
- Expressed as a percentage
- Suppose AR is 75% in a study of smoking and lung cancer; that means 75% of lung cancers are attributed to smoking

Q3.4: What is Population Attributable Risk?

Answer:

- PAR = incidence among the total population - incidence among exposed / incidence among total population * 100

	Outcome- CVD		
Risk Factor -Smoking	**YES**	**NO**	**Total**
YES	a	b	a+b
NO	c	d	c+d
Total	a+c	b+d	

- Total population = a+b+c+d
- Incidence among total population = a +c / a+b+c+d
- Incidence among non-exposed = c / c+d
- PAR %= $\frac{\left(\frac{a+c}{a+b+c+d}\right) - \left(\frac{c}{c+d}\right)}{\left(\frac{a+c}{a+b+c+d}\right)}$

Q3.5: How to interpret PAR?

Answer:

- In a study of smoking and lung cancer
- If PAR- 90%
  - It means if smoking is eliminated as a risk factor, there will be a 90% reduction in the annual incidence of lung cancer cases in the population
- PAR is of importance to policymakers
- Here, a PAR of 90% implies that smoking cessation is important in lung cancer reduction
- Incidence of disease among exposed vs. incidence of disease among non-exposed: Relative risk
- How much of the disease is attributed to a particular exposure: Attributable risk
- If smoking is eliminated as a risk factor, there will be a 90% reduction in the annual incidence of lung cancer cases: Population attributable risk
- Example:
  - Community physician/epidemiologist: attributable risk
  - Policymakers (smoking cessation program): Population attributable risk

3. CASE CONTROL/CROSS-SECTIONAL/ ECOLOGICAL STUDY

BIG QUESTION 1: Write briefly regarding the case-control study

Broad answer: PYQ: FMGE 2020,2021,2023 | PYQ: INICET 2021 | PYQ: NEET PG 2019,2022

- A case-control study is a type of observational epidemiological study used to investigate the factors that may contribute to a disease or condition
- Start at the present time
  - Cases - diseased
  - Controls - non-diseased
- Study proceeds retrospectively, i.e., backward

DETAILED QUESTIONS

Q1.1: What type of study is a case-control study?

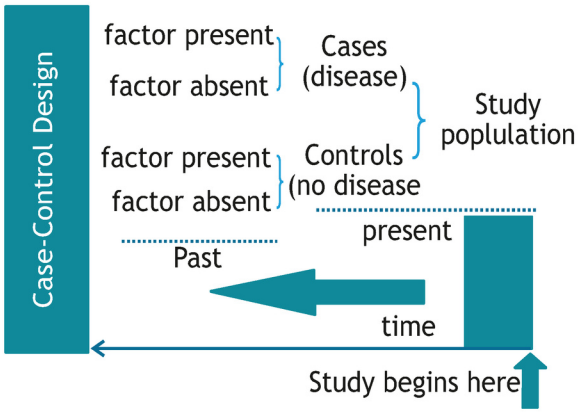
Answer:

- A case-control study is an observational, analytical study

Q1.2: What is the basic design of a case-control study?

Answer:

- Basic design: Comparison between diseased vs non-diseased



Q1.3: What is the difference between a retrospective and a case-control study?

Answer:

- In the retrospective cohort study, we also start at the present time and move backward, but there, we were comparing exposed and non-exposed
- In a case-control study, the study is started at present, comparing diseased v/s non-diseased at present

Q1.4: What are the synonyms of a case-control study?

Answer:

- Retrospective study
- Backward-looking study
- Outcome to exposure

- Disease to risk factor
- Effect to the cause
- Trohoc - opposite of cohort

Q1.5: What are the steps involved in a case-control study?

Answer:

- Selection of cases and controls
  - For 1 case: maximum 4 controls can be taken if the cost of collecting cases & controls is equal
  - 1:1 is also sufficient
- Matching
  - Matching means that cases and controls are similar to almost all the factors that can affect the outcome of the study, except the disease under study
  - Matching eliminates all the known confounders in the study
- Measurement of exposure
- Analysis and interpretation

Q1.6: Give an example of a case-control study.

Answer:

- The Dolls and Hills study is an example of a case-control study

Q1.7: Which of the following is not a part of the case-control study?

A. Strength of association
B. Follow-up
C. Matching
D. Selection of study objects

Answer: B. Follow-up

- Follow-up is a feature of cohort studies, not case-control studies. Case-control studies are retrospective and compare exposures between cases and controls without following them over time.

Q1.8: What are the advantages and disadvantages of a case-control study?

Answer:

Advantages	Disadvantages
• Easy to carry out • Rapid and inexpensive • Sample size: smaller • Investigate rare diseases • Multiple exposures • No attrition bias • No Hawthorne bias • Minimal ethical problems	• Recall bias • Selection of appropriate control groups may be difficult • Incidence cannot be calculated

Q1.9: Which study is better for rare exposure and rare disease?

Answer:

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- For rare exposures, like occupational exposure, a cohort study is better, as we begin with exposure
- But for rare diseases, as we begin with a case of a rare disease, a case-control study is better

Q1.10: A study was conducted on a group of 600 patients having breast cancer, and another group of 300 was chosen from the general population. Both these groups were questioned on their exposure to smoking. Which study design is this?

Answer:

- Case-Control Study - comparison between diseased (breast cancer) & non-diseased (no breast cancer)

Q1.11: A researcher wants to study the relationship between depression and with history of social media usage. One group had social media users with depression, and the other group had social media users without depression. Which study design does this reflect?

Answer:

- Case control study
  - Approach to identify study designs
- Exposure here is social media usage
- The outcome is depression
- We are taking history indicates that we are going back in time (Buzzword: history)
- Comparison group: depressed with those who are not depressed
- Clinically depressed cases are rare, so a case-control study
- So, we begin the study with the outcome
- And go back in time to see the usage of social media
- So, this is a case-control study

Q1.12: The most feasible design to assess the relationship between breast cancer and the risk factor OCP can be established by

Answer:

- The best study design would be to start with the population having breast cancer and not having breast cancer
- Then go back in time and look for OCP exposure
- The most feasible design is a case-control study.

Q1.13: An investigator suspects that acetaminophen used during the first trimester of pregnancy can cause neural tube defects. She estimates the risk of neural tube defects in the general population is 1:1000. Which of the following is the best study design to investigate the hypothesis?

Answer:

- Here, we cannot make the pregnant woman take Acetaminophen and then follow up to see if the babies develop neural tube defects. (NTD is also a rare disease)
- So, we start with babies having neural tube defects and go back in time to see the usage of acetaminophen
- Compare the babies having neural tube defects with the ones that do not have neural tube defects
- This is a case-control study

Q1.14: What is the measure of strength of association of a case-control study?

Answer:

- Odds ratio or cross-product ratio
- Odds ratio = ad/bc
  - >1 - Positive association (risk factor)

- o =1 - No association
- o <1 - Negative association (protective factor)

Q1.15: Explain the measure of strength of association of a case-control study with an example.

Answer:

PYQ: INICET 2022 PYQ: AIIMS 2019

- Odds ratio = ad/bc = 30*30/ 20*20 = 9/4 = 2.5
- Here, the odds ratio = 2.5, which is > 1, so a positive association OR provides an estimate of relative risk

	Disease	
Risk Factor	Case	Control
Present	a	b
Absent	c	d

	CAD	No CAD
Smokers	30	20
Non- smokers	20	30

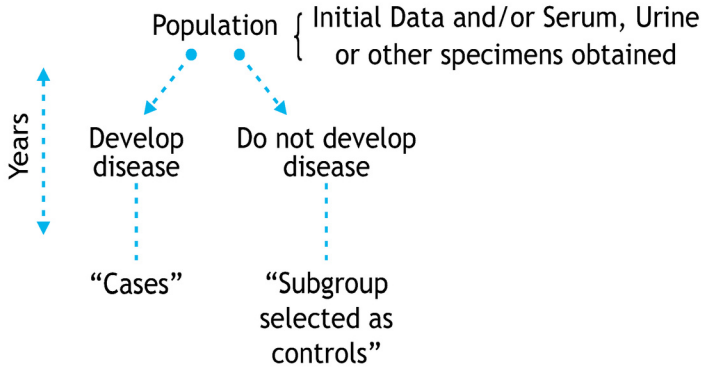
Q1.16: What is nested case-control? Explain with an example.

Answer:

- Nested case-control is a smaller case-control in a bigger cohort

Example

- Cohort- Suppose 100 Children are born in one of the hospitals in Delhi today
- We take the antenatal history of the mothers, preserve their blood samples, urine samples, and stem cells - all exposure details are collected at the start of the study
- We have followed these children for 50 years
- This is a prospective cohort study
- Out of these 100 Children, we observe that 10 have developed a disease
- So, these 10 are the cases, and the remaining 90 are controls (as they do not develop the disease)
- Go backward and analyze the samples of only the cases; therefore, a smaller case control is initiated in a bigger cohort



Q1.17: What are the advantages of nested case-control?

Answer:

- Prospective in nature
- Temporality established

- Recall bias eliminated
- Economical
- Used when the measurement of exposure is expensive
- Rare investigations
- Study of the biological precursor of disease

Q1.18: A nested case-control study avoids which problem as compared to a case-control study?

A. Confounding bias
B. Need for long follow-up
C. Randomization
D. Temporal association

Answer: D. Temporal association

- A nested case-control study is conducted within a defined cohort where exposure data is collected before the disease develops.
- This ensures a clear temporal relationship between exposure and outcome, which is harder to establish in traditional case-control studies

BIG QUESTION 2: Write briefly regarding the Cross-Sectional Study Design

Broad answer:

- A cross-sectional study is a type of observational research design that analyzes data from a population, or a representative subset, at a single point in time
- Neither going forward nor backward

DETAILED QUESTIONS

Q2.1: What type of study is a Cross-Sectional Study Design?

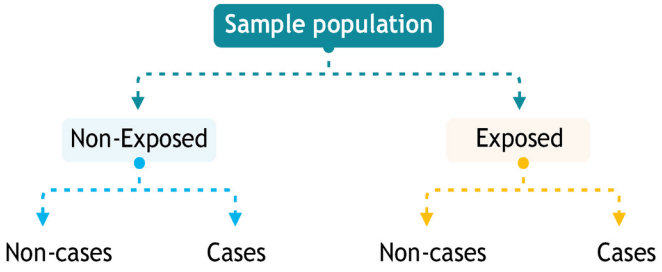
Answer:

- A cross-sectional study is an observational, analytical study

Q2.2: What is the basic design of a Cross-Sectional Study Design?

Answer:

- Determine exposure and outcome simultaneously using primary data, i.e., the researcher collects the data themselves.



Q2.3: What are the advantages and disadvantages of a Cross-Sectional Study Design?

Answer:

- Advantage
  - o Snapshot of a population
  - o Calculate prevalence- A prevalence study can be used for descriptive purposes
- Biggest disadvantage- Cannot establish temporality.

Q2.4: Residents of three villages with three different types of water supply were asked to participate in a study to identify cholera carriers. Because several cholera deaths have occurred in the recent past, virtually everyone who presents at the time submitted to examination. The proportion of residents in each village who are carriers was computed and compared. What type os study is this?

A. Cross-sectional study
B. Case-control study
C. Concurrent cohort study
D. Nonconcurrent

Answer: A. Cross-sectional study

- 3 different types of data were collected at the same point in time
- We are collecting fresh data, not relying on already collected data
- So, this is a cross-sectional study

Q2.5: A health camp was organized on Republic Day, where blood sugar levels of community individuals were calculated to know the diabetes status in that community. What type of study is most suited?

A. Cohort study
B. Case-control study
C. Ecological study
D. Cross-sectional study

Answer: D. Cross-sectional study

- A cross-sectional study measures both exposure and outcome at a single point in time.
- In this case, blood sugar levels were assessed during a one-time health camp, making it a classic example of a cross-sectional design used to determine the prevalence of diabetes

BIG QUESTION 3: Write briefly regarding the Exological Study.

Broad answer:

- An ecological study is a type of observational study in which the unit of analysis is a population, rather than an individual.
- Data is collected and analyzed at the population or "group" level, such as countries, states, cities, or schools
- Neither going forward nor backward
- Uses in nutritional service

DETAILED QUESTIONS

Q3.1: What type of study is an ecological Study?

Answer:

- Ecological study is an observational, analytical study

Q3.2: What is the basic design of an ecological study, and how can it be represented?

Answer:

- Basic design - we determine exposure and outcomes at the same point in time using secondary data (rely on previously collected data)
- A scatter diagram is used to represent the correlation

Q3.3: By what other names is ecological study called?

Answer:

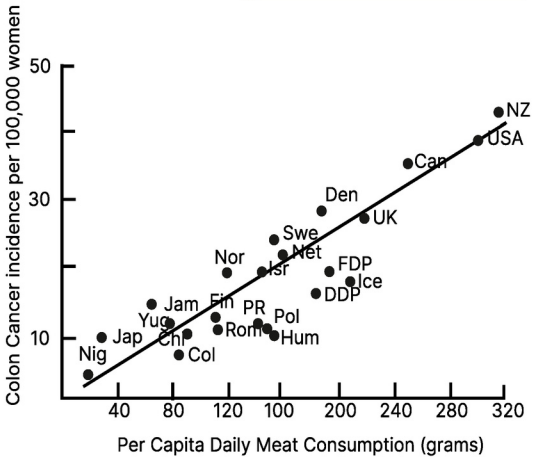
- Correlational study
- Geographical study
- Population study
- Aggregate study

Q3.4: What is the biggest problem with ecological study? Explain with an example.

PYQ: NEET PG 2018,2020

Answer:

- The biggest problem of ecological study is the ecological fallacy
- Ecological fallacy - we generalize the result of the population to individuals, which they might not have as individuals
- For Example, in the image here, countries that have high daily meat consumption have reported higher incidences of colon cancer
- But those people who have colorectal cancer may not be eating meat



Q3.5: A research group designed a study to investigate the epidemiology of syphilis. The investigators examined per capita income and rates of syphilis in Delhi, Hyderabad, Noida, and Mumbai. Data on city-wide syphilis rates were provided by each city's health agency. The investigators ultimately found that the number of new cases of syphilis was higher in low-income neighborhoods. The study is best described as which of the following?

Answer:

- We are studying cities - population
- Relying on secondary data
- So, this is an ecological study

Q3.6: Give a brief comparison between different study designs.

Answer:

Characteristics	Cohort	Case Control	Cross sectional	Ecological
Type of study	Observation	OA	OA	OA
Direction	Forward	Backward	Same point (primary default)	Same point (secondary default)
Unit of study	Individual	Individual	Individual	Population
Presence of disease at start	Prospective Cohort: not present Retrospective cohort: Disease has occurred but determined at time study begins	Disease present		
Parameters	RR, AR, PAR	OR	Prevalance	

Q3.7: How can different epidemiological study designs be identified based on the timing of exposure and outcome?

Answer:

- Exposure has occurred, but outcome has not yet occurred - Prospective cohort
- Both exposure and outcome have already occurred, but the outcome is determined at the time the study begins. Using historical records, comparison is made between exposed and non-exposed, and the outcome is determined at the time the study begins - Retrospective cohort
- Both exposure and outcome have already occurred. Retrospective in nature, i.e., using historical records where comparison is between diseased and non-diseased - Case control
- Both exposure and outcome are determined at the same point in time using primary data - Cross-sectional
- Both exposure and outcome are determined at the same point in time using secondary data - Ecological study

4. SYSTEMATIC REVIEW AND META ANALYSIS

BIG QUESTION 1: What are systematic reviews and meta-analysis used for in research?

Broad answer:

- Systematic Review
  - A type of literature review that collects and critically analyzes multiple research studies
  - Does not include quantitative synthesis of data from all studies available
- Meta-analysis
  - One step ahead and perform quantitative analysis: Meta-Analysis
  - It is a quantitative approach for systematically combining previous research to arrive at conclusions about the body of research.

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DETAILED QUESTIONS

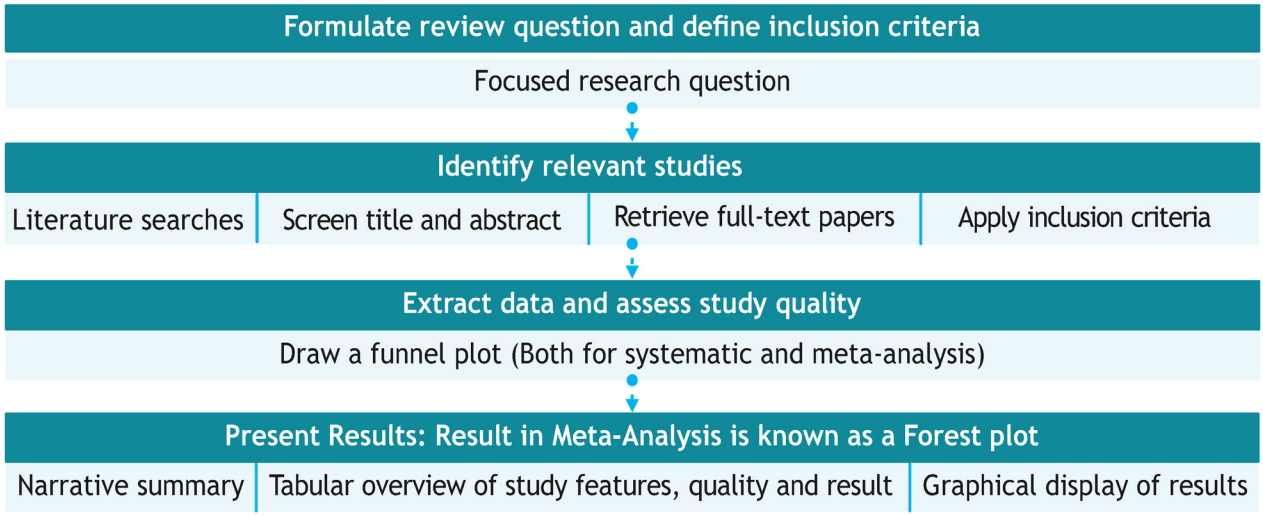
Q1.1: What are the basic steps involved in conducting a systematic review?

Answer:

Step 1	Defining the review question and eligibility criteria
Step 2	Searching for studies
Step 3	Selecting the studies
Step 4	Data extraction
Step 5	Data synthesis
Step 6	Interpretation of the results

Q1.2: What are the basic steps involved in conducting a meta-analysis?

Answer:



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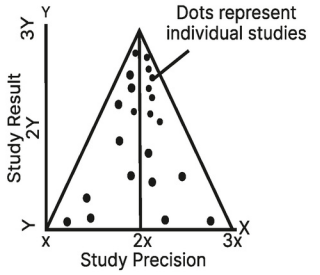
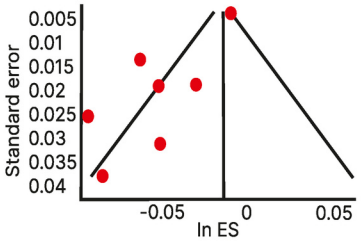
Q1.3: What is a funnel plot?

Answer:

- A Funnel Plot is drawn for both the systematic review and the Meta-Analysis
- Checks for publication bias
- Also checks for the qualities of the studies.

Q1.4: How can the file drawer effect be identified using a funnel plot in meta-analysis?

Answer:

No file drawer effect	File drawer effect
	
Dots uniformly scattered: No publication bias	Dots are not uniformly scattered: Publication bias present.

Q1.5: What type of study uses a forest plot, and what is another name for it?

Answer:

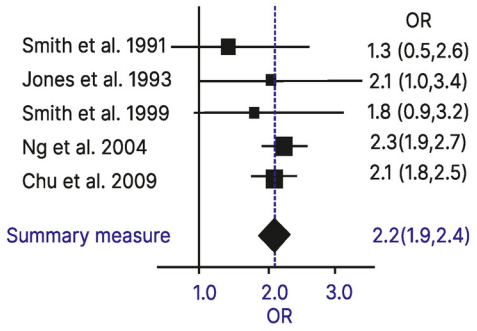
- Forest Plot is only made for a Meta-Analysis
- Forest Plot is also known as a Blobbogram

Q1.6: How is a Forest plot interpreted? Explain with an example

Answer:

- Suppose we were studying the association of risk factors with the following 5 studies
  - Smith et al- effect of Age
  - Jones et al- effect of smoking
  - Smith et al- effect of alcohol
  - NG et al- effect of diet
  - Chu et al- effect of SES on breast Cancer
- If the interval includes 1- not significant
- If the interval does not include 1- Significant association
  - If it is >1-Risk factor
  - If it is <1-Negative/inverse/protective factor
- Or ratio
  - >1 Positive Association
  - =1 No association
  - <1 Inverse association or protective factor
- The diamond in the plot represents the overall estimate or pooled estimate
  - 2.2(1.9-2.7)- <1, significant
  - Overall OR >1- Risk factor

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Q1.7: What are the reporting guidelines used for different types of medical research studies?

Answer:

Type of Study		Reporting Guidelines
Case Report	CARE	Case Report
RCT	CONSORT	Consolidated Standard of Reporting Trials
Observational Studies	STROBE	Strengthening the Reporting of Observational Studies in Epidemiology
Meta Analysis	MOOSE	Meta Analysis of Observation Studies
Systematic Reviews	PRISMA	Preferred Reporting items for Systematic Reviews and Meta Analysis
Qualitative Research	SRQR	Standards for Reporting Qualitative Research
Quality Improvement Studies	SQUIRE	Standards for Quality Improvement Reporting Excellence
Diagnostic/Prognostic studies	STARD	Standards for Reporting of Diagnostic Accuracy

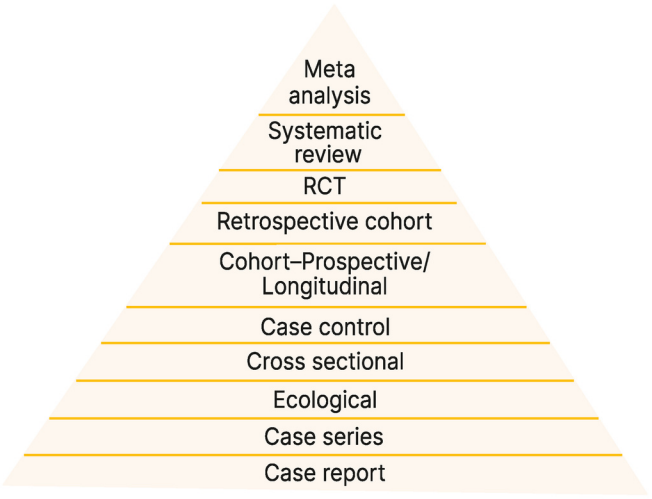
Q1.8: Who is considered the father of evidence-based medicine, and what is the gold standard for establishing causality?

Answer:

- The father of Evidence-based medicine is David Sackett
- Provide maximum evidence to establish causality
- Gold standard of evidence-based medicine: Meta-analysis

Q1.9: What is the hierarchy of evidence in research studies, starting from the lowest to the highest level of evidence?

Answer:



Q1.10: What are Hill's criteria used for, and who proposed them?

Answer:

- Bradford Hill gave criteria to establish causality.
- Association: Two variables occur more often together than expected by chance
  - Measure the strength of association by cohort or case-control
- Causality: Hill's criteria

Q1.11: What are Hill's criteria for establishing causality in epidemiological studies, and which one is considered the most important?

Answer:

- Most important-Temporality: Cause precedes effect
  - Example: Smoking can lead to lung cancer
- Least important-Specificity: One exposure, one outcome
  - Example: Smoking only leads to lung cancer (possible, but not true)
- Biological plausibility-Should be supported by biological mechanism/bodily mechanism/pathogenesis
  - Example: Smoking causes inflammation of the lung parenchymal tissue
- Consistency of findings: Findings are repeatable
- Coherence of association: Researchers support each other's findings
- Cessation of exposure: If smoking is stopped, the chance of lung cancer may be reduced
- Dose-response relationship
- Strength of association
- Experiment: RCT

Q1.12: Best study of first choice for assessment of an Unknown or New Disease with no etiological hypothesis?

A. Cohort study

B. Case control

C. Cross-sectional

D. Descriptive epidemiology

Answer: D. Descriptive epidemiology

- When a new or unknown disease emerges and no cause is yet known, descriptive epidemiology is the first step.
- It helps describe the person, place, and time distribution of the disease, forming the basis for generating hypotheses for further analytical studies.

Q1.13: A study is designed to evaluate the feasibility of acupuncture in children with chronic headaches. Sixty children with chronic headaches are recruited for the study. In addition to their usual therapy, all children are treated with acupuncture three times a week for 2 months. Which of the following best describes this study design?

A. Case control

B. Case series

C. Cross-sectional

D. Historical cohort

E. Randomized clinical trial

Answer: B. Case series

- In a case series, a group of patients with a known condition (here, children with chronic headaches) are given an intervention (acupuncture), and outcomes are observed without a control group or randomization.
- This design helps in assessing feasibility or preliminary effects, not in establishing causality.

Q1.14: British investigators conducted a study to compare measles-mumps-rubella (MMR) vaccine history among 1,294 children with pervasive development disorder (e.g. autism and Asperger's syndrome) and 4,469 children without such disorders. (They found no association.) This is an example of which type(s) of study?

A. Experimental
B. Cohort
C. Case-control
D. Clinical trial
E. Ecological

Answer: C. Case-control

- This study compared past exposure (MMR vaccination history) between cases (children with developmental disorders) and controls (children without such disorders).
- This retrospective comparison to identify associations makes it a case-control study.

Q1.15: The Iowa Women's Health study, in which researchers enrolled 41,837 women in 1986 and collected exposure and lifestyle information to assess the relationship between these factors and subsequent occurrence of cancer, is an example of which type(s) of study?

A. Experimental
B. Cohort
C. Case-control
D. Clinical trial
E. Ecological

Answer: B. Cohort

- The Iowa Women's Health Study involved enrolling a large group of women and following them over time to observe the development of cancer based on their baseline exposures and lifestyle.
- This prospective design is characteristic of a cohort study, ideal for assessing incidence and risk factors.

Q1.16: If a researcher wants to study the precedence relationship between the exposure and effect, which design should he prefer?

A. Descriptive survey
B. Ecological survey
C. Case series
D. Cross-sectional
E. Cohort

Answer: E. Cohort

- A cohort study follows participants over time from exposure to outcome, making it the best design to establish temporality—i.e., whether the exposure precedes the effect.
- This is essential for suggesting a possible causal relationship

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Q1.17: A researcher wanted to study the time sequence to prove the concept of causality. Which design of study should be preferred by the researcher?

A. Longitudinal
B. Cross-sectional
C. Case report
D. Case series report
E. Quasi-experimental

Answer: A. Longitudinal

- A longitudinal study involves repeated observations of the same variables over a period of time, allowing researchers to assess the time sequence between exposure and outcome, an essential requirement for establishing causality.

Q1.18: In a cohort study conducted, out of those exposed to risk factor 10 are diseased, and out of those non-exposed to risk factor, only 5 are diseased. What is the relative risk?

A. 1.33
B. 2
C. 0.5
D. 50

Answer: B. 2

- Relative risk = Incidence among exposed / Incidence among non-exposed
  = 10/5
  = 2

Q1.19: The health authorities are launching a smoking cessation program by designing different activities for smokers. These are very expensive but still useful, as a large proportion of lung cancer will be eliminated if smoking is stopped. This proportion of lung cancer can be indicated by?

A. Relative risk
B. Prevalence
C. Attributable risk
D. Population attributable risk
E. Incidence density

Answer: D. Population attributable risk

- Population Attributable Risk (PAR) estimates the proportion of disease in the entire population that can be prevented if the exposure (e.g., smoking) is eliminated.
- It reflects the public health impact of the risk factor, making it ideal for evaluating large-scale preventive programs.

Q1.20: A study found the relative risk of alcohol addiction to have depression to be 2.03. What is the interpretation?

A. Positive association
B. No association

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C. Negative association
D. Not significant

Answer: A. Positive association

- A relative risk (RR) > 1 indicates a positive association, meaning the exposure (alcohol addiction) is associated with a higher risk of the outcome (depression).
- An RR of 2.03 suggests that alcohol-addicted individuals are about twice as likely to develop depression compared to non-addicted individuals.

Q1.21: A study found the Odds ratio of maternal hypertension to have an IUGR fetus to be 1:5. What is the interpretation drawn?

A. Positive association
B. Common association
C. Inverse association
D. Rare outcome

Answer: C. Inverse association

- An odds ratio (OR) <1 indicates an inverse (negative) association, meaning the exposure (maternal hypertension) is associated with a lower odds of the outcome (IUGR).
- An OR of 1:5 (i.e., 0.2) suggests that hypertension is less likely associated with IUGR in this study.

Q1.22: In a study of 400 smokers and 600 non-smokers were followed up over 10 years to find out the incidence of hypertension. Calculate the risk ratio of the study?

		Hypertension	
		Yes	No
Smoking	Yes	120	280
	No	30	570

A. 0.06
B. 0.60
C. 6.0
D. 60

Answer: C. 6.0

- Relative risk = Incidence among exposed/Incidence among non-exposed
  = 120/400 ÷ 30/600
  = 6

Q1.23: While launching a new national health program and policy population attributable risk is calculated. Which of the following best defines population attributable risk?

A. Incidence of disease among the exposed is so many times higher as compared to that among the non-exposed
B. So much disease can be attributed to exposure
C. If the risk factor is modified or eliminated, there will be a significant annual reduction in the incidence of disease in the given population
D. None of the above

Answer: C. If the risk factor is modified or eliminated, there will be a significant annual reduction in the incidence of disease in the given population

- Population Attributable Risk (PAR) quantifies the reduction in disease incidence that would occur in the entire population if the risk factor (e.g., smoking, hypertension) were eliminated.
- It reflects the potential public health benefit of removing or modifying the exposure.

Q1.24: Random in Randomization in a clinical trial means?

A. Equal but unknown chance
B. Unequal and unknown chance
C. Unequal but known chance
D. Equal and known chance

Answer: D. Equal and known chance

- In a clinical trial, randomization ensures that each participant has an equal and known chance of being assigned to any of the study groups.
- This process helps eliminate selection bias and ensures groups are comparable at baseline.

Q1.25: Intention to treat analysis is done in?

A. Cohort study
B. Survival analysis study
C. Randomized control trials
D. Case control study

Answer: C. Randomized control trials

- Intention-to-treat analysis is used in randomized controlled trials (RCTs) to include all participants as originally assigned, regardless of whether they completed the intervention.
- This preserves the benefits of randomization and provides a more realistic estimate of the treatment effect.

Q1.26: The major purpose of random assignment in a clinical trial is to?

A. Help ensure that study subjects are representative of the general population
B. Facilitate double blinding
C. Facilitate measurement of the outcome variable
D. Ensure that study groups are comparable on baseline characteristics

Answer: D. Ensure that study groups are comparable on baseline characteristics

- The main purpose of random assignment in a clinical trial is to distribute known and unknown confounding factors equally between the intervention and control groups.
- This helps ensure that any observed effect is due to the intervention and not due to pre-existing differences between groups.

Q1.27: Which one of the following is true regarding a confounding factor except?

A. It is associated with exposure under investigation
B. It is distributed equally in the study and control groups
C. It is associated both with exposure and disease
D. It is related to matching in a case-control study

Answer: B. It is distributed equally in the study and control groups

- A confounding factor is associated with both the exposure and the outcome, potentially distorting the true relationship.
- If it were equally distributed in the study and control groups, it would not confound the results.

Q1.28: Which of the following statements about clinical trials is true?

A. Post-marketing surveillance is done in phase 3
B. Safety and non-toxicity evaluated in phase 2
C. RCT in patients done in phase 3
D. Unit of study in 1 is patients

Answer: C. RCT in patients done in phase 3

- Phase 3 clinical trials involve large groups of patients and are designed as randomized controlled trials (RCTs) to assess the efficacy and safety of a drug before approval.
- They provide the most robust evidence for therapeutic effectiveness.

Q1.29: Recall bias is mostly associated with?

A. Case control study
B. Cohort
C. RCT
D. Field trial

Answer: A. Case control study

- Recall bias occurs when participants do not accurately remember past exposures.
- It is most common in case-control studies, where individuals with the disease (cases) may recall their exposures differently than those without the disease (controls), potentially distorting the results.

Q1.30: Double blind means?

A. Observer is blind about the study
B. Person or groups being observed are blind about the study
C. Both observer and observed group is blind
D. Interpreters and analyzers are blind about study

Answer: C. Both observer and observed group is blind

- In a double-blind study, both the participants (observed) and the researchers or investigators (observers) are unaware of which intervention the participant is receiving.
- This minimizes bias in treatment administration and outcome assessment.

Q1.31: Best study design to establish causality?

A. Cross-sectional
B. Ecological
C. Longitudinal
D. Case control
E. Non-concurrent cohort

Answer: E. Non-concurrent cohort

- A non-concurrent cohort study (also known as a retrospective cohort study) tracks subjects based on past exposure and follows them up to the present, allowing assessment of exposure before outcome.
- Though RCTs are the gold standard for causality, among observational designs, cohort studies—including non-concurrent ones—are the best for establishing causality due to their ability to demonstrate temporality.

Q1.32: Which of the following quantitative methods is the best to study previous research studies?

A. RCT
B. Systematic review
C. Meta Analysis
D. Cohort study

Answer: C. Meta Analysis

- A meta-analysis is a quantitative method that combines data from multiple previous studies to produce a pooled estimate of effect size.
- It provides stronger statistical power and is considered the best method for synthesizing results from existing research.

5. TYPES OF ERRORS/ RANDOMIZED CONTROL TRIAL/ CLINICAL TRIALS

BIG QUESTION 1: What are confounders and types of errors in clinical/epidemiological studies?

Broad Answer: Errors are of two types, mainly confounders and biases.Confounders are variables associated with both the exposure and the outcome in a study, acting as independent risk factors for the outcome.

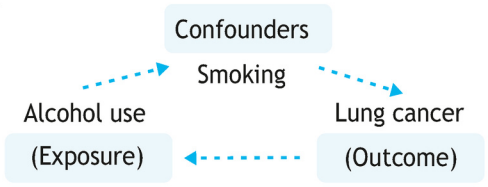
DETAILED QUESTIONS:

Q1.1: What is a confounder, and how does it influence a study?

Answer:

- A confounder is a variable that:
  - Is associated with both the exposure and the outcome
  - Is an independent risk factor for the outcome
  - Is unequally distributed between study and control groups
  - In any study, there are both known and unknown confounders present
- Example:
  - Smoking is associated with both exposure and outcome
  - Alcohol - Exposure
  - CVD - Outcome
  - This means that those who drink may also smoke (possible confounding)
  - Smoking is an independent risk factor for the outcome

PYQ: NEET PG 2019



Q1.2: What are known confounders?

Answer:

- Common known confounders include:
  - Age
  - Gender
  - Religion
  - Socioeconomic status
- Example: Relationship between smoking and lung cancer
  - Exposure - Smoking
  - Outcome- Lung cancer

Q1.3: What is an effect modifier and how is it different from a confounder?

Answer:

- An effect modifier is a variable that alters the effect (positively or negatively) of the exposure on the outcome
- It does not distort the relationship like a confounder, but instead modifies it
- Example:
  - Is exercise associated with smoking? NO
  - Is exercise an independent risk factor, or is it independently associated with lung cancer? NO
  - If a person exercises, the effect of smoking on lung cancer reduces

Q1.4: What is randomization and how does it help in eliminating confounders?

Answer:

- Randomization is assigning subjects randomly to treatment or control groups, giving each participant an equal and known chance
- It eliminates both known and unknown confounders
- The best technique to eliminate confounders is stratified randomization

Q1.5: What are other techniques to control confounders apart from randomization?

Answer:

Restriction	Cohort
Matching	• Done in a case-control study o Case are matched with the control o Case should be similar to control in every possible variable which can affect the outcome of the study except the disease in question • Matching eliminates only the known confounders
Stratification	Eliminate confounders
Multivariate regression models	• When there are multiple confounders in a study, this model is utilised

BIG QUESTION 2: What is bias in clinical studies, and how can it be eliminated?

Broad Answer: Bias is a systematic, non-random error that occurs during the design, conduct, or analysis of a study. It creates a false association between exposure and outcome, leading to misleading conclusions. Bias can arise from the subject, investigator, or analyzer, and is best controlled by blinding techniques.

DETAILED QUESTIONS:

Q2.1: What are random & non-random errors?

Answer:

Non-random errors	Random errors
Bias	Sampling error
Doesn't occur by chance	Occurs by chance
Cannot be eliminated by increasing sample size	Can be eliminated by increasing sample size
More serious	Less serious

Q2.2 What are the types of bias Explain them briefly.

Answer:

Subject Bias	• Recall Bias: Seen in Case-Control studies • Hawthorne Bias: Seen in Cohort studies • Non-response Bias: High non-response rates to surveys and questionnaires can cause error if non responders differ in some way from responders.

Investigator Bias	• Interviewer Bias: Seen in case control study
	• Selection Bias: Seen in case control study
	  ○ Berksonian Bias: Due to different hospital admission rates
	  ○ Misclassification bias: Seen in cohort study
	• Pygmalion Bias: Example, increased motivation by teacher increases student performance, gives an exaggerated response
	• Golem Bias: Example, decreased motivation by teacher decreases student performance

Analyzer	Least commonly reported bias

Q2.3: How can bias be minimized or eliminated in studies?

Answer:

PYQ: FMGE 2020
PYQ: AIIMS 2019

- Blinding is the primary method used to eliminate bias
- Types:

Single Blinding	Double Blinding	Triple Blinding
• Subject is unaware of intervention • Investigator and analyzer know the intervention being given.	• Both the subject and the investigator are unaware of intervention given. • Most common form of blinding	• Subject, investigator and analyzer are unaware of the intervention given. • The best form of blinding.

Q2.4 An epidemiologist uses double blinding in a clinical trial to evaluate two new therapeutic procedures for a disease X. Which of the following statements best reflects double blinding?

A. Experimental(t) and reference (control) groups are blinded.
B. Observer and analyser are blinded
C. Observer and observed are blinded
D. Study subjects and analysts are blinded

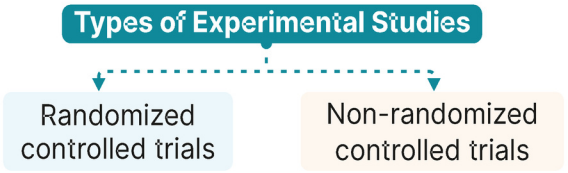
Answer: C. Observer and observed are blinded

Explanation:

Options	Justification
A. Experimental and reference groups are blinded	Groups themselves cannot be blinded; only individuals can be blinded
B. Observer and analyser are blinded	The analyser may be blinded in triple blinding, but it is not essential for double blinding.
D. Study subjects and analysts are blinded	Again, an analyser is part of triple blinding, not the standard double.

Big Question 3: What are experimental studies and its types?

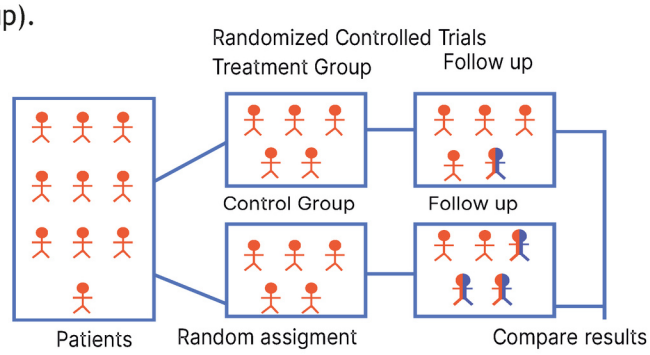
Broad Answer: Experimental studies are a type of scientific research design where the researcher actively intervenes and manipulates one or more variables to observe the effect on another variable.



DETAILED QUESTIONS:

Q 3.1: What is a Randomized Controlled Trial (RCT) and how is it designed, executed, and analyzed?

Answer: A Randomized Controlled Trial (RCT) is a prospective study where participants are randomly allocated into treatment and control groups. It is a prospective study. "Random" in randomization means "equal and known chance". Every study participant will get an equal and known chance of being allocated either in the study (treatment group) or the control group (placebo group).



Q3.2: What is the unit of study in a Randomized Controlled Trial (RCT)?

Answer: The unit of study in RCT is the patient

Q3.3: What are the two main groups in an RCT?

Answer:

- Group A: Treatment group (Experimental group)
- Group B: Control group (Reference group or Placebo group)

Q3.4: What are the key advantages of randomization in RCTs?

Answer:

1. Eliminates selection bias by ensuring comparability between the two groups.
2. Eliminates both known and unknown confounders
3. Ensures internal validity of the study

Q3.5: At what stage is randomization done in a clinical trial?

Answer:

- Allocating study participants into treatment and control groups

Q3.6: What are the commonly used techniques to achieve randomization?

Answer:

- Lottery or chit method
- Flip a coin method
- Table of random numbers (Best technique)

Q3.7: What are the steps of RCT?

Answer:

Protocol design

↓

Selection of reference (receives placebo) and experimental (receives drug) populations

↓

Randomization

↓

Manipulation and intervention

↓

Follow-up

↓

Outcome assessment

Q3.7 Which of the following is used to reduce the selection bias in a clinical trial?

A. Selecting the population
B. Intervention
C. Randomization
D. Written informed consent

Answer: C. Randomisation

Explanation:

Selection bias occurs when the groups being compared differ in ways other than the intervention being tested, often due to non-random assignment of participants.

Q3.9: What is interpretation of experimental designs?

Answer:

Intention to treat analysis	As treated analysis (per-protocol analysis)
• Also called a randomized or method effectiveness analysis. • Involves the inclusion in the analysis of all participants randomized who participated in the trial regardless of their adherence to the entry criteria, the status of treatment received, completion status, withdrawal from treatment or deviation from the protocol.	• It is the opposite of the intention to treat analysis. • Only those cases who completed the treatment are analyzed. • Randomization isn't preserved. • It shouldn't be used in the main analysis or alone.

Q3.10: Which type of randomized controlled trial is prospective in nature, with study groups followed simultaneously?

Answer:

- Concurrent parallel RCT → Participants are randomly allocated to groups that are followed at the same time in a prospective manner.
- Concurrent parallel RCT → Participants are randomly allocated to groups that are followed at the same time in a prospective manner.

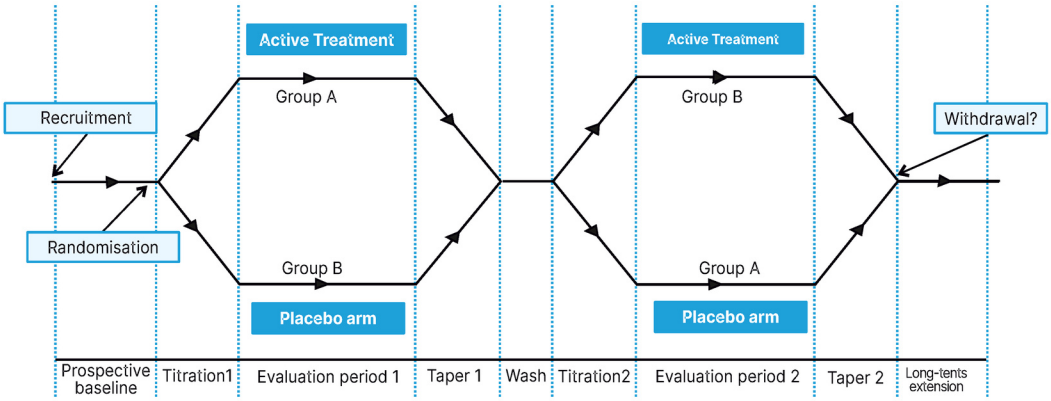
BIG QUESTION 4: What are different types of experimental studies including cross-over trials, natural experiments, and clinical trials?

Broad Answer: Experimental studies are interventional in nature and include various types such as Randomized Control Trials, Cross-over Trials, and Natural Experiments. Clinical trials progress through phases, each with a specific purpose from microdosing to post-marketing surveillance.

DETAILED QUESTIONS:

Q4.1: What is a cross-over trial?

Answer:



Cross -over Trial

- Every participant acts as their self-control.
- Every participant gets the new drug at least once.
- Involves a wash-out period where both groups are put off their drug or placebo for some time.
- Then the control group crosses over to the study group and receives the drug and the study group crosses over to the control group and starts receiving the placebo.

Q4.2 What are the advantages of a cross-over trial?

Answer:

- Every participant has an assurance of receiving the new treatment at least once during the study course
- Every participant serves his/her own control, eliminating the inter-subject variability
- Economical- As smaller sample sizes may be evaluated with accuracy

Q4.3: What is a natural experiment?

Answer:

- It is an experimental/interventional study without randomization
- Individuals are exposed to experimental and control conditions that are determined by nature or by factors outside the control of Investigators
- Use of natural existing groups:
  - Migrant population
  - Religious/social/ethnic groups
  - Atomic bombing of Japan
  - Natural disasters: famines, floods, earthquakes
  - John snow experiment that cholera is a water borne disease

Q4.4: All are true about natural experiments except?

A. The researcher has no control over the allocation of subjects

B. John Snow's experiment is an example

C. Includes RCT

D. Done when experimental studies are not possible in the human population

Answer: C. Includes RCT

Explanation:

RCT (Randomized Controlled Trial) is not a natural experiment—it is a controlled experiment where randomization is done by the investigator.

Q4.5 In a study, group A received placebo while group B received a new drug. In group A, 36 deaths were reported out of a sample of 120. In group B, 26 deaths were reported out of a sample of 130. How many patients should be treated to avert a 1 death?

A. 100
B. 10
C. 250
D. 160

Answer: B. 10

$$NNT = \frac{1}{ARR}$$

$$ARR = \frac{36}{120} - \frac{26}{130} = 0.3 - 0.2 = 0.1$$

$$NNT = \frac{1}{0.1} = 10$$

ARR = Absolute risk reduction
ARR = CER - EER
= Control group event rate - Experimental group event rate

Q4.6: What are the different phases of clinical trials and their characteristics?

PYQ: FMGE 2021
PYQ: NEET PG 2022,2023

Answer:

Phase	Purpose
Phase 0 (Healthy human volunteers)	Microdosing
Phase 1 (Healthy human volunteers) Extends from months to years (10-100)	Safety and non toxicity profile of drug, maximum tolerated dose of a drug
Phase 2 (Patients) 50-500; 1-2 years	Effectiveness and Efficacy
Phase 3 (Patients) 500-3000; 3-5 years	Comparison with existing drugs (RCT)
Phase 4 (Patients) Large or as per study; unending	Long term and rare side effects Post marketing surveillance

Q4.5: What are unique features of each phase of clinical trial?

Answer:

- Unit of study healthy individuals: Phase 0,1
- Maximum tolerated dose of a drug: Phase 1
- Maximum drug failure: Phase 2
- Phase which is an RCT: Phase 3
- Drug is launched in market after which phase of the trial: Phase 3
- Longest phase of a trial: Phase 4
- Post marketing surveillance: Phase 4

6. DESCRIPTIVE EPIDEMIOLOGY/INFECTIOUS DISEASE EPIDEMIOLOGY

BIG QUESTION 1: Explain the core concepts of descriptive epidemiology and its role in identifying disease patterns.

Broad Answer: Descriptive epidemiology studies the distribution of diseases in terms of time (when), place (where), and person (whom). Time trends include short-term fluctuations (epidemics), periodic trends (seasonal/cyclical), and long-term trends (secular). Disease occurrence patterns are classified as endemic, epidemic, pandemic, sporadic, or outbreak. Epidemics may arise from a common source (point or continuous exposure) or propagated transmission (person-to-person, vectors, reservoirs). Point source epidemics show a rapid rise and fall in cases within one incubation period, often from a single exposure like food poisoning. This classification helps in detecting, investigating, and controlling public health threats

DETAILED QUESTIONS

Q1.1: Define Descriptive Epidemiology

Answer:

- Descriptive Epidemiology is the study of the distribution of disease in terms of time (when), place (where), and person (whom)

Q1.2: Explain the time distribution of the disease

Answer:

- Short-term fluctuations - Epidemics
- Periodic term fluctuations - Cyclical and seasonal distribution in disease occurrence
- Long-term fluctuations- Secular distribution in disease occurrence.

Q1.3: What is the constant presence of a disease in a population called?

Answer:

- Endemic.

Q1.4: What does “epidemic” mean in epidemiology?

Answer:

- The occurrence of a disease clearly in excess of normal expectancy.

Q1.5: What statistical threshold can be used to define an epidemic?

Answer:

- Mean + 2 standard deviations or >80% of expected frequency.

Q1.6: A single case of polio in India is classified as what?

Answer:

- Epidemic (disease previously eliminated).

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Q1.7: A single case of yellow fever in India is classified as what?

Answer:

- Epidemic (exotic disease).

Q1.8: What is the definition of a pandemic?

Answer:

- Worldwide distribution of a disease, crossing at least 2 continents or 2 WHO regions.

Q1.9: What does "sporadic" mean in epidemiology?

Answer:

- Haphazard occurrence of disease with no epidemiological link in time, place, or person.

Q1.10: What is a localized distribution of an epidemic called?

Answer:

- Outbreak.

Q1.11: What are the types of epidemics?

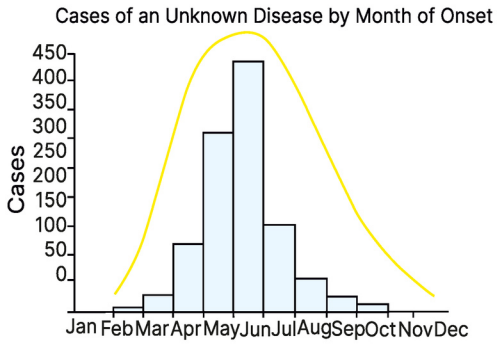
Answer:

Common source epidemics	Propagated Epidemic or progressive epidemics	Slow (Modern epidemic)
• Single exposure or point source • Continuous exposure or multiple exposures	• Person-to-person transmission • Arthropod vector • Animal reservoir	

Q1.12: Describe a Point source or single exposure epidemic

Answer:

- There is a rapid rise & rapid fall in cases.
- Cases occur over a single incubation period of the disease.
- Explosive in nature: Clustering of cases within one incubation period of the disease. · Single peak: No secondary phase.
- Mostly, but not always infectious in origin. E.g., food poisoning.
- Non-infectious: Bhopal gas tragedy (leakage of Methyl isocyanate gas)

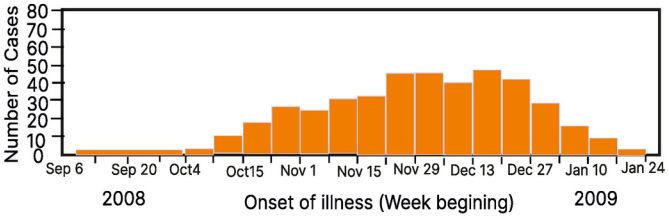


Q1.13: Write briefly about Continuous or multiple exposure epidemics

Answer:

- Common source
- Smooth, gradual rise in the number of cases and a gradual fall.

- Cases occur over multiple incubation periods of the disease
- Multiple peaks (secondary waves).
- Not explosive in nature; there is no clustering of cases.
- Prolonged plateau phase
- Example of continuous exposure:
  - Gonorrhea outbreak due to a commercial sex worker
  - A well of contaminated water



Q1.14: Describe the propagated epidemic

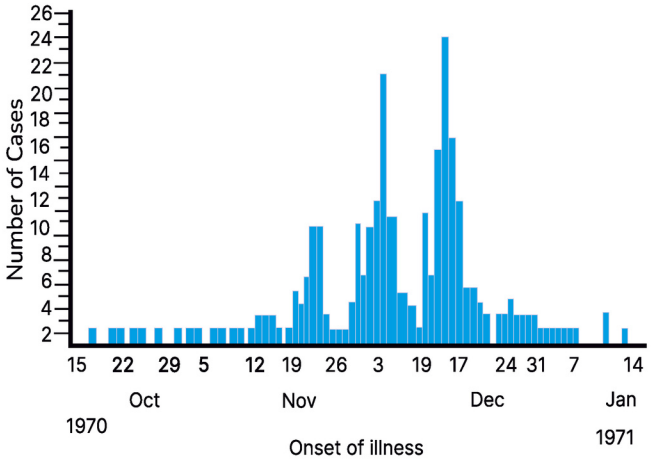
Answer:

- Not a smooth rise in cases. Bumpy gradual rise
- Exposure to infectious agents is not simultaneous but through a chain of transmission.

Q1.15: What are the features of the propagated epidemic?

Answer:

- Propagated Epidemic.
  - Person-to-person transmission happens.
  - Mostly infectious in origin
  - Cases occur over multiple incubation periods
  - Gradual rise of cases, not a smooth rise.
  - Shorter plateau phase
  - Multiple spurts
  - Taller peaks.
  - E.g., Epidemics of hepatitis A, epidemics of polio, vector-borne diseases, and COVID



Q1.16: Tabulate the differences between Point source/ Single exposure, Common source / continuous exposure, and propagated epidemic.

Answer:

PYQ: FMGE 2021,2023 PYQ: NEET PG 2019

Point source/ Single exposure	Common source / continuous exposure	Propagated
The rapid rise and rapid fall of cases.	Gradual **smooth rise and gradual fall** of cases	Gradual unsmooth rise of cases **(bumpy rise)** with multiple spurts.
Cases occur over one incubation period of the disease	Cases occur over multiple incubation periods	Cases occur over multiple incubation periods
Explosive	Nonexplosive	Nonexplosive
A single peak reflects a single incubation period. No secondary waves	Multiple peaks (reflects multiple incubation periods) - secondary waves	Secondary waves are present but not as prominent as in a common source.
No plateau phase	Prolonged plateau	Very short plateau
Single tall peak	Multiple Shorter peaks	Taller peaks

E.g. • Infectious: Food poisoning • Noninfectious: Bhopal gas tragedy	E.g. • Contaminated well • Commercial sex worker,	E.g. Person to person transmission • Hepatitis A • Polio • Covid • Vector-borne

Q1.17: In a case of an epidemic, 5 villages are affected simultaneously with typhoid cases. Upon study, it is found that one milkman is going to all these 5 villages to supply milk. This is an example of which type of epidemic?

A. Point source

B. Common source, propagative

C. Common source, single exposure

D. Common source, continuous exposure

Answer: D. Common source, continuous exposure

- In this specific case, the milkman is the **common** source, and the exposure is **continuous** because he is regularly supplying milk to all five villages.

BIG QUESTION 2: Explain the different types of time-based fluctuations in disease occurrence and their significance.

Broad Answer: Disease occurrence varies over time in three main ways. **Short-term fluctuations** occur in epidemics, where cases rise and fall quickly, such as in polio or foodborne outbreaks. **Periodic fluctuations** include seasonal patterns (e.g., influenza in winter, road traffic accidents on weekends) and cyclical trends (e.g., influenza pandemics every 7-10 years due to antigenic variation). **Long-term fluctuations** or secular trends show gradual shifts over decades, like the rise of non-communicable diseases during the epidemiological transition. Recognizing these patterns allows public health authorities to predict outbreaks, plan prevention measures, and allocate resources effectively.

DETAILED QUESTIONS

Q2.1: What are the types of Periodic fluctuation of disease occurrence?

Answer:

- 2 Types
  - o Cyclical distribution of disease
  - o Seasonal distribution of disease

Q2.2: Describe the Cyclical distribution of disease

Answer:

- Disease is repeated in certain cycles
- Every 2-3 years in unvaccinated areas measles epidemic happens
- Influenza - every 7-10 years
- Non-infectious: RTA - weekends

Q2.3: Describe the Seasonal distribution of disease

Answer:

- Diseases occur in particular seasons
- Measles in the winter months
- Gastrointestinal infections - more prominent in summer as they help in the propagation of the flies.
- Respiratory ailments like pneumonia - more common in the winter
- Polio
- RTA is more in the winter

Q2.4: Do road traffic accidents show periodic fluctuations?

Answer:

- Yes, it is cyclical (more during weekends) and seasonal (more common in winter months).

Q2.5: The influenza pandemic can occur every 7-10 years due to antigenic variations of the virus. This is an example of:

A. Secular trend

B. Progressive trend

C. Seasonal trend

D. Cyclical trend

Answer: D. Cyclical trend

- A **cyclical trend** in epidemiology refers to the periodic fluctuation in the incidence of a disease over time. These cycles can be short, like the seasonal flu, or longer, spanning several years, like the influenza pandemic's occurrence every 7-10 years.

Q2.6: What are long-term fluctuations in disease occurrence?

Answer:

- Refers to secular change in disease distribution
- Means progressive change in disease occurrence
- Epidemiological transition

Q2.7: Explain the Epidemiological transition

Answer:

- **Epidemiological transition** means cases of non-communicable diseases are increasing over a decade.
- Shift from an era of communicable diseases to non-communicable diseases.

Q2.8: In recent years, the incidence of non-communicable diseases like diabetes and hypertension has increased. This is an example of:

A. Cyclical trend

B. Seasonal trend

C. Periodic trend

D. Secular trend

Answer: D. Secular trend

- A **secular trend** refers to a long-term change in the occurrence of a disease or health condition over an extended period, typically decades.

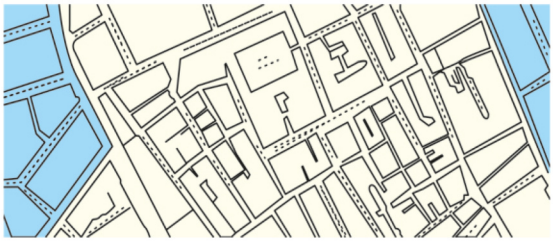
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- The steady increase in the incidence of non-communicable diseases like diabetes and hypertension over recent years is a classic example of this type of trend.

Q2.9: What are spot maps and their significance in epidemiology?

Answer:

- Spot maps are drawn to show the local distribution of cases
- Drawn by John Snow during the cholera epidemic in London and presented the clustering of cases around the source of infection was presented.
- John Snow: Father of epidemiology / Father of modern epidemiology



Q2.10: What are the steps of the investigation of an epidemic?

Answer:

Verification of diagnosis • Most important step
Confirmation of the existence of an epidemic
Define the population at risk.
Rapid search for all cases and their characteristics
Data analysis
Formulation of hypothesis • Work of descriptive epidemiology
Testing of hypothesis • Analytical study o All of those who have suffered have become the cases and compare them with those who have not become the cases to answer why and how.
Evaluation of etiological factors
Further investigation of the population at risk
Writing a report

Q2.11: When should the investigation of the Epidemic be stopped?

Answer:

- The investigation is stopped when no new cases occur for twice the incubation period of the disease from the occurrence of the last case.
- Preliminary study during an outbreak:
  - o Descriptive study
  - o Analytical study: Case-control study
    - → When there is evidence of an association between exposure and outcome: Cohort study

BIG QUESTION 3: Explain the concepts of host types and modes of transmission of infectious diseases with examples.

Broad Answer: The host is the organism that harbors the infectious agent. A primary (definitive) host supports the sexual cycle of the pathogen (e.g., Anopheles mosquito in malaria), while a secondary (intermediate) host supports the asexual cycle (e.g., humans in malaria). Dead-end hosts (e.g., humans in rabies) cannot transmit infection further, and obligate hosts (e.g., humans in typhoid, measles) are the only natural hosts. Transmission can be direct (person-to-person via contact, droplets, vertical transfer) or indirect (via vehicles like food/water, fomites, or vectors—mechanical or biological). Understanding these concepts is essential for breaking the chain of infection and planning control measures.

DETAILED QUESTIONS

Q3.1: Define the source of infection.

Answer:

- Any person, animal, object, or substance from which an infectious agent passes or is disseminated to the host: Source of infection

Q3.2: Define reservoir

Answer:

- Any person, animal, arthropod, plant, soil, or substance in which an infectious agent lives and multiplies, on which it primarily depends for survival, and where it reproduces itself in such a manner that it can be transmitted to a susceptible host: Reservoir

Q3.3: In which disease are the host and reservoir the same?

Answer:

- Tetanus

Q3.4: Give one example where the reservoir and source are different.

Answer:

- Hookworm infestation.

Q3.5: Give a few examples of diseases with their reservoirs and sources of infection.

Answer:

Disease	Reservoir	Source
Tuberculosis	Man	Sputum
HIV/AIDS	Man	Body secretions, fluids
Malaria	Man/mosquito	Infected blood
Rabies	Dog/other animals	Saliva
Measles	Man	Droplets
JE	Pigs and birds	Infected mosquitoes
Cholera	Man	Unsafe water and food

Typhoid	Man (Case or carrier)	Unsafe water and food
Plague	Rodents	Infected flies
Hookworm	Man	Soil contaminated with infective larvae
Tetanus	Soil	Soil

Q3.6: What are the different types of hosts?

Answer:

- Primary host
- Secondary host
- Dead-end host
- Obligate host

Q3.7: What is a primary host? Give an example.

Answer:

- The sexual cycle of the infectious agent takes place.
- Also called the definitive host.
- E.g., Anopheles in the case of malaria.

Q3.8: What is a secondary host? Give an example.

Answer:

- The asexual cycle of the agent occurs.
- Also called an intermediate host.
- E.g., a Man in case of malaria.

Q3.9: What is meant by a dead-end host? Give examples.

Answer:

- No person-to-person transmission.
- Accidental/ incidental host
- E.g., Rabies, Japanese Encephalitis, tetanus, Bubonic plague.

Q3.10: What is an obligate host? Give examples.

Answer:

- Only the host.
- Organisms cannot survive without a host
- Humans are obligate hosts of typhoid and measles

Q3.11: Give examples of diseases with their primary and secondary hosts.

Answers:

	Primary Host	Secondary Host
Malaria	Mosquito	Man
Filaria	Man	Mosquito (culex)

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Tapeworm	Man	• Pig (T.Soilum) • Cattle (T. Saginata)
Guinea worm	Man	Cyclops
Sleeping sickness	Man	TseTse fly
Hydatid disease	Dog	Sheep, cattle, man

Q3.12: What are the modes of disease transmission?

Answer:

- Direct transmission
- Indirect transmission

Q3.13: How is a disease directly transmitted?

Answer:

- A disease is directly transmitted via:
  - o Direct contact
  - o Droplet infection
  - o Contact with soil
  - o Inoculation into the skin or mucosa
  - o Vertical transmission- Transplacental

Q3.14: How is a disease indirectly transmitted?

Answer:

- A disease is indirectly transmitted via:
  - o Vehicle borne
  - o Airborne
    - → Droplet nuclei
    - → Dust
  - o Vector-borne
    - → Mechanical vector - asexual cycle
    - → Biological vector - sexual cycle
  - o Fomite borne
  - o Unclean hands and fingers

Q3.15: What are the differences between Droplet Infection and Droplet Nuclei?

Answer:

Droplet	Droplet Nuclei/ Airborne transmission
• Direct mode of transmission.	• Indirect mode of transmission. • Diseases: Measles, chickenpox, TB, influenza, covid 19.
• **Size: >5 microns.** • Heavier particles	• **Size: <5 microns.** • Lighter particles.
• Under the influence of gravity, fall to the ground.	• Airborne- Remain suspended in air.
• Travel a distance **<1 meter.**	• Travel a distance **>1 meter.**

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BIG QUESTION 4: Explain the different modes of biological transmission, key airborne transmission differences, and important epidemiological terms related to cases.

Broad Answer: Biological transmission occurs in vectors in three ways: **propagative** (agent multiplies only, e.g., dengue in Aedes), **cyclodevelopmental** (develops without multiplying, e.g., filarial worm in Culex), and **cyclopropagative** (multiplies and develops, e.g., malaria in Anopheles). **Droplets** (>5 microns) spread directly within 1 meter, while **droplet nuclei** (<5 microns) remain airborne and travel >1 meter. Key terms include **primary case** (first infected in the community), **secondary case** (infected from the primary), **index case** (first detected by investigators), **incubation period** (entry to symptoms), and **window period** (entry to lab positivity). Carriers, especially chronic or healthy carriers, can be epidemiologically more dangerous than cases, as they silently spread infection.

DETAILED QUESTIONS

Q4.1: What is the Biological cycle?

Answer:

- The biological cycle tells about how the agent is in the vector

Q4.2: What is a propagative biological transmission? Give examples.

Answer:

- Only increases in number or only multiplying in a vector.
- Dengue virus in the Aedes mosquito
- Plague bacilli in a rat flea

Q4.3: What is a cyclodevelopmental biological transmission? Give examples.

Answer:

- Only developmental, and the number remains the same
- Microfilaria in Culex.
- Dracunculus worm in cyclops

Q4.4: What is a cyclopropagative biological transmission? Give examples.

Answer:

- The agent multiplies and develops (changes shape) in the vector.
- Malaria parasite in Anopheles

Q4.5: What is a primary case in epidemiology?

Answer:

- The **first case of infectious origin** introduced in a population; the earliest case of the disease in a community.

Q4.6: What is a secondary case?

Answer:

- Cases that develop on exposure to a primary case.

Q4.7: Define incubation period.

Answer:

- The time interval between the **entry of an organism** into the body and the **development of signs and symptoms**.

Q4.8: What is the latent period?

Answer:

- The equivalent of the incubation period for **non-communicable diseases**.

Q4.9: What is an index case?

Answer:

- The **first case detected** or that comes to the notice of the investigator in a population.

Q4.10: What is the serial interval?

Answer:

- The time interval between the occurrence of the **primary case and the secondary case**.

Q4.11: What is the window period?

Answer:

- The time between **entry of the organism** and the point at which laboratory tests **first become positive**.

Q4.12: What is the median incubation period?

Answer:

- The time interval between the **entry of an organism** and the point at which **50% of cases have occurred**.

Q4.13: What is generation time in epidemiology?

Answer:

- The time interval between the **entry of an organism** and the point of **maximum infectivity**.

Q4.14: Which group is epidemiologically more dangerous than active cases of a disease?

Answer:

- Carriers — because they can transmit the disease without showing symptoms, making them harder to detect and control.

Q4.15: What are the types of carriers?

Answer:

- Contact carrier
- Paradoxical carrier
- Incubatory carrier
- Convalescent carrier
- Temporary carrier
- Chronic carrier
- Pseudo carrier
- Health carrier

Q4.16: Define contact, paradoxical, and incubatory carriers.

Answer:

Contact carrier	• Develops from a case.
Paradoxical carrier	• Develops from another carrier.
Incubatory carrier	• Shed organism during the incubation period

Q4.17: What are convalescent, temporary, chronic, and pseudo carriers?

Answer:

Convalescent carrier	• Carriers that are shedding organisms during the recovery phase.
Temporary carrier	• Carriers shedding organism for > 3months up to < 1 year
Chronic carrier	• Carriers shedding organisms for < 1 year
Pseudo carrier	• Carriers of an avirulent organism.

Q4.18: Describe a Healthy carrier

Answer:

- Emerges from subclinical cases.
- Victims of subclinical infection who have developed a carrier state without suffering from overt disease, but are nevertheless shedding the disease agent.
- E.g., Polio, cholera, meningococcal meningitis, salmonellosis, diphtheria.

Q4.19: Which diseases can produce a chronic carrier state?

Answer:

- Malaria
- Meningitis
- Typhoid
- Dysentery
- Gonorrhea
- Hepatitis B Virus (HBV)

Q4.20: Which diseases are associated with a healthy carrier state?

Answer:

- Polio
- Typhoid
- Cholera
- Diphtheria
- Meningitis

Q4.21: Which diseases are linked to a convalescent carrier state?

Answer:

- Diphtheria
- Typhoid
- Cholera
- Dysentery
- Pertussis

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Q4.22: Which diseases are known for an incubatory carrier state?

Answer:

- Diphtheria
- Measles
- Mumps
- Polio
- Pertussis
- Hepatitis B Virus (HBV)
- Influenza
- COVID-19

BIG QUESTION 5: What are the key epidemiological measures used to quantify disease events?

Broad Answer: In epidemiology, several measures are used to understand disease patterns. **The crude death rate** gives the overall mortality in a population. **The proportional mortality rate** shows the share of total deaths due to a particular disease, reflecting its burden. **The case fatality rate** measures the proportion of cases that die, indicating disease virulence. **Attack rate** is the incidence rate during an outbreak, showing how rapidly a disease spreads. **Secondary attack rate** measures the proportion of susceptible contacts who develop the disease within one incubation period of exposure, reflecting communicability. Together, these measures help in assessing severity, spread, and public health impact.

DETAILED QUESTIONS

Q5.1: Enumerate common measures of disease events

Answer:

- Crude death rate
- Proportional mortality rate
- Case fatality rate
- Attack rate
- Secondary attack rate

Q5.2: Which measure indicates the overall mortality in a population?

Answer:

- Crude death rate.

Q5.3: What is the simplest measure of mortality of a disease that reflects its burden?

Answer:

- Proportional mortality rate.

Q5.4: Which rate measures the virulence of a disease?

Answer:

- Case fatality rate.

Q5.5: Which measure is used to describe incidence during an outbreak?

Answer:

- Attack rate.

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Q5.6: What does the secondary attack rate measure, and how is it calculated?

Answer:

- It measures communicability/transmissibility of a disease;
- Calculated as:
  - Secondary attack rate= $\frac{\text{No. of Secondary cases that develop following exposure to a primary case within one incubation period of the disease}}{\text{Total Susceptible}} \times 100$

Q5.7: A village has a total of 100 under-five children. The coverage with the measles vaccine in these age groups is 60%. Following the occurrence of a measles case in a child after a visit outside, twenty-six children developed measles later. The secondary attack rate of measles is?

A. 16.6%

B. 26%

C. 65%

D. 66.6%

Answer:

- SAR = $(\frac{26}{39}) \times 100 = 66.6\%$
- Subtract the primary case from the susceptible

Q5.8: Differentiate between Isolation and Quarantine

PYQ: FMGE 2021

Answer:

Isolation	Quarantine
• Done for cases	• Done for healthy contacts
• Done for a period of communicability or transmissibility of a disease or till the person recovers.	• Done for a maximum incubation period of the disease. • Known as **absolute Quarantine.**

Q5.9: Explain the concept of modified quarantine.

Answer:

- Modified quarantine: partial limitation in freedom of movement
  - Exclusion of children from school

Q5.10: Who can apply quarantine to ships or vehicles suspected of carrying disease?

Answer:

- Health authorities can also apply the term quarantine to any ship or vehicle supposed to be the carrier of a disease.

7. CONCEPT OF HEALTH AND DISEASE

BIG QUESTION 1: What is the concept of well-being, and how is it measured using indices like PQLI and HDI?

Broad Answer: Well-being is a multidimensional concept comprising both objective and subjective components. The objective component includes the standard of living, which depends on the Gross National Product (GNP) or Gross National Income (GNI). The subjective component refers to quality of life, i.e., a person's perception, and is assessed using indices like PQLI (Physical Quality of Life Index) and HDI (Human Development Index).

DETAILED QUESTIONS:

Q1.1: What is the difference between the objective and subjective components of well-being?

Answer:

Well Being	
Objective Component • Independent of subject perception • standard of living/level of living • Depends on the Gross National Income/product of the country (GNP/GNI)	**Subject Component** • Affected by the subject's perception • Qualityoflife (Subject'sperceptionof happiness/unhappiness) • Depended on PQLI (physical quality of life index) and HDI (Human development index)

Q1.2: What is the difference between PQLI and HDI?

Answer:

PYQ: NEET PG 2022,2023 PYQ: FMGE 2021,2022 PYQ: INICET 2022

PQLI	HDI
Mnemonic: ILL	**Mnemonic:** KIL Given by the United Nations Developmental Program (UNDP)
1. Infant mortality rate - > 0 - 100	1. Knowledge index / Education index
2. Literacy rate	2. Income: Gross National income per capita in purchasing power parity US dollars.
3. Life expectancy at one year.	3. Life expectancy at birth.
Score: 0- 100 Current score: 65 Not used nowadays	Score: 0-1 Current score: 0.644 Rank (India): 134

Q1.3: How is the HDI calculated?

Answer:

Step 1: Calculate Dimension Index	$DI = \frac{(\text{Actual value} - \text{Minimum value})}{(\text{Max value} - \text{Minimum value})}$	• Calculate longevity index • Knowledge index • Income index
Step 2: Aggregate the subindices to produce HDI	HDI is the geometric mean of 3 dimension indices.	$HDI = I^{\frac{1}{3}}(\text{Life}) \times I^{\frac{1}{3}}(\text{Knowledge}) \times I^{\frac{1}{3}}(\text{Education})$

Q1.4: What are the dimensions of the Human Development Index?

Answer:

- Longevity:
  - o Life expectancy index
    - → Reflected by Life expectancy at birth
- Education:
  - o Knowledge index/education index
    - → Expected year of school - EYS
    - → Mean year of school - MYS
- Standard of living:
  - o Income index
    - → Reflected by Gross National income per capita in purchasing power parity US dollars

Q1.5: HDI includes which of the following parameter:

A. IMR
B. Life expectancy at birth
C. Life expectancy at 1 year
D. Literacy rate

Answer: B. Life expectancy at birth

Q1.6 What is true about PQLI?

A. Literacy rate, birth rate, life expectancy at birth
B. Life expectancy at 1 year, IMR, literacy rate
C. Life expectancy at birth, income, literacy rate,
D. Soon to be replaced by GNP

Answer: B. Life expectancy at 1 year, IMR, literacy rate

Explanation: The Human Development Index (HDI) includes life expectancy at birth, education indicators (literacy and school enrollment), and per capita income, but not IMR or life expectancy at 1 year.

- PQLI is an index developed by **Morris David Morris** to measure the **quality of life or well-being** of a country based on social indicators, **not economic ones**.

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BIG QUESTION 2: What is the Multidimensional Poverty Index (MDPI), and how is it used to assess acute poverty?

Broad Answer: The Multidimensional Poverty Index (MDPI) is an international measure that evaluates acute poverty in over 100 developing countries. It replaced the Human Poverty Index (HPI) and complements traditional monetary-based poverty measures.

DETAILED QUESTIONS:

Q2.1: What are the 3 dimensions of the Multidimensional Poverty Index?

Answer:

- Health
- Education
- Living Standards

Q2.2: What are the indicators used in MDPI and their weightage?

Answer:

Dimension	Indicators	Weight
Health	1. Nutrition	1/6
	2. Child Mortality	1/6
Education	3. Years of Schooling	1/6
	4. School Attendance	1/6
Living Standard	5. Cooking Fuel	1/18
	6. Sanitation	1/18
	7. Drinking Water	1/18
	8. Electricity	1/18
	9. Housing	1/18
	10. Assets	1/18

Q2.3: What are the thresholds of deprivation in MDPI?

Answer:

MDPI Score	Interpretation
20% - 33.3%	Vulnerability to poverty
> 33.3%	Poor
> 50%	Severe poverty

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Q2.4: What is the utility of MDPI?

Answer:

- MDPI is used to assess acute poverty using a multidimensional approach
- Overall deprivation in >1/3rd of indicators signifies poverty in a country

BIG QUESTION 3: What are the key theories explaining disease causation and their historical contributors?

Broad Answer: Over time, multiple theories have been proposed to explain the causation of diseases. These include early speculative ideas like the Miasma Theory and Spontaneous Generation, followed by more scientific models like the Germ Theory, Multifactorial Causation, and the Web of Causation. Each theory marks a significant development in the understanding of disease origin and spread.

DETAILED QUESTIONS:

Q3.1: What is the Miasma Theory, and who proposed it?

Answer:

- The Miasma Theory was proposed by William Furr. It states that diseases occur due to bad clouds, meaning the person is sick or has a disease because their time is not right.

Q3.2: What does the Theory of Spontaneous Generation suggest? Who gave this theory?

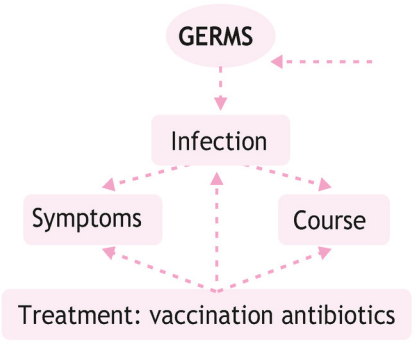
Answer:

- Theory of Spontaneous Generation was proposed by Aristotle
- This theory states that disease arises on its own, without any external agent or cause.

Q3.3: Who proposed the Germ Theory of Disease, and what does it state?

Answer:

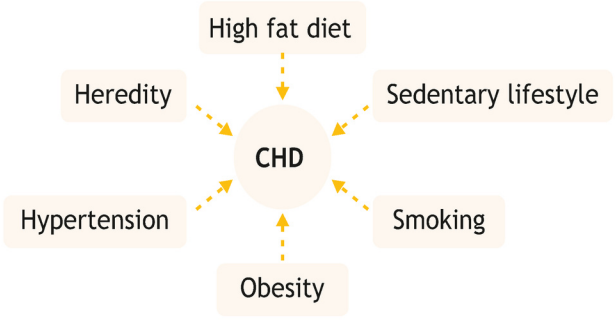
- Louis Pasteur proposed the Germ theory
- It states that diseases are caused by germs entering our bodies



Q3.4: What is the Theory of Multifactorial Causation?

Answer:

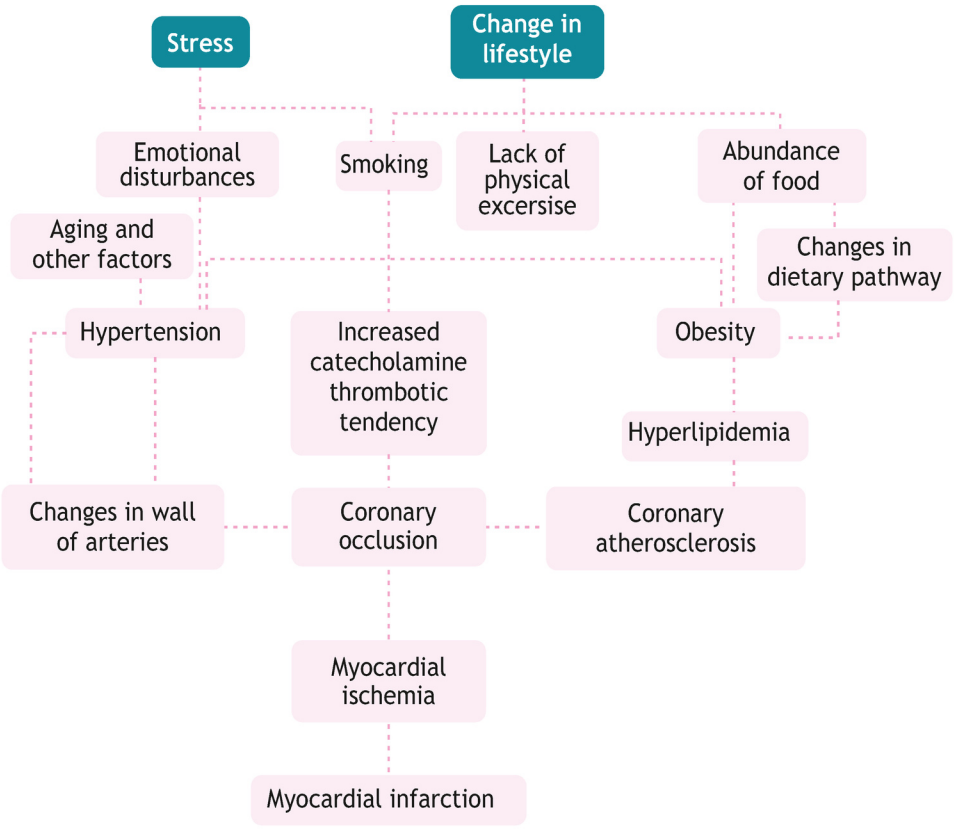
- Proposed by Pettenkofer
- It suggested a possible etiology of the disease



Q3.5: What is the Web of Causation model, and who introduced it?

Answer:

- Given by MacMahon and Pugh
- It highlights the possible modes of transmission of the disease



BIG QUESTION 4: What is the Epidemiological Triad?

Broad Answer: The Epidemiological triad explains disease occurrence as the result of the interaction between three elements: the agent, host, and environment. This model has evolved to the Advanced Triangle of Epidemiology

DETAILED QUESTIONS:

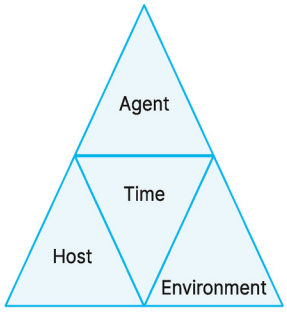
Q4.1: What are the three elements of the classical Epidemiological Triad?

PYQ: FMGE 2019

Answer:

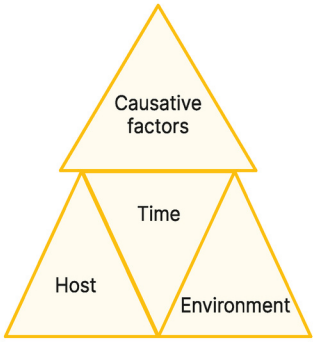
- Interaction and interdependence between
  - Agent
  - Host
  - Environment

Q4.2: What are the components of epidemiological triangle?



Q4.3: What changes were made in the advanced model of the epidemiological triangle?

Answer: In the advanced model, the agent is replaced by broader causative factors, making the model applicable to both communicable and non-communicable diseases.

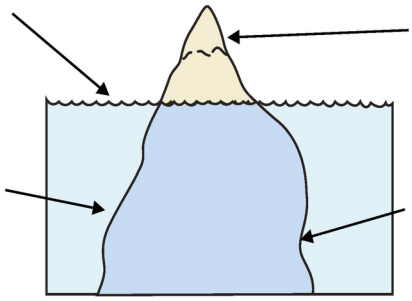


Q4.4: What is the Iceberg Phenomenon?

PYQ: NEET PG 2022
PYQ: FMGE 2021

Answer:

- In this concept, the diseases are compared to an Iceberg.

The line of demarcation separates the area of apparent infection from the inapparent infection.		**Tip of the Iceberg:** Apparent infection • Symptomatic / diagnosed cases. • Diagnostic test is applied.
The water around the iceberg represents a healthy population.		**Hidden Portion of the Iceberg:** Inapparent infection • Covers the people who are undiagnosed/ asymptomatic/ latent /carriers /subclinical cases. • Contributes to the maximum burden of a disease (Maximum prevalence) • Screening test is applied.

Q4.5: Which diseases follow the Iceberg Phenomenon?

Answer:

- Non-communicable diseases like CVD
- Cancer
- Protein-energy malnutrition
- Tuberculosis
- HIV

Q4.6: Which diseases do not follow the Iceberg Phenomenon?

Answer:

- Measles (as the source of infection is only a case of measles)
- Rabies (highest CFR rate)
- Tetanus (no person-to-person transmission)

BIG QUESTION 5: What is the spectrum of diseases, and how are diseases controlled, eliminated, and eradicated in public health?

Broad Answer: The spectrum of disease refers to the progression from exposure to a health event through impairment, disability, and potentially to handicap, reflecting the impact of disease on anatomy, physiology, and daily life roles. Public health addresses diseases at population level through control, elimination, and eradication. Control aims to reduce disease frequency and impact; elimination interrupts transmission in specific regions, though the agent may persist; eradication completely removes the agent globally.

DETAILED QUESTIONS:

Q5.1: What are the stages in the spectrum of disease?

Answer:

- Disease/Health event → Impairment → Disability → Handicap
- Impairment can be:
  - Loss of structure (anatomical)
  - Loss of function (physiological)
  - Affected mental health (psychological)
  - Handicap: Inability to fulfill social or life roles due to disability

Q5.2: Give examples of disease progression from event to handicap.

Answer:

- Accident → Loss of leg (impairment) → cannot walk (disability) → Loses job (handicap)
- Diabetes → Erectile dysfunction → No sexual activity → Divorce

Q5.3: What is disease control in public health?

Answer:

- It refers to ongoing operations aimed at reducing:
  - Frequency of disease incidence
  - Financial burden to the community
  - Effects of infection, including both physical & psychological complications
  - Duration & transmission of the disease
- So that the disease ceases to be a public health problem

Q5.4: What is meant by the elimination of a disease?

Answer:

- Complete interruption of transmission of the disease
- Agent may still persist in the population
- It has regional relevance (e.g., country/WHO-specific region)

Q5.5: Define eradication of a disease.

Answer:

- Extermination of the agent globally
- Agent no longer exists anywhere
- Example: Smallpox (1980), WPV2 (September 2015), WPV3 (October 2019)

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Q5.6: Which diseases are targeted globally for eradication?

Answer:

- Polio
- Measles
- Diphtheria

Q5.7: Which diseases have been eliminated or are targeted for elimination from India?

PYQ: NEET PG 2019

PYQ: FMGE 2023

Answer:

Disease Elimination from India	Disease Targeted by India for Elimination
Leprosy in 2005 • Elimination criteria: Occurrence of case <1/10,000 of the population • Current prevalence: 0.45	Kala Azar • Elimination criteria: Prevalence rate <1/10,000 population (India has currently reported but needs to be sustained)
Maternal and neonatal tetanus: Elimination criteria: <1 case/1000 live birth • Eliminated in September 2015." with a solid bullet	Filariasis • Elimination criteria: <1% microfilariae carrier rate.
Infective Trachoma	Measles
Guinea worm infection / Dracunculiasis	
Polio: India has been declared POLIO-FREE (elimination), with the last case presented in 2011 • India got the certificate of polio-free in 2014.	HIV AIDS by 2024 TB by 2025 Malaria by 2030

Q5.8: Causative agent is present, but there is no transmission; this phenomenon is known as?

A. Elimination

B. Control

C. Eradication

D. Endemic

Answer: A. Elimination

Explanation:

Elimination means:

- Zero incidence (no transmission) of a disease in a defined geographic area (e.g., a country or region).
- The causative agent is still present, so continuous surveillance and preventive measures are required.

Q5.9 Disease elimination refers to?

A. Extinction of disease agent

B. Termination of all diseases

C. Global removal of the disease agent

D. Regional removal of the disease agent

Answer: D. Regional removal of the disease agent

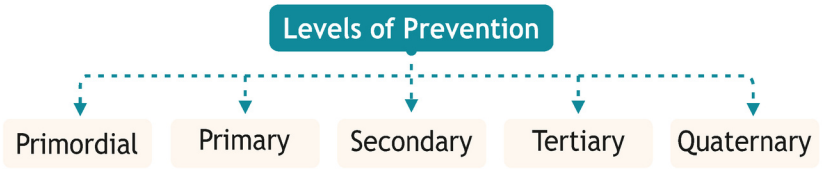
Explanation:

- Extinction of disease agent: Post-eradication agents are no longer maintained under supervised conditions in WHO/CDC-accredited labs
- Termination of all diseases: Eradication
- Global removal of the disease agent: Eradication
- Regional removal of the disease agent: Elimination

BIG QUESTION 6: What are the different levels of prevention in public health, and how do their interventions differ?

PYQ: FMGE 2019,2022

Broad Answer: Levels of prevention describe public health strategies aimed at different stages of disease development – from preventing the emergence of risk factors to limiting disability or avoiding overtreatment. These include:



DETAILED QUESTIONS:

Q6.1: What is primordial prevention, and what are its examples?

Answer: Prevention of the occurrence of risk factors

Definition	Mode of Interventions
• A level of prevention applied before the **emergence of risk factors.** • Example: o Do not start smoking and drinking. o Prevention of childhood obesity	• Achieved by **health education.**

Q6.2: What is primary prevention, and how is it categorized?

Answer: Prevention of the occurrence of disease

Definition	Mode of Interventions
• **The risk factor is present,** but the disease has not started. • Example: o Reduce smoking/ Quit smoking,	**Health Promotion** • Enables people to **lead a healthy life.** • **Adopted in Ottawa Charter** **Specific Protection**

Q6.3: Give example of Primary prevention- Health promotion & Specific protection.

Examples of Primary Prevention (Health Promotion)	Examples of Primary Prevention (Specific Protection)
• Providing safe water supply and sanitation • Hand washing	• Control of air, noise pollution • Chlorination of water • Use of helmets and seat belts to protect against head injuries • Use of mosquito nets • Use of contraception to parent unwanted pregnancy

	• Avoidance of allergens • Immunization • Chemoprophylaxis • IFA supplementation • Vitamin A prophylaxis • Protection against occupational hazards • Protection from carcinogens

- All types of immunization are primary prevention (specific protection) except the use of the BCG vaccine for the treatment of bladder cancer, in this case, secondary prevention

Q6.4: What is secondary prevention and give its key examples?

Answer:

- Prevention of the occurrence of complications from disease

Definition	Mode of Interventions
• The disease process has started, but there are **no complications.** • This means the **disease is still reversible.**	• Make an early diagnosis and provide treatment. • E.g., early diagnosis of cervical cancer by pap smear

Q6.5: Give some examples of secondary prevention of diseases.

Answer:

- Examples:
  - Active search for Malaria cases by MPW male
  - School health examination (most common ailments are dental ailments)
  - Health camps
  - PAP smear
  - Self-breast examination
  - MDT, ART, ATT (DOTS)
  - LASIK - treatment for myopia

Q6.6: What is tertiary prevention and how is it implemented?

Answer:

- Prevention of the occurrence of disability or fatality due to complications from disease

Definition	Mode of Interventions
• The disease has progressed to a stage of irreversibility. • Complications are present. • Eg: smoking cessation after habit	**Disability Limitations** • Limit further damage to the complication. **Rehabilitation** • It means making the person a part of the society again.

Q6.7: Give examples of tertiary level of prevention of diseases.

Answer:

- Examples:
  - Early ambulation after surgery to prevent DVT - Disability limitation
  - Reconstructive surgery - Rehabilitation
  - School for the blind - Rehabilitation

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- Crutches for patients suffering from polio - Rehabilitation
- Provision of artificial limbs - Rehabilitation
- Providing hearing aids - Rehabilitation
- Restoration of personal dignity and confidence - Psychological Rehabilitation
- Contact lenses/ Spectacles:
  - → They stabilize the vision → Disability
  - → They provide visual clarity → Rehabilitation

Q6.8: What is quaternary prevention and its purpose?

Answer:

- Prevent overdiagnosis and over treatments.
- It is a new term that denotes actions taken to identify patients at risk of overtreatment to protect them from new medical procedures and ethically acceptable alternatives to be advise

Q6.9: A person is going for a self-health check-up at a hospital as his father died last week due to ischemia. Which level of prevention is this?

A. Primary

B. Primordial

C. Secondary

D. Tertiary

Answer: C. Secondary

Explanation:

- **Primordial:** Preventing risk factors from emerging (e.g., healthy lifestyle from childhood)
- **Primary:** Preventing disease before it starts
- **Secondary:** Early detection of disease
- **Tertiary:** Reducing the impact of established disease

Q6.10: Which of the following is an example of primary prevention?

A. Measles vaccination

B. Smoking cessation after a heart attack

C. Self-breast examination for the lump

D. Cervical cytology screening

Answer: A. Measles vaccination

Explanation:

- Smoking cessation after MI- **Tertiary**
- Self-breast examination for the lump- **Secondary**
- Cervical cytology screening- **Secondary**

BIG QUESTION 7: What is ICD-11, and how does it differ from ICD-10?

Broad Answer: The International Classification of Diseases (ICD-11) is the 11th revision of the global standard developed by the World Health Organization (WHO) in 2018 for mortality and morbidity statistics. It is structured into 3 volumes and 26 chapters. It is more digitally compatible, clinically comprehensive, and globally standardized than ICD-10, reflecting updated medical terminology and clinical practices.

DETAILED QUESTIONS:

Q7.1: What is the purpose of ICD-11?

Answer:

- ICD-11 is used for the international classification of diseases to record mortality and morbidity statistics.

Q7.2: Who publishes ICD-11, and when was it released?

Answer:

- ICD-11 was published by the World Health Organization (WHO) in 2018

Q7.3: How is ICD-11 structured?

Answer:

- ICD-11 consists of:
- 3 Volumes:
  - Tabular list (Volume 1)
  - Reference guide (Volume 2)
  - Alphabetical index (Volume 3)
- 26 Chapters, including:
  - Chapter 6: Mental, behavioral, or neurodevelopmental disorders
  - Chapter 26: Traditional medicine
- V: Supplementary section for functioning assessment
- X: Extension codes for added detail

Q7.4: What are the advantages of ICD-11 over ICD-10?

Answer:

- Reflects current medical terminology and information needs
- Functions in digital and electronic health record environments
- More comprehensive for use in broader clinical settings, enabling greater international comparability with no country-specific variations

8. HEALTH INDICATORS

BIG QUESTION 1: What are the various health indicators and their purposes in public health?

Broad answer: Health indicators can measure health and reflect the health status of a population

DETAILED QUESTIONS

Q1.1: What are the various health indicators?

Answer:

- Mortality indicators
- Indicators of quality of life
- Morbidity indicators
- Health policy indicators
- Disability indicators
- Socio-economic indicators
- Nutritional status indicators
- Environmental indicator
- Healthcare delivery indicators
- Indicators of social and mental health
- Healthcare utilization indicators

Q1.2: What are the commonly used mortality indicators to assess population health?

Answer: PYQ: NEET PG 2022, 2023 | PYQ: INICET 2022, 2023 | PYQ: FMGE 2020, 2021, 2022, 2023

• Crude death rate • Age-specific death rate • Expectation of life • IMR: Infant mortality rate • U5MR: Under-five mortality rate	• Child mortality rate • Maternal mortality rate • Maternal mortality ratio • Disease-specific death rate • Proportional mortality rate • Case fatality rate • Year of potential life lost

Q1.3: What is "life expectancy at birth"?

Answer:

- Expectation of life
- Life expectancy at birth: A positive mortality indicator
- Average no. of years a newborn is expected to live, considering the current mortality rates.

Q1.4: What does the Crude Death Rate indicate, and how is it calculated?

Answer: The **Crude Death Rate (CDR)** is calculated as:

$$\text{CDR} = \frac{\text{Number of deaths in a year}}{\text{Mid-year population}} \times 1000$$

- Risk of death from all causes in a given population

Q1.5: What is the Age-Specific Death Rate, and what is its purpose?

Answer: The Age-specific death rate (ASDR) is calculated as:

$$\text{ASDR} = \frac{\text{Number of deaths in a specific age group in a given year}}{\text{Mid-year population of the same age group in the same year}} \times 1000$$

- Identify high-risk age groups for mortality.

Q1.6: What is the Age-Standardized Death Rate, and why is it used?

Answer: The age-standardized death rate (ASDR) is calculated as:

$$\text{ASDR} = \frac{\text{Number of expected deaths in the standard population}}{\text{Total standard population}} \times 100000$$

- Compare mortality patterns between two populations with different age structures

Q1.7: What is the Standardized Mortality Rate (SMR), and what is its purpose?

Answer: The Standardized mortality rate (SMR) is calculated as:

$$\text{SMR} = \frac{\text{Observed deaths in the study population}}{\text{Expected deaths (based on standard population rates)}}$$

- Compare mortality between the population vs the general population- same age structures

Q1.8: What is the Case Fatality Rate (CFR), and what's its use?

Answer: The case fatality rate (CFR) is calculated as:

$$\text{Case Fatality Rate (CFR)} = \frac{\text{Number of deaths due to a specific disease}}{\text{Total number of diagnosed cases of that disease}} \times 100$$

- Uses:
  - The measure of virulence/severity of a disease
  - Limited value for chronic diseases
  - Independent of the duration of the disease

Q1.9: What is the Proportional Mortality Rate, and what does it reflect?

Answer: The Proportional Mortality rate (PMR) is calculated as:

$$\text{PMR} = \frac{\text{Number of deaths due to a specific disease (or cause)}}{\text{Total number of deaths from all causes in th same population and period}} \times 100$$

- Simplest measure of the burden of disease

Q1.10: What are morbidity indicators, and what do they include?

Answer:

- Morbidity indicators measure spells of sickness or illness due to disease.
- They include:
  - Incidence (new cases)
  - Prevalence (total existing cases)
  - Spells of sickness / Sickness absenteeism
  - Notification rate

YOURWISH

- Duration of hospital stay
- Attendance rate at OPD and health centers
- Admission, readmission, and discharge rate

Q1.11: What are Health Care Delivery Indicators?

Answer:

- Doctor-population ratio
- Doctor-nurse ratio
- Population-bed ratio
- Population per health center/ sub-centers
- Population per traditional birth attendant
- Availability of health services
- Accessibility of health care services
- Quality of health care delivery

Q1.12: Give examples of Health Care Utilization Indicators.

Answer:

- Proportion of infants who are fully immunized: 76.1% (NFHS-5)
- Proportion of pregnant women who receive ANC care or have institutional deliveries
- Percentage of the population that adopts family planning
- Bed occupancy ratio, Bed turnover ratio etc.,

BIG QUESTION 2: Describe the various types of disability indicators and explain what aspects of health and functioning they are designed to measure.

Broad answer: Disability Indicators, such as disability rates, measure any restriction or lack of ability to perform an activity, reflecting the level of functional limitation in a population.

DETAILED QUESTIONS

Q2.1: What are the types of disability indicators?

Answer:

Types of disability indicators	
Event type disability indicator	**Person-type disability indicator**
• E.g., No. of days restricted to bed due to sickness • Bed disability rates • Work/school days lost within a specified period	• Limitation of mobility- confined to bed • Limitation of activity- not able to perform activities.

Q2.2: What is a Disability-Adjusted Life Year (DALY) and what does it represent?

PYQ: FMGE 2022

Answer:

- 1 DALY: Years of life lost to premature death + years lived with disability
- 1 DALY: 1 year of healthy life lost
  - Perfect health = 0
  - Death = 1
- It is the best measure of the burden of disease and the effectiveness of intervention
- Maximum DALY in India and worldwide: Cardiovascular disease

YOURWISH

Q2.3: What is Sullivan's Index and what does it indicate?

Answer:

- Advanced disability indicator
- Sullivan's index = LE - Duration of stability
- It is a disability-free life expectancy based on current rates of mortality and disability
- Active life expectancy

Q2.4: What is Health-Adjusted Life Expectancy (HALE) and what does it represent?

Answer:

- HALE = Life Expectancy at birth + adjustment of time spent in poor health
- Average no. of years a newborn is expected to live in full health considering the current rates of ill health and mortality.

Q2.5: What does the Quality-Adjusted Life Year (QALY) represent, and how is it used in evaluating health interventions ?

Answer:

- Measures disease burden based on Quality and quantity of life lived
- No. of years of life added due to the medical intervention
- QALY: 1 year of life lived in perfect health
- Measures quality of life in health gain
- Expressed in terms of utility value
- Best measure of cost-effectiveness of intervention
- Score between 0 (death) and 1 (perfect health)

Q2.6: Due to recent advances in testing for breast cancer, life expectancy has reportedly increased by 20 years in a country X. The healthcare utility value for the country was 0.7. Which indicator can be calculated from the parameters given?

A. DALY
B. HALE
C. QALY
D. DFLE

Answer: C. QALY

- QALY combines both quantity and quality of life. It is calculated by multiplying life expectancy by a health utility value (here, 20 years × 0.7 = 14 QALYs). Since both life expectancy and utility score are given, QALY is the appropriate indicator.

Q2.7: Life expectancy of two different countries can be compared using which of the following demographic indicators?

A. QALY
B. DALY
C. HDI
D. HPI

Answer: **C. HDI** (Human Development Index)

- HDI is a composite indicator used to compare overall development between countries. It includes life expectancy, education, and per capita income. Thus, it allows for comparing life expectancy along with other key development parameters across countries.

Q2.8: What do Health Policy Indicators reflect, and what is the recommended health expenditure as per WHO?

Answer:

- % GDP spent on health: Increases public health expenditure to 2.5 % of GDP by 2025
- Every country should spend 5% of GDP on health, according to WHO
- India currently spends 1.2 % GDP on health

Q2.9: How do Environmental Indicators reflect the quality of public health infrastructure? Provide examples.

Answer:

- Percentage of the population has access to safe water supply and sanitation
- Percentage of households that have a water source at home within 15 minutes

Q2.10: All are disability indicators except:

A. Disability-adjusted life years
B. Health-adjusted life expectancy
C. Sullivans index
D. Life expectancy

Answer: D. Life expectancy

- Only measures **average number of years a person is expected to live**, regardless of disability status

Q2.11: How is Years of Potential Life Lost (YPLL) used to assess the impact of premature mortality?

Answer:

- Mortality indicator
- Years of life lost due to premature death
- Defined as one that occurs before the age to which a dying person could have expected to survive (usually taken as 75 years)

9. VACCINE AND COLD CHAIN

BIG QUESTION 1: What is vaccination, and who are the scientists known for major contributions to the development of vaccines?

Broad answer:

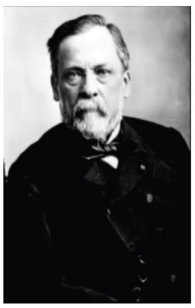
- Vaccination is the primary level of prevention (specific protection)
- Scientists known for major contributions to the development of vaccines are:
  - Louis Pasteur
  - Edward Jenner

DETAILED QUESTIONS

Q1.1: What are the contributions of Louis Pasteur & Edward Jenner towards the development of vaccines?

Answer:

Scientist	Work Done
Louis Pasteur	• Coined the term "vaccine" • Proposed Germ theory of disease causation • Rabies and anthrax vaccine
Edward Jenner	• Discovered the first vaccine - smallpox vaccine • Coined the term "vaccination"



Louis Pasteur



Edward Jenner

Q1.2:What level of prevention does vaccination fall under, and what are examples of active and passive immunity?

Answer:

- All forms of vaccination are considered the primary level of prevention (specific protection), except for the use of the BCG vaccine (intravesical instillation) in bladder cancer treatment
  - Since the BCG vaccine is used as a mode of intervention, it falls under the secondary level of prevention
- Example:
  - Active Immunity: Vaccine
  - Passive Immunity: Immunoglobulins

Q1.3: In which diseases are both active and passive immunizations given simultaneously?

Answer:

- Rabies
- Tetanus
- Hepatitis B
- Diphtheria

Q1.4: Which disease does not allow the simultaneous administration of active and passive immunity?

Answer:

- Measles

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- Immunoglobulins are given after 2 weeks of the vaccine
- If immunoglobulin is given first, then the vaccine is given after 12 weeks

BIG QUESTION 2: What are the types of vaccines, their characteristics, examples, and special considerations in immunization schedules?

Broad answer:

- Vaccines are classified based on the form of the pathogen and components used:
  - Live vaccines: Contain attenuated (weakened) organisms that stimulate strong and long-lasting immunity; may require boosters in certain cases (e.g., OPV).
  - Killed (inactivated) vaccines: Contain organisms killed by heat or chemicals; multiple doses and boosters are usually needed.
  - Subunit vaccines: Prepared from parts of the organism (toxoid, protein, polysaccharide, conjugate, recombinant); often safer and suitable for immunocompromised individuals.
  - Combination vaccines: Contain more than one immunizing agent to protect against multiple diseases simultaneously.
- Vaccines may also exist in both live and killed forms (e.g., polio, JE, influenza).
- Proper scheduling, strain specificity, and antibody response monitoring are essential for effective immunization.

DETAILED QUESTIONS

Q2.1: What does the term "attenuated form" mean in the context of vaccines?

Answer:

- Organism's virulence (disease-causing ability) is reduced, while its antigenicity (ability to stimulate antibody production) is preserved in attenuated form

Q2.2: Which live vaccine typically requires booster doses despite single-dose sufficiency in other live vaccines?

Answer:

- Single vaccine doses are sufficient to produce the required immunity for live vaccines
- Exception: Oral polio vaccine
  - In OPV, other than the primary dose, booster doses are required to produce sufficient immunity

Q2.3: Give examples of Live vaccines

PYQ: INICET 2022

Answer:

Mnemonic: **I love Chick EMBRYO**

- **I**nfluenza live- via the nasal root
- **Chick**en pox/varicella vaccine
  - Stain: Oka strain
- **E**ncephalitis (Japanese- live)
  - Strain: SA-14-14-2
- **M**easles/measles-rubella
- **B**CG
- **R**otavirus vaccines
- **Y**ellow fever vaccine
- **O**ral polio vaccine (OPV- Found by Sabin)

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Q2.4: What are the key features of killed (inactivated) vaccines?

PYQ: FMGE 2021

Answer:

- Killed vaccines are prepared from organisms that have been inactivated by heat or chemicals (formalin)
- Major antigens persist, while minor antigens are destroyed
- Require multiple doses and booster doses to build and maintain immunity

Q2.5: Give examples of killed vaccines.

Answer:

Mnemonic: **KILLED**

- **K**FD (Kyasanur Forest disease)
- **I**PV (discovered by SALK)
- Ki**LL**ed Influenza
- **E**ncephalitis (Japanese- Killed)
  - Strain: JENVAC
- **D**og bite-Rabies (not a part of NIS)

Q2.6: Name a few vaccines available in both live and killed form.

Answer:

- Polio vaccine (OPV and IPV)
- Influenza vaccine
- JE
- Hepatitis A

Q2.7: All are live vaccines except?

A. Hepatitis B

B. Measles

C. Yellow fever

D. Rubella

Answer: A. Hepatitis B

- Hepatitis B is a recombinant vaccine

Q2.8: All are live vaccines except?

A. Measles

B. Yellow fever

C. BCG

D. JE

Answer: D. JE:

- JE vaccine is both live and killed vaccines

Q2.9: What are subunit vaccines and what its types?

Answer:

- Subunit vaccines are prepared from extracted cellular fractions of the organism
- Types

- Toxoids
- Protein
- Recombinant vaccine
- Polysaccharide vaccine
- Conjugate vaccine

Q2.10: When are toxoid vaccines used?

Answer:

- Tt - in trauma
- Td - Tetanus Diphtheria in NIS (National Immunization Schedule)

Q2.11: Which vaccines are based on protein components?

Answer:

- Killed Influenza vaccine (hemagglutinin and Neuraminidase)
- Acellular pertussis vaccines

Q2.12: What are recombinant vaccines, and give examples?

Answer:

- Recombinant vaccines are prepared by DNA technology
- Hepatitis B - b subunit recombinant vaccine
- Hepatitis B vaccine is prepared using HbSAg
- HPV (Human Papillomavirus) for cervical cancer

Q2.13: What are polysaccharide vaccines, and give some examples?

Answer:

- Antibody is produced against the capsular polysaccharide of pathogenic bacteria
- Hib - Haemophilus influenzae B
- Meningococcal
- VI polysaccharide (killed typhoid)
- Pneumococcal polysaccharide vaccine 23
  - PPV23 is not used in children below 2 years

Q2.14: What is a conjugate vaccine, and what are its advantages and disadvantages?

Answer:

- Polysaccharide antigen is chemically linked to a protein recognized by T cells
- Advantage: More efficient in children < 2 years
- Disadvantage: Serotype-specific
- Example:
  - Pneumococcal (Pneumococcal conjugate vaccine PCV 13)
    → PCV used in NIS
  - HiB

Q2.15: What is a combination vaccine, and can you give examples?

Answer:

- It contains more than one immunizing agent

- Example:
  - MMR vaccine protects from measles, mumps, and rubella
  - MMR V with varicella
  - DPT: Diphtheria, tetanus, and pertussis.
  - Pentavalent vaccine protects from DPT (Diphtheria, pertussis, and tetanus), HbsAgS (hepatitis B), and Hib (Haemophilus influenzae)

Q2.16: Which of the following statements regarding live vaccines is false?

A. Two live vaccines cannot be administered simultaneously

B. Booster doses are not required when live vaccines are administered

C. Single doses give lifelong immunity

D. The live vaccine contains major and minor antigens

Answer: A. Two live vaccines cannot be administered simultaneously

- Two live vaccines or one live and one killed vaccine can be administered simultaneously at different sites

Q2.17: Name the commonly used vaccines and their specific strains

PYQ: FMGE 2022

Answer:

Vaccines	Strains
BCG- Protects from extrapulmonary TB	Danish 1331
Measles	Edmonston Zagreb
Mumps	Jeryl Lynn strain
Rubella	RA 27/3
Chickenpox vaccine/ Varicella vaccine	Oka
Japanese Encephalitis	Live: SA-14-14-2 Killed: Jenvac
Yellow fever	17 D
Dengue	CYD- TDV
Polio	OPV: Sabin IPV: Salk
Leprosy	Mycobacterium pranii indicus
HIV	Modified vaccinia Ancara
Malaria	Mosquirix, Lytic cocktail RTS/AS/01
Influenza (killed)	A7/California/2009

BIG QUESTION 3: When was the National Immunization Schedule (NIS) started, and who are its beneficiaries?

Broad answer:

- The National Immunization Schedule (NIS) is a government program initiated on November 19, 1985, to provide systematic vaccination against preventable diseases. It targets children from birth to 16 years and pregnant women, aiming to reduce morbidity and mortality from vaccine-preventable illnesses through timely immunizations, boosters, and essential supplements like Vitamin A

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DETAILED QUESTIONS

Q3.1: Which vaccines are given at birth under the National Immunization Schedule?

Answer:

- BCG, OPV_0 (Oral Polio Vaccine), and HepB (birth dose)

Q3.2: Which vaccines are administered at 6 weeks of age?

Answer:

- OPV_1, RV_1 (Rotavirus), $Penta_1$, $fIPV_1$ (Fractional IPV), and PCV_1 (Pneumococcal Conjugate Vaccine)

Q3.3: What vaccines are given at 10 weeks of age?

Answer:

- OPV_2, RV_2, $Penta_2$

Q3.4: Which vaccines are scheduled at 14 weeks of age?

Answer:

- OPV_3, RV_3, $Penta_3$, $fIPV_2$, PCV_2

Q3.5: What immunizations are given at 9 months?

Answer:

- MR_1 (Measles-Rubella), JE_1 (Killed Japanese Encephalitis), PCV booster, $fIPV_3$, and Vitamin A drops

Q3.6: What vaccines are administered between 16 to 24 months?

Answer:

- MR_2, JE_2, OPV booster, and DPT 1st booster

Q3.7: Which vaccine is given at 5 to 6 years of age?

Answer:

- DPT 2nd booster

Q3.8: What is the vaccine given at 10 years of age under NIS?

Answer:

- Td_1 (Tetanus and Diphtheria)

Q3.9: Which vaccine is administered at 16 years?

Answer:

- Td_2 (Tetanus and Diphtheria)

Q3.10: What is the schedule and dosage of Vitamin A supplementation in children under the National Immunization Programme?

Answer:

- 9 completed months- 1 ml or 1 L IU
- Thereafter, every 6 months till 5 years of age- 2 ml or 2L IU
- Total number of doses of Vitamin A- 9
- Total dose of Vitamin A given- 17 lakh IU

YOURWISH

Q3.11: What is the Td vaccination schedule for pregnant women under the National Immunization Schedule (NIS)?

Answer:

Criteria	Vaccine
• Primi- First time pregnant or Multi with last childbirth more than 3 years ago	• 2 doses of Td vaccine o Td_1- As soon as possible o Td_2- 4 weeks or 28 days later
• Multi with last childbirth less than 3 years ago	• Booster dose of Td vaccine around the 7th month of pregnancy.

Q3.12: A 26-year-old primigravida in her second trimester presented to the hospital to take her Td dose. Which of the following is true regarding Td dose in pregnancy?

A. 1 dose in 2nd trimester

B. 2 doses (1 month apart) in the second trimester

C. 1 dose anytime as soon as possible in pregnancy

D. 2 doses (1 month apart) as soon as possible in pregnancy

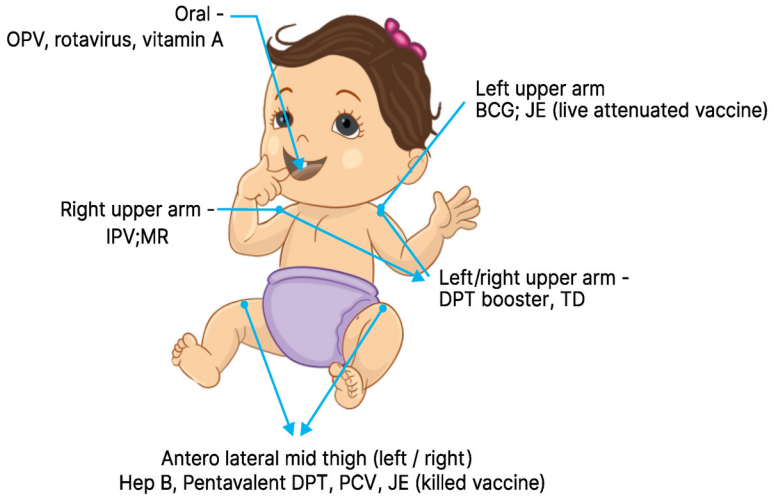
Answer: D. 2 doses (1 month apart) as soon as possible in pregnancy

- The Td (Tetanus and Diphtheria) vaccine is recommended during every pregnancy, ideally starting as early as possible.
- Two doses are given 1 month apart, with the first dose as early as feasible to ensure protection for both mother and baby

Q3.13: What are the routes, dose, and site of administration of various vaccines?

Answer:

ORAL	ID (0.1 ml, Angle- 10-15°)	S/C (0.5 ml, Angle- 45°)	IM (0.5ml, Angle- 90°)
OPV • Dose- 2 drops	BCG • Dose- 0.05 ml up to 1 month • After 1 month till 1 year - 0.1 ml • Site - Left upper arm	MR • 9 completed months • Site- Right upper arm	't' series vaccine • Hepatitis B • Pentavalent • DPT (upto 1st booster) • Site- Anterolateral aspect of left thigh
Rotavirus Vaccine • Dose- 5 drops	**fIPV- ⅕ of the full dose** • Dose- 0.1ml • Site- Right upper arm	**JE** • Site- Left upper arm • Given only in endemic areas	**PCV** • Site- Anterolateral aspect of the right thigh **JE - Jenvac** (Left thigh)



Q3.14: How many drops of polio vaccine can save a life?

Answer:

- 2 drops of polio vaccine can save a life

Q3.15: How many drops are given in Rotavirus-associated diarrhea?

Answer:

- 5 drops

Q3.16: Why is the DPT 2nd booster given in the upper arm instead of the thigh after 5 years of age?

Answer:

- After 5 years, absorption from the leg decreases, so the DPT 2nd booster is given in either of the upper arms

Q3.17: You are posted at a PHC, and you have to ensure that the routine vaccination process is carried out smoothly. All of the vaccines are given at 16-24 months except:

A. DPT booster

B. OPVbooster

C. Japanese encephalitis 2nd dose

D. PCV booster

Answer: D. PCV booster

- The PCV (Pneumococcal Conjugate Vaccine) booster is typically given at 9 months, not at 16-24 months, unlike DPT booster, OPV booster, and JE 2nd dose, which are scheduled in the 16-24 month age range as part of NIS

Q3.18: What are the key differences between a tuberculin syringe and an insulin syringe, and can they be used interchangeably?

Answer:

- The tuberculin syringe has (0.1ml to 1 ml) markings
- The insulin syringe has units 10 to 100 units
- There is no interchangeability between the syringes



Q3.19: What are the angles of needle insertion for intradermal (ID), subcutaneous (S/C), and intramuscular (IM) injections, and what device is used to safely cut used syringe hubs?

Answer:

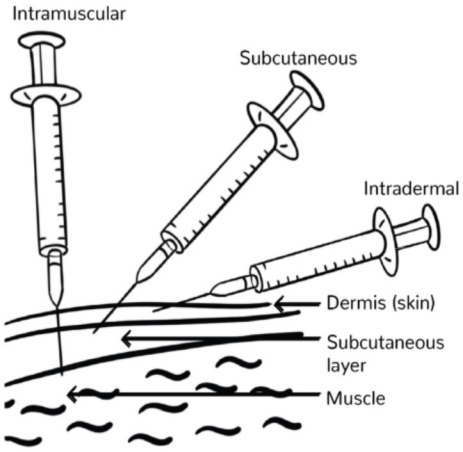
- Hubcutter is used to safely cut the used syringe hub.



Intramuscular injection-angle is 90°



Hub cutter



ID (Angle- 10-15°)	S/C (Angle- 45°)	IM (Angle- 90°)

BIG QUESTION 4: What is delayed immunization?

Broad answer:

- Delayed immunization refers to the administration of vaccines later than the recommended age or schedule. While vaccination programs aim for timely protection, various factors can lead to delays, such as parental concerns, illness of the child, socio-economic barriers, or disruptions in healthcare services

DETAILED QUESTIONS

Q4.1: What is the delayed immunization schedule for different vaccines? PYQ: INICET 2023 PYQ: NEET PG 2023

Answer:

Time	Vaccine
Till 15 days	OPV birth dose
Till 24 hours	Hepatitis B- birth dose
Upto 1 year	• BCG • Rotavirus Vaccine • Pentavalent • fIPV • PCV • Hepatitis B vaccine alone can also be given till 1-year
Upto 5 years	• OPV • Measles vaccine • MR vaccine • Vit A drops
Upto 6 yrs	HiB
Upto 7 years	DPT
Upto 15 years	JE
Life long	Td

YOURWISH

Q4.2: An 18-month-old unvaccinated child comes to the PHC for the first time. Vaccines to be given include:

A. OPV, DPT

B. Pentavalent vaccine

C. BCG, OPV

D. BCG, OPV, MMR, Pentavalent

Answer: A. OPV, DPT

- For an 18-month-old unvaccinated child, BCG is generally not given after 1 year as efficacy decreases.
- Instead, the child should receive vaccines that are age-appropriate catch-up doses, including OPV and DPT, which are part of the booster schedule at this age

Q4.3: What are the common additives or excipients used in DPT, OPV, and Measles vaccines, and what are their purposes?

Answer:

- DPT
  - Aluminium compound- Adjuvant (increase antibody formation)
  - Thiomersal- Preservative
- OPV
  - Magnesium compound- Thermostability
- Measles
  - Neomycin (Antibiotic)- Prevents Toxic Shock Syndrome

BIG QUESTION 5: What are the general and specific contraindications for administering vaccines, including live vaccines?

Broad answer:

- All vaccines are contraindicated, whether live or killed in:
  - Previous anaphylactic reaction
  - Current serious illness
- Live vaccines are contraindicated during pregnancy, radiation therapy, and severe symptomatic immunodeficiency.

DETAILED QUESTIONS

Q5.1: Which vaccines are contraindicated during pregnancy, and what is the exception?

Answer:

- All live vaccines are contraindicated except for yellow fever vaccine
  - In India, the yellow fever vaccine is not used due to the required storage temperature
  - Yellow fever is an exotic disease in India

Q5.2: Which vaccine is contraindicated during mild to moderate fever?

Answer:

- All vaccines are given, while mild to moderate fever except the typhoid oral vaccine

Q5.3: Are vaccines contraindicated in cases of protein-energy malnutrition (PEM) or mild to moderate diarrhea and fever?

Answer:

- No vaccine is contraindicated in protein-energy malnutrition (PEM) or mild to moderate diarrhea and fever

Q5.4: What should be done regarding vaccination during high-grade fever or acute illness?

Answer:

- Withhold all vaccines

Q5.6: Are any vaccines contraindicated in individuals with asymptomatic HIV infection?

Answer:

- No vaccine is contraindicated in individuals with asymptomatic HIV infection

Q5.7: Which live vaccines are allowed in symptomatic HIV patients (adults and newborns)?

Answer:

- Adult
  - All live vaccines are contraindicated except measles, measles-rubella, MMR, and varicella vaccines
- Newborn
  - All live Vaccines are contraindicated except for measles, OPV, and BCG (TB endemic areas)

Q5.8: Which component of the DPT vaccine is contraindicated in individuals with epilepsy?

Answer:

- DPT (Pertussis component) is contraindicated in individuals with epilepsy

Q5.9: What vaccine is contraindicated in individuals with epilepsy or progressive neurologic disease?

Answer:

- DPT is contraindicated (pertussis component)
- DPT can be given to people who have convulsions controlled by anti-epileptics

Q5.10: What vaccines are contraindicated in individuals receiving immunosuppressants or corticosteroids, and what is the recommended waiting period before vaccination?

Answer:

- All live vaccines are contraindicated
- Stop for a minimum of 2 weeks, then give the live vaccine

Q5.11: Which vaccines are contraindicated in individuals with egg allergy?

Answer:

- Yellow fever and Influenza vaccines are contraindicated

Q5.12: Which vaccines are contraindicated in individuals with a neomycin allergy?

Answer:

- Measles
- MR

Q5.13: What are the general contraindications applicable to all vaccines?

Answer:

- Previous anaphylaxis and current serious illness are general contraindication

Q5.14: A vaccine contraindicated during pregnancy is:

A. Hepatitis A

B. Rabies

C. Yellow fever

D. JE

Answer: D. JE

- Live vaccines like Japanese Encephalitis (JE) are generally contraindicated during pregnancy due to the potential risk to the fetus.
- In contrast, Hepatitis A, Rabies, and even Yellow fever (in high-risk areas) may be given if the benefits outweigh the risks

Q5.15: List the adverse effects of various vaccines.

Answer:

Vaccine	Side-effects
Influenza (inactivated)	GBS (Guillain-Barré syndrome)
Japanese Encephalitis	Neurologic events
TT, Td	Brachial neuritis
OPV	VAPP - Vaccine-associated paralytic poliomyelitis
Hep B>DPT	Anaphylaxis, Hypersensitivity, shock
Measles	Toxic shock syndrome (TSS), febrile seizures, anaphylaxis, encephalopathy
Rotavirus (After 1 month)	Intussusception
Pertussis	Inconsolable crying- > 3hrs, HHE (Hypotensive hyporesponsive encephalopathy)
BCG	Osteomyelitis, lymphadenopathy, Ulcer- most common
MMR	Thrombocytopenia
Rubella, MMR	Arthralgia

Q5.16: An eight-month-old child had a history of unusual crying and convulsions following previous vaccination after BCG, DPT, and OPV (first dose), and Hepatitis B. Now, the parents have brought their child to the next dose of vaccination. Which vaccine is contraindicated in this situation?

A. Measles

B.DPT

C. Hepatitis B

D. DT

Answer: B.DPT

- Inconsolable crying following the DPT/ Pentavalent vaccine due to the pertussis component is not an absolute contraindication for the DPT/ Pentavalent vaccine

Q5.17: A 1-year-old child was bought to the OPD for vaccination. He had 1 dose of DPT 6 weeks after birth. After that, other doses were not administered. What should be the next step? PYQ: INICET 2022

A. Restarts DPT
B. Give only DT
C. Give 2 doses
D. Not to give anything

Answer: C. Give 2 doses

- If a child has received only 1 dose of DPT and missed the subsequent doses, the schedule should be resumed, not restarted.
- The child should be given 2 more doses of DPT, at least 4 weeks apart, to complete the primary series and ensure adequate immunity

Q5.18: You are the medical officer of a PHC. A child is due for the measles vaccine; however, he is having diarrhea. What should be the plan of action?

A. Do not give the vaccine
B. Can give the vaccine to the child and ask the mother to wait for 1/2 an hour at the PHC
C. Can give the vaccine to the child and ask the mother to leave
D. Not sure

Answer: B. Can give the vaccine to the child and ask the mother to wait for 1/2 an hour at the PHC

- Mild illnesses like diarrhea are not contraindications for vaccination.
- The measles vaccine can safely be administered, and as per standard immunization protocol, the mother should be asked to wait for 30 minutes to monitor for any adverse events following immunization

BIG QUESTION 6: What is vaccine availability and in which forms are vaccine available?

Broad answer:

- Vaccine availability refers to the forms in which vaccines are manufactured and distributed for administration
- Primarily, vaccines are available in two forms: powdered (lyophilized) and liquid

DETAILED QUESTIONS

Q6.1: What are powered vaccines, and how are they prepared before administration?

Answer:

- Cannot be injected
- Needs to be reconstituted by adding diluent
- These vaccines are called reconstituted vaccines, freeze-dried vaccines, or lyophilized vaccines

Q6.2: How long can BCG, Measles, Japanese Encephalitis, and Yellow Fever vaccines each be used after opening?

Answer:

- BCG- Can be used up to 4 hours after opening
- Measles or Measles rubella- Can be used up to 4 hours after opening
- Japanese encephalitis- Can be used up to 2 hours after opening
- Yellow fever- Can be used up to 1/2 hour after opening

Q6.3: What diluents are used for reconstituting vaccines like BCG, Measles, Japanese Encephalitis, and Yellow Fever?

Answer:

Vaccine	Diluent
BCG	Normal saline
Measles or Measles rubella	Distilled water/ sterile water
Japanese encephalitis	Phosphate buffer solution
Yellow fever	Cold physiological saline

BIG QUESTION 7: What is the Open Vial Policy in immunization programs?

Broad answer:

- Open vial policy states that vaccine vials opened in a session site can be used in more than one immunization session up to 4 weeks/ 28 days

DETAILED QUESTIONS

Q7.1: What are the conditions that must be met to use a vaccine vial under the Open Vial Policy?

Answer: PYQ: INICET 2023 PYQ: NEET PG 2023 PYQ: FMGE 2021, 2023

- The extra date has not passed
- Vaccines are stored strictly under an appropriate temperature (+2 to +8°C) range during transportation and storage at a cold chain point
- Aseptic technique has been used to withdraw all doses
- The vaccine vial monitor has not reached the discard point
- The vaccine vial septum is not contaminated

Q7.2: Which vaccines are included under the Open Vial Policy and what is their common physical form?

Answer:

- Vaccines following Open Vial Policy: All are Liquid vaccines (All t series vaccine + PIO + Jenvac)
  - Hepatitis B
  - DPT
  - Pentavalent
  - Td, Tt
  - Rotavac
  - PCV
  - IPV
  - OPV
  - Jenvac-killed JE

Q7.3: Which vaccines do not follow the Open Vial Policy, and what are they commonly known as?

Answer:

- Vaccines that do not follow the open vial policy are known as reconstituted vaccines
  - BCG, Measles, MR, JE(Live), Yellowfever, COVID vaccine

YOURWISH

Q7.4: An ANM receives two open vial vaccines- one MMR vaccine vial and another pneumococcal vaccine vial. Which vial can be used for the immunization round?

A. Discard MMR and use Pneumococcal

B. Use MMR and discard the Pneumococcal

C. Both discard

D. Both can be used

Answer: A. Discard MMR and use Pneumococcal

- As per the Open Vial Policy, reconstituted vaccines like MMR must be used within 4 hours and cannot be reused once opened.
- In contrast, liquid vaccines like Pneumococcal Conjugate Vaccine (PCV) can be used in subsequent sessions if they meet storage and handling criteria

Q7.5: Which vaccines are sensitive to heat and freezing?

Answer:

Vaccines Sensitive to Heat	Vaccines Sensitive to Freezing
• BCG (after reconstitution) - most sensitive • OPV • IPV • Measles, MR • Rota • JE • DPT • BCG (before reconstitution) • TT • Penta • Hepatitis B	• Hepatitis B - most sensitive • Pentavalent • IPV • DPT • DT • TT

Q7.6: Which are the most heat-sensitive vaccines?

Answer:

- Reconstituted BCG
- OPV
- Measles

Q7.7: Which is the most freeze-sensitive vaccine?

Answer:

- Hepatitis B

Q7.8: How can vaccine damage due to heat or cold be detected, and is the loss of potency reversible?

Answer:

- Physical appearance of the vaccine may remain unchanged even after it is damaged
- The loss of potency of vaccines due to either exposure to heat or cold is permanent and cannot be regained
- Damage of vaccine to heat → Vaccine vial monitor
- Damage of vaccine to cold → Shake test

BIG QUESTION 8: What is a vaccine vial monitor?

Broad answer:

- Vaccine vial monitor is a heat-sensitive label that reflects overexposure to heat by changing the color of the monitor.

DETAILED QUESTIONS

Q8.1: What is the structure of a Vaccine Vial Monitor (VVM), and which chemical is used in it? PYQ: FMGE 2021

Answer:

- VVM has an outer circle and an inner square
- Chemical is always present in the square - Toluene sulfate

Q8.2: How can you tell if the vial is safe to use based on the color of the inner square and outer circle?

Answer:



• The inner square is lighter than the outer circle.	• The inner square starts to change color but is still lighter than the outer circle.	• The inner square has the same color as the outer circle.	• The inner square is darker than the outer circle.
• Can be used	• Can be used	• Cannot be used	• Cannot be used

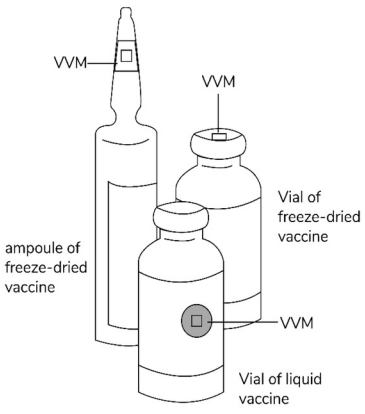
Q8.3: In which color bag should vaccine vials be discarded, and why?

Answer:

- Vaccine vials are discarded in yellow color bags as they contain the vaccine inside them

Q8.4: Where is the Vaccine Vial Monitor (VVM) placed on different types of vaccines?

Answer:

Placement of VVM on Vaccines	• VVM is on the body- Liquid vaccine. • VVM is on the cap/ neck of the ampule- A freeze-dried vaccine or reconstituted vaccine - do not follow open vial policy	

Q8.5: Which of the following options is correct?

1. VVM has a chemical indicator in the circle, which changes color
2. VVM gives an idea of the number of days for ethe xpiry of vaccine
3. It is the only tool among all time temperature indicators that is available at any time in the process of distribution, and at the time a vaccine is administered at a health center
4. It indicates whether the vaccine has been exposed to a combination of excessive heat over time and whether it is likely to have been damaged
5. 5. VVM tells about the efficacy of the vaccine
6. 6. The expiry date of the vaccine can be relaxed if the WM is intact

A. 1,2,4 are correct

B. 1,3,5 are correct

C. 3 and 4 are correct

D. All are correct

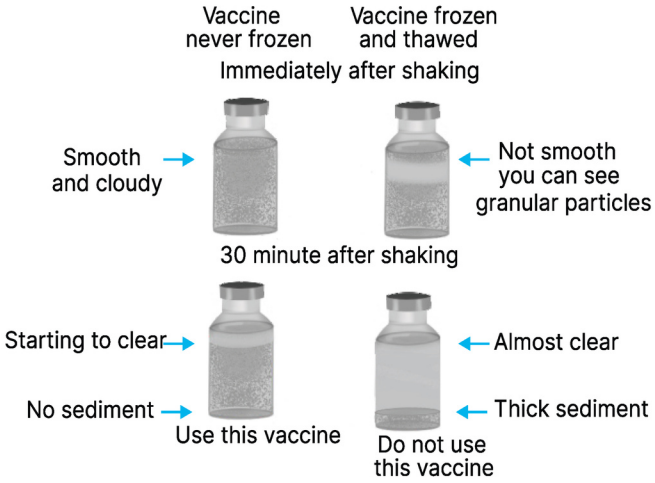
Answer: C. 3 and 4 are correct

- Statement 3 is correct: VVM is available throughout the cold chain, even at the point of administration
- Statement 4 is correct: VVM indicates if a vaccine has likely been damaged due to heat over time

Q8.6: What is the purpose of the Shake Test in vaccine handling?

Answer:

- Used to check whether the vaccine vials have been damaged by exposure to freezing conditions



BIG QUESTION 9: What is the required cold chain temperature range for vaccine storage in India, and why is it important?

PYQ: FMGE 2023 PYQ: INICET 2023 PYQ: NEET PG 2023

Broad answer:

- The vaccines must be maintained at proper temperatures and conditions from the point of manufacture to the point of use
- Cold chain temperature in India is +2° to +8°C

DETAILED QUESTIONS

Q9.1: Which vaccines can be stored in freezing conditions, and what is the recommended temperature range?

Answer:

- OPV (long-term storage) and yellow fever vaccine in freezing conditions: -15° to - 25°C

Q9.2: At which healthcare levels is cold chain failure most likely, and why are vaccines not stored there?

Answer:

- The maximum chance of failure of the cold chain is seen at the subcenter and Village levels; thus, vaccines are not stored there

Q9.3: How are vaccines handled and stored at the Subcenter or Village level?

Answer:

- Vaccines are not stored but carried using a vaccine carrier/day carrier/ice packs
- The temperature of vaccines can be maintained by carriers for up to 24 to 48 hours, and ice packs for up to 1-4 hours

Q9.4: What type of vaccine storage equipment is used at Primary Health Centers, and what is its purpose?

Answer:

- Small ILR (Ice Lined Refrigerators)
  - Contains up to 140 liters
  - Stored for up to 1 month
- Small DF (Deep Freezer)- Only used to prepare the ice packs

Q9.5: What vaccine storage facilities are available at CHCs, Sub-District Hospitals, and District Hospitals?

Answer:

- Large ILR
  - Contains a 300-liter capacity
  - Stored for up to 1 month
- Large deep freezers - Used to prepare ice packs at the temperature

Q9.6: What cold chain facilities are available at the national, state, and regional levels for vaccine storage and handling?

Answer:

- Walk-in cold rooms
  - Maintain the temperature of the vaccine for up to 3 months
- Walk-in freezers
  - Prepare ice packs

Q9.7: What equipments is used in cold chain storage?

Answer:

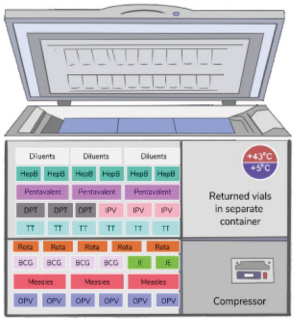
- Ice line refrigerator
- Dial thermometer
- Stem alcohol thermometer
- Domestic refrigerator
- Vaccine carrier
- Day carrier
- Ice pack

YOURWISH

YOURWISH

Q9.8: What is the most important equipment used in the vaccine cold chain, and how does it function?

Answer:



- Ice line refrigerator is the most important equipment for the cold chain is the ILR (ice line refrigerator)
- This is a top-load refrigerator opened from the top
- Mechanism of the ILR - All cold air goes and settles at the bottom

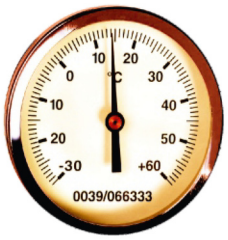
Q9.9: What is the vaccine placement rule in an Ice Line Refrigerator (ILR), and which vaccines are most sensitive to freezing and heat?

Answer: Vaccine Placement Rule

- At the bottom of ILR, never place freeze-sensitive vaccines
- Always place heat-sensitive vaccines only
- Most freeze-sensitive vaccine is Hepatitis B vaccine, so it is placed at the topmost level of ILR
- Most Heat-sensitive vaccine is the OPV vaccine
- If ILR receives an uninterrupted electricity supply for 8 hours, it can function for 5 days continuously

Q9.10: How is the temperature of an Ice Line Refrigerator (ILR) monitored, and who is responsible for it?

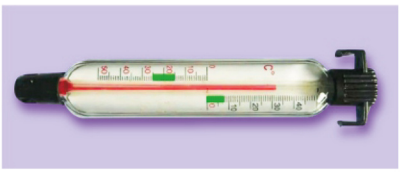
Answer:



- Dial thermometer is used to monitor the temperature of the ILR
- It is based on the principle of the thermocouple
- Monitors the temperature of ILR twice a day
- Done by a medical officer

Q9.11: Which other equipment is used for monitoring the temperature of ILR/Deep Freezer (DF)?

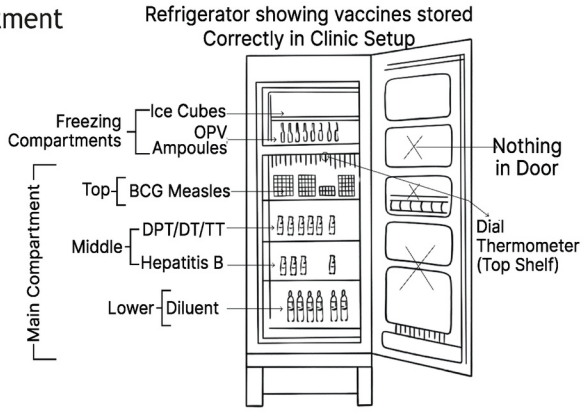
Answer:



- Stem alcohol thermometer is also used for monitoring the temperature of ILR/Deep Freezer (DF)

Q9.12: How should vaccines be stored in a domestic refrigerator when an ILR is not available, and what precautions must be taken with diluents?

Answer:



- Used only if no ILR is available
- Heat-sensitive vaccines are stored next to the freezing compartment
- OPV ampules can be stored for the long term
- BCG, measles vaccine on the top shelf
- Middle shelf- 't' series vaccines
- At the bottom place, the hepatitis B vaccines (freeze-sensitive vaccine)
- Diluents are kept on a lower shelf
  - Can be stored at room temperature
  - Must be brought to the same temperature as the vaccine 24 hours before the session

- If not, it will lead to Toxic shock syndrome
- Never keep any vaccine at the door side of the refrigerator

Q9.13: What are the features and capacity of a vaccine carrier used during immunization sessions?

Answer:



- Lined with 4 ice packs
- Can carry 16 to 20 vaccine vials
- Maintains vaccines for up to 24 to 48 hours
- The vaccine carrier may be blue or white

Q9.14: What are the features and capacity of a day carrier used in field immunization?

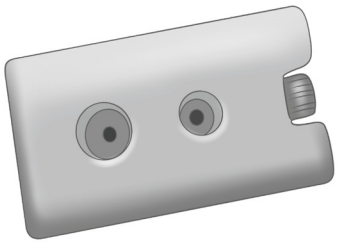
PYQ: FMGE 2019

Answer:

- Lined by two ice packs
- Carries 6 to 8 vaccine vials
- Maintain vaccines for up to 24 to 48 hours

Q9.15: What are the preparation guidelines and usage details for ice packs used in vaccine transportation?

Answer:



- Prepared in a deep freezer
- Temperature: −15°C to −25°C
- Carry out sessions at sub-center, village levels, or outreach sessions
- Ice packs have 2 holes for keeping the vaccines
- Plain water is filled only up to the horizontal level as the water expands on freezing
- Only water should be added
- Ice packs can maintain the temperature of the vaccine for up to 1-4 hours

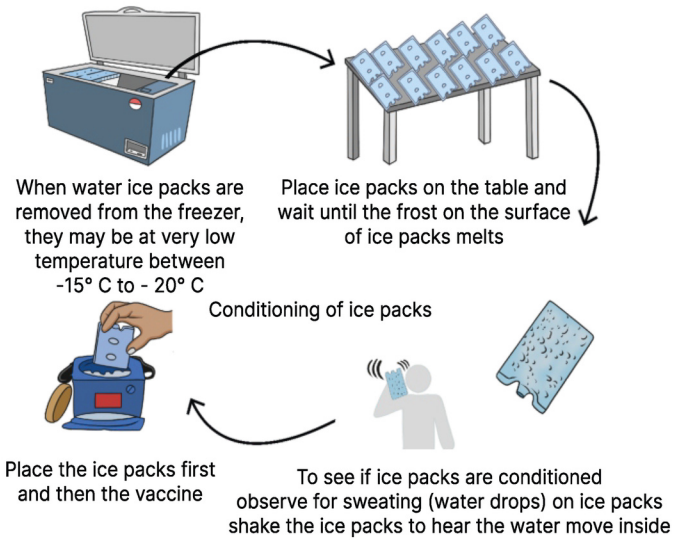
Q9.16: What is the purpose of conditioning ice packs, and how is it identified during vaccine transport?

Answer:

- Water droplets signify the conditioning of the ice pack- A process called sweating
- Conditioning reduces the temperature from ice to the required temperature (+2°C to +8°C)

Q9.17: What are the steps involved in conditioning ice packs before placing vaccines in a carrier?

Answer:



Q9.18: What is the reverse cold chain, and how are stool samples for suspected AFP cases transported?

Answer:

- Carry stool sample from suspected AFP (acute flaccid paralysis)
- Red carriers can carry reverse cold chain products
- The temperature required to carry the stool sample is +2°C to +8°C
- This carrier can be transported to the National Institute of Virology in Pune within 72 hours.

Q9.19: What is an example of a warm chain?

Answer:

- Kangaroo mother care

BIG QUESTION 10: What is Mission Indradhanush, and when was it launched?

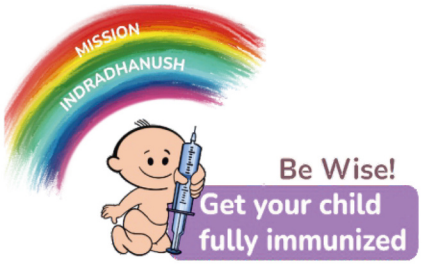
Broad answer:

- Mission Indradhanush is a government initiative to increase vaccine coverage in India
- Launched in 2014

DETAILED QUESTIONS

Q10.1: What is the key message promoted by Mission Indradhanush regarding child health?

Answer:



Q10.2: What is Mission Indradhanush 5.0, and who are its target beneficiaries?

Answer:

- Latest is Mission Indra Dhanush 5.0 - Launched in February 2020 to achieve > 90% full vaccination in
  - Dropouts- incomplete vaccination
  - Left outs- never started vaccination (0-2yrs)
  - Pregnant women

Q10.3: How many diseases are covered under Mission Indradhanush, and why is only 11 included in the Pan-India coverage?

Answer:

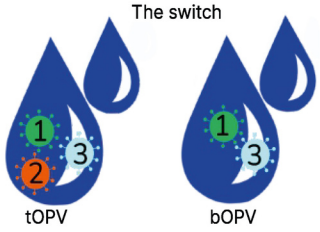
- 12 diseases are included
- Pan India- only 11 diseases are included because the Japanese encephalitis vaccine is not given throughout India; it is given only in endemic areas

BIG QUESTION 11: What is "The Switch" in polio vaccination, and when was it implemented?

Broad answer:

- Switch- switching from trivalent to bivalent OPV
- Proposed: 25th April 2016

PYQ: FMGE 2021



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DETAILED QUESTIONS

Q11.1: What is the difference between trivalent and bivalent oral polio vaccines in terms of poliovirus types included?

Answer:

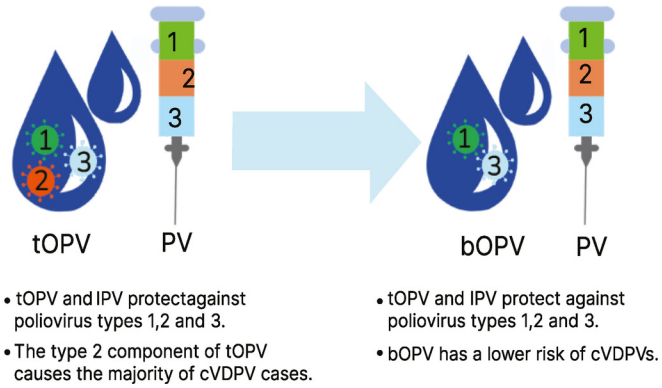
- Trivalent oral polio vaccine
  - o A live vaccine containing attenuated forms of wpv1, wpv2, and wpv3
- Bivalent oral polio vaccine
  - o Contains attenuated forms of wpv1 and wpv3

Q11.2: Why was the switch from trivalent to bivalent OPV implemented, and what were the key milestones in polio eradication in India?

Answer:

- wpv2 in tOPV was leading to CVDPV (Circulating Vaccine Derived Poliovirus)- Dangerous and causing outbreaks
- wpv2 was eradicated in September 2015
- National Validation Day - 9th May 2016: India was declared free of tOPV
- wpv3 is associated with VAPP (vaccine-associated paralytic polio); it does not cause outbreaks
- wpv3 eradicated in October 2019. To maintain immunity against type 3 components, it is retained in bOPV

The switch from tOPV to bOPV



Q11.3: What is the purpose of the eVIN app in the immunization program?

Answer:

- EVIN app provides information about vaccine logistics/stocks of vaccine

eVIN
ELECTRONIC VACCINE INTELLIGENCE NETWORK

Q11.4: What is the function of the SAFE-VAC system in vaccination programs?

Answer:

- SAFE-VAC provides information about adverse effects reported post-vaccination

Q11.5: What is ring immunization, and how is it implemented around a suspected case?

Answer:

- Ring Immunization: Any suspected case in the center, vaccinate the susceptible children within a 100-yard radius of the infected case

Q11.6: What is herd immunity?

Answer:

- Herd Immunity: Break in the chain of disease transmission

YOURWISH

Q11.7: What are the herd immunity threshold levels for common diseases, and which diseases do not benefit from herd immunity?

Answer:

- Threshold cut off:
  - Measles, Pertussis, Chickenpox >90%
  - Polio, Mumps: 80-85%
  - No role of herd immunity in tetanus and rabies

Q11.8: Who is considered a fully immunized child under the National Immunization Schedule?

Answer:

- A fully immunized child under the National Immunization Schedule (NIS) is:
  - A child aged 12-23 months who has received all primary immunization vaccines scheduled before 1 year of age

Q11.9: Who is considered a completely immunized child under the National Immunization Schedule?

Answer:

- Completely immunized: A child who has completed all due vaccines till 2 years of age among 5-year-olds

Q11.10: Does the BCG vaccine protect against pulmonary tuberculosis?

Answer:

- BCG vaccine does not protect from pulmonary TB

Q11.11: What is the effectiveness of one and two doses of the measles vaccine, and what vaccination strategy has India adopted?

Answer:

- >90% with one dose
- >99% with two doses
- India adopted the 2-dose measles vaccine strategy called the Accelerated Measles Mortality Reduction Strategy

Q11.12: Which vaccine has the highest efficacy with a single dose, and what is its effectiveness rate?

Answer:

- Rubella >95% (Vaccine with highest efficacy with a single dose)

Q11.13: What is Cervavac, which strains does it target, and what is its recommended dosing schedule and age group?

Answer:

- Cervical cancer vaccine
- Target strains- 6,11,16,18
- Vaccine type: L1 VLP: Based on major capsid protein L1 virus-like particles (VLPs)
- Age: 9-26 years, in females
- Dose: 2 doses 6 months apart (3 doses for immunocompromised)

Q11.14: Which of the following is/are a combination vaccine?

A. DaPT vaccine

B. Pneumococcal vaccine

C. Hepatitis B vaccine

D. OPV vaccine
E. MMR vaccine

Answer: A. DaPT vaccine and E. MMR vaccine

- Combination vaccines contain multiple antigens in a single shot to protect against multiple diseases:
  - DaPT vaccine combines Diphtheria, acellular Pertussis, and Tetanus
  - MMR vaccine combines Measles, Mumps, and Rubella

Q11.15: All live vaccines are contraindicated in Pregnancy except:

A. Yellow fever vaccine
B. BCG
C. OPV
D. Rubella

Answer: A. Yellow fever vaccine

- Live vaccines like BCG, OPV, and Rubella are generally contraindicated in pregnancy due to the risk to the fetus.
- However, Yellow fever vaccine—though live—is an exception: it may be given during pregnancy if travel to an endemic area is unavoidable, as the benefits outweigh the risks in such cases

Q11.16: Which is not a contraindication for OPV?

A. Leukemia
B. Diarrhea
C. Malignancy
D. Immunocompromised

Answer: B. Diarrhea

- Mild diarrhea is not a contraindication for giving Oral Polio Vaccine (OPV); the dose can still be administered, although absorption might be slightly reduced
- In contrast, leukemia, malignancy, and immunocompromised states are contraindications because OPV is a live attenuated vaccine and may pose a risk in these conditions

10. SCREENING

BIG QUESTION1: What is screening, and why is it an important tool in public health?

Broad answer: Screening is the process of identifying unrecognized diseases or defects in apparently healthy individuals using simple, quick tests. It is a secondary level of prevention, aimed at early diagnosis and timely treatment to reduce complications, mortality, and disease transmission. Screening detects disease in the pre-symptomatic phase, allowing for interventions before clinical symptoms appear. It helps identify the hidden burden of disease (as described by the iceberg phenomenon) and is especially valuable in non-communicable diseases like hypertension, diabetes, and cancer. The benefits of screening outweigh its risks when the disease is common, has a latent phase, and effective treatment is available.

DETAILED QUESTIONS

Q1.1: What is meant by the "Iceberg Phenomenon" in epidemiology, and what do its different parts represent?

Answer:

PYQ: FMGE 2021

- Diseases are compared to an iceberg.
- **Tip of the iceberg** → Diagnosed cases.
- **Hidden portion** → Asymptomatic individuals, subclinical cases, carriers, latent infections.
  - Apparently healthy, but the disease process has begun.
  - Contributes to maximum disease burden.
- **Water around the iceberg** → Healthy population.
- **Line of demarcation** → Separates apparent from inapparent infections.

Q1.2:In the context of the Iceberg Phenomenon, where are diagnostic and screening tests applied, and who is interested in each portion?

Answer:

- **Diagnostic test** → Applied on the tip of the iceberg (diagnosed cases).
- **Screening test** → Applied on the hidden portion (asymptomatic/subclinical cases).
- **Clinician** → Interested in the tip portion.
- **Epidemiologist** → Interested in the hidden portion.

Q1.3: Name the diseases that do not follow the Iceberg phenomenon.

Answer:

- Measles (The Source of infection is a case)
- Tetanus (No person-to-person transmission)
- Rabies (It has a 100% case fatality rate)

Q1.4: Name the diseases that follow the Iceberg phenomenon.

Answer:

- Non-communicable diseases
- Diabetes

- Hypertension, CVDs
- Cancers
- Protein-energy malnutrition
- Tuberculosis, HIV

Q1.5 Differentiate between screening and diagnostic test

Answer:

Screening test	Diagnostic test
Done on apparently healthy people It is applied on the hidden portion	Done on those who are sick. It is applied on the tip of the iceberg
Applied to groups.	Applied on individual patients
Test results are arbitrary and final	Diagnosis is not final but modified in the light of new evidence, sum of evidence.
Based on one criterion or cut-off point.	Based on evaluation of a number of symptoms, signs and laboratory findings.
Less accurate	More accurate
Less expensive	More expensive
Cannot be used as a basis for treatment	Can be used as a basis for treatment.
Initiative comes from investigator or agency providing care	Initiative comes from a patient with complaint.

Q1.6: A characteristic of a diagnostic test as compared to a screening test is:

A. Test results are arbitrary and final

B. Based on one criterion or cutoff point

C. Less accurate

D. Done on those with an indication or sick

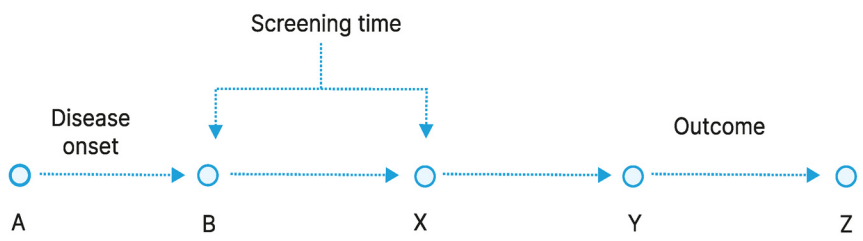
Answer: D. Done on those with an indication or sick

Q1.7: What is lead time in screening, and how is it different from screening time?

PYQ: FMGE 2022, 2021

Answer:

- The purpose of screening test is to provide early diagnosis, timely treatment and prolong the survival
- A- Point of disease onset st
- B- 1 possible point of diagnosis (no signs and symptoms)
- X- A critical point of diagnosis
- Y- Usual time of diagnosis (signs & symptoms present)
- B - Y- Lead time (early detection of the diseases)
- B - X- Screening time



YOURWISH

Q1.8: What is the time gained by early detection of diseases called?

Answer:

- Lead time

Q1.9: What is the Time difference between the earlier possible point of diagnosis and critical point of diagnosis ?

Answer:

- Screening time

Q1.10: What is the time difference between the earliest possible point of diagnosis and usual point of diagnosis ?

Answer:

- Lead time

Q1.11: What are the key characteristics that make a disease suitable for screening in public health?

Answer:

- Condition should be an important public health problem
  - It should have a substantial prevalence
  - It can be identified by cross sectional study
- There should be a recognizable latent or early asymptomatic period (early pathogenesis phase)
- Natural history of the disease should be well understood including development from latent to declared disease
- There is a test to detect the presence of disease prior to onset of signs and symptoms.
  - Eg: Pap smear for Cervical cancer
- Facilities should be available to confirm the diagnosis.
- There should be effective treatment
- Evidence which shows that early detection and treatment reduces mortality and morbidity due to disease.
- The expected benefits (Eg: no of lives saved) by early detection exceeds the risks and costs

Q1.12: Screening for a condition is recommended when:

A. Low case fatality rate

B. Diagnostic tools not available

C. No effective treatment is possible

D. Early diagnosis can change the disease course because of effective treatment

Answer: D. Early diagnosis can change the disease course because of effective treatment

Q1.13: Name some of the types of screening.

Answer:

- Mass screening
- High risk screening (Selective screening)
- Multiphase screening
- Multipurpose screening
- Case finding or opportunistic screening

Q1.14: What is mass screening in public health, and what are its characteristics and examples?

Answer:

- Screening of the whole or large population irrespective of high-risk status.
- Done for diseases with high prevalence.

- The least efficient type of screening.
- Example: Screening for TB using chest X-ray.

Q1.15: What is high-risk (selective) screening, and why is it considered the most efficient type of screening? Give an example.

Answer:

- Screening of individuals based on high-risk criteria.
- Most efficient → focuses on people with a higher probability of developing the disease.
- Example: Mammography in women with a history of breast cancer.

Q1.16: What is multiphase screening, and how is it applied? Give an example.

Answer:

- Definition: Application of two or more screening tests together on a large group of people at one time to detect a single disease.
- Example: Cervical cancer detection in a health camp → questionnaire, Pap smear, and visual inspection done simultaneously instead of separately for the population.

Q1.17: What are the disadvantages of multiphase screening?

Answer:

- It is expensive
- Few tests might not be validated

Q1.18: What is multipurpose screening, and how does it differ from multiphase screening? Give an example.

Answer:

- Definition: Screening of a population using more than one test simultaneously to detect more than one disease.
- Example: Antenatal investigations in pregnant women Hb, Rh typing, HIV, VDRL, HBsAg, urine routine microscopy.

Q1.19: What is case finding (opportunistic screening), and how is it applied? Give an example.

Answer:

- Definition: Screening is limited to patients who visit a healthcare provider for another purpose.
- Purpose: Presumptive identification of an unrecognized disease not requested by the patient.
- Example: A cancer patient visiting the OPD is also screened for diabetes or hypertension.

Q1.20: List a few examples of activities and the type of screening indicated for them.

Answer:

Activity	Type of screening
Random blood sugar for people residing in an urban slum.	Mass screening
Screening for CVD in the elderly.	High risk
Screening for TB in resettlement colonies.	High risk
Screening for cervical cancer in lower socio-economic status.	High risk

Annual health checkups.	Multipurpose screening
Health camps.	Multiphase screening
Screening of pregnant women	Multipurpose screening

Q1.21 What are the categories of screening test ? PYQ: NEET PG 2020

Answer:

Prescriptive screening	Prospective screening (presumptive, predictive screening)
Done for one's own benefit	Done for others benefit
Secondary level of prevention	Primary level of prevention
Purpose -Early case detection and timely treatment	Purpose -Control of disease and health planning

Examples of prescriptive screening	Examples of prospective screening
• Screening neonates for neonatal hypothyroidism • Deafness in children • Blood glucose testing for diabetes mellitus • Mammography for breast cancer • PAP smear for cervical cancer • Visual acuity for refractive errors.	• Screening of immigrants for infections disease like TB and COVID (risk factor for the others) • HIV screening for blood donation • HIV screening in ANC cases • Health checkups for persons working in a food industry.

Q1.22: Which of the following is an example of prescriptive screening?

A. PAP smear for cervical cancer
B. Screening of immigrants for yellow fever
C. Screening of blood donors
D. Screening for HIV during antenatal visits

Answer: A - PAP smear for cervical cases

- Screening for cervical cancer by PAP smear is for the benefit of the woman herself
- It's an example of Prescriptive screening

BIG QUESTION 2: What are the essential properties of a good screening test and how are they assessed?

Broad Answer: A good screening test must be acceptable, meaning it should be painless, quick, and non-embarrassing, to ensure high participation. It must be reliable—yielding consistent results on repeated testing (reproducibility/precision). Reliability is assessed using tools like Cohen's Kappa (for interobserver agreement). The test must also be valid (accurate)—correctly identifying those with and without the disease, as compared to the gold standard. Validity is evaluated through sensitivity (detecting true positives), specificity (detecting true negatives), and predictive values (likelihood test results reflect disease status). These properties together determine how well a screening test performs in real-world public health programs.

DETAILED QUESTIONS

Q2.1: What are the properties of a screening test?

Answer:

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- Acceptability
- Reliability
- Validity/Accuracy

Q2.2: What is the most important property of a screening test in terms of participant cooperation, and how should it be designed to meet this criterion?

Answer:

- **Most important property:** Acceptability.
- **Requirement:** The Screening test should be painless and non-embarrassing.

Q2.3: In the context of screening tests, what is reliability, what are its other names, and how is observer variation assessed?

Answer:

- **Definition:** Degree to which repeated measurements of a test yield the **same result** under the same conditions.
- **Other names:** Repeatability, reproducibility, consistency, precision.
- **Types of variation:**
  - **Intraobserver variation** → Within the same observer.
  - **Interobserver variation** → Between different observers.
- **Assessment:** Level of agreement between two observers measured using **Cohen's Kappa**.

Q2.4: What is Cohen's Kappa in the context of screening test reliability? How is it calculated, and how are its values interpreted?

Answer:

- **Purpose:** Measures the level of agreement between two observers **beyond chance**.
- **Formula:** $\text{Kappa} = \frac{\text{Agreement observed} - \text{Agreement expected by chance}}{1 - \text{Agreement expected by chance}}$
- **Interpretation:**

Value of k	Strength of Agreement
<0.20	Poor
0.21-0.40	Fair
0.41-0.60	Moderate
0.61-0.80	Good
>0.80	Very good

Q2.5: What tests are used to assess the precision of a screening test, and what do they indicate?

Answer:

- **R charts** → Indicate the stability of test results.
- **LJ charts (Levey-Jennings charts)** → Used for quality control testing in laboratories.

Q2.6: Define validity of a screening test. What parameters are used to assess it?

Answer:

- Ability of a screening test to differentiate diseased from non diseased

YOURWISH

YOURWISH

- Degree of closeness of a measured/calculated quantity to its actual value or true value
  - It means how close the screening test result is to the gold standard result.
- Implies test must give correct and accurate results
- Validity depends on
  - Sensitivity
  - Specificity
  - Predictive Accuracy

Q2.7: What is sensitivity and how is it interpreted in screening programs?

Answer:

- Ability of a screening test to identify correctly all those who have the disease.

Result of a Screening Test	Disease	
	Yes	No
Positive	A(TP)	B(FP)
Negative	C(FN)	D(TN)

A	Those who have the disease and screening test is positive	Known as TP (True positive)
B	Those who do not have the disease and the screening test result is positive	Known as FP (False positive).
C	The disease is present, but the screening test shows negative.	Known as FN (False Negative).
D	The disease is not present, and the screening test shows negative.	Known as TN (True Negative).

Sensitivity	Ability of a screening test to identify correctly all those who have the disease. PYQ: FMGE 2023	
	• Sensitivity Formula = $\frac{a}{a+c} \times 100 = \frac{TP}{TP+FN} \times 100$	Interpretation • ST → Sensitivity = 90% • If a ST is applied on 100 diseased people, it will identify 90 as true positives and the remaining 10 as false negatives.

Q2.8:What is Specificity, and how is it interpreted in screening programs?

Answer:

Result of a Screening Test	Disease	
	Yes	No
Positive	A(TP)	B(FP)
Negative	C(FN)	D(TN)

Specificity	Ability of a screening test to identify correctly all those who have the disease.	
	• Specificity Formula= $\frac{d}{(b+d)} \times 100 = \frac{TN}{(TN+FP)} \times 100$	• Interpretation → Sensitivity = 90% • If a ST is applied on 100 non diseased people, it will identify 90 as true negative and the remaining 10 as false positives.

Q2.9 What is predictive accuracy and how is it interpreted?

PYQ: INICET 2021, 2022
PYQ: NEET PG 2019

Answer:

- Reflects its performance and diagnostic power
- PPV (Positive predictive value)
  - o Out of all those tested positive on a screening test, how many actually have the disease

Result of a Screening Test	Disease	
	Yes	No
Positive	A(TP)	B(FP)
Negative	C(FN)	D(TN)

- Positive predictive value (PPV) = $\frac{a}{a+b} \times 100 = \frac{TP}{TP+FP} \times 100$
- NPV (Negative predictive value)
  - o Out of all those tested negative on a screening test, how many actually do not have the disease

Result of a Screening Test	Disease	
	Yes	No
Positive	A (TP)	B (FP)
Negative	C (FN)	D (TN)

- Negative predictive value (NPV) = $\frac{d}{c+d} \times 100 = \frac{TN}{TN + FN} \times 100$

Q2.10: What is the validity of a screening test and how is it measured?

Answer:

- Ability of a screening test to differentiate diseased from non-diseased, nearness to true, actual or gold standard value
- Validity = $\frac{a + d}{a+b+c+d}$

- Tests for Validity :
  - o Mean chart
  - o Levy Jennings (LJ) chart
  - o Shewhart control chart

Result of a Screening Test	Disease	
	Yes	No
Positive	A (TP)	B (FP)
Negative	C (FN)	D (TN)

Q2.11: Define the key terms used in screening test evaluation.

Answer:

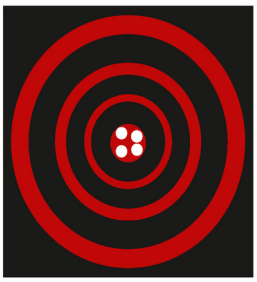
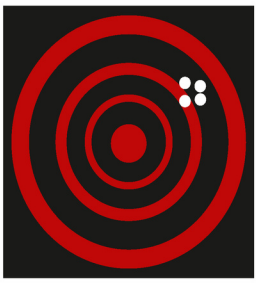
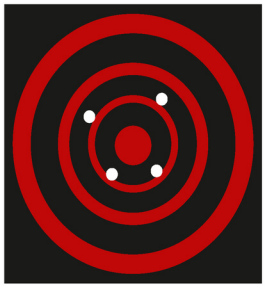
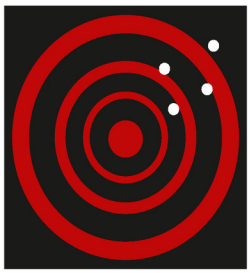
- Validity/Accuracy: Ability of a screening test to differentiate diseased from non-diseased, closeness to the true, actual, or gold standard value
- Sensitivity: Ability of a screening test to identify all those who have the disease or the probability of having a test positive out of the total diseased population.
- Specificity: Ability of a screening test to identify all those who do not have the disease, or the probability of having a test negative out of the total healthy population

- PPV: Probability of having the disease out of those who tested positive
- NPV: Probability of not having the disease out of those tested negative
- Most useful property of a screening test: Sensitivity
- PPV: Diagnostic power of the screening test to correctly include the disease
- NPV: Diagnostic power of the screening test to exclude the disease
- Precision: Reproducibility, Repeatability, Reliability, Consistency, getting the same results on repeat measurements

Q2.12: Reliability of a screening test does not mean:

A. Reproducibility
B. Precision
C. Repeatability
D. Validity

Answer: D. Validity

Accurate Precise	Not Accurate Precise	Accurate Not Precise	Not Accurate Not Precise
			
• Every line is hitting the central point. So, it is exactly at the gold standard value.	• Every time we get the same finding, but it is far from the true value. It is not accurate but precise	• It is accurate as the ST result is closer to the gold standard value in the first circle. It is not precise.	• It is not precise or accurate.

Q2.13:A Senior resident has been trained during her graduation to examine the palpebral conjunctiva for Anemia. She uses this method to identify anemia in a patient. This method of detecting Anemia:

A. Lacks reliability
B. LacksValidity
C. Lacks both Validity and as well as Reliability
D. Has both, adequate validity and reliability

Answer: B. Lacks Validity

- Since she is trained, her technique will be correct. So the result will be reliable
- But the gold standard method for detecting Anemia is Hemoglobin estimation → So this lacks Validity

Q2.14: Out of 1000 population, a screening test found 90 to be diabetic correctly. Then a gold standard test found 100 to be diabetic. What is the sensitivity of the test?

A. 90/100
B. 100/110
C. 80/100
D. 100/100

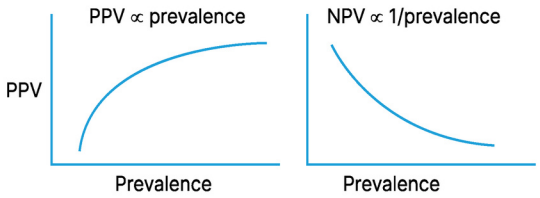
Answer: A. 90/100

- Sensitivity is the ability to identify all those who have the disease
- Gold standard test gives that 100 have the disease
- Screening test gives that 90 have the diseases
- Sensitivity = 90/100

Q2.15: What is the relation of predictive value with prevalence of a disease ?

Answer:

- PPV is directly proportional to Prevalence
- NPV is indirectly proportional to Prevalence



Q2.16: Out of the following positive predictive value of a test is most affected by?

A. Sensitivity
B. Specificity
C. Prevalence
D. NPV

Answer: C. Prevalence

- Positive predictive value increases as the prevalence of the disease rises, since a higher proportion of positive results will be true positives.

Q2.17: What is the yield of a screening test, and what factors determine it?

Answer:

- Yield is the measure of previously unrecognized disease, diagnosed as the result of screening and brought to treatment
- It depends on three important parameters:
  - Sensitivity of a test
  - Specificity of a test
  - Prevalence of a disease

Q2.18: All comprise inherent properties of a screening test except:

A. Sensitivity
B. Specificity
C. Yield
D. Predictive accuracy

Answer: C. Yield

- Yield is a gain because of a screening test

BIG QUESTION 3: What is the purpose of using screening tests in combination, and how does it affect sensitivity and specificity?

Broad answer: Screening tests can be used in series or parallel to improve diagnostic accuracy.

- In series testing, only those who test positive on the first test undergo the second. A person is considered positive only if both tests are positive, leading to ↑ specificity and ↓ sensitivity.

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- In parallel testing, both tests are done together. If either is positive, the person is considered positive, leading to ↑ sensitivity and ↓ specificity. This method helps balance diagnostic power based on the condition's severity and test cost-effectiveness.

Q3.1 Differentiate between Tests in Series and Tests in Parallel. Provide examples.

Answer:

Series Testing (Sequential Testing):

- The second test is done only if the first is positive.
- A person is declared positive only if both tests are positive.
- Example: HIV screening via two consecutive ELISA tests.

Parallel Testing (Simultaneous Testing):

- All tests are done at the same time.
- A person is considered positive if any test is positive.
- Example: Kidney function test (KFT) using urea and creatinine together.

	Series	Parallel
Sensitivity	Decreases	Increases
Specificity	Increases	Decreases
PPV	Increases	Decreases
NPV	Decreases	Increases

Q3.2 . If the Hemoccult test is negative for screening of colon cancer, no further test is done. If the hemooccult test is positive the individual will have a second stool sample tested with the Hemoccult II test. If this second test for blood is positive the individual will be referred for more extensive evaluation. The effect of net sensitivity and net specificity of this method of screening is:

A. Net sensitivity and Net specificity are both increased

B. Net sensitivity is decreased and Net specificity is increased

C. Net sensitivity is increased and net specificity is decreased

D. Net sensitivity remains the same and net specificity is increased

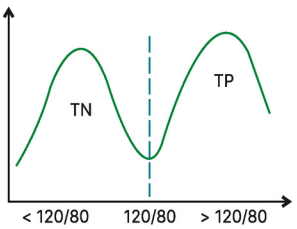
Answer:

- Net sensitivity is decreased and Net specificity is increased
  - o The second test is done after the first test is positive
  - o This is the application of tests in series
  - o When the tests are applied in series

Q3.3 How does changing the cut-off value of a screening test affect sensitivity and specificity? Explain with examples

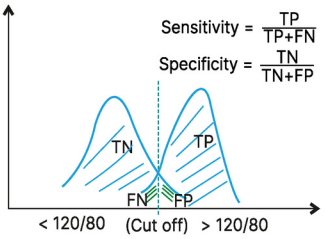
Answer:

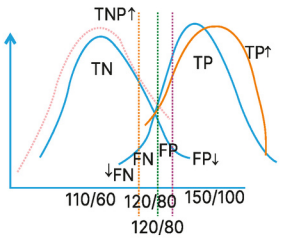
- The cut off is taken as 120/80 for hypertension
- Any person with BP > 120/80 is considered Screening test positive (True positive)
- Any person with BP< 120/80 is considered screening test negative (True negative)
- In reality, a screening test to be 100% sensitive and specific is not possible
- The cut off is taken as 120/80 for hypertension



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- Suppose the BP is > 120/80 -> True positive
- Sensitivity = TP/TP+FN
- Those who have BP< 120/80 - > True negative
- Specificity = TN/TN+FP
- If true positive occupies most of the area, false positive will be less
- If true negative occupies most of the area, false negative will be less
- If the cut off of the screening test is increased
  - o True negative increases, False positive will decrease
  - o Specificity will increase
- If the cut off is decreased
  - o True positive increases, False negative will decrease
  - o Sensitivity will increase





BIG QUESTION 4: What is the purpose of an ROC curve and how does it help in evaluating diagnostic tests?

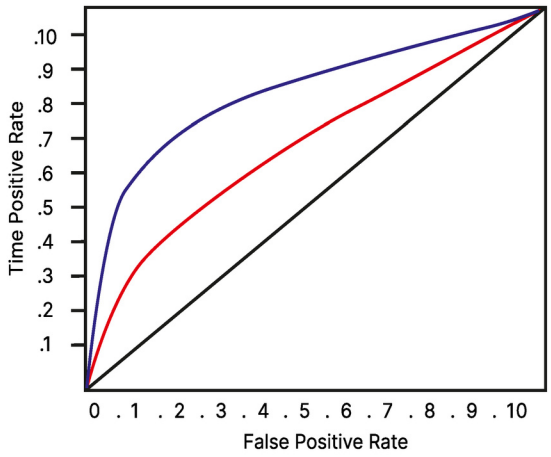
Broad answer:

- The Receiver Operating Characteristic (ROC) curve helps evaluate diagnostic tests by plotting sensitivity (TPR) vs 1-specificity (FPR) for various cut-off points. It shows the trade-off between true positives and false positives.
- The Area Under Curve (AUC) reflects the test's ability to distinguish between disease and no disease.
- Higher the AUC (closer to 1), better the test.
- The Youden's Index (J = Sensitivity + Specificity - 1) identifies the optimal cut-off with the best balance of sensitivity and specificity.

Q4.1: What is a Receiver Operator Characteristic (ROC) curve, what does it represent, and how is it used in selecting cut-offs for a diagnostic test?

Answer:

- **Definition:** Graphical plot used to determine the optimal cut-off point for a diagnostic test.
- **Axes:**
  - o **Y-axis:** True positive rate (**Sensitivity**)
  - o **X-axis:** False positive rate (**1 – Specificity**)
- **Cut-offs:** Shown as points along the curve (red and blue curves); the one with the **largest area under the curve (AUC)** is preferred.
- **Interpretation:**
  - o The more the area under the curve, the cut-off is taken
  - o The more the sensitivity, that particular cut-off is taken
- **Measure of validity:** AUC is an effective measure of the inherent validity of a diagnostic test.
- **Index used: Youden's Index**



Q4.2: What is Youden's Index, and how is it calculated?

Answer:

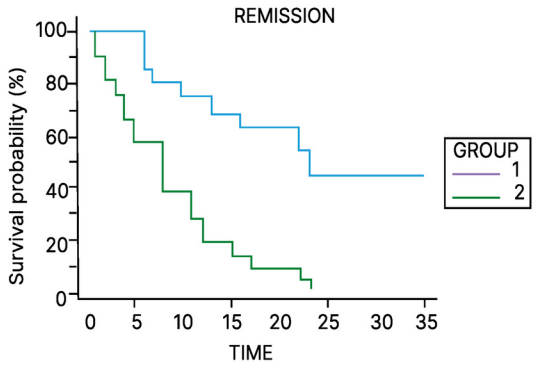
- Youden's Index is a summary measure of the effectiveness of a diagnostic test.
- It is calculated using the formula:
  - Youden's Index (J) = Sensitivity + Specificity - 1
  - The value ranges from 0 to 1, where:
    - → 0 indicates a test with no diagnostic value
    - → 1 indicates a perfect test
- The point on the ROC curve with the highest Youden's Index gives the optimal cut-off – the best balance between true positives and true negatives.

AUC Values	Test quality
0.9-1	Excellent
0.8-0.9	Very good
0.7-0.8	Good
0.6 -0.7	Satisfactory
0.5-0.6	Unsatisfactory

Q4.3: What is the Kaplan-Meier survival analysis, and how can it be used to assess the effect of a screening test?

Answer:

- **Definition:** A statistical method used to estimate and depict survival curves, showing the fraction of patients alive at specific times (e.g., 1 year after treatment).
- **Application:** Compares survival periods with and without a screening test.
- **Example:**
  - Without screening → survival is between 20-25 years.
  - With screening → survival increases to 35 years.



Q4.4 What are likelihood ratios and how are they used in interpreting test results?

Answer:

It is the likelihood that a given test result would be expected in a patient with a target disorder compared to the likelihood that the same result would be expected in a patient without the target disorder

Positive LR = Sensitivity/1-Specificity

- Demonstrate how much to increase the probability of having a disease positive test result
- Positive LR = (Probability a person with the condition tests positive)/(Probability a person without the condition tests positive)
- Positive LR = (probability of TP)/(Probability of FP)

Negative LR = 1-Sensitivity/Specificity

- Demonstrate how much to decrease the probability of having the disease given a negative test result
- Negative LR = (Probability a person with the condition tests negative)/(Probability a person without the condition tests negative)
- Negative LR = (Probability of TN)/(Probability of FN)

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Q4.5 What is Cronbach's Alpha and what does it indicate?

Answer:

- Most common measure of internal consistency or reliability
- Multiple likert questions in a survey/questionnaire can form a scale and the reliability of the scale is determined by Cronbach's alpha
- Internal consistency should be determined before a test can be employed for research or examination purposes to ensure validity
- Expressed between 0 and 1 Q.

Q4.6 What are the key statistical tools used to assess diagnostic tests, agreement, and survival analysis in public health?

Answer:

In public health research:

- **The Kaplan-Meier curve** is used for survival analysis to estimate the probability of survival over time.
- **Cohen's Kappa** assesses interobserver agreement beyond chance.
- **Cronbach's Alpha** is a reliability coefficient for internal consistency of scales.
- **ROC Curve** helps identify the ideal cut-off and evaluates the performance (validity) of a diagnostic test.

Q4.7: Q. Ability of a screening test to correctly identify all those who have the disease?

A. Specificity
B. Sensitivity
C. Positive predictive value
D. Negative predictive value

Answer: B. Sensitivity

- Sensitivity measures the proportion of true positives detected by the test, meaning it correctly identifies individuals who actually have the disease. A higher sensitivity reduces the chance of missing diseased cases.

Q4.8: Probability that a person out of those who tested positive on a screening test has in fact the disease is known as?

A. Sensitivity
B. Specificity
C. Positive predictive value
D. Negative predictive value

Answer: C. Positive predictive value

- PPV represents the probability that a person who tested positive actually has the disease, reflecting the test's accuracy in confirming disease among positives.

Q4.9: Which of the following is sensitivity?

A $\frac{TN}{TN+FP}$

B $\frac{TN}{TN+FN}$

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C $\frac{TP}{TP+FN}$

D $\frac{TP}{TP+FP}$

Answer: C. $\frac{TP}{TP+FN}$ (Sensitivity)

- PPV = $\frac{TP}{TP+FP}$
- Specificity= $\frac{TN}{TN+FP}$
- NPV= $\frac{TN}{TN+FN}$

Q4.10: For the calculation of the Negative predictive value of the Screening test, the denominator is comprised of :

A. True negative + False negative
B. False positive +True negative
C. True positive + False positive
D. True positive + True negative

Answer: A. True negative + False negative

- Negative predictive value is the proportion of people who test negative and are actually disease-free. The denominator includes all those who tested negative — i.e., True negatives + False negatives.

Q4.11: If a test is 90% specific, then:

A. 90% of disease people will be true positives
B. 10% of diseased people will be false negatives
C. 90% of non-diseased people will be true negatives
D. 10% of non-diseased people will be false negatives

Answer: C. 90% of non-diseased people will be true negatives

- This means that if the test is applied to 90 non-diseased people, it will identify 90 as true negatives
- So 90% non-diseased will be true negatives, and 10% will be false positives

Q4.12: A screening test was positive in 50% of diseased and 10% of healthy population. What is the specificity of the test?

A. 0.5
B. 0.9
C. 0.83
D. 0.064

Answer: B. 0.9

- Specificity is the ability to identify correctly all those who do not have the disease
- Specificity = TN/TN+FP
- Sensitivity= 50/100= 0.5
- Screening test is positive in 10% of healthy population
  - If 100 are healthy, a screening test is positive in 10% of healthy population
  - False positive = 10 and True negative= 90

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- Specificity = TN/TN+FP = 90/100 =0.9

Result of a Screening Test	Disease	
	Yes	No
Positive	A(TP)=50	B(FP) =10
Negative	C(FN)	D(TN)=90
	Total=100	Total=100

11. DEMOGRAPHY AND HEALTH

BIG QUESTION 1: How are epidemiology and demography related, and what role do demographic processes play in health?

Broad Answer: Epidemiology studies diseases, while demography tracks population changes. Demographic processes like fertility and mortality influence health trends, explained through the Demographic Transition Model and the demographic gap (CBR - CDR)

DETAILED QUESTIONS

Q1.1 Define epidemiology and demography.

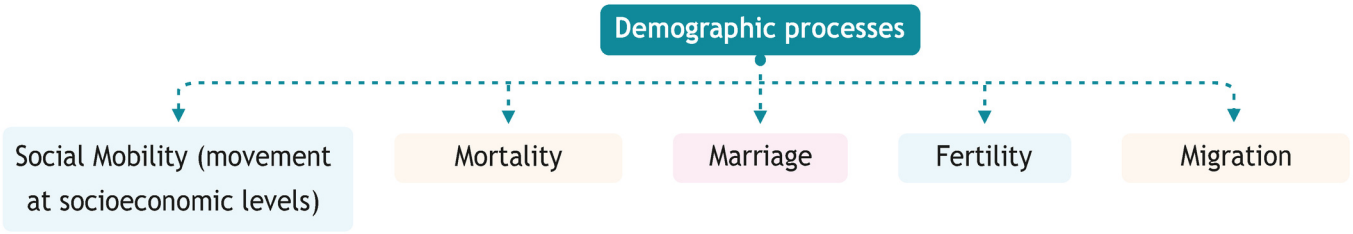
Answer:

- Epidemiology is the study of diseases
- Demography is the study of size, composition and distribution of population.

Q1.2 Describe the demographic processes and highlight which factor is not included in it.

Answer:

- Demographic processes govern changes in a population's size, composition, and distribution, influencing its overall demographic structure.



- Demographic process does not include morbidity

Q1.3 What is the demographic gap?

PYQ: FMGE 2021

Answer:

- Demographic gap: Crude Birth Rate (CBR) - Crude Death Rate (CDR).

The total number of lives births per thousand estimated mid-year population (considered on 1st July) India's current CBR is 19.5/1000 MYP } Crude birth Rate — Crude Death rate { The total number of deaths per thousand estimated mid-year population India's current CDR is 6/1000 MYP

Q 1.4: What governs the Demographic Transition Model?

Answer: Demographic gap

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Q 1.5: What is the demographic transition model?

Answer:

Stage I: High stationary	• When a country forms, birth and death rates are both high (CBR and CDR) - Population is stable.
Stage II: Early expanding	• As a country progresses, healthcare services get better, and the CDR rate declines while CBR is still high • The population is increasing at a very rapid rate • Signifies population and is also called Demographic trap.
Stage III: Late expanding	• Hospital services get better. CDR continues to decline. • CBR starts to decline due to family planning services put in place. • The population still growing but at a slower rate
Stage IV: Low Stationary	• Hospital services are further revolutionized. • CDR declines even more • There's an improvisation of family planning services so that the birth rate declines as well. • Both CBR and CDR are low and the population is again stable
Stage V: Declining Phase	• There's an extent to which hospital services can be improved. • The death rate becomes stable with a slow decline, whereas the birth rate keeps declining. • Family planning services are much more efficient now. • So, CBR<CDR

Q1.6: What is the stage that no country would want to be in?

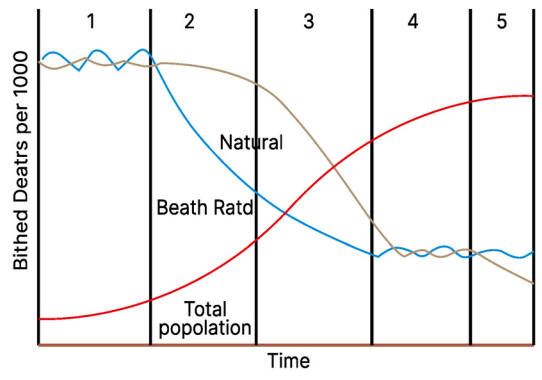
Answer:

- Stage II: Early Expanding. It's called a demographic trap.

Q1.7: Which stage is the most desirable for any country?

Answer:

- Stage IV: Low Stationary. A stable population with low CDR and CBR.



- The blue line represents the crude birth rate
- The orange line represents the crude death rate.

- The graph shown above depicts all the stages in a transition model.
- The X-axis is the total population, and the Y-axis is the births/deaths per thousand.

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Q1.8: Where's the demographic gap minimum?

Answer:

- It's minimum in stages I and IV

Q1.9: Where's the demographic gap maximum?

Answer:

- The demographic gap is maximum in late stage II

Q1.10: When does the demographic gap start contracting?

Answer:

- The demographic gap starts contracting in the early stage III.

Q1.11: Where is the demographic gap negative?

Answer:

- The demographic gap is negative in stage V

Q1.12: India is currently in which phase and why?

Answer:

- India is currently in the late expanding phase.
- The birth rate is declining at a slower rate than the death rate or vice versa or the death rate is declining at a faster rate than the birth rate.
- European countries are in Stage 5

Q1.13: Define Demographic transition, Demographic trap and Epidemiological transition

Answer:

Demographic transition	• A transition from high CBR and CDR to low CBR and CDR (Stages 1 to 4)
Demographic trap	• This means that a country gets trapped in stage II: early expanding. • CBR is high, and CDR starts to decline
Epidemiological transition	• Shift of an era of communicable diseases to non-communicable diseases at least over a decade.

Q 1.14: What are the key features of each stage of the Demographic Transition Model?

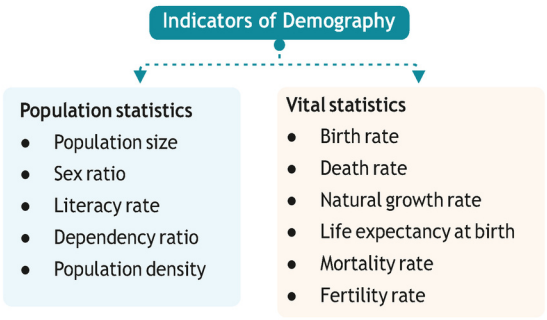
Answer:

Stage	High stationary	Early expanding	Late expanding	Low stationary	Declining
Birth rate	High	High	Starts declining	Low	Low
Death rate	High	Starts declining	Continues declining	Low	Declining at a very slow rate or stable
Demographic gap	Minimum	Maximum	Starts contracting	Minimum	Negative
Population growth	Stationary	Growing at a faster rate (Population explosion)	Growing at a slower rate	Stationary	Decreasing

Composition	High fertility (Young)	Working class (30-40 years)		Mixed (50 years)	Ageing (60 years)
Example	India before 1921	India 1921-1991	India 1991-currently		European regions

Q1.15: What are the Indicators of Demography?

Answer:



BIG QUESTION 2: What is a Population Pyramid and how does it relate to a country's demographic stage?

Broad Answer: A Population Pyramid is a graphical representation of age and sex distribution in a population. The shape reflects the country's fertility, mortality, and life expectancy.

- Expanding pyramids (wide base) → high fertility, developing countries (e.g. Nigeria).
- Constrictive pyramids (narrow base, wide middle) → aging population, developed countries (e.g. USA). It directly correlates with the country's demographic transition stage and economic planning needs.

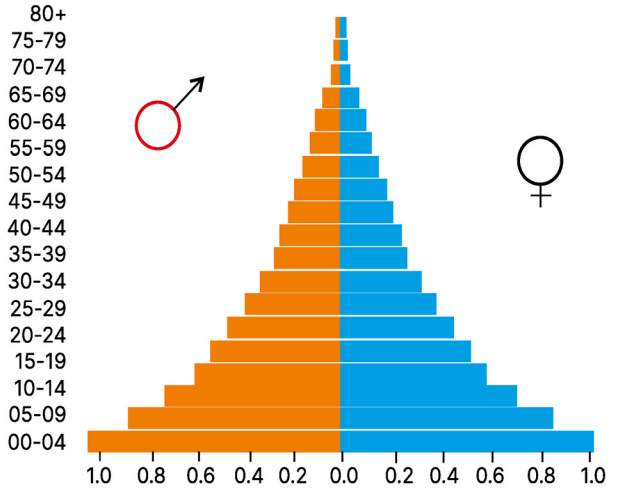
Q 2.1: What do population pyramids represent and how are they structured?

PYQ: FMGE 2022

Answer:

Population pyramid

- Representation: Age and sex composition or gender distribution of a population.
- Different pyramids are present in both developed and developing countries.
- Shape: Triangle/ upward pyramid (representing child to adult to elder)
- Lower most: Children
- Middle: Working class
- Upper: Elderly

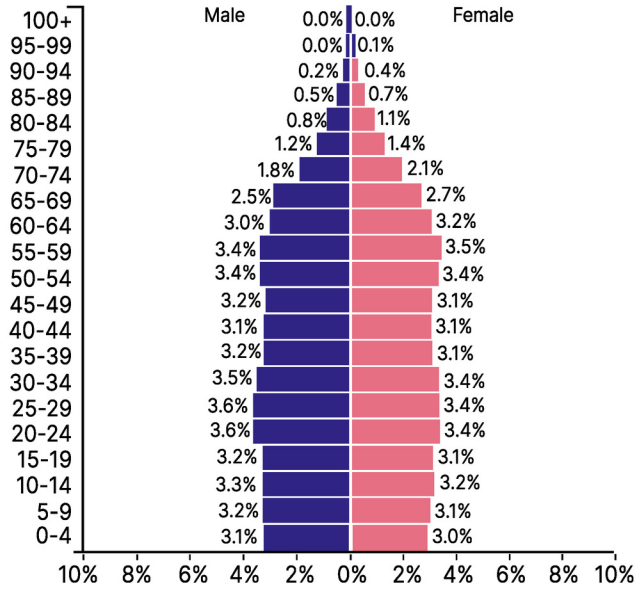


Q 2.2: How do population pyramids differ between developed and developing countries?

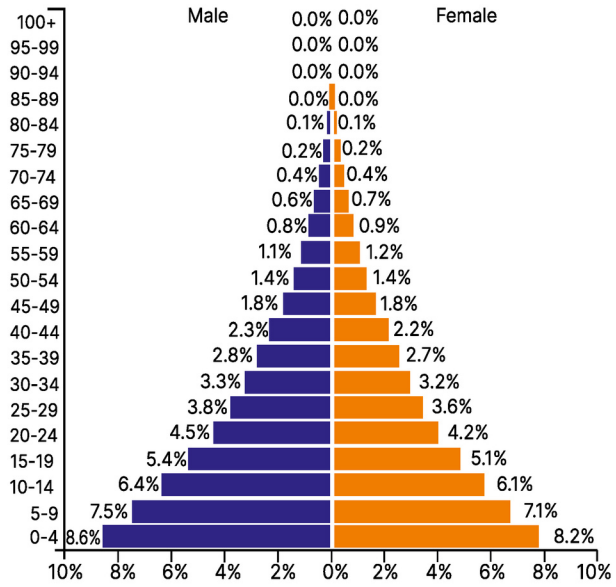
Answer:

Features		
Country	United States- Developed country	Nigeria- Developing country
Base	Narrow base- low fertility	Broad base- high fertility
Apex	Obtuse- More older people	Acute- Few elder people
Height of pyramid	Taller- More life expectancy	Shorter- Less life expectancy
Shape	Spindle shape- More working population	Upward triangular- Less working population
Type of pyramid	Constrictive	Expanding

Span	More life expectancy	Less life expectancy
Symmetry (ideal sex ratio)	Symmetrical	Asymmetrical



United States of America-2017
Population : 326,474,013



Nigeria -2017
Population : 191,835,936

Q2.3: Describe dependency ratio

Answer:

$$\frac{\text{Children 0-14 years + Population >65 years age}}{\text{Population between 15-64 years age}} \times 100$$

- Children 0-14 years: Young age dependency.
- Population >65 years age: Old age dependency.
- Population between 15-64 years of age: Working class.

Q2.4: What are key demographic concepts like demographic burden, dividend, window, gift, trap, transition, and carrying capacity?

Answer:

PYQ: FMGE 2021, 2022, 2023

Demographic Bonus	• Decrease in dependency ratio because of decrease in old age dependancy
Demographic Burdens	• Increase in dependency ratio because of increase in old age dependancy
Demographic dividend	• A rise in the rate of **economic growth is** due to a **rising share** of working-age people in a population.
Demographic Window	• A period of time in a nation's demographic evolution when the proportion of the population of the **working age group** is particularly prominent.
Demographic gift	• The initially favorable effect of falling fertility rates on the ratio of the working population to the **dependent population.**
Demographic Trap	• High birth rate and low death rate
Demographic transition	• Shift from high birth rate and death rate to low birth rate and death rate
Carrying capacity	• The maximum population size of a species that a particular environment can normally and consistently support in terms of resources.

YOURWISH

Q2.5: Define the word 'literate' and how is effective literacy rate calculated

Answer:

- Literate: Anyone who can read and write with an understanding of any one language
- Age cut off: 7 years and above
- Formula:

$$\text{Effective Literacy Rate} = \frac{\text{No.of literates 7 years and above}}{\text{Total population (7 years and above)}} \times 100$$

Q 2.6: What is Crude Birth Rate (CBR) and how is it calculated?

Answer:

- Definition
  - The total number of live births in a year per 1000 estimated mid-year population (measured on 1st July)
  - Simplest measure of fertility, without any specifications
- **Formula**

$$\text{CBR} = \frac{\text{Total number of live births in a year}}{\text{Estimated Mid-year population)}} \times 1000$$

Q 2.7: What is the General Fertility Rate (GFR) and how is it measured?

Answer:

Definition	• The number of live births in a year per thousand married women in the **reproductive age group (15 to 49 years).**
Formula	$\text{GMFR} = \frac{\text{Number of live births in an area in a year}}{\text{Married women in reproductive age group}} \times 1000$

Q 2.8: What is Total Fertility Rate (TFR) and what does it indicate?

Answer:

Definition	• Gives the average/ total number of children a woman will have throughout her reproductive age (15-49 years), • Computed by summing age-specific fertility rates for all ages.
Family size	• An indicator of **complete family size.** • **Family size** is the number of children a woman has at a particular age in her reproductive age (15-49 years).
Complete family size	• **Complete family size** is the number of children a woman will bear throughout her reproductive age (15-49 years).

Q 2.9: What are the statistics for total fertility rate?

Answer:

- For the population of a country to stabilize, a TFR of 2.1 is required
- It explains that every couple is giving birth to 2 children
- For TFR to be 2.1, NRR (Net Reproduction Rate) must be equal to 1 (Replacement level fertility)

YOURWISH

- NRR is equal to 1 when the Couple protection rate (an indicator of contraceptive prevalence rate) is >60%
- Currently in India: TFR= 2 and CPR= 66.7%

Q 2.10: What is Gross Reproduction Rate (GRR) and Net Reproduction Rate (NRR)?

Answer:

- GRR is the average number of girls a woman will have throughout her reproductive age, considering the current age-specific fertility pattern and with no mortality
- GRR is given by TFR for girl children
- GFR= 1/2 of TFR
- NRR is the total number of daughters or girls a newborn girl will bear or will have throughout her reproductive lifespan, considering the current age-specific fertility patterns and mortality rates
- NRR is a mortality-dependent fertility indicator

Q2.11: Demographic gap is maximum in which stage?

A. Early part of stage 3

B. Late part of stage 2

C. Stage 1

D. Stage 5

Answer: B. Late part of stage 2

- Stage 2 → Death rate falls, birth rate remains high → gap widens maximally.

Q2.12: Late expanding stage of the population in India due to?

A. Birth rate stationary, death rate continues to fall

B. The death rate declines faster than the birth rate

C. Birth rate declines, death rate same

D. The birth rate is less than the death rate

Answer: B. The death rate declines faster than the birth rate

- In the late expanding stage of the demographic cycle (India's current stage):
  - Death rate has already fallen and remains low.
  - Birth rate starts to decline gradually, but is still higher than the death rate → population continues to grow, but at a slower pace.

Q2.13: The number of live births for 1000 women in the reproductive age group in a year refers to the?

A. Total fertility rate

B. Gross reproduction rate

C. Net production rate

D. General fertility rate

Answer: D. General fertility rate

- GFR= The number of live births per 1000 women in the reproductive age group (15-49 years) in a year

Q2.14: To attain a two-child norm, the net reproductive rate to be obtained is?

A. 0.5

B. 1

C. 1.5

D. 2

Answer: B. 1

- Net Reproductive Rate (NRR) = average number of daughters a newborn girl will bear during her lifetime, assuming current fertility & mortality patterns.
  - NRR = 1 → each woman is exactly replacing herself → replacement level fertility → corresponds to two-child norm (1 daughter + 1 son on average).

Q2.15: Net reproduction rate of 1 can be achieved only when couple protection rate exceeds

A. 40%

B. 50%

C. 60%

D. 70%

Answer: C. 60%

- To achieve Net Reproduction Rate (NRR) = 1 (replacement level fertility):
  - India's demographic studies suggest that the Couple Protection Rate (CPR) must generally exceed 50-55%, depending on existing fertility levels.
  - Among the given options, the closest and widely accepted threshold is:

Q2.16: If older people die, what will happen to the dependency ratio?

A. Increase

B. Decrease

C. Remains same

D. None

Answer: B. Decrease

- Dependency ratio = (Population aged 0-14 + Population aged 65+) ÷ (Population aged 15-64) × 100
  - If older people die, the numerator decreases (fewer elderly dependents).
  - Denominator (working-age population) remains the same → dependency ratio decreases.

Q2.17: The average number of children a woman would have if she were to pass through reproductive years bearing children at the same rate as women now in each group is known as?

A. General fertility rate

B. Total fertility rate

C. Gross reproduction rate D. Net production rate

Answer: B. Total fertility rate

- TFR: The average number of children a woman would have if she were to pass through reproductive years bearing children at the same rate as women now in each age group

Q2.18: True about the general fertility rate?

A. Indicator of complete fertility rate

B. Measure of fertility

C. Not better than the crude birth rate

D. All the above

Answer: B. Measure of fertility (in bold)

> GFR is not an indicator of complete fertility (like TFR), but still a measure of fertility.

Q2.19: What is the net reproduction rate?

A. Number of children a newborn girl has in her life.

B. Number of female children a newborn girl has in her life.

C. Number of male children a newborn girl has in her life.

D. Number of female children a newborn girl has in her life, taking into account the mortality.

Answer: D. Number of female children a newborn girl has in her life, taking into account the mortality.

- NRR= The average number of daughters a newborn girl will bear during her lifetime, taking into account current fertility and mortality rates.

Q2.20: In a European country, there are low births and high deaths reported. At which stage the demographic cycle will be present?

A. High stationary stage

B. Late expanding stage

C. Low stationary stage

D. Declining stage

Answer: D. Declining stage

- Low births + high deaths → population declining.
- This corresponds to the Declining stage of the demographic transition.

YOURWISH

12. FAMILY PLANNING AND CONTRACEPTIVES

BIG QUESTION 1: What are the key indicators and methods used in family planning to evaluate contraceptive needs, usage, and effectiveness?

Broad Answer: Family planning in public health includes monitoring eligible couples, contraceptive use, and failure rates. Couple Protection Rate (CPR) indicates the percentage of eligible couples protected by any approved family planning method. The Pearl Index is used to assess the failure rate of contraceptives, expressed as accidental pregnancies per 1200 months of exposure (per 100 woman-years). It helps determine the comparative effectiveness of different contraceptives.

DETAILED QUESTIONS

Q1.1: Who are considered eligible couples?

Answer:

- Eligible couples are married couples in the reproductive age group (15-49 years) who need family planning services
- There are 150-180 eligible couples per 1000 population
- The term "eligible couple" replaces the older term "target couple"
- The ANM (Auxiliary Nurse Midwife) maintains the eligible couple register at the sub-centre

PYQ: FMGE 2022

Q1.2: What is the Couple Protection Rate (CPR), and what does it signify?

Answer: Indicator of contraceptive prevalence rate

- Couples protected by an approved family planning method
- Currently, CPR in India is 66.7%
- NRR is 1 when the CPR is > 66.7%

Q1.3: What is the Pearl Index, and how is it calculated?

PYQ: FMGE 2021

Answer:

- It is used to express the failure rate of a contraceptive
- It expresses the effectiveness of a contraceptive
- Pearl index = $\frac{\text{No. of accidental pregnancies}}{\text{Total months of exposure}} \times 1200$
- 1200 is expressed in terms of per hundred women per year (HWY)
- 1200 means the number of months in 100 years
- Life table analysis is a better measure to evaluate the effectiveness of a contraceptive than Pearl index

Q1.4: A contraceptive "X" is used by 100 couples for a continuous period of 2 years. During this period, 20 accidental pregnancies were reported. Calculate the pearl index?

Answer: Pearl index = (20/24 × 100) × 1200 = 10/HWY

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Q1.5: What are the Pearl Index failure rates of common contraceptive methods?

Answer:

Method	Pearl Index (per 100 woman-years)
Male condoms	2-14
Female condoms	5-21
Sterilization	0.1
Vaginal sponge	9-20
IUD	1-5% • First generation can go up to 5/HWY • LNG 20 has a low failure rate • IUCDs: 0.5-0.8/HWY
OCP (Oral pills)	0.1-2

BIG QUESTION 2: What are the different types of temporary contraceptive barrier methods, and how do they compare in usage, protection, and failure rates?

Broad Answer: Temporary contraceptive methods are used primarily for spacing pregnancies and include barrier methods like male condoms, female condoms, vaginal sponges, and diaphragms. These methods work by preventing the sperm from reaching the egg and vary in terms of material, reusability, failure rates, and protection from STDs/HIV.

DETAILED QUESTION

Q2.1: What are the main types of contraceptives?

Answer:

- Temporary: Used for spacing pregnancies
- Permanent: Used for limiting pregnancies
  - o Examples: Vasectomy, Tubectomy

Q2.2: What are the key features of male condoms?

PYQ: FMGE 2020

Answer:



- Mostly used by males worldwide
- It is a temporary barrier method
- It is made up of Latex
- It protects from HIV/STDs
- It is freely available under National Family Welfare Programme by the name 'Nirodh' till the level of Subcentre
  - o Nirodh means prevention
  - o Provided under a social marketing scheme
- It should not be reused
- Failure rate is 2-14/HWY
- 72 Condoms are needed to be used for effective protection in a year
- Most common cause of failure of male condom is: Incorrect use

Q2.3: What are the key features of female condoms?



Answer:

- Identified by the presence of two rings
  - The inner ring covers the cervix
  - The outer ring lies outside vulva - interferes with sexual intercourse
- It is a temporary barrier method
- It was discovered by MD Hessel
- Made up of: Latex, nitrite & polyurethane

Q2.4 What are the advantages & disadvantages of female condoms?

Answer:

- Advantage:
  - It protects from HIV/STDs
  - It covers more area of vaginal diaphragm, thus offering even more protection than the male condom
  - It can be reused
  - It is preloaded with spermicides
  - It is provided freely under the National AIDS Control Programme to Commercial Sex workers
- Disadvantage:
  - It is difficult to insert and use it
  - It needs a little motivation and technique
  - It is not provided freely under the National Family Welfare Programme
  - Male and female condoms should not be used together due to anti-synergistic effect
  - It has a high failure rate: 5-21/HWY

Q2.5: Which of the following is not true about female condoms?

A. It should be used with a male condom

B. Invented by Hessel

C. It offers protection against STDs

D. Reusable

Answer: A. It should be used with a male condom

PYQ: FMGE 2020

- Due to anti-synergistic effect



Q2.6: What are the characteristics of the vaginal sponge?

Answer:

- Barrier method
- Available under the brand name:Today
- It contains a spermicide: Nonoxynol 9
- Technique of insertion:
  - It has to be inserted into the vagina and then pushed gently to be placed over cervix
  - It has to be inserted prior to sexual insertion and left for up to six hours post-ejaculation
- It can be reused

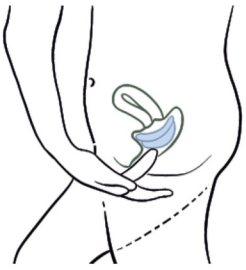
Q2.7: What are the disadvantages of the vaginal sponge?

Answer:

- Disadvantages:
- If a woman forgets to take it beyond 24 hours, it will lead to Toxic Shock Syndrome → death
- It does not offer protection from HIV/STDs
- It is not freely provided under the National Family Welfare Programme

Q2.8: What are the features of the diaphragm contraceptive?

Answer:





- Also known as Cervical cap/Dutch cap
- It is a temporary barrier method
- Shallow cup of 5-10 cm in diameter made of synthetic rubber or plastic
- Technique:
  - It has to be inserted into the vagina and then pushed gently to be placed over cervix
- It is used along with a spermicidal jelly
- It has to be inserted prior to sexual insertion and left for upto six hours post-ejaculation
- It must be ensured that diaphragm is of correct size
- It should be fitted properly and not damaged
- Not recommended under the National Family Planning Welfare Programme.

Q2.9: What are the advantages & disadvantages of Dutch cap?

Answer:

Advantages	Disadvantages
• Nil side effects and medical contraindication. • Can be Reusable.	• Required motivation to use and practice on the part of the woman to insert and remove the diaphragm • Privacy for practice, washing and storage of Diaphragm. • If left for more than 24 hours leads to Toxic Shock Syndrome (TSS). • Doesn't protect from HIV and STDs.

Q2.10: What are the variations in cervical cap?

Answer:

- Variation of the diaphragm includes:
  - Cervical cap
  - Vault cap
  - Vimule cap

Q2.11: What is the failure rate of the Dutch cap?

Answer:

- Failure rate: 6-12/HWY
- The failure rate is higher for multiparous than nulliparous

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BIG QUESTION 3: What are the types of intrauterine devices (IUDs), their mechanisms, uses, advantages, contraindications, and side effects?

Broad Answer: IUDs are long-acting reversible contraceptives categorized into three generations:

- First generation: Non-medicated (inert) devices
- Second generation: Medicated copper-containing IUDs
- Third generation: Hormonal IUDs

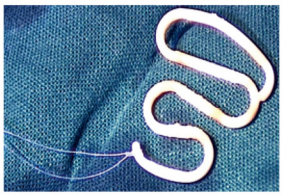
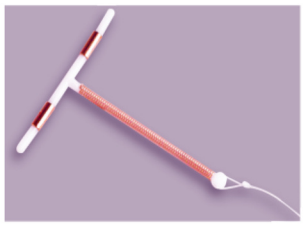
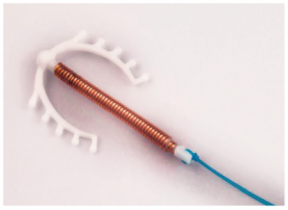
IUDs may cause bleeding, pain, PID, and spontaneous expulsion, with specific contraindications

DETAILED QUESTIONS

Q3.1: What are the three generations of IUDs?

Answer:

PYQ: FMGE 2020 PYQ: NEET PG 2021

1st Generation IUD • Inert (non-medicated) • No longer used	 Grafenberg ring (ring is of silver)  Lippes Loop
2nd Generation IUD • Copper-containing (CuT 380A, CuT 375, NOVA T)	 CuT 380 A (Brown colour copper wire on both horizontal and vertical stem)  CuT 380 Ag (Copper wire only on the vertical stem)  Multiload -CuT 375
3rd Generation IUD • Hormonal (Mirena, Progestasert)	

Q3.2: Which IUDs are available freely under the National Family Welfare Programme?

Answer:

- CuT 380A (shelf life: 5 years)
- CuT 375 (shelf life: 5 years)
- Progestasert

Q3.3: What is the mechanism of copper IUDs?

Answer:

- Enhances foreign body reaction
- Induces cellular response in endometrium
- Alters enzyme activity in uterus
- Alter cervical mucus thus affecting sperm motility, capacitation and survival

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Q3.4: What are the advantages of copper IUDs?

Answer:

- Lower expulsion rate
- Lower incidence of side effects like bleeding and pain
- Lower failure rate or increased contraceptive effectiveness
- Easier to fit
- Effective as post-coital contraceptives if inserted within 3-5 days of unprotected intercourse
- Best emergency contraception

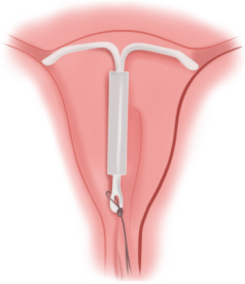
Q3.5: What are 3rd generation IUDs and their mechanism of action?

Answer:

- 3rd generation IUDs include:
  - Mirena (LNG-20)
  - Progestasert
- They are not provided freely under the national family welfare programme.
- Mechanism of action:
  - Hormones in IUDs increase the viscosity of cervical mucus
  - Prevent sperm from entering the cervix
  - Makes the endometrium unfavorable to implantation due to high progesterone and low estrogen
- Ectopic pregnancies are less reported with Hormonal IUDs

Q3.6: What is the difference between Mirena and Progestasert?

Answer:

Mirena	Progestasert
	

• Contains 52mg levonorgestrel
  o Releases 20µg of levonorgestrel per day
• Shelf life: 5- 7 years
• Least failure rate of all IUDS (0.3/ HWY)
• It has low cases of Ectopic pregnancy
• Easily available in India
	• It is a commonly used IUD that carries 38 mg of progesterone in a silicone oil reservoir
	  o It releases 65µg of progesterone per day
	• Shelf life of 1 year.
	• It is available under the National Family Welfare programme
	• Not much available in India

Q3.7: Which IUDs have the highest & lowest expulsion rate, removal rate & pregnancy rate?

Answer:

IUD Expulsion Rate	IUD Removal Rate	IUD Pregnancy Rate
• Lowest - progestasert • Highest Lippes loop	• Lowest - Progestasert • Highest - Levonorgestrol	• Lowest - Levonorgestrol • Highest - Lippes loop

Q3.8: What are the side effects of IUDs?

Answer:

Bleeding	• Most common side effect • Physiological bleeding that resolves on its own in 1-3 months • Administration of iron tablets for 2-3 months: Reassurance
Pain	• 2nd most common side effect • Most common cause of removal of IUD
Pelvic inflammatory disease (PID)	• Absolute contraindication for insertion of IUDs • History of PID is a relative contraindication • Never advice IUD in a woman who has multiple sexual partners o It can precipitate PID
Spontaneous expulsion	• It can happen even in the hands of trained physicians o Wrong size was inserted, chances of spontaneous expulsion is present o Post partum, there are chances of spontaneous expulsion
Uterine perforation	
Ectopic pregnancy	• Relative contraindication with IUD insertion
Pregnancy in situ	• If threads are visible and woman want to continue with pregnancy Pull the IUD and pregnancy can be continued • If threads are not visible, rule out any possible complications and then continue the pregnancy • If any intrauterine complications are present, abortion of the baby should be done • Only 25% cases turn into an uneventful pregnancy o Most of the cases, the child who is conceived will spontaneously abort

Q3.9: What are the absolute and relative contraindications to IUD insertion?

PYQ: FMGE 2019, 2020

Answer:

Contraindications of IUDs	
Absolute	**Relative**
• Suspected Pregnancy • Current PID • Vaginal bleeding of undiagnosed etiology. • Cancer of cervix, uterus or adenoma and other pelvic tumours	• Anemia, menorrhagia • History of PID since last pregnancy • Purulent cervical discharge • Distortion of uterine cavities e.g. congenital malformations, fibroids • Unmotivated person. • Previous ectopic pregnancy

Q3.10: When can IUDs be inserted post-delivery?

Answer: IUDs can be inserted within 48 hours of delivery or concurrently with C-section and after 6 weeks of delivery

Q3.11 What is the best time for IUCD insertion?

Answer:

- During menses
- A woman does not require her husband's permission for MTP or IUCD

BIG QUESTION 4: What are the types, features, indications, contraindications, and non-contraceptive uses of hormonal contraceptives?

Answer: Hormonal contraceptives are divided into:

- Oral pills
- Depot (slow-release) formulations
- Emergency contraceptives

DETAILED QUESTIONS

Q4.1: How are hormonal contraceptives classified?

Answer:

Oral Pills	Depot (slow release) formulations
• Combined pill • Progesterone-only pill (POP) • Post-coital pill • Once a month (long-acting) pill • Male pill	• Injectables • Subcutaneous implants • Vaginal rings • Patches

Q4.2 What is the composition, dose, advantage & side effects of the depot formulation?

Answer:



- Injectable DMPA: Depo-Provera Medroxy Progesterone acetate
- Dose - 150 mg IM for 3 months
- DMPA is now available freely under the name of ANTARA as a newer contraceptive till the level of the sub-centre
- Advantage
  - Highly effective
  - Long-lasting and reversible
  - Does not affect lactation
- Side effects
  - Irregular menses

Q4.3 What are the advantages & side effects of norethisterone enanthate injection?

Answer:

- Advantages
  - Highly effective
  - Long-lasting and reversible
- Side effects
  - Menstrual irregularities

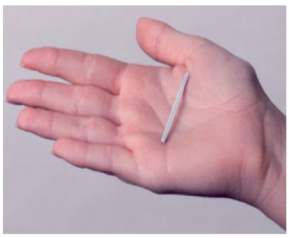
Q4.4 What are the constitution & disadvantages of subdermal implant contraceptives?

Answer:

- Norplant: Hormonal contraceptive -subdermal implant contraceptive
  - 6 Silastic capsules containing 35 mg Levonorgestrel (LNG) each

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- Norplant R2: 2 capsules containing 75 mg LNG each
- Capsules or rods are inserted beneath the skin of the forearm, prevents ovulation



- Effectiveness: 5 years
- Disadvantages:
  - Irregularities of menstrual bleeding (MC)
  - Surgical procedures required for insertion and removal
- Implants are not available under National family welfare programs.

Q4.5 What is a patch contraceptive?

Answer:

- Contraceptive patch is a transdermal patch applied to the skin that releases both synthetic estrogen and progesterone hormones
- Mechanism of action: Inhibits ovulation
- Have the same effectiveness as combined OCPs
- Composition:
  - Ethinyl estradiol (estrogen)
  - Norelgestromin (progestin)
- 1 patch is applied for 7 days; 3 such patches are applied successively.
- No patch is applied in the 4th week (Menstrual period)



Q4.6 What is Saheli contraceptive?

Answer:

- It was earlier known as Centchroman pills
- It's a once-a-week non-hormonal steroidal contraceptive
- It is now available by the name of Chaya, which is introduced as a newer contraceptive till the level of sub-centre
- Brand name: Saheli
- Chemical composition: Ormeloxifene
- Mechanism of action: SERM (Selective Estrogen Receptor Modulator)
- Developed by CDRI (Central Drug Research Institute based in Lucknow)
- Dosage and Frequency:
  - 1 tablet (30mg) twice a week for 3 months, then 1 tablet per week.
- Pearl Index: 1.83-2.84 /HWY
- Other uses: Dysfunctional Uterine Bleeding
- Contraindication: PCOD



BIG QUESTION 5: What are Combined Oral Contraceptive Pills (COCPs), their types, mechanism, usage, benefits, contraindications, and government schemes?

PYQ: FMGE 2019

Broad Answer: Combined Oral Contraceptive Pills (COCPs) contain both estrogen and progesterone and are used in a cyclic pattern of 21 hormonal tablets followed by 7 iron tablets (containing 60 mg elemental iron in the form of ferrous fumarate). They inhibit ovulation and are effective contraceptives with added non-contraceptive health benefits.



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DETAILED QUESTIONS

Q5.1: What are MALA-N and MALA-D? How are they different?

PYQ: INICET 2022

Answer:

MALA-N	MALA-D
	
• Contains - Levonorgestrel 0.15 mg and ethinylestradiol 0.03 mg • Not for sale • Freely available under the National Family Welfare program at the level of the sub-centre	• It is not provided freely under the National Family Welfare Programme • Promoted under a social marketing scheme • Contains: Ethinylestradiol 0.03mg & Levonorgestrel 0.15 mg

Q5.2: What is Femilon, and how does it differ from standard OCPs?

Answer:



- It is an ultralow-dose OCP
- Contains: Estrogen 0.02 mg + Progesterone 0.15 mg
- Not supplied under the National Family Welfare Programme
- The estrogen component may have cardiovascular effects

Q5.3: OCP can be advised safely to a woman in which of the following conditions?

A. Breast cancer

B. Congenital hyperlipidemia

C. Liver disease

D. PID

Answer: D. PID

- IUDs are contraindicated in Pelvic Inflammatory Diseases, but OCPs can be given.

Q5.4: What are the contraindications of OCPs?

PYQ: INICET 2023

Answer:

Absolute	Relative
• Cancer of the breast and genitals • Liver disease • Previous or present history of Thromboembolism • Cardiac abnormalities • Congenital hyperlipidaemia	• Special problems require medical surveillance o Age over 40 years, or smoking and age over 35 years o Risk of cardiovascular effects increases with age and smoking o Mild hypertension o Chronic renal disease

• Undiagnosed Abnormal uterine bleeding	o Epilepsy o Migraine o Nursing mother in the first 6 month o Diabetes Mellitus o Gallbladder disease o History of infrequent bleeding, Amenorrhea, etc

Q5.5 What are the non-contraceptive benefits of OCPs?

Answer:

- OCPs protect against benign breast disorders (fibrocystic disease, fibroadenoma)
- Ovarian cysts
- Iron deficiency anemia
- Osteoporosis
- Pelvic Inflammatory Disease (PID)
- Ectopic pregnancy (OCPs can be given to a woman who has a history of ectopic pregnancy)
- Ovarian cancer
- Endometrial cancer
- Dysfunctional Uterine Bleeding (DUB)
- Irregular menses
- Dysmenorrhea

Q5.6 OCPs are associated with a high risk of which malignancies?

Answer:

- Breast cancer
- Cervical cancer

Note: OCPs are protective of ovarian cancer and endometrial cancer

Q5.7 How is a missed pill managed?

Answer:

1. Missing 1-2 pills
• Take one pill as soon as possible or take 2 pills at the scheduled time: No risk of pregnancy
2. Miss ≥ 3 pills in first or second week or started new pack 3 days late
• Take one pill as soon as possible, and then continue with the scheduled pill • Use the barrier method for the next 7 days • In case of unprotected sex in the last 72 hours, use an emergency contraceptive method
3. Miss ≥ 3 pills in 3rd week (last week)
• Take one pill as soon as possible and finish the rest of the hormonal pills • The last 7 non - hormonal pills (Ironpills) should be discarded, start a new pack the next day • Use a barrier method for the next 7 days • In case of unprotected sex in the last 7 days, use emergency contraception

Q5.8 In case women on OCP forget to take pills on 3 successive days. What should she do?

A. Take 2 pills each for the remaining cycle
B. Take 3 pills the next day, then continue with 1 pill per day
C. Use barrier method for the rest of the cycle
D. Continue with the next pill the next day onward

Answer: C. Use barrier method for the rest of the cycle
Explanation:

- If **1 pill** is missed: Take it as soon as remembered, continue the rest normally.
- If **2 pills** are missed: Take 2 pills for 2 days, use barrier method for 7 days.
- If **3 or more pills** are missed: Discard current pack, **use barrier method**, and start a new cycle after menstruation.

Q5.9 What are the adverse events reported with OCPs?

Answer:

1. Cardiovascular effects (due to estrogen contents)
   - MI
   - Cerebral thrombosis
   - Venous thrombosis
   - Risk increases with age and smoking
2. Carcinogenesis
   - Increased risk of cervical cancer and breast cancer
3. Metabolic effects
   - Elevated BP altered serum lipid levels
4. Liver
   - Can precipitate Hepatocellular adenoma and gallbladder disease
5. Cholestatic jaundice
6. Lactation
   - Cannot prescribe OCPs within 6 months of delivery
   - Breast tenderness
   - Weight gain
   - Headache
   - Migraine
   - Bleeding disturbances

BIG QUESTION 6: What are the types, indications, mechanisms, and key facts about emergency contraception?

Broad Answer: Emergency contraception is used to prevent pregnancy after unprotected sexual intercourse or sexual assault. Levonorgestrel-only pills are the most commonly used method. Other options include the Yuzpe method, Ulipristal acetate, Mifepristone, and Copper IUD. The timing of administration is critical for effectiveness.

DETAILED QUESTIONS

Q6.1: What is the drug of choice for emergency contraception?

Answer:

- Levonorgestrel-only pill (1.5 mg single dose)

- Also called i-pill
- A single tablet is taken within 72 hours of unprotected intercourse



Q6.2: What is the Yuzpe method and when is it used?

PYQ: FMGE 2021, 2022 PYQ: NEET PG 2022

Answer:

- Combined OCP containing levonorgestrel 0.5 mg + ethinylestradiol 0.1 mg
- Dosage: 2 tablets within 72 hours + 2 more tablets 12 hours later
- It was used before Levonorgestrel-only pills became available

Q6.3: What are other options for emergency contraception besides Levonorgestrel?

Answer:

- Ulipristal acetate:
  - A selective progesterone receptor modulator
  - Effective up to 120 hours (5 days) after intercourse
- Mifepristone (200 mg):
  - Can be used as an emergency contraceptive
  - Single dose taken within 72 hours
  - Also used for medical abortion
  - Research is done if 10 mg of Mifepristone can be used as an emergency contraceptive
- IUCD:
  - Best method
  - Can be inserted within 5 days of unprotected intercourse

Q6.4: Drug of choice for emergency contraception is?

A. Yuzpe

B. Danazol

C. Levonorgestrel only pill

D. High dose estrogen alone

Answer: C. Levonorgestrel only pill

Explanation: Levonorgestrel-only pill:

- **Dose:** 1.5 mg single dose (or 0.75 mg twice, 12 hours apart)
- Must be taken within 72 hours of unprotected intercourse (most effective if taken within 24 hours)

Q6.5: What is the best contraceptive option for a 28-year-old breastfeeding woman with a 4-week-old infant?

A. ANTARA

B. IUD 380A

C. POP

D. OCP

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Answer: C. POP

Explanation:

- IUCDs can be given after 48 hours or after 6 weeks of delivery
- OCPs can be given after 6 months of delivery
- POP (Progesterone only pill) doesn't interfere with lactation and can even be given within 6 weeks of delivery

Q6.6 What are the recommended family planning methods in the postpartum period?

Answer:

Family Planning Method	Post Partum
IUCD (380 A & 375)	Within 48 hours of Vaginal delivery or concurrently with C-section or after 6 weeks of delivery
Injectable contraceptive DMPA (ANTARA)	Breastfeeding: At 6 weeks after delivery Non-breastfeeding: Earlier than 6 weeks
Combined OCP	Breastfeeding: After 6 months Non-breastfeeding: Anytime on days 21-28 after giving birth
POP	Breastfeeding/Non-breastfeeding: Earlier than 6 weeks
Weekly Oral Pill - Chhaya	Breastfeeding/Non-breastfeeding: Anytime after delivery
Female sterilization	Within 7 days of delivery or after 6 weeks

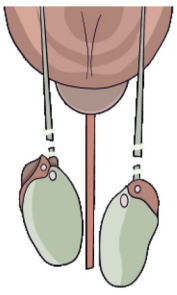
BIG QUESTION 7: What are the types and key points of permanent methods of contraception in men and women?

Broad Answer: Permanent contraception includes vasectomy in males and tubal sterilization in females, offered to eligible married individuals with at least one child over 1 year of age. Timing, eligibility, and service providers differ based on gender and procedure.

DETAILED QUESTIONS

Q7.1: What is done during a vasectomy, and what follow-up is needed post-procedure?

Answer:



- Minimum of vas deferens is removed, and the ends are ligated
- A minimum of 1 cm or more than 1 cm of vas deferens is to be removed, and the ends are ligated
- Safer and simpler procedure
- Post-vasectomy, a barrier method must be used for 3 months
- Heavy weights should not be carried
- Most common cause of failure of vasectomy- Misidentification of vas deferens.

Q7.2: What are the eligibility criteria for male sterilization?

PYQ: FMGE 2020

Answer:

- Married or ever-married men
- Age < 60 years
- At least one child >1 year

- No history of sterilization of self/spouse
- Sound mind
- For a mentally ill patient
  - Certified by a psychiatrist
  - Statement on soundness of mind by legal guardian/spouse

Q7.3: Who is eligible to perform vasectomy procedures?

Answer:

- Conventional vasectomy: Trained MBBS doctor
- No-scalpel vasectomy (NSV): Trained MBBS doctor

Q7.4: What are the complications of vasectomy?

Answer:

- Failure rate: 0.15 per 100 person-years
- Operative complications: Pain, infection
- Sperm granulomas: Appear 10-14 days post-procedure, eventually subside
- Autoimmune response: Antibodies to sperm may form, though these are harmless and carry no clinical significance
- Psychological impact
- Spontaneous recanalization: Seen in 0-6% of cases

Q7.5: What are the eligibility criteria for female sterilization?

Answer:

- Married or ever-married women
- 22-49 years of age
- At least one child >1 year
- No prior history of sterilization of self/spouse
- Sound mind
- For a mentally ill patient
  - Certified by a Psychiatrist
  - Statement on soundness of mind by legal guardian/spouse

Q7.6: Who is eligible to perform female sterilization procedures?

Answer:

- Minilap sterilization: Trained MBBS doctor
- Laparoscopic sterilization: DGO, MD (ObGyn), or MS (Surgery)

Q7.7: What is the appropriate timing for female sterilization procedures?

Answer:

Procedure	Timing
Interval sterilization	Within 7 days of the menstrual period (in the follicular phase of the menstrual cycle)
Postpartum	Between 24 hours to 7 days of delivery
Sterilization with	Concurrently
Sterilization following	Performed if client fulfills medical eligibility criteria

- Best time for IUCD insertion is during menses
  - Receptive time: After delivery
- The woman doesn't require the permission of husband for MTP/IUCD insertion

Q7.8: What is the contraceptive of choice for a healthy newly married couple?

Answer:

- Oral contraceptive pills
- OCPs have a low failure rate than other methods

Q7.9: What is the contraceptive of choice for couples meeting occasionally?

Answer: IUCD (low failure rates)

Q7.10: What is the contraceptive of choice for a breastfeeding woman?

Answer: Progesterone-only-pills

13. PREVENTIVE OBSTETRICS AND GYNECOLOGY, PEDIATRICS, GROWTH, DEVELOPMENT, SCHOOL HEALTH

BIG QUESTION 1: What is the standard antenatal care protocol and supplementation recommended during pregnancy?

Broad Answer: Antenatal care (ANC) involves scheduled health visits and essential supplementation to monitor and promote the health of the mother and fetus. WHO recommends a minimum of 8 ANC visits for optimal care. The Indian government mandates at least 4 visits. Supplementation includes folic acid, iron, and calcium at different stages of pregnancy.

DETAILED QUESTIONS

Q1.1: What is the WHO recommendation for antenatal care visits?

Answer:

- Minimum of 8 ANC visits
- Termed as "antenatal care contact"
- Aims to enhance bond between health workers and pregnant women
- Visit schedule:
  - 1st Trimester: 1 visit
  - 2nd Trimester: 2 visits
  - 3rd Trimester: 5 visits

Q1.2: What is the Government of India recommendation for ANC visits?

Answer:

- Minimum of 4 visits
  - 1st visit: <12 weeks (Registration)
  - 2nd visit: 14-26 weeks
  - 3rd visit: 28-32 weeks
  - 4th visit: 36 weeks - term

Q1.3: What is the ideal number of ANC visits?

Answer:

- At least 13 to 14 visits
  - Up to 7 months: Once every month
  - 8th month: Twice every month
  - 9th month: Weekly

Q1.4: What supplementation is recommended during the 1st trimester?

Answer:

- Folic acid tablet: 400 mcg daily

Q1.5: What supplementation is recommended from 2nd trimester onwards?

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Answer:

- As per Anemia Mukt Bharat:
  - Iron Folic Acid (IFA) tablet daily
  - For anemic women: Twice daily
  - Contains Elemental iron 60 mg, Folic acid 500 mcg
  - Minimum: 100 tablets in pregnancy
  - Preferred: 4th month to delivery (180 days)

Q1.6: What is the cutoff for anemia in pregnancy?

Answer:

- Hemoglobin < 11 g/dl

BIG QUESTION 2: What are the nutritional requirements and weight gain recommendations during pregnancy?

Broad Answer: Pregnancy increases the requirement of calories and various nutrients to support fetal development. Recommendations vary with trimesters and physiological conditions. Average weight gain also serves as an indicator of maternal and fetal health.

DETAILED QUESTIONS

Q2.1: What is the additional calorie requirement during pregnancy as per NIN?

Answer:

- +350 kcal/day

Q2.2: How does additional calorie requirement vary trimester-wise?

Answer:

- 1st trimester: No additional calories / 70-85 kcal/day
- 2nd trimester: 230-280 kcal/day
- 3rd trimester: 390-470 kcal/day

Q2.3: Which nutrient requirements increase only during pregnancy?

Answer:

- Iron (Fe)
- Folic acid

Q2.4: Which nutrient requirements increase during both pregnancy and lactation?

Answer:

- Calcium (Ca)
- Vitamin A
- Iodine

Q2.5: What are the trimester-wise protein requirements?

Answer:

Stage	Protein (gm/day)
Non-pregnant	45.7

1st Trimester	45.7
2nd Trimester	+9.5
3rd Trimester	+22

Q2.6: What are the average values for other nutrients during pregnancy?

Answer:

Nutrient	Pregnant Value
Iron (mg/day)	27
Calcium (mg/day)	1000
Iodine (mcg/day)	250
Folate (mcg/day)	570
Vitamin A	900 mcg/day
Carbohydrates	175 gm/day

Q2.7: What is the average recommended weight gain during pregnancy?

Answer:

- Average: 9-11 kg
- NIN recommendation: 10 kg
  - Lower socioeconomic status: 6 kg

Q2.8: What is the trimester-wise pattern of weight gain?

Answer:

- 1st trimester: No weight gain
- 2nd trimester: 2 kg/month
  If 3 kg/month: Consider twins, big baby, preeclampsia, or diabetes
- Low SES women: 5-6 kg total

BIG QUESTION 3: What are the vaccination protocols and preventive technologies in pregnancy?

Broad Answer: Pregnant women require specific vaccination schedules to prevent infections like tetanus. Kangaroo Mother Care is a notable low-cost intervention that supports neonates, particularly in resource-limited settings.

DETAILED QUESTIONS

Q3.1: What is the Td vaccine protocol during pregnancy?

Answer:

- 2 doses of Td required:
  - 1st dose: As soon as pregnancy is confirmed
  - 2nd dose: 28 days later
- Booster dose:
  - Given in the 7th month of pregnancy

Q3.2: Who needs full Td vaccination vs. booster?

Answer:

- Primi & multipara with last childbirth >3 years: Full 2 doses
- Multipara with childbirth <3 years ago: Only booster

Q3.3: What is Kangaroo Mother Care (KMC)?

Answer:

- An example of appropriate technology (Primary Health Care principle)
- Components:
  - Skin-to-skin touch
  - Airway disease prevention
  - Ambulatory benefit
  - Nutritional benefit
  - Emotional support

BIG QUESTION 4: What are high-risk pregnancies and the related care protocols?

Broad Answer: High-risk pregnancies involve conditions that may pose a threat to the life or health of the mother or fetus. They require specialized care and monitoring throughout the antenatal, intranatal, and postnatal periods.

DETAILED QUESTIONS

Q4.1: What conditions are classified under high-risk pregnancies?

Answer:

- Elderly primi (Age ≥30 years)
- Short stature primi (Height ≤140 cm)
- Malpresentation (Breech, transverse lie)
- Antepartum hemorrhage (APH)
- Threatened abortion
- Preeclampsia and eclampsia
- Anemia
- Twins
- Hydramnios
- Previous stillbirths or intrauterine death
- Manual removal of placenta
- Elderly grand multipara
- Prolonged pregnancy (>14 days after expected date)
- History of previous cesarean or instrumental delivery
- Pregnancy with comorbidities: kidney disease, diabetes, TB, liver disease
- History of 3 or more spontaneous abortions
- History of infertility

Q4.2: What are the essential components of intranatal care?

Answer:

- 5 cleans to prevent neonatal tetanus:
  - Clean surface for delivery
  - Clean hands
  - Clean tie

  - Clean cord
  - Clean blade
- Purpose: Prevention of tetanus, ensuring safe delivery

Q4.3: What is the postnatal care protocol according to the Government of India?

Answer:

- For home deliveries (ANM): 4 visits on Day 1, 3, 7, and 42
- For institutional deliveries: 3 visits on Day 3, 7, and 42
- For low birth weight babies: 6 visits on Day 1, 3, 7, 14, 21, 28, and 42
- Rooming-in: Baby's cot should be close to the mother

Q4.4: What are the laboratory investigations advised during pregnancy?

Answer:

- At Sub-Centre:
  - Pregnancy detection test
  - Hemoglobin (Hb) examination
  - Urine test for albumin and sugar
  - Rapid malaria test
- At PHC/CHC/FRU:
  - Blood group and Rh status
  - VDRL/RPR
  - HIV testing
  - Rapid malaria test (if unavailable at sub-centre)
  - Blood sugar testing
  - HBsAg for Hepatitis B

Q4.5: What is Kangaroo Mother Care (KMC) and its benefits?

Answer:

- Example of appropriate technology (Primary Health Care principle)
- Benefits:
  - Skin-to-skin contact
  - Prevents airway disease
  - Provides ambulatory benefit
  - Enhances nutrition
  - Offers emotional support

BIG QUESTION 5: What are the maternal and child health indicators and their implications?

Broad Answer: Maternal and child health indicators help evaluate the effectiveness of healthcare delivery and the overall well-being of a population. These include mortality rates, birth weights, and other demographic health data. Monitoring them helps in identifying areas for public health interventions.

DETAILED QUESTIONS

Q5.1: What is the maternal mortality ratio (MMR) and how is it calculated?

Answer:

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- Formula: Maternal deaths per 100,000 live births
- Reflects quality of healthcare services
- $\frac{\text{No. of maternal deaths during, antenatal period, during delivery and up to 42 days post delivery}}{\text{Number of live birth}} \times 100000$
- Current MMR (India): 97/100,000 live births

Q5.2: What defines maternal death?

Answer:

- Death during antenatal period, delivery, or within 42 days post-delivery due to pregnancy-related causes
- Excludes accidental/incidental causes (e.g., fall, electric shock)

Q5.3: What is the maternal mortality rate?

Answer:

- Maternal deaths among women aged 15-49 years per 100,000 women in the same age group

$$\frac{\text{Maternal deaths in a given year}}{\text{Women of reproductive age (15-49 years) in the same year}} \times 100000$$

Q5.4: What are the most common causes of maternal mortality?

Answer:

- Direct cause: Hemorrhage
- Indirect cause: Anemia

Q5.5: What is the best indicator of the quality of delivery services in India?

Answer:

- Maternal Mortality Ratio (MMR)

Q5.6: What is the most sensitive indicator of health status of a community?

Answer:

- Infant Mortality Rate (IMR)

Q5.7: What are the mortality rates related to children and how are they defined?

Answer:

Indicator	Formula
Neonatal Mortality Rate (NMR)	(Deaths (0-28 days) / live births) × 1000
Early Neonatal Mortality Rate	(Deaths (0-7 days) / live births) × 1000
Late Neonatal Mortality Rate	(Deaths (8-28 days) / live births) × 1000
Post-Neonatal Mortality Rate	(Deaths (29 days-1 year) / live births) × 1000
Infant Mortality Rate (IMR)	(Deaths (0-1 year) / live births) × 1000
Under-5 Mortality Rate (U5MR)	(Deaths (0-5 years) / live births) × 1000
Stillbirth Rate	(Late fetal deaths / total births) × 1000
Perinatal Mortality Rate	(Late fetal death ≥28 weeks + early neonatal deaths) / total births) × 1000

Q5.8: What are the criteria for stillbirth?

Answer:

- Death at ≥28 weeks of gestation
- Fetal weight ≥1000 g
- Length ≥35 cm

Q5.9: What are the current (2023) and target (2030) values for mortality indicators in India?

Answer:

Indicator	Current (2023)	Target (SDG 2030)
NMR	20/1000 LB	<12/1000 LB
IMR	28/1000 LB	—
U5MR	32/1000 LB	<25/1000 LB
SBR	5/1000	—
MMR	97/100000 LB	<70/100000

Q5.10: What methods are used for evaluating causes of maternal and child death?

Answer:

- Medical Certification of Cause of Death (MCCD 2021)
  - Most common cause of IMR, NMR, U5MR: Hypoxia and birth asphyxia
  - As per SRS 2022: LBW/Prematurity is now the leading cause
- Verbal autopsy:
  - Used in field areas by healthcare workers when hospital data unavailable
- RHIME:
  - Representative, routine, restructured, household interview for mortality evaluation

Q5.11: What are the best indicators of development and health service quality?

Answer:

- IMR: Health status of a community
- IMR: Overall development of the nation
- U5MR (per UN): Best indicator of overall social development
- IMR: Availability, utilization, effectiveness of health services
- U5MR: Health and socio-economic status of a community
- Perinatal mortality rate: Combined obstetrics and pediatrics care
- MMR: Quality of healthcare delivery in a population

BIG QUESTION 6: What are the risk factors and nutritional indicators for child survival, growth, and development?

Broad Answer: Children at risk due to birth conditions or malnutrition require early identification and intervention. Growth charts, anthropometric indices, and birth weight trends are used to evaluate risk and track development.

DETAILED QUESTIONS

Q6.1: Who are classified as at-risk infants?

Answer:

- Babies of working mothers and single parents
- Birth weight <2.5 kg
  - Twins
  - Birth order 5 or more
  - Infants on artificial feeding
  - II- and III-degree malnutrition (Weight <70% of expected)
  - Failure to gain weight in 3 successive months (failure to thrive)
  - Children with PEM
  - Infants with diarrhea

Q6.2: What is the Child Death Rate and Child Survival Index?

Answer:

- Child Death Rate = (Deaths of children 1-4 years / midyear population of 1-4 years) × 1000
- Child Survival Index = $\frac{1000\text{-U5MR}}{10}$

  → Represents proportion of children surviving up to 5 years

Q6.3: What is the Infant Mortality Rate (IMR) in India and average birth weight?

Answer:

- IMR: $\frac{\text{Deaths of children (0-1 year)}}{\text{live births}} \times 1000$
- Average Indian birth weight: 2.8 kg

Q6.4: What are the leading causes of neonatal, infant, and under-5 mortality as per SRS 2022?

Answer:

- Low Birth Weight (LBW)/Prematurity
  - o Most common cause of neonatal mortality
  - o Most common cause of infant mortality
  - o Most common cause of under-5 mortality

Q6.5: What is the most common cause of stillbirth rate and perinatal mortality?

Answer:

- Stillbirth rate: Placental causes (e.g., antepartum hemorrhage)
- Perinatal mortality: Combined maternal and fetal causes

Q6.6: What defines Low Birth Weight and its growth pattern post-birth?

Answer:

- LBW: <2.5 kg
- Average Indian birth weight: 2.8 kg
- Weight doubles by 5 months
- Triples by 1 year
- Quadruples by 2 years

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Q6.7: What are the causes of LBW?

Answer:

- Prematurity
- Small for gestational age (Intrauterine Growth Restriction – IUGR)

Q6.8: Who are classified as Small for Date Babies (SDF)?

Answer:

- Babies with weight <10th percentile for gestational age
- Exhibit intrauterine growth retardation
- Can be term or preterm
- High risk of mortality due to PEM and infections

BIG QUESTION 7: How is child growth assessed and what are the indicators of malnutrition?

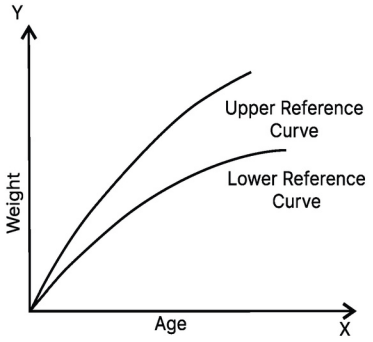
Broad Answer: Child growth is assessed using standardized growth charts, weight and height measures, and anthropometric tools. Malnutrition is classified based on deviations in weight-for-age, height-for-age, and weight-for-height metrics.

DETAILED QUESTIONS

Q7.1: What are growth charts and who devised them?

Answer:

- Tools to assess malnutrition status
- Devised by David Morley
- Up to 5 years: Weight-for-age used
- Superimposed with indicators of acute and chronic malnutrition
- ICDS charts used in India



Q7.2: What is the difference between WHO and ICDS growth charts?

Answer:

- ICDS chart: Adopted from WHO chart
- Based on Multicentric Growth Reference Study (MGRS)
  - MGRS: Included exclusively breastfed babies, excluded alcohol and smoking mothers
- Gender color coding:
  - Girls: Pink
  - Boys: Blue

Q7.3: What is the Salter Scale and what does it measure?

Answer:

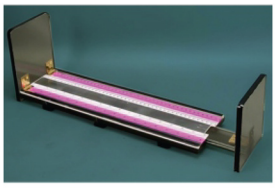
- Used to measure weight of a child in field settings
- Graduation: 100 grams



Q7.4: What tools are used to measure length and height in children?

Answer:

- Infantometer: For length till 2 years



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- Stadiometer: For height after 2 years



Q7.5: What are the common types of growth charts?

Answer:

- WHO Growth Chart
- Road to Health Growth Chart
- Boston Health Chart
- Field Growth Chart
- All based on MGRS

Q7.6: What are the percentile references in growth charts?

Answer:

- Upper reference: 50th percentile (boys)
- Lower reference: 3rd percentile (girls)
- Between references: Road to Health
- Below lower reference: Indicates malnutrition

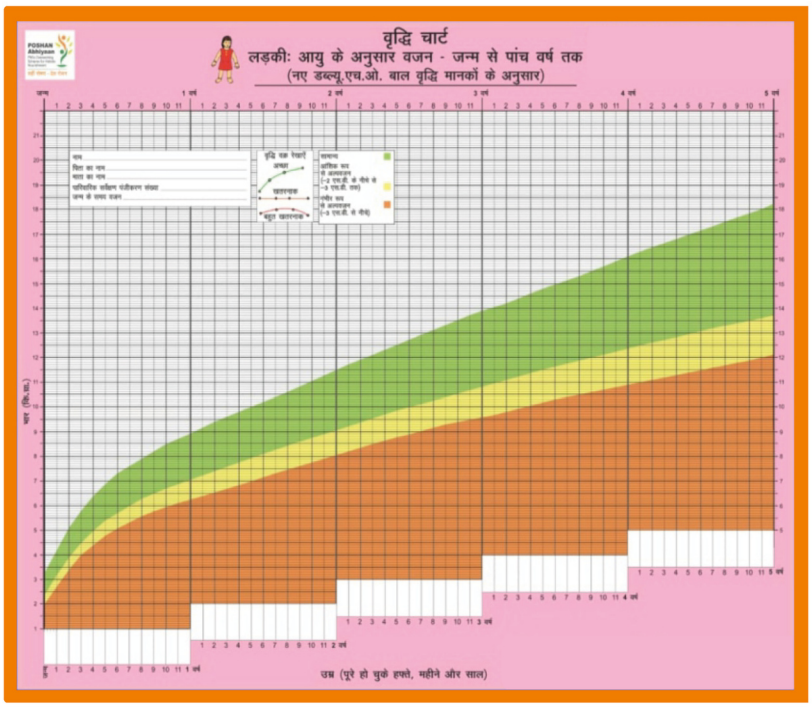
Q7.7: What are the diagnostic criteria for Severe Acute Malnutrition (SAM)?

Answer:

- Weight-for-height: < -3 Z score or <70% expected
- Mid-upper arm circumference (MUAC): <11.5 cm
- Bilateral edema present

Q7.8: How are different grades of malnutrition color-coded on charts?

Answer:



- +2 to -2 SD: Green - Normal, advise adequate growth
- -2 to -3 SD: Yellow - Mild to moderate, supplement diet and breastfeeding
- < -3 SD: Red - Severe malnutrition, refer to CHC or higher center

Q7.9: What is the MUAC and how is it used?

Answer:

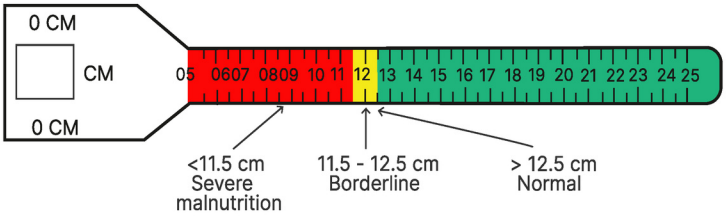
- MUAC: Mid-Upper Arm Circumference
- Age-independent indicator
- Age group: 6 months to 5 years
- Location: Midpoint between acromion and olecranon
- Sensitive indicator of malnutrition
- First muscle to lose or gain weight: Triceps
- Commonly used by health workers

Q7.10: What is Shakir's Tape and its interpretation?

PYQ: FMGE 2020

Answer:

- Used for field assessment of nutritional status
- Color code:
  - Red: <11.5 cm - Severe Acute Malnutrition (SAM)
  - Yellow: 11.5-12.5 cm - Undernourished
  - Green: >12.5 cm - Normal
- Measures Mid-Upper Arm Circumference



BIG QUESTION 8: What are the key facts about breastfeeding, protein energy malnutrition (PEM), and milk comparisons?

Broad Answer: Breastfeeding provides essential nutrients and immunity to infants. Differences in breast milk and cow milk, and the understanding of PEM conditions like kwashiorkor and marasmus, are crucial for child nutrition and public health guidance.

DETAILED QUESTIONS

Q8.1: What are the recommendations for breastfeeding?

Answer:

- Exclusive breastfeeding: For the first 6 months
- Continued breastfeeding: Up to 2 years
- Energy provided: 65 kcal per 100 ml
- Protein content: 0.9 to 1.1 g/100 ml
- Dominant immunoglobulin: IgA > IgD

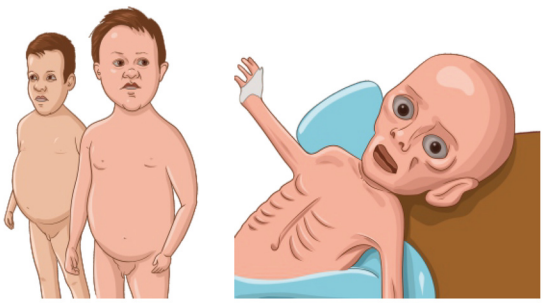
Q8.2: What is the difference between Kwashiorkor and Marasmus?

Answer:

Feature	Kwashiorkor	Marasmus
Deficiency	Protein	Protein + Calorie
Age group	6 months - 3 years	<1 year

Subcutaneous fat	Preserved	Lost
Edema	Present	Absent
Liver	Enlarged fatty liver	No fatty liver
Ribs	Not prominent	Prominent
Behavior	Lethargic	Alert and irritable
Muscle wasting	Mild or absent	Severe
Appetite	Poor appetite	Voracious feeder
Treatment focus	Adequate protein intake	Adequate protein, fat, and carbohydrate intake

PYQ: FMGE 2021, 2022



kwashiorkor Marasmus

Q8.3: What are the compositional differences between breast milk and cow milk?

PYQ: NEET PG 2020

PYQ: FMGE 2021

Answer:

Component	Breast Milk	Cow Milk
Protein	1.1 gm%	3.3 gm%
Cysteine/Taurine	Increased	Decreased
Fat	Decreased (3.4 gm%)	Increased (4.1 gm%)
DHA	Increased	Decreased
Lactose	7.4 gm% (Increased)	4.4 gm% (Decreased)
Ca/P ratio	Increased	Decreased
Iron (bioavailability)	Increased (70%)	Decreased
Sodium	Decreased	Increased
Calcium/Phosphorus	Decreased	Increased
Immunoglobulins	IgA (Local Immunity)	None
Vitamin Deficiency	K, D, C	Less deficient
Energy	65-70 kcal/100 ml	67 kcal/100 ml
Infection Risk	Very Low	Very High
Whey:Casein Ratio	60:40	20:80

BIG QUESTION 9: What are the components and standards of school health services?

Broad Answer: School health services focus on the physical and environmental wellbeing of children in schools. They include regular health checkups, dental and eye screenings, and maintaining a healthful learning environment.

DETAILED QUESTIONS

Q9.1: What is the historical background and current recommendation for school health checkups?

Answer:

- Concept introduced by: Sir Joseph Bhore (Bhore Committee)
- Improvised by: Renuka Roy Committee (Recommended once every 4 years)
- Current recommendation: Health checkup every 6 months
- Responsibility: Medical Officer

Q9.2: What are the environmental and infrastructure standards for school health?

Answer:

- One classroom should have only 40 students
- Desks: Should be minus type
- Doors and windows: Should account for >25% of floor area
- Toilets:
  - 1 urinal per 60 students
  - 1 latrine per 100 students
- Lighting: Should come from the left side (as most students are right-handed)

Q9.3: What is the dental health protocol in school health services?

Answer:

- Most common infection found during school health checkups: Dental infections
- Types:
  - Dental caries
  - Periodontal diseases
- Dental checkup recommended: Once every year

Q9.4: What is the eye health protocol in school health services?

Answer:

- Teachers can conduct eye checkups
- One teacher for every 150 students
- Referral criteria:
  - If visual acuity <6/9, child should be referred to paramedical ophthalmic assistant

MCQs

Q10.1: Perinatal mortality rate includes:

A. Death within the first week of life

B. Abortions stillbirths, death within the first week of life

C. Death from 28 weeks within the first week of life

D. Death within the first month of life

Answer: C. Death from 28 weeks within the first week of life

Explanation:

Perinatal mortality includes **late fetal deaths (≥28 weeks gestation)** and **early neonatal deaths (within 7 days of birth)** per 1000 total births (live births + stillbirths).

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Q10.2: Stillbirth rate is:

A. Death of a fetus weighing 1000 gm or more in one year per 1000 total births

B. Death of a fetus weighing 1000 gm or more in one year per 1000 live births

C. Death of a fetus weighing 1000 gm or more in one year per 1000 stillbirths

D. None of the above

Answer: A. Death of a fetus weighing 1000 gm or more in one year per 1000 total births

Explanation:

Stillbirth rate refers to the **number of fetal deaths ≥1000 grams (or ≥28 weeks)** per **1000 total births** in a given year.

Q10.3: All are criteria for identifying at-risk infants except?

A. Birth weight less than 2.8 kg

B. Birth order 5 or more

C. PEM, diarrhea

D. Working mother

Answer: B. Birth order 5 or more

Explanation:

Birth order alone is not a direct criterion for risk; low birth weight, malnutrition (PEM), or infections like diarrhea are clinical risk indicators.

Q10.4: Mean birth weight of Indian babies:

A. 2.5 kg

B. 2.8 kg

C. 3.1 kg

D. 3.5 kg

Answer: A. 2.5 kg

Explanation:

The average birth weight of Indian newborns is around **2.5 kg**, which is lower than global averages due to nutritional and maternal factors.

Q10.5: As per WHO, Low birth weight is defined as:

A. Birth weight <2.5 kg

B. Birth weight < 10 percentile

C. Gestational age <34 weeks

D. Working mother

Answer: A. Birth weight <2.5 kg

Explanation:

WHO defines **Low Birth Weight (LBW)** as a birth weight of **less than 2.5 kg**, irrespective of gestational age.

Q10.6: Term "small for date babies" is defined as?

A. Weight <5th percentile of gestational age

B. Weight <10th percentile of gestational age

C. Weight <15th percentile of gestational age
D. Gestational age <38 weeks
E. Weight <75th percentile of gestational age

Answer: B. Weight <10th percentile of gestational age
Explanation: "Small for Date" or **Small for Gestational Age (SGA)** refers to babies whose weight is **below the 10th percentile** for their gestational age.

14. BASIC CONCEPT OF NUTRITION, RDA AND VITAMINS

BIG QUESTION 1: What is the concept of a Reference Man and Reference Woman in nutritional science?

Broad Answer: The National Institute of Nutrition (NIN), Hyderabad, defines a 'Reference Man' and 'Reference Woman' to standardize dietary recommendations (RDA). These definitions consider age, weight, height, BMI, and activity patterns to estimate nutrient and energy needs.

DETAILED QUESTIONS

Q1.1: Who is considered a Reference Man and Woman?

Answer:

- Reference Man: 19-39 years, 65 kg, 177 cm, BMI ~20.75
- Reference Woman: 19-39 years, 55 kg, 162 cm, BMI ~20.95

Q1.2: What is the daily activity pattern used to define reference adults?

Answer:

- 8 hours of sleep
- 8 hours of moderate work
- 4-6 hours of sitting or light activity
- 2 hours of walking/recreational activity

Q1.3: What BMI classification is used for nutritional reference?

Answer:

- Asian/Indian classification is used for BMI standards in the NIN guidelines

Q1.4: Why is RDA based on the reference adult model?

Answer:

- RDA aims to cover 97-98% of the healthy population, assuming average requirements as observed in the reference man/woman

Q1.5. Rahul 35-year-old brought his mother who is 70 years to his family doctor for a health check-up. The family doctor is advising Rahul and his mother on adequate nutritional requirements. Rahul tells the doctor, weight is 65 kg is a teacher and his mother stays at home. According to the latest NIN RDA guidelines, how many calories should Rahul and his mother take?

A. 2350 kcal, 1700 kcal
B. 3470 kcal, 1500 kcal
C. 2710 kcal, 1700 kcal
D. 2110 kcal, 1500 kcal
E. 1690 kcal, 1500 kcal

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Answer: D. 2110 kcal, 1500 kcal

Explanation ·

Rahul who weighs 65 kg is a teacher and is a sedentary worker o Calorie requirement of a sedentary worker is 2110 kcal · The mother stays at home and is 75 years old (Elderly woman) o Calorie requirement is 1500 kcal/day

Q1.6. A 12-week primigravida comes to you for check-up. What is the correct advice you will give to her regarding additional calories requirement?

A. Additional calories of 400 needed in 3rd trimester only

B. Additional calories of 100 in second trimester

C. Additional calories of 350 in all trimester

D. Additional calories of 400 in second trimester

Answer: A. Additional calories of 400 needed in 3 trimester only

Explanation

- According to the NIN guidelines, pregnant woman should add extra 350 calories
- In the first trimester, it is difficult for her to eat because of morning sickness, nausea
- In first trimester, no additional calories are required ideally or in a small amount (70-85 kcal/day)
- In the second trimester, 230-280 kcal/day
- The maximum weight gain of a pregnant female occurs in the third trimester
- Weight of the baby in the second trimester is 1 kg
- At birth, weight is on an average is 2.8 kg
- Third trimester: Additional calories required is 400 kcal/day

Pregnancy	Extra calories required
1st trimester	70-85 kcal/day
2nd trimester	230-280 kcal/day
3rd trimester	390-470 kcal/day
Average	310-375 kcal/day

BIG QUESTION 2: How are energy requirements defined based on lifestyle and special conditions like pregnancy and lactation?

Broad Answer: Energy needs vary by age, sex, body weight, activity level, and physiological status (e.g., pregnancy, lactation). The NIN classifies activity levels as sedentary, moderate, and heavy, and provides energy addition guidelines for special populations.

DETAILED QUESTIONS

Q2.1: What are the calorie requirements for men and women based on activity level?

Category	Men (kcal/day)	Women (kcal/day)
Sedentary	2110	1660
Moderate	2710	2130
Heavy	3470	2720

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Q2.2: How many calories are required for a sedentary adult male (e.g., a teacher weighing 65 kg)?

Answer:

- Calorie requirement for a sedentary adult male is 2110 kcal/day

Q2.3: What is the daily calorie requirement for an elderly woman (e.g., 70+ years old staying at home)?

Answer:

- Elderly women typically require about 1500 kcal/day

Q2.4: Protein requirement of 55 kg female:

A. 45 gm

B. 54 gm

C. 65 gm

D. 55 gm

Answer: A. 45 gm

Explanation

- Protein required ideally is 0.83 gm/kg/day
- $55 \times 0.83 = 45$ gm

Q2.5: How are additional energy needs calculated during pregnancy and lactation?

Answer:

- Pregnancy: +350 kcal/day (especially needed from 2nd trimester onward)
- Lactation:
  - 0-6 months: +600 kcal/day
  - 7-12 months: +520 kcal/day

Q2.6: What trimester-specific calorie increments are observed in pregnancy?

Trimester	Extra Calories/day
1st Trimester	70-85 kcal
2nd Trimester	230-280 kcal
3rd Trimester	390-470 kcal

Q2.7: Why are no additional calories advised in the 1st trimester?

Answer:

- Due to nausea and morning sickness, appetite is reduced; actual metabolic demands are also low at this stage

Q2.8: How does fetal weight evolve across pregnancy?

Answer:

- Around 1 kg by the end of second trimester; average birth weight is 2.8 kg

Q2.9: How much weight gain is expected during pregnancy?

Answer:

- Average: 9-11 kg throughout pregnancy

Q2.10: Compared to a pregnant female, a lactating female would require a higher level of nutrient supplementation for which of the following?

A. Vitamin A

B. Iron

C. Folic acid

D. Calcium

Answer: D. Calcium

Explanation

Vitamin A and Calcium are both required at a higher level in lactation and the range of requirement for calcium is more than Vitamin A

Q2.11: How much energy does an infant require in early life?

Age Group	Energy (kcal/kg/day)	Protein (g/kg/day)
0-6 months	92	1.16
6-12 months	80	1.69

BIG QUESTION 3: What are the protein requirements, RDA guidelines, and macronutrient recommendations across life stages?

Broad Answer: Protein and energy requirements depend on weight, age, and physiological status. The Recommended Dietary Allowance (RDA) ensures adequate nutrient intake for nearly all healthy individuals, while macronutrient distribution guides balanced diet planning.

DETAILED QUESTIONS

Q3.1: How is protein requirement calculated for adults?

Answer:

- Standard: 0.83 g/kg/day
- For a 55 kg female: 55 × 0.83 = ~45.7 g/day

Q3.2: What are the average macronutrient recommendations for adults?

Macronutrient	Percentage of Total Energy
Proteins	10-15%
Fats	15-30%
Carbohydrates	50-80%

Q3.3: What are the RDA values of energy and protein during pregnancy and lactation?

Stage	Protein (g/day)	Energy (kcal/day)
Pregnancy	+10 (1st), +9.5 (2nd), +22 (3rd)	+350 average
Lactation (0-6 mo)	+16.9	+600
Lactation (6-12 mo)	+13.2	+520

Q3.4: What are the average RDAs for protein, carbs, and key micronutrients for men and women?

Nutrient	Males (65 kg)	Females (55 kg)
Protein (g/day)	54	45.7
Carbs (g/day)	130	130
Vitamin A (mcg)	1000	840
Vitamin D (IU)	600	600
Iron (mg/day)	19	29
Calcium (mg)	1000	1000
Iodine (mcg)	150	150
Folate (mcg)	300	220

Q3.5: How is RDA defined and how does it relate to EAR?

Answer:

- RDA = EAR + 2 SD
- It meets needs of ~97.5% of the population
- EAR (Estimated Average Requirement) meets the needs of 50%
- Exception: For calorie intake, RDA = EAR

Q3.6: Which nutrients are significantly increased during pregnancy?

Answer:

- Iron, Folic Acid, Protein, Zinc

Q3.7: Which nutrients have higher requirements during lactation?

Answer:

- Calcium, Vitamin A, Iodine, Vitamin C, Carbohydrates

BIG QUESTION 4: How are amino acids classified and how is protein quality assessed?

Broad Answer: Amino acids are categorized based on their necessity and synthesis in the body. Protein quality depends on amino acid composition, digestibility, and retention. Various indices such as NPU and DIAAS help evaluate dietary protein effectiveness.

DETAILED QUESTIONS

Q4.1: What are essential, non-essential, and conditionally essential amino acids?

PYQ: INICET 2023

Answer:

- **Essential amino acids (9):** Cannot be synthesized in adequate amounts, must be obtained from diet
  Mnemonic: PVT TIM HALL – Phenylalanine, Valine, Tryptophan, Threonine, Isoleucine, Methionine, Histidine, Leucine, Lysine
- **Non-essential amino acids (6):** Synthesized by the body – Arginine, Aspartic acid, Serine, Glutamic acid, Proline, Glycine
- **Conditionally essential:** Normally synthesized but may become essential during stress, illness, or deficiency of precursors
  - Examples: Tyrosine (from phenylalanine), Cysteine (from methionine), Arginine, Glutamine, Taurine, Glycine

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Q4.2: What are semi-essential amino acids?

Answer:

- Required in greater quantities during growth, pregnancy, adolescence
- Examples: Arginine and Histidine

Q4.3: What is meant by the supplementary action of proteins?

Answer:

- Combining cereals (deficient in lysine/threonine) with pulses (deficient in methionine/cysteine) improves amino acid profile
- Example: Cereal + Pulse = balanced protein

Q4.4: Which amino acids are limiting in major food groups?

Food Item	Limiting Amino Acid(s)
Cereals	Threonine, Lysine
Pulses	Methionine, Cysteine
Maize	Tryptophan, Lysine

Q4.5: How is protein quality assessed?

Answer:

- **DIAAS:** Digestible Indispensable Amino Acid Score — most accurate
- **PDCAAS:** Protein Digestibility Corrected Amino Acid Score
- **AAS:** Amino Acid Score
- **NPU:** Net Protein Utilization — proportion of ingested protein retained after digestion
  - Formula: NPU = BV × DC/100
  - BV = Biological Value; DC = Digestibility Coefficient

Q4.6: What is the reference protein and which foods have high-quality protein?

Answer:

- Reference: Egg protein
- Maximum protein content: Soybeans (43%) with 432 kcal/100g
- Best retained (highest NPU): Egg (NPU = 96-100)

Q4.7: What is the "Rule of 6" for an egg?

Answer:

- 6 g protein
- 6 g fat
- 66-70 kcal energy
- 30 mg calcium
- 1.5 mg iron
- 250 mg cholesterol

BIG QUESTION 5: What are the types of dietary fats, their sources, and clinical implications of fatty acid deficiencies?

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Broad Answer: Fats are classified by structure and saturation. They are vital for energy, cellular health, and inflammation regulation. Deficiencies in essential fatty acids can lead to conditions like phrynoderma. Understanding types, sources, and their roles helps in clinical and nutritional planning.

DETAILED QUESTIONS

Q5.1: What are the classifications of dietary fats?

Answer:

- **Simple lipids:** Triglycerides
- **Compound lipids:** Phospholipids
- **Derived lipids:** Cholesterol
- Based on saturation:
  - o Saturated fats: Animal-based (e.g., butter, coconut oil)
  - o Unsaturated fats: Vegetable-based
    - → Monounsaturated (e.g., oleic acid in groundnut oil)
    - → Polyunsaturated (e.g., linoleic and linolenic acid in sunflower and safflower oil)

Q5.2: What are essential fatty acids (EFAs) and their major sources?

Answer:

- **Linoleic acid (Omega-6):** Safflower, sunflower oil
- **Alpha-linolenic acid (Omega-3):** Flaxseed, soybean oil
- **EPA/DHA (Omega-3):** Fish oils (e.g., cod liver, breast milk for DHA)
- **Arachidonic acid (AA):** Derived from linoleic acid



Q5.3: What clinical condition arises from essential fatty acid deficiency?

Answer:

- **Phrynoderma:** Rough, toad-like skin due to EFA deficiency

Q5.4: What roles do Omega-3 and Omega-6 fatty acids play?

Answer:

Fatty Acid Group	Key Examples	Effects
Omega-3	Alpha-linolenic, EPA, DHA	Anti-inflammatory, cardioprotective
Omega-6	Linoleic, Arachidonic acid (AA)	Pro-inflammatory, membrane structure

Q5.5: What is the caloric value of different macronutrients?

Nutrient	Energy Yield (kcal/g)
Proteins	4
Carbohydrates	4
Fats	9
Fiber	2
Alcohol	7

Q5.6: What is the typical NPU range of Indian diets?

Answer:

- Between 50-80, depending on dietary quality and digestibility

Q5.7: What does 1 gram of nitrogen correspond to in protein terms?

Answer:

- 1 gram of nitrogen ≈ 6.25 grams of protein

BIG QUESTION 6: What are the nutritional roles of carbohydrates, dietary fiber, and key minerals?

Broad Answer: Carbohydrates are the main source of energy in the human diet. Fiber aids digestive health and impacts glycemic response. Minerals such as calcium, zinc, selenium, and iron play vital roles in growth, immunity, and enzymatic functions.

DETAILED QUESTIONS

Q6.1: What is the primary role of carbohydrates and how is glycemic index defined?

Answer:

- Carbohydrates are the primary energy source
- **Glycemic Index (GI):** Measures the blood glucose response over 2 hours after consuming 50g of carbohydrate, relative to glucose or white bread

Q6.2: How are foods categorized based on glycemic index?

GI Category	Range	Examples
Low GI	≤ 55	Most fruits, vegetables, whole grains, legumes
Medium GI	56-69	Basmati rice, brown rice, sucrose
High GI	≥ 70	Cornflakes, white bread, candy bars, some white rice types

Q6.3: What are the types and functions of dietary fiber?

Answer:

- **Recommended:** 40 g/day for a 2000 kcal diet
- **Soluble fiber:** Pectin — slows digestion, helps regulate blood sugar
- **Insoluble fiber:** Cellulose — adds bulk to stool, promotes regularity

Q6.4: Which grain is richest in calcium and what aids its absorption?

Answer:

- **Ragi (finger millet):** Richest grain source of calcium
- **Vitamin D** is essential for calcium absorption

Q6.5: What are the functions and deficiency signs of zinc?

PYQ: FMGE 2022 PYQ: INICET 2023

Answer:

- **Functions:** Wound healing, immune function, fertility, growth
- **Deficiency:** Infertility, delayed healing, diarrhea, hair loss

- **Clinical condition:** Acrodermatitis enteropathica – genetic defect in zinc absorption; causes inflammatory periorificial rashes
- **Requirement:** 5-10 mg/day

Q6.6: What are the sources and functions of Omega-3 and Omega-6 fatty acids?

Fatty Acid	Sources	Functions
Omega-3	Flaxseed, fish oil, DHA (milk)	Anti-inflammatory, CNS development, heart health
Omega-6	Safflower, sunflower, soybean oil	Pro-inflammatory, cell structure

Q6.7: What are the properties and deficiency effects of selenium and vitamin E?

Answer:

- **Selenium:** Antioxidant; deficiency causes Keshan cardiomyopathy PYQ: FMGE 2019
- **Requirement:** 50-60 mcg/day
- **Vitamin E:** Strongest natural antioxidant; deficiency can cause hemolytic anemia and eye movement disorders

BIG QUESTION 7: What are the causes, stages, and treatment strategies for Vitamin A deficiency?

Broad Answer: Vitamin A deficiency presents with progressive eye symptoms and systemic signs, especially in children. (Most common age group is 1-3 yrs) The WHO has classified the stages from night blindness to corneal scarring. Public health programs use both curative and preventive strategies with standard dosing schedules.

DETAILED QUESTIONS

Q7.1: What are the key sources of Vitamin A?

PYQ: FMGE 2020,2021 PYQ: NEET PG 2022

Answer:

- **Animal (richest):** Halibut fish oil
- **Other rich sources:** Cod liver oil, red palm oil, mango, papaya
- **Cheapest source:** Green leafy vegetables (e.g., spinach)

Q7.2: What are early symptoms and clinical signs of Vitamin A deficiency?

Answer:

- **Earliest symptom:** Night blindness
- **First clinical sign:** Conjunctival xerosis (lustreless eye)
- **Most specific sign:** Bitot's spots – foamy white patches on bulbar conjunctiva

Q7.3: What is the WHO classification of xerophthalmia?

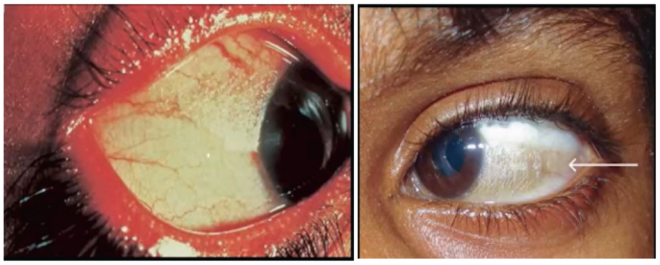
WHO Code	Clinical Feature	Reversibility
XN	Night blindness	Primary/reversible
X1A	Conjunctival xerosis	Reversible
X1B	Bitot's spot	Reversible
X2	Corneal xerosis	Reversible
X3A	Corneal ulcer <1/3 surface	Irreversible

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X3B	Corneal ulcer >1/3 (keratomalacia)	Irreversible
XF	Fundal changes	Secondary
XS	Corneal scar	Secondary

Q7.4: What is the public health significance of xerophthalmia and how is it assessed?

Answer:



- Age group affected: 6 months to 6 years
- **Prevalence thresholds:**
  - Night blindness >1%
  - Bitot's spots >0.5%
  - Corneal xerosis/ulceration >0.01%
  - Corneal scar >0.05%
  - Serum retinol <10 mcg/dl in >5% of children

Q7.5: What is the treatment protocol for clinical deficiency?

Age Group	Day 0	Day 1	Day 14
<6 months	50,000 IU	50,000 IU	50,000 IU
6 months - 1 year	1 lakh IU	1 lakh IU	1 lakh IU
>1 year	2 lakh IU	2 lakh IU	2 lakh IU

Q7.6: What are the guidelines for Vitamin A prophylaxis?

Answer:

- **First dose:** At 9 months with measles vaccine (1 lakh IU)
- **Follow-up:** Every 6 months till 5 years — 2 lakh IU per dose
- **Total doses:** 9
- **Total IU administered:** 17 lakh IU
- **Level of prevention:** Primary (specific protection)

Q7.7: What precautions are advised during oral Vitamin A administration?

Answer:

- Given via white plastic spoon (1 ml = 1 lakh IU)
- Avoid teaspoons (risk of overdose)
- If spoon unavailable, use cap of bottle
- Stored in amber-colored bottle at room temperature, away from light

BIG QUESTION 8: What are the deficiency manifestations and sources of Vitamins B1-B12, C, D, E, and K?

Broad Answer: Each vitamin in the B-complex group, along with C, D, E, and K, plays a critical biochemical role. Their deficiencies lead to characteristic clinical syndromes, often with overlapping but distinguishable signs. Timely diagnosis and supplementation are essential in prevention and treatment.

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DETAILED QUESTIONS

Q8.1: What is the deficiency syndrome of Vitamin B1 (Thiamine)?

PYQ: INICET 2023

Answer:

- **Deficiency disease:** Beriberi (dry and wet types)
- **Dry type:** Neurological – peripheral neuropathy
- **Wet type:** Cardiovascular – heart failure, edema
- **Infantile beriberi:** Seen in breastfed infants of thiamine-deficient mothers
- **Wernicke's encephalopathy:** Seen in chronic alcoholics – features include ataxia, ophthalmoplegia, and confusion
- **Richest source:** Gingelly seeds
- Thiamine deficiency is seen:
  - o Among Chronic alcoholics
    - → In chronic alcoholics
    - → The patient presents with ataxia, Ophthalmoplegia, Mental retardation
  - o Among polished rice eaters - In people of Andhra Pradesh
  - o Those who chronically fast
- **Prevention:** Parboiling of polished rice

Q8.2: What are the clinical signs of Vitamin B2 (Riboflavin) deficiency?

PYQ: NEET PG 2022

Answer:

- **Triad:** Magenta tongue, cheilosis, angular stomatitis
- Tongue may appear smooth, inflamed ("geographic tongue")



Q8.3: What is Pellagra and which vitamin deficiency causes it?

Answer:



- **Vitamin B3 (Niacin) deficiency** causes Pellagra
- **Clinical signs – 6 D's:** Diarrhea, Dermatitis (sun-exposed), Dementia, Depression, Delirium, Death
- **Characteristic skin lesion:** Casal's necklace (hyperpigmentation around neck)
- **High-risk group:** Maize-based diets (Jowar eaters) due to excess leucine, which inhibits tryptophan to niacin conversion
- **Conversion rate:** 60 mg tryptophan = 1 mg niacin PYQ: FMGE 2021 PYQ: INICET 2022 PYQ: NEET PG 2023
- **Preventive food:** Groundnut

Q8.4: What is the classic deficiency manifestation of Vitamin B5 (Pantothenic acid)?

Answer: **Syndrome:** Burning feet/sole syndrome

Q8.5: What are the deficiency effects of Vitamin B9 (Folic acid)?

Answer: **Results in:** Megaloblastic anemia, neural tube defects, infertility (in severe deficiency)

Q8.6: What are the deficiency manifestations of Vitamin B12 (Cobalamin)?

PYQ: FMGE 2022

Answer:

- **Leads to:**
  - Megaloblastic anemia
  - Pernicious anemia (autoimmune gastritis-related)
  - Peripheral neuropathy
  - Subacute combined degeneration of spinal cord
- **High-risk:** Vegetarians

Q8.7: What are the symptoms of Vitamin C deficiency (Scurvy)?

PYQ: FMGE 2021 PYQ: NEET PG 2023

Answer:



- Swollen and bleeding gums
- Subcutaneous bruising
- Bleeding into joints
- Poor wound healing, anemia, weakness
- **Key function:** Collagen synthesis (structural protein for blood vessels and tissues)
- **Preventive history:** James Lind used citrus fruits
- **Richest source:** Amla (Indian gooseberry)
- **Requirement:** 40 mg/day

Q8.8: What are the deficiency diseases linked to Vitamin D?

PYQ: FMGE 2021,2022 PYQ: NEET PG 2022 PYQ: NEET PG 2023

Answer:

- **Children:** Rickets (e.g., bow legs – genu varum)
- **Adults:** Osteomalacia
- **Most active form:** Calcitriol
- **Richest source:** Halibut fish

Q8.9: What is the function of Vitamin E and its deficiency signs?

Answer:

- **Strong antioxidant**
- **Requirement:** 8-10 mg/day
- **Deficiency:** Hemolytic anemia in newborns, progressive external ophthalmoplegia

Q8.10: What role does Vitamin K play and how is it supplemented?

Answer:

- **Function:** Blood clotting (prothrombin activation)
- **Deficiency disease:** Hemorrhagic disease of the newborn
- **Forms:**
  - K1 (Phylloquinone): from diet
  - K2 (Menaquinone): gut flora
  - K3 (Menadione): synthetic, water-soluble
- **At birth:** Vitamin K injection given to all newborns

15. TRACE ELEMENTS/NUTRITION HEALTH PROGRAMS/FOOD ADULTERATION/FOOD LOGOS

BIG QUESTION 1: What are the established hemoglobin cutoff levels for diagnosing anemia across different population groups, and what are the key indicators

Broad Answer: Anemia is diagnosed based on specific hemoglobin cutoffs that vary by age and physiological state. Iron deficiency is indicated by serum transferrin saturation, with serum ferritin being the most sensitive and definitive tool for assessing iron status.

DETAILED QUESTIONS

Q1.1: What are the minimum hemoglobin content cutoffs for diagnosing anemia in adult males, non-pregnant adult females, pregnant adult females, children aged 6 months to 6 years, and children aged 6 months to 14 years?

Answer:

- Adult male - 13 gm/dl
- Adult females (non-pregnant) - 12 gm/dl
- Adult females (pregnant) - 11 gm/dl
- Children, 6 months to 6 years - 11 gm/dl
- Children, 6 months to 14 years - 12 gm/dl

Q1.2: What hemoglobin levels categorize "Early Anemia" and "Marked Anemia"?

Answer:

- Early Anemia: Hb level 10-11 gm/dl
- Marked Anemia: Hb level < 10 gm/dl

Q1.3:Describe the Indicators for Iron deficiency

Answer:

Hemoglobin Concentration	• Best Epidemiological indicator o Used for epidemiological Survey of anemia • It is an Insensitive index of nutrient depletion
Serum Iron Concentration	• A better index of nutrient depletion • Normal range: 0.8-1.8 mg/L • Values <0.5 mg/L indicate iron deficiency • Preferred for index of nutrient depletion
Serum Ferritin	• Most sensitive tool for evaluating iron status • Most commonly used • Best and most definitive clinical indicator • Most useful indicator of iron status in a population where the prevalence of iron deficiency is not high • Normal value: 20 -160 mcg/L • Values <10 mcg/L: Absence of stored iron.

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Q1.4: After achieving normal Hb levels in iron deficiency anemia, for how long should iron preparation be continued to replenish stores?

Answer: After normal Hb% is achieved, continue iron preparation for a minimum of 3 months.

Q1.5: What are considered the richest and "poor man's" sources of iron?

Answer:

- Richest source of iron: Dried pumpkin seeds, pistachio.
- Poor man's iron source: Jaggery.

Q1.6: Which trace element, regardless of Hb and socioeconomic status, cannot be completely supplemented by diet during pregnancy?

Answer: Iron.

Q1.7: For mass prophylaxis of iron deficiency, which form of iron is most suitable considering operational aspects?

Answer: For mass prophylaxis, considering the operational aspect, tablet ferrous sulphate is most suitable.

Q1.8: In which specific cases should prophylaxis with iron be withheld?

Answer:

- Prophylaxis with iron should be withheld in cases of:
  - Acute illness (fever, pneumonia, diarrhea).
  - Known case of thalassemia major.
  - History of repeated blood transfusion.

BIG QUESTION 2:Describe fluorine as a trace element

Broad Answer: Fluorine is a "double-edged sword" as both deficiency and excess lead to health issues. Excess fluorine causes dental fluorosis (at >1.5 mg/L), skeletal fluorosis (at 3-5 mg/L), and genu valgum, while crippling fluorosis occurs at levels >10 mg/L. Defluoridation is achieved by the Nalgonda technique using lime, alum, and bleaching powder.

DETAILED QUESTIONS

Q2.1: What is the normal fluorine content in drinking water?

Answer: Normal fluorine content in Drinking water - 0.5-0.8 mg/L.

Q2.2: What technique is used to remove excess fluorine from water, what chemicals are involved, and which institute developed it?

Answer:

- Excess fluorine is removed from water by the Nalgonda technique.
- Defluoridation of water involves LAB (Lime, Alum, and Bleaching powder are added).
- Developed by NEERI Institute, Nagpur (National Environmental Engineering Research Institute).

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Q2.3: If a child's frontal anterior incisors developed white patches that later turned brown, what is the most likely over-supplemented substance?

Answer: Fluorine.

Q2.4: At what fluoride content in water does Dental fluorosis occur, and what are its characteristic signs? Conversely, when does Dental caries occur due to fluorine deficiency?

Answer: PYQ: FMGE 2019

- Dental fluorosis: Happens when the fluoride content in water is more than 1.5 mg/l.



Mottling of the teeth

- Mottling of upper incisors.
- Dental caries: Deficiency of fluorine in the water (Fluoride content is less than 0.5 mg/l).



Dental caries

Q2.5: At what levels of fluorine in drinking water do Skeletal Fluorosis, Genu Valgum, and Crippling fluorosis occur?

Answer:



- Skeletal Fluorosis: When the level of fluorine in water is 3-5 mg/L of drinking water.
- Genu Valgum: Occurs due to excess fluorine, also called Knock-knee syndrome.
- Crippling fluorosis: The level of fluorine in water is > 10 mg/L of drinking water.

Q2.6: In which Indian states is fluorosis endemic?

Answer: Fluorosis is endemic in AP, Karnataka, Kerala, Tamil Nadu, Punjab, and Haryana.

BIG QUESTION 3: What is the primary consequence of iodine deficiency, and what are the various preventive measures and indicators used to assess iodine deficiency in a population?

Broad Answer: Iodine deficiency leads to goiter. Preventive measures include iodized salt (at production and consumption levels), Jeevan bindi (iodine skin patches), and iodized oil injections. Key indicators for assessing iodine deficiency are the goiter rate, urinary iodine excretion rate, neonatal hypothyroidism, and the level of iodine in household salt.

DETAILED QUESTIONS

Q3.1: What health condition results from iodine deficiency?

Answer: A deficiency of iodine leads to goiter.

Q3.2: What are the preventive measures implemented under the National Iodine Deficiency Disease Control Program, including target iodine levels in salt and alternative delivery methods?

Answer:

- Iodized salt: Production level: 30ppm; Consumption level: 15ppm.
- Life-saving dots: Jeevan bindi - Iodine skin patch.
- Preparation of Iodine (ex-food fortification).
- Two-in-one salt - Twin fortified salt (1mg iron/40mcg iodine) per gram of salt.
- Iodized oil injection: 1ml IM provides 3-4 years of supply.
- Oral iodized oil - 2 years of supply.

Q3.3: What are the indicators used to assess iodine deficiency, categorized by long-term input, most important epidemiological, environmental, and process/operational aspects?

Answer:

- Long-term input indicator: Goiter rate < 5%.
- Most important epidemiological indicator: Urinary iodine excretion rate.
- Environmental iodine deficiency indicator: Neonatal hypothyroidism.
- Process/ operational indicator: Iodine in household salt level.

BIG QUESTION 4: What specific disorder is caused by zinc deficiency, and what are its characteristics?

Broad Answer: Zinc deficiency causes Acrodermatitis Enteropathica, an inherited disorder characterized by impaired zinc uptake leading to inflammatory rashes around the mouth, nose, and anal region.

DETAILED QUESTIONS

Q4.1: What inherited disorder is caused by zinc deficiency, and what are its clinical features?

Answer:

- Zinc deficiency causes Acrodermatitis Enteropathica.
- Inherited disorder of impaired uptake of zinc from the body.
- Inflammatory rashes around mouth, nose, anal region.

BIG QUESTION 5: Define food adulteration and describe specific examples of adulterants

Broad Answer: Food adulteration involves adding substances that decrease the nutritive value or cause harm. Specific examples include Neurolathyrism, Epidemic dropsy , Endemic ascites, Aflatoxicosis , and Ergotism, each with distinct clinical syndromes and detection/prevention methods.

DETAILED QUESTIONS

Q5.1: For Neurolathyrism, identify the toxin, the adulterated food item, clinical features, and management strategies.

Answer:

- Adulterant Toxin: B-oxalyl amino alanine in Khesari Dal.

- Food item: Khesari Dal (Lathyrus Sativus) Mixed with Arhar dal.
- Clinical features: Gradual onset of Spastic paralysis, Involvement of knee joint - Latent phase- No stick- 1 stick- 2 stick- crawling.
- Management: Vitamin C, Parboiling, Ban crop.



(Khesari Dal or Lathyrus Sativus)



Two stick stage

Q5.2: For Epidemic dropsy, identify the toxin, the adulterated food item, clinical features, and detection methods.

PYQ: FMGE 2020

Answer:

- Adulterant: Sanguinarine in Argemone oil.
- Food item: Mustard oil mixed with Argemone oil.
- Clinical features: Sudden Non-inflammatory pitting edema, diarrhea, dyspnea, glaucoma, cardiac failure.
- Detection: Nitric Acid test, Paper Chromatography test (most sensitive to check for argemone oil contamination).
- Characteristic feature: Bilateral noninflammatory pitting Edema.







Argemone Mexicana flower

Q5.3: For Endemic Ascites, identify the adulterant, the food item, clinical features, and management strategies.

Answer:

- Adulterant: Pyrrolizidine in crotolaria/Jhunjhunia seeds.
- Food item: Millets.
- Clinical features: Liver involvement.
- Management: Deweeding of jhunjunia, Filtration, sieving.





Millet seeds and Crotalaria

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Q5.4: For Aflatoxicosis, identify the causative agent, the food items, clinical features, and management strategies.
Answer:

- Adulterant: Aflatoxins from the storage fungus, Aspergillus flavus.
- Food item: Groundnut, cereal, maize.
- Clinical features: HCC (Hepatocellular Carcinoma).
- Management: Keep moisture content below 10%, Proper storage, improve ventilation.

Q5.5: For Ergotism, identify the causative agent, the food items, clinical features, and detection methods.
Answer:

- Adulterant: Field fungus Claviceps fusiformis- ergot alkaloids.
- Food item: Sorghum, rye, bajra.
- Clinical features: GI complains, diarrhea.
- Detection: Float in 20% salt solution.





Q5.6: A person consuming adulterated food developed bilateral swelling of legs, diarrhea, glaucoma, and cardiac failure. Which toxin is most likely responsible?
Answer: Sanguinarine.

Q5.7: If a population's staple diet is *Lathyrus sativus*, which public health measure is *not* indicated to prevent an epidemic of lathyrism?
Answer: DEC (Diethylcarbamazine is used for filariasis treatment, not lathyrism).

BIG QUESTION 6: Describe the structure, beneficiaries, services, and nutritional norms of the Integrated Child Development Services (ICDS) program.

Broad Answer: ICDS is a centrally sponsored program. It provides a package of services including supplementary nutrition, immunization, and education to children (0-6 years), pregnant and lactating women, adolescent girls, and women of reproductive age. Specific nutritional norms for calories and protein are prescribed per beneficiary category.



DETAILED QUESTIONS

Q6.1: Which Ministry is responsible for the ICDS program, and at what administrative level does it primarily operate?
Answer:

- Ministry: Women & Child Development. ICDS project runs at the block level.

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Q6.2: Describe the supervisory structure of the ICDS program, including the roles and supervision ratios of CDPO, Mukhya Sevikas, and Anganwadi Workers.

Answer:

- Child/Community Development Project Officer (CDPO): Supervises the overall functioning of ICDS.
  - 1 CDPO can supervise 1 Block (1,00,000 population).
  - 1 CDPO can supervise 4 Mukhya sevikas.
  - 1 Mukhya Sevika supervises 25 Anganwadi worker.
  - 1 CDPO can supervise 100 AWW'S.

Q6.3: What is the primary operational unit of the ICDS program, and who is the most important health personnel within it, along with their population coverage in plain and hilly areas?

Answer:

- The government runs the ICDS program in an "Anganwadi Centre (AWC)."
- Anganwadi worker (AWW): Most important Health personnel in an AWC.
- Plain areas: 400-800 population.
- Hilly areas: 300-800 population.

Q6.4: What are Mini-AWCs and "Anganwadi on demand"?

Answer:

- Mini-AWC: 150-300 population.
- Anganwadi on demand: Settlement has 40 children under 6 years of age but no AWC.

Q6.5: List the beneficiaries and the range of services provided under the ICDS program.

Answer:

Beneficiaries of ICDS	Benefits / Services Under ICDS
• Children (0-6 years) • Pregnant women • Lactating women • Adolescent girls - Kishori shakti yojana • Reproductive age women (15-45 years)	• Supplementary Nutrition • Immunization • Non-formal preschool education • Health checkups • Referral services • Nutritional and health education • Adolescent health, vocational training, food and health program.

Q6.6: What are the daily nutritional norms (calories and protein) for children (6-72 months), severely malnourished children, and pregnant/nursing mothers under ICDS supplementary nutrition?

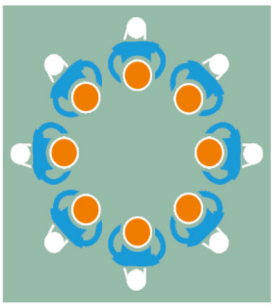
Answer: ICDS provides Supplementary nutrition to the beneficiaries

S.No	Category	Revised (Per beneficiary per day)	
		Calories (Kcal)	Protein (g)
1	Children (6-72 months)	500	12-15
2	Severely Malnourished	800	20-25
3	Pregnant women and Nursing Mothers	600	18-20

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BIG QUESTION 7:Describe PM Poshan and Poshan Abhiyan

Broad Answer: PM Poshan (formerly Mid-Day Meal scheme) aims to prevent school dropouts by providing meals in government schools to children from Balvatikas to Class VIII, under the Ministry of Education. Poshan Abhiyan (National Nutrition Mission) is a broader initiative under the Ministry of Women & Child Development, focused on holistic nourishment and reducing malnutrition indicators like stunting and anemia.



DETAILED QUESTIONS

Q7.1: What was the previous name of the PM Poshan scheme, and which Ministry is it under?

Answer:

- Earlier known as the "Mid-Day Meal" scheme. Under "Ministry of Education."

Q7.2: What is the main initiative of the PM Poshan Scheme, and which beneficiaries are currently covered?

Answer:

- Main initiative - to prevent dropouts from school.
- Beneficiaries - Balvatikas (Preschool children), Class I-VIII (Primary & Upper Primary, upto 14 yrs).

Q7.3: What proportion of energy and protein requirements should the meal provided daily in the PM Poshan Shakti program supply?

Answer:

- One-third of the energy requirement and half of the protein requirement.
  - Primary- 450 kcal, 12 gm protein;
  - Upper primary- 700 kcal, 20 gm protein.
  - Every child in every place and government-assisted primary school with a prepared midday meal with a minimum content of 300 calories and 8-12 grams of protein each day of school for a minimum of 200 days

Q7.4: Under which Ministry does the PM Poshan Shakti program fall?

Answer:

- Ministry of Education.

Q7.5: Describe Poshan Abhiyaan 2.0, and what are its annual targets for reducing stunting, undernutrition/ underweight, anemia (children/women), and low birth weight?

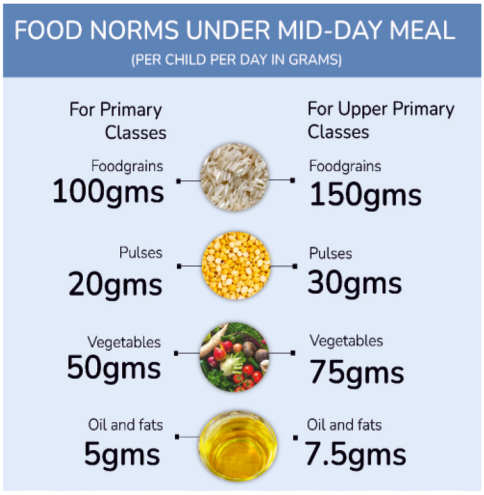
Answer:

- "PM's Overarching Scheme for Holistic Nourishment."
- Other name: "National Nutrition Mission."

Indicator	Each year
Prevent and reduce stunting in children 0-6 years	By 2% per year
Prevent and reduce undernutrition and underweight prevalence in children 0-6 years	By 2% per year
Reduce prevalence of anemia among child 6-59 months	By 3% per year
Reduce prevalence of anemia among girls and women in age 15-49 years	By 3% per year
Reduce low birth weight	By 2% per year

Q7.6:Describe the food norms under Mid-day meal?

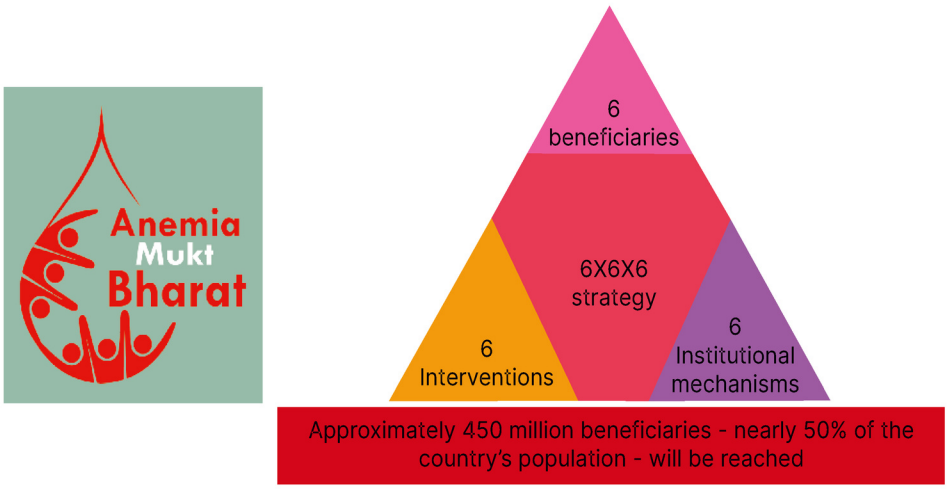
Answer:



BIG QUESTION 8: Explain Anemia Mukt Bharat program and its components

Broad Answer:

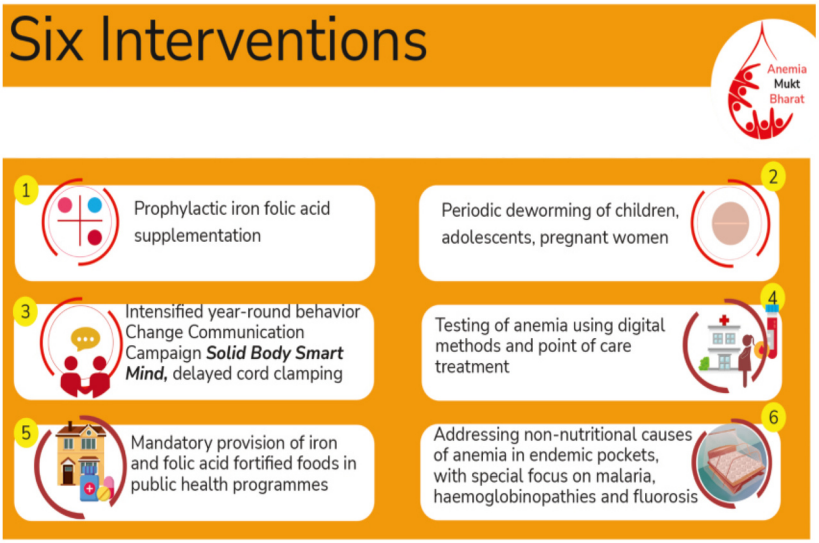
- Anemia Mukt Bharat comprises prophylactic Iron & Folic Acid Supplementation and Deworming. For mild to moderate anemia, it follows a 6x6x6 strategy under the Intensified National Iron Plus initiative, providing iron and folic acid supplements to six beneficiary groups at specific schedules. Severe anemia in pregnant women is managed based on gestational age and Hb levels, involving hospitalization, IV iron sucrose, IV ferric carboxy maltose, and/or blood transfusion.



DETAILED QUESTIONS

Q8.1: What are the 6 interventions under Anemia Mukt Bharat program?

Answer:



Q8.2: What is the deworming schedule for pregnant women, children <2 years, and children >2 years under the program?

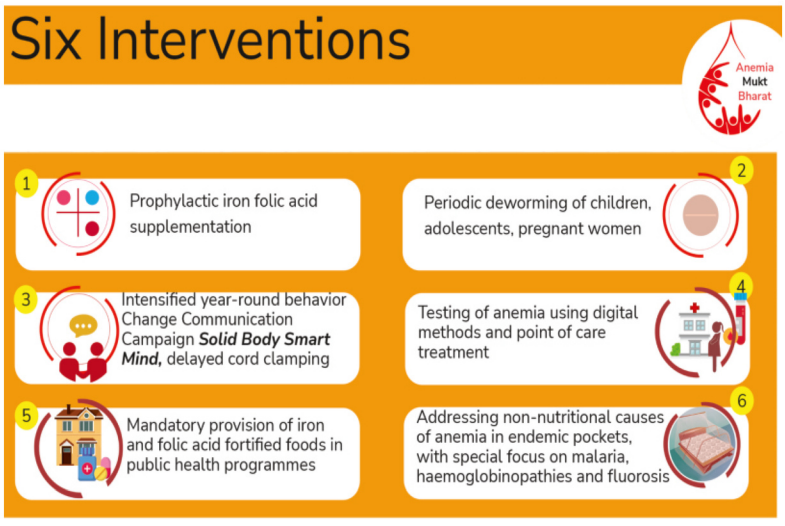
Answer:

- In pregnant women: Full tab of Albendazole (400 mg HS) is given in the 2nd trimester.
- In children <2 years: Half a tab of Albendazole (200 mg HS) is given.
- In children >2 years: Full tab of Albendazole (400 mg HS) is given.

Q8.3: For the management of mild to moderate anemia under Anemia Mukt Bharat, what is the strategy called, and which Ministry is responsible? What level of prevention does it represent?

Answer:

- It follows a 666 strategy.
- Ministry: Ministry of Health and Family Welfare (MOHFW).
- Level of prevention: Primary prevention (Specific protection).



Q8.4: List the six beneficiary populations under the 6x6x6 strategy for prophylactic Iron and Folic Acid Supplementation, specifying the elemental iron and folic acid dosage and schedule for each.

Answer:

Population	Iron	Folic Acid	Schedule
6-59 months	20 mg Elemental Iron	100 mcg Folic acid	Bi-weekly (Syrup)

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5-9 years	45 mg Elemental Iron	400 mcg Folic acid	Weekly (Pink tabs)
10-19 years WIFS (weekly iron-folic acid supplementation)	60 mg Elemental Iron	500 mcg of Folic acid	Weekly (Blue tabs)
Reproductive age women	60 mg Elemental Iron	500 mcg of Folic acid	Weekly (Red tabs)
Pregnant and Lactating women	60 mg Elemental Iron	500 mcg of Folic acid	Daily (Red tabs)

Q8.5: What is the management plan for mild to moderate anemia ?

Answer:

- Under Anemia Mukt Bharat

	Gestational Age < 34 weeks	Gestational Age > 34 weeks
Tolerant to IFA	2 Tablets IFA	IV Iron Sucrose or IV Ferric Carboxy Maltose
Not tolerant to IFA	IV Sucrose or IV Ferric Carboxy Maltose	

Q8.6: What is the management plan for severe anemia in pregnant women based on their Hb levels and trimester?

Answer: PYQ: NEET PG 2022

- Under Anemia Mukt Bharat

	Hb 5-6.9gm/dl	Hb<5gm/dl
1st or 2nd trimester	IV Iron Sucrose or IV Ferric Carboxy Maltose	Hospitalization + IV Infusion and/or blood transfusion
3rd trimester	Hospitalization + IV Infusion and/or blood transfusion	

Q8.7. As part of the Anaemia Mukt Bharath program, pregnant women with mild to moderate anaemia who are less than 34 weeks pregnant are managed with which the following treatment approach?

A. 3 iron and folic acid (IFA) tablets, taken OD

B. 2 iron and folic acid tablets OD + IV iron sucrose

C. IV iron sucrose for non-compliance with oral tablets

D. IM ferric carboxy maltose (FCM)

Answer: A. 3 iron and folic acid (IFA) tablets, taken OD.

Explanation: The Anaemia Mukt Bharat program recommends high-dose oral iron supplementation as the first-line treatment for mild to moderate anaemia in pregnant women less than 34 weeks pregnant. This regimen helps manage the condition without resorting to intravenous iron, which is reserved for severe cases or non-compliance.

BIG QUESTION 9: What are the purposes and responsible organizations for the FSSAI, BIS, and AGMARK food logos in India?

Broad Answer: FSSAI provides national food standards derived from CODEX ALIMENTARIUS and is under the Ministry of Health and Family Welfare. BIS ensures quality above minimum standards, while AGMARK is for the marketing of agricultural products.

DETAILED QUESTIONS

Q9.1: What does FSSAI stand for, what is its headquarters, and which Ministry does it come under? What is its role in food standards, and from where are these standards adopted?

Answer:

- FSSAI: Food Safety and Standards Authority of India.
- Headquarters: New Delhi.
- Ministry: Ministry of health and family welfare.
- Role: FSSAI provides National food standards for food products.
- Adopted from: CODEX ALIMENTARIUS given by WHO (World Health Organization) and FAO (Food and Agriculture Organization of the United Nations).
- WHO headquarters is located in Geneva.
- FAO headquarters is located in Rome.

Q9.2: How does the Bureau of Indian Standards (BIS) relate to the Prevention of Food Adulteration (PFA) Act?

Answer:

- PFA (Prevention of Food Adulteration) provides the Minimum quality of food products.
- BIS provides excellence needed above minimum quality.

Q9.3: What is the purpose of AGMARK?

Answer: Marketing of Agricultural products.

Q9.4: Which Ministry does the Food Safety and Standards Authority of India come under?

Answer: Ministry of health and family welfare.

BIG QUESTION 10: What is the purpose of milk pasteurization, what types of microorganisms does it destroy, and what are the widely used methods and tests to check its efficiency?

Broad Answer: Pasteurization destroys pathogens in milk while minimally altering its composition and flavor, killing approximately 90% of bacteria, including heat-resistant forms like *Tubercle bacilli*. It does not kill cysts, ova, spores, or thermoduric bacteria. Widely used methods include the Holder method, HTST (High-Temperature Short-Time) method, and Ultra High-Temperature method. Efficiency is checked by the Phosphatase test, Standard Plate Count, and Coliform count.

DETAILED QUESTIONS

Q10.1: What is the primary purpose of pasteurization of milk, and what impact does it have on its composition, flavor, and nutritive value?

Answer: Pasteurization destroys any pathogens in milk, causing a minimal change in composition, flavor, and nutritive value.

Q10.2: list examples of heat-resistant pathogens it effectively destroys? What types of microorganisms does it *not* kill?

Answer:

- It kills nearly 90% of the bacteria in milk, including the more heat-resistant Tubercle bacilli, Q fever, brucellosis, coliform group, and typhoid bacilli.
- It does not kill cysts, ova and spores.
- It does not kill the thermoduric bacteria.

Q10.3: Describe the widely used methods for pasteurization

Answer:

- **Holder method:**
  - Milk kept at 63-66°C for 30 minutes is rapidly cooled to 5°C.
- **HTST method:**
  - High-temperature short-time method (flash method).
  - Heated to 72°C for 15 sec and then rapidly cooled to 4°C
  - Most widely used method.
- **Ultra high-temperature method:**
  - Rapidly heated in two stages to 125°C for a few seconds.
  - The second stage is being under pressure.
  - It is then rapidly cooled.

Q10.4: Which of the following tests is *not* used to check the efficiency of pasteurization of milk?

Answer: Methylene blue reduction test. (This test is done *before* pasteurization to confirm heavy contamination of animal milk).

Q10.5: Describe the purpose and significance of the Phosphatase test

Answer: **Phosphatase test:** Widely used to check the efficiency of pasteurization. Phosphatase in raw milk is destroyed on pasteurization. Its presence is an indicator of inadequate pasteurization or the addition of raw milk.

Q10.6:Define Standard Plate Count (SPC) and mention the permissible limit in pasteurized milk?

Answer **Standard plate count:** Used to determine bacteriological quality of pasteurized milk. Limit: 30000 bacterial count/ml of pasteurized milk.

Q10.7:How does coliform count help in assessing post-pasteurization contamination in milk?

Answer **Coliform count:** The presence of coliform in milk indicates improper pasteurization or post-pasteurization contamination.

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Q10.8. Which essential nutrients are present in very low amounts in milk?

Answer: Milk is a poor source of vitamin C and iron.

Q10.9. What is the chief protein found in milk?

Answer: The chief protein in milk is casein.

Q10.10. What is the casein to albumin ratio in human milk?

Answer: The ratio of casein to albumin in human milk is 1:1.

Q10.11. Which vitamins are abundant in milk?

Answer: Milk is rich in retinol (Vitamin A) and Vitamin D.

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16. SOCIAL SCIENCE AND HEALTH

BIG QUESTION 1: How does social science contribute to the understanding and improvement of health in a community?

Broad Answer: Social science plays a vital role in understanding and improving health by examining how social, cultural, economic, and behavioral factors influence health outcomes. It helps identify health disparities among different population groups and the root causes such as poverty, education, occupation, gender, and social norms. By analyzing human behavior and community dynamics, social science provides insights into how people perceive illness, access healthcare, and adhere to treatments. This knowledge informs public health policies, improves health education strategies, and guides interventions that are culturally sensitive and socially appropriate, leading to more effective and equitable healthcare delivery.

DETAILED QUESTIONS

Q1.1: Define Sociology.

Answer:

- Study of Human relationships and behavior.

Q1.2: What is a society?

Answer:

- A group of individuals who are sharing common values and interests leading a certain way of life.

Q1.3: What is a community?

Answer:

- A group of individuals within a defined geographical boundary.

Q1.4: What is acculturation, and what are some examples of how cultural contact can occur? PYQ: FMGE 2020

Answer:

- Definition: Cultural contact or the exchange of culture.
- Examples of Culture contact can occur through:
  - Marriage
  - Conquest
  - Migration
  - Industrialization

Q1.5: Define Socialization.

Answer:

- A process by which individuals adopt the cultures and become a part of a society.

Q1.6: What is a social structure?

Answer:

- A pattern of interrelationships among members of society.

Q1.7: What is social pathology, and what are some examples?

Answer:

- Study of social causes leading to the occurrence of a disease.
- Examples: Unemployment, Illiteracy, Poverty.

Q1.8: Define Culture.

Answer:

- Learned pattern of behaviour or learnt way of doing things. It is acquired over generations.

Q1.9: What are customs?

Answer:

- Established pattern of behaviour.

Q1.10: Sociology is?

A. Study of human relationships
B. Study of human behavior
C. Both
D. None

Answer: C. Both
Explanation: Sociology involves studying both human relationships and behaviour within social contexts.

Q1.11: An organised group of people with social relationships:

A. Community
B. Association
C. Society
D. Family

Answer: C. Society
Explanation:
A society is a structured group bound by social relationships, norms, and culture.

- **Community**: A group of people **living in the same geographical area** or **sharing common interests**, which may or may not include formal social structures.
- **Association**: A **formal group** formed for a specific purpose, such as a professional or interest-based organisation.
- **Family**: The **basic unit of society**, consisting of individuals related by blood, marriage, or adoption.

Q1.12: Social Pathology is:

A. Change in disease pattern due to lifestyle change.
B. Study of social problems that cause disease in the population.
C. Conflicts arising from new opportunities in transition societies.
D. Study of human relationships and behaviour.

Answer: B. Study of social problems that cause disease in the population.

Explanation:

- Social pathology focuses on social issues like poverty and inequality that contribute to illness.

Q1.13. Acculturation is:

A. Triage

B. Cultural change due to socialisation

C. Attitude

D. Belief

Answer: B. Cultural change due to socialisation

Explanation:

- Acculturation is the process of adopting cultural traits through interaction and socialisation.

Q1.14. Learned behaviour which is socially acquired is known as:

A. Customs

B. Acculturation

C. Standard of living

D. Culture

Answer: D. Culture

- Explanation: Culture is the collective, socially learned behavior shared by members of a community.

BIG QUESTION 2: What are the core concepts studied in psychology

Broad Answer: Psychology primarily studies opinions, beliefs, and attitudes.

Opinions	• Something that is temporary and subjective in nature. • Subjective means, it depends on what the individual thinks.
Beliefs	• Something that is permanent and subjective in nature. • Something that we acquire from our parents.
Attitude	• It is more or less permanent • It is objective in nature • It doesn't depend upon our thoughts • It circles around our beliefs • Attitude is the acquired characteristics of an individual.

DETAILED QUESTIONS

Q2.1: What is an accustomed way of doing things called?

Answer:

- An accustomed way of doing things is called habit.

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Q2.2:How are emotions defined, and what is the most common emotion experienced by a person?

Answer:

- Emotions are the feeling experienced by a person. Most common emotion experienced by a person is Fear.

Q2.3:Define Learning and describe its three types with examples.

Answer:

- Any relatively permanent change in behavior that occurs as a result of practice or experience - Learning.
- **Cognitive Learning:** (knowledge-based).
- **Affective Learning:** (attitude-based).
- **Psychomotor Learning:** (skill development).
  - Example: A child is taught hand-washing technique, An intern is taught knee reflex demonstration etc.

BIG QUESTION 3:What are temporary and permanent social groups, and how do they differ in their characteristics

Broad Answer:

- Social groups can be categorized into temporary and permanent.
  - Temporary groups like crowds, mobs, and herds are transient gatherings with varying levels of emotional agitation or leadership.
  - Permanent groups such as bands, villages, towns, cities, and states are more stable, defined by shared living, cultural values, geographical boundaries, and organized patterns of life.

DETAILED QUESTIONS

Q3.1: Describe the characteristics of a Crowd, Mob, and Herd as temporary social groups, providing examples.

Answer:

- **Crowd:** A temporary gathering of individuals brought together by a shared interest or curiosity, usually spontaneous and unorganized.
  Example: People gathering to witness an accident.
- **Mob:** An emotionally agitated crowd, typically influenced or led by a leader
- **Herd:** A passive group led by a leader, where individuals follow without questioning or independent decision-making.
  Example: Tourists following a guide.

Q3.2: Describe the characteristics of permanent groups such as Band, Village, Town, City, and State.

Answer:

- **Band:** A most elementary community of a few families living together. Groups have organized itself and follow a pattern of life.
  - Example: Gypsies in India.
- **Village:** Small collection of people permanently settled with cultural values.
- **Town:** A larger, more densely populated settlement than a village, with structured governance, services, and emerging urban characteristics.
- **City:** A large, permanent urban settlement with a heterogeneous population exceeding 100,000
- **State:** A well-defined political and social organization occupying a specific geographical area, typically unified by a common language, culture, and legal system.

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BIG QUESTION 4: What are the major sociological perspectives that explain the relationship between society and health outcomes?

Broad Answer:

- Marxist Theory posits that profit prioritization can negatively impact health
- Parsonian Theory highlights social constraints like poverty and migration as contributors to disease.
- McKeown's Theory specifically attributes the reduction in TB primarily to improvements in socio-environmental conditions.

DETAILED QUESTIONS

Q4.1: Explain the Marxist Theory in the context of health, providing an example.

Answer:

- Marxist theory suggests that capitalist motives can undermine public health when profit is placed above well-being.
- *Example:* Tobacco products remain legal and widely available despite their health risks because they generate significant government revenue.

Q4.2: Explain the Parsonian Theory in relation to social constraints and disease, providing an example.

Answer:

- Parsonian theory links illness to social factors like poverty, industrialization, and migration, which create environments (e.g., overcrowded housing) that facilitate disease spread.
- Example: Tuberculosis prevalence is higher in overcrowded, low-income communities.

Q4.3: What is the central argument of McKeown's Theory regarding the reduction of Tuberculosis?

Answer:

- McKeown argued that TB mortality declined primarily due to improved living standards, nutrition, and sanitation—rather than medical treatment—highlighting the power of social determinants in disease reduction.

BIG QUESTION 5: Define 'family' , describe the stages of the 'family cycle' and various types of families based on their structure, function, and duration.

Broad Answer:

- A family is a group of individuals related by blood or law, sharing a common kitchen.
- The family cycle progresses through stages of formation, extension, contraction, and dissolution.
- Families are categorized into nuclear, joint (including three-generation), broken, problem, communal, new, and dysfunctional families, each with distinct characteristics.

DETAILED QUESTIONS

Q5.1: Differentiate between 'Family of origin' and 'Family of procreation'.

Answer:

- Family of origin: A family where one is born.
- Family of Procreation: The family one creates after marriage.

Q5.2: What are the major sociological perspectives that explain the relationship between society and health outcomes?

Answer:

- **Formation:** Marriage to the birth of the 1st child.
- **Extension:** Birth of the 1st child to birth of the last child.
- **Complete extension:** Birth of the last child to 1st child leaving home.
- **Contraction:** The 1st child leaving home to the last child leaving home.
- **Complete contraction:** The last child leaving home to the 1st spouse dying.
- **Dissolution:** Death of the 1st spouse to the death of the survivor.

Q5.3: What is a nuclear family?

Answer:

- AKA elementary family.
- Involves newly married couple with their dependent children.

Q5.4: What are the features of a joint family?

Answer:

- A family with two or more married couples, where the males of the family are related by blood, and the females are either the wives, daughters or widows.
- They eat from a common kitchen.
- There should be a common purse-all expenditures are made from that.
- It is like an extended family.

Q5.5: What is a Three-generation family?

Answer:

- A type of joint family where representatives of three generations is living together.

Q5.6: What is a broken family?

Answer:

- **Broken family:** A family where either of the parents has died, or the couple is divorced/separated.

Q5.7: What constitutes a problem family?

Answer:

- **Problem family:** A family that lags behind the rest of the community. Parents cannot fulfill the family's physiological requirements.

Q5.8: What are the characteristics of a communal family?

Answer:

- **Communal family:** A family with a division of labor. A family where roles and responsibilities are divided.

Q5.9: Define and describe the characteristics of a New family

Answer:

- **New family:** Nuclear family, but it has less than 10 years of duration.

Q5.10: What is a dysfunctional family?

Answer:

- **Dysfunctional family:** A family where violence and conflicts exit and family members have adjusted to it.

Q5.11: Who is considered the Head of the family, and what are their typical characteristics?

Answer:

- Major decision maker of the family.
- It can be a male or female.
- Not necessarily the most educated person or most earning.

BIG QUESTION 6: What are the various socioeconomic scales (SES), and what are their features and significance?

Broad Answer: Various scales assess socioeconomic status

Urban areas	Rural SES scale
• Modified kuppuswamy scale • Kul Shrestha scale • Srivastava scale • Jalota scale, Gaurs	• Udai Pareek scale • Modified B.G Prasad scale • Radhukar scale • Shirpurkar scale
Students' scale	**Non-Indian SES scales**
• Bhardwaj scale	• Hollingshead (occupation-based) scale • Henderson scale

DETAILED QUESTIONS

Q6.1: Which socioeconomic status scale is used for both urban and rural areas?

Answer:

- BG Prasad scale is used for both urban and rural areas

Q6.2: What are the three components of the Modified Kuppuswamy Scale, and what is the scoring range for each component and the total scale? PYQ: FMGE 2021

Answer:

- **Components:** Education of the head of the family, Occupation of the head of the family, Total family income
- **Scoring:**
  - Education: 1-7.
  - Occupation: 1-10.
  - Total family income: 1-12.
- The Modified Kuppuswamy scale ranges from 3 to 29
- The lowest score on the Modified Kuppuswamy scale is 3
- The highest score on the Modified Kuppuswamy scale is 29

Q6.3: What is the scoring for different occupations in the Modified Kuppuswamy Scale?

Answer:

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Occupation of Head of Family	Score
Profession	10
Semi- profession	6
Clerical shop owner	5
Skilled owner	4
Semi-skilled worker	3
Unskilled worker	2
Unemployed	1

Q6.4: How are total scores on the Modified Kuppuswamy Scale classified into different socioeconomic statuses?

Answer:

Total score	Socioeconomic status
26-29	Upper-class
16-25	Upper middle
11-15	Lower middle
5-10	Upper lower
Below 5	Lower

Q6.5: What are the lowest and highest scores in the Modified Kuppuswamy Scale?

Answer

- The Modified Kuppuswamy scale ranges from 3 to 29
- The lowest score on the Modified Kuppuswamy scale is 3
- The highest score on the Modified Kuppuswamy scale is 29

Q6.6: What is the Udai Pareek Scale based on, and what are its 9 parameters?

Answer:

- It is based on 9 parameters
- Mainly for rural areas
- It is independent of income
- **Parameters:** Material possession, Farm power, House, Family members, Social participation, Land, Education, Occupation, Caste

Q6.7: What is the BG Prasad scale based on?

Answer:

- Based on per capita income.

BIG QUESTION 7: What is the Below Poverty Line (BPL), and how is it defined in terms of criteria and indicators?

Broad Answer

- The **Below Poverty Line (BPL)** is defined based on a threshold income or consumption level determined by the government, below which individuals or households are considered poor and eligible for government assistance programs

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- The definition is given by
  - India: According to Tendulkar committee , per capita income
  - WHO: per capita income

DETAILED QUESTIONS

Q7.1: What are the criteria for a BPL family in India based on per capita income for rural and urban areas?

Answer:

- **Per capita income:**
  - Less than 32 INR/day (Rural)
  - Less than 47 INR/day (Urban)

Q7.2: Define BPL according to the Tendulkar committee?

		Rural areas	Urban areas
According to **Tendulkar committee**	Per capita calorie intake	<2400 kcal per day	<2100 kcal per day
	Per capita Income	<27/- INR per day	<33/- INR per day

Q7.3: How does WHO define poverty based on per capita income?

Answer:

- As per WHO, if per capita income < 2.15 US$ per day, poverty

Q7.4: What is Gross national income (GNI)/Gross national product (GNP)?

Answer:

- The gross income generated from within the country, as well as the net income received from abroad

Q7.5: What is GDP?

Answer:

- Gross income generated within a country (excludes net income received).

Q7.6: What is Net national product (NNP)

Answer:

- GNP minus the capital we consume.

17. WASTE DISPOSAL/HOUSING STANDARDS/OVER CROWDING

BIG QUESTION 1: What are the types of waste?

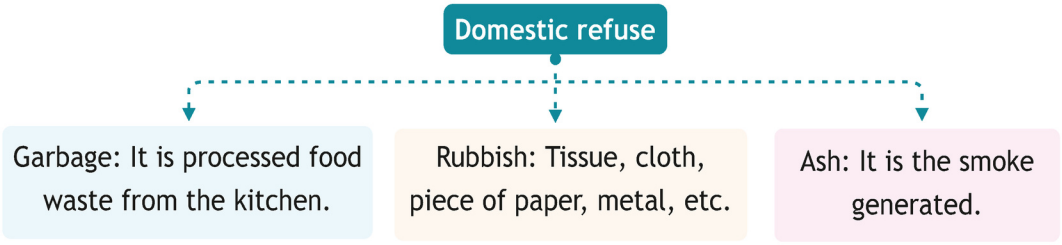
Broad Answer:

- Waste is generally classified based on its physical state into:
  - o Solid Waste
    - → Garbage
    - → Rubbish
    - → Ash
  - o Liquid Waste

DETAILED QUESTIONS

Q1.1: What are the types of domestic refuse?

Answer:



BIG QUESTION 2: What are the various methods of refuse disposal?

Broad Answer: Refuse disposal methods range from the unsatisfactory "dumping" to the most satisfactory "controlled tipping" (sanitary landfill), which includes trench, ramp, and area methods. Incineration is a costly high-temperature process, not preferred in India due to lack of manure generation. Composting (Bangalore and Indore methods) integrates refuse and night soil disposal. Manure pits are for rural solid waste, while burial is a temporary technique for small populations

DETAILED QUESTIONS

Q2.1: What is the most unsatisfactory method of refuse disposal, and why?

Answer:

- Dumping : it is a social nuisance

Q2.2: What is considered the most satisfactory method of refuse disposal, and what are its three primary methods?

Answer:

- Controlled tipping or sanitary landfill
- The three methods are: Trench method, Ramp method, Area method

Q2.3: Describe the Trench method of controlled tipping, including its suitability, dimensions, land requirements for a specific population, and the end product.

Answer:



- Most commonly used.
- In this method, the ground is dug and the solid waste (refuse) is buried in it. The solid waste is then covered with mud.
- The trench is dug where level ground is available.
- A 2-3-meter-deep, 4-12-meter wide trench is dug.
- For a population of 10,000, a two-meter-deep trench is dug, and one acre of land is required.
- The end product of solid waste treatment is manure, which can be used in farming
- It is costly

Q2.4: For what type of terrain is the Ramp method of controlled tipping suited?

Answer:

- Suited for moderately sloping terrain.

Q2.5: Describe the Area method of controlled tipping, and what is its main disadvantage?

Answer:

- In this method, Land depressions, disused quarries and clay pits are filled with refuse.
- Disadvantage: It requires supplemental earth from an outside source.

Q2.6: Describe Incineration as a refuse disposal method.

Answer:

PYQ: NEET PG 2022

- Incineration is a high-temperature dry oxidation process.
- Not preferred in India as manure is not generated.
- Incineration is done when suitable land is not available for solid waste disposal.

Q2.7: What is Composting, what two methods achieve it, and what are the characteristics of each method?

Answer:

- Composting is an integrated method of refuse and night soil disposal.
- Composting is achieved by two methods (CBI):
  - **Bangalore method:** Based on an anaerobic hot fomentation process.
  - **Indore method:** Aerobic process.

Q2.8: What are Manure pits used for, in which areas, and describe their operation and conversion time?

Answer:

- Manure pits are used for solid waste disposal in rural areas.
- Two manure pits are dug at the back of the house.
- Garbage, cattle dung, straw, and leaves are put in the pit daily and covered with the material.
- Usually takes 6 months to convert into manure.

Q2.9: Describe the Burial method of refuse disposal, including its typical use, trench dimensions, and filling time for a specified population

Answer:

- The burial method is a technique used in camping.
- In this technique, a trench of 2-meter depth and 1.5-meter width is dug.
- For a population of around 200 people, a bigger trench of 1 meter in depth is dug.
- This will get filled in at least one week.

Q2.10: For what population size is Composting not a preferred method?

Answer:

- Composting is not a preferred method for a population of more than 1,00,000.

BIG QUESTION 3: Define sewage and sullage, describe the composition and methods for expressing the strength of sewage, and explain the principles and common methods of modern sewage treatment.

Broad Answer: Sewage is liquid waste containing excreta, while sullage is liquid waste without excreta. Its composition is 99.9% water and 0.1% solids. Sewage strength is expressed by Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), and Suspended Solids. Modern sewage treatment involves primary and secondary stages, with secondary treatment utilizing aerobic oxidation through methods like trickling filters and the activated sludge process. Other methods include oxidation ponds and septic tanks for smaller communities.

DETAILED QUESTIONS

Q3.1: Define Sewage and differentiate it from Sullage.

Answer:

- Sewage is a liquid waste with excreta
- Sullage: Liquid waste without excreta

Q3.2: What is the composition of sewage?

Answer: 99.9% water, and 0.1% solid.

Q3.3: How is the strength of sewage expressed?

Answer:

- It is expressed in three terms:
  - Biological Oxygen Demand (BOD)
  - Chemical Oxygen Demand (COD)
  - Suspended solids

Q3.4: Define Biological Oxygen Demand (BOD).

Answer:

- Defined as the amount of oxygen absorbed by a sample of sewage during a specific period (usually 5 days) at a specified temperature of 20° C for aerobic destruction or use of organic matter by living organisms.

Q 3.5: What is the most important test done on sewage and what are its normal, strong, and weak levels?

Answer:

- **Biological Oxygen Demand** is the most important test that is done on sewage

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- Normal range: BOD is 100-300 mg/L
- Strong sewage: BOD of >300 mg/L
- Weak sewage: BOD of < 100 mg/L

Q3.6: Define COD. How is COD best estimated?

Answer:

- Defined as the measure of oxygen equivalent to that portion of organic matter in a sample that is susceptible to oxidation by a strong chemical oxidizer.
- COD estimation is best estimated by potassium dichromate.

Q3.7: What is the normal range of suspended solids in sewage, and what values indicate strong or weak sewage?

Answer:

- Normal range of suspended solids: 100-500 mg/L.
- Strong sewage: > 500 mg/L of suspended solids.
- Weak sewage: <100 mg/L of suspended solids.

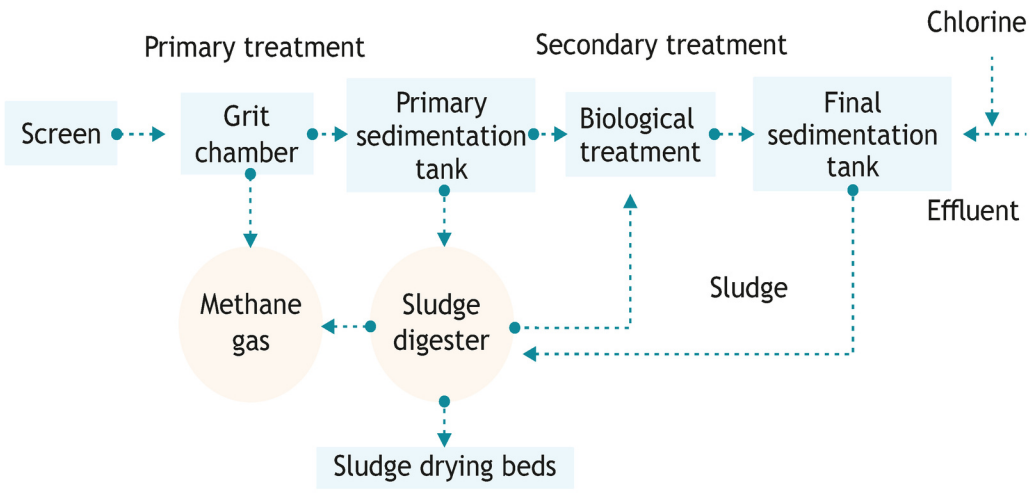
Q3.8: What is the most efficient method to reduce organic matter in sewage? which process is used for highly concentrated sewage with plenty of solids?

Answer:

- The most efficient method to reduce organic matter in sewage is the aerobic process.
- Highly concentrated sewage with plenty of solids: Anaerobic process.

Q3.9: Describe a modern sewage treatment plant

Answer:



Flow diagram of a modern sewage treatment plant

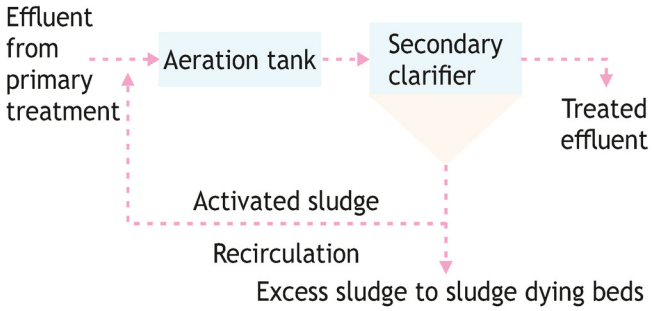
Q3.10: Describe Stage 2 (Secondary Treatment) in modern sewage treatment plants

Answer:

- In this stage, the effluent from the primary sedimentation tank is subjected to aerobic oxidation.
  - o Trickling filter: Secondary method of sewage disposal. A percolating filter with a fixed bed of rocks, gravel, coke, and slag of 1-2 meters in depth and 2-30 meters in diameter. Disadvantage: Occupies a very large space.



- Activated sludge process: The aerobic oxidation process is used as a secondary treatment. A modern method of sewage treatment. Aeration tanks are the heart of the activated sludge process. The retention period in the aeration chamber is 6-8 hours.



Q3.11: Compare the Activated Sludge Process with the Trickling Filter method in terms of space, skill requirement, and suitability for city size.

Answer:

- The activated sludge process is preferred over the trickling filter method because it occupies less space.
- However, it requires skill, whereas the trickling filter process does not require skill.
- Activated sludge process is suited for larger cities. 1 acre of activated sludge plant does work of 10 acres of percolating filters.
- Trickling filters are preferred for small towns as they are cheaper to install and easier to operate.

Q3.12: What are Oxidation ponds (waste stabilization ponds), and what natural process do they utilize for sewage treatment?

Answer:



- Oxidation ponds: They are also known as waste stabilization ponds, sewage lagoons or redox ponds.
- In this, the natural method of photosynthesis is used for sewage treatment.
- Used for purifying sewage for small communities.

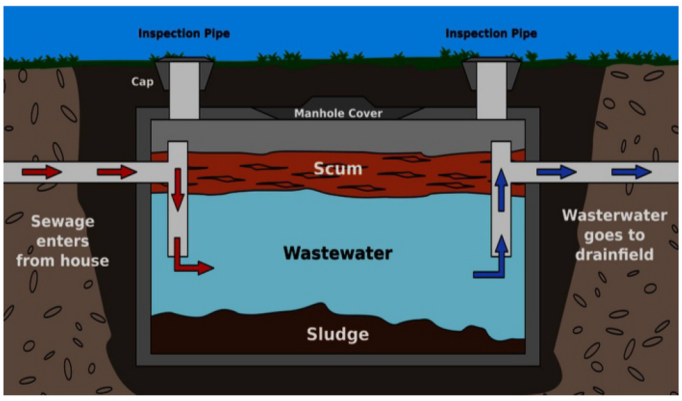
Q3.13:What land area do Oxidation ponds require for a population of 5000-20000 ?

- The following is the required for waste treatment for a population of 5000-20000:
  - 1 acre of land for an oxidation ditch.
  - 22 acres of land for an oxidation pond.
  - 2.5 acres of land for aerated lagoons.

Q3.14: Describe Septic Tanks, including their use, the type of digestion inside and oxidation outside, capacity, retention period, cleaning frequency, and sludge disposal method.

Answer:

- Septic tanks are used in smaller communities with no access to a sewage treatment plant.
- Inside the septic tank: Anaerobic digestion takes place.
- Outside the septic tank: Aerobic oxidation takes place.
- Up to 500 gallons of sewage is admitted into the tank that is retained for 24 hours.
- The solid sludge settles down and the greasy material rises.
- The contents of the tank are cleaned once every year by a process called sludging.
- The sludge should be disposed of by trenching.



Q3.15: What is "Dry weather flow" in the context of sewage?

Answer:

- The amount of sewage that flows in the sewage pipeline for 24 hrs period is Dry weather flow.

Q3.16: All are methods of sewage disposal except?

A. River outfall

B. Land treatment

C. Oxidation pond

D. Bangalore method (Composting)

Answer: D. Bangalore method (Composting)

- Bangalore method (Composting - this is for solid waste/refuse and night soil, not sewage disposal).

Q3.17: Trickling filter used in?

A. Primary treatment of sewage

B. Secondary treatment of sewage

C. Sewage effluent treatment

D. Sewage farming treatment

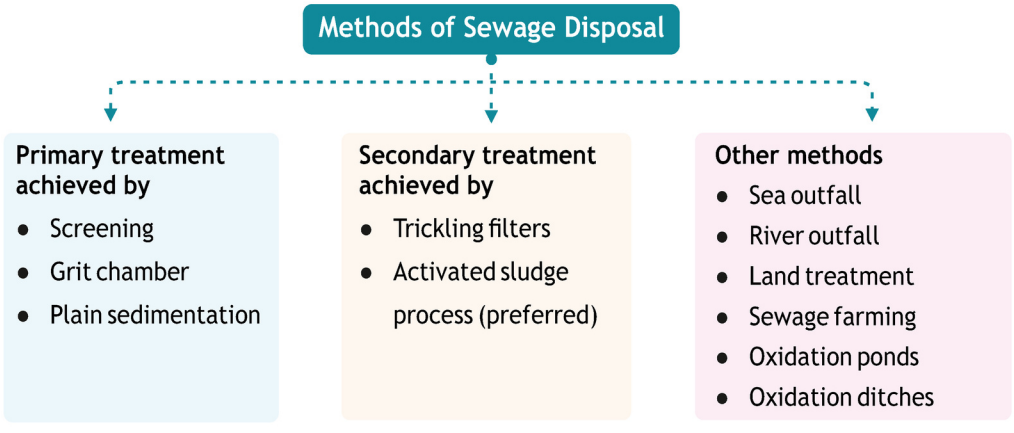
Answer: B. Secondary treatment of sewage.

- A trickling filter is a biological treatment process used in the **secondary treatment** stage of sewage.

Q3.18: What are the methods of sewage disposal

Answer

- Sewage treatment plants are used for sewage disposal.



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Q3.19: What is the most practical method for determining organic load when waste contains toxic substances?

Answer:

- Chemical Oxygen Demand

Q3.20: Describe the environmental sanitation programs in india?

Answer:



Q3.21: What is the maximum permissible level of occupational exposure to ionizing radiation per year to the whole body of an individual as set by the International Commission of Radiological Protection?

A. 2 rad

B. 3 rad

C. 5 rad

D. 8 rad

Answer: C. 5 rad

> The International Commission on Radiological Protection (ICRP) sets the maximum permissible occupational exposure to ionizing radiation for the whole body at: 5 rad per year (equivalent to 50 mSv/year).

Q3.22: In a remote area of the country a gastroenteritis epidemic broke out. A community shallow well was suspected to be the cause. The doctor of PHC had no other facility to check the quality of water except a physical examination of water. Which is a physical parameter that would indicate water pollution?

A. Biological oxygen demand

B. NO2 (2 in subscript)

C. Chemical oxygen demand

D. Turbidity

Answer: D. Turbidity

> Turbidity → a physical parameter (cloudiness of water, usually due to suspended particles, organic matter, or microbial growth).

BIG QUESTION 4: Summarize key aspects of environmental health related to noise, light, housing standards, overcrowding, and radiation, including their measurements, acceptable levels, health impacts, and sources.

Broad Answer: Environmental health encompasses managing noise levels (measured in Decibels, with specific thresholds for damage), ensuring adequate light (measured in Candela, Lumen, Lux, Lambert, and Daylight Factor), establishing housing standards (covering site, space, and ventilation), addressing overcrowding (defined by persons per room and floor space), and understanding radiation sources (natural and man-made), their permissible exposure limits, and associated health risks.

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DETAILED QUESTIONS

Q4.1: How is loudness measured, and what are the tolerable daily exposure?

Answer:

- Loudness: Measured in Decibels.
- Tolerable daily exposure to noise without substantial damage to hearing: 85 dB.

Q4.2: Mention the noise threshold for pain, auditory fatigue level, tympanic membrane rupture threshold

Answer:

- Noise threshold for pain: 140 dB.
- Auditory fatigue: 90 dB.
- Rupture of tympanic membrane if the nose is above: 160 dB

Q4.3: Permanent deafness due to noise occurs at what level?

Answer:

- Repeated or continuous exposure to noise around 100 dB

Q4.4: What illumination level is considered adequate for satisfactory vision?

Answer:

- For satisfactory vision, an illumination of 15-to-20 foot candles is adequate

Q4.5: Define and provide units for Luminous intensity, Luminous flux, Illumination, and Brightness/illuminance.

Answer:

Measurement	Description	Units
Luminous intensity	Power of light source	Candela
Luminous flux	Flow of light	Lumen
Illumination	Amount of light reaching the surface	Lux
Brightness or illuminance	Amount of light re-emitted from the surface	Lambert
Daylight measure	-	Daylight factor

Q4.6: How is natural illumination measured, and what are the recommended daylight factors for living rooms and kitchens?

Answer:

- Daylight illumination is measured by the Daylight factor.
- Daylight factor in living rooms: 8%.
- Daylight factor in kitchen: 10%.

Q4.7: Luminous flux is measured in?

A. Lux

B. Candela

C. Lumen

D. Lambert

Answer: C. Lumen.

- Luminous flux refers to the total amount of visible light emitted by a source per unit time and is measured in lumens (lm).
- Lux measures illumination (lumens per square meter).

Q 4.8: How is light measured from its source to its effect on a surface?

Answer:

Imagine you are on one end of the study table and have a candle on the other end

↓

The candle is a power of light source

Luminous intensity: Measured in candela

↓

Light flows in the air

Luminous flux: Measured in lumen

↓

The light falls on the surface

Illumination: Measured with Lux

↓

Some amount of light is re-emitted

Brightness: Measured in Lambert

BIG QUESTION 5: What are the recommended housing standards?

Broad Answer: Recommended housing standards cover various aspects to ensure healthy living conditions. This includes choosing higher sites with deep subsoil water, providing adequate open space (setback), and balancing built-up area. Specific requirements are detailed for floor space per person, roof height, wall construction, and window dimensions. Additionally, standards address cubic air space, minimum living rooms, sufficient natural lighting, proper cross-ventilation, and optimal air change rates for residential and commercial settings.

Q5.1: What are the site requirements for a house regarding surroundings and subsoil water?

Answer:

- Higher levels from surroundings.
- Subsoil water should be present below 10 feet.

Q5.2: Differentiate between 'Set back' and 'Built up area' for rural and urban areas.

Answer:

- **Set back (Open space around the house):** Rural areas: 2/3rd; Urban areas: 1/3rd.
- **Built up area (The area where the house is built):** Rural areas: 1/3rd; Urban areas: 2/3rd.

Q5.3: What are the recommended floor area standards per person?

Answer:

- 1 person: 70 to 90 sq ft.
- 2 persons: 100 to 110 sq ft.

Q5.4: What are the minimum recommended height for a roof, and specifications for walls?

Answer:

- Roof: 10 ft.
- Wall: 9-inch brick wall, plastered.

Q5.5:What are the recommended requirements for windows in a living room?

Answer:

- Windows: Minimum 2 in the living room.
- One opening directly to an open space.
- Height of window: 3 ft.
  - It should cover 1/5th of the total floor area.
  - Doors and windows combined should cover 2/5th of the floor area.

Q5.6: What are the recommended cubic space (air space) per capita, and preferred cubic space?

Answer:

- Air space: 500 cu. ft per capita.
- Preferable: 1000 cu. ft per capita.

Q5.7: How many living rooms are considered minimum, and what is the lighting standard for them?

Answer:

- Minimum 2 living rooms. One can be closed for security.
- Lighting: Daylight factor should be more than 1% over half of the floor area.

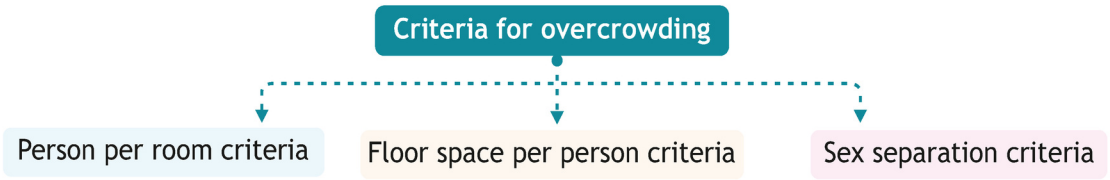
Q5.8: What is the ideal arrangement for doors and windows for ventilation, and what are the recommended air change rates for residential and commercial spaces?

Answer:

- Doors and windows should be diagonally opposite for ventilation.
- Air change:
  - Residential: 2-3/ hr
  - Commercial: 4-6/hr

Q5.9: What are the criteria for overcrowding?

Answer:



Q5.10: As per the WHO recommended standards for floor space, a space of 90 to 100 sq ft can accommodate?

A. 1 adult

B. 2 adults

C. 1 adult, 1 child of 8 years, 1 child of 2 years

D. 1 adult, 1 child of 6 years and one 6-month-old infant

Answer: C. 1 adult, 1 child of 8 years, 1 child of 2 years

- A 6-month infant is not counted.
- So, 1 adult needs 70 to 90%, and 6 years child needs 25 to 30%
- Total of 90 to 100%.

Q5.11: What are the 'Person per room criteria' and 'Sex separation criteria' for overcrowding?

Answer:

- **Person per room criteria:**
  - 1 room >2 persons.
  - 2 room > 3 persons.
  - 3 rooms > 5 persons.
- **Sex separation criteria:** 2 persons above 9 years of age of different sexes are obliged to sleep in one room, except for husband and wife.

Q 5.12: What are the floor space requirements per person?

Answer:

- 1 person: 70 to 90 sq ft.
- 2 persons: 100 to 110 sq ft.
- Children up to 1 year are not counted.
- Children from 1 to 10 years- counted as half.

BIG QUESTION 6: What are the main sources of radiation?

Broad Answer:

- Natural sources:
  - Cosmic rays
  - Terrestrial radiations
  - Internal radiation.
- Man-made sources.

Q6.1: What is the typical skin dose to a patient from a single X-ray film?

Answer:

- 0.02 to 3 Rad.

Q6.2: Which radioactive isotopes are associated with radioactive fallout, and which were specifically linked to the Chernobyl tragedy?

Answer:

- Radioactive fallout: C14, I131, Cs137, Sr90.
- Radiation exposure in Chernobyl tragedy - Cs, Sr.

Q6.3: What is the maximum permissible dose of radiation exposure for human per year?

Answer: The maximum permissible dose of radiation exposure for human beings is 5 rads per person per year.

Q6.4: What is the total natural radiation received by humans per year?

Answer: Total Natural radiation received by humans is 0.9 Rad per person per year.

Q6.5: What thickness of lead apron is required to prevent radiation exposure?

Answer: > 0.5mm

Q6.6: Which Indian state receives the highest solar radiation, and which state utilizes the maximum solar radiation?

Answer:

- The state receiving the highest solar radiation: Rajasthan.
- State utilizing maximum solar radiation: Gujarat.

18. WATER/AIR

BIG QUESTION 1: What defines safe and wholesome water, and how is it different from potable water?

Broad answer: Safe and wholesome water is water that is colorless, odorless, tasteless, and free from disease-causing organisms—suitable for cooking and domestic use. Potable water, a stricter term, must meet microbiological standards—specifically zero coliforms in 100 ml, ensuring it's completely safe to drink. While all potable water is wholesome, not all wholesome water may be potable.

DETAILED QUESTIONS

Q1.1: What are the daily water requirements for individuals in different settings?

Answer:

- The basic physiological requirement of drinking water is 2L per head per day
- Daily supply per capita is adequate to meet the needs of all urban domestic purposes: 150-200L per capita/day
- Daily supply per capita is adequate to meet the needs of all rural domestic purposes: 40-60L per capita/day

Q1.2: Which of the following is the purest form of water in nature?

A. River water
B. Rainwater
C. Deep well
D. Impounding reservoirs

Answer: B. Rainwater

Explanation:

- Rainwater is considered the purest form because it is formed by natural distillation during the water cycle
- It may, however, pick up impurities (e.g., dust, gases) while falling through the atmosphere, but at the point of condensation, it is nearly pure

Q1.3: What are the criteria for identification of problem habitations ?

Answer:

- The drinking water source point is not within 1.6 km in plain areas or at 100 m elevation in hilly areas
- Water is available at a depth of more than 15 meters

Q1.4: Define safe yield of a water source. Why is it important?

Answer:

- Safe yield is defined as yield that is adequate for 95% of the year
- The safe yield of the source should be sufficient to serve the population expected at the end of the design period which is 10 to 50 years in future

Q. 1.5: Under the water supply program, which of the following statements is false?

A. At Least 1 hand pump (safe water spot) for 250 population

B. At Least 40 L per capita water supply per day in rural areas

C. At least 140 L in urban areas with sewage

D. It is a problem village if there is no safe water within 1km

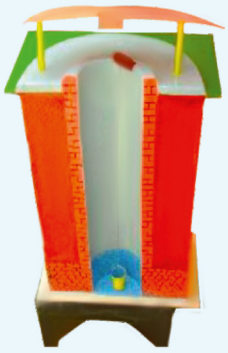
Answer: D. It is a problem village if there is no safe water within 1km

Explanation:

A village is defined as a "problem village" if there is no safe water source within 1.6 km in plains (or within 100 m elevation in hilly areas), not 1 km.

Q1.6: Differentiate between a step well and a sanitary well.

Answer:

Stepwell 	• Source of Guinea worm disease • Banned • Type of dug well
Sanitary Well 	• Properly and suitably constructed PYQ: FMGE 2019 • **Well-protected from contamination** • The following points should be considered while constructing a sanitary well o Located within 60m (not more than 100m because water can get contaminated while transporting) from human dwelling o Located at least 15m (50 ft) on the site of likely contamination (like a drain)

Q1.7: How are water-related diseases classified under Public Health?

Answer:

Water Borne Diseases	Water Washed Diseases
• Drinking contaminated water o Diarrhea o Typhoid o Cholera o Gastrointestinal infections	• Also known as Water scarcity disease • Inadequate amount of water to maintain personal hygiene. o Infective trachoma o Scabies

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Water Based Diseases	Water-related/ Breeding Diseases
• Due to intermediate host in water o Schistosomiasis (snails) o **Cyclopes:** Guinea worm disease/ Dracunculiasis	• Vectors require water for breeding (Mosquito-borne) o Anopheles (malaria) needs clean water. o Culex needs dirty water for Japanese encephalitis and filariasis. o Aedes, dengue, and chikungunya in artificial water collection sources.

Q1.8: What is the WHO acceptability criteria for drinking water?

Answer:

Physical Properties	• **Turbidity:** Up to 5 NTU **(Nephelometric turbidity unit)** • **Color:** Up to 15 TCU **(true color unit)** or 5 Hazen unit • Taste and odor: Tasteless, odorless
Chemical Properties	• **Chlorides:** The Standard prescribed for chloride is 200 mg/L maximum prescribed level is 600 mg/L • Excess **NaCl causes CVDs** (cardiovascular diseases) • **Hardness:** Recommended between **100-300 mg/L is acceptable** • Softening of water is recommended at 150 mg/L • **pH:** 6.5-8.5 (Chlorine acts best at pH 7)
	• **Hydrogen sulfide:** Taste and odor threshold should be at **0.05-0.1 mg/L** • **Iron:** A reddish brown color occurs when ferrous iron in groundwater oxidizes to ferric iron. Iron level is up **to 0.3 mg/L** • **Total dissolved solids:** <600 mg/L is good. Prescribed permissible level TDS can go up to 1000 mg/L • Gross radiological activity: o Alpha activity: < 0.5 Bq/l o Beta activity: < 1 Bq/l

Q1.9: Which is the most undesirable metal in water?

Answer:

- Lead

Q1.10: What does nitrates in drinking water signify?

Answer:

- Nitrate concentration <45mg/l: Remote contamination
- Nitrite concentration <3mg/l: Recent contamination
- If both nitrates and nitrites are present, the amount should be ≤1 mg/L

Q1.11: What organisms are used as indicators in the bacteriological surveillance of drinking water, and what do they signify?

Answer:

- Most reliable evidence for fecal contamination: Coliform bacteria
- Evidence for recent contamination: Fecal streptococci
- Remote contamination: Clostridium perfringens

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Q1.12: Describe the Presumptive Coliform Test (Multiple Tube Method).

Answer:

- Yields the probable no. of coliform bacilli per 100 mL of water (Using McCrady's Table)
- Screening test for the presence of E. coli

Q1.13: What is the EIC test ?

Answer:

- A confirmatory test for E coli is EIC
  - E -Eijkman test
  - I -Indole production
  - C - Citrate utilization

Q.1.14: Scabies, an infection of the skin caused by Sarcoptes scabiei, is an example of a?

A. Waterborne diseases

B. Water washed diseases

C. Water based diseases

D. Water-related/ breeding diseases

Answer: B. Water washed diseases

Explanation:

- Scabies is caused by the mite *Sarcoptes scabiei* and spreads primarily through direct skin contact or contaminated clothes/bedding.
- It is not waterborne (not spread through water), but it is associated with lack of personal hygiene and insufficient water for proper washing—hence categorized as a water-washed disease.

BIG QUESTION 2: What are the small-scale methods of water purification, and why is chlorination preferred over boiling?

Broad answer: Boiling is the most effective method—it kills bacteria, viruses, and protozoa. However, it is costly, and has no residual effect, meaning water can get recontaminated. Chlorination, though slightly less effective against certain organisms (e.g., cyclops, ova), is cheaper, easy to apply in bulk, and provides residual protection (free chlorine), making it the preferred method in public health settings.

DETAILED QUESTIONS

Q2.1: Compare boiling and chlorination as small-scale water purification methods.

Answer:

Boiling

- Boiling is the best method for the purification of water
- It kills everything but boiling is not preferred as a mode of purification of water because o
  - Costly
  - No residual activity: This means once we boil water after 4-6 hours we will need to boil it again

Chlorination

- The second best method for purification
- To kill Poliovirus/ cyclops, the dose of chlorine needs to be increased, leading to alteration in the taste and smell of water

- Residual activity: This important property of chlorine, meaning water once chlorinated doesn't have to be re-treated again.
- This residual activity is also known as Free chlorine.
- The most commonly used form of chlorination is bleaching powder.
- 100g of bleaching powder releases 33 grams of chlorine.
- 2.5 grams of bleaching powder is required for 1000L of water.
- Kills only pathogenic forms · The most common organism killed is E.coli
- No ova, no cyclops, no spores are killed.
- Best acts at pH:7.

Q2.2: What happens when chlorine is added to water?

Answer:

Addition of chlorine to water (also known as Combined Chlorine)

↓

HOCl (Hypochlorous acid) + HCl (Hydrogen chloride)

HCl get neutralized by the alkalinity of water | HOCl remains

↓

HOCl dissociates into H^+ and OCl- (Hypochlorite ion)

- Disinfecting property of chlorine: 90% due to HOCl (Hypochlorous acid) and 10% due to OCl- (Hypochlorite ion)
- The major disinfecting property of chlorine is due to Hypochlorous acid
- Note: Chlorine also oxidizes iron, manganese and hydrogen sulfide and controls algae, slime organisms, and AIDS coagulation.

Q2.3: What is chlorine demand of water and how is it measured?

Answer:

- The amount of chlorine required or demanded to destroy bacteria and to oxidize all the organic matter and ammoniacal substances present in water

Horrocks Apparatus

PYQ: FMGE 2021



- **Estimates chlorine demand of water (or the dose of Bleaching water required for disinfecting of water).**
- Contains: 1 Black cup and 6 white cups (same in size with increasing level of markings).
- Indicator used: **Starch iodide.**
- The color changes to **blue** during the procedure of estimation.
- Black cup: Preparation of the solution (Water to be disinfected + Indicator)
- White cups: Water is filled at an increasing level in all six cups and 2 drops of solution to each white cup is added.

Interpretation

- Upon adding the solution 1 white cup would change color, following which other cups also change color.
- **(nx2) gms of bleaching powder will disinfect 455 liters of water.**
  - **n** is the first cup which will show a color change(blue)

Q2.4: How many grams of bleaching powder is used to disinfect 3000L of water where the 3rd cup is the first cup to show the color change in the apparatus?

A. 40 gms

B. 39 gms

C. 64 gms

D. 100 gms

Answer:

- 39 gms

Explanation:

- **(nx2) gms of bleaching powder will disinfect 455 liters of water.**
  - **n is the first cup which will show a color change(blue)**
- First cup to show color = 3 ⟶ 3 × 2 = 6 g per 455 L
- Total water = 3000 L

$$\text{No. of 455-L units in 3000 L} = \frac{3000}{455} \approx 6.59$$

$$\text{Bleaching powder} = 6\text{g} \times 6.59 \approx 39.5\text{g} \approx 39\text{g}$$

Q2.5: What is free or residual chlorine, and how is it measured?

PYQ: FMGE 2022

Answer:

Free or Residual Chlorine

- Breakpoint chlorination is the point at which the chlorine demand of water is met
- After breakpoint chlorination has been achieved, additional chlorine is added to the water in the form of free or residual chlorine which will keep the water disinfected



Chloroscope

- To know that we have achieved the level of free or residual chlorine, an apparatus is used which is a **chloroscope,** and certain tests are known as **OT & OTA tests.**
- The instrument used to estimate the free or residual chlorine.
- **Total amount (or dose) of chlorine added to water = combined chlorine + Free/Residual Chlorine.**
- Combined chlorine is estimated by Horrocks apparatus and free/residual chlorine is estimated by Chloroscope or tests known as OT or OTA test.

Levels of residual chlorine required

Drinking water: >0.5 mg/L for a contact period of 1 hour.	Swimming pool sanitation: > 1 mg/L and contact period of 1 hour.	To kill poliovirus or cyclops: > 2 mg/L for a contact period of 1 hour.	Post-disaster phase: ≥ 0.7 mg/L for a contact period of 1 hour.

Q2.6: What are the tests for chlorination of water?

Answer:

- OT (Ortho Toluidine) Test or OTA test (Ortho toluidine arsenite test)

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- The color change is noticed in the first 10-15 sec
- Upon adding OT reagent or OTA reagent, there is a color change to The color change in the first 10-15 seconds is free Yellow. chlorine
- OTA tests can detect both free and combined chlorines separately
- OT tests can also detect free chlorine separately. It can detect combined chlorine but not separately
- For calculating: (Total chlorine - Free Chlorine)
- The OTA test is better than the OT test as it detects Free/residual and combined chlorine separately
  - Also, it is not affected by interfering substances such as nitrates, iron, and manganese

Q2.7: What is the main reason for disinfecting action of chlorine ?

Answer:

- HOCl

Q2.8: What is the main reason for disinfecting property of chlorine?

Answer:

- HOCl + Ocl-

Q2.9: How to calculate total dose of chlorine required?

Answer:

- Chlorine demand + Residual Chlorine of 0.5 mg/L

Q2.10: What is breakpoint chlorination?

Answer:

- The point at which Chlorine demand has been met

Q2.11: Which is the most commonly used form of chlorine?

Answer:

- Bleaching Powder (100 gms of bleaching powder releases 33 grams of chlorine)

Q2.12: What is stabilized bleach?

Answer:

- Bleaching powder mixed with excess lime; retains its strength.

Q2.13: What is water hardness, how is it classified, and what is its public health significance?

Answer:

- The hardness of water is defined as soap destroying the power of water
- Protects from heart diseases.
- Types:
  - Temporary hardness: Due to Calcium and Magnesium salts of bicarbonates
  - Permanent hardness: Due to Calcium and Magnesium salts of Chlorides, Nitrates, Sulphates
- The hardness of water is expressed in terms of Milliequivalents per liter (meq/L) of $CaCO_3$
- 1 meq/L hardness = 50 mg CaCO (50 ppm per liter of water 3
- The softness of water is recommended when the hardness of water is 150mg/L or > 3meq/L
- Hardness of water is shown to protect from Cardiovascular Disease

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Soft water	<1 (<50 mg/l)
Moderately Hard water	1-2 (50-150 mg/l)
Hard water	3-6 (150-300 mg/l)
Very hard water	>6 (>300 mg/l)

Q.2.14: All the following statements are true about breakpoint chlorination except

A. Free chlorine is released into the water after the breakpoint.

B. Chlorine Demand is the amount of chlorine needed to kill bacteria, oxidize organic matter and neutralize the ammonia

C. 1 ppm free Chlorine should be present in water after the breakpoint has reached

D. A contact period of 1 hour is necessary

Answer: C. 1 ppm free Chlorine should be present in water after the breakpoint has reached

Explanation:

- 1 ppm free chlorine is too high for drinking water, as it can cause taste and odor issues and may produce harmful by-products (like trihalomethanes).
- 0.5 ppm is sufficient to ensure disinfection and safety without affecting taste or forming excess by-products.

Q.2.15: The color produced in the Orthotolidine test after 5 minutes is due to the action of :

A. Dissolved solids

B. Free chlorine

C. Combined Chlorine

D. Free and combined chlorine

Answer: D. Free and combined chlorine

Explanation:

- Orthotolidine test is a colorimetric test used to detect chlorine in water.
- Orthotolidine (OT) reacts with both free residual chlorine and combined chlorine (chloramines) to produce a yellow color.
- After 5 minutes, the color represents the total chlorine content (free + combined chlorine).

Q.2.16: What are some applications of chlorine?

Answer:

- Chlorine's oxidizing properties make it useful in processes where the oxidation of iron, manganese, and hydrogen sulfide is desired
- It's used to control algae and slime organisms, and also for AIDS coagulation process

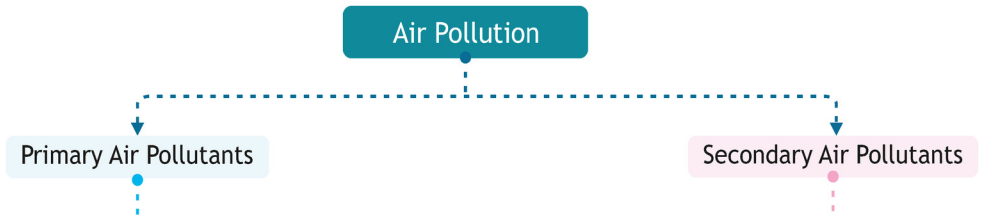
BIG QUESTION 3: What are the major indicators of air pollution and how is air quality assessed?

Broad answer: Air pollution is assessed using physical, chemical, and biological indicators. The most reliable indicator is sulphur dioxide (So_2), while lichens serve as a biological indicator. Instruments like the soiling index, grit and dust measurement, and coefficient of haze help quantify particulate and gaseous pollutants. The Air Quality Index (AQI), developed by CPCB, integrates multiple pollutants to categorize air quality into health-related levels.

DETAILED QUESTIONS

Q3.1: How is air pollution classified?

Answer:



- Pollutants which are directly released into the air.
- E.g.:Sulphurdioxide,Carbonmonoxide,Nitrogendioxide,Particulate matter,Hydrocarbons,Chlorofluorocarbons(CFC`s), Ammonia,etc.
- Metals like Lead, Cadmium, Copper, Nickel, Particulate matter

- Formed by a combination of primary air pollutants.
- E.g.: Ground level ozone, Peroxyacetyl nitrate, particulate matter formed by combinations.

Q3.2: What are the indicators of air pollution?

Answer: **Indicators of air pollution**

Sulphur Dioxide	The most important indicator of air pollution
Smoke or soiling index	The specific amount of filtered air is filtered through a filter paper and the stain is measured by the photoelectric meter.
Grit and dust measurement	Checks the dust, grit deposits and small particulate matter present in the air.
Coefficient of haze	Measures smoke and other aerosols in the air.
Air Pollution Index	A combined index that takes multiple air pollutants with upper limits into consideration.

Q3.3: What are the major indicators used to assess air pollution?

Answer:

- The best indicator of air pollution is sulphur dioxide
- The recommended level of SO in 24 hours of exposure is 2 3. <20 mcg/m
- Most common and widely distributed air pollutant: Carbon monoxide
- Best biological indicator of air pollution: Lichens
- The corrected effective temperature of comfort zone: 25-27 (70-76 F) and measured by globe thermometer
- Air pollution is controlled by the central pollution control board under the Ministry of Environment and Forest and Climate change

Q3.4: Describe air quality index

Answer:

- An indicator of air pollution
- It is given by the Central Pollution Control Board (CPCB).

Components of Air Quality Index (AQI)

- Sulfur dioxide, Nitrogen dioxide, Carbon monoxide
- Particulate matter 2.5 and 10
- Measures Ozone level
- Measures Lead, Ammonia, Chlorofluorocarbons, Hydrogen sulfides, etc.

Q3.5: What are the Central Pollution Control Board's Air Quality Standards ?

Answer:

AIR QUALITY INDEX (AQI)	CATEGORY
0-50	Good
51-100	Satisfactory
100-200	Moderate
201-300	Poor
301-400	Very Poor
401-500	Severe

Q3.6: What are the instruments used to measure air quality?

Answer:

Kata thermometer



PYQ: NEET PG 2019

- **Identification:** Has a red-colored narrow and thin bulb
- Used to measure low air velocity and cooling power of air.
- More reserved for low air velocity measurement.
- The cooling power of air is an indicator of air comfort. Not very reliable estimates are provided of cooling power of air by Kata thermometer.
- In the Kata thermometer, **dry Kata reading** is more than 6 and **wet Kata reading** is more than 20 - indicates thermal comfort.

Globe thermometer



- Thick and wide bulbs are present.
- Used to measure corrected effective temperature or radiant heat.

Q3.7: Define air humidity and enlist the instruments used to measure air humidity

Answer:

- Air humidity is the moisture content of the air
- Instruments used to measure air humidity:



Hygrometer



Sling psychrometer





Dry and wet bulb hygrometer

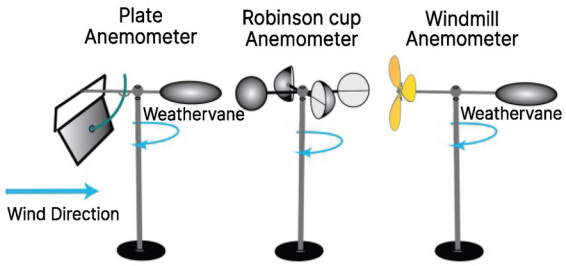


Assman psychrometer

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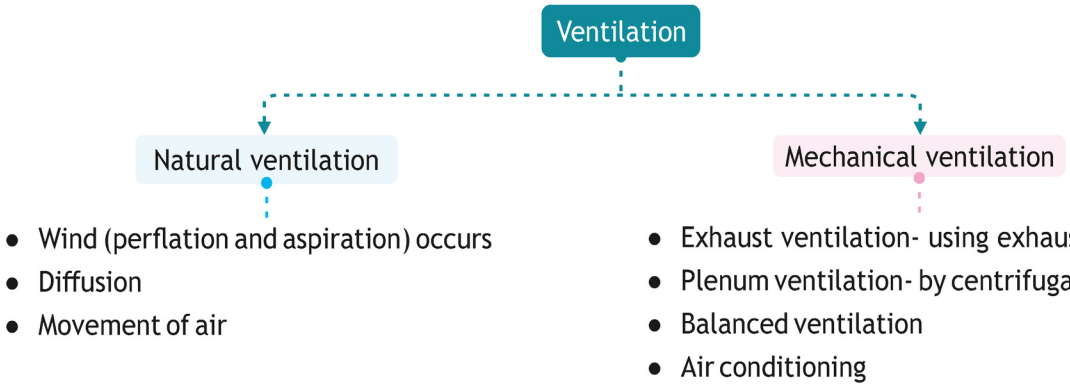
Q3.8: Differentiate between Robinson cup anemometer and Barometer

Answer:

Robinson cup Anemometer 	• It measures air velocity in the early days. • Types of Anemometer 
Barometer  	• It is an instrument to measure atmospheric pressure • In this, the Aneroid Barometer and Mercury Barometer are present.

Q3.9 What are the types of ventilation?

Answer:



Q3.10 What are greenhouse gases and how are they controlled globally?

Answer:

Greenhouse gases

- The temperature of the earth is rising due to greenhouse gases
- Few important greenhouse gases: Water vapor (Most important), Carbon dioxide, Nitrous oxide, Methane, Ground level ozone
- The stratosphere ozone layer cuts down the harmful radiations released from the sun.
- Chlorofluorocarbons decrease the stratosphere layer

Agreements to control the effect of Greenhouse gases (Climate change)

- Kyoto protocol is one of the initiatives to control global warming
- The Kyoto Protocol called for 90% reduction in greenhouse gas emissions.
- Water vapor is a major greenhouse gas than Co2

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- The Kyoto protocol was launched for climate protection.
- The Paris Agreement is used to control greenhouse gas emissions
- Glasgo Agreement (2021): COP26

19. MISCELLANEOUS, HISTORY OF PUBLIC HEALTH AND ENTOMOLOGY

BIG QUESTION1: Who are the key contributors to public health and what are their major contributions?

Broad answer: PYQ: FMGE 2021

- John snow is the father of epidemiology
- Edward Jenner discovered the first vaccine, the smallpox vaccine, and coined the term vaccination
- Robert Koch formulated the Koch postulates
- Louis Pasteur gave germ theory and coined the term vaccine
- James Lind said that scurvy can be prevented by consumption of citrus fruits
- Walter Reed worked on yellow fever and identified Aedes mosquitoes as the vector
- Ronald Ross showed that malaria transmission occurs via mosquitoes



John Snow | Edward Jenner | Robert Koch | Louis Pasteur | James Lind | Walter Reed | Ronald Ross

DETAILED QUESTIONS

Q1.1 Name key public health scientists and their discoveries.

PYQ: FMGE 2019 PYQ: AIIMS 2019

Answer:

John Snow	Father of epidemiology, Father of modern epidemiology, Cholera epidemic London (spot maps) using natural experiment study design
Edward Jenner	Small Pox vaccine, coined term vaccination
Robert Koch	Koch Postulates, Anthrax bacilli, Vibrio Cholera
Louis Pasteur	Germ theory of disease, coined term vaccine
James Lind	Use of citrus fruits in prevention of scurvy, first human experiment
Walter Reed	Yellow fever and aedes mosquito
Ronald Ross	Malaria & Anopheles mosquito
Alfred Grotjahn	Social pathology
Cea Winslow	Defined public health
Edwin Chadwick	Great Sanitary Awakening in UK, Enactment of Public Health Act, 1848
Fracastorius	Founder of epidemiology, explained cause of epidemic, syphilis transmission through sexual route, Theory of contagion
David Morley	Growth charts

BIG QUESTION 2: What are the key entomological features of mosquitoes and their role in disease transmission?

Broad Answer: Different genera of mosquitoes have distinctive morphological traits, egg-laying habits, larval characteristics, and resting positions that aid in their identification. They serve as vectors of major diseases: Anopheles for malaria, Aedes for arboviral infections (dengue, chikungunya, Zika, yellow fever), Culex for Japanese encephalitis and filariasis, and Mansonia for brugian filariasis. Recognition of these species is essential for vector control and epidemiological investigations.

DETAILED QUESTIONS

Q2.1: What are the characteristics of disease vectors (mosquitoes)?

PYQ: FMGE 2020, 2021

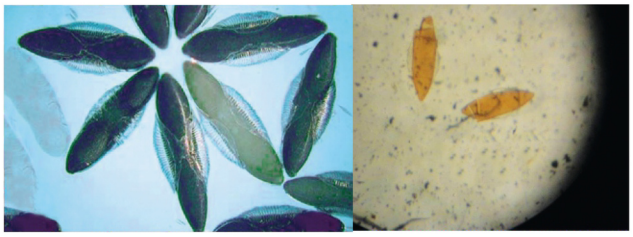
Answer:

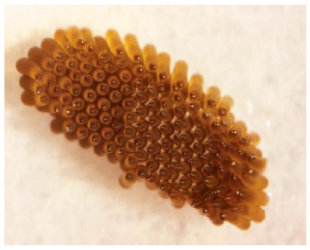
Aedes (Tiger) • Hunchback position, white stripes on the entire black body. • They transmit Dengue, Chikungunya, Zika virus, Rift valley disease, Yellow fever	
Culex • Hunchback position, small body with long legs, no white stripes on black body.	
Anopheles • Spotted wings. • Anopheles has an inclination of **45 degrees** with surface.	
Mansonia • Squatting position, long body, white spots on legs.	

Q2.2 How can different mosquito species be identified based on their egg pattern, larval structure, adult posture, and breeding habitat?

PYQ: FMGE 2022

Answer:

Anopheles • Known as **Sophisticated mosquito.** • Lays eggs **singly in clean stagnant waters.** • **Eggs: Boat shaped** with lateral floats.	

Mansonia • **Eggs: Star shaped,** laid in clusters.	
Aedes • It breeds in **artificial waters** • Eggs: Laid singly, **Cigar shaped**	
Culex • Known as Nuisance mosquito. • Lays eggs in dirty waters. • It can fly upto 11 km • Eggs: Clusters or Rafts (100-250 eggs in one cluster).	

PYQ: FMGE 2020 PYQ: NEET PG 2022

Larvae of mosquitoes

Anopheles

- Rest parallel to the water surface.
- No breathing tube (siphon tube) present.

Culex

- Longer siphon tubes

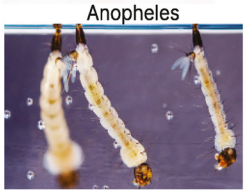
Aedes

- Shorter siphon tubes.



Larvae


Anopheles


Aedes

	Anopheles	Aedes	Culex	Mansonia
Breeding zone	Clean, stagnant water	Artificially collected water	Dirty, polluted water, Paddy fields, long standing water collections	• Large water bodies under aquatic plants like pistia plants • Removal of pistia plants
Adult (Resting position)	Inclined at 45 degrees to skin, head is down, spotted wings	Hunchback with white stripes	Hunchback, no white stripes on short body and long legs	Squatting position, large body and legs
Egg	Single, boat shaped, lateral floats	Single, cigar shaped	Cluster, 100-250 eggs in one raft/cluster	Cluster, star shaped
Larva	Rest parallel to water surface, no siphon tubes	Siphon tubes (shorter), inclined at an angle to water surface	Siphon tubes present at an angle to water surface	Attached to roots of aquatic plants

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Bite	Relatively less painful	Painful	Stingy and burning	Painless
Biting time	Morning & Evening (Dawn & Dusk)	Day time (2 hours after sunrise and 2 hours before sunset)	Nocturnal (Midnight)	Morning & Evening (Dawn & Dusk)
Flight range	2-3 kms	100-200 meters	11-13 km	2-3 km
Habitat	Exophilic (outside houses)	Endophilic (inside houses)	Exophilic (at daytime), Endophilic (at nighttime)	Exophilic

Q2.3: What are the common diseases transmitted by mosquito species and other arthropod vectors ?

Answer:

- Anopheles transmit Malaria
- Aedes transmit Dengue, Chikungunya, Yellow fever, Zika virus transmission, Rift valley fever
- Culex transmits Japanese encephalitis, lymphatic filariasis, West nile fever
- Mansonia transmits Brugian filariasis

Q. 2.4:The insect shown below is a vector for which disease:

A. Chikungunya

B. Visceral leishmaniasis

C. Malayan filariasis

D. Japanese encephalitis



Answer: D. Japanese encephalitis

Explanation:

- It has a short body and long legs
- Chikungunya is caused by Aedes
- Malayan filariasis is caused by Mansonia
- Visceral leishmaniasis is caused by Sand fly

Q.2.5: Water from a stagnant drain is collected in a container and observed for breeding mosquitoes. The image of the larva is shown below. Identify the species of the mosquito?

A. Anopheles

B. Aedes

C. Culex

D. Mansonia

Answer: C. Culex

Explanation:

- Long siphon tube indicates larva of culex
- Anopheles has no siphon tube
- Aedes has a shorter siphon tube
- Culex has a longer siphon tube

Q2.5: Water from a stagnant drain is collected in a container and observed for breeding mosquitoes. The image of the larva is shown below. Identify the species of the mosquito?





Answer: Culex

- Long siphon tube indicates larva of culex
- Anopheles has no siphon tube
- Aedes has a shorter siphon tube
- Culex has a longer siphon tube

BIG QUESTION 3: What are the medically important arthropod vectors beyond mosquitoes?

Broad Answer: Several arthropods besides mosquitoes serve as disease vectors. Flies, fleas, lice, ticks, mites, and bugs transmit a wide range of bacterial, viral, protozoal, and helminthic diseases. Correct identification of the vector is critical for diagnosis, epidemiological tracing, and targeted vector control measures.

DETAILED QUESTIONS

Q3.1 Specify the morphological features of following: Louse, Rat flea, Black fly, Reduviid Bug, Tse tse fly, housefly

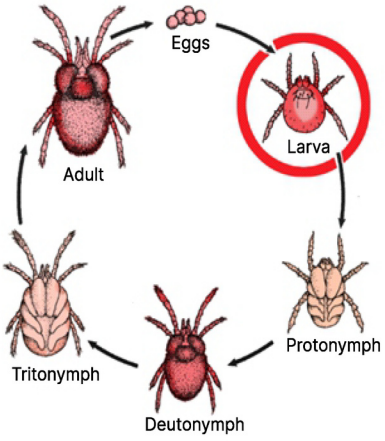
Answer:

Louse	• Dorso-ventrally flattened 
Rat flea	• Hairy bristles are seen 

Black fly	• Vector of Onchocerciasis volvulus (River blindness)  
Reduviid bug	
Tse tse fly	• Vector of African trypanosomiasis • Overlapping wings are present 
Housefly	

Q3.2: Describe characteristic features and life cycle of trombiculid mite

Answer:



Trombiculid mite

- This is the adult form
- It doesn't form transmit Scrub typhus

Life cycle:

- Larvae: 3 pairs of legs
- It transmits Scrub typhus
- Scrub typhus causes Eschar- wound covered with a black region
- Agent: Orientia tsutsugamushi

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Q3.3: What are the medically important arthropod vectors and the diseases they transmit? PYQ: INICET 2023

Answer:

Sandfly	• Leishmaniasis o Visceral /Kala Azar o Cutaneous/Oriental Sore • Sandfly fever, Oraya fever
Housefly (Musca domestica)	Acute Gastroenteritis, Polio, Trachoma, Yaws, Anthrax
Tse Tse fly (Glossina palpates)	African sleeping sickness/African trypanosomiasis
Reduviid bug (Triatominae/Kissing)	American sleeping sickness/American trypanosomiasis (Chagas disease)
Black fly (Simulum)	Onchocerciasis (River blindness)
Louse	Pediculosis, Epidemic typhus, Relapsing fever, Trench fever
Rat Flea (Xenopsylla)	Bubonic Plague, Endemic (Murine typhus), Chiggerosis, Hymenolepis diminuta
Trombiculid Mite	Scrub typhus
Itch mite	Scabies

Q3.4: What are the control measures and insecticides used against common arthropod vectors in public health?

Answer:

Sandfly	Pyrethrum (first choice), DDT
Housefly	Environmental control, Source reduction, safe water supply and sanitation
Louse	0.5% Malathion (Resistant to DDT)
Fleas	10% DDT dust (cheapest and widely used), carbaryl, diazinon
ITCH Mite	25% Benzyl benzoate

Q3.5: What are the diseases transmitted by hard and soft ticks, and how do they differ in their transmission pattern?

Answer:

Hard tick	Soft tick
Tick typhus (RMSF)	Q fever
Tularemia	Relapsing fever
Tick fever	
Tick paralysis	
KFD	
Human Babesiosis	
Viral encephalitis	

BIG QUESTION 4: What are the lifecycles and special transmission highlights of Japanese Encephalitis (JE), Leptospirosis, Zika, Ebola, Nipah?

Broad Answer: These infections have varied lifecycles involving humans, animals, and vectors. Arboviruses like Japanese Encephalitis (JE) and Zika are maintained in zoonotic cycles between animals and mosquitoes, with humans often being incidental hosts. Leptospirosis is a bacterial zoonosis transmitted via contact with water or soil

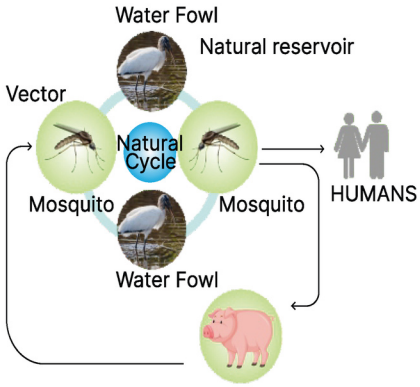
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contaminated by urine of infected animals. Ebola and Nipah are viral zoonoses with bat reservoirs, transmitting to humans through direct contact, animal intermediates, or person-to-person spread. Each has unique host relationships and transmission patterns that determine epidemiology and control strategies.

DETAILED QUESTIONS

Q4.1: Describe the life cycle of the Japanese Encephalitis virus (JEV). Include its reservoir, vectors, and amplifying hosts.

Answer:

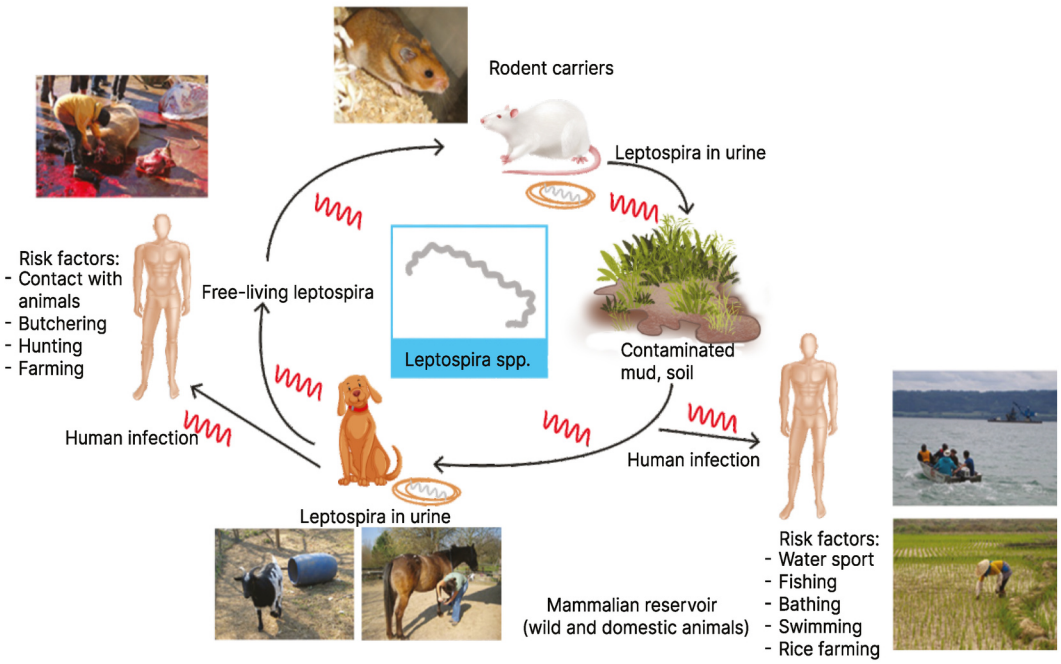


- Reservoir host: Wading birds (e.g., herons, egrets) - maintain the virus in nature.
- Amplifying host: Pigs - develop high viremia, act as major amplifiers.
- Vector: Culex mosquitoes (especially Culex tritaeniorhynchus).
- Dead-end host: Humans (viremia too low to infect mosquitoes).

Q4.2: Describe the life cycle of Leptospirosis

PYQ: INICET 2023

Answer:

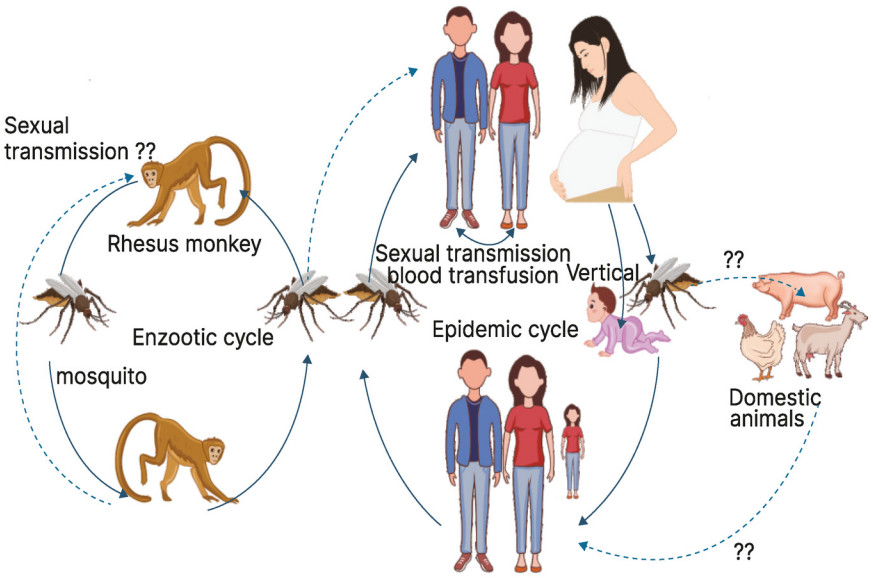


- Reservoir host: Rodents (esp. rats) - carry Leptospira in renal tubules, excrete in urine.
- Environmental phase: Survives in moist soil/water for weeks.
- Accidental hosts: Humans and domestic animals (infected by contact with contaminated water/soil or urine).

Q4.3: Describe the life cycle of zika virus and what are the transmission modes for it

Answer:

- Zika virus transmission can happen through sexual route or vertical
- Mother to child transmission causes Microcephaly in babies

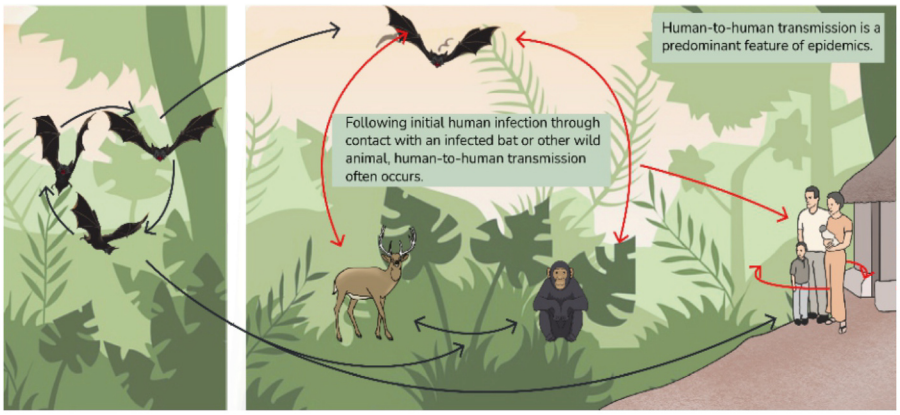


- Reservoir host: Primates (non-human primates).
- Vector: Aedes aegypti and Aedes albopictus mosquitoes.
- Hosts: Humans (major amplifying host in outbreaks).
- Other transmission routes: Sexual transmission, vertical transmission (mother-to-fetus), blood transfusion.

Q4.4: Outline the zoonotic transmission and life cycle of the Ebola virus.

Answer:

- Ebola is Bioterrorism category A
- This can have a CFR up to 90%

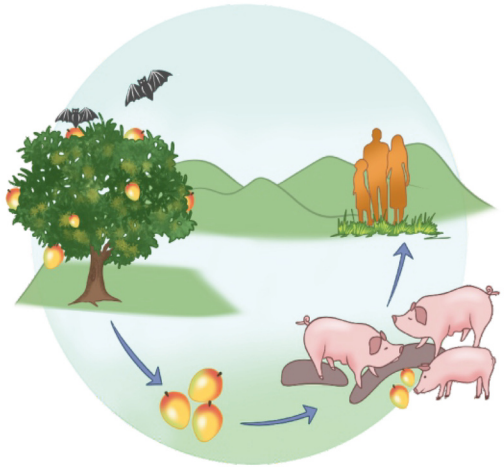


- Reservoir host: Fruit bats (esp. Pteropodidae family).
- Intermediate hosts: Non-human primates (gorillas, chimpanzees) can be infected and spread to humans.
- Accidental host: Humans (via contact with infected body fluids or bushmeat).
- Human-to-human: Direct contact with blood, secretions, contaminated surfaces.

Q4.5 Outline the life cycle of Nipah virus

PYQ: NEET PG 2022

Answer:



- This belongs to bioterrorism category C
- Reservoir host: Fruit bats (Pteropus species).
- Intermediate host: Pigs (amplifying host, outbreaks linked to pig farms).
- Accidental host: Humans (infected by pigs, contaminated fruit, or bat secretions).
- Human-to-human: Documented in outbreaks via respiratory secretions.

20. COMMUNICABLE DISEASES: RESPIRATORY INFECTIONS

BIG QUESTION 1: What are the clinical features, transmission, diagnosis, prevention, and differences between chickenpox and smallpox?

Broad Answer: Chickenpox is caused by the Varicella-Zoster Virus (VZV), presenting as a superficial, pleomorphic rash with centripetal distribution. Transmission occurs via droplets, droplet nuclei, and vertical transmission. It is highly communicable with a secondary attack rate of 90%. Chickenpox must be differentiated from smallpox based on rash characteristics and distribution.

DETAILED QUESTIONS

Q1.1: What is the source of infection, mode of transmission & incubation period of chickenpox?

Answer: PYQ: NEET PG 2023 PYQ: FMGE 2020

Agent	Varicella zoster virus [human (alpha) herpes virus-3]
Source of infection	Case of chicken pox
Period of communicability	1-2 days before and 4-5 days after onset of rash
IP	14-16 days
MOT	Droplet, droplet nuclei, vertical transmission (life threatening if transmitted in 1st trimester)
SAR (measure of communicability of a disease)	90%
Host factor	Age: < 10 years

- **Droplet:** Heavier particle, size >5 micron, travel a distance <1m after falling to the ground PYQ: AIIMS 2020
- **Droplet nuclei:** Smaller particle, size <5 micron, remain suspended in air

Q1.2: What is the clinical presentation of chickenpox rash?

Answer:

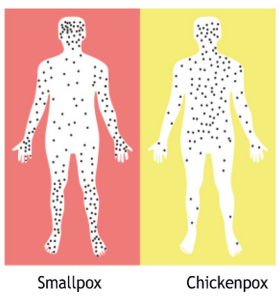


- Signs/ Symptoms:
  - Symmetrical, superficial, pleomorphic (all stages are seen simultaneously at a given time) vesicular rash which looks like a dew drop on a rose petal, centripetal in distribution
  - An area of inflammation around the rash is seen
  - Scabs of rash are not infectious
- Diagnosis: Clinical or RT-PCR

Q1.3: How does chickenpox rash differ from smallpox rash?

Answer:

Feature	Chickenpox	Smallpox
Depth	Superficial	Deep seated
Inflammation	Present around the rash	Absent



Smallpox Chickenpox

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Distribution	Centripetal	Centrifugal
Palms & soles	Usually spared	Not spared

Q1.4: What are the common complications of chickenpox?

Answer:

- Varicella pneumonia is the most common complication in neonates, adults, and immunocompromised individuals
- Can lead to pneumonia-related deaths

Q1.5: What is the chickenpox vaccine schedule and strain?

Answer:

- Live vaccine
- Oka strain
- Not a part of the National Immunization Schedule
- Two dose schedules of 0.5ml by S.C. route with an interval of either 6 weeks or 3 months for children between 12 months to 12 years of age
- For adolescents and adults (>13 years): 2 doses of 0.5ml S.C. each with an interval of 4 to 6 weeks

Q1.6: What is VZIG, and who should receive it?

Answer:

- Varicella Zoster Immunoglobulin (VZIG) is given within 72 hours of exposure for the prevention of chickenpox in exposed individuals
- Indications:
  - HIV/AIDS or immunocompromised persons
  - Immunosuppressive therapy patients
  - Congenital cellular immunodeficiency
  - Pregnant females, early neonates, and premature infants of low birth weight
- Dose: 12.5 units/kg (max 625 units); repeat dose in 3 weeks in high-risk patients who remains exposed

BIG QUESTION 2: What are the clinical features of measles?

Broad Answer: Measles is a highly contagious RNA virus infection caused by a paramyxovirus. It presents with retroauricular confluent maculopapular rash, preceded by Koplik spots. It is transmitted by droplets and droplet nuclei.

DETAILED QUESTIONS

Q2.1: What is the causative agent and the key epidemiological features of measles?

Answer:

Agent	RNA paramyxovirus (only one serotype is known) **Does not follow iceberg phenomenon**
Source of infection	Case of measles, no carrier
Period of communicability	4 days before and 5 days after onset of rash
IP	10- 14 days
MOT	Droplet, droplet nuclei

SAR (Measure of communicability of a disease)	80%
Host factor	Age: 6 months- 3 years

Q2.2: What are the clinical features and complications of measles?

Answer:

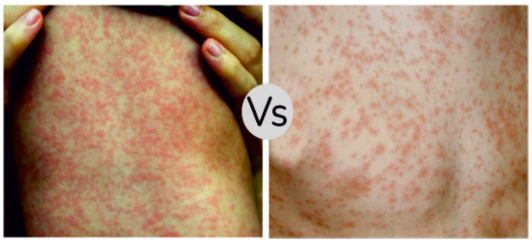


- Rash:
  - o Confluent maculopapular rash
  - o Retroauricular in origin
  - o Koplik spot:
    - → Appears prior to the rash (before 48 hours of the eruption of rash)
    - → Formed on the buccal mucosa opposite to the lower 2nd molar
- Complications:
  - o Otitis media (most common in young children)
  - o Pneumonia (most common cause of death)
  - o SSPE (subacute sclerosing panencephalitis) - a rare long-term complication
- Diagnosis: Clinical

PYQ: FMGE 2021
PYQ: NEET PG 2020
PYQ: INICET 2023

Q2.3: How can measles rash be differentiated from rubella rash?

Answer:

Measles rash	Rubella rash
	
• Rash is maculopapular	• Rash is maculopapular
• Confluent rash	• Discrete rash or non-confluent rash (25% of rubella will be presented without rash)

Q2.4: What is the schedule and dosing of the measles vaccination?

Answer:

- Vaccine: Live attenuated measles vaccine
- Given as: MR vaccine at 9 months and 16-24 months
- Route & dose: 0.5 ml subcutaneously in the right arm

Q2.5: What is the role of immunoglobulin in measles prevention?

Answer:

- Dose: 0.25 ml/kg body weight
- Given within 3-4 days of exposure (early incubation period)
- Live vaccine should be given 8-12 weeks later
- Measles immunoglobulin and vaccine cannot be given together – a 12-week gap must be maintained

Q2.6: What are the outbreak control measures for measles?

Answer:

- Isolation: For 7 days after rash onset
- Susceptible contacts (9-12 months) may be protected by giving measles vaccine within 3 days of exposure
- Measles vaccine can be given between 6-9 months in case of an outbreak and PEM
- Seroconversion rate of vaccine is faster than natural incubation period of the disease, antibodies are formed within 7-10 days

Q2.7: What is the WHO strategy for measles elimination?

Answer:

- Catch up, Keep up, Follow up' Strategy:
  - Catch up: Nationwide campaign vaccinating all children 9 months-14 years, irrespective of history of measles or vaccination status
  - Keep up: Routine immunization to cover >95% of each successive birth cohort
  - Follow-up: Repeated vaccination campaigns every 2-4 years for children born after catch up campaign

Q2.8: Which diseases are transmitted by droplet infection?

Answer:

- Measles
- Chickenpox
- Influenza
- COVID-19
- Tuberculosis

Q2.9 Which diseases do not follow the iceberg phenomenon?

Answer: Mnemonic - **MTR**

- Measles
- Tetanus
- Rabies

BIG QUESTION 3: What are the clinical features, transmission, complications, prevention, and vaccination strategy for Rubella?

Broad Answer: Rubella is a mild viral illness caused by an RNA virus from the Togavirus family. It is transmitted by droplets and vertical transmission. Though often asymptomatic, especially in children, rubella poses a high risk of congenital rubella syndrome (CRS) when infection occurs during early pregnancy. Vaccination using the live RA27/3 strain is the key preventive measure, especially targeting women of childbearing age and children.

DETAILED QUESTIONS

Q3.1: What is the causative agent and transmission route of rubella?

Answer:

- Agent: RNA virus, Togavirus family, only one antigenic variant
- Source: Clinical or subclinical cases
- Incubation period (IP): 14-21 days
- Period of communicability: 1 week before symptoms to 1 week after rash onset

- Mode of transmission:
  - Droplet
  - Vertical transmission (mother to fetus)
- Secondary Attack Rate (SAR): 80%
- Common age group: 3-10 years

Q3.2: What are the clinical features of rubella?

Answer:

- Maculopapular discrete rash starting from the face
- Mild illness
- 3-day fever
- 25% infections manifest without rash

Q3.3: What is the most serious complication of rubella?

Answer:

- Congenital Rubella Infection (CRI):
  - 90% infections occur during first trimester of pregnancy
- Congenital Rubella Syndrome (CRS) Triad:
  - Congenital cataract
  - Congenital heart disease (PDA)
  - Sensorineural hearing loss (SNHL)

Q3.4: What are the features of the rubella vaccine?

Answer:

- Type: Live attenuated vaccine
- Strain: RA27/3
- Precaution: Avoid pregnancy for 1 month after vaccination

Q3.5: What is the rubella vaccination strategy?

Answer:

1. 1st Priority: Vaccinate women of childbearing age (15-34 or 15-39 years)
2. 2nd Priority: Interrupt transmission by vaccinating all children 1-14 years
3. 3rd Priority: Routine immunization of all children <1 year via MR or MMR vaccine

BIG QUESTION 4: What are the types of influenza and how is it transmitted?

Broad Answer: Influenza is an acute respiratory illness caused by RNA viruses, primarily Influenza A and B, which are responsible for epidemics, while antigenic shift in type A may lead to pandemics. Transmission occurs via droplets and airborne particles, with an incubation period of 1-3 days.

DETAILED QUESTIONS

Q4.1: What is the period of communicability of influenza?

Answer: Period of communicability: 1-2 days before and after the onset of symptoms

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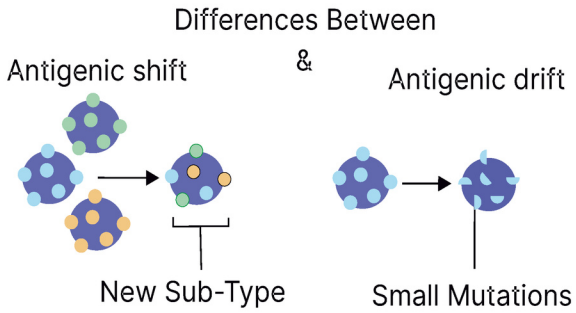
Q4.2: What is the drug of choice for influenza?

Answer: Oseltamivir

Q4.3: What is the difference between antigenic drift and antigenic shift in influenza?

Answer:

Feature	Antigenic Drift	Antigenic Shift
Type of change	Minor changes (Within subtype)	Major changes (New subtype)
Mechanism	Point mutations	Exchange of gene segments
Subtypes affected	Occurs in A and B subtypes	Occurs in A subtype only
Consequence	Causes epidemics	Causes pandemics
Example	A/Fujian (H3N2) replaced A/Panama (H3N2) in 2003-04	H3N2 replaced H2N2 in 1968



PYQ: NEET PG 2020

BIG QUESTION 5: What is the epidemiology of mumps?

Broad Answer: Mumps is a contagious viral illness caused by an RNA virus from the Myxovirus family, commonly affecting 5-9-year-old children. It spreads via droplet transmission, has a high secondary attack rate (86%), and may be subclinical in up to 40% of cases.

DETAILED QUESTIONS

Q5.1: What is the incubation period and period of communicability of mumps?

Answer:

- Incubation Period (IP): 2-4 weeks
- Period of communicability: From 4-6 days before to 7 days after the onset of swelling

Q5.2: What are the clinical features of mumps?

PYQ: FMGE 2021

Answer:

- Subclinical cases: 30-40%
- Typical signs:
  - Pain and swelling of one or both parotid glands
  - Earache on the affected side before the onset of swelling
  - Pain/stiffness in mouth opening before swelling appears



Q5.3: What are the common complications of mumps?

Answer:

- Children: Aseptic meningitis

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- Adolescents:
  - Orchitis (males)
  - Oophoritis (females)

Q5.4: What is the vaccination schedule and formulation for mumps?

Answer:

- Type: Live attenuated vaccine
- Dose: 0.5 ml IM
- Schedule:
  - 1st dose: After 1 year of age (alone or with MMR/MMRV)
  - 2nd dose: At 4-6 years, before starting school

BIG QUESTION 6: How is ARI and pneumonia managed in children under 5 years as per IMNCI guidelines?

Broad Answer: According to the IMNCI (Integrated Management of Neonatal and Childhood Illness) guidelines, pneumonia in children aged 0-5 years is managed through age-specific classification and color-coded treatment protocols.

DETAILED QUESTIONS

Q6.1: What are the five diseases managed under IMNCI for under-5 children?

Answer:

1. Pneumonia (ARI)
2. Diarrhea
3. Measles
4. Malaria
5. Malnutrition

Q6.2: How are children categorized by age in IMNCI?

Answer:

- Group 1: Up to 2 months
- Group 2: 2 months to 5 years

Age up to 2 months	Age up to 2 months to 5 years
• No chest indrawing and/or fast breathing ↓ No Pneumonia	• No chest indrawing and/or fast breathing ↓ No Pneumonia
• Chest indrawing and/or fast breathing ↓ Severe Pneumonia	• Chest indrawing and/or fast breathing ↓ Pneumonia
• If baby shows danger signs: o Stridor in a calm child o Lethargy o Convulsions	• If baby shows danger signs: o Stridor in a calm child o Lethargy o Convulsions

o High grade fever o Inability to drink/breastfeed o Vomiting o Cyanosis ↓ Very Severe Pneumonia	o High grade fever o Inability to drink/breastfeed o Vomiting o Cyanosis ↓ Severe Pneumonia

Q6.3: What is the IMNCI color-coded classification system for pneumonia?

Answer:

Color Code	Meaning	Management
Green	No pneumonia	Home care
Yellow	Pneumonia	Medical/OPD treatment
Pink	Severe or Very Severe Pneumonia	Urgent referral to CHC

Q6.4: What are the threshold for fast breathing in children with pneumonia according to IMNCI?

Answer:

- Fast breathing: Rule of 60, 50, 40

Age Group	Respiratory Rate Threshold
Up to 2 months	>60 breaths/min
2-12 months	>50 breaths/min
1-5 years	>40 breaths/min

Q6.5: What are the danger signs indicating severe or very severe pneumonia?

Answer:

- Stridor in a calm child
- Lethargy
- Convulsions
- High-grade fever
- Inability to drink or breastfeed
- Vomiting
- Cyanosis

Q6.6: What is the management for pneumonia in children?

Answer:

	Age up to 2 months	Age up to 2 months to 5 years
No Pneumonia	• Symptomatic home management. • Green color is assigned	• Symptomatic home management • Green color is assigned
Severe Pneumonia/ Pneumonia	• Give first dose of antibiotic (Amoxicillin syrup) • Keep the baby warm • Pink color is assigned • Refer to CHC (pediatrician)	• Give first dose of antibiotic (Amoxicillin syrup) • Keep the baby warm • Sent home- return to follow up in 2 days • Yellow color is assigned

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Very Severe Pneumonia/ Severe Pneumonia	• Pink color is assigned • Give first dose of antibiotic (Amoxicillin syrup) • Advice mother to keep baby warm. • Refer to CHC	• Pink color is assigned • Give first dose of antibiotic (Amoxicillin syrup) • Advice mother to keep baby warm. • Refer to CHC

Q6.7: A child aged 24 months was brought to the PHC with complaints of cough and fever for the past 2 days. On examination, the child weighed 11 kgs, respiratory rate was 38/ min, and chest drawing was present. The most appropriate line of management for this patient is:

A. Classify as pneumonia and refer urgently to a secondary level hospital

B. Classify pneumonia, start antibiotic and advice to report after 2 days

C. Classify as severe pneumonia, start antibiotics and refer urgently

D. Classify as severe pneumonia and refer urgently

Answer: B. Classify pneumonia, start antibiotic and advice to report after 2 days

- Average birth weight of Indian babies: 2.8 kgs
- Weight doubles by 5 months, triples by 1 year and quadruples by 2 years
- Here, the weight of the child according to age is adequate
- If the weight was reduced, the child would have been categorized as malnourished and referral to CHC would be the best option

BIG QUESTION 7: What is diphtheria, and how is it transmitted?

Broad Answer: Diphtheria is an acute bacterial disease caused by Corynebacterium diphtheriae, a gram-positive, non-motile bacterium, mainly affecting children aged 1-5 years. The primary source of infection is chronic carriers, especially nasal carriers, accounting for 95% of disease transmission. It is spread through droplet infection and healthy carriers.

DETAILED QUESTIONS

Q7.1: What are the sources of infection and how common are carriers?

Answer:

- Source of infection: Cases, subclinical cases, carriers
- Carriers:
  - Account for 95% of transmission
    → Carrier:Case ratio = 95:5
  - Nasal carriers are more dangerous than throat carriers
  - Incidence of carriers in community: 0.5-1%
  - Immunization does not prevent carrier state

Q7.2: What is the incubation period and period of communicability of diphtheria?

Answer:

- Incubation period (IP): 2-6 days
- Communicable period: From infection to 14-28 days after

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Q7.3: What are the clinical features of diphtheria?

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Answer:

- Pseudomembrane formation:
  - Grayish-yellow, over tonsils, pharynx, or larynx
  - Well-defined edges
  - Cannot be wiped off
  - Bleeds if forcibly removed
  - Composed of: bacterial growth + toxin + necrosis + host immune response
- Bull's neck appearance

Q7.4: What is the treatment for diphtheria?

Answer:

- Vaccine and immunoglobulin can be given together
- Diphtheria antitoxin (DAT):
  - Given IM/IV after preliminary test dose (0.2 ml SC)
  - Mild disease: 20,000-40,000 units
  - Moderate disease: 40,000-60,000 units
  - Severe disease: 80,000-100,000 units
- Antibiotics:
  - Erythromycin or Penicillin for 5-6 days
  - Carriers: Oral erythromycin for 10 days

Q7.5: How are contacts managed in diphtheria?

Answer:

- If fully vaccinated within 5 years: No vaccine needed
- If >5 years since last dose (but full three doses received): Give 1 booster
- If <3 doses or unknown status: Complete primary vaccination
- Isolation until 2 throat cultures taken 24 hours apart are negative

Q7.6: What is the immunization schedule for diphtheria prevention?

Answer:

- Pentavalent:
  - DPT vaccine
  - Pentavalent given at 6,10 and 14 weeks
  - DPT 1st booster: 16-24 months
  - DPT 2nd booster: 5-6 years
  - DPT can be given till 7 years

BIG QUESTION 8: What is the transmission and epidemiology of pertussis?

Broad Answer: Pertussis, commonly known as whooping cough, is a highly contagious respiratory disease caused by Bordetella pertussis and rarely by B. parapertussis (5%). It affects mostly infants and preschool children, with a >90% secondary attack rate (SAR). Transmission occurs via droplet infection and direct contact. Active cases are the source of pertussis.

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DETAILED QUESTIONS

Q8.1: What is the incubation period and period of communicability of pertussis?

Answer:

- Incubation Period (IP): 7-14 days
- Period of Communicability: From 1 week after exposure to about 3 weeks after onset of paroxysmal stage

Q8.2: What is the drug of choice for pertussis and for contact prophylaxis?

Answer:

- Drug of choice (DOC):
  - Erythromycin 30-50 mg/kg/day, QID for 10 days
- Contact prophylaxis:
  - Erythromycin or Ampicillin for 10 days

SUMMARY

Disease	IP	POC	Causative Agent
Measles	10-14 days	4 days before rash to 5 days after rash	RNA paramyxovirus
Chickenpox	14-16 days	1-2 days before rash to 4-5 days after rash	Human herpes virus 3
Rubella	14-21 days	1 week before rash to 1 week after rash	RNA togavirus
Influenza	18 hour- 72 hours	1-2 days before symptoms to 1-2 days after	Orthomyxovoirus
Diphtheria	2-6 days	Symptoms to 14-28 days	C. diphtheriae
Pertussis	7-14 days	1 week after exposure to 3 weeks after symptoms	Pertussis
Meningococcal meningitis	3-4 days	1-2 days before symptoms to 1-2 days after	N. meningitidis

21. COMMUNICABLE DISEASES ZOONOTIC DISEASES/ SURFACE INFECTIONS/INTESTINAL INFECTIONS/STD

BIG QUESTION 1: What is Plague and how is it transmitted, diagnosed, and prevented?

Broad Answer: Plague is a zoonotic communicable disease caused by *Yersinia pestis*. It is transmitted through wild rodents and rat fleas, and presents in bubonic and pneumonic forms. Pneumonic plague is highly fatal, while diagnosis and rapid control of vectors are key to prevention. Vaccination and quarantine measures are used for public health containment.

DETAILED QUESTIONS

Q1.1: What is the causative agent and reservoir of Plague?

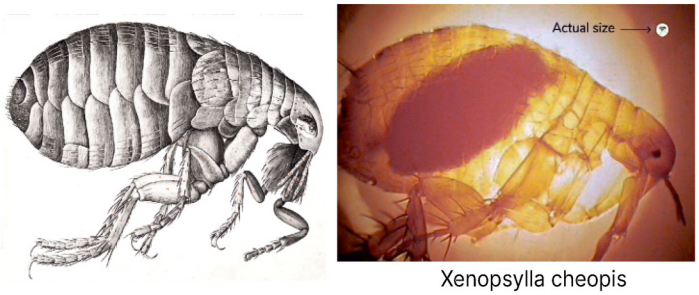
Answer:

- **Agent:** *Yersinia pestis*
- **Reservoir:** Wild rodents, especially *Tatera indica*

Q1.2: What is the vector and how does it contribute to plague transmission?

Answer:

- **Vector:** Rat flea (*Xenopsylla cheopis*)
- Each flea can carry up to 5000 plague bacilli in 0.5 cu mm of blood
- **Cheopis index:** Average number of fleas per rat; a value >1 indicates an explosive epidemic potential



Xenopsylla cheopis
(oriental rat flea) engorged with blood

Q1.3: What are the sources of infection and incubation periods?

Answer:

- **Sources:**
  - Infected rodents
  - Fleas
  - Pneumonic plague cases
- **Incubation Period (IP):**
  - Septicemic/ Bubonic plague 2-7 days
  - Pneumonic plague 1-3 days

Q1.4: What are the clinical forms of plague and their severity?

Answer:

- **Most common:** Bubonic plague
- **Most dangerous:** Pneumonic plague
  - Has a case fatality rate (CFR) of 100%

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Q1.5: How is plague diagnosed in clinical and laboratory settings?

Answer:

- **Wayson's staining:** Bipolar appearance of the bacteria
- **Gold standard:** Blood culture

Q1.6: What is the treatment protocol for plague, including isolation and drugs?

Answer:

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- **Isolation:** Essential for pneumonic plague
- **Drugs of Choice (DOC):**
  - Streptomycin
  - Tetracycline (also used for chemoprophylaxis)

Q1.7: What is the available vaccine for plague and how is it administered?

Answer:

- **Name:** Haffkine Sokhey vaccine
- **Schedule:**
  - 2 doses
  - Given at least 1 week before exposure
  - Can be used in large doses during an epidemic

Q1.8: What are the public health control measures for plague?

Answer:

- **Vector control:** Flea index should be brought to zero within 48 hours of outbreak
- **Quarantine period:** 40 days
- **Plague** is a **notifiable disease** under public health law

BIG QUESTION 2: What is Rabies and how is it transmitted, diagnosed, and prevented?

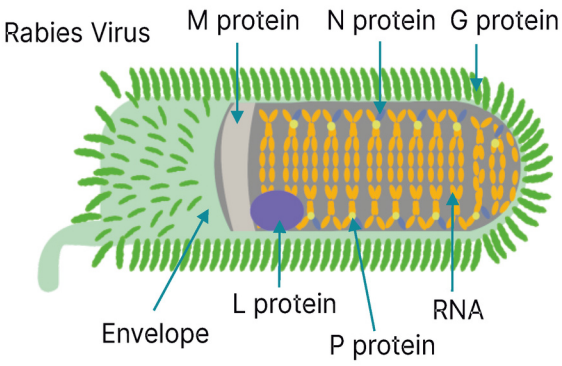
Broad Answer: Rabies is a fatal zoonotic viral disease caused by the Lyssavirus Type 1. It is transmitted through animal bites, scratches, or licks, with saliva being the main infective material. Diagnosis includes the identification of Negri bodies postmortem or antigen detection during life. Prevention involves immediate wound care, vaccination, and immunoglobulin administration.

DETAILED QUESTIONS

Q2.1: What is the etiology and reservoir of Rabies?

Answer:

- **Etiologic agent:** Lyssavirus Type 1 (bullet-shaped RNA virus)
- **Types:**
  - Street virus (natural)
  - Fixed virus (Used for vaccine preparation)
- **Reservoir:** Wild animals
- **Source of infection:** Saliva of a rabid animal



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Q2.2: What is the incubation period, secondary attack rate, and fatality rate of rabies?

Answer:

- **Incubation period:** 3-8 weeks
- **Secondary Attack Rate (SAR):** 0%
- **Case Fatality Rate (CFR):** 100%

Q2.3: Which states and countries are rabies-free?

Answer:

- **India:** Goa, Andaman & Nicobar Islands, Lakshadweep
- **Countries:** Australia, United Kingdom

Q2.4: How is rabies diagnosed?

Answer:

- **Postmortem:**
  - Negri bodies (intracytoplasmic eosinophilic inclusions) PYQ: FMGE 2022
  - Sites:
    - → 1st: Ammon's horn of hippocampus
    - → 2nd: Cerebellum
- **In living person:**
  - Skin biopsy from nape of neck
  - Viral antigen detection by fluorescent antibody test

Q2.5: What are the modes of rabies transmission?

Answer:

- **Animal bites:** Dogs, cats, monkeys, cattle, sheep, horses
- **Licks:** On abraded skin or mucosa (even unabraded)
- **Others:**
  - Aerosols rabies infected bats (not reported in india)
  - Person to person
  - Organ transplantation

Q2.6: How are exposures to rabid animals classified?

Answer:

Category	Exposure	Post-exposure Prophylaxis
Category I	Touching/feeding animals, licks on intact skin	None
Category II	Nibbling, minor scratches/abrasions without bleeding	Local wound care + Anti-rabies vaccine
Category III	Transdermal bites/scratches with bleeding, mucosal contamination with saliva from licks & licks on broken skin	Wound care + Vaccine + Rabies Immunoglobulin

Q2.7: What is the wound management protocol in rabies prevention?

Answer:

- **Physical:** Wash with running tap water → mechanical removal of virus
- **Chemical:** Soap wash and application of disinfectant → virus inactivation
- **Biological:** Infiltrate immunoglobulin in the depth and around the wound in category III exposures → virus neutralization

Q2.8: What is the vaccination protocol for Rabies?

Answer:

- **Post-exposure prophylaxis (PEP):**
  - **Updated THAI Red Cross regimen (Intradermal):**
    → 0.1 ml at 2 sites on Days 0, 3, 7, 28
  - **ESSEN regimen (Intramuscular):**
    → 0.5 ml at 1 site on Days 0, 3, 7, 14, 28
- **Re-exposure prophylaxis:**
  - If within 3 months: No need
  - If after 3 months: 2 doses on Day 0 and 3 (ID/IM)
- **Pre-exposure prophylaxis:**
  - For high-risk individuals (e.g., veterinarians)
  - 3 doses (Day 0, 7, 21/28)
  - Repeat booster every 2 years

Important Information

- Vaccines are given:
  - Adults: Deltoid muscles
  - Infants and children: Antero lateral aspect of the thigh
- In India, we accept the Thai regimen.
- Day 0 is the first day when the vaccine is taken

Q2.9: When and how is Rabies Immunoglobulin (RIG) used?

Answer:

- Given for **Category III** exposure
- Types:
  - **Equine RIG:** 40 IU/kg (50% in wound, 50% IM)
  - **Human RIG:** 20 IU/kg, max 70% in wound, rest IM (Gluteal/Nearby site)
  - Used even for Category II in **immunocompromised patients (e.g., HIV)**

Q2.10: What are the additional public health strategies for rabies control?

Answer:

- Dog population control: vaccination, registration, licensing
- Population control of stray dogs & vaccinating all dogs
- Registration & licensing of domestic dogs
- Quarantine for 6 months of imported animals
- Public education: dog care, wound hygiene, early reporting
- Immediate destruction of cats and dogs bitten by rabid animals
- Rabies vaccine sites:
  - **Adults:** Deltoid
  - **Children/Infants:** Anterolateral thigh

Rabies Case Scenarios and Explanation:

Q2.11: A patient comes with a history of category 3 dog bites. He received prophylaxis for a monkey bite 6 months back. What is the next step in management?

A. Wound cleaning only
B. Wound cleaning + rabies vaccine on day 0 & 3
C. Wound cleaning + rabies vaccine on day 0, 3 & 7
D. Wound cleaning + IM vaccine + RIG

Answer: B - Wound cleaning + rabies vaccine on day 0 & 3

Explanation:

- Since it has been more than 3 months 2 doses given on day 0,3.
- Re-exposure prophylaxis:
  - If within 3 months: No need
  - If after 3 months: 2 doses on Day 0 and 3 (ID/IM)

Q2.12: An urban area has higher number of rabies cases. Most cost effective and logical approach of controlling Rabies is

A. Testing all dogs for rabies
B. Reduce stray dogs and vaccinate all dogs
C. Providing more laboratory facilities
D. Building cooperation among health workers and capacity building for surveillance

Answer: B. Reduce stray dogs and vaccinate all dogs
Explanation: The most sustainable and cost-effective method to control rabies in urban areas is to target the source — stray dogs. This includes mass vaccination and reducing their numbers, both of which are evidence-based strategies supported by WHO for long-term rabies elimination.

BIG QUESTION 3: What are Rickettsial Diseases and how are they classified, transmitted, and managed?

Broad Answer: Rickettsial diseases are zoonotic infections caused by obligate intracellular bacteria, transmitted through arthropod vectors like lice, ticks, fleas, and mites. They are classified into various groups including typhus, rocky mountain spotted fever, scrub typhus, and others like Q fever. Diagnosis is clinical and serological, and doxycycline is the treatment of choice & also used for prophylaxis.

DETAILED QUESTIONS

Q3.1: How are Rickettsial diseases classified and what are their vectors and hosts?

Answer:

Disease Type	Agent	Vector	Mammalian Host
Epidemic typhus	*R. prowazekii*	Louse	Humans
Murine typhus (Endemic)	*R. typhi*	Flea	Rodents
Indian tick typhus	*R. conorii*	Tick	Rodents, dogs
Rocky Mountain SF	*R. rickettsii*	Tick	Rodents, dogs
Rickettsial pox	*R. akari*	Mite (trombiculid)	Mice
Scrub typhus	*O. tsutsugamushi*	Mite (chigger)	Rodents
Q fever	*C. burnetii*	None in India	Cattle, sheep, goats
Trench fever	*R. quintana*	Louse	Humans

Q3.2: What are the features of scrub typhus?

Answer:

- Caused by *Orientia tsutsugamushi*
- **Characteristic feature:** Eschar - black scab at bite site

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- Transmitted by chigger mites
- Reservoir: Rodents

Q3.3: What is the drug of choice for rickettsial diseases?

Answer: **Doxycycline** is the drug of choice for both treatment and chemoprophylaxis

BIG QUESTION 4: What are Leptospirosis, Brucellosis, and Kyasanur Forest Disease (KFD) and how are they diagnosed, treated, and prevented?

Broad Answer: These are important zoonotic diseases seen in India, each caused by distinct bacterial or viral agents. They share features such as fever, systemic involvement, and animal reservoirs, but vary in their diagnostic techniques, severity, and prevention strategies.

DETAILED QUESTIONS

Q4.1: What are the causative agents, vectors, and reservoirs for Leptospirosis, Brucellosis, and KFD?

Answer:

Disease	Agent	Vector	Reservoir
Leptospirosis	*Leptospira interrogans*	Urine of infected rats	Monkey, rat, squirrel
Brucellosis	*Brucella mellitensis*	Foodborne, airborne	Domestic animals
KFD	Group B arbovirus	Hard tick - India Soft tick - Others	Monkey, rat, squirrel

Q4.2: What are the clinical features of these diseases?

Answer:

- **Leptospirosis:**
  - Mild: Fever, chills, myalgia, conjunctivitis, headache
  - Severe: Jaundice, renal failure, CV collapse
- **Brucellosis:**
  - Acute: Swinging fever, sweating, arthralgia, headache
  - Chronic: Recurrent episodes for long time
- **KFD:**
  - Sudden onset fever, headache, myalgia, bleeding from skin, mucosa, viscera

Q4.3: How are these diseases diagnosed?

Answer:

- **Leptospirosis:**
  - Detection of *Leptospira* in urine or blood
  - Serological tests
- **Brucellosis:**
  - Rose Bengal test
  - Milk ring test
  - RT-PCR for bacterial confirmation
- **KFD:**
  - Viral isolation by RT-PCR
  - Serological tests

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Q4.4: What are the treatment options for these diseases?

Answer:

- **Leptospirosis:**
  - Mild: Doxycycline
  - Severe: Penicillin
- **Brucellosis:** Doxycycline (DOC)
- **KFD:** Supportive treatment only

Q4.5: How can these diseases be prevented?

Answer:

- **Leptospirosis:** Chemoprophylaxis with Doxycycline
- **Brucellosis:** Live vaccine (for animals)
- **KFD:** Killed vaccine
- **Additional note:** Leptospirosis is commonly reported post-flooding or after water exposure activities like swimming/rafting

BIG QUESTION 5: What are the key surface infections, their features, and prevention strategies?

Broad Answer: Surface infections like trachoma and tetanus are preventable communicable diseases with significant morbidity. Trachoma, caused by *Chlamydia trachomatis*, leads to blindness if untreated. Tetanus, caused by *Clostridium tetani*, causes muscle rigidity due to neurotoxin release. Proper hygiene, antibiotic therapy, and immunization are the mainstays of prevention and treatment.

DETAILED QUESTIONS

Q5.1: What are the key features of Trachoma and its management?

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Answer:

- **Causative agent:** *Chlamydia trachomatis* (serotypes A, B, C)
- **Incubation period:** 5-12 days
- **Age group affected:** 0-10 years (avg. 2-5 years)
- **Consequence:** Leading cause of preventable adult blindness
- **Drug of choice:** Azithromycin 20 mg/kg oral single dose

Q5.2: How can Trachoma be prevented?

Answer:

- **SAFE Strategy:**
  - **S:** Surgery
  - **A:** Antibiotics - Tetracycline ointment, Azithromycin
  - **F:** Facial cleanliness
  - **E:** Environmental cleanliness
- **GET Strategy:** Also part of broader prevention campaigns

Q5.3: What is the another name of tetanus, agent, IP, reservoir & mechanism of tetanus?

Answer:

- **Incubation period:** 6-10 days
- **Also known as:** 8th day disease (in neonates)

- **Agent:** Clostridium tetani
- **Reservoir & source:** Soil
- **Mechanism:** Neurotoxin blocks inhibitory spinal reflex → muscle spasm

Q5.4: How is Tetanus treated and prevented?

Answer:

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- **Treatment:**
  - Drug of choice: Penicillin
  - Tetanus immunoglobulin: 250 IU (Human TIG)
- **Prevention:**
  - Pre-exposure prophylaxis: Tetanus toxoid immunization
  - Goal: Maintain antitoxin > 0.01 IU/ml
  - In NIS: Total of 7 doses

Q5.5: What are the strategies and criteria for neonatal tetanus elimination?

Answer:

- **Strategy:** "5 cleans" of safe delivery
  - Clean surface
  - Clean hands
  - Clean cord cut
  - Clean cord
  - Clean cord stump
- **Criteria:**
  - <1 case per 1000 live births
  - 90% immunization coverage
  - 75% attended deliveries

Q5.6: What is the wound management protocol for Tetanus based on immunization history?

Answer:

Category	Immunization Status	Clean Wound	Unclean Wound
A	Fully immunized within 5 years	Only wound care	Only wound care
B	Fully immunized >5 years but <10	Wound care + TT single dose	Wound care + TT single dose
C	Fully immunized >10 years	Wound care + TT single dose	Wound care + TT single dose + Human TIG
D	Unknown or never immunized	Wound care + full TT course	Wound care + full TT course + Human TIG

Q5.7: A 40 yr old male presents to the emergency department with a crush injury on his leg. He says he had received a last dose of Tt vaccination at the age of 33. What is the preferred treatment of choice in this patient?

A. Only wound care
B. Wound care with single dose of tetanus toxoid
C. Wound care with full course of Tt vaccine
D. Wound care with tetanus Ig and Tt vaccine

Answer: B. Wound care with single dose of tetanus toxoid

Explanation: Crush injury falls under unclean wound category and since the last dose of vaccine is received > 5 years & < 10 years, wound care and single dose of TT is given.

BIG QUESTION 6: What are the major intestinal infections and how are they diagnosed, treated, and prevented?

Broad Answer: Intestinal infections such as poliomyelitis, typhoid, cholera, and hepatitis are common in India and are transmitted mainly through the fecal-oral route. These diseases have distinct clinical features, diagnostic methods, treatment protocols, and prevention strategies including immunization, chemoprophylaxis, and sanitation.

DETAILED QUESTIONS

Q6.1: What are the types of polio, agent & how is it diagnosed?

Answer:

- **Agent:** Poliovirus (Serotypes 1, 2, 3)
  - Type 1: Most common for natural epidemics; most difficult to eradicate
  - Type 2: Most antigenic; eradicated (CVDPV risk)
  - Type 3: Associated with VAPP; eradicated
- **Diagnosis:**
  - **Stool examination:** Isolation of virus is gold standard
  - Virus present in feces for <8 weeks post-paralysis; best detection in first 2 weeks
- **Recommended in all AFP (Acute Flaccid Paralysis) cases**

Q6.2: What are the clinical forms of Polio infection?

Answer:

Form	Frequency	Remarks
Inapparent/Subclinical	95%	Detected only by antibody titers
Abortive polio	4-8%	Mild illness
Non-paralytic polio	1%	Aseptic meningitis
Paralytic polio	<1%	Descending asymmetric flaccid paralysis

Q6.3: What are the characteristics of different types of hepatitis viruses?

Answer:

Type	Virus	Route of Transmission	IP	Key Feature
A	Enterovirus	Feco-oral, needles, sexual	10-50 days	Viral hepatitis, acute
B	Hepadnavirus	Sexual Needles & syringes Blood & parenteral	30-180 days	Serum hepatitis, chronic carrier
C	Hepacivirus		2 wks-6 months	Chronicity, liver cancer
D	Viroid-like		30-90 days	Seen with HBV coinfection
E	Calicivirus	Feco-oral	3-8 weeks	Fulminant hepatitis in pregnancy

- **Hepatitis B:**
  - **Vaccine:** Recombinant subunit vaccine (HbsAg based)
  - **Post-exposure:** If anti-HBs <10 IU/ml give **HBIG + Hep B vaccine**

Q6.3.1: Intern had a prick from positive hepatitis B patient. Anti HBs values were <10 IU/ml of the intern while patient was HBsAg positive. Next line of management will be?

A. 1 dose of HBIG and be vaccinated asap
B. 1 dose of hep B vaccine
C. 1 dose of HBIG and 1 dose of hep B vaccine
D. No post exposure HBV management is necessary

Answer: C. 1 dose of HBIG and 1 dose of hep B vaccine
Explanation: Post-exposure prophylaxis in a healthcare worker with anti-HBs <10 IU/mL after a needle prick from an HBsAg positive patient requires both passive immunization (HBIG) and active immunization (Hepatitis B vaccine) to prevent infection.

Q6.4: What is Typhoid and how is it diagnosed and treated?

Answer:

- **Agent:** *Salmonella typhi* (G-ve, motile, flagellated)
- **Antigens:** O (somatic), H (flagellar), Vi (capsular)
- **Transmission:** Feco-oral route
- **Reservoir:** Humans (only)
- **Carriers:**
  - Convalescent: 6-8 weeks shedding
  - Chronic: >1 year shedding

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- **Diagnosis:**
  - O antibody (Day 6-8), H antibody (Day 10-12)
  - Rapid serological test: Tubex, Typhi dot (IgM/IgG detection)
- **Treatment:**
  - Isolation: Till 3 -ve stool/urine culture obtained on 3 diff days
  - DOC: Cefixime
  - Resistant cases: Ceftriaxone, Azithromycin
  - Carriers: Ampicillin/Amoxicillin + Probenecid; best = Cholecystectomy + Ampicillin
- **Disinfection:** 5% cresol

Important Information

- 1st week, Blood culture (most sensitive)
- 2nd week, Antibodies sensitive (Widal test)
- 3rd week, Stool culture
- 4th week, Urine culture

Q6.5: What is the immunization protocol for Typhoid?

Answer:

Vaccine Type	Route	Age	Doses	Revaccination
Ty21a (oral)	Oral	≥5 years	3 doses (Day 1, 3, 5)	Every 3 years
Vi polysaccharide	SC/IM	>2 years	Single dose	Every 3 years

Q6.6: What are the key features, diagnosis, and treatment of Cholera?

Answer:

- **Agent:** *Vibrio cholerae* O1 (Classical/El Tor) & O139
  - India: Mostly El Tor, Ogawa serotype
- **Transmission:** Feco-oral route via stool/vomitus
- Period of communicability: 8-10 days to weeks/months
- IP: 1-2 days

YOURWISH

- Humans are the only reservoir
- **Carrier Types**: Incubatory, Convalescent, Contact, Chronic
- **Diagnosis**:
  - **Culture**:
    - → McCartney bottles (for transport), VR media
    - → Rectal swab: alkaline peptone water, Cary-Blair medium
    - → Hanging drop prep: "Scintillating movement"
    - → Darkfield: "Shooting stars" appearance
- **Treatment**:
  - Isolation till 2-3 negative cultures
  - ORS + Zinc
  - Adults: Doxycycline
  - Children/Pregnant: Erythromycin/Azithromycin
  - **Chemoprophylaxis**: Tetracycline
  - Disinfection: 5% cresol

Q6.7: What are the available vaccines and control measures for Cholera?

Answer:

- **Vaccines**:
  - Oral killed (monovalent 01/0139): Dukoral
  - Bivalent (01 + 0139): Sanchol, Euvichol
  - Schedule: 2 doses, 1-6 weeks apart; booster after 2 years
- **Most effective control**: Health education
- **Cholera is notifiable under IHR (International Health Regulations)**

BIG QUESTION 7: What are the different types of diarrhea, their clinical patterns, and how are they managed?

Broad Answer: Diarrheal diseases include a spectrum from watery stools to bloody dysentery and persistent diarrhea. Their management revolves around oral rehydration, zinc therapy, continued feeding, and awareness of danger signs. Classification into different types helps guide both home-based and institutional management. Public health strategies such as proper sanitation and rotavirus vaccination reduce incidence.

DETAILED QUESTIONS

Q7.1: How is diarrhea classified by type and duration?

Answer:

- **Acute watery diarrhea**: Commonest form; lasts less than 14 days
- **Persistent diarrhea**: Lasts more than 14 days
- **Dysentery**: Diarrhea with visible blood in stool
- **Chronic diarrhea**: Lasts more than 1 month

Q7.1.1: Most reliable indicator of some dehydration in SAM?

A. Sunken eyes

B. Lethargy

C. Thirst

D. Delayed skin pinch
E. Decreased urine output

Answer: C. Thirst

DEGREES OF DEHYDRATION

Factors	Mild	Moderate	Severe
General condition	Well, alert	Restless, thirsty, irritable	Drowsy, cold extremities, lethargic
Eyes	Normal	Sunken	Very sunken, dry
Anterior fontanelle	Normal	Depressed	Very depressed
Tears	Present	Absent	Absent
Mouth + tongue	Moist	Sticky	Dry
Skin turgor	Slightly decrease	Decreased (1-2 sec)	Very depressed (>3 sec)
Thirst	Normal	Drinks eagerly, thirsty	Unable to drink or drinks poorly
Pulse (N=100-120 bpm)	Slightly increase	Rapid, weak	Rapid, sometime impalpable
BP (N=90/60 mm Hg)	Normal	Decreased	Decreased, may be unrecordable
Respiratory rate	Slightly increase	Increased	Deep, rapid
Urine output	Normal	Reduced	Markedly reduced
Treatment	Plan A	Plan B	Plan C

Q7.2: What are the composition and features of WHO-recommended low osmolarity ORS?

Answer:

ORS	Standard	Reduced Osmolarity
Contents	mEq/L	mmol/L
Glucose	111	75
Sodium	90	75
Chloride	80	65
Potassium	20	20
Citrate	10	10
Osmolarity	311	245

Reduced Osmolarity ORS	g/L
Sodium chloride	2.6
Glucose, anhydrous	13.5
Potassium chloride	1.5
Trisodium citrate hydrate	2.9
Total weight	20.5

Component	Amount (mEq/L)
Sodium	75
Chloride	65
Glucose	75 mmol/L
Potassium	20
Citrate	10
Osmolarity	245 mOsm/L

Q7.3: How is zinc used in diarrhea management and what is the dosing schedule?

Answer:

- >2 months - <6 months: 10 mg/day × 14 days
- ≥6 months: 20 mg/day × 14 days
- Zinc reduces severity and duration of diarrhea and protects against future episodes for up to 2-3 months.

Q7.4: What are the four rules of home-based diarrhea management?

Answer:

1. Give more fluids than usual
2. Continue feeding
3. Give zinc supplementation
4. Recognize signs for immediate medical help

Q7.5: What are the clinical signs indicating need for referral in a diarrheal child?

Answer:

- Lethargy/unconsciousness
- Inability to drink/breastfeed
- Vomits everything
- Convulsions
- Sunken eyes
- Skin pinch goes back very slowly

Q7.6: What is the type of vaccine given for rotavirus & it's schedule for immunization?

Answer:

- **Agent:** Rotavirus (Reoviridae family)
- **Vaccine:** Live attenuated oral vaccine
- **Schedule:** 6 weeks, 10 weeks, and 14 weeks (oral drops)
- Part of Universal Immunization Program (UIP)

Q7.7: How is homemade ORS prepared and what are its guidelines?

Answer:

- Ingredients: 1 pinch of salt + 1 fistful of sugar in 1 glass of safe water
- Stir till dissolved
- Use within 24 hours
- Children < 2 years: 50-100 ml after every stool
- Older children: 100-200 ml after each stool
- Adults: As much as they want

Q7.8: What is Plan A, B, and C in diarrheal management and how is dehydration classified?

Answer:

Signs of Dehydration	No Dehydration (Plan A)	Some Dehydration (Plan B)	Severe Dehydration (Plan C)
Consciousness	Alert	Restless, irritable	Lethargic or unconscious
Eyes	Normal	Sunken	Very sunken
Thirst	Normal	Thirsty, drinks eagerly	Drinks poorly or unable to drink
Skin pinch	Goes back quickly	Goes back slowly	Goes back very slowly (>2 seconds)

YOURWISH

- **Plan A:** Extra fluids + continued feeding; manage at home

Up to 2 years	50-100 ml after each loose stool
2 years or more	100-200 ml after each loose stool

Zinc supplements	
2 months to 6 months	½ tablet for 14 days
6 months and more	1 tablet daily for 14 days

- **Plan B:** ORS 75 ml/kg over 4 hours under observation

Weight	<6 kg	6-<10 kg	10-<12 kg	12-19 kg
Age	Up to 4 months	4 months up to 12 months	12 months up to 2 years	2 years up to 5 years
In ml	200-450	450-800	800-960	960-1600

- **Plan C:** Rapid IV rehydration with Ringer lactate (preferred) or Normal Saline; 100 ml/kg within 3-6 hours depending on age

Age (months)	30 ml/kg	70 ml/kg
<12 months	1 hour	5 hour
12 months -5 years	30 min	2.5 hour

BIG QUESTION 8: What are common worm infestations and how are they diagnosed, treated, and prevented?

Broad Answer: Worm infestations, including soil-transmitted helminths and eradicated vector-borne parasites like Dracunculus, are targeted through deworming campaigns and public health education. Key interventions include Albendazole-based therapy, sanitation, and behavior change. Guinea worm is a notable eradicated example in India.

DETAILED QUESTIONS

Q8.1: What are the key types of soil-transmitted helminths and their transmission mode?

Answer:

Worm	Transmission Route	Morphology Features
Roundworm (*Ascaris*)	Ingestion of eggs	Fertile egg: Oval, bile-stained
Whipworm (*Trichuris*)	Ingestion of eggs	Barrel-shaped with bipolar plugs
Hookworm (*Ancylostoma, Necator*)	Skin penetration	Thin-shelled, non-bile-stained egg

Q8.2: What is Dracunculiasis (Guinea Worm Disease) and its status in India?

Answer:

- Caused by *Dracunculus medinensis* (filarial nematode)
- Transmission: Drinking water containing infected Cyclops (copepods)
- Symptoms: Painful blister, usually on lower limb, ruptures in water
- Status: Eradicated from India (last case 1996)
- Prevention:
  - o Safe drinking water
  - o Vector control (filtering Cyclops)
  - o Health education

YOURWISH

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Q8.3: What are the clinical features and complications of common worm infestations?

Answer:

- Nutritional deficiencies (esp. iron deficiency anemia)
- Growth retardation, poor school performance
- GI symptoms: pain, bloating, nausea, altered appetite
- Severe infestations:
  - Roundworm: Obstruction
  - Hookworm: Anemia
  - Loeffler's syndrome (ascaris larval migration to lungs)

Q8.4: What is Chander Index and what does it indicate?

Answer:

- Chander Index = % of children with 250+ eggs per gram (epg) in stool.
- Used to estimate worm load in population-based surveys.
- Helps monitor mass deworming program effectiveness.
- Calculation: Kato-Katz technique
- CI < 200: Nonsignificant
- CI > 200-250: Potential danger
- CI : 250-300 :- Minor Health Problem
- CI > 300: Major public health problem
- DOC: Albendazole

Q8.5: What are key facts about Taeniasis and Echinococcosis?

Answer:

- **Taeniasis:**
  - Caused by *Taenia saginata* (beef) or *Taenia solium* (pork)
  - Transmission: Ingestion of undercooked beef or pork
  - *Taeniasis, Cystocercosis, T. solium* → neurocysticercosis
  - Prevention: Meat inspection, proper cooking
  - Treatment: Praziquantel, Niclosamide with purgative, Neurocysticercosis - Albendazole + steroid
- **Echinococcosis (Hydatid disease):**
  - Caused by *Echinococcus granulosus*
  - Dog = definitive host; sheep/humans = intermediate host
  - Hydatid cyst in liver/lung; diagnosed by imaging & serology
  - Prevention: Deworming dogs, hygiene
  - Treatment: Mebendazole or Albendazole

Q8.6: What is the deworming schedule under the National Deworming Day program?

Answer:

- **Drug used:** Albendazole
- **Dose:**
  - 1-2 years: 200 mg single dose (chewable)
  - ≥2 years: 400 mg single dose (chewable)
- **Frequency:** Biannual (Feb 10 and Aug 10)
- **Target population:** Children and adolescents aged 1-19 years
- **Delivery:** Through schools and Anganwadi centers

Q8.7: What are the key preventive measures for worm infestations?

Answer:

- Wearing footwear (hookworm prevention)
- Washing hands with soap
- Using sanitary latrines
- Avoiding open defecation
- Proper washing of vegetables and fruits

Q8.8: What are the WHO hemoglobin cutoffs to define anemia in children with worm burden?

PYQ: FMGE 2020

Answer:

- Hookworm contributes directly to blood loss.
- Roundworm and whipworm contribute via malnutrition and GI loss.

Age Group	Hb Threshold (g/dL)
<5 years	<11
5-11 years	<11.5
12-14 years	<12

BIG QUESTION 9: What are Sexually Transmitted Infections (STIs), how are they classified, and how are they managed in public health?

Broad Answer: STIs include a range of infections primarily transmitted through sexual contact. Their management involves syndromic diagnosis, targeted treatment, counseling, and contact tracing. National strategies focus on reducing stigma, increasing awareness, and integrating testing and treatment into reproductive health services.

DETAILED QUESTIONS

Q9.1: What are the major types of STIs, their causative agents, and recommended treatments under syndromic management?

Answer:

Syndrome	Color	Content
UD, ARD, Cervicitis	Grey	• Tab, azithromycin 1g (1 stat) • Tab cefexine 400mg (1 stat)
Vaginitis	Green	• Tab, secnidazole 2g (1 stat) • Cap, Flucanazole 150mg (1stat)
Genito ulcerative disease-non herpetic	White	• Benzathine • Penicillin (2.4MU)-1 vial • Tab azithromycin (1g) single dose
GUD-non herpetic for patients allergic to penicillin	Blue	• Doxycycline 100mg BD × 15 days • Azithromycin 1g (single dose)
GUD-herpetic	Red	• Tab acyclovir 400mg TDS × 7 days
Lower abdominal pain (LAP)	Yellow	• Tab cefixime 400mg OD stat • Tab metronidazole BD × 14 days • Doxycycline 100mg BD × 21 days
Inguinal bubo	Black	• Tab azithromycin 1g OD stat • Tab doxycycline 100 mg BD × 21 days

Q9.2: What is the syndromic management approach for STIs?

Answer:

- Based on symptoms and clinical presentation, not lab confirmation
- Uses pre-packaged, color-coded drug kits provided under NACO
- Ensures prompt treatment, reduces complications and further transmission
- Enables treatment at point of care (esp. in resource-limited settings)

Q9.2.1: Match the following STI kits:

Answer:

A. A-4, B-3, C-2, D-1

B. A-4, B-1, C-3, D-2

C. A-1, B-4, C-3, D-2

D. A-3, B-2, C-4, D-1

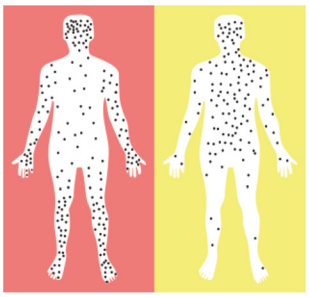
Match List:

A. LAP → Yellow kit 6

B. Urethral discharge → Grey kit 1

C. Non herpetic genital ulcer → White kit 3

D. Vaginal discharge → Green kit 2



Smallpox Chickenpox

A. LAP	1. Grey kit1
B. Urethral discharge	2. Green kit 2
C. Non herpetic genital ulcer	3. White kit 3
D. Vaginal discharge	4. Yellow kit 6

Explanation:

- **LAP** is treated with **Yellow Kit 6 (Metronidazole + Doxycycline)**
- **Urethral discharge: Grey Kit 1 (Azithromycin + Cefixime)**
- **Non-herpetic genital ulcer (Syphilis): White Kit 3 (Penicillin)**
- **Vaginal discharge: Green Kit 2 (Secnidazole + Fluconazole)**

Q9.3: What are incubation period, isolation period, and communicability of common STIs?

Answer:

STI	Incubation Period	Period of Communicability	Isolation Required?
Gonorrhea	2-7 days	While discharge present	No
Chlamydia	7-14 days	Until completion of treatment	No
Syphilis	10-90 days	Early stages highly infectious	No
Herpes (HSV)	2-12 days	During vesicular phase	Yes (if lesions active)
Trichomoniasis	4-28 days	Until treated	No
HPV (warts)	Weeks to months	While warts visible	No

Q9.4: What are additional public health strategies for STI control?

Answer:

- Partner notification and contact treatment
- Counseling to promote treatment adherence
- Integration with HIV, RCH, and family planning services
- Condom distribution and safe sex education
- Surveillance in high-risk groups (FSWs, MSM, PLHIV)

YOURWISH

Q9.5: What is the role of IEC and counseling in STI prevention?

Answer:

- Reduces stigma and improves treatment-seeking behavior
- Educates about symptoms and importance of early care
- Promotes behavioral change toward safer sex practices
- Enhances acceptance of partner treatment and follow-up

Incubation Period of some diseases PYQ: FMGE 2021

Influenza	18-72 hours
Staphylococcal	1-8 hours
Clostridium perfringens	6-24 hours
Salmonella	12-24 hours
Botulinum	18-36 hours
Cholera	1-2 days (6 days - 3 week)
Typhoid	10-14 days
Polio	7-14 days
Hepatitis A	15-50 days
Most diarrheal diseases	1-5 days

Disease	Incubation period
Influenza	18-72 hours
Measles	10-14 days
Chicken pox	14-16 days
Rubella	2-3 weeks, average 18 days
Mumps	2-4 weeks (14-18 days)
Diphtheria	2-6 days
Pertussis	7-14 days max up to 3 weeks
Bacillus cereus	1-6 hours
Most upper respiratory diseases	2-5 days
COVID 19	3-21 days

Period of Isolation

Chickenpox	Until all lesions crusted, usually 6 days after onset of rash
Measles	7 days after onset of rash
German measles	None except women in first trimester or sexually active nonimmune women in child bearing years not using contraceptives measures should not be exposed
Influenza	3 days after onset
Mumps	Until swelling subsides

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Pertussis	4 weeks or until paroxysms cease
Diphtheria	Until 48 hours of antibiotics or negative cultures after treatment
Tuberculosis	Until 3 weeks of effective chemotherapy
Cholera	3 days after tetracycline started
Shigellosis and salmonellosis	Until 3 negative stool cultures
Hepatitis A	3 weeks of onset
COVID	14 days

Period of Communicability

Chicken pox	1-2 days before to 4-5 days after the appearance of the rash
Measles	4 days before to 5 days after the rash appearance
Rubella	7 days before symptoms to 7 days after the appearance of the rash
Mumps	4-6 days before symptoms to 7 days thereafter
Influenza	1-2 days before to 1-2 days after onset of symptoms
Diphtheria	14-28 days from disease onset
Tuberculosis	As long as not treated

22. NON COMMUNICABLE DISEASES AND NATIONAL PROGRAM FOR CONTROL OF NCD'S

BIG QUESTION 1: How is obesity defined and classified using BMI

PYQ: NEET PG 2018, 2022

Broad Answer: Obesity is primarily indicated by Body Mass Index (BMI), with different classification thresholds for WHO and Asian populations, encompassing categories from underweight to morbid/super obesity. Other critical anthropometric indicators include Ponderal index, Broca's index, Corpulence index, Lorentz formula, skin fold thickness (measured at specific sites), waist circumference, and waist-hip ratio, each with specific cutoffs for identifying risk.

DETAILED QUESTIONS

Q1.1: What is the formula for Body Mass Index (BMI), and what is its alternative name?

Answer:

- BMI: Weight in kg/Height in m^2.
- It is also known as Quetelet's index.

Q1.2: Define and provide formulas for Ponderal index, Broca's index, Corpulence Index, and Lorentz formula.

Answer:

- **Ponderal index:** $PI = \frac{\text{Weight(kg)}}{\text{Height (m)}^3}$
- **Broca's index:** Height in cm - 100.
- **Corpulence Index: A height-independent indicator of obesity.** Actual weight/Desirable **weight**. It should not exceed 1.2.
- **Lorentz formula:**

  For men:

  $$\text{Ideal body weight (kg)} = \text{Height (cm)} - 100 - \frac{\text{Height(cm)} - 150}{4}$$

  For women:

  $$\text{Ideal body weight (kg)} = \text{Height (cm)} - 100 - \frac{\text{Height(cm)} - 150}{2}$$

Q1.3: What is the BMI classification for Undernutrition, including mild, moderate, and severe categories?

Answer:

- BMI < 18.5.
  - Mild: 17 -18.49.
  - Moderate: 16-16.99.
  - Severe: <16.

Q1.4: What are the BMI percentile classifications for children regarding normal weight, overweight, and obesity?

Answer:

- Weight < 85^{th} percentile: Normal.

- 85^{th} - 95^{th} percentile: Overweight.
- 95 percentile: Obesity.
  - Morbid obesity: BMI >40.
  - Super Obesity: BMI >50.

Q1.5: Classify the BMI of two Indian females with BMIs of 17.5 and 24.99, respectively, according to the Asian classification.

A. Normal and Obese

B. UnderweightandNormal

C. Underweight and Obese

D. UnderweightandOverweight

Answer: D. Underweight and Overweight

- 17.5: Underweight.
- 24.99: Overweight.
- Asian classification is used for Indians. Underweight is < 18.5. Overweight is between 23-24.99.

Q1.6: Provide the BMI classification according to WHO

Answer:

According to WHO	
Underweight	<18.5
Normal BMI	18.5-24.99
Overweight (Pre obese)	25-29.9
Obesity	≥30
Obese class I	30-34.9
Obese class II	35-39.9

Q1.7: Provide the BMI classification according to the asian Classification

Answer:

According to Asian Classification	
Underweight	<18.5
Normal BMI	18.5-22.9
Overweight (Pre obese)	23-24.9
Obesity	≥25
Obese class I	25-29.9
Obese class II	≥30

YOURWISH

Q1.8: What are the health risks associated with obesity?

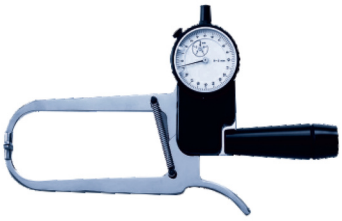
Answer:

Greater risk	Moderate risk
Type 2 Diabetes	Coronary artery disease
Insulin resistance	Hypertension
Gall bladder disease	Osteoarthritis of knees
Dyslipidemia	Gout and Hyperuricemia
Breathlessness	
Sleep apnea	

Q1.9: What tool is used to measure skin fold thickness, at which sites is it measured?

Answer:

- **Tool:** Harpenden's Caliper
- **Sites:** Subscapular, Supra-iliac, Mid-biceps, Mid-triceps (most important is triceps).
- **Sum of all 4 sites measurements:**
  - Males: <40 mm.
  - Females: <50 mm.



Q1.10: Where is waist circumference measured, and what are the global and Indian cutoffs for males and females that indicate risk?

Answer:

- **Measurement site:** Midpoint between the lower border of ribcage and iliac crest.
- **Males:** WC > 102 cm (Global); >90 cm (Indian).
- **Females:** WC > 88cm (Global); >80 cm (Indian).

Q1.11: What are the cutoffs for waist-hip ratio that indicate risk for males and females?

Answer:

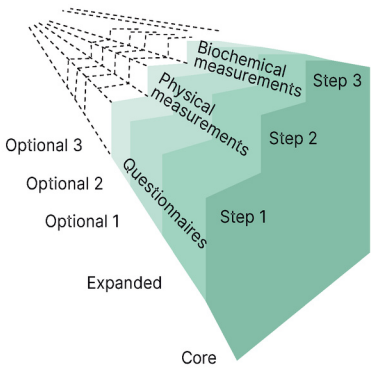
- Males: >1.
- Females: >0.85.

PYQ: NEET PG 2023 PYQ: FMGE 2022

BIG QUESTION 2: What is the WHO STEPS approach for NCD surveillance?

Broad Answer:

- The WHO STEPS approach is a surveillance tool for NCD risk factors, encompassing behavioral, anthropometric and biochemical measurements.



DETAILED QUESTIONS

Q2.1: What is the WHO STEPS approach, and what are its three steps/components?

Answer:

Step 1: Questionnaire	Step 2: Anthropometric Measurements	Step 3: Biochemical Measurements
• All about lifestyle and behavioural and psychological factors.	• Height • Weight • Waist and hip circumference	• Lab Investigations: Blood glucose, Serum lipids

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Q2.2. WHO steps approach includes all except:

A. Behavioural

B. Psychological

C. Physical

D. Therapeutic

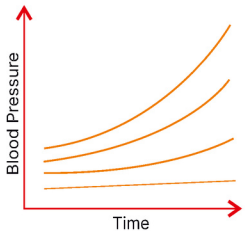
Answer : D. Therapeutic

- The WHO STEPS approach is a standardized framework for surveillance of non-communicable diseases (NCDs) and their risk factors. It includes three core levels of assessment:
  - Step 1: Behavioural measurements - using questionnaires to assess risk factors like tobacco use, alcohol consumption, diet, and physical activity.
  - Step 2: Physical measurements - such as height, weight, blood pressure, and waist circumference.
  - Step 3: Biochemical measurements - including blood glucose and cholesterol levels.

Q2.3: Explain the "Tracking phenomenon" in relation to blood pressure.

Answer:

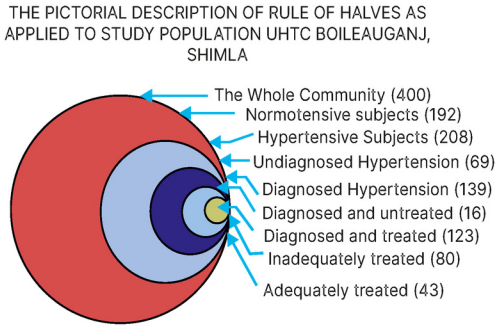
- Blood pressure is tracked from childhood to adulthood.
- If a person is hypotensive in childhood, then the person remains hypotensive in adulthood.
- If a person is hypertensive in childhood, then the person remains hypertensive in adulthood.



Q2.4: Explain the "Rule of Halves" as applied to hypertension.

Answer:

- It is based on a research study
- The pictorial graph of rule of nine is applied to the study population
- There was a study done in Shimla
  - Out of the entire population, only 50% are aware that they are hypertensive.
  - Out of that 50% who are aware that they're hypertensive, only 50% receive the treatment.
  - Out of those who're receiving the treatment, only 50% of the population receive adequate treatment.



Q2.5: What is the "DASH Diet" primarily for?

Answer: DASH Diet for Hypertension: Dietary approaches to stop hypertension.

Q2.6: What is the "Prudent Diet" specifically designed to prevent, and what are its recommended daily intake percentages/amounts?

Answer:

- It is particularly to prevent Cardiovascular diseases.
- Total fat: 15-30%.
- Saturated fats: <7%.
- Trans fat: <1%.
- Daily salt: <5 gm/day.
- Daily cholesterol <200 mg/day.
- Cholesterol HDL ratio <3.5.

Q2.7: What is the current name of the NPCDCS program, what was its earlier name, and what are the newer inclusions to the program?

PYQ: FMGE 2020

Answer:

- Current name: National Program for Control of NCDs.
- Earlier name: National Program for prevention and control of Cancer, Diabetes, Cardio-vascular disease and stroke.
- Newer inclusions: COPD, Chronic Kidney Disease, Ayush, Rheumatic fever and Rheumatic Heart disease, Non-alcoholic fatty liver.

Q2.8: What is the best level of prevention for NCDs, and on what level do most National Health programs typically rely?

Answer:

- Best level of prevention for NCDs: Primordial.
- Most National Health programmes rely on secondary level of prevention - to make early diagnosis and timely treatment for malaria, leprosy.

Q2.9: What are the Organizational set up under the NPCDCS program?

PYQ: FMGE 2022

Answer: Organisational set up under the Programme

District Hospital
- NCD clinic
- Cardiac care unit
- Cancer care facility

Community Health Centre
- One per 120,000 population in plain areas and 80,000 population in hilly/difficult terrain
- NCD services: NCD clinic-Early diagnosis and management, laboratory facilities, referral

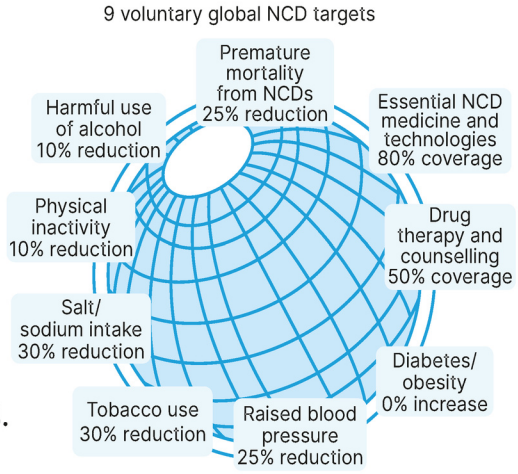
Primary Health Centre
- One per 30,000 population in plain areas and 25,000 population in hilly/difficult terrain
- NCD services: Screening facility, early diagnosis and management, referral

Subcentre
- One per 5000 population in plain areas and 3000 population in hilly/difficult terrain
- NCD services: Health promotion, opportunistic.
- Screening, referral

Q2.10: What is WHO global framework for elimination of NCDs by 2025?

Answer:

- It represents 9 voluntary global NCD targets:
- **2A (for 10%):**
  - Reduce the Harmful use of alcohol by 10%.
  - Reduce Physical inactivity by 10%.
- **2S (for 30%):**
  - Reduce salt intake by 30%.
  - Tobacco use (Smoking) 30%.
- **2O (for 25% - Outcome):**
  - Reduce the prevalence of Premature mortality from NCDs by 25%.
  - Reduce blood pressure by 25%.



BIG QUESTION 3: Identify the most common types of cancer worldwide. What screening facilities are available at Sub-centers and PHCs for various cancers and NCDs?

Broad Answer:

- Breast cancer is the most common worldwide.
- Sub-centers and PHCs offer screening facilities for cervical, breast, oral cancers, blood sugar testing, and hypertension.

DETAILED QUESTIONS

Q3.1: What are the most common cancers in India for males and females, respectively?

PYQ: FMGE 2021

Answer:

- Males: Lip/oral cancer.
- Females: Breast cancer.

Q3.2: Identify the most common cancer in elderly males, young males, as an occupational cancer, and in females in rural areas.

Answer:

- Most common cancer in elderly male: Prostate cancer.
- Most common cancer in young male: Testicular cancer.
- Most common Occupational cancer: Skin cancer.
- Most common cancer in females in rural areas: Cervical cancer.

Q3.3: What are the most common causes of cancer death in India for males and females?

Answer:

- Among males: Lung cancer.
- Among females: Breast cancer.

Q3.4: What screening facilities are available at Sub-centers for various cancers and NCDs?

Answer:

- Cervical cancer via VIA.
- Breast cancer via self-breast examination.
- Oral cancer mouth cavity examination.
- Blood sugar testing (RBS, FBS, post prandial).
- HTN.

Q3.5: What screening facilities are available at Primary Health Centers (PHC) for various cancers and NCDs?

Answer:

- Cervical cancer via VIA.
- Breast cancer via self breast examination.
- Oral cancer mouth cavity examination.
- COPD (Pulse oximetry).
- Blood sugar testing (RBS, FBS, post prandial).
  - If HbA1C facility is available at PHC, it is done from PHC.
  - If HbA1C facility is not available at PHC, it is done from CHC.
- HTN (sphygmomanometer, S.creatinine).

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Q3.6: What is the present strategy for initial screening of cervical cancer?

A. PAP smear

B. Cervical biopsy

C. High vaginal swab

D. Visual inspection after application of freshly prepared 5% acetic acid

Answer: D. Visual inspection after application of freshly prepared 5% acetic acid (VIA).

- This method, known as VIA (Visual Inspection with Acetic Acid), is the recommended initial screening strategy for cervical cancer in low-resource settings. It is a simple, cost-effective, and quick test that can provide an immediate result.

BIG QUESTION 4: How is blindness defined according to the NPCB and WHO

Broad Answer:

- Blindness (according to programme) : Visual acuity < 3/60 in better eyes with available correction.
- According to WHO: visual acuity<3/60 in better eye with best possible correction

Comparison of WHO and NPCB Definitions		
WHO ICD	**Visual Acuity**	**NPCB**
Low vision		
Category (1)	<6/18-6/60	Low vision
Category (2)	<6/60-3/60	Economic blindness
Blindness		
Category (3)	<3/60-1/60	Social blindness
Category (4)	<1/60 perceptions of light	Manifest blindness
Category (5)	No perceptions of light	Absolute blindness

DETAILED QUESTIONS

Q4.1.What is NPCB?

Answer: NPCB stands for National Programme for Control of Blindness.

Q4.2: What is the most common cause of blindness in India and worldwide?

Answer: Cataract.

Q4.3: What is the most common cause of visual impairment in India?

Answer: Cataract.

Q4.4: What is the most common cause of ocular morbidity?

Answer: Uncorrected refractory error.

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Q4.5: What are the most common causes of preventable blindness in children and adults?

Answer:

- M/C cause of preventable blindness in children: Vitamin A deficiency.
- M/C cause of preventable blindness in adults: Cataract.

Q4.6: What is the definition of "Visual impairment" in India?

Answer: Visual acuity < 6/18 in better eyes with available correction in India.

23. NATIONAL HEALTH MISSION/ RMNCAH+N/MATERNAL INITIATIVES

BIG QUESTION 1: What is the National Health Mission (NHM), its components, and goals, including RMNCAH+N?

Broad Answer: The National Health Mission (NHM) was started to provide accessible, affordable, and quality health care to all, especially the vulnerable sections of society. It includes two sub-missions: NRHM (2005) and NUHM.

DETAILED QUESTIONS

Q1.1: When was the National Health Mission (NHM) launched, and what does it include?

Answer:

- Launched: 2013
- Includes:
  - National Rural Health Mission (NRHM) - launched in 2005
  - National Urban Health Mission (NUHM)

Q1.2: What are the key components of the National Health Mission?

PYQ: FMGE 2020

Answer:

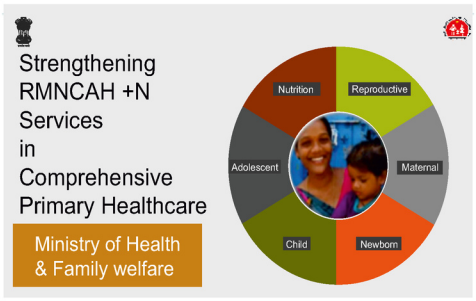
- National Rural Health Mission (NRHM)
- Administrative components
- Control of Communicable Diseases
- Control of Non-communicable Diseases
- National Urban Health Mission (NUHM)
- RMNCAH+N (Reproductive, Maternal, Child Health, Adolescent + Nutrition)

Q1.3: Under which ministry does RMNCAH+N function?

PYQ: NEET PG 2022

Answer:

- Ministry: Ministry of Health & Family Welfare



BIG QUESTION 2: What are the key maternal health initiatives under NHM and their components, goals, and beneficiary schemes?

Broad Answer: The Government of India, under the National Health Mission (NHM) and RMNCAH+N, has launched several maternal health initiatives to reduce maternal mortality, promote safe institutional deliveries, and improve the quality of maternal healthcare. Key programs include Janani Suraksha Yojana (JSY), Janani Shishu Suraksha Karyakram (JSSK), Pradhan Mantri Matru Vandana Yojana (PMMVY), Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA), Dakshata, LaQshya, and SUMAN.

DETAILED QUESTIONS

Q2.1: What is Janani Suraksha Yojana (JSY), and what are its key features?

Answer:

- Launched in 2005
- Goal: To reduce maternal mortality
- Purpose: To promote institutional deliveries

Q 2.2: What are the services provided under Janani Suraksha Yojana (JSY)?

Answer:

- Cash is disbursed to the mother at the institution for having a hospital delivery
- Safe motherhood services under the Vandemataram scheme (antenatal care)
- Celebrate village health and nutritional day once a month in the Anganwadi centre
- Maternal death review
- Pregnancy tracking by ASHA/AWW
- Safe abortion services: Mifepristone followed by Misoprostol and manual vacuum aspiration
- Cash assistance for institutional delivery (in Rs)
  - o ASHA< pregnant females
  - o Rural areas > Urban areas
  - o Cash assistance is provided irrespective of the age of pregnant women, and parity
- Cash assistance for home delivery: Rs 500 is given to BPL pregnant women

Q2.3: What are the cash incentive amounts under JSY for LPS and HPS?

Answer:

Category	Rural Areas			Urban Areas
	Mother's Package	ASHA's package	Mother's Package	ASHA's package
LPS (Low performing states) - % of institutional deliveries is poor	All pregnant women delivering in government health centers - Rs. 1400	Rs. 600	Rs 1000	Rs. 400
HPS (High Performing states) - % of institutional deliveries is high.	All BPL /Scheduled caste/ Scheduled Tribe (SC/ST) women delivering in a government health center- 700rs benefit	Rs. 600	Rs. 600	Rs. 400

- LPS (based on % of hospital deliveries): UP, MP, Bihar, Jharkhand, Rajasthan, Odisha, J&K, Assam, Chhattisgarh
- HPS: Other states

Q2.4: What services are provided under Janani Shishu Suraksha Karyakram (JSSK)?

Answer:

- Free service for pregnant and sick infants

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- Free Delivery (both normal & C-section)
- Free Diagnostics
- Free Drug
- Free Diet (3 days for normal & 7 days for C-section)
- Free Transport from home to health institutions
- Free transport between facilities in case of referral
- Free Blood
- Free drop back from institutions to home after 48 hours of stay
- Exemption from all kinds of user charges



Q2.5: What is LaQshya, and its purpose?

PYQ: AIIMS 2019



Answer:

- Labor Room Quality Improvement Initiative
- Aim:
  - Improve the quality of care in delivery services in labour rooms
  - Ensure satisfaction of beneficiaries

Q2.6: What are the benefits provided under Pradhan Mantri Matru Vandana Yojana (PMMVY)?

Answer:

- It is under the Ministry of Women and Child Development
- Cash incentive is given only up to 1 birth.
- A cash incentive of Rs. 5000 is given only for the firstborn child in 2 installments
  - 1st instalment: Rs 3000 after registration of pregnancy and at least 1 ANC done within 6 months of LMP
  - 2nd instalment: Rs 2000 after childbirth is registered and the child receives a full cycle of BCG, OPV, DPT, Hep B
- If the second child in the family is a girl, a benefit of Rs. 6000 has recently been introduced
  - Given in a single instalment



Q 2.7: What are the three instalments of benefits previously given under maternity-related schemes?

Answer:

- At the time of registration
- At the time of prenatal checkup, after 6 months
- At the time of vaccination of the baby
  - At the time of vaccination of the baby

Q2.8: What is Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA)?

Answer:

- It is under the Ministry of Health and Family Welfare
- On the 9th of every month, free antenatal services are provided to women, particularly in the 2nd/ 3rd trimester, in government & private facilities
- Purpose - Identify high-risk pregnancies on time
  - Red card - Women at high risk
  - Green card - Women at no risk



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- Blue card - Woman identified as a case of PIH
- Yellow card - Women with comorbidities (Diabetes, Thyroid, PID)

Q2.9: What is Dakshata?

Answer: Initiative to train healthcare workers in intrapartum care at all delivery points

Q2.10: What is SUMAN (Surakshit Matritva Aashwasan) scheme, and who are the beneficiaries?

Answer:



- Launched in 2019
- It is under the Ministry of Health and Family Welfare
- Initiative: Zero preventable maternal and newborn deaths
- Beneficiaries:
  - All pregnant women during the antenatal period
  - All women during delivery,
  - Women up to 6 months post-delivery.
  - Children up to 1 year
- Total number of services provided -18

Q2.11: What is the aim of SUMAN charter/service guarantee scheme?

Answer:

- To provide
  - Assured, Dignified, respectful, good quality health care at no cost.
  - Zero tolerance for denial of services to pregnant women and infants for every woman and newborn visiting the public health facility to end all preventable maternal and newborn deaths and morbidities, and provide a positive birthing experience

Q2.12: What are the assured services guaranteed under SUMAN?

Answer:

1. Ambulance & referral services (102 or 108)
2. Minimum 4 antenatal check-ups
3. Normal delivery or C-section
4. Medicines, diagnostics tests & blood services to mothers (during pregnancy, during delivery, after delivery till six months) and for the baby up to 1 year
5. Proper care with respect and dignity
6. Grievance redressal mechanism (toll-free no 104)

Q2.13: A pregnant woman residing in an urban area registers under Janani Suraksha Yojana. All the services are provided under the scheme except:

A. Cash assistance for institutional delivery

B. Maternal death review

C. Safe abortion services

D. HIV counselling and testing

Answer: D. HIV counselling and testing

Explanation:

- **HIV counselling and testing** is **not a direct component** of the **JSY scheme**.

- Instead, it is provided under the **National AIDS Control Programme (NACP)** and the **Prevention of Parent to Child Transmission (PPTCT)** program, often integrated into antenatal care services at the **facility level** (e.g., under RCH/NHM umbrella)

Q2.14: All are true about Janani Shishu Suraksha Karyakram except?

A. Free diet for the mother during the hospital stay.
B. Free delivery
C. Free transport from home and back
D. Free treatments of sick infants up to 6 months

Answer: D. Free treatments of sick infants up to 6 months
Explanation: JSSK provides free treatment of sick newborns and infants up to **1 year of age**, not limited to 6 months.

Q2.15: What incentive is known to train medical officers and ANMs for intrapartum care?

A. LaQshya
B. Sparsh
C. Dakshata
D. MAA (Mother's absolute affection)

Answer: **C. Dakshata**
Explanation:
Dakshata is a programme launched to improve the **skills of** healthcare providers, especially Medical Officers (MOs) and Auxiliary Nurse Midwives (ANMs), in providing quality **intrapartum and immediate postpartum care.**

- **LaQshya** - Labour Room Quality Improvement Initiative
- **Sparsh** - A skin-to-skin care initiative for newborn thermal regulation
- **MAA (Mother's Absolute Affection)** - Focuses on promoting breastfeeding

Q2.16: An initiative for zero preventable maternal and newborn deaths is:

A. Janani Shishu Suraksha Karyakram
B. Pradhan Mantri Surakshit Matritva Abhiyan
C. Surakshit Matritva Aashwasan
D. Navjat Shishu Suraksha Karyakram

Answer: C. Surakshit Matritva Aashwasan
Explanation:
Surakshit Matritva Aashwasan programme ensures free, respectful, and quality care to all pregnant women, newborns, and mothers up to 6 months post-delivery.

- **Janani Shishu Suraksha Karyakram (JSSK):** Provides free delivery, treatment, transport, etc.
- **Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA):** Provides **antenatal care** on the 9th of every month.
- **Navjat Shishu Suraksha Karyakram (NSSK):** Aims to **train health workers** in neonatal care and resuscitation.

Q2.17 Pradhan Mantri Matru Vandana Yojana was launched by which ministry?

A. Ministry of health and family welfare
B. Ministry of women and child development
C. Ministry of human resource and development
D. Ministry of Education

Answer: B. Ministry of women and child development

Explanation:

- **Ministry of Health and Family Welfare**: Implements schemes like **JSSK**, **PMSMA**, **SUMAN**, etc.
- **Ministry of Human Resource and Development**: Renamed to **Ministry of Education**, mainly oversees school and higher education.
- **Ministry of Education**: Not involved in maternal welfare schemes.

BIG QUESTION 3: What are the key child health initiatives under the National Health Mission?

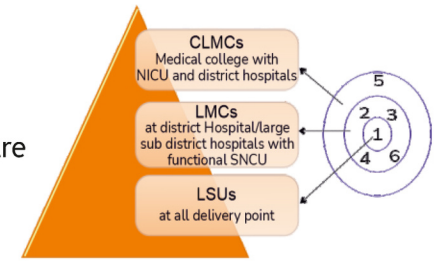
Broad Answer: Child health initiatives under NHM focus on reducing neonatal and under-five mortality by providing structured, multi-level care through programs like MAA, NSSK, RBSK, HBNC, FBNC, and IMNCI. These initiatives ensure essential newborn care, early detection of health problems, lactation support, and systematic screening for diseases and developmental delays.

DETAILED QUESTIONS

Q3.1: What is the aim of the MAA Programme, and what are the key components under the Human Milk Bank system?

Answer:

- Aim: To promote breastfeeding.
- Human Milk Bank is organized at three levels:
  - CLMC: Comprehensive Lactation Management Centre
  - LMC: Lactation Management Centre
  - LSU: Lactation Support Unit





Q3.2: What are the services provided under the Mother's Absolute Affection programme?

Answer:

- Services include:
  - Lactation counselling and breastfeeding initiation
  - Support for stimulation and milk expression through electric breast pumps
  - Collection of donor human milk
  - Storage of donor human milk
  - Processing of donor human milk
  - Dispensing of donor human milk

Q3.3: What is Navjat Shishu Suraksha Karyakram (NSSK)?

Answer: PYQ: AIIMS 2020 PYQ: FMGE 2023

- 2 days of training is provided to healthcare workers/medical officers in basic newborn care and resuscitation services at all delivery points



(Health workers practicing on a mannequin)

Q3.4: What are the features of Rashtriya Bal Swasthya Karyakram (RBSK) and who are its target beneficiaries?

Answer:

- Features
  - o Launched in 2013
  - o Child health screening and early intervention services programme under National Rural Health Mission
- Target age:
  - o 0-6 years: Rural areas + Urban slums in mobile vans
  - o 6-18 years: Enrolled in government schools

Q3.5 Which screening tests are done under Rashtriya Bal Swasthya Karyakram?

Answer:

- It is secondary level of prevention
- Screening is done for: 4D's

Defects at birth	Deficiencies	Diseases of childhood	Development delay
• Neural tube defects • Down's syndrome • Talipes (club foot) • Developmental dysplasia of the hip • Congenital cataract • Congenital deafness • Congenital heart diseases • Retinopathy of prematurity	• Anaemia especially severe anaemia • Vitamin A deficiency (Bitot's spot) • Vitamin D deficiency (rickets) • Severe Acute malnutrition • Goitre	• Skin conditions (scabies, fungal and eczema) • Otitis media • Rheumatic heart disease • Reactive airway disease • Dental conditions • Convulsive disorders	• Vision impairment • Hearing impairment • Neuromotor impairment • Motor delay • Cognitive delay • Language delay • Behaviour disorder • Attention Deficit Hyperactivity Disorder • Sickle cell anemia, b thalassemia, congenital hypothyroidism

Q 3.6 Which conditions are not included in the screening under Rashtriya Bal Swasthya Karyakram (RBSK)?

Answer:

- Congenital glaucoma is not screened while screening for birth defects.
- Vitamin C and B are not screened for while screening for deficiencies.

Q 3.7: Who are the members of the mobile health teams involved in screening under Rashtriya Bal Swasthya Karyakram (RBSK)?

Answer:

- Medical officers
- Ayush officers
- Pharmacists
- ANM/Staff Nurse

Q3.8: What is Home-Based Newborn Care (HBNC)?

PYQ: NEET PG 2021

Answer:

Purpose	• Council the women about newborn care. • Additional visits provided by ASHA workers. • Essential visits - 4 ANC or 4 PNC.

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Type of Delivery	When to Visit	Number of Visits
Home	**Days 1, 3, 7, 14, 21, 28, 42.**	7
Institutional vaginal delivery	**Days 3, 7, 14, 21, 28, 42.**	6 (1st day mother is at hospital)
Lower segment C-section	**Days 7, 14, 21, 28, 42**	5 (1st 3 days mother is at hospital)
Objectives	• To ensure that vaccination is given to infants. • To ask about the diet of the mother. • To counsel and educate the mother about o Breast-feeding o Keeping baby warm o Newborn care	
Incentive	• ASHA workers get Rs. 250/- after all the visits	

Q3.9: What is Home-Based Young Child Care?

Answer:

- Additional visits are being made by both ANM and ASHA workers for:
  - o Children with low birth weight (LBW)
  - o Children released from SNCU (Special Newborn Care Unit)
- Visits are performed after the 42nd day
- Starts from 60 days onwards with a 3-month gap
  - o Usually 3, 6, 9, 12, and 15 months
- Incentive- Rs 50/- per visit. (Rs. 250 for 5 visits)

Q3.10: What is Facility-Based Newborn Care (FBNC) and its structure?

Answer:

Health facility	Newborns at birth	Sick newborns
• MCH level I- PHC, Sub-centre (Deliveries happen here)	• Labour room newborn care corner (Basic care of newborn happens here)	• Urgent referral
• MCH II- CHC, First referral unit	• Labour room and operation theatre. • Newborn care corner	• Newborn stabilization unit • LBW: 1.8kg-2.5 kg
• MCH III- District hospital	• Labour room and operation theatre • Newborn care corner	• Special newborn care unit • LBW: <1.8kg

Q 3.11: What are the different services provided by the Newborn Care Corner, Newborn Stabilization Unit, and Special Newborn Care Unit?

Answer:

Newborn Care Corner	Newborn Stabilization Unit	Special Newborn Care Unit
• Care of normal newborn • Breastfeeding support • Care of sick newborn	• Care of normal newborn • Breastfeeding support • Care of sick newborn • Phototherapy for newborns with hyperbilirubinemia • Management of newborn sepsis	• Care of normal newborn • Breastfeeding support • Care of sick newborn • Managing all sick newborns (except those requiring mechanical ventilation) • Low birth weight <1800 gms are managed

• Identification and prompt referral of at risk and sick newborn	• Stabilization and referral of sick newborn and those with very low birth weight (1800-2500 gms) • Referral services	• Follow-up of all babies discharged from the SNCUs. • Immunization services • Referral services

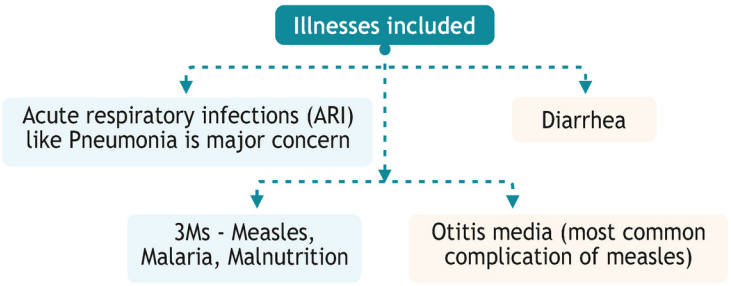
Q3.12: What is IMNCI, its target and how does it categorize treatment for children?

Answer:

- Integrated Management of Neonatal and Childhood Illness
- Launched by Government of India
- Target age group: 0-5 years
- Color-coded classification:
  - Green - Home management
  - Yellow - OPD/medical treatment
  - Pink - Referral

Q 3.13: What illness are included under IMNCI?

Answer:



Q3.14: What is the aim of Indian Newborn Action Plan (INAP) and what are its component?

Answer: Aims to reduce neonatal mortality and stillbirth rate to single digits by 2030





Q3.15: Under Navjat Shishu Suraksha Karyakram, training for health workers should be provided for how many days?

A. 1 day

B. 2 days

C. 7 days

D. 15 days

Answer: B. 2 days

Explanation:
Duration of training: 2 days

- **Day 1:** Theoretical sessions
- **Day 2:** Hands-on skills training using mannequins (e.g., NeoNatalie)

Q3.16: Program for screening development delay, deficiency, and neonatal genetic defects is?

A. Janani Suraksha Yojana
B. Janani Shishu Suraksha Karyakram
C. Rashtriya Bal Swasthya Karyakram
D. Rashtriya Kishor Swasthya Karyakram

Answer: C. Rashtriya Bal Swasthya Karyakram
Explanation:

- **Janani Suraksha Yojana (JSY):** Focuses on promoting institutional deliveries through financial incentives
- **Janani Shishu Suraksha Karyakram (JSSK):** Provides **free maternity and newborn services**
- **Rashtriya Kishor Swasthya Karyakram (RKSK):** Targets **adolescents** (10-19 years), focusing on nutrition, reproductive health, mental health, etc.

Q3.17: All facilities are provided in the newborn care corner, except:

A. Care of a sick newborn
B. Care of a normal newborn
C. Breastfeeding support
D. Support for low-birth-weight babies

Answer: D. Support for low-birth-weight babies
Explanation:
NBCC does not manage sick newborns. For that, babies are referred to higher-level units like:

- Newborn Stabilisation Units (NBSU) – at CHCs
- Special Newborn Care Units (SNCU) – at district hospitals

BIG QUESTION 4: What are the key adolescent health initiatives under NHM, and what are their objectives and services?

Broad Answer: Adolescent health is addressed in India through Rashtriya Kishor Swasthya Karyakram (RKSK), Adolescent Friendly Health Clinics (AFHCs), Menstrual Hygiene Scheme, and Kishori Shakti Yojana (KSY). These programs aim to improve adolescent nutrition, sexual and reproductive health, mental well-being, and address substance use, violence, and NCD risk factors.

DETAILED QUESTIONS

Q4.1: What are the targets, objectives, and critical components of Rashtriya Kishor Swasthya Karyakram (RKSK)?

Answer:

PYQ: FMGE 2023

- India's first comprehensive adolescent health program
- Target group: Adolescents (10-19 years)
- Strategy: RMNCH + A (reproductive, maternal, newborn, child health + adolescent)



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Targets	Objectives	Critical components
• Girls and boys • Married and unmarried • Poor and affluent • School and out of school	• Improve nutrition • Enable sexual and reproductive health • Enhance mental health • Prevent injuries and violence • Prevent substance abuse or misuse • Address conditions for non-communicable diseases	• Coverage • Content • Communities • Clinics • Counseling • Communication • Convergence

Q4.2: What are Adolescent Friendly Health Clinics (AFHCs), what services do they provide, and where are they located?

Answer:

AFHC Adolescent Friendly Healthcare Clinics

Provides clinical and counselling services
- Sexual and reproductive health is setting up friendly health clinics
- Nutrition
- Substance abuse
- Injuries and violence
- Non communicable diseases
- Mental health

Trained service providers
- Medical officers
- ANM
- Counsellors

Location
- PHCs
- CHCs
- District hospitals
- Medical colleges
- Not located at sub-centers

Q4.3: What is the Menstrual Hygiene Scheme?

Answer:

- Introduced by Ministry of Health and Family Welfare
- Aim: Promote menstrual hygiene among adolescent girls (10-19 years) in rural areas
- Objectives:
  - Increase awareness about menstrual hygiene in adolescent girls
  - Increase access to the use of high-quality sanitary napkins for adolescent girls in rural areas
  - To ensure the safe disposal of sanitary napkins
- Sanitary packs provided at Rs 6 for 6 napkins to adolescent girls in rural areas
- ASHA workers get Rs 1 for a pack sold and a free pack of napkins monthly for personal use

PYQ: FMGE 2023

Q4.4: Who is Kishori Shakti Yojana (KSY) for?

Answer:

- For adolescent girls enrolled under ICDS

Q4.5: This program was launched by which ministry?

A. Ministry of Women and Child Development
B. Ministry of Health & Family Welfare
C. Ministry of Human Resource Development
D. None of the above

Answer: B. Ministry of Health & Family Welfare



YOURWISH

24. NATIONAL HEATH PROGRAMS/TB/HIV/ LEPROSY/POLIO

BIG QUESTION 1: What are the key targets and operational components of the National Tuberculosis Elimination Programme (NTEP)

Broad Answer:

- The National Tuberculosis Elimination Programme (NTEP) aims to eliminate TB by 2025, drastically reduce mortality by <90%, and incidence by <80%.
- Its strategy involves active and passive case detection, various incentives for patients and providers (Nikshay Poshan Yojana, TB Mukt Bharat, incentives for DOTS providers and private practitioners)

DETAILED QUESTIONS

Q1.1: What is the new logo of NTEP?

PYQ: NEET PG 2023 PYQ: FMGE 2020, 2021

Answer:

Old Logo RNTCP (Revised National Tuberculosis Control Programme)	New logo NTEP in 2020 TB Harega Desh Jeetega
DOTS- sure cure for **TB.**	NATIONAL TUBERCULOSIS ELIMINATION PROGRAMME TB MUKT BHARAT TB Harega Desh Jeetega

Q1.2: When was the National Strategic Plan for TB Elimination launched? what is its vision and target, and what is its core strategy?

Answer:

- **Launch date:** 2017-2025.
- **Vision:**
  - 0-death, 0-disease, 0-poverty
- Target:
  - Eliminate TB by 2025
- Strategy:
  - Detect/test → Treat → Prevent → build

Q1.3: What are the differences between Active TB case finding, Intensified Case finding, and Passive case finding in NTEP?

Answer:

- **Active TB case finding:** Among high-risk populations.

- **Intensified Case finding:** Provider-initiated TB case finding for patients attending health facilities with co-morbidities.
- **Passive case finding:** TB clinics.

Q1.4: What are the nutritional incentives under "Nikshay Poshan Yojana" and "TB Mukt Bharat"?

Answer:

- **Nikshay Poshan Yojana:** Nutritional incentives of Rs. 500/month given to all notified TB cases/patients. Nutritional incentives for Tribal patients is Rs. 750.
- **TB Mukt Bharat:** Monthly food basket for patients.

Q1.5: What are the incentives provided to DOTS treatment providers for different types of TB cases. Who cannot act as a DOTS provider?

Answer: JEET stands for "Joint effort for elimination of Tuberculosis".

- Anyone can act as DOTS provider except the parents of the patient.
- **Incentive is given to DOTS provider who ensures treatment completion of:**
  - New & previously treated case: Rs.1000.
  - Drug-resistant TB case (MDR & XDR): Rs. 5000 (Rs.2000 after the IP phase and Rs.3000 after the CP phase).

Q1.6: What incentives are given to private practitioners for notifying TB cases and treatment completion? What is the notification deadline, and what are the consequences of failing to notify?

Answer:

- On notifying a case of TB: Rs.500.
- On notifying treatment completion: Rs.500.
- **Total incentive for complete case:** Rs.1000.
- **Duration:** Must notify a TB case within 30 days to the DTO.
- If fails to do so, it is a punishable offense under IPC 269 & 270.

Q1.7: what is the "JEET Strategy"

Answer:



- Indian organizations, Ministry NGOs and International organizations work together to eliminate TB.
- The main reason TB is not eliminated completely is non-notification by private practitioners.
- Strategy: To increase the notification rates of TB by private practitioners

Q1.8: What is the difference between Nikshay, Nikusth, and Nischay?

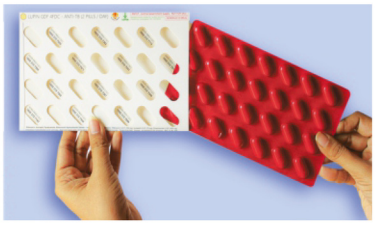
PYQ: FMGE 2022



Answer:

- **Nikshay:** Software for TB notification, a web-based portal for TB treatment compliance and surveillance
- **Nikusth:** Software for notification of leprosy patients.
- **Nischay:** Free UPT (Urine Pregnancy Test) kit provided by ASHA workers.

Q1.9: Explain the DOTS-99 initiative.



Answer:

- A Toll-free number is written below the tablets.

- To ensure the continuity of the treatment, patients in the CP (Continuation Phase) are expected to call the Toll-free number when they take the medicine.
- By this initiative, the aim is to achieve a **99% cure rate.**



Q1.10: What is a MERM Container Box?

Answer: MERM stands for Medicine Event Reminder box. It is a GPS-enabled box that detects when the patient has taken the medicine.

Q1.11: What is the "screening test" and "first investigation of choice" for TB in a community? PYQ: NEET PG 2023

Answer: Screening test, 1st investigation of choice for TB in a community: **Sputum AFB.**

Q1.12:What is the "confirmatory test for TB" and what resistance does it detect?

Answer: **Confirmatory test:** CBNAAT / Gene XPERT - result within 2 hours. Detects resistance for Rifampicin alone.

Q1.13:What is the "Gold standard" for TB diagnosis?

Answer: **Gold standard:** Liquid culture.

Q1.14: What is Truenat?

Answer: Truenat is the indigenous (Indian) version of CBNAAT, used for the rapid molecular diagnosis of tuberculosis (TB). It provides results within 1 hour

Q1.15:what is the purpose and turnaround time for the Line Probe Assay?

Answer:

- Purpose: Used for the detection of drug resistance in tuberculosis (TB), specifically in cases resistant **to both Rifampicin and Isoniazid** (i.e., Multidrug-Resistant TB or MDR-TB).
- Turnaround Time: Results are typically available within 72 hours.

Q1.16: What are the baseline investigations for a TB suspect?

Answer: Sputum AFB + CBNAAT + Chest X-Ray.

Q1.17:What is the investigation of choice for TB among people living with HIV, recurrent TB cases, extrapulmonary TB cases, and paediatric cases?

Answer:

- The investigation of choice for TB among people living with HIV, recurrent TB cases, extrapulmonary TB cases, and paediatric cases: CBNAAT

Q1.18: What does it mean when a patient is classified as 'TB cured'?

Answer: A person who has completed treatment and has a documented negative sputum test report.

Q1.19. What is meant by Treatment Completed?

Answer: A person who has completed treatment but either has no documented sputum result or the report is unavailable.

Q1.20. What is TB Treatment Failure?

Answer: If a patient becomes sputum positive anytime after a previous negative report, or is still sputum positive at the end of the 5th month of treatment.

Q1.21. What is Loss to Follow-Up in TB treatment?

Answer: If a TB patient interrupts treatment for more than 1 month.

Q1.22. What is Recurrent TB?

Answer: When a patient becomes sputum positive again after completing the previous TB treatment.

Q1.23. What is a New Case of TB?

Answer: A person who is sputum positive for the first time or has received TB treatment for less than 1 month.

Q1.24: What is the standard treatment regimen and duration for Drug-Sensitive TB (both new and previously treated cases)?

PYQ: FMGE 2019, 2020, 2021 PYQ: NEET PG 2022

Answer: 2HRZE + 4HRE. Duration: 6 months.

Q1.25: What is the regimen and duration for H-Mono DRTB (Isoniazid mono-resistant)?

Answer: 6 months: ZERO (Z-Pyrazinamide, E-Ethambutol, R-Rifampicin, O-Levofloxacin).

Q1.26: What are the treatment regimens for MDR TB and XDR TB?

Answer:

- **MDR TB (All oral shorter Bedaquiline regimen):**
  - 4-6 months: CHOB2EE (Z-Pyrazinamide, E-Ethambutol, E-Ethionamide, C-Clofazimine, H-high dose Isoniazid, O-Levofloxacin, B-Bedaquiline).
  - 5 months: COZE (Z-Pyrazinamide, E-Ethambutol, C-Clofazimine-Levofloxacin).
- **XDR TB (All oral longer Bedaquiline Regimen):**
  - 18-20 months: BC2L2 (B-Bedaquiline, C-Cycloserine, C-Clofazimine, L-Linezolid, L-Levofloxacin).

Q1.27: What is the BPaLM regimen?

Answer:

- **BPaLM regimen:** Under trial for all eligible people diagnosed with MDR/RR-TB. Recommendation includes a shorter 6-month regimen comprising Bedaquiline, Pretomanid, Linezolid and Moxifloxacin.
- The previous longer 9-month BPaL regimen is recommended only in those patients with proven fluoroquinolone resistance.

Q1.28: What is Drug-Sensitive TB?

Answer: TB that is susceptible to all first-line anti-TB drugs.

Q1.29. What is Monodrug-Resistant (MR) TB?

Answer: TB that is resistant to any one first-line anti-TB drug, excluding Rifampicin.

Q1.30. What is H-Mono-Resistant (H-MR) TB?

Answer: TB that is resistant only to Isoniazid (H).

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Q1.31. What is Rifampicin-Resistant (RR) TB?

Answer: TB that is resistant to Rifampicin (R), with or without resistance to other first-line drugs.

Q1.32: What is Multi-Drug Resistant (MDR) TB?

Answer: TB that is resistant to both Rifampicin (R) and Isoniazid (H).

Q1.33. What is Poly-Drug Resistant (PDR) TB?

Answer: TB that is resistant to more than one first-line drug, other than both Rifampicin (R) and Isoniazid (H).

Q1.34. What is Pre-Extensively Drug-Resistant (pre-XDR) TB?

Answer: MDR-TB with additional resistance to any fluoroquinolone (e.g., Levofloxacin or Moxifloxacin).

Q1.35. What is Extensively Drug-Resistant (XDR) TB?

Answer: TB that is resistant to Isoniazid and Rifampicin, any fluoroquinolone, and at least one Group A drug (e.g., Bedaquiline or Linezolid).

Q1.36: What are the indicators for using the Shorter oral Bedaquiline regimen and the Longer Oral Bedaquiline Regimen?

Answer:

- **Indicator for Shorter oral Bedaquiline regimen:** Rifampicin & InH (mutation in InH-A or KAT-G) resistance OR Only rifampicin-resistant, not isoniazid-resistant.
- **Indicator for Longer Oral Bedaquiline Regiment:** Rifampicin & InH (Both gene mutation InH-A or KAT-G) resistance OR XDR.

Q1.37: What is "TB Mukt Bharat"? What are its components?

Answer:



- **TB Mukt Bharat:** Accelerating towards elimination of TB by 2025.
- **Components:**
  - The Ni-kshay Mitra initiative ensures additional diagnostic, nutritional, and vocational support for those undergoing TB treatment.
  - Ni-kshay Mitra (Donors): Individuals/NGOs/Corporate organizations who can support by adopting health facilities (for individual donors), blocks/urban wards/districts/states to accelerate response against TB to complement government efforts. They can adopt TB patients for 6 months - 3 years.
  - Ni-kshay Digital portal provides a platform for community support for persons with TB.

Q1.38. What is the population coverage of one Tuberculosis Unit (TU) in plain areas?

Answer: One TU covers **1.5 to 2.5 lakh** population in plain areas.

Q1.39. What is the population coverage of one Tuberculosis Unit (TU) in hilly areas?

Answer: One TU covers **1 lakh** population in hilly areas.

Q1.40. What are the functions of a Tuberculosis Unit (TU)?

Answer: A TU is responsible for **TB diagnosis, treatment, and supervision**, including **laboratory services**.

Q1.41. What does DMC stand for in TB control?

Answer: **Designated Microscopy Centre** - a facility for TB diagnosis through sputum smear microscopy.

- Present at PHC's level.
- Present for every 50,000 population in hilly areas
- For every 1 lakh population in plain areas
- 1 TU: 2-4 DMCs

Q1.42: What are the aim, vision, and targets of the WHO's "END TB" strategy?



Answer:

- **Aim:** Eliminate TB by 2035.
- **Vision:** World free of TB (0 deaths, diseases and suffering due to TB).
- **Target (95-90-0):**
  - Reduce mortality of TB by 95% compared with 2015.
  - Reduce incidence of TB by 90% by 2035.
  - Zero TB-affected families facing catastrophic costs due to TB by 2035.

Q1.43: What is the organizational setup for DOTS center?

Answer:DOTS center is located at periphery

BIG QUESTION 2: what are the targets, management, and prophylaxis of HIV under the National AIDS Control Program?

PYQ: FMGE 2019, 2021, 2022, 2023 | PYQ: INICET 2022, 2023 | PYQ: NEET PG 2023

Broad Answer:

- HIV is a single-stranded RNA virus
- India's epidemic is concentrated, targeting high-risk groups and bridge populations.
- The National Strategic Plan for HIV/AIDS (2017-2024) aims for "0 death, 0 disease, 0 stigma" by 2024 through prevention, testing, and treatment. Diagnosis involves ELISA (screening) and Western Blot (confirmatory), with specific tests for in

DETAILED QUESTIONS

Q2.1: Which family does HIV belong to, and what are its two major types?

Answer:

- Single-stranded RNA virus.
- Family: Lentivirus.
- Types: HIV 1 (more common), HIV 2.

Q2.2: What is the most common mode of HIV transmission in India, and which route has the maximum efficiency of transmission?

Answer:

- **The most common mode of HIV transmission in India:** Sexual transmission (heterosexual).
- Sexual transmission is of two types
  - Homosexual: Most efficient route
  - Heterosexual
- **Route for HIV transmission with maximum efficiency:** Blood transfusion (>90-95%).

Q2.3: Q. The highest number of AIDS cases in India have occurred in the age group of:

A. 0-14 years

B. 15-29 years

C. 30-44 years

D. Above 45 years

Answer:

- 30-44 years.
- Order: 30-44 years > 15-29 years > 45 + years > under 15 years.

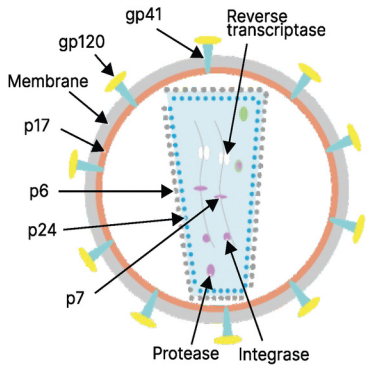
Q2.4: Describe the epidemiological pattern of the HIV epidemic in India.

Answer: This pattern is known as the concentrated epidemic.

Q2.5: What is the structure of HIV?

Answer: gp41, gp120, Reverse transcriptase

Identification of HIV virus



Q2.6: What are the routes of HIV Transmission and their Efficiency?

Answer:

Route of Transmission	Maximum Burden (Prevalence)	Efficiency of the Route
Sexual route	• > 90% of the cases • Heterosexual	• 0.01 - 1%
Blood Transfusion	• 1% of the cases	• >90% - 95%
Sharing needles and syringes	• 2 (5-10)	• < 1%
Needle prick injury	• <1% cases	• 0.3%
Mother-to-child transmission-vertical	• 5% of the total cases	• 25 -30% with treatment reduced to < 1 % • Breastfeeding: 12- 16% • 30% for **developing countries**

Q2.7: Describe the progression of the HIV epidemic from high-risk groups to the general population.

Answer:

An epidemic starts from

↓

Highest risk group: Commercial sex workers, homosexuals, drug users

↓

Bridge population: Clients of sex workers, STD patients, migrant population, partners of drug users

↓

General population: Pregnant females taken as proxy indicators after taking informed consent (currently 0.22)

Q2.8: What are Targeted Interventions in NACP, and for which specific groups are they done?

Answer: These are specific groups of interventions directed towards the high-risk group.

- **Targeted groups:** Commercial sex workers, Migrant laborers, Street children, IV drug users. (Industrial workers are generally not part of targeted interventions in this context).
- **Examples:** Provision of female condoms for commercial sex workers, Opioid substitution therapy for IV drug users.

Q2.9: Targeted Interventions for HIV are done for all except:

A. Commercial sex workers
B. Migrant laborers
C. Street children
D. Industrial workers

Answer: D. Industrial workers

- Targeted Interventions (TIs) under the National AIDS Control Programme (NACP) in India aim to prevent and control the spread of HIV among high-risk and vulnerable populations, including:
  - Commercial Sex Workers (CSWs)
  - Men who have sex with men (MSM)
  - Injecting drug users (IDUs)
  - Transgender/Hijra community

Q2.10: When was the first case of HIV/AIDS reported in India, and when was the National AIDS Control Programme (NACP) launched?

Answer:



- First case of HIV/AIDS in 1986 (Chennai, Tamil Nadu)
- National AIDS Control Programme (NACP) launched in 1987
- National AIDS Prevention and Control Policy (NAPCP) IN 2001.
- National Strategic plan for HIV/AIDS Elimination
- 2021: Merged with National health mission

Q2.11: What are the goal and strategy of the National Strategic Plan for HIV/AIDS 2017-2024?

Answer:

- **Goal:** 0 death, 0 disease, 0 stigma.
- **Target:** Eliminate HIV by 2024.
- **Strategy:** Prevent → Test → Treat.

Q2.12: What is the most common opportunistic infection among PLHIV in India and worldwide?

Answer:

- **MC opportunistic infection among PLHIV in India:** Tuberculosis.
- **MC opportunistic infection among PLHIV in the World:** Pneumocystis carinii pneumonia/ Pneumocystis jirovecii.

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Q2.13:What is the second most common disease in India?

Answer: **The 2nd most common disease in India:** Candida.

Q2.14: What are the screening and confirmatory tests for HIV?

Answer:

- **Screening test:** ELISA (most sensitive).
- **Confirmatory test:** Western blot (highly specific).

Q2:15:Which test is done in the window period, and which is the test of choice for infants < 1 year?

Answer:

- **Test in window period:** P24 antigen detection test.
- **Test of choice for infants < 1 year:** HIV DNA RT PCR.

Q2.16: What is used as a proxy for HIV burden in the community under NACP, and what is the current prevalence observed in this proxy group?

Answer: Prevalence of HIV in ANC (Antenatal Care) females is used as a proxy for HIV burden in the community (0.22%).

Q2.17: Where is HIV diagnosis primarily conducted?

Answer: Diagnosis at Integrated Counseling and Testing Centers.

Q2.18: What types of screening tests are used in ERS batteries for HIV diagnosis, and which one is considered the most sensitive?

Answer: ERS batteries use ELISA (Most sensitive), RAPID, and Spot test.

Q2.19: Under what circumstances is "one out of three tests" done for HIV screening?

Answer: One out of three tests is done when a person is going for a blood transfusion.

Q2.20: When are "two out of three tests" performed for HIV screening?

Answer: Two out of three tests are done when a person is symptomatic.

Q2.21: When are "all three tests" performed for HIV screening?

Answer: All three tests are done when a person is Asymptomatic and high risk.

Q2.22: What is considered the best investigation for assessing response to treatment and the effect of ART therapy, and what technique is used for it?

Answer: Viral load estimation is the best investigation for assessing response to treatment and the effect of ART therapy, done by RT-PCR technique.

Q2.23: What is a reliable test to assess response to treatment and progression of disease for HIV?

Answer: CD4 count.

Q2.24: What are 'Opt-in' and 'Opt-out' HIV testing?

Answer:

- **Opt-in:** Testing is offered, and the patient is required to give permission before it can occur actively.

- **Opt-out:** Performing an HIV test after notifying the patient that the test is normally performed but that the patient may elect to decline or defer testing. Consent is assumed unless the patient denies testing.
- WHO and CDC recommend Opt-out for pregnant females.

Q2.25: What is the "Treat all strategy" in HIV management?
Answer: Anyone who is HIV positive will be put on ART irrespective of CD4 count.

Q2.26: What is the preferred antiretroviral regimen for an HIV-positive pregnant female, irrespective of gestation?
Answer: TLD > TLE Tenofovir + Lamivudine + Dolutegravir (TLD) is preferred over Tenofovir + Lamivudine + Efavirenz

Q2.27: For a newborn born to an HIV-positive mother who is on ART, what prophylaxis is given and for how long, and does the type of feeding affect this?
PYQ: INICET 2023
Answer: Syrup Nevirapine for 6 weeks, irrespective of the type of feeding (low-risk infant).

Q2.28: For a newborn born to an HIV-positive mother who is not on ART, what prophylaxis is given?
Answer: Nevirapine + Zidovudine (high-risk infant).

Q2.29: If a high-risk infant (mother not on ART) is on exclusive breastfeeding, for how long should they receive prophylaxis?
Answer: Upto 12 weeks.

Q2.30: If a high-risk infant (mother not on ART) is on exclusive replacement feeding, for how long should they receive prophylaxis?
Answer: Upto 6 weeks.

Q2.31: Between which ages should cotrimoxazole prophylaxis be given to infants of HIV-positive mothers?
Answer: From 6 weeks to 18 months.

Q2.32: When is early infant diagnosis (EID) performed, and what technique is used?
Answer: Early infant diagnosis is done at 6 weeks by DNA-PCR.

Q2.33: When is confirmatory testing for HIV done in infants born to HIV-positive mothers, and by what method?
Answer: Confirmatory testing is done at 18 months by DNA-PCR.

Q2.34: What percentage of total HIV cases is attributed to parent-to-child transmission (burden)?
PYQ: INICET 2024
Answer: 5% of total cases.



Q2.35: What is the efficiency of parent-to-child transmission in developing nations without treatment, and how much is it reduced with treatment?
Answer: Efficiency is 30% (developing nations) without treatment, and with treatment, it is reduced to < 1%.

Q2.36: What is the drug of choice for Post Exposure Prophylaxis (PEP) for health professionals after a needle prick injury, its duration, and the ideal/maximum time to start it?

Answer:

- **Drug of choice:** Single tablet of Tenofovir + Lamivudine + Dolutegravir (TLD).
- **Duration:** Given for 28 days.
- **Timing:** Best if started within 2 hours. Should be started within 72 hours.

Q2.37: When is Pneumocystis jirovecii prevention started and stopped, and what is the drug used?

Answer:

- **Drug:** Double-strength Cotrimoxazole.
- **Start:** When CD4 < 350 cells/mm^3
- **Stop:** When CD4 > 350 cells for more than 6 months.

Q2.38: What are the preferred daily Fixed Dose Combination (FDC) tablets for HIV patients in adults, children, and neonates?

Answer:

Daily Fixed dose combination (FDC) tablets for HIV patients.	Adults	Preferred: Tenofovir + Lamivudine + Dolutegravir (TLD)
	Children	Preferred: Zidovudine or Abacavir + Lamivudine + Dolutegravir
	Neonate	Zidovudine + Lamivudine + Raltegravir (or Lopinavir/ Ritonavir)

Q2.39: What is the protocol for managing a PLHIV + TB co-infection?

Answer:

PLHIV + TB → CBNAAT	
If negative - To Prevent	If positive - For Patients with HIV TB Coinfection
• < 13 years: 3 months of Isoniazid + Rifapentine: Weekly • Update: o If > 13 years: 1 month of Isoniazid + Rifapentine: Daily	• Start ATT first • And after 2-4 weeks, put on ART • Else, it will result in immune reconstitution syndrome.

Q2.40: What is HIV sentinel surveillance, frequency and sample size?

Answer:

- **Purpose:** To find out the burden of HIV in the community.
  - o Unlinked anonymous.
- **Frequency:** Biennial (Once every two years).
- **Sample size:**
  - o 400 among ANC females
  - o 250 each for the bridge population and high-risk groups.

Q2.41: How are populations categorized in HIV surveillance and prevention programs?

Answer:

1. High-Risk Groups (HRGs):	2. Bridge Population:	3. General Population:
• Female commercial sex workers (CSWs)	• Truck drivers • Single male migrants	• Pregnant women attending antenatal clinics (ANC surveillance)

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• Men who have sex with men (MSM) • Transgenders/Hijras • Injecting drug users (IDUs)	• Clients of sex workers	• General community members in low-risk settings

Q2.42: What are the infrastructural setup for HIV/AIDS services?

Answer:

- **Integrated Counseling and Testing center:** Fixed and Mobile.
- **ART centers:** Providing 1st line ART drug.
- **ART PLUS:** Providing 2nd line ART Drugs.
- **LINK ART/LAC PLUS:** For follow-up and treatment of minor diseases.

Q2.43: What are some key preventive measures against HIV?

PYQ: FMGE 2019

Answer:

- Red ribbon club in college (sex education).
- Link worker scheme in case of HIV (Health worker).
- Safe blood transfusion: Test blood before transfusion for HIV1, 2, Hep B, Hep C, Malaria, Syphilis.

Q2.44: What is the goal of the UN AIDS Global Strategy, where are its headquarters, and what are its "95:95:95" targets?

PYQ: FMGE 2022

Answer:

- **Goal:** End the AIDS epidemic by 2030.
- **Headquarters:** Geneva.
- **95:95:95 Targets:**
  - 95% of PLHIV should know their HIV status.
  - 95% of people who know their status should receive treatment.
  - 95% of people on HIV treatment should be virally suppressed.

Q2.45: What are the objectives ofthe National Strategic Plan for HIV/AIDS 2017- 2024?

Answer:

Objective 1	Reduce 80% of new infections by 2024 (Baseline 2010)
Objective 2	Ensure 95% of estimated PLHIV (people living with HIV) know their status by 2024
Objective 3	Ensure 95% of PLHIV (people living with HIV) have ART initiation and retention by 2024 for sustained viral suppression.
Objective 4	Eliminate mother-to-child transmission of HIV and Syphilis by 2020 (it has been extended)
Objective 5	Eliminate HIV/AIDS-related stigma and discrimination by 2020
Objective 6	Facilitate sustainable NACP service delivery by 2024

BIG QUESTION 3: What are the key features of leprosy and the objectives, initiatives, and management strategies of the National Leprosy Eradication Programme (NLEP)?

Broad Answer: Leprosy, caused by *Mycobacterium Leprae*. India achieved elimination status in 2005 based on prevalence and incidence criteria. Sources of infection include close contact with multibacillary cases. Initiatives like "Sparsh Programme" and "Leprosy Mukt Bharat" focus on awareness, early detection, free treatment, and rehabilitation.

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DETAILED QUESTIONS

Q3.1: What is the causative agent , incubation period and characteristic feature of Leprosy?

Answer:

- **Agent:** Mycobacterium Leprae.
- **IP:** 1-20 years.
- **Characteristic:** Leprosy is a disease of high infectivity but low pathogenicity.

Q3.2: Which nerves are most and least commonly affected by leprosy?

Answer:

- Most common nerve damage: Ulnar nerve.
- Least affected: Radial nerve.

Q3.3: When was leprosy eliminated in India, and what were the criteria for this elimination status? What is the current prevalence rate?

Answer:

- **Status of leprosy in India:** Eliminated in December 2005.
- **Criteria :**
  - Prevalence: < 1 case/ 10000 population.
  - 0 incidence in all districts.
- **Current prevalence rate:** 0.45.

Q3.4: What are the primary sources of infection for leprosy?

Answer:

- Source of infection:
  - Case of Multibacillary leprosy
  - Close skin contact with leprosy patients
  - Breastfeeding
  - Use of tattoo needles

Q3.5: What are the Revised Leprosy Treatment Guidelines (2019-20)?

PYQ: FMGE 2020, 2021

PYQ: NEET PG 2022

Answer:

- Relies on **Three-drug therapy.**
- India will adopt from 2025.
- Treatment of children with a body weight of 40 kg requires single formulation medications since no MDT combination blister packs are available.

Q3.6: How are antileprosy drugs given across various age groups?

Answer:

Age	Drugs	Dosage & Schedule	Duration (PB & MB)
Adult	Rifampicin Clofazimine Dapsone	600 mg once a month 300 mg once a month and 50 mg daily 100 mg daily	6, 12

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Children (10-14 years of age)	Rifampicin Clofazimine Dapsone	400 mg once a month 150 mg once a month, 50 mg Alternate days 50 mg daily	6, 12
Children < 10 years of age or < 40kg Single formulation	Rifampicin Clofazimine Dapsone	10mg/kg once a month 100mg once a month and 50mg twice weekly 2mg/kg daily	6, 12

Q3.7: What is the prophylaxis for close contacts of leprosy patients?

Answer:

- **Prophylaxis of leprosy:** Single dose Rifampicin.
  - ≥15 yrs: 600 mg.
  - 10-14 yrs: 450 mg.
  - Children 6-9 yrs: 300 mg.
  - Children <20 kg: 10-15 mg/kg.
- **Contact time:** > 20 hours/ week.

Q3.8: What is the "Sparsh Programme", and who is its mascot?

PYQ: INICET 2023

Answer:

- **Sparsh Programme:** Create awareness about leprosy using the mascot SAPNA.
- **SAPNA:** School-going village girl spreading awareness on leprosy.
  - The concept of Sapna was adopted from, Meena
  - It is for child rights and impairment.



Q3.9: What are the features and new achievements of "Leprosy Mukt Bharat 2027"?

Answer:

Leprosy Mukt Bharat 2027	
Features	**New Achievements**
• Early detection (based on 2nd level prevention). • Free of cost treatment to prevent the development of disabilities and deformities. • Medical rehabilitation of those with existing deformities. • ASBULS o If ASHA detects a case of leprosy without disability, Rs 250 is given o If ASHA detects a case of leprosy with disability, Rs 200 is given	• Welfare allowance raised from Rs.8000 to Rs.12000 for patients for reconstructive surgeries. • Prevalence rate of leprosy has come down from 0.69/10,000 population (2014-15) to 0.45 (2021-22) • Annual new case detection rate per 100000 population has come down from 9.73 (2014-15) to 5.52 (2021-22) • Enhance awareness regarding the stigma surrounding Leprosy.

Q3.10: What are the most important Epidemiological, Operational, and Health awareness/Leprosy awareness indicators for leprosy?

Answer:

- Most important Epidemiological Indicator: ANCDR (Annual new case detection rate).
- Most important operational Indicator: Grade 2 disability Indicator.
- Most important health awareness/ Leprosy awareness indicator: Grade 2 disability Indicator.

Q3.11: Describe the infrastructure for leprosy control

Answer:

- SET (Survey, Education, Treatment): 1/25000 at PHC.
- ULC (Urban Leprosy Centers): 1/50000 at U-PHC.
- LCU (Leprosy Care Unit): 1/ 4.5 lac.

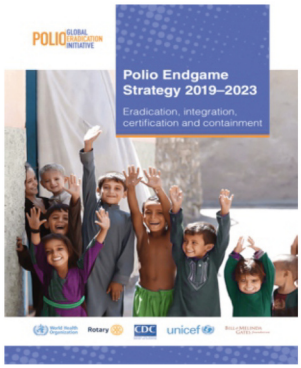
BIG QUESTION 4: What are the goals and key components of the Polio Endgame Strategy?

Broad Answer: The Polio Endgame Strategy aims to eradicate polio by 2023 by interrupting transmission of all wild and vaccine-derived polioviruses, ensuring containment, and strengthening immunization systems. This includes the "Switch" from trivalent to bivalent OPV following the eradication of WPV2 and WPV3.

DETAILED QUESTIONS

Q4.1: What are the launch date and target of the Polio Endgame Strategy?

PYQ: FMGE 2021



Answer:

- **Launch date:** 2019 to 2023.
- **Target:** Trying to eradicate Polio by 2023.

Q4.2:What is the current status of the three strains of poliovirus?

Answer:

- Wild poliovirus 1: Still seen in Afghanistan and Pakistan.
- Wild poliovirus 2: Eradicated in September 2015.
- Wild poliovirus 3: Eradicated in October 2019.

Q4.3: What is the "Switch" initiative given by WHO and the rationale behind it?

Answer:

- **Switch:** Switching from trivalent OPV to bivalent OPV.
- **Happened in India:** April 2016.
- **India declared free from Trivalent OPV:** May 9, 2016 - National Validation Day.
- **Trivalent OPV:** Has all 3 strains.
- **Bivalent OPV:** Has 1 and 3 strains.
- **Rationale:** Because WPV2 was responsible for causing CVDPV (Circulatory Vaccine Derived Polio Virus), which is dangerous and responsible for outbreaks (WPV2 eradicated in Sept 2015). WPV3 is associated with vaccine-associated paralytic polio, but does not lead to outbreaks.

Q4.4: When was IPV (Inactivated Polio Vaccine) introduced in India relative to the OPV switch?

Answer: IPV (all 3 strains in killed form) was introduced prior to the switch.

Q4.5: When was the last case of polio in India, and when was India declared polio-free?

Answer:

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- Last case of polio in India: **Jan 2011, West Bengal.**
- India was declared **polio-free on 27th March 2014.**

Q4.6: What is "Endgame and Eradication Strategy" in polio control?

Answer: Sequential pulling back of OPV and the start of IPV is called the Endgame and Eradication Strategy.

Q4.7: What are the main goals of The Endgame Eradication Strategy 2019 to 2023?

Answer:

- **Goal 1: Eradication:** Interrupt transmission of all wild poliovirus (WPV); Stop all circulating vaccine-derived poliovirus (CVDPV) outbreaks within 120 days of detection; Eliminate the risk of the emergence of future VDPVs.
- **Goal 2: Integration:** Contribute to strengthening immunization and health systems to help achieve and sustain polio eradication; Ensure sensitive poliovirus surveillance through integration with comprehensive and communicable disease surveillance systems; Prepare for and respond to future outbreaks and emergencies.
- **Goal 3: Certification and Containment:** Certify eradication of WPV; Contain all polioviruses.

Q4.8: What are the primary responsibilities for the National Polio Surveillance Programme?

Answer: The responsibility lies with the Surveillance Medical Officer and District Immunization Officer.

Q4.9: What type of surveillance is primarily conducted under the National Polio Surveillance Programme?

Answer: Active surveillance, specifically AFP (Acute Flaccid Paralysis) Surveillance.

Q4.10: How is Acute Flaccid Paralysis (AFP) defined clinically in the context of surveillance?

Answer: AFP is a clinical syndrome characterized by the acute onset of weakness and paralysis with reduced muscle tone in children. It's a collection of signs and symptoms, not a diagnosis itself.



Q4.11: What is the immediate action required for an AFP case once reported?

Answer: The AFP case should be immediately reported and kept under investigation for up to 48 hours.

Q4.12: What are some non-polio probable causes of flaccid paralysis that are considered in AFP surveillance?

Answer: Transverse myelitis and Guillain-Barré syndrome.

Q4.13: What is the age range for active case finding and passive reporting of AFP in children?

Answer: Children aged 0-15 years.

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Q4.14: What is the timeframe for initiating an investigation after an AFP case is reported?

Answer: Investigation must start **within 48** hours of reporting an AFP case.

Q4.15: How are stool samples transported to the National Institute of Virology (NIV), Pune, and what are the specific requirements for transport and sample size?

Answer: Samples are transported to NIV (National Institute of Virology, Pune) in a **reverse cold chain** (red carriers - carries stool sample at +2 to +8°C). Each sample size should be 8 grams (equal to the size of a thumb), and it should reach the lab within **72 hours.**

Q4.16: What follow-up is done on the 60th day after paralysis onset in an AFP case?

Answer: Check for Residual paralysis and Isolation of wild poliovirus and mapping.

Q4.17: Within what timeframe is a case of polio confirmed, compatible, or discarded?

Answer: Within 90 days.

Q4.18: When is a "Mop-up operation" conducted in relation to polio detection?

Answer: Mop-up operation is done when wild poliovirus is detected.

Q4.19: How is a "Confirmed case" of polio defined in AFP surveillance?

Answer: A confirmed case is defined by an isolated poliovirus in stool.

Q4.20: What constitutes a "Compatible case" of polio?

Answer: Death within 60 days of paralysis or only 1 stool sample available with residual paralysis on the 60th day.

Q4.21: What are the two key monitoring and evaluation indicators for AFP Surveillance?

Answer: AFP Reporting Rate and Stool Adequacy Rate.

Q4.22: What is the target AFP Reporting Rate, and what does it indicate about the program's effectiveness?

Answer:

- Should be more than **1 AFP case / 100,000 children / 1 year < 15 years of age.**
- It is a sensitive indicator for the ability to detect polio in a community.

Q4.23: What is the target Stool Adequacy Rate, and what does it indicate about the program's efficiency?

Answer:

- It should be more than 80%.
- It is an indicator of the program's operational efficiency.
- The stool sample should reach the laboratory within 72 hours of collection.

Q4.24: Describe the protocol for collecting stool samples for AFP surveillance

Answer: The 1st stool sample is collected within 48 hours of reporting. The 2nd stool sample is collected 24 hours apart, ideally within 14 days of onset of paralysis, but can be collected till 2 months.

25. NATIONAL HEATH PROGRAMS/VECTOR BORN PROGRAM

BIG QUESTION 1: What is the history, targets, and key strategies of the National Vector-Borne Disease Control Programme (NVBDCP)

PYQ: FMGE 2020

Broad Answer:

- The NVBDCP, established in 2002 from earlier malaria control programs, aims to protect against six diseases. Its targets include reducing API to <1/1000, increasing ABER to >10%, and eliminating Kala-azar and Lymphatic Filariasis, while reducing dengue morbidity and mortality.
- Integrated vector control for mosquitoes involves environmental (minor engineering), chemical (larvicides, synthetic insecticides), and biological (larvivorous fishes, predator mosquitoes) anti-larval measures.

DETAILED QUESTIONS

Q1.1: What are the six diseases included in the NVBDCP?

PYQ: FMGE 2022

Answer:

- Malaria
- Japanese encephalitis
- Lymphatic Filariasis
- Dengue
- Chikungunya
- Kala-azar/Visceral leishmaniasis.

Q1.2: Trace the historical development of malaria control programs leading to the establishment of NVBDCP.

Answer:

- 1953: National malaria control program
- 1958: National malaria eradication program
- 1977: Modified plan of operation
- 1997: Enhanced malaria control project
- 2002: NVBDCP
- 2005: RDT (Rapid Diagnostic Test) introduced

Q1.3: What are the main targets of the NVBDCP

Answer:

- API (Annual parasite incidence) < 1/1000 population.
- ABER (Annual blood examination rate) > 10%.
- Elimination: Kala-azar and lymphatic filariasis as soon as possible.
- Reduce morbidity and mortality due to dengue.

Q1.4: What are the primary vector responsible for transmitting the diseases under NVBDCP?

Answer:

- Anopheles: Malaria
- Culex: Japanese encephalitis and Lymphatic Filariasis
- Aedes: Dengue and Chikungunya
- Sandfly: Kala-azar/Visceral leishmaniasis

BIG QUESTION 2: What are the comprehensive strategies for mosquito control? How is Malaria transmitted and what is its global and Indian prevalence?

Broad Answer:

- Mosquito control involves a multi-pronged approach including, anti-larval measures, anti-adult measures, personal protection, and legislative measures.
- Malaria is transmitted by the Anopheles mosquito
- India accounts for 3% of global malaria cases, with Africa bearing the vast majority (95%).
- Malaria month is June

DETAILED QUESTIONS

Q2.1: Describe the "Integrated Vector Control approach" for mosquitoes, categorizing its components.

Answer:

Mosquito Control Measures			
Anti larval measures	Anti adult measures	Against mosquito (personal protection)	Legislative
E: Environmental measures C: Chemical control B: Biological control	• Space sprays • IRS- indoor residual sprays • Genetic control	• Nets • Screening • Repellents	Civic Laws

Q2.2: What are the Anti-Larval Measures used in urban areas, specifically detailing environmental control and chemical control methods?

Answer:

- **Environmental control or source reduction:** Yields permanent results, e.g., Minor engineering methods like leveling of ground, improving drainage facilities.
- **Chemical Control:** Mineral oil, Paris green (larvicide), Synthetic insecticides (Fenthion, chlorpyrifos, Abate).

Q2.3: What are the Biological Control methods for mosquito larvae?

Answer:

- **Larvivorous Fishes:** *Gambusia affinis* and *Lebister reticulates* (Barbados Millions) - fish that eat the larvae.
- **Predator mosquitoes:** *Toxorhynchites splendens* for *Aedes aegypti*.
- **Usage areas:** Burrow pits, sewage oxidation ponds, ornamental ponds, cisterns, and farm ponds.

Q2.4: What are the Anti-Adult Measures used in rural areas?

Answer:

- **Space spray (fogging):** Malathion, Pyrethrum extract.
- **Residual spray:** DDT, Malathion, Synthetic pyrethroids.

Q2.5: What are the NVBDCP strategies for classifying states/UTs based on API and the corresponding vector control measures?

Answer:

- **API 2-5:** Conventional mosquito nets treated with insecticides and indoor residual spray.
- **API > 5:** Long-lasting insecticide-treated nets (shelf life of 3 years).

Q2.6: How are the states/UTs categorized based on the API?

Answer:

- Classification is based on API as a primary criterion:
- **API** = (Positive for Malarial parasite / total population under surveillance) × 1000

Categories of State /UTs	Definition
Category 0: Prevention of re-establishment phase.	• 0 indigenous cases. o No state at this stage at this point.
Category 1: Elimination phase (15 states)	• API <1/1000 population at risk
Category 2: Pre - Elimination phase (11 states)	• API <1/1000 population at risk • But for districts API ≥1/1000 population.
Category 3: Intensified control phase. (10 states)	• API ≥1/1000

Q2.7: For areas with API > 2, what are the recommended insecticide spray intervals and general measures?

Answer: Regular insecticide sprays at 6-week intervals, particularly during the transmission season.

Q2.8: What is the specific insecticide spray protocol for areas with API < 2?

Answer: Focal sprays of DDT (or BHC or malathion) only when a case of Pf (Plasmodium falciparum) occurs in the area.

Q2.9: Describe the stepwise approach for selecting insecticides of choice for Indoor Residual Spray (IRS) based on API and vector refractoriness.

Answer: IRS is done when the API >1.

- **Initial:** 2 rounds of DDT (1gm/m^2) at a 6-week interval during the transmission season.
- **If vector is refractory to DDT:** Add malathion, 3 rounds of Malathion (2gm/m^2) at 6-week intervals.
- **If vector is still refractory to malathion:** Add 2 rounds of a synthetic pyrethroid (0.25gm/m^2) at 6-week intervals.

Q2.10: What are the main methods for malaria diagnosis using blood slides, and what is the "gold standard"?

Answer:

- **Blood slides:**
  - o JSB (Jaswant Singh Bhattacharya) stain - preferred;
  - o Giemsa stain.
- **Gold standard:** Blood Smear Examination.

Blood Smear Examination The gold standard for the diagnosis of malaria	
Thick smear • Used to identify whether the malarial parasite is present or not. • Sensitivity	**Thin smear** • Used to identify the species of the malarial parasite. • Specificity

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Q2.11: What are RPTs used in malaria diagnosis?

Answer: RPT: Rapid diagnostic kits

Q2.12: What is the treatment for Plasmodium Vivax and Ovale malaria?

Answer:

- Chloroquine (Mnemonic: VOC).
- In the case of pregnant or non-pregnant women, chloroquine is preferred.

Q2.13: What type of therapy is used for Plasmodium falciparum and malariae?

Answer: ACT (Artemisinin Combination Therapy).

Q2.14: Which antimalarial drugs are used and contraindicated in pregnancy?

Answer:

- Primaquine is contraindicated in pregnancy.
- The drug of choice for *Plasmodium falciparum* in pregnancy if the trimester is not mentioned, is ACT.

Q2.15: What are the specific ACT regimens for Plasmodium falciparum?

PYQ: NEET PG 2021

Answer:

Artemisinin Combination Therapy	
Other States: ACT-SP • A: Artesunate • S: Sulphadoxine • P: Pyrimethamine	Northeastern states: ACT-LM • A: Artesunate • L: Lumefantrine • M: Artemether
+ Primaquine	

Q2.16: What are the recommended drugs for Plasmodium falciparum in different trimesters of pregnancy?

Answer:

PYQ: FMGE 2022

Trimesters	Drug of choice
1st trimester	• Quinine salts 10mg/kg TDS × 3 days
2nd and 3rd trimester	• ACT o Other states: ACT-SP o Northeastern states: ACT-LM

Q2.17: How is treatment handled for mixed malaria infection?

Answer: Area-specific (ACT + Primaquine × 4 days).

Q2.18: What are the differences between short-term and long-term malaria prophylaxis?

PYQ: NEET PG 2022

Answer:

Short Term	Long Term
• Travelling for <6 weeks • Drug of choice: **doxycycline** • Start 1-2 days before travel. • The dose has to be continued for 4 weeks (post travel)	• Travelling for >6 weeks • Drug of choice: **Mefloquine** • Start 2-3 weeks before travel • The dose has to be continued for 4 weeks (post travel)

Q2.19: What chemicals are used in ITBNs, how long are they effective, and how do LLINs differ?

Answer:

- **Chemicals used in ITBN Program:** Synthetic pyrethroids, specifically Deltamethrin (2.5% in dosage of 25 mg/m^2) and Cyfluthrin (5% in dosage of 50mg/mm^2). Other insecticides used: Permethrin.
- **Effectiveness of pyrethroids:** For 6-12 months (retreatment every six months).
- **LLINs:** Also use pyrethroid insecticides and a chemical binder that allows the nets to be washed > 20 times, allowing use for > 3 years.

Q2.20: What are the recommended specifications of household bed nets for effective mosquito control?

Answer:

- No. of holes per sq. inches: > 150.
- Diameter of each hole: < 0.0475 inches.



Q2.21: How is the Anopheles mosquito identified?

Answer: Sits at an angle of 45^0 to the skin surface and has spotted wings.

Q2.22: Who discovered malaria transmission by a vector?

Answer: Sir Ronald Ross.



Q2.23: What percentage of global malaria cases does India contribute, and which continent is responsible for the majority of cases worldwide?

Answer:

- India contributes to 3% of malaria cases.
- Africa is responsible for the majority of malaria cases worldwide (95%).

Q2.24: What are the incubation periods of plasmodium species?

Answer:

- Ovale: 17 days.
- Malaria: 28 days.
- Falciparum: 12 days (Most common cause of death).
- *Vivax*: 14 days (Most common in India).

Q2.25: What are the common Anopheles mosquito species found in different ecological regions of India?

Answer:

- Anopheles culicifacies: Common in rural and peri-urban areas.
- Anopheles Stephensi: Common in urban and industrial areas.
- Anopheles fluviatilis: Hilly areas, forests, forest fringes (east India).
- Anopheles minimus: Foothills (northeastern states).
- Anopheles epiroticus: Andaman and Nicobar Islands.

PYQ: NEET PG 2021

Q2.26: Define Annual Parasite Incidence (API) and explain its significance as an epidemiological indicator.

Answer: API = (Confirmed case of malaria during 1 year / Total population under surveillance) × 1000. It is the best measure of the burden of malaria.

Q2.27: Define Annual Blood Examination Rate (ABER) and explain its significance as an indicator.

Answer: ABER = (Total blood slides examined / Total population under surveillance) × 100. It is an indicator of the operational efficiency of a program.

Q2.28: Define Slide Positivity Rate (SPR) and when is it calculated?

Answer: SPR = (Slides positive for malarial parasite / Total slides examined) × 100. Calculated during an outbreak.

Q2.29: Define Infant Parasite Rate (IPR) and what does it indicate?

Answer: IPR = (Number of infants positive for malarial parasites in a year / Total infants examined) × 1000. It is an indicator of recent malaria transmission in a community.

Q2.30: What is Spleen Rate, and what does it measure? What is a "Holoendemic pattern"?

Answer:

- Number of children from 2 to 10 years showing enlargement of the spleen.
- It is a measure of the endemicity of malaria.
- Holoendemic pattern is seen during 2-10 years.

BIG QUESTION 3: What is filariasis, and what are its causative agent, mode of transmission, clinical features, and the national elimination strategies?

Broad Answer:

- Lymphatic Filariasis is caused by *Wuchereria bancrofti* and *Brugia malayi* .The elimination criteria target a microfilariae carrier rate below 1% and antigenemia-free children.
- The national strategy includes mapping endemic areas, Mass Drug Administration (MDA) with triple drug therapy, and Transmission Assessment Surveys (TAS) to guide program cessation.

DETAILED QUESTIONS

Q3.1: What are the definitive and intermediate hosts for Filariasis?

Answer:

- **Definitive host:** Man (primary host).
- **Intermediate host:** Mosquito - Culex (Secondary host), specifically *Culex quinquefasciatus* and *Culex fatigans*.



Q3.2: What are the main causative agents (species) of Filariasis, and which is the most common in India?

Answer:

- Wuchereria bancrofti causes Bancroftian/Lymphatic Filariasis (90% in India). It has nocturnal periodicity.
- Brugia malayi causes Malayan/Brugian Filariasis (seen in Kerala).
- Brugia timori.

Q3.3: List some endemic areas for Filariasis in India.

Answer: Bihar, Jharkhand, Uttar Pradesh, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Gujarat.

Q3.4: What is the treatment regimen for filaria (Mf-positive persons)?

PYQ: NEET PG 2022

Answer: DEC (6 mg/kg/day for 12 doses to be completed in 2 weeks) + Albendazole 400 mg stat (for age greater than 2 years) + Ivermectin (150 - 200 mcg/kg of BW).

Q3.5: What are the elimination criteria for lymphatic filariasis?

Answer: Microfilariae carrier rate < 1%, and children born after initiation of the program are free from antigenemia. The eviction target was set in 2020.

Q3.6: What is the most common method used for epidemiological assessment of filariasis? What is the most sensitive method for detecting low-density microfilaremia?

Answer:

- **Most common method:** Thick film, using a thick film of capillary blood collected between 8:30 pm and 12 midnight.
- **Most sensitive method:** Membrane filter concentration method.

Q3.7: Explain the DEC provocation test.

Answer: Microfilaria can be induced to appear in the blood during the daytime, and the blood is examined one hour after using DEC.

Q3.8: Describe the three-part elimination strategy for Filariasis.

Answer:

- **Mapping:** Measure antigenemia by the Immunochromatography test. If prevalence is > 1% (endemic area → start MDA).
- **MDA (Mass drug administration):** Number of Drugs - 3 (DEC, Albendazole, Ivermectin). Given once a year for 5-6 years. Coverage: 85% of the eligible population. Contraindication: pregnant females, < 2 years of age.
- **TAS (Transmission Assessment Survey) among children 6-7 years of age in each district:** If infection is below the threshold level, MDA is stopped.

BIG QUESTION 4: What is Kala-azar, and what are its elimination target and common endemic areas in India?

Broad Answer:

- Kala-Azar is caused by *Leishmania donovani* and transmitted by the Sandfly (*Phlebotomus argentipes*).
- The elimination target is less than 1 case per 10,000 population, achieved but requiring continuation for three years.
- Diagnosis involves rapid diagnostic kits for suspects.
- Control measures include active case finding, Kala-azar fortnight, and Indoor Residual Spray (IRS).

DETAILED QUESTIONS

Q4.1: What is the vector for Kala-Azar, and how is it identified?

Answer:

- ***Sandfly (Phlebotomus argentipes).***
- Identified by hairy wings.



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Q4.2: What are the causative agents and vectors for Visceral leishmaniasis (Kala-Azar), Cutaneous leishmaniasis (Oriental sore), and Mucocutaneous leishmaniasis?

Answer:

- Visceral leishmaniasis (Kala-Azar): Agent - *Leishmania donovani*; Vector - *Phlebotomus argentipes*.
- Cutaneous leishmaniasis (Oriental sore): Agent - *Leishmania tropica*; Vector - *Phlebotomus papatasi*.
- Mucocutaneous leishmaniasis: Agent - *Leishmania braziliensis*; Vector - *Phlebotomus sargentii*.

Q4.3: What are the host factors and life cycle of leishmania?

Answer:

- It can affect all ages, but is more common among 5-9 years of age and more common in males.
- **Life cycle:**
  - A vertebrate (amastigote form - leishmania bodies) - humans.
  - An insect (flagellated promastigote) - sandfly.

Q4.4: What is the reservoir of infection for Kala-Azar globally versus Indian Kala-Azar?

PYQ: FMGE 2022

Answer:

- **Globally:** Dogs, jackals, foxes, rodents, and mammals.
- **Indian Kala Azar:** It's a non-zoonotic infection; its only reservoir is humans.

Q4.5: What is the elimination target for Kala-Azar, and what is its current status? List the endemic states in India.

Answer:

- **Elimination target:** < 1 case/ 10,000 population.
- **Status:** Has been achieved for the first time but has to continue for the next 3 years.
- **Endemic states:** Uttar Pradesh, Bihar, Jharkhand, West Bengal.

Q4.6: What are the key clinical features of a "Kala-azar suspect"?

Answer:

- Fever, Weight loss, Hepatosplenomegaly, Anemia.

Q4.7: What is the primary diagnostic method for Kala-Azar?

Answer:

- Rapid diagnostic kits - rk39-kit.

Q4.8: What is the main treatment for Kala-Azar?

Answer:

- **Main treatment:** Liposomal Amphotericin B (LAMB) for all age groups (10 ml/kg body weight, single dose).
- **Other drugs:**
  - Miltefosine 10mg-50mg (Given for 2-65 years old).
  - Combination of Paramomycin injection IM and Miltefosine for 10 days.
  - PKDL (Post-Kala-azar Dermal Leishmaniasis): Miltefosine 100mg/day for 12 weeks.

Q4.9: What are the control measures for Kala-Azar?

Answer:

- Active case finding (Kala-azar fortnight - once every 2 weeks, done quarterly in endemic areas). Control (IRS) Indoor residual spray is preferred with synthetic pyrethroids over DDT.

BIG QUESTION 5: What are the causative agent, vector, life cycle with different hosts, and available vaccines for Japanese Encephalitis (JE)?

Broad Answer:

- Japanese Encephalitis is a mosquito-borne zoonotic disease caused by a Group B Arbovirus (Flavivirus), transmitted by *Culex* mosquitoes .
- Humans are accidental or dead-end hosts. Vaccines include the live and the killed used in NIS, follows open vial policy).

DETAILED QUESTIONS

Q5.1: What is the causative agent and vector for Japanese Encephalitis? Where do the vectors mostly breed?

Answer:

- **Agent:** Mosquito-borne zoonotic disease caused by Group B Arbovirus (Flavivirus).
- **Vector:** *Culex* mosquito.
- **Breeding grounds:** Mostly breeds in irrigated rice, paddy fields, shallow ditches, and pools.

Q5.2: List the common Culex species involved in JE transmission.

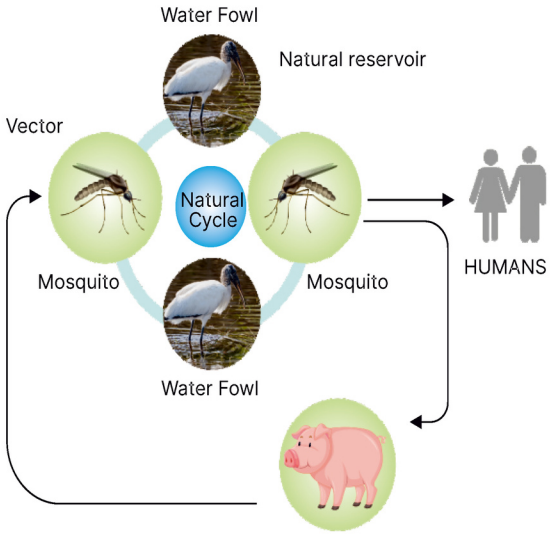
Answer:

- *Culex tritaeniorhynchus*, *Culex vishnui*.

Q5.3: Describe the life cycle of the JE virus.

Answer: The life cycle of the JE virus is primarily between:

- **Pig → Mosquito → Pig.**
- **Ardeid birds → Mosquito → Ardeid bird.**
- **Pigs:** Amplifier hosts; don't develop the disease but maintain viremia.
- **Ardeid Birds (Pond herons, Ducks, Poultry):** Maintenance hosts; maintain the life cycle of viruses; found in natural reservoirs.
- **Man:** Accidentally or dead-end host; no man-to-man transmission.



Q5.4: What role do cattle and buffaloes play in JE epidemiology? Which animals are the only ones that manifest symptoms of JE?

Answer:

- **Cattles and buffaloes:** Acts as mosquito attractants.
- **Horses:** Only animals that manifest symptoms.

Q5.5: What is the case fatality rate for Japanese Encephalitis?

Answer: 30%.

Q5.6: What are the two types of JE vaccines, and how do they differ regarding the "open vial policy"?

Answer:

- **Live:** SA-14-14-2: does not follow open vial policy.
- **Killed:** Jenvac (used in NIS): follows open vial policy (can be used up to 4 weeks).

BIG QUESTION 6: What is the causative agent, vector, clinical features, diagnosis, and prevention/control measures for Dengue, including different forms of the disease and surveillance indices?

Broad Answer:

- Dengue is caused by Flavivirus, transmitted by *Aedes* mosquitoes (*Aedes aegypti* and *Aedes albopictus*). Clinical features range from uncategorized fever to classical "break bone fever" and Dengue Hemorrhagic Syndrome. Diagnosis involves NS1 antigen test / IgM ELISA. Prevention and control focus on larval surveillance

DETAILED QUESTIONS

Q6.1: What is the causative agent of Dengue?

Answer:

- Flavivirus - 1, 2, 3, 4 serotypes.
- No cross-immunity among serotypes; recovery from one serotype only gives immunity to that particular serotype.

Q6.2: What are the two main Aedes mosquito species that transmit Dengue?

Answer:

- ***Aedes aegypti*:** Comparatively less aggressive, discordant feeder (needs >1 feed).
- ***Aedes albopictus*:** More Aggressive, concordant feeder (1 feed is enough).

Q6.3: What are the different clinical presentations of dengue infection?

Answer:

- **Uncategorized fever:** No typical features.
- **Breakbone fever:** Classical dengue fever (acute viral infection, retro orbital pain, arthralgia, myalgia).
- **Dengue hemorrhagic syndrome:** Dengue fever + hemorrhagic manifestations (bleeding from any orifice), rash (maculopapular/rubelliform).

Q6.4: What is the typical presentation of fever in Dengue?

Answer: Bimodal presentation of fever, peaking on day 1-2 and resurging on day 5-6. Recovery usually within 7-10 days.

Q6.5: What are the key lab diagnostic findings for Dengue Hemorrhagic Syndrome? What clinical diagnosis method can be used?

Answer:

- **Lab Diagnosis:** 20% increase in hematocrit, Thrombocytopenia (Platelet count <100000).
- **Clinical diagnosis:** Tourniquet test (>10 petechiae/sq inch area).

Q6.6: What is the investigation of choice for Dengue diagnosis within 1-5 days of fever onset, and after 5 days?

Answer:

- Within 1-5 days: NS1 antigen test.
- 5 days: IgM ELISA.

Q6.7: What are the main sampling unit and key indices used for Larval Surveillance in Dengue prevention and control?

Answer:

- **Sampling unit:** Houses or premises searched for water-holding containers.

- **Indices:**
  - **House index (Aedes Aegypti Index):** Number of houses positive for aedes larvae / Number of houses searched.
  - **Container index:** Number of containers positive / Number of containers checked.
  - **Breteau index:** Number of containers positive for larva or pupa / Number of houses checked.

Q6.8: What is the acceptable percentage for the Aedes Aegypti Index?

Answer:

- Should not be >1%.
- Airports and seaports in endemic areas should be kept at least 400m around their premises free from breeding *Aedes aegypti*.

Q6.9: What is the first dengue vaccine, and what are its type, target age group, and serotype coverage?

Answer:

1st dengue vaccine: Dengvaxia (CYD-TDV).

Type: Live recombinant tetravalent.

Age: 9-45 years of age in endemic areas.

Serotypes: All 4 serotypes.

BIG QUESTION 7: What is Yellow Fever, epidemiology, vaccination, and the status of the disease in India?

Broad Answer:

- Yellow Fever is an exotic disease not occurring in India.
- It has a live vaccine, which provides immunity post-vaccination.
- The vaccination certificate is valid from 10 days post-vaccination and lasts lifelong.

DETAILED QUESTIONS

Q7.1: What is the status of Yellow Fever in India?

Answer:

- Exotic disease: does not occur in India.

Q7.2: What type of vaccine is available for Yellow Fever?

Answer:

- Live - 17D vaccine.

Q7.3: How long does immunity from the Yellow Fever vaccination last, and what is the validity period of the vaccination certificate?

Answer:

- Immunity lasts for 7 days after vaccination.
- Validity of the vaccination certificate starts from 10 days and lasts lifelong.

Q7.4: What is the quarantine period for travelers without a Yellow Fever vaccination certificate?

Answer:

- Quarantine for travellers without a vaccination certificate: for 6 days.

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Q7.5: What are the indices to monitor control of yellow fever?

Answer:

- **Aedes aegypti index:**
  - No. of Aedes mosquito found within 400 mts of an area.
  - Also known as house index.
  - The % of houses showing the breeding of Aedes larvae
  - The AAI is kept as around 400m of ports. <1 %
- **Breteau index:**
  - (Number of containers positive for larvae/ Number of houses inspected) × 100

26. HEALTH INITIATIVE-IDSP,AYUSHMAN BHARAT & MISCELLANEOUS

BIG QUESTION 1: What is the purpose of the Surveillance Program (IDSP), and what diseases are covered under its various surveillance categories?

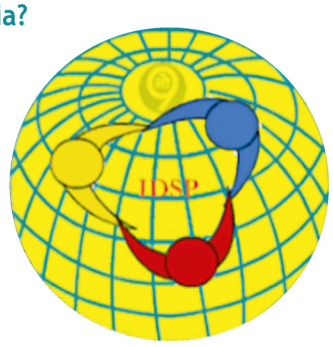
Broad Answer: The IDSP, launched by the Government of India, to conduct surveillance for both communicable and non-communicable diseases, particularly those with epidemic potential. It covers a wide range of diseases, including vector-borne, water-borne, respiratory, vaccine-preventable, eradication programs, international commitments, unusual clinical syndromes, STDs, blood-borne infections, NCDs, and other environmental health factors.

DETAILED QUESTIONS

Q1.1: What is the full form of IDSP, and when was it launched by the Government of India?

Answer:

- IDSP stands for **Integrated Disease Surveillance Program,** and it was launched in 2004.



Q1.2: What is the primary aim of the IDSP?

Answer:

- To conduct surveillance for both communicable and non-communicable diseases, especially those with the potential to become an epidemic.

Q1.3: What are the three forms used in the IDSP, and who is responsible for filling each of them?

Answer:

- **S - Suspected cases:** Filled by Health workers.
- **P - Probable form:** Filled by Medical Officer.
- **L - Lab Confirmed:** (No specific person mentioned, implies laboratory confirmation).

Q1.4: List the diseases classified as "Vector-borne."

Answer:

- Malaria, Dengue, Japanese Encephalitis (JE), Chikungunya.

Q1.5: Which diseases are categorized as "Water-borne"?

Answer:

- Acute Diarrheal Disease (Cholera), Typhoid, Gastroenteritis, Hepatitis.

Q1.6: What specific disease is listed under "Respiratory"?

Answer:

- Tuberculosis.

Q1.7: Which disease is mentioned as "Vaccine Preventable"?

Answer:

- Measles.

Q1.8: What disease is currently "Under Eradication" according to IDSP?

Answer:

- Polio.

Q1.9: Which diseases are categorized under "International Commitments"?

Answer:

- Plague, Yellow fever.

Q1.10: What are the examples of "Unusual Clinical Syndromes" under surveillance.

Answer:

- Meningoencephalitis, respiratory distress, haemorrhage, fevers, and other undiagnosed conditions.

Q1.11: What types of diseases are specifically mentioned under "Sexually transmitted diseases (under sentinel surveillance)"?

Answer:

- Blood-borne, HIV/HBV, HCV.

Q1.12: List the "Non-communicable diseases" that are tracked through "Regular periodic surveys."

Answer:

- Cardiovascular, Diabetes, Stroke, Fluorosis, etc.

Q1.13: What "Other" conditions or factors are included in the surveillance system?

Answer:

- Water Quality, Outdoor Air Quality, Road Traffic Accidents.

BIG QUESTION 2: What is Ayushman Bharat, and what are its key components?

Broad Answer:

- Ayushman Bharat aims to achieve Universal Health Coverage in India by providing quality healthcare with financial protection.
- At the primary level, it upgrades sub-centers and PHCs to Ayushman Arogya Mandirs (Health and Wellness Centres) offering comprehensive primary healthcare services.
- At the secondary and tertiary levels, it provides financial protection through health insurance coverage of up to Rs. 5 lakhs per family per year

DETAILED QUESTIONS

Q2.1: What is the full name of the scheme launched in 2018 under Ayushman Bharat, and what is its primary aim?

Answer:

- Pradhan Mantri Jan Arogya Yojana.
- Its aim is to achieve Universal Health Coverage in India.

YOURWISH

Q2.2: What does "Universal Health Coverage" mean in the context of Ayushman Bharat?

Answer:

- Universal Health Coverage means quality-based healthcare with financial protection.

Q2.3: What are the existing sub-centers and primary health centers (PHC) under Ayushman Bharat now called, and what is their role at the primary level?

Answer:

- They are now called Ayushman Arogya Mandir (previously Health and Wellness Centres - HWC).
- Their role is to provide comprehensive primary healthcare focusing on RMNCAH + Nutrition facilities and NCDs + Ayush facilities, including free essential drugs and diagnostic services, screening for NCDs, and follow-up of hospitalization cases.

Q2.4: When and where was the first HWC launched by the Prime Minister?

Answer:

- The first HWC was launched by PM at Jangla Bijapur, Chhattisgarh, on April 14, 2018.

Q2.5: What is the financial protection provided at the secondary and tertiary levels under Ayushman Bharat?

Answer:

- Government provides financial protection in the form of Insurance Coverage, specifically Rs. 5 lakh per family, per year. It is also known as the National Health Protection Scheme or Modi Care.

Q2.6: What kind of hospital services are covered under the National Health Protection Scheme (Modi Care)?

Answer:

- It is provided in IPD (In-Patient Department) services, covering secondary and tertiary care hospitalization.

Q2.7: What are the key features of the health insurance cover provided under Ayushman Bharat?

Answer: PYQ: FMGE 2021

- Health insurance cover of up to Rs. 5 lakhs per family per year.
- There is no cap on family size and age of members.
- All pre-existing diseases shall be covered, and hospitals cannot deny treatment.

Q2.8: Which families are targeted to be covered under Ayushman Bharat - National Health Protection Scheme?

Answer:

- All families listed in the SECC (Socio-Economic Caste Census) database as per defined criteria will be covered, targeting 20 crores poor and vulnerable families and 60 crore beneficiaries.
- Priority would be given to girl children, women, and senior citizens.

Q2.9: What are the benefits related to hospitalization expenses under the scheme?

Answer:

- It covers up to 3 days of pre-hospitalization and 15 days post-hospitalization expenses.

Q2.10: Where can beneficiaries avail free treatment under the scheme?

Answer:

- Free treatment is available at all public hospitals and empaneled private hospitals in time of need. Private hospitals with a minimum of 10 beds can provide services under the scheme.

Q2.11: How many medical packages does the scheme provide, and what do they cover?

Answer:

- It provides 1350 medical packages covering medical, day care treatments, surgery, medicines, and diagnostics.

Q2.12: What are the administrative features of the scheme related to payments and access?

Answer:

- Cashless and paperless access to quality healthcare services. Hospitals cannot charge any additional money from beneficiaries for the treatment.

Q2.13: What is the helpline number for Ayushman Bharat, and what services does it provide?

Answer:

- Helpline number for AB: 14555. Beneficiaries can reach out for information, assistance, complaints, and grievances.

Q2.14: Is Ayushman Bharat a flexible scheme for states?

Answer:

- Yes, it is a flexible scheme; states can choose to adopt it or not.

Q2.15: What is the significance of December 12, 2012, for Universal Health Coverage (UHC)?

Answer:

- On December 12, 2012, the UN General Assembly endorsed a resolution urging countries to accelerate progress towards UHC (everyone everywhere should have access to quality, affordable healthcare - priority for international development).

Q2.16: When is "AB Divas" celebrated across India?

Answer:

- AB Divas is celebrated across India on April 30th.

Q2.17: Which previous health schemes have been subsumed under Ayushman Bharat?

Answer:

- Rashtriya Swasthya Bima Yojana (financial protection of Rs. 30,000/year for up to 5 family members) and Senior Citizen Health Insurance Scheme Components.

Q2.18: Which of the following statements is incorrect about Ayushman Bharat-National Health Protection Scheme

A. Upgrading sub centers and PHC to health and Wellness centres

B. Health insurance coverage upto Rs: 10 lakh per family per year

C. Treatment to all pre-existing diseases are covered

D. Age-appropriate health promotion at schools

Answer: B. Health insurance coverage up to Rs: 10 lakh per family per year

Explanation:

Insurance coverage- 5 lakh per family, per year, not 10 lakhs.

BIG QUESTION 3: What are some other significant national health and welfare schemes?

Broad Answer:

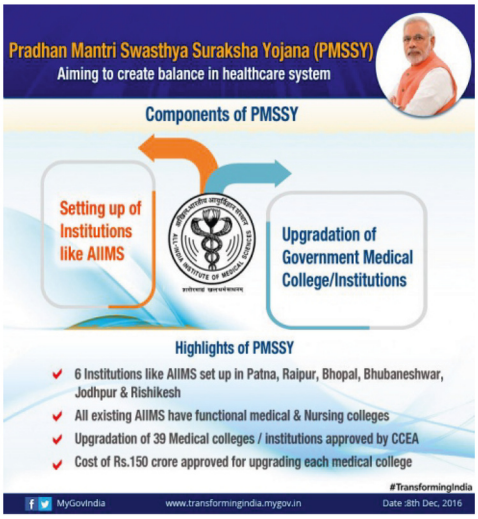
- Beyond IDSP and Ayushman Bharat, other key initiatives include
- Pradhan Mantri Swasthya Suraksha Yojana
- Jan Aushadhi Scheme
- Pradhan Mantri Jan Dhan Yojana
- Pradhan Mantri Swasthya Suraksha Nidhi.
- The National Programme for Health Care of the Elderly provides comprehensive care for seniors.

DETAILED QUESTIONS

Q3.1: What is the main objective of the Pradhan Mantri Swasthya Suraksha Yojana (PMSSY)?

Answer:

- The government is setting up institutes like AIIMS and upgrading government medical colleges and institutions.



Q3.2: What is the purpose of the Jan Aushadhi Scheme?

Answer:

- Under this scheme, quality medicines are made available at affordable prices to all.



Q3.3: What is the aim of the Pradhan Mantri Jan Dhan Yojana?

Answer:

- Everybody should have a bank account.



Q3.4: When was the Pradhan Mantri Swasthya Suraksha Nidhi (PMSSN) launched, by which ministry, and what is its purpose?

Answer:

- Launched in 2021 by the Ministry of Health and Family Welfare.
- It aims to create an account with a steady source of funding to provide facilities under AB, committed to enhancing action towards universal and affordable healthcare through the availability of additional resources.



Q3.5: What is the objective of the National Programme for Health Care of the Elderly (NPHCE)?

Answer:

- To provide separate comprehensive healthcare to senior citizens at various levels of healthcare.

National Programme for Health Care of the Elderly (NPHCE):

Q3.6: What is the scope of the National Mental Health Programme, and what policy and infrastructure are part of it?

Answer:

- All types of mental illness are part of this. It includes the National Mental Health Policy (2014) and the establishment of mental health clinics at the district level.

Q3.7: How is IQ calculated, and what are the corresponding mental status classifications for different IQ ranges?

Answer: IQ = Mental age / Chronological age × 100.

PYQ: FMGE 2021

Mental status	IQ
Normal	More than or equal to 70
Mild	50-69
Moderate	35-49
Severe	21-34
Profound	Less than or equal to 20

Q3.8: What are the corresponding mental status classifications for different IQ ranges according to the Wechsler Scale?

Answer

Mental status	IQ
Normal	40-109
Below normal	80-89
Borderline	70-79
Moron	50-69
Imbecile	25-49
Idiot	Less than 25

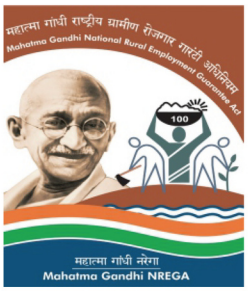
Q3.9: What has the National Rural Health Mission (NRHM) been upgraded to?

Answer:

- This is upgraded to the National Health Mission

Q3.10: What is the objective of the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) regarding job provision and duration? How does one register for it, and what is the timeframe for getting a job?

Answer:



- The government is trying to provide jobs to at least one member of the family for a minimum of 100 days in rural areas. This has been extended to 150 days and is planning to go up to 200 days. This scheme ensures livelihood. People register in Grama Sabha, and they would get a job within 15 days of registration, with salary as per an unskilled laborer.

Q3.11: What is the purpose of the Ujwala scheme?

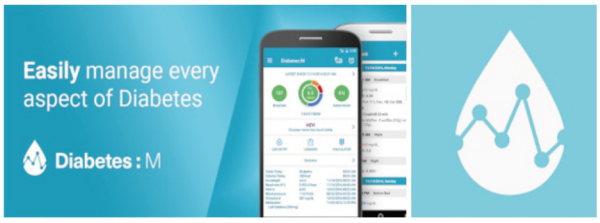
Answer:



- To provide LPG connection to women from below poverty line, which protects them from indoor air pollution.

Q3.12: What is the purpose of the "M - Diabetes" initiative?

Answer:



- For diabetes, primary and secondary protection.

Q3.13: What services are provided by " E-RaktKosh"?

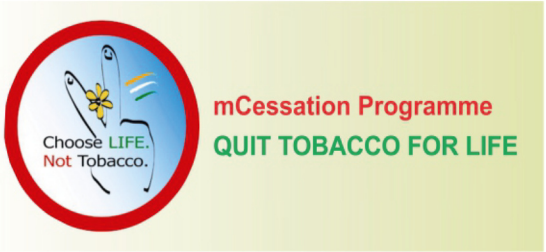
Answer:



- For safe blood donation and blood bank services.

Q3.14: What is the objective of "M - Cessation"?

Answer:



- For tobacco cessation.

Q3.15: What is "E - Sanjeevani," and when did it start?

Answer:





- An online OPD (Outpatient Department). It started in the year 2019.

Q3.16: What is the function of "Mera Aspataal," and what examples are given for its operation?

Answer:

- A platform for feedback from private and public hospitals.
- Examples include Mahila Arogya Samiti in rural areas and Rogi Kalyan Samiti for quality checks on hospitals.

Q3.17: What is the primary objective of the Ujala scheme?

Answer:

- To provide affordable LED bulbs to the community.

Q3.18: What is the main focus of the Ujjawala scheme(200)?

Answer:

- Prevention of human trafficking.

Q3.19: What are the four key components or stages of intervention under the Ujjawala scheme for human trafficking?

Answer:

- Rescue, Rehabilitation (give them a job), Reintegration (make them part of society), and Repatriation

Q3.20: What is the "Anmol App"?

Answer:

- It is an Auxiliary Nurse Midwife (ANM) app.

Q3.21: What is the functionality of the Anmol App?

Answer:

- It is a mobile tablet-based Android application meant for early identification and tracking of beneficiaries for healthcare and to promote family planning methods.

Q3.22: What is the purpose of the "Urban health equity and assessment and response tool"?

Answer:

- It is a decision support tool to identify health inequities in cities.

BIG QUESTION 4: What are the distinct stages in the natural history of a disease, and what are the characteristics and corresponding levels of prevention associated with each stage?

Broad Answer:

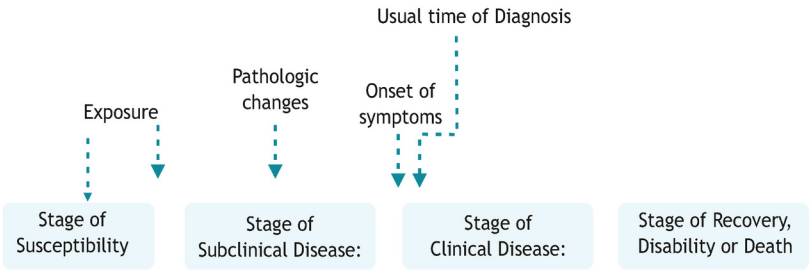
- The natural history of a disease progresses through four stages:
  - Susceptibility
  - Subclinical disease
  - Clinical disease
  - Recovery, disability, or death.

DETAILED QUESTIONS

Q4.1: What are the four main stages that define the natural history of a disease?

Answer:

- The four main stages are:
  - Stage of Susceptibility
  - Stage of Subclinical Disease
  - Stage of Clinical Disease, and
  - Stage of Recovery, Disability or Death.



Q4.2: Describe the "Stage of Susceptibility." What is its key characteristic, and what level of prevention is primarily applied during this stage?

Answer:

- This stage happens in the environment where the patient is exposed to risk factors. The primary level of prevention is applied here.

Q4.3: What defines the "Stage of Subclinical Disease"?

Answer:

- It is the stage of early pathogenesis, where the signs and symptoms do not come immediately.

Q4.4: What characterizes the "Stage of Clinical Disease," and what levels of prevention are primarily applied during this stage?

Answer:

- It is the stage of late pathogenesis. Secondary and Tertiary levels of prevention are applied here.

27. HEALTH COMMUNICATION

BIG QUESTION 1: What is health communication, and what are its primary goals?

Broad answer:

- Health communication is an exchange of ideas, feelings, and information in the field of health
- The main purpose of health communication is improving health literacy, bridging gaps, and influencing health choices

DETAILED QUESTIONS

Q1.1: What are the key components of a typical communication cycle, and can you provide an example related to public health messaging?

Answer:

- Communication cycle

Sender frames a message → Proper channel → Receiver → Feedback

- Example: An advertisement in which Amitabh Bachchan quotes, "Two drops of polio can save the lives of people"
  - Sender: Government or non-government organization that wants to bring change
  - Channel: Amitabh Bachchan
  - Receiver: Audience
  - Feedback: Surveys, exit polls

Q1.2: What is the sequence of change that will bring about a behavioral change?

Answer:

The message to be delivered should be interesting for the audience to be accepting

↓

It should generate awareness

↓

It should be motivational

↓

Evaluation

↓

Adoption

Q1.3: What are the different types of barriers to communication?

Answer:

Physiological	Psychological
• Difficulties in hearing, expressions	• Emotional disturbances • Levels of intelligence • Neurosis • Language or comprehension difficulty

YOURWISH

Environmental	Cultural PYQ: FMGE 2023
• Noise • Invisibility • Congestion	• Illiteracy • Levels of knowledge/understanding • Customs • Beliefs • Religion • Attitude

Q1.4: Give an example of a cultural barrier to communication.

Answer:

- Vaccination may lead to impotence- a cultural barrier

Q1.5: What are the methods of health communication?

Answer:

- Mass approach
- Individual approach
- Group method (smaller groups)

Q1.6: What are some common methods used in A mass communication approach?

Answer:

- TV
- Radio
- Newspaper
- Posters
- Direct mailing
- Folk methods
- Exhibition and museum
- Internet
- Printing materials

Q1.7: What are some common methods used in an individual communication approach?

Answer:

- Personal contact
- Home visits
- Personal letters
- Counseling sessions

Q1.8: What are some common methods used in group communication (smaller groups)?

Answer:

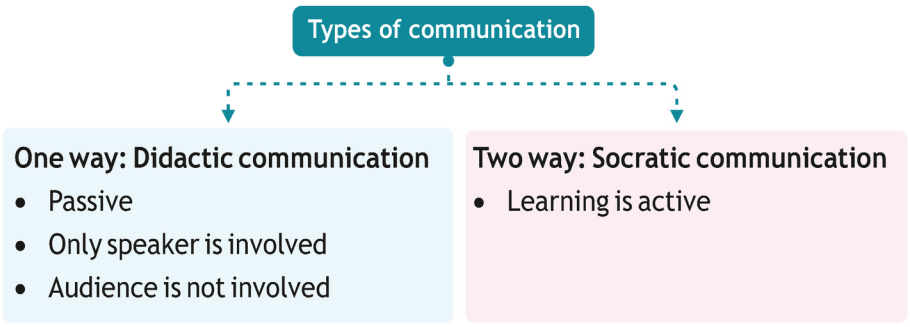
- Lecture
- Panel discussion
- Symposium
- FGD (focus group discussion)
- Seminar

YOURWISH

- Conference
- Workshop
- Demonstration
- Nukkad natak
- Delphi

Q1.9: What are the types of communication, and how do they differ in terms of speaker and audience involvement?

Answer:



Q1.10: Give examples of one-way and two-way communication.

Answer:

One way: Didactic communication	Two way: Socratic communication
• Lecture • TV • Radio • Newspaper • Internet • Museum	• Panel discussion • Symposium • FGD (Focused Group Discussion) • Workshop • Conference/ Seminar • Role plays • Demonstration

Q1.11: What are the key characteristics and guidelines for a lecture as a method of communication?

Answer:

- Lecture is one-way or didactic
- One person addresses the audience
- Size of the group < 30 people
- The lecture duration should be 15-20 minutes
- Learning is passive: No participation from the audience
- Also known as the chalk and talk method
- Presentations, graphs can be used

Q1.12: What is "Demonstration" as a communication method, what principle does it rely on, and what are some examples?

Answer:

- Two-way or Socratic communication
- Relies on the principle of "Seeing is believing and learning by doing."
- E.g.: ORS demonstration or preparation, application of scabies ointment, hand washing technique

Q1.13: What is an FGD (Focus Group Discussion), and what are its key characteristics and components?

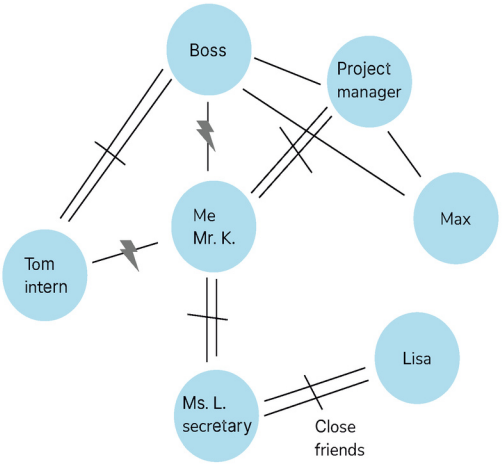
Answer:

- FGD is a two-way or Socratic method of communication
- Participants: 6-12 sitting in a round table circle with a moderator leading the FGD in the center
- A technique of qualitative data collection
- The moderator puts forward the 10-13 leading questions, open-ended questions
- Recorder: Another person recording everything with prior permission
- The role of the moderator is to make sure that the discussion does not deviate from other topics

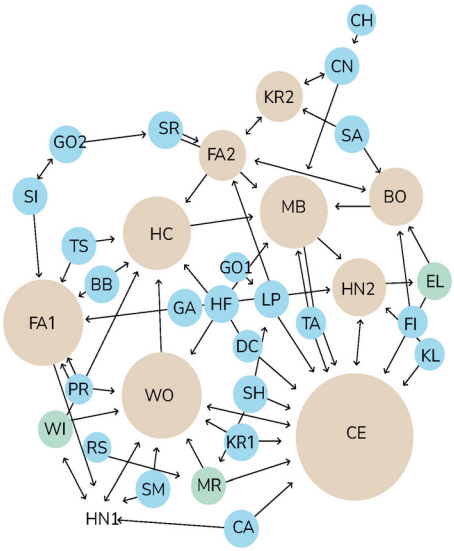
Q1.14: What is a sociogram? Give an illustration of a sociogram.

Answer:

- A sociogram is a type of diagram or chart made by a person present who sits outside the circle
- Sociogram will reflect the quality of FGD and, interactiveness of FGD



Sociogram



Moreno's sociogram

Q1.15: Elaborate on the differences between a panel discussion and a symposium.

Answer:

Panel Discussion	Symposium
Two way or Socratic	Two way or Socratic
4-8 experts	4-8 experts
No set agenda	Set agenda
Not set speeches	Set speeches
No set order of speaking	Set order of speaking
Audience is present	Audience is present
Experts can intervene in between	Experts cannot intervene in between
Feedback can be taken	Feedback can be taken

Q1.16: What is a workshop, what type of communication does it involve, and what are its key characteristics and goals?

Answer:

- Workshop is a Two-way/Socratic method of communication
- Workshop is a series of ≥ 4 meetings to provide practical skills/training
- Here, resource personnel are used, group work is done, and a plan of action is prepared
- Focuses on skill development

Q1.17: What are the defining characteristics of a conference as a method of communication?

Answer:

- Conference is a Two-way/Socratic method of communication
- Macro events- Can be held at the national level, state level, or regional level
- A lot of activities are happening simultaneously at the same time
- Helps develop social relations

Q1.18: What is a seminar, and what are its key characteristics?

Answer:

- Seminar is a Two-way/Socratic method of communication
- They are typically micro-events
- Happens on a small scale

Q1.19: What is "Role Play" as a communication method, and what are its main characteristics and uses?

Answer:

- Also known as Nukkad Natak or Sociodrama
- Role play is a Two-way or Socratic method
- The size of the audience is a maximum of 25
- E.g., Done for issues associated with stigma like HIV
- There is a discussion of a single topic in depth
- Can be more comprehensive
- Simultaneously, a lot of activities are happening
- A good place to develop social relations

Q1.20: What group communication method uses multiple rounds of questionnaires with experts to reach a consensus or forecast?

Answer:

- The Delphi technique is a group method
- It is a Two-way or Socratic method
- Process used to arrive at a group opinion or decision by surveying a panel of experts
- A forecasting process of a framework based on the results of multiple rounds of questionnaires sent to the panel of experts

Q1.21: Which communication method is considered economical?

Answer: Lecture

Q1.22: Name the most common mode of imparting health education.

Answer: Motivational model

Q1.23: Which communication method is based on the principle of "seeing is believing and learning by doing"?
Answer: Demostration

Q1.24: Which communication method is very effective when long-term compliance or a change in attitude is desired?
Answer: Focus group discussion

Q1.25: In which type of communication method is no discussion permitted among the experts?
Answer: Symposium

Q1.26: Which communication method offers an opportunity to improve effectiveness as a professional worker?
Answer: Workshop

Q1.27: Which communication method requires a limited number of participants and a significant amount of baseline preparation?
Answer: Workshop

Q1.28: Which communication method is characterized by active audience involvement?
Answer: Role play

Q1.29: Which communication events are known for fostering social interaction and long-term bonding associations?
Answer: Conferences & seminars

Q1.30: What is the communication method where a series of 4 to 8 experts discuss a health problem in front of an audience?
Answer: Panel discussion

Q1.31: Which one is an example of one-way communication?
A. Socratic method
B. Didactic method
C. Visual communication
D. Telecommunication

Answer: B. Didactic method

- The didactic method involves a one-way flow of information from the teacher to the learner, with little or no interaction-hence, it is a classic example of one-way communication.
- In contrast, methods like the Socratic method involve two-way dialogue.

Q1.32: All are true about panel discussion except?
A. Panel of 4-8 experts discusses a health topic
B. Audience is present
C. Specific order, set speeches
D. Audience can take part

Answer: C. Specific order, set speeches

- A panel discussion is an informal, interactive method where 4-8 experts discuss a topic in front of an audience. It does not follow a strict order or set speeches, allowing for spontaneous discussion.
- The audience is present and may participate during the Q&A session.

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Q1.33: What is a workshop?

A. Discussion of 4-8 experts in front of an audience
B. Discussion between 6-12 members
C. Series of 4 or more meetings
D. Series of speeches on a given subject

Answer: C. Series of 4 or more meetings

- A workshop is a participatory training method involving a series of sessions or meetings (often 4 or more), where participants actively engage in learning through hands-on activities, group work, and discussions.

BIG QUESTION 2: What is the Protocol of 6 steps?

Broad answer:

- When delivering bad news to a patient and their family, the SPIKES protocol is a widely recognized and effective 6-step framework. It helps healthcare professionals communicate empathetically and effectively

DETAILED QUESTIONS

Q2.1: What are the six steps of the SPIKES protocol for delivering bad news?

Answer:

- **S** - Set up interview
- **P** - Assess patients' and family members' perception
- **I** - Invitation to explain
- **K** - Knowledge
- **E** - Emotions
- **S** - Summary and Strategy

BIG QUESTION 3: Which approach is currently adopted for contraceptive counseling?

Broad answer:

- The Gather approach is adopted for contraceptive counseling
- Earlier Cafeteria approach was used

DETAILED QUESTIONS

Q3.1: When using the GATHER approach in counseling, what specific actions are represented by each letter of the acronym?

Answer:

- **G**- Greet the couple
- **A**- Ask the couple
- **T**- Tell the couple
- **H**- Help in the selection
- **E**- Explain
- **R**- Return to follow-up

28. HEALTH PLANNING/PLANNING COMMITTEES/ HEALTH MANAGEMENT TECHNIQUES

BIG QUESTION 1: What is health planning, and what does it involve?

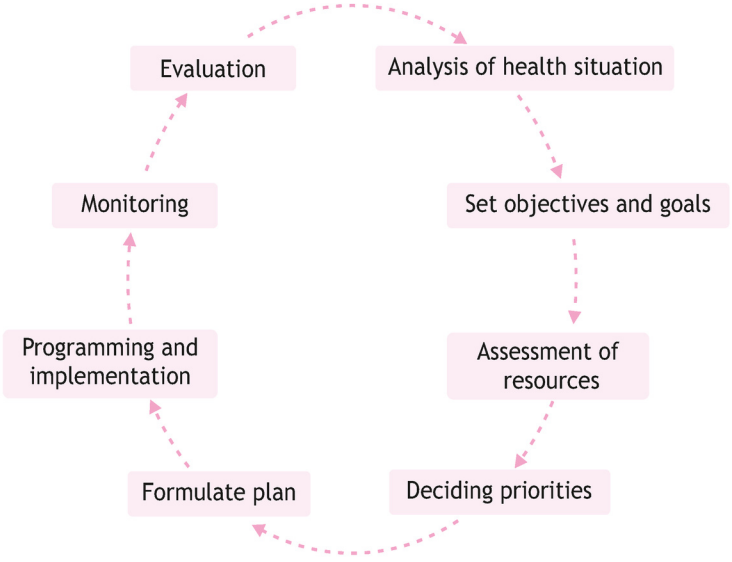
Broad answer:

- Health planning is an orderly process of defining community health problems
- It involves:
  - Identifying unmet needs
  - Surveying the resources to meet them
  - Establishing realistic priority goals
  - Projecting administrative action to accomplish the purpose of the proposed program

DETAILED QUESTIONS

Q1.1: What are the steps involved in a health planning cycle?

Answer:



Q1.2: What are the key resources that need to be assessed in a health planning cycle?

Answer:

- Manpower
- Money
- Material

Q1.3: How is monitoring done in the health planning cycle?

Answer:

- Analysis of daily routine activities
- Process directed
- Done by an internal body

Q1.4: How is evaluation carried out in the health planning cycle?

Answer:

- Done at the end
- Done by an external body
- Periodic assessment
- Outcome oriented

Q1.5: What are the definitions and characteristics of a Goal, Objectives, and Targets in planning?

Answer:

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Goal	Objectives	Target
• **Goal is the ultimate endpoint of all activities towards which resources are directed** • Follows- all or none phenomenon meaning either the goal can be achieved or cannot be achieved • Not constrained by time or resources.	• **It's a planned end point of all activities.** • Objectives need to be **SMART** (Mnemonic) o **S - Specific** o **M - Measurable** o **A - Achievable** o **R - Realistic** o **T - Time-bound**	• **It is a degree of achievement of objectives with time**

Q1.6: What are the defining characteristics that differentiate Monitoring from Evaluation?

Answer:

Monitoring	Evaluation
• Analysis of daily routine activities. • Process directed. • Done by internal audit.	• It is a periodic assessment. • Outcome directed. • Done by external audit.

BIG QUESTION 2: What is a Health Planning Committee and its purpose?

Broad answer:

- Health planning committees are established to assess the health needs of the country and recommend strategies for health policy, program development, and implementation

DETAILED QUESTIONS

Q2.1: Name the health planning committees.

Answer:

- Bhore Committee
- Mudaliar Committee
- Chaddha Committee
- Mukherjee Committee
- Jungalwallah Committee
- Kartar Singh Committee
- Shrivastava Committee

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- Krishnan Committee
- Balwant Rai Mehta Committee
- High-Level Expert Group Committee

Q2.2: Who provided the Bhore Committee and when? PYQ: FMGE 2020

Answer:

- The Bhore Committee was established by Sir Joseph Bhore in 1946
- Also known as the Health Survey and the Development Committee

Q2.3: What are the concepts provided by the Bhore Committee?

Answer:

- Three months of training in PSM
- Produce social physicians
- School health programs
- 3 million plan
- Concept of comprehensive healthcare
- Promotive, Preventive, and curative services should be provided at PHC
- 1 PHC for 40,000 population

Q2.4: What were the key aspects and proposals of the Mudaliar Committee?

Answer:

- Proposed by Mudaliar, an IAS officer
- Focused on Planning; Also called the **health survey and planning committee**
- Strengthen the existing facility
- Proposed a cadre of All India Health Services

Q2.5: What were the proposals made by the Chaddha Committee? PYQ: NEET PG 2018

Answer:

- Target: Malaria control activities and family planning activities
- 1 basic health worker for every 10,000 population

Q2.6: What was the proposal made by the Mukherjee Committee?

Answer:

- The Mukherjee Committee proposed delinking family planning activities from Malaria control activities

Q2.7: What was the main aim of the Jungalwallah Committee, and what were the proposals made by this committee?

Answer:

- It was the committee on the integration of health services
- Proposals:
  - A unified approach to promotive, preventive, curative, and rehabilitative services
  - Equal pay for equal work
  - No private practice for doctors

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Q2.8: What was the concept provided by the Kartar Singh Committee?

Answer:

- Kartar Singh provided the concept of:
  - Multiple-purpose workers, both male and female

Q2.9: What proposals were made by the Shrivastava Committee?

Answer:

- Reorient Medical Education (ROME)
- Referral services
- Rural health services strengthening
- He also proposed the concept of a village health guide

Q2.10: What was the target of the Krishnan Committee?

Answer:

- The Krishnan Committee targeted urban areas to provide health services through the Urban Revamping Scheme

Q2.11: What were the key recommendations of the Bajaj Committee?

Answer:

- Recruiting and training manpower
- National medical and education policy
- UGC grant committee

Q2.12: Which committee proposed the Panchayat Raj Institutions?

Answer:

- Balwant Rai Mehta Committee

Q2.13: When was the High-Level Expert Group Committee established, and what were their proposals & responsibilities?

Answer:

- Set up by the planning commission in 2010
- They have a responsibility to achieve universal health coverage in India
- Also proposed a three-year course on BSc rural health

Q2.14: What are the key aspects of NITI Aayog?

PYQ: FMGE 2019, 2020

Answer:

- National Institution of Transforming India replaced the Planning Commission
- It was formed on January 1, 2015
- It is also known as the Think Tank of India, Responsible for framing all administrative policies
- The chairperson is the **Prime Minister**

BIG QUESTION 3: What is health management, and what are its two main types?

Broad answer:

- Health management deals with the effective use and management of health resources.
- The two main types are:

- Quantitative
- Qualitative, based on behavioral sciences

DETAILED QUESTIONS

Q3.1: What are the quantitative health management techniques?

Answer:

- Cost-benefit analysis
- Cost-effective analysis
- System analysis
- Cost accounting
- PPBS: Planning, Programming, and Budgeting System
- Work sampling
- Network analysis
- Decision making
- Input-output analysis
- Model

Q3.2: What are the qualitative health management techniques?

Answer:

- Qualitative health management techniques based on behavioral sciences: (Mnemonic: **POCIMon**)
  - **P**- Personal management
  - **O**- Organizational design
  - **C**- Communication
  - **I**- Information system
  - **Mon**- Management by objectives

Q3.3: How is a program's outcome analyzed in Cost-Benefit analysis? Give an example.

Answer:

- The outcome of a program is analyzed in monetary terms
- Example: NACP saved 1 million USD this year

Q3.4: What is Cost-Effective Analysis (CEA), how are its outcomes measured, and what are its key advantages and examples?

Answer:

- The outcome of a program is assessed in non-monetary terms
- Examples:
  - Number of lives saved
  - Number of heart attacks avoided
  - Decreased incidence of disease
- Most comprehensive indicator: QALY gained
- Most widely used
- Easier to interpret

Q3.5: Which components are regarded as inputs and outputs in Input-Output Analysis?

Answer:

Input (3 M's)	Output
• **Manpower** • **Money** • **Material** • Technical skills	• Number of lives saved

Q3.6: What does Cost Accounting focus on?

Answer:

- Cost structure of a program
  - o Resources, cost control, reimbursements

Q3.7: What does PPBS focus on?

Answer:

- PPBS: Planning, Programming, and Budgeting System focuses on the program planning and budget framework of a program
- Zero base budgeting: A Fresh budget should be allocated every year

Q3.8: What is Work Sampling, and what is its primary purpose concerning health workers' activities?

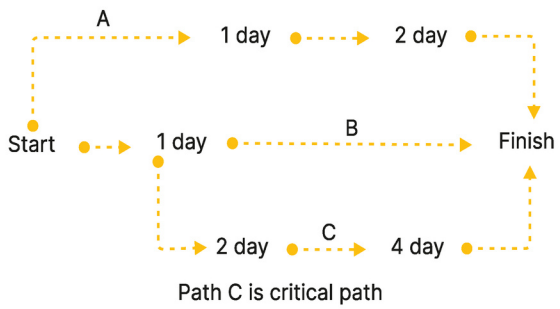
Answer:

- Work sampling involves the systematic recording and reporting of the activities of health workers:
  - o Doctors
  - o Nurses
  - o Lab techniques
- Work sampling is done to increase the output

Q3.9: What is Network Analysis?

Answer:

- Network analysis is a graphic plan of all events to be completed to reach an end objective
  - o PERT (Program Evaluation Review Technique): Event sequencing
  - o CPM (Critical Path Method): Event time sequencing



Path C is critical path

Q3.10: The planning cycle includes:

A. Analysis of the situation

B. Evaluation

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C. Resources assessment

D. All of the above

Answer:

- **D. All of the above**
- The planning cycle in public health includes several key steps:
  - Analysis of the situation to understand the problem
  - Resource assessment to identify available inputs (manpower, funds, materials)
  - Evaluation to assess outcomes and effectiveness

Q3.11: The correct sequence of cycles is:

A. Planning, Evaluation, Objective, Goal

B. Planning, Objective, Goal, Evaluation

C. Planning, Objective, Evaluation, Goal

D. Planning, Goal, Evaluation, Objective

Answer:

- **B. Planning, Objective, Goal, Evaluation**

Q3.12: In management, "Goal" refers to:

A. Planned endpoint of all activity

B. Discrete activity

C. Ultimate desired state towards which objectives and resources are directed

D. Analysis of the health situation

Answer:

- **C. Ultimate desired state towards which objectives and resources are directed**
- In management, a goal represents the broad, long-term desired outcome or ultimate purpose that guides planning and resource allocation. It is less specific than an objective and serves as the end point toward which all efforts and strategies are directed

Q3.13: Which is the management technique most promising for application in the health field?

A. Cost-effective analysis

B. Cost-benefit analysis

C. Cost accounting

D. Input-output analysis

Answer:

- **A. Cost-effective analysis**
- Cost-effective analysis (CEA) compares the relative costs and outcomes of different interventions without needing to assign a monetary value to health outcomes. It helps decision-makers choose the most efficient option to achieve health goals within limited resources

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Q3.14: Which of the following is based on behavioral sciences?

A. Decision making

B. Systems analysis

C. Network analysis

D. Management by objective

Answer:

- **D. Management by objective**
  - Management by Objective is a management technique rooted in behavioral sciences, emphasizing goal setting, employee motivation, participation, and communication. It aligns individual objectives with organizational goals through a collaborative and human-centered approach

Q3.15: You are the medical superintendent of a hospital, and you have observed lately that your hospital is running at a loss. You decide to pay a visit to the hospital randomly and observe the activities of health staff, including the doctors, at regular intervals. Which is this health management technique?

A. Organizational design

B. Decision making

C. System analysis

D. Work sampling

Answer:

- **D. Work sampling**
- Work sampling is a health management technique where the observer records the activities of staff at random intervals to assess how time is utilized. It helps identify inefficiencies, resource wastage, and opportunities for improving productivity, making it ideal for evaluating hospital performance in this scenario

Q3.16: What is the process of comparing two alternatives based on their cost-effectiveness?

Answer:

- System analysis

BIG QUESTION 4: What is the purpose of stock analysis or inventory control in healthcare?

Broad answer:

- Stock analysis or inventory control helps ensure the availability of essential medical supplies by categorizing them based on cost and criticality

DETAILED QUESTIONS

Q4.1: What are the different techniques used in stock analysis/inventory control?

Answer:

- Different techniques used: Based on cost
- Vital- E.g., Anti-snake venom
- Essential- E.g., Higher antibiotics
- Desirable- E.g., PCM, ORS

Q4.2: What is the ABC classification in inventory control?

Answer:

- A - Extremely important (vital)
- B - Moderately important (essential)
- C - Relatively unimportant (desirable)

29. HEALTH CARE DELIVERY SYSTEM IN INDIA

BIG QUESTION 1: What is the definition of Primary Health Services, encompassing its core principles and accessibility?

Broad answer:

- Essential health care is based on practical, scientifically sound, and socially accepted methods and technology, made universally accessible to individuals and families in the community, through their full participation, and at a cost that the community and country can afford

DETAILED QUESTIONS

Q1.1: Where and when was the concept of primary health care adopted?

Answer:

- In September 1978, at the Alma-Ata Conference in the USSR

Q1.2: What are the "4 As" that define the core tenets of Primary Health Care?

Answer:

- Availability
- Accessibility
- Acceptability
- Affordability

Q1.3: What are the 4 Principles or Pillars of Primary Health Care?

Answer:

- Community participation
- Appropriate technology
- Equitable distribution
- Intersectoral coordination

Q1.4: Who are the participants in Community participation? Give examples.

Answer:

- Community participation involves grassroots-level workers
- Examples:
  - ASHA workers or any grassroots-level workers
  - Rogi Kalyana Samithi

Q1.5: What defines "Appropriate technology" in healthcare, and what are some examples?

Answer:

- Appropriate technology should be cost-effective and provide good-quality services.
- Example:

- ORS
- VVM (Vaccine Vial Monitor): Heat-sensitive label, damage to the vaccine by heat is indicated with a color change
- Shakir tape: For grading malnutrition
- Kangaroo mother care: Provides care for preterm babies
- DOTS 99 for TB
- NIKUSHTH for leprosy

Q1.6: What does "Equitable distribution" mean in the context of health services?

Answer:

- Equitable distribution of health services irrespective of ability to pay, rich or poor, urban/rural etc.,

Q1.7: What is intersectoral coordination in health? Explain its importance with an example.

Answer:

- To maintain good support from other sectors like agriculture, education, environmental sectors, etc.
- Maintains good health.
- E.g., ICDS- MOHFW and MOWCD

Q1.8: Name the elements or components of Primary Health Care

Answer:

MNEMONIC: ELEMENTS

- **E**ssential medicines (especially paracetamol)
- **L**ocally Endemic Diseases - Prevention and Control
- **E**ducation on health or health education
- **M**aternal, child health, and family planning
- **E**PI (Expanded Immunization Programme) has now changed to UIP (Universal Immunization Programme)
- **N**utrition and food supply
- **T**reatment of common ailments
- **S**afe water supply and sanitation

BIG QUESTION 2: What does the Healthcare delivery system imply, and what are its categories?

Broad answer:

- The Healthcare delivery system refers to the organized way in which healthcare services are planned, delivered, and managed to meet the health needs of a population

PYQ: FMGE 2023



DETAILED QUESTIONS

Q2.1: What are the levels of the healthcare delivery system, and what manpower is assigned at each level in rural areas?

Answer:

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Level of the healthcare delivery system	Rural
Tertiary Level of Health Care	• MC: Medical colleges • SSH: Superspeciality hospitals
Secondary Level of Health Care	• CHC: Community Health Center • SDH: Sub-District hospital • DH: District hospital
Primary Level of Health Care	• SC: Sub centers (now called health and wellness centre-Arogya mandir) • PHCs: Primary health centers
Grassroot Level workers	• ASHA

Q2.2: What are the levels of the healthcare delivery system, and what manpower is assigned at each level in urban areas?

Answer:

Level of the healthcare delivery system	Urban
Tertiary Level of Health Care	• MC: Medical colleges • SSH: Superspeciality hospitals
Secondary Level of Health Care	• Urban CHC o Metro city o Non-metro city • SDH and DH are also present
Primary Level of Health Care	• Urban PHC or Urban Health Center (u-HWC)
Grassroot Level workers	• USHA

Q2.3: Who set the guidelines for healthcare delivery system services in rural areas?

Answer: Guidelines have been set up by IPHS: Indian Public Health Standards

Q2.4: What are the key characteristics and operational details of a Sub-center in rural areas?

Answer:

	Sub-center
Population	• 1 / 5,000 in plain areas • 1 / 3,000 population in hilly areas
Categorizations	• Type A- No delivery • Type B- Delivery happens
Staff	• Type A- 3 • Type B- 4
Responsibility for maintenance	• Central government
No. of villages supervised	• 4 villages
No. of beds	• Type A: 1-2 beds • Type B: 2-3 beds

Q2.5: What are the key characteristics and operational details of a PHC in rural areas?

Answer:

	PHC
Population	• 1 / 30,000 in plain areas • 1 / 20,000 in hilly areas
Categorizations	• Type A- < 20 deliveries in a month • Type B- ≥20 deliveries/month
Staff	• Type A-13-18 • Type B-14-21
Responsibility for maintenance	• State government
No. of villages supervised	• 29 villages
No. of beds	• Type A: 4-6 beds • Type B: 6-10 beds

Q2.6: What are the key characteristics and operational details of a CHC in rural areas?

Answer:

	CHC
Population	• 1 / 1,20,000 in plain areas • 1 / 80,000 in hilly areas
Categorizations	• No categorization
Staff	• 46-52
Responsibility for maintenance	• State government
No. of villages supervised	• 158 villages
No. of beds	• >30 beds

Q2.7: What is the staff pattern in the sub-centre?

Answer:

- No medical officers in the sub-center
- Type A - 3 staff
  - Multipurpose worker (MPW)- Male/ Health worker male - HW
  - Multipurpose worker (MPW)- Female/ Health worker female- ANM
  - Safai karamchari
- Type B - 4 staff
  - 1 Multipurpose worker- Male
  - 2 Multipurpose worker- Female- ANM
  - 1 Safai karamchari

Q2.8: What is the staff pattern in the PHC?

Answer:

- 3 medical officers

  - 1 medical officer in charge (MBBS)
  - 1 AYUSH
  - 1 Dental MO
- Health Assistant Male - HA
- Health assistant, Female or LHV (lady health visitor)
- 1 Pharmacist (1/10,000 population)
- 1 Lab technician

Q2.9: What is the staff pattern in the CHC?

Answer:

• 1 MD physician • 1 MS surgery • 1 MS obs /gyne • 1 MD pediatrics • 1 MD anesthesia • 1 Ophthalmologist **(1 ophthalmologist can visit 5 CHCs / 5 lac population)** • 1 ENT surgeon • 1 dental surgeon • 1 MD PSM	• 1 Medical officer • 1 AYUSH officer • **Health supervisor Male** • **Health supervisor Female** • Staff nurse - 10 or more • Lab technician • Pharmacist • 1 Ophthalmic assistant- paramedical • 1 radiographer • Statistician • Registration clerk

Q2.10: Who are the grassroot-level/field-level workers in rural areas?

Answer:

- ASHA
- AWW- Anganwadi worker
- TBA- Trained birth attendant
- VHG- Village health guide

Q2.11: What are the key qualifications, population norms, training details, and limitations of an ASHA worker?

Answer:

- Education- 10th pass
- Population norms
  - Existing: 1 ASHA / 1000 population
  - Proposed: 2/1000
- Training- Requires 23 days of training
- Limitations- Cannot give vaccine

Q2.12: What are the key qualifications, population norms, training details, and limitations of an AWW (Anganwadi worker)?

Answer:

- Education- 10th pass
- Population norms

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  - 1 AWW: 400-800 in plain areas
  - 1 AWW: 300- 800 in hilly areas
- Training- Requires 4 months of training
- Limitations- Can give vaccine

Q2.13: What are the key qualifications, population norms, training details, and limitations of a TBA (Trained birth attendant)?

Answer:

- Education- No educational qualification needed
- Population norms- 1 / 1000 population
- Training- Requires 1 month of training
- Should conduct at least 2 supervised deliveries during 1 month of training and register pregnant females

Q2.14: What are the key qualifications, population norms, training details, and limitations of a VHG (Village health guide)?

Answer:

- Education- 6th pass
- Population norms- 1 / 1000 population
- Training- Requires 3 months of training
- Responsible for Health education

Q2.15: Which type of health worker is a prime example of community participation in healthcare?

Answer:

- ASHA worker

Q2.16: What are the eligibility criteria and the selection process for an ASHA worker in a village?

Answer:

- A local resident of the community
- Age: 25 - 45 years
  - She is married/divorced/separated/widowed
  - She can have more than or equal to 1 child
- She is elected by the village panchayat under the supervision of a medical officer
- Accountability towards the village panchayat

Q2.17: What is the duration of the training period for ASHA workers, and who trains them

Answer:

- Duration of training: 23 days by ANM or Anganwadi worker

Q2.18: What is the main function of an ASHA worker?

Answer:

- The main function of the ASHA worker is to mobilize the community

Q2.19: What are the roles & responsibilities of an ASHA worker?

Answer:

- Identify target beneficiaries and support ANM in conducting outreach sessions

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- Promote the formation of Women's Health Groups
- Provide information to the community
- Facilitate access to health and related services
- Accompany pregnant women and children requiring treatment/admission
- Facilitate the development of a comprehensive health plan
- Facilitate the construction of community/household toilets
- Acts as depot holder of things like ORS, contraceptives etc.,
- Maintain necessary information and records

Q2.20: What are the job responsibilities of HW female / MPW female / ANM?

Answer:

- Registers pregnant women
- Conducts deliveries and 2 post-natal visits
- Maintains special register -Eligible couples register
- Identifies high-risk pregnancies and referrals
- Performs hemoglobin and urine testing
- MTP: Identification and referral
- Nutrition: Identify and referral to IFA, Vitamin A
- Immunization
- Dai training
- Record keeping
- Identify and notify communicable diseases
- Vital events record maintenance
- Treatment of minor ailments
- Team activities

Q2.21: What are the job responsibilities of HW male / MPW Male?

Answer:

- Prepare malaria slides
- Chlorination
- Collects sputum samples
- Maintenance of records
- Identify diarrhea/dysentery cases

Q2.22: What are the job responsibilities of both male and female MPWs?

Answer:

- Distribute contraceptives
- Distribute ORS
- Vaccination
- Maintain a vital records register
- Identify suspected cases of diseases like vector-borne diseases, NCDs, leprosy, and TB

Q2.23: What is the principal unit of administration in India?

Answer:

- A District is the principal unit of administration in India

BIG QUESTION 3: What are the key demographic characteristics of urban areas in the context of health care delivery services?

Broad answer:

- Population norm: > 50,000
- 75% of the male working population is involved in the non-agricultural sector

DETAILED QUESTIONS

Q3.1: What are the different levels of healthcare delivery services in urban areas, and what are the key characteristics and facilities associated with each level?

Answer:

Primary level	• U- PHC / urban health center o U-PHC: 1/50,000 population o U-HWC: 1/15000-20000 population
Secondary level	• Urban CHC in Metro city o 1 per 5 lac population o 100 beds • Urban CHC in Non-Metro city o 1 per 2.5 lac population o 30-50 beds
Tertiary level	• Medical college and super-specialty hospital

Q3.2: Who are the key ground-level health workers in urban areas, and what are their typical population or household coverage norms?

Answer:

- 1 Urban ANM- for every 10,000 population
- **USHA- Urban Social Health Activist**
  - o 1/1,000- 2,500 population
  - o 1/250- 500 households
- **Mahila Arogya Samiti- Present in urban areas**
  - o 1/250- 500 population
  - o 1/50- 100 households

Q3.3: What is the typical staffing pattern for a U-PHC (Urban Primary Health Center)?

Answer:

- 1 medical officer- full-time
- 2nd medical officer- part-time
- Nurse- 3
- LHV- 1
- Pharmacist- 1
- ANM- 3-5
- Program health Manager /Mobilization officer- 1
- Support staff- 3
- Monitoring and evaluation- 1

Q3.4: What is the Panchayati Raj Institution, and which committee proposed it?

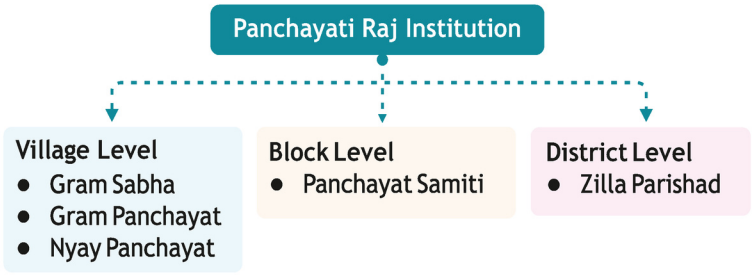
Answer:

- Panchayati Raj Institution is a rural local self-government that links villages to the districts
- Given by the Balwant Rai Mehta committee



Q3.5: What are the different levels of the Panchayati Raj Institution, and the bodies associated with each level?

Answer:



Q3.6: Who represents the first point of contact for people with India's healthcare delivery system at the grassroots level?

Answer: The first point of contact for people with the health care delivery system of India at the grassroot level is **ASHA workers**

Q3.7: Which of the statements regarding PHC is correct

A. Provision of total beds at PHC is 4 - 6

B. 1 PHC covers a population of 3000 in hilly areas

C. Staff at PHC must have an obstetrician and a gynecologist

D. PHCs with ≥10 deliveries are considered as type B PHCs

Answer:

- **A. Provision of total beds at PHC is 4 - 6**
- In hilly/tribal areas, a PHC covers 20,000 population, not 3,000.
- PHC staff does not mandatorily include a specialist like an obstetrician
- Type B PHCs are those conducting ≥20 deliveries/month, not 10

Q3.8: One PHC supervises how many sub-centres?

A. 4

B. 5

C. 6

D. 8

Answer:

- **C. 6**
- Under the Indian public health system, one Primary Health Centre (PHC) typically supervises around 6 Sub-Centres (SCs). This structure ensures effective monitoring, support, and referral services from the PHC to the SC level

Q3.9: A trained birth attendant is for:

A. 1000

B. 3000

C. 10,000

D. 50,000

Answer:

- **A. 1000**
- A Trained Birth Attendant (TBA) is typically assigned to serve a population of 1,000 in rural areas to ensure safe delivery practices and maternal care at the community level

Q3.10: All of the following are grassroot-level workers except:

A. Anganwadi worker

B. Trained birth attendant

C. Multipurpose worker

D. Health Assistant

Answer:

- **D. Health Assistant**
- A health assistant has a supervisory role and is not directly engaged at the community level. They supervise grassroot workers like ANMs.

Q3.11: First referral unit (FRU):

A. Sub-center

B. PHC

C. CHC

D. Medical college and hospital

Answer:

- **C. CHC**
- A First Referral Unit is a facility equipped to provide emergency obstetric and newborn care, including 24/7 services like caesarean sections, blood transfusions, and newborn care. In India, a CHC is typically designated as an FRU and serves as the first point of referral beyond the PHC level.

Q3.12: Primary urban health centre covers a population of:

A. 30000

B. 50000

C. 10000

D. 120000

Answer:

- **B. 50000**

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30. MISCELLANEOUS:INTERNATIONAL HEALTH/ SOURCES OF HEALTH INFORMATION/MTP ACT

BIG QUESTION 1: Write briefly about the goals and organization under International Health.

Broad answer:

PYQ: FMGE 2020

- International health is a broad and dynamic field that involves collaborative efforts among various organizations, governments, and communities to improve health outcomes worldwide, particularly for vulnerable populations.
- Various organizations under International Health are:
  - World Health Organization
  - United Nations Development Programme
  - United Nations Children's Fund

DETAILED QUESTIONS

Q1.1: When was the World Health Organization (WHO) established, and where is its headquarters?

Answer:

- Started on 7th April 1948
- Headquarters - Geneva

Q1.2: Who is the main governing body of the WHO?

Answer:

- World Health Assembly

Q1.3: When is World Health Day celebrated, and what is the theme of World Health Day?

Answer:

- World Health Day is celebrated on 7th April
- Theme of World Health Day: My health, my right

Q1.4: How many specific regions does the WHO have, and where is the headquarters of the South-East Asian region located?

Answer:

- WHO has 6 specific regions
- Headquarters for the South-east Asian region: Delhi

Q1.5: Which organization was responsible for framing the Sustainable Development Goals (SDGs)?

Answer:

- **The United Nations Development Programme (UNDP)** framed the Sustainable Development Goals (SDGs) in collaboration with the **UN.**

Q1.6: When was the UNDP established, and where is its headquarters?

Answer:

- Established in 1966
- Headquarters - New York

Q1.7: Where is the headquarters of the United Nations located?

Answer:

- New york

Q1.8: Which international institution assists countries around the world financially?

Answer:

- The World Bank is headquartered in Washington
- It assists all the countries financially

Q1.9: Which UN agency is responsible for population-related activities, and where is its headquarters located?

PYQ: FMGE 2020

Answer:

- United Nations Fund for Population Activity
- Headquarters - New York

Q1.10: Where is UNICEF's headquarters located, and what is its purpose?

Answer:

- The United Nations International Children's Emergency Fund is headquartered in New York.
- It works predominantly for child health.

Q1.11: What is the GOBI-FFF campaign given by UNICEF, and how does it help?

Answer:

- **GOBI - FFF** campaign was given by UNICEF
  - **G**: **G**rowth monitoring
  - **O**: **O**RS
  - **B**: **B**reastfeeding
  - **I**: **I**mmunisation
  - **F**: **F**emale Literacy
  - **F**: **F**amily Planning
  - **F**: **F**ood Supplements
- It helps in ICDS projects, Applied Nutrition projects

Q1.12: Where is the Food and Agriculture Organization (FAO) headquartered, and what are its initiatives?

Answer:

- Headquarters - Rome
- It has taken the initiative for the 3 F's:
  - Farming
  - Forestry
  - Fisheries

Q1.13: Where is the International Labour Organisation headquartered?

Answer:

- Headquarters - Geneva

Q1.14: Where is the headquarters of UNAIDS, and what is the policy set by UNAIDS?

Answer:

- Headquarters - Geneva
- The UNAIDS has set the policy to achieve 95-95-95 targets
- 95% of all people living with HIV know their HIV status
- 95% of those diagnosed receive sustained antiretroviral therapy (ART)
- 95% of those on ART achieve viral suppression

Q1.15: Where is the headquarters of the International Red Cross, and what is its purpose?

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Answer:

- The headquarters are in Geneva
- It provides for war victims and also in disasters

Q1.16: What is the aim of Suraksha Clinic?

Answer:

- Suraksha clinic is an initiative of the National AIDS Control Programme, which ensures sexual and reproductive health services.

suraksha clinic
Sexual and Reproductine Health Services

Q1.17: What is the aim of the Rockefeller Foundation and the Ford Foundation, and where is their headquarters located?

Answer:

- The headquarters of both of them are located in New York
- They particularly work for rural health

The ROCKEFELLER FOUNDATION

Ford foundation

Q1.18: What is CARE, and where is its headquarters?

Answer:

- CARE is Cooperative for Assistance and Relief Everywhere
- Headquarters - Geneva

Q1.19: Which agency helps India in the National TB Control Program?

Answer:

- **Swedish International Development Agency (SIDA),** headquartered in Sweden and funded by the WHO, assists India in the National TB Control Program.

Q1.20: What is the purpose of the Danish International Development Agency, and where is its headquarters?

Answer:

- Headquarters- Denmark
- Assisting the **National Blindness Control Programme**

Q1.21: What is the Colombo Plan?

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Answer:

- The Colombo Plan was held in the setup of AIIMS at New Delhi
- It provides Cobalt Radiotherapy Units to Medical Institutions in India

Q1.22: What are some international organizations, their headquarters, and the functions they perform?

Answer:

International Organization	Headquarters	Function
United Nations	New York	Framed SDG
UNDP	New York	Framed SDG, HDI
UNICEF	New York	GOBI FFF, ICDA, Child nutrition, Applied nutrition programme
ILO	Geneva	Labour
FAO	Rome	Assist in food, forest and fisheries
USAID	Washington	Family planning, TB and HIV programme
World bank	Washington	Assist countries financially
International red cross	Geneva	War victims, disasters and first aid
Ford foundation	New York	Rural health, construction of toilets, family planning, drainage system (particularly in Calcutta), NIHAE (National Institute of health administration and education

Rockfeller foundation		• All India institute of hygiene and public health, Kolkata works for rural health and sanitation • It works for Hook worm infestation in Madras
SIDA		Assist TB programme in India
DANIDA		Blindness programme
COLOMBO PLAN		AIIMS Cobalt Radiotherapy unit to medical institutions in India
CARE		Cooperative for assistance and Relief Care

Q1.23: What are the functions of CARE in India?

Answer:

- CARE assists in:
  - Integrated Nutrition and Health Project
  - Improving Women's Health Project
  - Anaemia Control Project
  - Improved Health Care for Adolescent Girls' Project Child Survival Project
  - Family Spacing Project
  - Konkan Integrated Development Project

Q1.24: Who are the beneficiaries of the World Food Programme?

Answer:

- The World Food Programme is the World's largest international food organization.
- Beneficiaries: Poor women and children at risk, poor first dependent population

Q1.25: What is the India mix?

Answer:

- The World Food Programme developed the India mix
- India-mix - **40% maize, 40% wheat, and 20% full-fat soya bean fortified by micronutrients (iron, calcium, vitamin A)** distributed through the ICDS project

Q1.26: Under applied nutrition programs in school, which organization provides the seed and manure

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A. CARE
B. WHO
C. UNICEF
D. UNDP

Answer:

- **C. UNICEF**
- The goal is to encourage nutrition education and improve the availability of locally grown nutritious food for children

Q1.27: Which of the following statements is correct regarding cancer treatment according to the Colombo plan?

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A. Setting up a chemotherapy unit
B. Setting up PET scan units for cancer diagnosis
C. Setting up cobalt therapy units
D. Manpower strengthening

Answer:

- **C. Setting up cobalt therapy units**
- Setting up Cobalt therapy units for cancer treatment at medical institutions in India was part of the Colombo Plan
- Regional organization that promotes the concept of collective intergovernmental effort to strengthen the economic and social development of member countries in the Asia-Pacific region
- Membership: 20 developing countries
- 6 non-regional members - Australia, Canada, Japan, New Zealand, the UK, USA
- AIIMS at New Delhi was established with financial assistance from New Zealand
- Canada supplied Cobalt Therapy Units to Medical Institutions in India.

Q1.28: As per the Sustainable Development Goals, the target for MMR is to achieve a maternal death rate of:

A. <70/Lac live births
B. <100/lac live births
C. <7/1000 live births
D. <10/1000 live births

Answer:

- **A. <70/Lac live births**
- As per the Sustainable Development Goals (SDG) set by the United Nations, the target for Maternal Mortality Ratio (MMR) is to reduce it to less than 70 per 100,000 live births (i.e., <70/lakh) by the year 2030. This is a global goal to ensure safer motherhood and reduce maternal deaths

BIG QUESTION 2: Write briefly about the Sustainable Development Goals and which goals are related to health?

Broad answer:

- The Sustainable Development Goals (SDGs) are a collection of 17 interlinked global goals and 169 targets designed to be a "blueprint to achieve a better and more sustainable future for all."
- Direct health-related goal -Goal 3
- Indirect health-related goals: 1, 2, 4, 5, and 6

DETAILED QUESTIONS

Q2.1: What are the 17 global goals adopted by the United Nations to achieve a better and more sustainable future by 2030?

Answer:



Q2.2: What are the targets of Goal No. 3 in the Sustainable Development Goals (SDGs)?

Answer:

- Goal No. 3 has 13 targets related directly to health
- Targets:
  - Reduce MMR <70/100000 Live births
  - Reduce the neonatal mortality rate to 12/1000 LB and under 5 to 25/1000 LB
  - Reduce communicable disease
  - Reduce premature mortality due to NCDs by 33%

BIG QUESTION 3: Write briefly about Bioterrorism agents and how many categories of bioterrorism agents are present?

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Broad answer:

- Bioterrorism agents are biological agents (like bacteria, viruses, fungi, or their toxins) that are intentionally released or disseminated to cause illness or death in people, animals, or plants, to create fear, panic, or to achieve political/social objectives
- Bioterrorism agents are categorized into Categories A, B, and C

DETAILED QUESTIONS

Q3.1: What are the key features of Category A bioterrorism agents?

Answer:

- Category A bioterrorism agents pose the highest risk to national security because they
  - Can be easily disseminated or transmitted from person to person
  - Results in high mortality rates
- Have the potential to cause public panic and social disruption
- Require special preparedness action

Q3.2: What are the key features of Category B bioterrorism agents?

Answer:

- Category B bioterrorism agents pose the second-highest risk because they
  - They are moderately easy to disseminate
  - Results in low mortality rates
- Require enhancement of diagnostic and surveillance capability

Q3.3: What are the key features of Category C bioterrorism agents?

Answer:

- Category C bioterrorism agents are emerging pathogens that could be engineered for mass dissemination because they
  - Are available
  - They are easily produced and disseminated
- Have the potential for high mortality rates

Q3.4: What are the diseases under category A bioterrorism?

Answer:

- Anthrax
- Botulism
- Plague
- Smallpox
- Tularemia
- Viral hemorrhagic fever (e.g., Ebola, Marburg)

Q3.5: What are the diseases under category B bioterrorism?

Answer:

- West Nile Virus
- Caliciviruses
- Hepatitis A
- Ricin toxin
- Salmonella
- Diarrheagenic E. Coli
- Brucellosis
- Psittacosis
- Typhus fever

Q3.6: What are the diseases under category C bioterrorism?

Answer:

- Nipah virus
- Hanta virus

Q3.7: What are the diseases covered under the International Health Regulations?

Answer:

- Cholera
- Plague
- Yellow Fever
- Wild Polio
- SARS
- Smallpox
- Human Influenza
- They cause a public health emergency and international concern.

Q3.8: What are the Diseases covered under International Surveillance by the WHO?

Answer:

- Louse-borne typhus fever
- Relapsing fever
- Polio
- Human Influenza
- SARS
- Smallpox
- Ebola

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Q3.9: What are the Tropical Diseases Targeted by WHO for Research and Training?

Answer:

- Vector-borne Diseases
- Malaria · Filariasis
- Leishmaniasis
- Schistosomiasis
- Trypanosomiasis
- Leprosy

BIG QUESTION 4: What are the different sources of health information, and what is their significance in public health?

Broad answer:

- Civil Registration System (CRS)
- Sample Registration System (SRS)
- National Family Health Survey (NFHS)
- Census

DETAILED QUESTIONS

Q4.1: What is the role of the Civil Registration System (CRS) in India, and what are the timelines for birth and death registration under it?

Answer:

- The Civil Registration System is the least efficient health information collection system
- It is overseen by the Office of the Registrar General of India
- **Birth registration:**
  - Birth should be registered in India within 21 days
- **Death registration**
  - Death should be registered in India within 21 days
  - NRI is registered within 60 days of arrival

Q4.2: What is the Sample Registration System (SRS)?

Answer:

- SRS is the Sample Registration System, a Dual recording system done by a part-time enumerator that is cross-matched by a full-time enumerator
- It is the most efficient health information collection system.

Q4.3: Who oversees the functioning of SRS, and what are the health indicators provided by SRS?

Answer:

- SRS is overseen by the Office of the Registrar General, India
- SRS provides annual estimates of CBR, CDR, IMR, MMR, and Natural growth rate

Q4.4: What is the National Family Health Survey (NFHS), and how frequently is it conducted in India?

Answer:

- NFHS is the National Family Health Survey
- As of now, NFHS has completed 5 successful rounds

- The last was conducted from 2019 to 2021
- Large-scale multi-round survey
- Done every 5-6 years at the National and State levels.

Q4.5: What types of health data are collected through the National Family Health Survey (NFHS) in India?

Answer:

- Fertility, infant and child mortality, the practice of family planning, maternal and child health, reproductive health, nutrition, anaemia, utilisation and quality of health and family planning services status data, and immunisation.

Q4.6: Who oversees the functioning of NFHS?

Answer:

- Functioning of NFHS is overseen by the Institute of Population Sciences, Mumbai, under the MOHFW.

Q4.7: What is the purpose of the Census in India, how often is it conducted, and which ministry is responsible for it?

Answer:

- Census is a union subject conducted every 10 years
- Purpose:
  - Demographic structure of the population
  - Census stop: Population count is declared on 1st March 00:00 hours
- Overseen by the Ministry of Home Affairs

BIG QUESTION 5: What are the criteria, indications, and objectives of the Medical Termination of Pregnancy (MTP) Act?

Broad answer:

- The Medical Termination of Pregnancy (MTP) Act is a crucial piece of legislation in India that governs the legality of abortions.
- The MTP Act of 1971 legalised abortion under certain specified conditions
- The primary objective was to reduce maternal mortality and morbidity due to unsafe and illegal abortions performed by untrained individuals in unhygienic conditions

DETAILED QUESTIONS

Q5.1: When was the MTP Act last revised?

Answer:

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- The MTP Act was last revised in 2021

Q5.2: What are the medical opinion requirements for termination of pregnancy at different gestational ages under Indian law?

Answer:

< 20 weeks	1 Doctor opinion for all indications
20-24 weeks	2 Doctors opinion is required in all conditions except social (contraceptive failure)
>24 weeks	It has to come under medical board Indications are Therapeutic and Eugenic

Q5.3: What are the legal indications for medical termination of pregnancy in India?

Answer:

- Therapeutic: The Life of the mother is endangered
- Eugenic: Fetal anomaly
- Humanitarian: Incest/Minor/Rape/mentally ill/Marital status change
- Social: Contraceptive failure

Q5.4: What is the consent process for Medical Termination of Pregnancy (MTP)?

Answer:

- Age for consent:18 years
- Consent of husband needed- Not required

31. ALLIED HEALTH SCIENCES

BIG QUESTION 1: What are the different types of occupational diseases, their sources, and their features?

Broad Answer: Occupational health is a branch of public health that deals with the prevention, diagnosis, and management of diseases and injuries resulting from workplace exposures. Among the most significant occupational illnesses are pneumoconioses-lung diseases caused by inhalation of inorganic dust. Silicosis results from inhaling silica dust and leads to progressive fibrosis, whereas asbestosis is caused by asbestos fibers and is associated with malignancies, such as mesothelioma. Bagassosis, caused by inhaling sugarcane dust, and byssinosis, seen in cotton industry workers, are examples of hypersensitivity pneumonitis and obstructive airway disease, respectively. Anthracosis, or coal worker's pneumoconiosis, is caused by coal dust accumulation in the lungs, and farmer's lung is a hypersensitivity reaction to moldy hay or grain. These conditions highlight the importance of preventive occupational safety measures and early detection.

DETAILED QUESTIONS

Q1.1: What is pneumoconiosis?

Answer:

- Occurs due to inhalation of dust particles.
- 0.5-3 microns - most dangerous size - they go to the lower respiratory tract, causing maximum damage.
- Causes: Restrictive lung diseases.
- Most dangerous: Insoluble fibers

Q1.2: What are the types of pneumoconiosis caused by inorganic mineral dust particles?

Answer:

Pneumoconiosis	Dust Particle (Inorganic Mineral Dust)
Asbestos	Asbestos fibers
Anthracosis	Coal dust
Aluminosis	Aluminium
Silicosis	Silica dust
Siderosis	Iron
Baritosis	Barium
Lithosis	Stone Industry

Q1.3: What are the types of pneumoconiosis caused by organic or soluble dust?

Answer:

Pneumoconiosis	Organic or Soluble Dust
Byssinosis	Cotton dust
Bagassosis	Sugar cane dust

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Tobaccosis	Tobacco
Farmer's Lung	Moldy hay/ grain dust
Bird Fancier Lung	Bird droppings

Q1.4: What are the common occupational sources or industries associated with various types of pneumoconiosis?

Answer:

Silicosis	Sandstone industry, granite industry. Pottery industry, ceramic industry, gold, mica and steel industry, glass factory, building and construction work, rock mining
Asbestosis	Cement factory, fireproof industry, construction, airplanes
Anthracosis	Coal mines
Baritosis	Photography, printing, barium diagnostic works
Byssinosis	Textile industry
Bagassosis	Cane sugar factories, paper and cardboard factories-Fibrous residue from bagasse used in paper factories
Farmer's lung	Agricultural industry
Siderosis	Iron mines, Iron, and steel industry

Q1.5: What are the X-ray changes seen in pneumoconiosis?

Answer:

Ground glass	Seen in asbestosis
Black lung	Seen in Anthracosis
Mottling	Seen in Bagassosis
Fine nodular opacity	Seen in Farmer's lung
Snowstorm	Seen in silicosis

Q1.6: What is the most common pneumoconiosis seen in India?

Answer: Silicosis is the most common pneumoconiosis and is the most common cause of death and disability (epidemiology in India)

Q1.7: What are the common diseases associated with different pneumoconioses?

Answer:

- Mesothelioma and lung cancer: Asbestosis
- Progressive massive fibrosis: Anthracosis
- Tuberculosis: Silicosis

Q1.8: What is silicosis? Write about occupational causes, time of development, radiological features, lung involvement, and type of fibrosis seen in silicosis.

Answer:

- First reported in India in the Kolar mines.
- Inhalation of silica dust
- Components of silica dust-free silica or silicon dioxide

Occupation	Sandblasting, Pottery
Time to Develop	A few months to 6 years for development
Diagnosis	X-ray appearance: Snowstorm
Portion of the lung affected	The upper part of the lung
Fibrosis	Dense Nodular fibrosis

- **The most common implicated form is Quartz**
- **Associated with TB: Silicotuberculosis**

Q1.9: What is silicotuberculosis?

Answer:

- Silicosis is more prone to pulmonary TB
- Sputum in silicotuberculosis rarely shows tubercle bacilli
- Children and women with Silicotuberculosis do not develop tuberculosis
- Post mortem on silicotuberculosis failed to prove the existence of TB disease and showed them to be cases of pure silicosis.

Q1.10: What are the features of asbestosis?

Answer:

Exposure	Asbestos Fiber
Occupation	Cement industry
Time to develop	5-10 years of exposure
Diagnosis	• X-ray shows ground glass appearance, • Sputum contains asbestos bodies (Asbestos fiber-coated fibrin: ferruginous bodies)
Portion of the lungs affected	The basal portion of the lung field
Fibrosis	Diffuse fibrosis
Notifiable disease	Yes

Q1.11: What are the types of various asbestos fibers?

Answer:

1. Serpentine or chrysolite variety

- The most commonly implicated form - 95% curly fibers

2. Amphibole Variety

- Dangerous form

Q1.12: What are the diseases caused by asbestos?

Answer:

Diseases caused	Asbestos may lead to pulmonary fibrosis, carcinoma of the bronchus, mesothelioma of the peritoneum, and cancer of the GIT
Most specific manifestation	Mesothelioma
Most common presentation	Adenocarcinoma of lungs

Q1.13: What are the causes, causative organism, first reporters in India, X-ray findings, and legal status under the Factories Act for Bagassosis?

Answer:

- Caused - Inhalation of sugar cane fibers, the Cardboard industry, and the paper industry
- Infested by a fungus known as **Thermoactinomyces sacchari**
- Reported in India by two people- Ganguly and Pal
- X-ray findings of the lung fields: Mottling
- Non-notifiable disease according to the Factories Act.

Q1.14: What fungal control measures should be advised to farmers to prevent bagassosis?

A. 1% propionic acid

B. 1% acetic acid

C. 2% acetic acid

D. 2% propionic acid

Answer: D. 2% propionic acid

- To prevent bagassosis, a lung disease caused by inhaling moldy sugarcane dust (bagasse), farmers should be advised to spray the stored bagasse with a 2% propionic acid solution.
- This acid acts as an effective antifungal agent, preventing the growth of the thermophilic actinomycetes (like Thermoactinomyces sacchari)

Q1.15: What is the cause of byssinosis and which occupational workers are affected?

Answer:

- Caused: Inhalation of cotton fibers
- Commonly seen in the jute and textile industry
  - Spinners are more affected than weavers

Q1.16: What are the causes and manifestations of anthracosis?

Answer:

- Exposure to coal dust.
- It presents with black lung.
- **Initially, it manifests as simple coal worker pneumoconiosis, which occurs after exposure for 10-12 years and is reversible. Later can progress to progressive massive fibrosis, which is irreversible.**

Q1.17: What is Farmer's lung, and how is it prevented?

Answer:

- Cause: Inhalation of moldy hay/grain dust
- Infested by fungus - **Micropolyspora faeni**
- Prevention: 1% mineral oil.

Q1.18: What are the examples of pneumoconiosis caused by organisms?

Answer:

- Bagassosis: **Thermoactinomyces sacchari**
- Farmers' lung: **Micropolyspora faeni**
- Compost lung: Aspergillus

BIG QUESTION 2: What are the features, investigations, and treatment of lead poisoning?

Broad Answer: Lead poisoning occurs due to exposure to various toxic lead compounds. Chronic lead poisoning presents with distinct clinical features affecting multiple systems. Diagnosis is confirmed by characteristic lab investigations, and treatment involves chelating agents. Understanding both the toxic sources and classical signs is essential for identification and management.

DETAILED QUESTIONS

Q2.1: What are the poisonous compounds responsible for lead poisoning?

Answer:

- The most toxic forms of lead are lead oxide, lead carbonate, and lead arsenate.
- The least toxic form is lead sulphide

Q2.2: What are the common routes of exposure in lead poisoning?

Answer:

- The most common route -**Inhalation**
- The most common route in children is ingestion·
- Skin absorption

Q2.3: What are the effects of lead poisoning on pregnancy?

Answer: Prolonged exposure in young or pregnant women can cause **miscarriage, stillbirth, premature birth, and low birth weight.**

Q2.4: Which industries are associated with lead and its poisoning?

Answer:

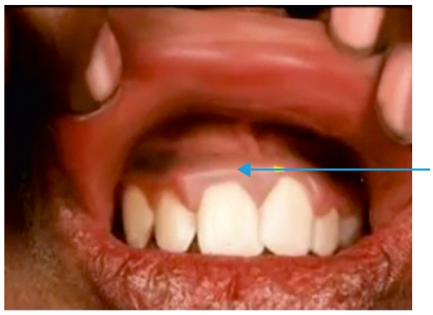
Industrial
• Manufacturing storage batteries, printing, paint, shipbuilding, lead pipes, dyes, glass manufacture, and potteries.
Non-industrial
• Gasoline from automobile exhaust (most common), drinking water through lead pipes, and ingestion of lead paints from wooden toys by children.

Q2.5: What are the clinical features of lead poisoning?

Answer:

Clinical picture of Lead poisoning	
Non-CNS effects on inorganic exposure	**CNS effect - due to organic exposure**
Anemia (facial pallor): Earliest and most consistent sign	• Insomnia • Mental confusion • Delirium • Convulsions
Burtonian line and basophilic stippling of RBCs	Encephalopathy-due to organic lead exposure
Colic-Constipation/diarrhea can also occur Wrist drop /Foot drop	

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Burtonian line indicates chronic lead poisoning deposition of lead sulphite on the gums

Q2.6: What is the most consistent finding in lead poisoning?

Answer: Facial pallor

Q2.7: What are the screening and diagnostic tests for lead poisoning?

Answer:

Coproporphyrin in urine	>150 mcg/L	Screening test-indicates exposure
Aminolevulinic acid (ALA) in urine	>5 mg/L	Indicates lead exposure
Lead in blood	>70 mcg/dL	Clinical symptoms appear
Lead in urine	0.8 mg/L	Indicates lead absorption
Basophilic stippling of RBC		Sensitive parameter for hematological response

Q2.8: What is the sensitive/screening test for lead exposure and lead absorption?

Answer:

- Sensitive/screening test for lead exposure: CPU
- Sensitive test for lead absorption: ALA

Q2.9: What is the quantitative indicator for Lead exposure and absorption?

Answer: Urine lead level

Q2.10: What is the confirmatory test for lead exposure and absorption

Answer: Blood lead level

Q2.11: What are the sensitive parameters for hematological response to lead levels and treatment

Answer: Basophilic **stippling of RBCs**

Q2.12: What is the treatment of lead poisoning?

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Answer:

- Chelating agents
  - EDTA
  - D- Penicillamine
  - Dimercaprol

BIG QUESTION 3: What are occupational-related cancers, what are their common causative exposures in the workplace, and how are they recognized in public health?

Broad Answer: Occupational-related cancers are malignancies that arise due to prolonged exposure to carcinogens in the workplace environment. These may include chemicals, dusts, metals, and radiation encountered in specific industries. Common examples include lung cancer due to asbestos (asbestosis), bladder cancer in dye industry workers, and skin cancer from exposure to tar and pitch. Such cancers are recognized under occupational health for prevention, compensation, and regulatory measures. Early detection and minimizing exposure are key to reducing their burden.

DETAILED QUESTIONS

Q3.1: What is the most common cancer seen in occupation-related cancers?

Answer: The most common is skin cancer (Squamous cell carcinoma)

Q3.2: Exposure to which chemicals causes bladder cancer?

Answer:

- Exposure to dyes, ß-naphthylamine, Auramine and magenta dyes, and Benzidine
- Benzidine also leads to leukemia.
- Rubber, gas, and electrical industry

Q3.3: What is the most common presentation and 1st investigation to be done for bladder cancer?

Answer:

- The most common form of presentation is transitional cell carcinoma.
- Most common presentation - **Hematuria**
- 1st investigation: Urine test

Q3.4: What are the examples of chemical carcinogenesis (occupational)?

Answer:

Types of Carcinoma	Predisposing Occupational Exposure
Lung	Arsenic, beryllium, cadmium, chromium, asbestosis, silica, radon, nickel, aromatic hydrocarbons
Liver	**Vinyl chloride**, arsenic
Bladder	**Benzidine, auramine,** β **naphthylamine**, paramino-diphenyl, magenta
Leukemia	**Benzene, ethylene oxide,** Roentgen rays, and radioactive substances
Skin	Arsenic, ionizing radiations, polycyclic aromatic hydrocarbons

Q3.5: All of the following are characteristic features of occupational cancers except.

A. The period between exposure and the development of the disease may be as long as 10-25 years.

B. The disease may develop even after cessation of exposure.

C. The average incidence is earlier than that for cancer in the general population.

D. The localization of tumors is variable in any one occupation.

Answer: D. The localization of tumors is variable in any one occupation.

- This statement is the exception because occupational cancers often have a specific site of localization depending on the nature of the carcinogenic exposure.
- **Note:** Changes due to occupational exposure cannot be reversed.

Q3.6: A 50-year-old male visits the urologist with a complaint of painless hematuria. The urologist advised cystoscopy. On cystoscopy, a fungating mass in the bladder was noted. Exposure to all of the following agents can cause this condition except:

A. Magenta
B. Benzidine
C. Cyclophosphamide
D. Benzene

Answer: D. Benzene

- Benzene is NOT associated with bladder cancer
- Benzene is linked to hematologic malignancies, especially acute myeloid leukemia (AML)

BIG QUESTION 4: What workplace-based strategies help maintain employee well-being, ensure fitness for duty, and support long-term occupational health?

Broad Answer: To ensure health and efficiency in the workplace, measures like monitoring sickness and tracking absenteeism are essential for identifying underlying occupational hazards. Pre-placement examinations are conducted to assess if a worker is fit for a specific job role before employment begins. In contrast, post-placement examinations are periodic checks to monitor the impact of work on health. Together, these steps help reduce the burden of occupational diseases, maintain productivity, and promote early detection and prevention of work-related illnesses.

DETAILED QUESTIONS

Q4.1: What is sickness absenteeism?

Answer:

- Reflects the state of health of workers.
- Sickness Absenteeism Rate
  - $\text{SAR} = \dfrac{\text{Total number of workers remaining absent in a year}}{\text{total workers} \times 100}$
- High SAR: Indicates low occupational health
- Rate of sickness absenteeism in India = 8-10 days/person/year

Q4.2: What are the causes of sickness absenteeism?

Answer:

- Medical
- Social
- Economic

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Q4.3: What is Pre-placement vs Post-placement Examination?

Answer:

Pre-placement	Post-placement
Before the person is employed • To see if the person is fit for the job	After the person is employed • To see if the person is deviating from their health • To see if they are developing illness due to occupational exposure
The primary level of prevention	Secondary level of prevention
Done only once	Done periodically • For most occupational exposures - done annually • For a few occupational exposures - done **monthly** • **Daily examination - Dichromate industries**

Q4.4: To prevent occupational diseases, the concept of 4Ps has been adopted. Which of the following does not belong to the 4Ps of occupational diseases?

A. Protection

B. Personal hygiene

C. Preselection check-up

D. Post-selection check-up

Answer: D. Post-selection check-up

- 4P's to prevent occupational diseases include:
  - Pre-placement check-up
  - Periodic check-up
  - Personal protection
  - Periodic measurement of the workplace environment

Q4.5: What is the definition of ergonomics?

A. Fitting the job to the worker

B. Study of human behavior

C. Process of improving industrial safety standards

D. Preventing health problems of factory workers.

Answer: A. Fitting the job to the worker

Ergonomics is the scientific study of designing the workplace, tools, and tasks to fit the worker, aiming to optimize human well-being and overall system performance. It focuses on minimizing physical strain, improving safety, and enhancing productivity by adapting the job to the person rather than forcing the person to adapt to the job.

BIG QUESTIONS 5: What is the Factory Act, and what are its key provisions relevant to occupational health and safety in industrial settings?

Broad Answer: The Factory Act is a vital piece of labor legislation in India that governs the working conditions in factories to ensure the health, safety, and welfare of workers. It lays down guidelines related to the definition of a factory, working hours, leave entitlements, and provisions for safety, hygiene, and worker welfare. It also includes a schedule of notifiable occupational diseases that must be reported. Overall, the Act aims to regulate industrial work environments to prevent exploitation and promote workers' well-being.

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DETAILED QUESTIONS

Q5.1: In which year was the Factories Act enacted in India?

Answer: 1948

Q5.2: In what year was the Factory Act established?

Answer: The Factory Act was established in 1948.

Q5.3: What is the definition of a factory?

Answer:

- This act defines a factory as an establishment employing o
  - o 10 or more workers where power is used.
  - o 20 or more than 20 workers, where power is not used.

Q5.4: What are the important features of the Factory Act?

Answer:

- No distinction between perennial (running throughout the year) and seasonal factories.
- All over India
- Workers include contract labor employed in the manufacturing process.
- Prohibits employment of children less than 14 years.
- A child between 15 to 18 years old must be certified as fit for work by a certified surgeon. Adolescents > 18 yrs can work without a certificate.

Q5.5: What are the recommended hours of work under the Factory Act?

Answer:

- 48 hours per week or 9 hours per day.
- 60 hours per week, including overtime.
- Adolescents can work 4.5 hours per day.

Q5.6: What are the leave entitlements under the Factory Act?

Answer:

- 1 day per 15 days of work for adolescents and
- 1 day per 30 days for adults
- Leaves can be accumulated up to 40 days for adolescents and up to 30 days for adults. Health, safety, and welfare recommendations

Q5.7: What are the health, safety, and welfare requirements for workers regarding space, staffing, facilities, and employment restrictions for adolescents and women?

Answer:

- Minimum cubic feet per space: 500 cubic feet per space per worker.
- 1 Safety officer: per >1000 workers
- 1 Welfare officer: per >500 workers
- 1 Canteen: per >250 workers
- 1 Creche: per 50 women workers

- Adolescents aged 15-18 years and women cannot be employed in dangerous work.
- Women can work between 6 am -7 pm and not during the night.

Q5.8: What are the notifiable occupational diseases under the Factory Act?

Answer: Under the Indian Factories Act 1948, 29 diseases are notifiable.

- Anthracosis
- Asbestosis
- Byssinosis
- Silicosis
- Occupational cancers
- Occupational dermatitis
- Noise-induced hearing loss.

Note: Bagassosis is not notifiable under the Factory Act.

Q5.9: The Factory Act was established in 1948 for the betterment of laborers. Which of the following is true about the Factories Act?

A. Children under 14 years of age must not be employed in factories
B. The maximum working hours for an adult, including overtime, is 72 hrs
C. A 15-year-old adolescent can work 7 hrs a day
D. Adults can work 8 hrs per day.

Answer: A. Children under 14 years of age must not be employed in factories

BIG QUESTION 6: What is the ESI Act, and what are its major provisions related to employee health and social security?

Broad Answer: The Employees State Insurance (ESI) Act is a social security legislation enacted in 1948 to protect employees against the risks of sickness, maternity, disability, and death due to employment injury. It ensures medical care to insured persons and their families through a contributory system. The ESI Act applies to non-seasonal factories and certain establishments employing 10 or more workers. The scheme is administered by the Employees State Insurance Corporation (ESIC) and includes benefits like medical, sickness, maternity, disablement, and dependent benefits, along with funeral and vocational rehabilitation benefits. It plays a vital role in promoting occupational health and reducing absenteeism due to illness or injury.

DETAILED QUESTIONS

Q6.1: What is the logo for the ESI Act?

PYQ: NEET PG 2023 PYQ: FMGE 2021,2022

Answer:



Q6.2: In what year was the Employees' State Insurance (ESI) Act established?

Answer: The Employees' State Insurance (ESI) Act was established in 1948.

Q6.3: What are the important features of the ESI act?

Answer:

- It's an important measure of social security and health insurance in India.
- Covers all the factories in India, excluding railways, defense, and mines.

Q6.4: Which establishments are covered under the Employees' State Insurance (ESI) Act in India?

Answer:

- All non-seasonal factories, employing 10 or more persons, for wages on any day in the implemented areas.
- All power-using factories employ 10 or more workers.
- Shops, hotels and restaurants, cinemas and theaters
- Road-motor transport establishments
- Newspaper establishments
- Medical institutions in a few states and UT employ 20 or more workers

Q6.5: Who administers the Employees' State Insurance (ESI), under which ministry, and what are the eligibility income limits for normal and disabled employees?

Answer:

- Administration: Autonomous body (ESI Corporation)
- Ministry of Labour: Union minister of labor
- Eligibility criteria: Employees earning up to Rs. 21000 / month are eligible to avail benefits
- For disabled people: Employees earning up to 25,000/month are eligible

Q6.6: What are the contribution rates for Employers, Employees, and the Government under the Employees' State Insurance (ESI) scheme, and are there any exemptions?

Answer:

- Employer contribution: 3.25% of the total wage bill.
- Employee contribution: 0.75% of the total wage bill.
  - Total contribution: 4%
- Employees earning less than Rs 176 per day are exempted from making any contribution.
- State government contribution: 1/8th (12%) of the total cost of medical care.
- Central government contribution: 7/8th (88%) of the total cost of medical care.

Q6.7: What are the medical benefits covered under the ESI Act? PYQ: INICET 2022

Answer:

- Full medical care, including hospitalization care, sickness care, maternity care
- Cashless benefit
- It is direct medical care - Provided by ESI hospitals.
- In indirect medical care - Provided by private hospitals empanelled under ESI hospitals.

Q6.8: What are the sickness benefits of the ESI Act?

Answer:

- Sickness benefit is offered for 91 days, continuous, at 70% wages.
- To be eligible for sickness benefits, the worker is required to contribute for 78 days in a period of 6 months.

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Q6.9: What are extended and enhanced sickness benefits?

Answer:

Extended sickness benefit

- Offered for 2 years at 80% of daily wages.
- Provided for 34 diseases, including TB, leprosy, HIV, mental illness

Enhanced sickness benefit

- Offered at 100% wages for 7 days in case of vasectomy.
- 100% wages for 14 days in case of tubectomy

Q6.10: What are the maternity benefits provided under the ESI Act?

Answer:

- Offered at 100% wages for 26 weeks.
- It can also be availed 8 weeks before delivery.
- In the case of MTP, 100% wages for 6 weeks.
- In case of pregnancy-induced confinement (sickness out of confinement), also offered at 100% wages for 4 weeks.

Q6.11: What are the disablement benefits covered under the ESI Act?

Answer:

- **Temporary disablement benefit**
  - Offered at 90% wages till the patient recovers.
- **Permanent disablement benefit**
  - Minimally offered at 90% wages, lifelong or the amount the board decides.

Q6.12: What is the dependent's benefit?

Answer:

- In case of the death of an insured person (employment-related death) under the ESI Act, a pension at the rate of 90% of daily wages will be offered to the dependent of the insured person.
- If the dependents are children, then the children of insured persons, once they turn 18 years, can avail themselves of this benefit.
- The benefit is withdrawn if the daughter marries earlier.

Q6.13: What are some miscellaneous benefits covered under the ESI Act?

Answer:

- **Rehabilitation**
  - On a monthly payment of Rs 10, the insured person and his family members continue to get medical treatment after permanent disablement or retirement.
- **Funeral expenses**
  - Rs 15,000 is provided under this act.

Q6.14: What are the healthcare infrastructure standards specified under the ESI Act?

Answer:

- **Setting up of one doctor dispensary: ≥ 1000 family units**
- Setting up of two doctor dispensaries: **≥2000 family units**

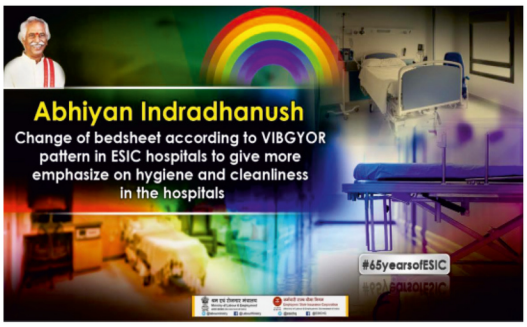
YOURWISH

- Setting up of diagnostic centers: **≥5000 family units**
- Setting up of 100 bedded hospital: **≥15000 family units**

Q6.15: What is Abhiyan Indra Dhanush?

Answer:

Change of bed sheets according to the **VIBGYOR** pattern in ESIC hospitals to give more emphasis on **hygiene** and **cleanliness in the hospitals.**



BIG QUESTION 7: What is disaster management, and how is it addressed in public health systems, including key components like planning, response, and mitigation strategies?

Broad Answer: Disaster management refers to the coordinated efforts taken before, during, and after a disaster to minimize its impact on human life and health. It involves a management cycle that includes preparedness, response, recovery, and mitigation. Key aspects include triage protocols to prioritize casualties, vaccination campaigns to prevent outbreaks, surveillance, and public education. Mitigation focuses on reducing the severity of disasters through planning and structural measures. Overall, it ensures a systematic and efficient handling of emergencies to protect population health.

DETAILED QUESTIONS

Q7.1: What are the definitions of a disaster?

Answer:

WHO Definition	• Any occurrence that caused damage, ecological disruption, loss of human life, or deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community or area.
Colin Grant's Definition	• Disaster is the occurrence of an unexpected event leading to injury or illness simultaneously to at least 30 people who will require emergency hospital treatment.

Q7.2: How are disasters classified?

Answer:

Classification of Disaster	
Natural disasters • Hydrological (most common in India): floods, landslides	**Man - Made Disasters** • Man-made disasters are also called warfare. • For Example - Accidents, nuclear warfare, biological warfare, etc.
	Bhopal Gas Tragedy • Worst man-made disaster • The gas leak of methyl isocyanate in a pesticide plant on 3rd Dec 1984. **Chernobyl tragedy** • Gas leak of cesium (Cs134, Cs137, and strontium (Sr90) from the nuclear power plant. • Gases: Iodine, cesium, and strontium.

Q7.3: What are the fundamental aspects of Disaster Management?

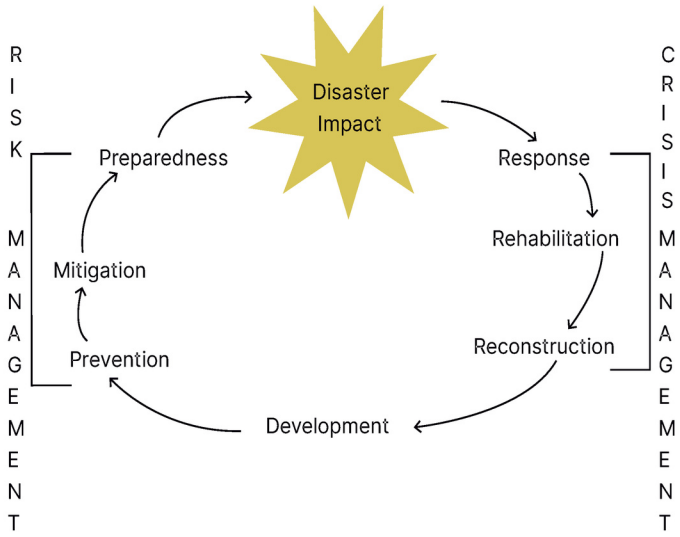
Answer: Three fundamental aspects of Disaster Management:

1. Disaster impact
2. Disaster preparedness
3. Disaster mitigation

Q7.4: What is the disaster management cycle?

PYQ: FMGE 2019,2020

Answer:



Q7.5: What are the phases of the disaster cycle?

Answer:

1° phase	• Lasts from 0 to 6 hours. • Rescue, first aid, triage, and treatment are provided.
2° phase	• Lasts from 6 to 24 hours. • Transport is provided to the hospital. • Sanitation and safe water supply is ensured by chlorination. • Prevention of communicable diseases is necessary
3° phase	• Lasts from 1 to 60 days. • Food, clothing, and shelter must be provided. • Reconstruction of damaged places.

Q7.6: What is triage?

PYQ: NEET PG 2023 PYQ: INICET 2023 PYQ: FMGE 2021

Answer:

- Categorization of victims based on the severity of injuries and the likelihood of survival.
- Triage is done after tagging the victim.

Q7.7: What is the color coding used in traige?

Answer:

Red	• High priority • Victims must be helped within 0 to 6 hours. • Require immediate resuscitation or limb-saving surgery. • E.g.- hemothorax or pneumothorax

Yellow or Blue	• Medium priority • Victims must be helped within 6 to 24 hours. • They can wait up to 24 hours.
Green	• Low priority • These victims are Ambulatory • They can move with minor injuries.
Black	• Least priority • They are either dead or moribund (likely to die)

Q7.8: What is reverse triage?

Answer:

- Used in wars and military settings.
- Minor injuries are preferred: Green color.

Q7.9: What are the common diseases seen post-disaster?

Answer:

- The most common infection post-disaster is gastrointestinal infections
- Diseases in the post-disaster phase: Diarrheal diseases, ARI, leptospirosis.
- Diseases that take time to report after disease: Vector-borne diseases (Dengue, malaria)
- The most common vitamin deficiency post-disaster is vitamin A deficiency.
- The most common long-term sequel post-disaster is protein-energy malnutrition.

Q7.10: What is the most common step post-disaster in controlling the diseases?

Answer: Most effective step post-disaster: Ensure safe water and sanitation, best done through chlorination **(The most crucial preliminary step)**

Q7.11: What is the vaccination protocol followed post-disaster?

Answer:

- All vaccines except measles are contraindicated in the post-disaster phase.
- The **measles** vaccine should be administered to children within 3 days of exposure.
  - The incubation period is 10 to 14 days.
  - The time taken for antibodies to form post-measles vaccination is 7 to 10 days.
  - This is less than the natural incubation period of the disease.
- Health professionals working in disaster-endemic zones - All the vaccines for cholera, typhoid, and hepatitis, except the Measles vaccine, are given.

Q7.12: What is disaster mitigation, and what are the engineering modalities?

Answer:

- Disaster mitigation means preventing the hazard from becoming a disaster.
- Engineering modalities are used to prevent hazards.
- **Engineering Modalities**
  - Proper land use
  - Improve building codes- Buildings should be earthquake-resistant.
  - Flood mitigation codes- Dams should be flood-resistant.
  - Protection of vulnerable populations and structures.

Q7.13: What is disaster preparedness?

Answer:

- Also called Surge capacity.
- **Surge capacity** is the proper equipment of the country to manage disasters.
- The overall capacity of the country to manage disasters must be strengthened.
- The country must have enough resources like manpower, money, materials, technical expertise, etc.

Q7.14: What are the institutional frameworks, administrative bodies related to disaster management in India?

Answer:

Disaster Management Act	• Came into force in 2005. • Vested with setting up National Disaster Management Authority (NDMA) at the National level and SDMA at the state level.
World Disaster Reduction Day	• 2nd Wednesday of October.
Nodal Ministry of Disaster Response	• Responsible for overall coordination of disaster management. • This is the Ministry of Home Affairs. • Chairperson: Prime Minister • Nodal controlling unit: **District**
National Disaster Management Authority	• Prepares disaster management plans at the national level. • Also responsible for the execution of disaster management functions at the national level.

Q7.15: What is the logo of the National Disaster Management Authority?

Answer:



Q7.16: Not true about disaster control after a disaster?

A. Gastroenteritis is the most commonly reported disease in the post-disaster phase

B. Vector-borne diseases will not appear immediately, but take several weeks for an epidemic

C. Displacement of domesticated and wild animals increases the risk of transmitting zoonoses

D. WHO recommends typhoid and cholera vaccines for routine use in endemic areas.

Answer: D. WHO recommends typhoid and cholera vaccines for routine use in endemic areas.

WHO does not recommend routine mass vaccination for typhoid and cholera immediately after a disaster; vaccines are used selectively based on risk and outbreak conditions.

BIG QUESTION 8: What are biomedical waste guidelines, and how do they ensure safe disposal and environmental protection in healthcare settings?

Broad Answer: Biomedical waste guidelines provide structured protocols for the segregation, collection, transport, treatment, and disposal of waste generated from healthcare activities. These guidelines aim to minimize risk to health workers, patients, and the environment. The waste is categorized by color-coded containers (e.g., yellow for human anatomical waste, red for contaminated plastic), and each type undergoes specific treatment such as incineration, autoclaving, or shredding. The guidelines are enforced under the Biomedical Waste Management Rules, and compliance is monitored by pollution control boards to ensure public health safety and ecological balance.

DETAILED QUESTIONS

Q8.1: What is biomedical waste?

Answer: **Any waste generated during the diagnosis, treatment, or immunization** of human beings or animals or in research activities pertaining thereto or in the production or testing of biological products.

Q8.2: What are the ministries involved in biomedical waste management?

Answer:

Ministry Involved
Ministry of Environment, Forestry and Climate Change

Roles of Ministry

- Making policies.
- Providing financial assistance for training/setting up of a common biomedical waste treatment facility.
- Operational research.
- Notify standards or operating parameters.

Role of Central Pollution Control Board (CPCB)

- Prepares guidelines on biomedical waste management and submit them to Ministry of Environment, Forestry and Climate Change.

Q8.3: What is the quantity of biomedical waste generated in India?

Answer: The quantity of waste generated in India is estimated as **1-2 kg/day/bed in a hospital and 600gm/day/bed in a clinic.**

Q8.4: What is the proportion of different types of waste generated in healthcare settings?

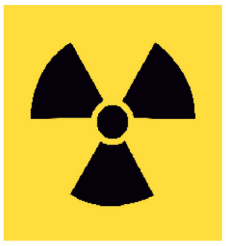
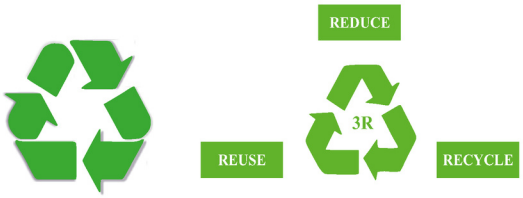
Answer: Healthcare Waste Generation

- General healthcare waste- 80%
- Biomedical waste - 20%
- Pathological and infectious waste - 15%
- Sharp waste - 1%
- Chemical and pharmacological waste - 3%
- Radioactive/Cytotoxic waste, pressurized containers, broken thermometers, used batteries - 1%

Q8.5: What are the logos used in biomedical waste management?

Answer:

Biomedical waste management	

Radiation hazard logo	
Recycling logo	

Q8.6: What are the categories of medical waste, and their methods of disposal?

Answer:

PYQ: NEET PG 2023 PYQ: FMGE 2021,2022

Color	Waste type	Method of disposal
Yellow	• Infectious. • May or may not be pretreated.	Incineration/plasma pyrolysis/deep burying
Red	• Infectious. • Rubber, plastic, tube. • No pretreatment. (subject to autoclave/hydro clave)	Recycling or reuse (road making)
Blue	• Glass and metallic implants. • No pretreatment.	Recycling or reuse.
White	• Sharps. • No pretreatment.	Recycling or reuse after shredding.

- Black bag color is for general waste: **Wrapper of a Foley catheter: black color bag.**

Q8.7: What is infectious waste according to biomedical waste management?

Answer:

- Fetus, organ, tissue, soiled cotton, gauze, dressings, bandages, casts, plasters, IUD, expired/discarded medicines, cytotoxic waste, body secretions e.g. sputum, pus, feces, X-ray developer fluids, disinfectants, linens, beddings, mattress, gowns, culture plates, blood bags, blood transfusion sets, live vaccine vial, blood products, masks, shoe cover, head cover
- Yellow bag for incineration, plasma pyrolysis, and deep burial.

Q8.8: Which biomedical wastes are disposed of in red bags, and what types of items are included?

Answer:

- Recyclable plastics, tubes, vacutainers without blood, syringes without needles, urobags, catheters, Ryle's tubes, IV drip sets, face shields, goggles

Q8.9: Which biomedical wastes are disposed of in white bags?

Answer: Sharps and other metals

Q8.10: Which biomedical wastes are disposed of in blue bags?

Answer: Orthopaedic implants, glassware, artificial pacemaker

BIG QUESTION 9: What is the role of genetics in community health, and how do concepts like eugenics, euthenics, genetic equilibrium, and counseling apply in public health settings?

Broad Answer: Genetics in public health focuses on understanding hereditary contributions to disease and promoting preventive strategies. Eugenics deals with improving genetic quality by controlling reproduction, while euthenics improves human functioning by modifying environmental conditions. The Hardy-Weinberg principle explains how gene frequencies remain stable in a population unless disrupted by external forces. Genetic counseling offers guidance on inherited disorders, helping families make informed health decisions. Together, these aspects support better community health through awareness, prevention, and responsible genetic education.

DETAILED QUESTIONS

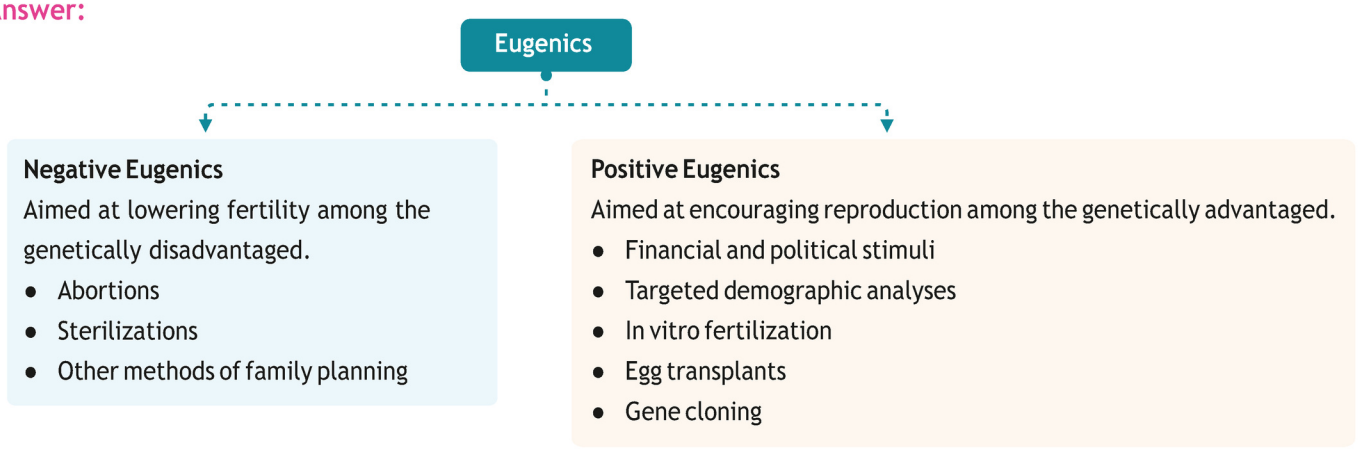
Q9.1: What is Eugenics?

Answer:

- Eugenics deals with genetic manipulation
- The term was given by Sir Francis Galton
- A **social philosophy** that advocates the improvement of human hereditary traits through **various forms of intervention** (genetic manipulation)

Q9.2: What are the types of eugenics?

Answer:



Q9.3: What is Euthenics?

Answer:

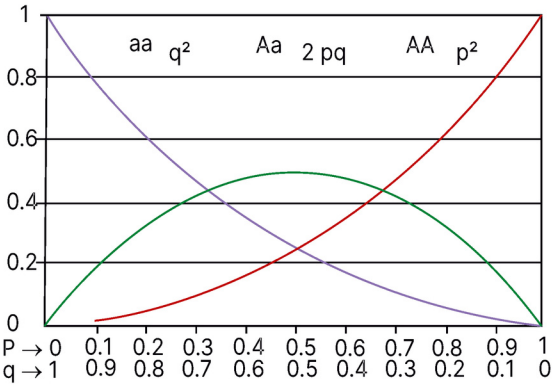
- Improving the human race via environmental manipulation
- Deals with human improvement through altering external factors
- Like education and the controllable environment, including preventing and removing contagious diseases and parasites, environmentalism, and education regarding home economics, sanitation, and housing (environmental manipulation).

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Q9.4: What is the Hardy-Weinberg Law?

Answer:

- The law states that the **genotype frequencies in a population remain constant** or are in equilibrium from generation to generation unless **specific disturbing influences** are introduced.
  - Migration is an example of a specific disturbance.
- Genetic equilibrium (HW law) is **a basic principle of population genetics; the entire principle is based on Mendelian genetics.**
- HW law assumes that the human population is static, large, and has random mating.



Q9.5: What are the conditions under which the Hardy-Weinberg principle fails to hold true in a population?

Answer:

- Small populations
- Dynamic populations
- Non-random mating
- Assortative mating
- Mutations
- Natural selection
- Gene flow
- Genetic drift
- Migration

Q9.6: What are the types of genetic counselling?

Answer:

Prospective genetic counseling	Retrospective genetic counseling
• Identify heterozygous individuals for any particular defect through screening	• Seeking genetic advice after the hereditary disorder has already occurred in the family
• Explain the risk of having affected children if they marry another heterozygous for the same gene	• Congenital anomalies, mental retardation, psychiatric illness, inborn errors of metabolism
• Sickle cell anemia and thalassemia	• Most common

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32. VARIABLES/CENTRAL TENDENCY/ DISPERSION/DISTRIBUTION

BIG QUESTION 1: What is biostatistics, and what are the two terminologies used in biostatistics?

Broad answer:

- Biostatistics: Application of statistics in the field of medicine
- There are 2 terminologies in biostatistics:
  - Variable: Anything that can take up a value
  - Data: Data is the value of variables
  - For example:
    - → Gender - Variable
    - → In a class, if there are 60 boys and 40 boys, the values 60 and 40 are the data

DETAILED QUESTIONS

Q1.1: What is the difference between descriptive and inferential statistics in terms of purpose, usage, and data handling?

Answer:

Descriptive statistics	Inferential statistics
Organize and summarize data using numbers and graphs	Use sample data to make an inference or draw a conclusion about the population
Collect, organize, summarize, and present the data	Draw conclusions, perform estimations and make predictions
Main purpose is to describe the characteristics of the sample or population	Main purpose is to draw conclusion of the population data
Uses measures of tendency and dispersion	Uses statistical tests
Used when the data set is small	Used when the data set is large

Q1.2: What is the branch of statistics that deals with describing the internal collection of data?

A. Theoretical statistics

B. Analytical statistics

C. Inferential statistics

D. Descriptive statistics

Answer: D. Descriptive statistics

- Descriptive statistics is the branch of statistics that deals with organizing, summarizing, and presenting data in a meaningful way.
- It includes measures like mean, median, mode, standard deviation, and graphical representations, helping to describe the internal characteristics of a data set without making inferences beyond it

Q1.3: What are the different types of variables in statistics, and how are they classified based on measurement and values?

Answer:

- Quantitative vs Qualitative
- Continuous vs Discrete
- Dichotomous vs Polytomous

Q1.4: How do quantitative and qualitative variables differ in terms of measurability and examples?

Answer:

Variables	
Quantitative	**Qualitative**
• Can be measured. • Can be compared • Has a unit • Examples: o Weight: Kg or grams o Height: cm or ft o Hemoglobin: g/dl	• Cannot be measured. • Cannot be compared • No unit • Examples: o Blood group o Gender o Religion o Anemia

Q1.5: What is the difference between continuous and discrete variables in statistics?

Answer: PYQ: FMGE 2020

Variable	
Continuous	**Discrete**
• Can take up many possible values and also in between values. • Can be expressed in decimals. • Quantitative	• Can take up fewer values and no in-between values. • Cannot be expressed in decimals • Qualitative
• Example: o Weight (20, 20.1, 23.5) Kg	• Example: o Gender o Blood group(A+,B+,AB+) o Anemia o Presence/ absence of a disease

Q1.6: What is the difference between dichotomous and polytomous variables in statistics?

Answer:

Variables	
Dichotomous	**Polytomous**
Take up 2 values	Take up more than 2 values
Examples: • Rh status • Presence/ absence of a disease	Examples: • Age • Religion

Q1.7: How is pulse rate categorized in terms of the type of variable?

Answer:

- Has a unit - beats/min
- It is quantitative
- Continuous
- Polyotomous
- Measurable

Q1.8: Blood pressure is which type of variable?

A. Nominal

B. Qualitative

C. Discrete

D. Continuous

Answer: D. Continuous

- Nominal - Blood group (A, B, AB, O)
- Qualitative - Eye color (brown, blue, green)
- Discrete - Number of children in a family (e.g., 2, 3, 4)

Q1.9: Which of the following is a continuous variable?

A. Blood group

B. Weight

C. Religion

D. Sex

Answer: B. Weight

- Blood group: Nominal variable
- Religion: Nominal variable
- Sex: Nominal variable

Q1.10: What are the different scales of measurement used in statistics?

Answer:

- Categorical scale
- Dimensional/Metric Scale

Q1.11: What are the two types of categorical scales used for qualitative variables, and can you give examples for each?

Answer:

Categorical Scale	
Qualitative Variable	
Nominal Scale	Ordinal Scale
Based on names	Based on order/ranking

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Examples: • Gender • Religion • Blood group • Type of delivery	Examples: • Staging of cancer • Grading of hypertension • Severity of anemia • APGAR score • Glasgow Coma scale • Child Park score • Likert scale

Q1.12: What are the two types of Dimensional/Metric Scale used for quantitative variables, and can you give examples for each? PYQ: AIIMS 2020

Answer:

Dimensional/Metric Scale	
Quantitative Variable	
Interval scale	Ratio scale
Metric data without an absolute zero and no start point. Hold no true zero and can represent values below zero	Metric data with an absolute zero Never falls below zero
Example: Temperature scales	

Q1.13: In a study, the following interpretations are obtained: satisfied, very satisfied, and dissatisfied. Which type of scale is this?

A. Nominal
B. Ordinal
C. Interval
D. Ratio

Answer: B. Ordinal

- Nominal: Categories without order
- Interval: Numerical scale with equal intervals but no true zero
- Ratio: Numerical scale with equal intervals and a true zero

Q1.14: An investigator studies the life expectancy of IV drug abusers and divides a sample of patients into HIV-positive and HIV-negative groups. What type of data does this division constitute?

A. Nominal
B. Ordinal
C. Interval
D. Ratio

Answer: A. Nominal

- Presence/absence of disease

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BIG QUESTION 2: What are measures of central tendency, and which values are commonly used to represent them?

Broad answer:

PYQ: FMGE 2022,2023

- Central Value: Value that is most representative of a data set
- All the individual values revolve around it
- Depending on the type of variable, this central value can be the mean, median, or mode

DETAILED QUESTIONS

Q2.1: What is the mean in statistics, how is it calculated, and why is it considered the best measure of central tendency?

PYQ: FMGE 2019

Answer:

- Sum of all observations/Total no. of observations
- E.g. 2, 1, 3, 1, 2
  - 2+1+3+1+2= 9/5= 1.8
- Statistically mean is the best measure of central tendency as it includes all values in data set

Q2.2: How is the median of a data set calculated for both odd and even numbers of observations?

Answer:

- Middle value when data is arranged in ascending order/descending order.
- Example:
  - When there is an odd number of observations: 2,1,3,1,2
    → Arrange in ascending order: 1,1,2,2,3
    → Median=2
    → Total no. of observations is 5 (odd number of observations)
  - When there is an even number of observations, then the median is the average of 2 values: 2,1,3,1,2,3
    → Arrange in ascending order: 1,1,2,2,3,3
    → N = 6 (even number of observations)
    → Median = Avg of 2 middle values
    → Median=2+2/2=4/2=2

Q2.3: What is the mode in statistics, how is it identified in a data set, and how is bimodal data handled?

Answer:

PYQ: FMGE 2020

- Most repeated value or most frequently occurring value in a data set.
- Example: 2,1,3,1,2
  - Mode is (1,2) Bimodal
- Bimodal into unimodal conversion - Take the average of the two values
  - Mode=1+2/2=1.5
  - Always try keeping in bimodal

Q2.4: What are outliers in a data set, and how do they affect the distribution of data?

Answer:

- Too high or too low values in a data set

- If outliers are present in a data set: Skewed data
- If outliers are absent in a data set: Normal data distribution.

Q2.5: 18, 20, 22, 24, 26, 28, and 30, the best central tendency is determined by:

A. Mean

B. Median

C. Mode

D. Range

Answer: A. Mean

- Data within a normal range - No outliers
- All observations are taken

Q2.6: The number of malaria cases reported during the last 10 years in a town is given below, 250,320,190,300,5000,100,260,350,320, and 160. The epidemiologist wants to find out the average number of malaria cases reported in that town during the last 10 years. The most appropriate measure of average for this data will be:

A. Arithmetic mean

B. Mode

C. Median

D. Geometric mean

Answer: C. Median

- 5000 is an outlier - Too high a value
- The mean will give an exaggerated answer
- Median is the best as 5000 will go to one end

Q2.7: Which measure of central tendency is considered statistically the best, and why?

Answer:

- Statistically best measure of central tendency - Mean
- Because it includes all observations in a data set

Q2.8: Which measure of central tendency is preferred for skewed data and why?

Answer:

- Best measure of central tendency in case of skewed data - Median
- Because it does not get affected by outliers

Q2.9: Which measure of central tendency is most affected by skewed data?

Answer: Most affected in a skewed data - Mean

Q2.10: If a wide range of values is present in a community, what is the best measure of central tendency?

A. Mean

B. Mode

C. Median

D. Standard deviation

Answer: C. Median

- Wide range of values implies skewed data

Q2.11: In a survey of sleep apnea scores among 10 persons, the highest value of 58 was wrongly recorded as 85. This will affect the final results as:

A. Median will increase, mean will remain the same 236

B. Mean will increase, median will remain the same

C. Both mean and median will increase

D. Neither mean nor median will increase

Answer: B. Mean will increase, median will remain the same

- Mean will increase as the numerator will increase when calculating
- When arranging the values in ascending order to calculate the median, whether 58 or 85, both being the highest in observation would be placed at the end. Hence, the median is not affected.

Q2.12: Which statistical tests are used to detect outliers in a data set?

Answer:

- Grubs test
- Dixon Q test

Q2.13: Bimodal distribution is represented by:

A. Mode = 3 median - 2 mean

B. Mode=3 median+ 2 mean

C. Mode = 2 median + 2 mode

D. Mode = 3 mode - 3 median

Answer: A. Mode = 3 median - 2 mean

BIG QUESTION 3: What are measures of dispersion, and what do they represent in a data set?

Broad answer:

- Measures of dispersion denote the spread of values in a data set
- Represents variability in a data set

DETAILED QUESTIONS

Q3.1: What are the measures of dispersion used for individual and sample observations in statistics?

Answer:

Individual Observations	Sample observations
• Range • Mean deviation • Standard deviation • Coefficient of variation • Variance	• Standard error of the mean • Standard error of the proportion

Q3.2: How is range calculated in a data set, and what does it signify?

Answer:

- Range = Maximum value - Minimum Value
- Example: If there is a class of 100 students. The maximum weight of a student is 100 kg, and the minimum is 50 kg.
  - Range= 100-50 = 50 Kg
  - Inference: The number of students' weights in the class differs by > 50 kg.

Q3.3: What is the formula for calculating mean deviation in statistics?

Answer:

- Mean deviation $= \Sigma\mu_i - \mu/N$

Q3.4: What is the formula for calculating standard deviation, and how does it change when the sample size is less than 30?

Answer:

- Root mean square of deviations
- Standard deviation $(\sigma) = \sqrt{\Sigma(\mu i - \mu)^2 \div N}$
- If N<30, SD: $\sqrt{\Sigma(\mu i - \mu)^2 \div (N-1)}$

PYQ: AIIMS 2020 PYQ: NEET PG 2019, 2023 PYQ: FMGE 2021 PYQ: INICET 2022, 2023

Q3.5: Suppose there are N=100 students in the class, the mean weight is 50kg, SD=5kg. What is the interpretation?

Answer:

- This means the weight of 100 students lies between 50 ± 5= 45–55 kg

Q3.6: There are 50 individuals in a population, and they have the same hemoglobin level, which is 14 g/dl. As there is no variability, the standard deviation will be:

A. 0

B. 1,-1

C. 0,1

D. +2

E. -2

Answer: A. 0

- There is no variability → so no dispersion = 0

Q3.7: What formulas are used to calculate the standard error of the mean and the standard error of proportion in sample observations?

Answer:

- Standard error is used.

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- Deviation of the sample means around the population means.
- Standard error is the standard deviation of the sample mean

- $SE_{mean} = \frac{\sigma}{\sqrt{N}}$
- $SE_{proportion} = \sqrt{\frac{pq}{N}}$
  - p = prevalence
  - q = 100-p

Q3.8: N=100 students μ=50 kg 10% of students in the class are obese (prevalence of obesity). Calculate SEproportion.

Answer:

- p=10
- Q=100-10=90

$$SE_{proportion} = \sqrt{\frac{pq}{N}} = \sqrt{\frac{10 \times 90}{100}} = 3$$

Q3.9: Mean of 400 variables is 100, and the standard deviation is 8. What will be the standard error of deviation?

A. 0.4

B. 1.0

C. 2.0

D. 4.0

Answer: A. 0.4

$$SE_{mean} = \frac{\sigma}{\sqrt{N}} = \frac{8}{\sqrt{400}} = \frac{8}{20} = 0.4$$

Q3.10: What is the formula for the coefficient of variance, and what is it used for in statistics?

Answer:

- Used to compare 2 data sets
- COV= $\frac{\text{Standard deviation}}{\text{Mean}}$ x100

Q3.11: How is it represented symbolically?

PYQ: NEET PG 2020

PYQ: AIIMS 2019

Answer:

- Variance = σ2

Q3.12: Given two data sets A and B, how do you compare them using coefficient of variation and variance?

Data set A	Data set B
N = 100 students μ1=50 kg σ1=5 kg	N = 100 students μ2= 60 kg σ2= 3 kg

Answer:

Data set A	Data set B
• COV = $\frac{\sigma}{Mean}$ X100 = $\frac{5}{20}$ X 100 = 10% • Variance = σ^2 = 5 x 5 = 25	• COV= $\frac{\sigma}{Mean}$ X100 = $\frac{3}{60}$ X100 = 5% • Variance = σ^2 = 3 x 3 = 9

Q3.13: How does the measure of dispersion affect the reliability of a data set, and how can reliability be improved?

Answer:

- The lower the value of the measure of dispersion, the lower the spread of data, the greater the reliability
- To increase the reliability of a data set, increase the sample size

BIG QUESTION 4: What are the two types of distribution?

Broad answer:

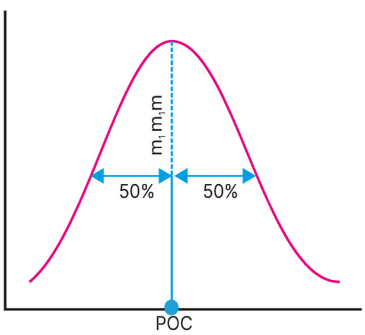
- Normal distribution
- Skewed distribution

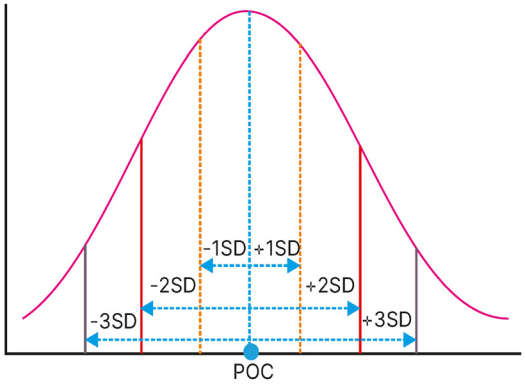
DETAILED QUESTIONS

Q4.1: What are the key features of a normal (Gaussian) distribution and how is data spread across standard deviations PYQ: AIIMS 2018

Answer:

- Normal distribution - no outliers
- Gaussian Distribution:
  - o Bell-shaped curve
  - o Bilaterally symmetrical
  - o POC: Point of coincidence
    - → Mean = median = mode
- Mean= median= mode= 0(Standard normal Curve)
- Total spread of data = 0.5+0.5 = 1 (SD)
- For a normal distribution: Mean= 0
- Total area under the curve = 1
  - o Mean ± 1 SD= 68% of observation
  - o Mean ± 2 SD= 95% of observation
  - o Mean ± 3 SD= 99% of observation
  - o Mean ± 1.64 SD= 90% of observation
  - o Mean ± infinite SD= 100% of observation
- Tails of the curve never touch the baseline

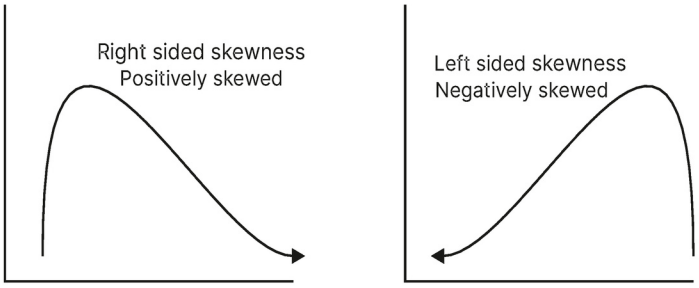




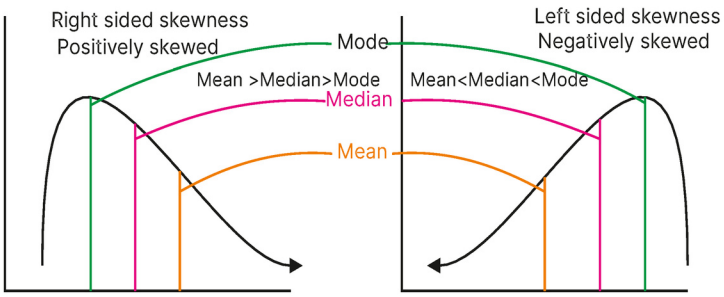
Q4.2: What is a skewed distribution, and how does it differ from a normal distribution?

Answer:

- Outliers are present in the data set
- Can be right-sided or left-sided skewness



- Mean> median> mode for right-sided skewness
- Mean<median<mode for left-sided skewness
- Mean is most affected
- Mode is least affected



Q4.3: Not true about the standard normal curve

A. Equal distribution on either side of the curve

B. The total area under the curve is 2

C. Its mean is zero

D. Standard deviation is 1

Answer: B. The total area under the curve is 2

- Total Area Under the Curve = 1
- Represents 100% of the probability

Q4.4: A study had a normal distribution with the median value as 200 and a standard deviation 20. 68% will fall between:

A. 160-240

B. 170-230

C. 180-220

D. 190-210

Answer: C. 180-220

- Mean ± 1 SD= 68% of observation
- 200 ± 1x20=68%
- 200 ± 20=68% = 180-220

Q4.5: Mean= 200, median= 180, mode= 150. Comment on the type of observation?

Answer:

- Positive skewness
- Mean > Median > Mode

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33. INFERENTIAL STATISTICS

BIG QUESTION 1: What are Type I and Type II errors in hypothesis testing, and why are they important in clinical trials?

Broad answer: Type 1 Error vs Type 2 Error

Set a hypothesis

- The hypothesis is an assumption yet to be verified

H_0- null hypothesis

- There is no difference in the treatment of the disease between a new drug and an old drug/already existing drug

H_A- alternate hypothesis A

- The new drug is better than already existing drugs for the treatment of disease

Type 1 error	Type 2 error
Situation 1: • In reality, H_0 is true - no difference in the treatment of the disease between the two drugs- but based on clinical trials - rejected a true H_0 • Based on the clinical trial, a new drug is better than an existing drug and the drug is launched in the market based on the result. But in reality, it is not better than the existing drug	**Situation 2:** • In reality, H_0 is false- Which means the new drug is **actually better, but** based on the result of a clinical trial we have accepted a false H_0 • False but accepted error in reality. • It implies the new drug is better than an existing drug, but is **not launched in the market** due to clinical trial
α error	β error
True - buzzword	False - buzzword
H_0 - true but rejected	H_0 is false but accepted
New drug launched in the market - not better than an existing drug	A new drug that is actually better than existing - not launched in the market
False positive trial	False negative trial
Serious error	No difference (less serious)

DETAILED QUESTIONS

Q1.1 Define p-value and interpret p < 0.05.

PYQ: NEET PG 2018

PYQ: AIIMS 2019

Answer:

- p-value is the probability of committing a Type 1 error
- p-value <0.05 indicates it is statistically significant and favours alternate hypotheses.

p = 0.08	p = 0.05	p = 0.02
Whose result is statistically significant? p <0.05		
Not significant	Not significant	Significant Because the p-value is less than 0.05

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Q1.2 How can we increase the power of a statistical test?

- Given by (1-β)
- The ability of a statistical test to show a significant result if it exists
- Why (1-β)?
  - Beta error is a Type II error
  - False
- H is false but accepted
- The new drug is good but could not be shown in the clinical trials
- The power of the test can be increased by increasing the sample size

Q1.3 Explain confidence interval and confidence level

Answer:

- Scenario: For a population of 10,000, find out the mean of their hemoglobin.
  - Take a sample of 500 people.
  - Calculate the mean (μ) of these 500
  - We will use the mean hemoglobin of this sample to estimate the mean hemoglobin of the population from which this sample was drawn.
- Confidence interval is how confident the researcher is that the mean hemoglobin calculation for the population using the sample mean will lie in that particular range.
- A minimum of 95% is confident enough for the result.

Q1.4 . Intraocular pressure was measured in 400 people. The mean was found to be 25mm, and the standard deviation was recorded as 10 mm Hg.95%. The confidence interval would be:

A. 22-28

B. 23-27

C. 24-26

D. 21-29

Answer: C. 24-26

Explanation:

- 95% confident that the mean intraocular pressure of the population from which the sample was taken will lie between 24-26mm

$CI_{mean} = mean \pm 2SE_{mean}$

$= 25 \pm \frac{2(\sigma)}{\sqrt{N}}$

$= 25 \pm \frac{2(10)}{\sqrt{400}}$

$= 25 \pm 1 = 24 \text{ to } 26$

Q1.5 What will be the 95% confidence interval in a study estimated prevalence of 10% and 100 is their sample size?

A. 4-16

B. 2-18

C. Inadequate information to calculate 95% of CI

D. 7-13

Answer: A. 4-16

Explanation:

$$Ci_{proportion} = p \pm 2SE_{proportion}$$
$$= p \pm 1 \times \frac{\sqrt{pq}}{N}$$

p = prevalence 10

q = 100 - p = 90

Keeping the values,

$$CI_{proportion} = 10 \pm 2 \times \sqrt{10} \times \frac{90}{100}$$
$$= 10 \pm 2x3$$
$$= 10 \pm 6 = 4\text{-}16$$

- This means 95% confident that the prevalence of the population lies between 4-16%

Q1.6 . Type 1 statistical error is said to have occurred if:

A. Null hypothesis is true and is accepted

B. Null hypothesis is false but is accepted

C. Null hypothesis is true but is rejected

D. Null hypothesis is false and is rejected

Answer: C. Null hypothesis is true but is rejected

Explanation: Type I error (α error) occurs when we reject a true null hypothesis.

- It is a "false positive" result.
- Example: Concluding a drug works when, in reality, it does not.
  Type II error (β error) occurs when we fail to reject a false null hypothesis (i.e., accept a false null hypothesis).

Q1.7: A randomized trial comparing the efficacy of two drugs showed a difference between the two (p <0.05). Assume that in reality, however, the two drugs do not differ. This is, therefore, an example of

A. Type I error

B. Type II error

C. 1- alpha

D. 1- beta

Answer: A. Type I error

Explanation:

The trial shows a statistically significant difference (p < 0.05) between the two drugs.

However, in reality, the drugs do not differ.

This means the null hypothesis (no difference) is true but has been incorrectly rejected — a Type I error (false positive).

BIG QUESTION 2: What is the test of statistical significance?

Broad answer: The mathematical tool used to compare data between 2 or more groups

PYQ: INICET 2020, 2021

Parametric tests	Non-parametric tests
Used when **quantitative variables** are used.	Used when **qualitative variables** have been used.
Compare means and standard deviations	Compare percentages and proportions
Normal distributions	Skewed distributions
More powerful	Less powerful

Types of Parametric Tests	• Student's T-Test: o Paired: Used to compare single groups. E.g. Compare mean Hb in a groups of dengue patients before and after treatment o Unpaired: Used when there are 2 groups. E.g. Compare mean Hb in a group of dengue and malaria patients
	• ANOVA: o Analysis of variance o It is used when you have more than 2 groups.
	• Pearson's Correlation Coefficient
	• Z-Test o Used in place of the T-test when the sample size is greater than 30, i.e., N>30
Types of Non-parametric Tests	• Paired non-parametric test: o Wilcoxon Signed Rank Test o McNemar Test
	• Unpaired non-paired tests: o Wilcoxon Rank Sum test o Mann Whitney U Test o Chi-Square test.
	• Analysis of variance test: o Chi-square test o Kruskal Wallis test o Friedman Test
	• Spearman Correlation Coefficient
	• Fischer's test: o Used in place of the chi-square test when the sample size is <30.

DETAILED QUESTIONS

Q2.1: A study to compare the hemoglobin level was conducted on alcoholics before and after consumption. The statistical method used to find significance is:

A. Chi-square test
B. Unpaired T test
C. Paired T-test
D. Mann Whitney test

Answer: C. Paired T-test

Explanation: In this study, hemoglobin levels are measured in the same subjects before and after alcohol consumption (same group, two time points).

Paired T-test is used when:

- The same sample is measured twice (before and after intervention) or
- Two measurements are dependent.

Q2.2: The test used to compare two qualitative data is?

A. Paired T-test

B. Unpaired T test

C. Chi-square test

D. Anova

Answer: C. Chi-square test

Explanation:

- Qualitative data = categorical data (e.g., gender, blood group, presence/absence of disease).
- Chi-square test is used to compare proportions or frequencies between groups for categorical variables.

Q2.3: A study was done to assess malnutrition among young children. 100 children were selected from rural and urban areas. Out of these, 30 in rural and 20 in urban areas were found to be malnourished. Which of the following statistical tests is used to compare the data sets?

A. Paired t-test

B. Chi-square test

C. The standard error of the mean

D. D. ANOVA

Answer: B. Chi-square test

Explanation:

- The data (malnutrition: yes/no) is qualitative (categorical) and we are comparing two groups (rural vs. urban) based on frequency counts.
- Chi-square test is appropriate for analyzing the association between two categorical variables.

Q2.4: The appropriate statistical test to find out if obesity is a significant risk factor for breast cancer is?

A. Students paired T-test

B. Students unpaired T-test

C. Chi-square test

D. Wilcoxon signed-rank test

Answer: C. Chi-square test

Explanation:

- Obesity (yes/no) and breast cancer (yes/no) are qualitative (categorical) variables.
- To check if there is a significant association between two categorical variables, we use the Chi-square test.

Q2.5: A clinical trial was done between two groups to measure their blood pressure after treatment. Which of the following tests would be appropriate to use?

A. Paired test
B. Unpaired t-test
C. ANOVA
D. Chi-square test

Answer: B. Unpaired t-test
Explanation:

- Blood pressure is a continuous variable.
- The trial compares two independent groups (e.g., treatment group vs control group).
- The Unpaired t-test (Student's t-test) is used to compare means of a continuous variable between two independent groups.

Q2.6: The test used to compare two qualitative data is?
A. Paired T-test
B. Unpaired T test
C. Chi-square test
D. Anova

Answer: C. Chi-square test
Explanation:

- Qualitative data = categorical variables (e.g., male/female, disease present/absent).
- Chi-square test compares proportions or frequencies between groups of categorical data.

Q2.7: Which is a Non-parametric test to compare qualitative data between 2 or more groups?
Answer: Chi-square test

Q2.8: Which is a Parametric test to compare quantitative data (means and SD in a single group)?
Answer: Paired T test

Q2.9: Which is a Parametric test to compare quantitative data (means and SD in two groups)?
Answer: Unpaired T test

Q2.10: Parametric test to compare quantitative data (means and SD in three or more groups)?
Answer: ANOVA test

BIG QUESTION 3: How are quantitative and qualitative data graphically represented in statistics?

Broad Answer:

Graphical representation of quantitative variables	Graphical representation of qualitative variables
• Histogram • Frequency polygon • Line diagram • Cumulative frequency curve (Ogive) • Scatter diagram	• Bar diagram • Pie chart • Pictogram • Venn diagram • Spot maps

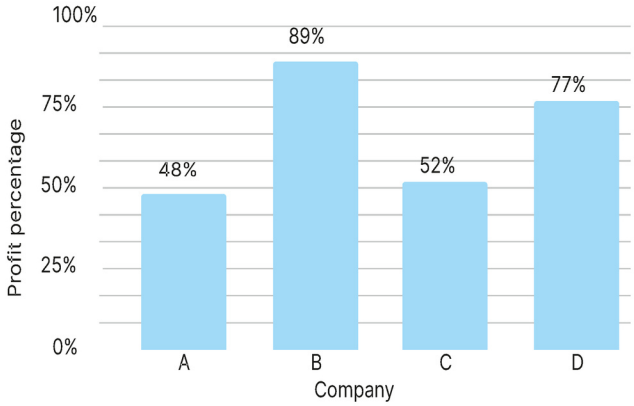
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DETAILED QUESTIONS

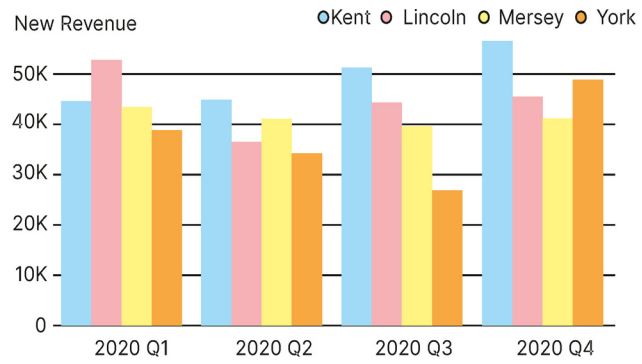
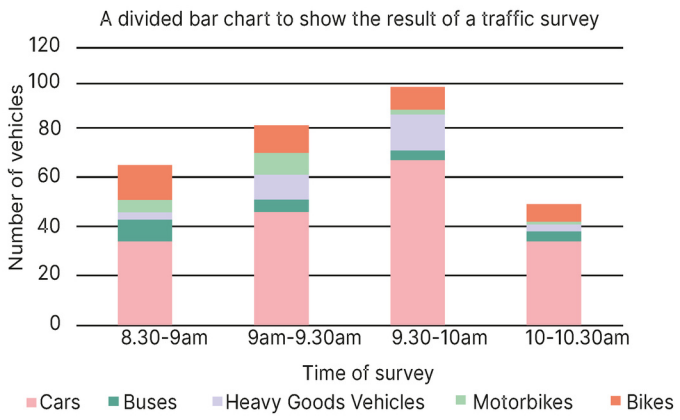
Q3.1: Describe bar graph as a method of qualitative data representation

PYQ: NEET PG 2019 PYQ: FMGE 2021

Answer:

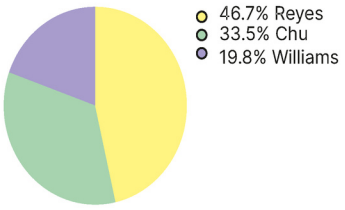


- Simple bar diagrams represent the frequency of categorical variables like gender.

Image	Explanation
	• It is a **Multiple bar diagram/ Compound bar diagram.**
	• This is a component bar diagram.
	• Each bar is divided into different components, it is known as the **Component bar diagram.**

Q3.2: Describe pie chart and pictogram

Answer:



Pie chart

- Used to represent variables in percentages and proportions
- Represents qualitative variables.

Pictogram

PYQ: FMGE 2021

- Used to teach concepts to a layman



Q3.3: A popular method of presenting data to the man in the street and those who cannot understand orthodox charts is?

A. Histogram

B. Frequency polygon

C. Line Diagram

D. Pictogram

Answer: D. Pictogram

Explanation:

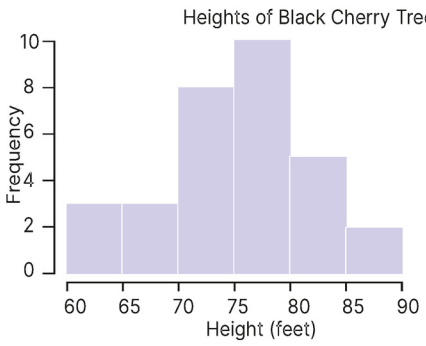
- A pictogram uses pictures or symbols to represent data, making it easier for the general public or people who may not understand complex charts (like histograms or frequency polygons).
- It is commonly used in health education, mass communication, and awareness campaigns.

Q3.4: Explain the importance and use of histogram

PYQ: INICET 2021

Answer:

- Height is a quantitative or continuous variable (can take many possible values and also in between values)
- A histogram represents the frequency of continuous variables or quantitative variables.

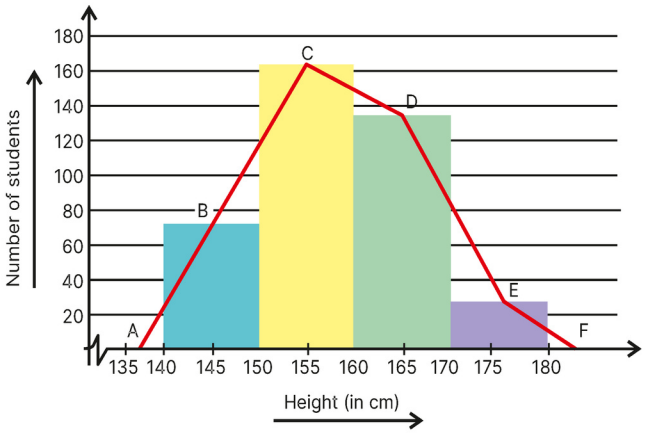


Q3.5: Explain frequency polygon

Answer:

- It is drawn above a histogram.
- Midpoints are joined by a straight line (frequency polygon).

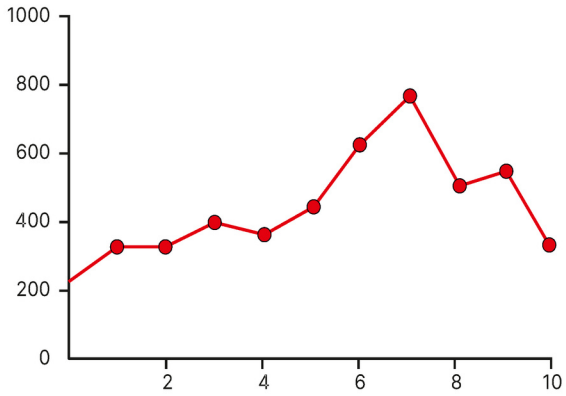
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Q3.6: What is a line diagram/line chart and what is its significance in epidemiology?

Answer:

- Represents the trends of an event or incidence of cases with time.
- It has both rise and fall.



Q3.7: Best chart to represent Incidence of disease over a period of time?

A. Histogram

B. Bar chart

C. Scatter plot

D. Line diagram

Answer: D. Line diagram

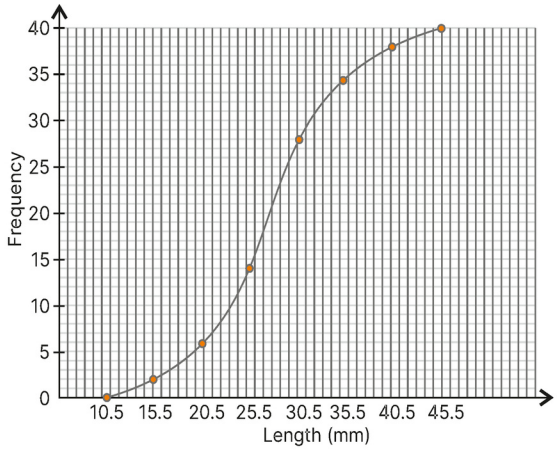
Explanation:

- Incidence of disease over a period of time represents a trend (time series data).
- A line diagram (line graph) is best suited to show changes or trends over time.

Q3.8: Describe Ogive and its use in statistical data interpretation.

Answer:

- There is no dip or fall of the curve.
- Cases are constantly increasing e.g., Recurrent cases.
- E.g. A person infected with TB recovers and gets infected again. This can be expressed by a Ogive curve



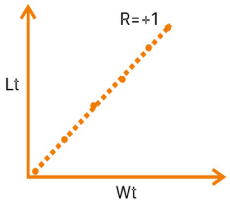
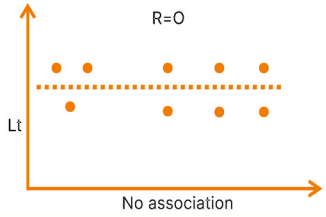
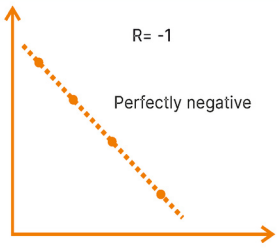
YOURWISH

YOURWISH

Q3.9: Explain the importance and uses of Scatter Diagrams in epidemiological studies. PYQ: NEET PG 2020

Answer:

- Represents correlation between two continuous variables.
- Represented by correlation coefficient 'r'.
- Value of 'r' ranges from: -1 < 0 < 1

Diagrams	Explanation
	• Weight is increasing with the increase in height (perfectly linear association) • Perfectly positive (r = +1)
	• No association between the x-axis and y-axis • r = 0
	• Variables on the x-axis increase with a decrease in the variables on the y-axis. • Perfectly linear association • Perfectly negative • r = -1

- When r = 0, no association
- When relative risk = 1: No association
- For instance, a researcher calculates the r value as 1.64. This indicates the researcher has calculated the wrong r value

Q.3.10: Graph to correlate two quantitative data is: PYQ: AIIMS 2019

A. Histogram

B. Scatter diagram

C. Line diagram

D. Frequency curve

Answer: B. Scatter diagram

Explanation:

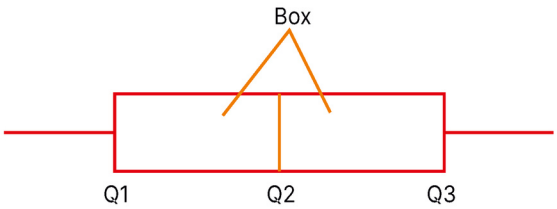
- A scatter diagram (scatter plot) is used to study the correlation between two quantitative (continuous) variables.
- Each point on the graph represents a pair of values (x, y), helping visualize patterns like positive, negative, or no correlation.

Q3.11: What is a Box and Whisker Plot? Describe its features and uses. PYQ: AIIMS 2018 PYQ: INICET 2021

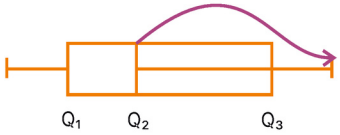
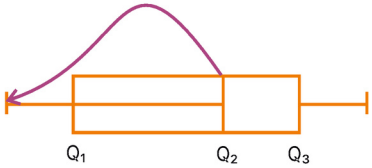
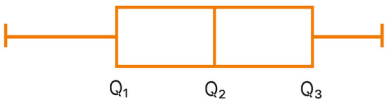
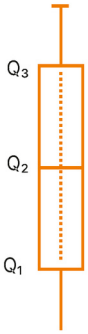
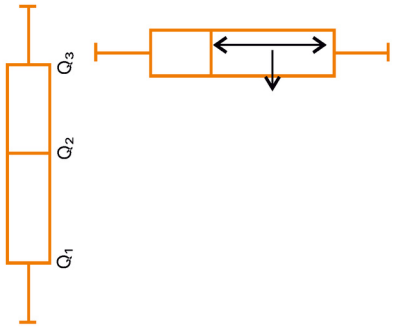
Answer:

- A method of quantitative data representation.
- Used to represent quartiles.

- It comments on the type of distribution i.e., normal or skewed.
- There is equal distribution on both sides (no outliers).
- It is a normal distribution.
- Tails are also equally distributed.



Example:

Image	Explanation
	• The gap is more on the right side (outliers are more on the right side). • So, it is Right-sided skewness or positively skewed.
	• The gap is more on the left side (outliers on the left side) • So, it is left-sided skewness or negatively skewed. • Mean < median < mode.
	• The box is normal (no outliers) • The tail is elongated more on the left side. • Left-sided skewness
	• Vertical box: Gap is equal on both sides (no outliers) • Normal distribution
	• Rotate the image clockwise. • The gap is more on the right side (right-sided skewness)

Q3.12: Describe the structure and interpretation of a Venn diagram.

Answer:

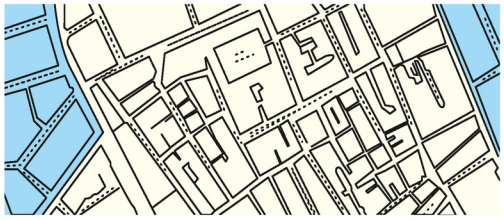
- Venn diagram is a qualitative data.
- The overlapping portion represents what should be done.
- The characteristics are represented by circles and the diagram represents logistics overlap.



Q3.13: What is a Spot Map and how is it used in epidemiology?

Answer:

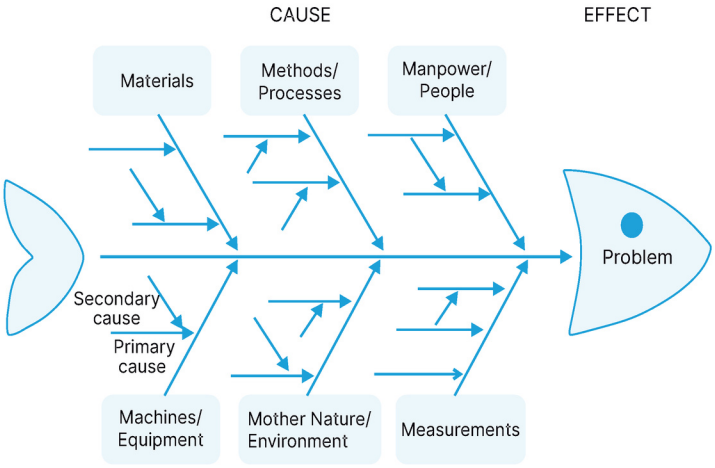
- Used for qualitative data distribution/representation or variable representation.
- It was drawn by: John Snow (Father of modern epidemiology)
- He used it to find the potential source of infection.
- Represents the local distribution of cases.



Q3.14: What is an Ishikawa (Fishbone) Diagram and how is it used in public health?

Answer:

- Informs about all the possible causes for a particular effect



Q3.15: A researcher conducts a follow-up study for a certain time duration and reports that people increasingly develop the disease with time. This is denoted by:

A. Incidence rate
B. Cumulative risk
C. Prevalence
D. Relative risk

Answer: B. Cumulative risk

Explanation:

- In a follow-up study, when we observe how many people develop a disease over a certain period, the measure that shows the probability of developing the disease over time is called cumulative risk (or cumulative incidence).
- It reflects the total risk of disease during the study period.

Q3.16: The data description shown below is referred to as?

A. Stem and leaf diagram
B. Box whisker plot
C. Forest plot
D. Funnel plot

5	3
6	8 9 5
7	9 2 0 2
8	4 7 9 5 3
9	0 4

Answer: A. Stem and leaf diagram

Explanation:

- Looks tabular/textual, with a stem | leaf format (e.g., 12 | 3 5 8).
- Preserves every individual data value.
- Good for small-moderate datasets to quickly see the distribution and median.

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Q3.17: Community medicine intern is asked to educate an uneducated village about the relevance of routine antenatal care for pregnant mothers. The intern wants to use some statistical data to emphasize its importance. Which of the following is the best way to do so?

A. Line diagram
B. Histogram
C. Pictogram
D. Frequency polygon

Answer: C. Pictogram
Explanation: A pictogram is the best choice for an uneducated village because it uses simple, relatable images to represent data, making the benefits of antenatal care easy to understand without needing to read or interpret complex graphs.

Q3.18: What is the graphical representation called when the midpoints of the tops of the bars in a histogram are joined by straight lines?

A. Bar chart
B. Frequency polygon
C. Line diagram
D. Scatter diagram

Answer. B. Frequency polygon
Explanation: Joining the midpoints of the tops of the bars in a histogram with straight lines creates a frequency polygon. This graphical representation is used for quantitative or continuous variables.

Q3.19: Which of the following graphical representations is best suited for showing the trends of a disease's incidence over a period of time?

A. Histogram
B. Bar chart
C. Scatter plot
D. Line diagram

Answer: D. Line diagram
Explanation: A line diagram is the best choice for showing trends over time, such as the incidence of a disease, because it effectively displays changes or trends in a variable across a continuous time series

Q3.20: Which graphical representation is used to show a constant increase in cases over time, where there is no dip or fall in the curve?

A. Ogive (Cumulative Frequency Curve)
B. Histogram
C. Line diagram
D. Bar chart

Answer: A. Ogive (Cumulative Frequency Curve)
Explanation: An Ogive, or cumulative frequency curve, is used to represent data where cases are constantly increasing and the curve has no dips or falls. It is suitable for representing recurrent cases, such as a person who recovers from TB and gets infected again

YOURWISH

Q3.21: Which of the following graphs is used to represent the correlation between two quantitative variables?

A. Histogram
B. Bar chart
C. Scatter diagram
D. Frequency polygon

Answer: C. Scatter diagram
Explanation: A scatter diagram (or scatter plot) is specifically designed to study the correlation between two quantitative (continuous) variables. It plots pairs of values to help visualise patterns of positive, negative, or no correlation.

Q3.22: Which of the following graphical representations is best suited for showing variables in percentages and proportions?

A. Bar chart
B. Histogram
C. Pie chart
D. Line diagram

Answer: C. Pie chart
Explanation: A pie chart is used to represent qualitative variables and is well-suited for showing data in percentages and proportions.

Q3.23: Which statistical chart is most effective for presenting data to people who may not understand complex charts, such as a layman or an illiterate person?

A. Histogram
B. Frequency polygon
C. Line Diagram
D. Pictogram

Answer: D. Pictogram.
Explanation: A pictogram uses pictures or symbols to represent data, making it easy for the general public or those who may not understand complex charts to grasp the information. It is often used in health education and awareness campaigns.

Q3.24: Which of the following graphical tools is used to show the local distribution of disease cases and was historically used by John Snow to identify the source of a cholera outbreak?

A. Histogram
B. Bar diagram
C. Spot map
D. Line diagram

Answer: C. Spot map.
Explanation: A spot map is used to show the local distribution of cases. The first spot map was created by John Snow, who is considered the father of modern epidemiology, to find the potential source of an infection.

BIG QUESTION 4: What are the major types of sampling techniques in epidemiological studies, and how are they classified?

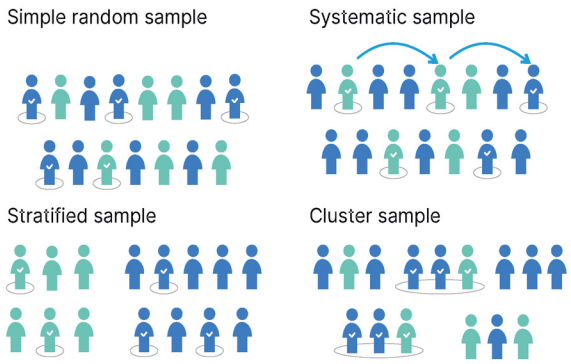
Broad answer: Sampling is used when studying a large population is not feasible. Sampling techniques are broadly classified into Probability (Random) and Non-Probability (Non-Random) methods. Random sampling gives every individual an equal and known chance of being selected, ensuring representation. Common types include Simple Random, Systematic, Stratified, and Cluster sampling. Non-random sampling includes Convenient, Quota, and Snowball sampling, where selection isn't based on randomization and may lead to bias but are useful in special scenarios like hidden populations.

DETAILED QUESTIONS

Q4.1: What are the types of sampling?

Answer:

Types of Sampling	
Random - Probability	**Non-Random - Non-Probability**
• Simple random sampling	• Convenient sampling
• Systematic random sampling	• Quota sampling
• Stratified random sampling	• Snowball sampling
• Cluster random sampling	
• Multi-stage sampling	
• Multi-phase sampling	



Q4.2: Describe Simple Random Sampling. When is it used and what are its limitations?

Answer:

- Adopted for a Homogenous population.
- A Sampling frame is available.
- Used for smaller populations.

Q4.3: What is Systematic Random Sampling? How is the kth value calculated?

Answer:

- Adopted for a heterogeneous population.
- Large population.
- Here every k^{th} participant is selected and kth interval is calculated.
  - k^{th} interval = $\frac{\text{Total population}}{\text{Sample size}}$

Q4.4: Define Stratified Random Sampling and give one public health example.

Answer:

- The population is divided into different strata based on predetermined criteria. PPS Example:Let's say there are 2 groups of people. One with 6 people and 9 people respectively. Then we select them in a ratio of 2:3. ·
- Here we are converting a heterogeneous population to a homogeneous one.
- Ex: Religion and age groups

  Cluster Random Sampling
- Uses

- o Evaluation of immunization coverage:
  → 30 clusters with 7 children (12-23 months) in each cluster o
- Antenatal coverage Non-Random

Q4.5: What is convenient sampling?
Answer: The sample is suitable/ convenient to you.

Q4.6: What is Snowball Sampling?
Answer:

- Definition: Non-probability sampling technique used for hidden or hard-to-reach populations. One participant refers to another, and the chain continues.
- Used for: Migrants, sex workers, homeless individuals, drug users.
- Example: Studying HIV prevalence among commercial sex workers.

Q4.7: In which sampling method is every Kth or nth individual selected from the population?
Answer: Systematic random sampling

Q4.8: Which sampling technique involves converting a heterogeneous population into homogeneous strata before selection?
Answer: Stratified random sampling

Q4.9: Which sampling method requires the presence of a complete sampling frame?
Answer: Simple random sampling

4.10: What is the 30x7 method?
Answer:30×7 method is a cluster random sampling technique

4.11: The urban areas of Delhi have 4000 population with different religions. Research is being done to study the dietary habits of the population. Which of the following techniques can be used to obtain a study sample?
A. Cluster random sampling
B. Stratified random sampling
C. Simple random sampling
D. Systemic random sampling.

Correct answer: B. Stratified random sampling
Explanation:

- In stratified random sampling, the population is divided into subgroups (strata) based on a characteristic relevant to the study (in this case, religion), and random samples are drawn from each stratum.
- This ensures **representation of all religious groups** in the sample, which is **critical** when religion may affect dietary habits.
- **Cluster random sampling** is used when the population is naturally divided into clusters (e.g. households, schools).
- **Simple random sampling** → Every individual has an equal chance of selection, but **might not represent all religions proportionally**—especially if some groups are small.
- Systematic random sampling → Selecting every *k-th* individual; again, **no guarantee of proportional religious representation.**