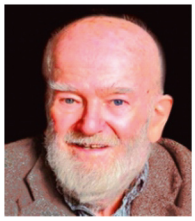
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1. EPIDEMIOLOGY-1

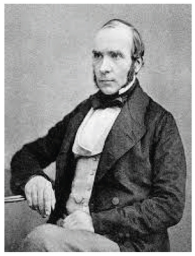
EPIDEMIOLOGY



00.00.30

- Definition - By John M Last
  - The study of the frequency, distribution, and determinants of disease or health-related states and events in specified populations and the application of the knowledge for disease prevention and control.

Components of Epidemiology



- Frequency: Refers to the no's of cases (Incidence & prevalence).
- Distribution: Refers to time, place, and person (Descriptive epidemiology).
- Determinants: Refers to why and how the disease occurred (Analytical epidemiology).
- Father of epidemiology: John Snow

TOOLS OF MEASUREMENT IN EPIDEMIOLOGY (FREQUENCY)

00.02.23

FMGE 2020
INICET 2021
NEET PG 2018

- Rate
  - Rate = N/D
  - N is part of D.
  - Multiplier: Usually 1000, 10000, or 100,000
  - Example: Incidence.
- Proportion
  - Proportion = N/D
  - N is part of D.
  - Multiplier: Always 100 (expressed as a percentage).
  - Example: Prevalence.
- Ratio
  - Ratio = N/D
  - N is not part of D.
  - Example: Sex Ratio.

INCIDENCE VS PREVALENCE

FMGE 2019, 2020, 2023, 2024,
AIIMS 2020, INICET 2021, 2025

- Incidence = (Number of new cases of a disease in a specified period of time/ Population at risk during that time) x 1000
  - E.g.: New cases developed from Jan 1 to Dec 31.
- Prevalence =(Number of all cases of a specified disease at a given point in time/ Estimated population at the same point in time) x 100
  - E.g.: Refers to existing cases (new + old) on Jan 1.

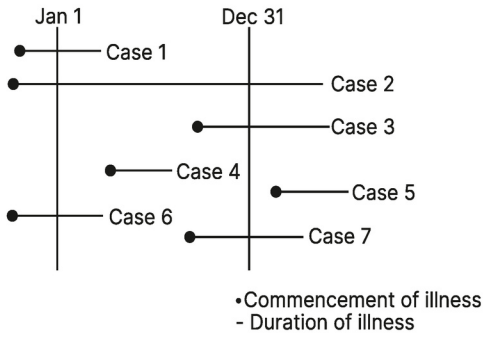
Measurement of Prevalence

- Point prevalence
  - Number of diseased persons in a defined population at one point in time/number of persons in population at the same point in time.

Yourwish

- Example: Suppose 5500 persons aged 60+ years in a town and 700 cases of coronary artery disease were found among them, the prevalence of CAD in that town at that time would be:
  → Point prevalence = (Number of subjects with the disease / Population at risk at that time) x 100
  → (700/5500) × 100 =12.73%

- Period prevalence
  - Number of persons with an episode of illness over a defined period of time/number of persons in the population over the same period.
  - Period prevalence = Number of existing cases/Total population
  - During a time period (i.e., May 1 - July 31, 1999)
  - Includes existing cases on May 1, and those newly diagnosed until July 31



- Disease Frequency Analysis
  - Incidence of the disease during the year = cases 3, 4, 7
  - Point prevalence on January 1 = cases 1, 2, 6
  - Point prevalence on December 31 = cases 2, 3, 7
  - Period prevalence during the year (Jan-Dec) = cases 1, 2, 6, 3, 4, 7

Q. An epidemiologist studies the incidence of measles in a population of 100 children, where 10 children have a previous history of measles, and 20 have been affected by the disease for the first time. What is the incidence? INICET 2025

a. 20%
b. 22.22%
c. 10%
d. 30%

Ans. b

- Incidence = New cases/Total population at risk=20/(100-10)
  - (20/90) x 100 = 22.22%

Q. A community with a population of 10,000 had 100 existing cases of Malaria on January 1, 2024. During the year, 30 patients were cured, and 10 patients died. Additionally, 20 new Malaria cases were reported, out of which 5 were cured before December 31, 2024. What is the incidence of TB at the end of the year and the prevalence of TB for the year? FMGE 2025

a. 2/1000, 10/1000
b. 2/1000, 12/1000
c. 1.2/1000, 6.5/1000
d. 1.5/1000, 12/1000

Ans. b

- Incidence = (20/10000) × 1000 = 2
- Prevalence=[(100+20)/10000] x 1000=12

Q. A cohort study was done with a sample size of 500. 20 of them developed the disease over 2 years. The total person-time observed was 950 years. Calculate the incidence rate of the disease?

INICET 2025

a. 2.1 per 1000 person years
b. 2.1 per 100 person years
c. 4.0 per 1000 person years
d. 2.0 per 1000 person years

Ans. b

- Incidence= No of new cases/Total person time required
  - 20/950 = 0.021 per person-year
    → 2.1 per 100 person-year

Feature	Incidence	Prevalence
Definition	New cases	Existing cases (New + Old)
Expressed as	Rate	Proportion
Calculated by	Cohort study	Cross-sectional study
Effect of duration	No effect of duration	Increases with duration
Purpose	Prevention & control of disease	Administrative and planning purpose

- Relationship between Incidence & Prevalence
  - Prevalence = Incidence × Duration

Q. If a disease has an incidence of 4 per 1000 with an average duration of 2 years, what is the prevalence?

NEET PG 2018

a. 8/100
b. 2/1000
c. 4/1000
d. 8/1000

Ans. d

	P=I x D	Incidence	Prevalence
New treatment cures the disease	D=decreases	Same	Decreases
New treatment prevents death but does not cure the disease	D=increases	Same	Increases
Easily curable or fatal diseases Eg: ART drug	D=decreases	Same	Decreases
New Preventive Modality (focus on risk factor) E.g., new vaccine in the market		Decrease	Decrease

Yourwish

Q. For a 100% mortality disease, the incidence and prevalence relationship will be: FMGE 2020

a. P = I
b. P < I
c. P > I
d. No relationship

Ans. b

Q. 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 is a true statement regarding prevalence and incidence? INICET 2021

a. Decrease in incidence
b. Decrease in prevalence
c. Increase in incidence
d. Increase in prevalence

Ans. d

CLASSIFICATION OF STUDY DESIGNS

00.20.20

Types of studies	Synonyms	Unit of study
Observational studies		

Descriptive studies: (No comparison group)
• Focus: Distribution (Time, Place, and Person).
• Eg:
  ○ Case Report
  ○ Case Series		

Analytical studies: (Includes a comparison group) • Focus: "Why" and "How"		
1. Ecological	Correlation, geographic, aggregate	Populations
2. Cross-sectional	Prevalence	Individuals
3. Case control	Case reference	Individuals
4. Cohort	Follow-up	Individuals
Experimental / Interventional Studies		
1. Randomized Controlled Trial	Clinical Trials.	Patients
2. Field trial	Vaccine trials.	Healthy people
3. Community trial	Community studies, Preventive trials.	Communities

Q. Which of the following is an example of a longitudinal observational and analytical study? INICET 2023

a. Case control Study
b. Cohort Study
c. Randomized Controlled Trial
d. Ecological Study

Ans. b

Yourwish

Yourwish

Unit of Study

Type of study	Unit
Ecological / Correlational	Population
Cross Sectional	Individual
Case Control / Case Reference	Individual
Cohort	Individual
Randomized Control Trials	Patient
Field Trial	Healthy Individual
Community Trial	Communities

Approach to Identify Study Design

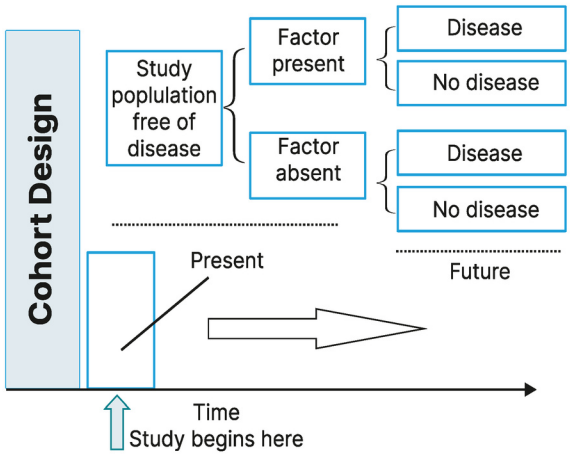
1. Identify Exposure (risk factor) & Outcome (disease)
2. Direction
   - Forward →Cohort
   - Backward→ Case Control
   - Same point of time→ Cross Sectional / Ecological
3. Identify Comparison Group
   - Exposed vs. Non-exposed→ Cohort
   - Diseased vs. Non-diseased → Case Control
4. Disease vs. Exposure Frequency
   - Rare disease → Case Control
   - Rare exposure→ Cohort
5. Buzzwords
   - Follow-up: Cohort
   - Matching: Case Control

COHORT STUDY

00.27.52

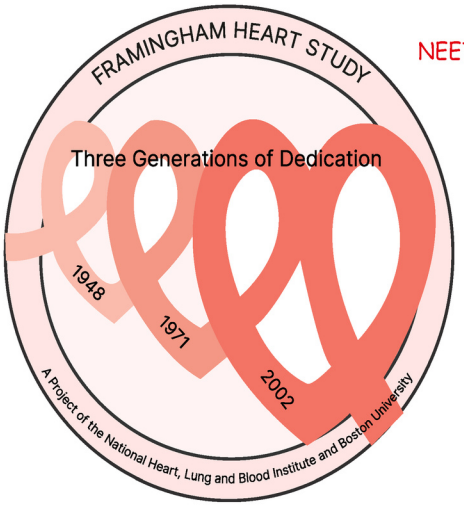
NEET PG 2020
FMGE 2018, 2020, 2025

- Type: Observational, Analytical
- Basic Design: Compare Risk Factor vs. no Risk Factor
- Direction: Cause to Effect (Prospective)
- Synonyms
  - Prospective Cohort
  - Longitudinal Study
  - Incidence Study
  - Follow-up Study
  - Forward-looking Study
- Examples
  - Framingham Heart Study - Largest
  - Doll & Hill's Study



INICET 2021
NEET PG 2019, 2022

- Steps of Cohort Study
  - Selection of study subjects
  - Obtaining data on exposure
  - Selection of comparison group
  - Follow up
  - Analysis
    → RR (Relative Risk)
    → AR (Attributable Risk)
    → PAR (Population Attributable Risk)



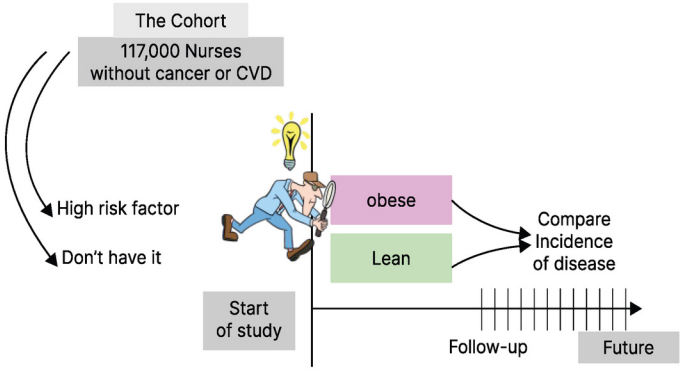
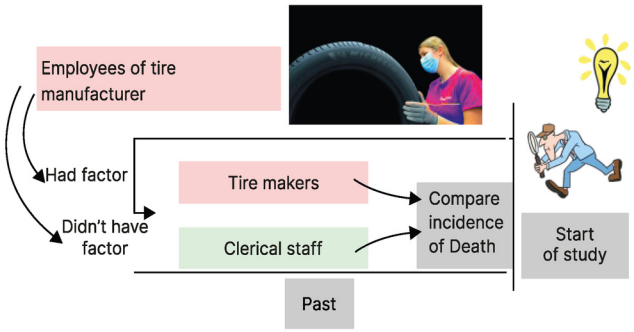
Advantages	Disadvantages
Establishes Temporality (Cause precedes effect; e.g., smoking leads to lung cancer)	Time: Time taking
Multiple outcomes	Cost: Costly
Incidence can be calculated	Sample size: Large
Direct estimate of relative risk	Common administrative problems
Rare Exposure (e.g., Occupational exposure)	Not suitable for rare diseases
Minimizes bias (No recall bias)	Hawthorne bias (subjects modify their behavior when being observed) Attrition bias (loss to follow-up).

Q. All are advantages of Cohort Study except:
a. Almost no recall bias
b. Presence of Hawthorne effect
c. Temporality can be studied
d. Incidence can be calculated

Ans. b

Types of Cohort Study

- Prospective Cohort
- Retrospective Cohort - better than prospective
- Mixed Cohort

Prospective Cohort	Retrospective Cohort
	
• Same sample size as retrospective • Exposed vs non exposed • Forward direction	• Use historical data • Exposed vs nonexposed • Backward direction • Saves time and cost

Q. A group of 400 low birth weight babies and 200 normal birth weight babies were followed from birth up to one year of age. The development of protein energy malnutrition was assessed at regular intervals during the follow-up period. What type of study design is this? FMGE 2025

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

Ans. c

Q. In a study begun in 1965, a group of 3000 adults in Baltimore were asked about alcohol consumption. The occurrence of cancer was studied in the group between 1981 and 1995.

a. Case control study
b. Prospective Cohort study
c. Retrospective Cohort Study
d. Cross Sectional Study

Ans. b

Q. A study to determine the association between maternal smoking histories from pregnant women during their antenatal visits and then subsequently assessing the birth weight of their babies soon after delivery. What type of study is this? FMGE 2021

a.Prospective cohort
b.Retrospective cohort
c.Case-control
d.Cross-sectional

Ans. a

Yourwish

Q. A study is being conducted to find an association between aniline dye exposure and bladder cancer among workers who have worked in the 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?

NEET PG 2023
FMGE 2025

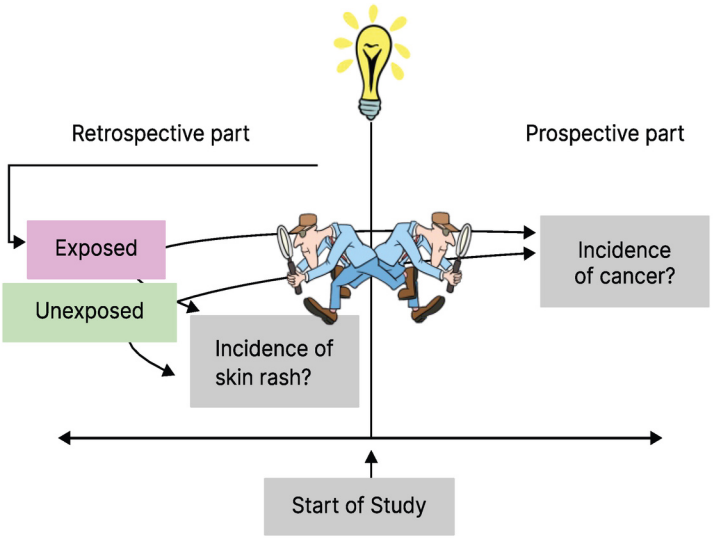
a. Case control study
b. Retrospective cohort study
c. Prospective cohort study
d. Interventional study

Ans. b

- Both exposure and outcome have already occurred, but outcome is determined at the time the study begins

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

Answer: Mixed Cohort (Ambispective Cohort)



Measure of Strength of Association of Cohort Study

00:43:00
NEET PG 2024
FMGE 2024

- RR (Relative Risk)
- AR (Attributable Risk)
- PAR (Population Attributable Risk)

Relative Risk (Risk Ratio)

	CAD	No CAD
Smokers	(a)30	(b)20
Non smokers	(c)20	(d)30

- Relative Risk = incidence in the exposed group /incidence in the non-exposed group.
  - RR= [a/(a+b)] / [c/(c+d)] = 1.5

Yourwish

Yourwish

- Interpretation of RR
  - RR > 1: Increased risk (Positive association).
    → In this case, smokers are 1.5 times more likely to develop CAD than non-smokers.
  - RR = 1: No association between the exposure and the outcome.
  - RR < 1: Protective factor (The exposure decreases the risk of the outcome).

Q. A cohort study on green tea and diabetes found a risk ratio of 0.84. What does this suggest? NEETPG 2022

a. Green tea reduces the risk of diabetes
b. Green tea increases the risk of diabetes
c. Data insufficient to establish causal association
d. The value (0.85) tends to be close to 1, hence there is no effect

Ans. a

- RR<1 is a protective factor

Q. To identify the association between vaccination and the development of a disease in a community, a study is conducted. 6 vaccinated individuals and 12 unvaccinated individuals developed the disease. Calculate the risk ratio for this community. FMGE 2024

a. 0.5
b. 1.5
c. 2
d. 2.5

Ans. a

- RR=6/12=0.5

Attributable Risk

	CAD	No CAD
Smokers	(a)30	(b)20
Non smokers	(c)20	(d)30

- AR= (incidence in exposed group - incidence in the non-exposed group) /incidence in the exposed group
  - Risk difference between exposed and non-exposed /incidence in the exposed group
- AR= {a/(a+b) - c/(c+d)} / a/(a+b)

Q. Incidence rate of lung cancer among smokers is 10 per 1000 and among non-smokers is 1/1000. The extent to which lung cancer can be attributed to smoking is:

a. 10%
b. 90%
c. 1%
d. 100%

Ans. b

Yourwish

- Given Data:
  - Incidence among exposed (smokers) = 10/1000
  - Incidence among non-exposed (non-smokers) = 1/1000
  - Risk difference between exposed and non exposed=10-1/1000=9/1000
  - AR=(9/1000)/(10/1000)=0.9

Population Attributable Risk

	CAD	No CAD
Smokers	(a)30	(b)20
Non smokers	(c) 20	(d)30

- PAR= [(incidence in total population - incidence in the non-exposed group) / incidence in the total population]x 100
- Incidence in total population= a+c/a+b+c+d

- Incidence of disease among exposed vs Incidence of disease among non -exposed: RR
  - M/c used
- How much of the disease is attributed to a particular exposure: AR
  - Used by epidemiologist
- If smoking is eliminated as a risk factor, there will be 90% reduction in the annual incidence of lung cancer cases:
  - In exposed -AR
  - In population -PAR
    → Used by policymakers

Q. The difference between Incidence in exposed and non-exposed groups is best given by: NEETPG 2020

a. Attributable risk
b. Odds Ratio
c. Relative Risk
d. Population Attributable Risk

Ans. a

Q. A study on smoking and lung cancer shows that the attributable risk percentage of smoking is 95%. All of the following interpretations are correct, except:

a. 95% cases of lung cancer can be avoided in smokers if smoking is eliminated
b. 95% cases of lung cancer can be avoided in general population if smoking is eliminated
c. It is the fraction of people who develop the disease among the exposed population
d. It is measured by dividing the risk difference by incidence of disease in the exposed group

Ans. b

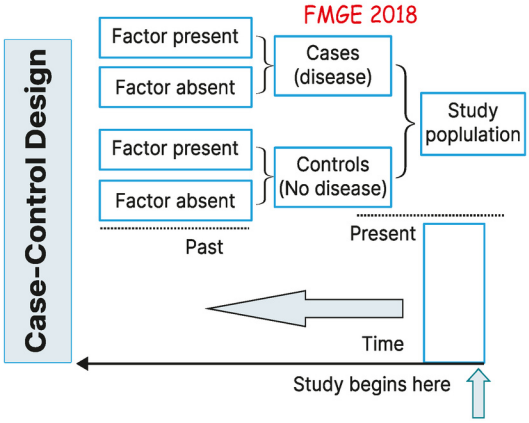
Q. A researcher is studying the difference in the incidence of asthma in children exposed to second-hand smoke and those who are not. If he wishes to express the additional incidence of asthma in the exposed children as a percentage, which of the following should he use? FMGE 2020

a. Attributable risk
b. Relative risk
c. Population attributable risk
d. Odds ratio

Ans. a

CASE CONTROL STUDY

NEET PG 2020 00.53.34
FMGE 2018



- Type: Observational Analytical
- Basic design: Compare diseased vs non-diseased
- Synonyms:
  - Retrospective Study
  - Backward-looking study
  - Effect to Cause
  - TROHOC (Cohort spelled backward)
- Steps of Case-control Study
  - Selection of cases and control
  - Matching → Eliminates only known confounders
    → 1 Case: 1 Control (Max 4 Controls)
  - Measurement of exposure
  - Analysis and interpretation
    → "OR" (Odds Ratio)

Q. Which of the following is not a part of case-control studies?

a. Strength of association
b. Follow up
c. Matching
d. Selection of study subjects

Ans. b

Q. A case-control study on Vitamin C and respiratory illness follows which sequence?

1. Measurement of exposure
2. Matching
3. Selecting case and control groups
4. Analysis

a. 3-2-1-4
b. 1-2-3-4
c. 4-3-2-1
d. 3-1-2-4

Ans. a

Yourwish

Advantages	Disadvantages
• Easy to carry out (Not time-consuming) • Sample size: Smaller (e.g., 30 cases) • Rapid and inexpensive • Investigate rare diseases • Multiple Exposures • No attrition bias • No Hawthorne bias • Minimal ethical problems	• Recall bias • Incidence cannot be calculated • Selection of appropriate control groups may be difficult (Selection bias, Interviewer bias) • No temporality

Q. A study was conducted on a group of 600 patients with breast cancer and another group of 300 people chosen from the general population. Both groups were questioned about their exposure to smoking. Which study design is this?

a. Cohort study
b. Cross-sectional study
c. Ecological study
d. Case-control study

Ans. d

- Evidence of association b/w exposure & outcome ⇒ First study is a case-control
- When evidence is present ⇒ Plan Cohort

Q. A case-control study on chemical exposure and leukemia needs a control group. Which is the correct choice?

a. Children from the area exposed, but unaffected with the disease
b. Children from the area not exposed and affected with the disease
c. Children coming to your OPD who do not have the disease
d. All children with ALL, irrespective of exposure status

Ans. c

Q. An intern has to study the relationship between ordering food online and the development of obesity using a case-control study. What are the best study groups to be selected? FMGE 2023

a. Only obese persons
b. Only online food eaters
c. Obese and non-obese persons
d. Online food eaters and non-online food eaters

Ans. c

Q. A research study is being conducted on patients in rehabilitation where the impact of addiction among young adults is addressed on their subsequent divorce. Among two groups of study subjects, divorced and non-divorced, the history of alcohol or drug use was assessed. What kind of study is being done here?

a. Prospective cohort study
b. Cross-sectional study
c. Case control study
d. Descriptive study

Ans. c

Yourwish

Yourwish

Q. A study was conducted to compare MMR vaccine history in children with autism and children without autism. What kind of study is being done here?

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

Ans. c

ODDS RATIO

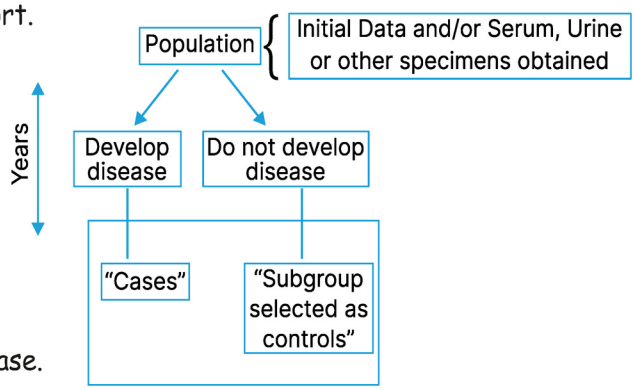
- Measurement of the strength of association of case control study

	CAD	No CAD
Smokers	(a)30	(b)20
Non smokers	(c)20	(d)30

  - OR or cross product ratio = ad/bc = 2.25
  - Interpretation of Results
    - → OR > 1: Indicates a Risk Factor (RF).
      - In this case, smokers are 2.25 times more likely to have CAD than non-smokers
    - → OR = 1: Indicates no association.
    - → OR < 1: Indicates a Protective factor.

Nested Case Control

- Definition: A smaller case-control study within a bigger Cohort.
- Analyze the details of only the cases
- Prospective in nature
- Advantages
  - Temporality established
  - Recall bias eliminated
  - Economical
  - Used when the measurement of exposure is expensive
  - Rare investigations studies of biologic precursors of disease.



Q. 20,000 women were followed up for 10 years for the development of breast cancer. 1000 women developed cancer and were given a questionnaire to assess possible risk factors. Additionally, 2500 women from the same study were used as controls and were also given the questionnaire. This is an example of what type of study? INICET 2023

a. Case cohort
b. Retrospective cohort
c. Nested case control
d. Cross-control cohort

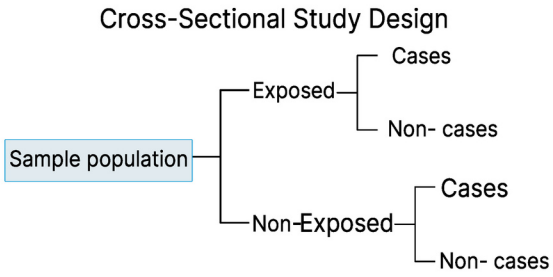
Ans. c

Yourwish

CROSS-SECTIONAL DISEASE

01.08.20

- Type: Observational, Analytical
- Basic design: Determine Exposure & Outcome at the same point of time using primary data.
- Synonyms:
  - Prevalence Study (Burden of disease)
- Advantages: Calculate prevalence
- Disadvantages: Does not establish temporality



Q. 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 present at the time submitted to examination. The proportion of residents in each village who were carriers was computed and compared. This study is a?

a. Cross-sectional study
b. Case control study
c. Concurrent cohort study
d. Non concurrent

Ans. a

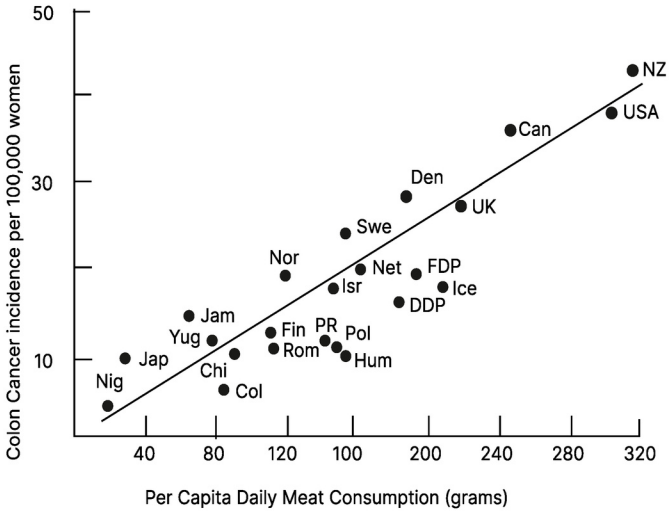
Q. A Health Camp was organized on Republic Day, where the blood sugar level of community individuals was calculated to know the diabetes status in that community. What type of study is most suited?

a. Cohort study
b. Case Control study
c. Ecological study
d. Cross-sectional study

Ans. d

ECOLOGICAL STUDY

01.11.21



- Type: Observational Analytical Study
- Basic design: Determine exposure & outcome at the same point of time using secondary data.
- Synonyms:
  - Correlational study
  - Population study
  - Geographic study
  - Aggregate study
- Advantages: Population characteristic.
- Disadvantages: No temporality
- Ecological Fallacy
  - Those countries with higher per capita daily meat consumption report higher Colon Cancer Incidence.
  - But individuals who actually suffer from Colon Cancer might not be eating meat
  - Generalizing population findings to an individual they might not actually have is known as the ecological fallacy.

Q. 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. This study is best described as which of the following?

a. Cross-sectional study
b. Ecological study
c. Case control study
d. Cohort study

Ans. b

Q. A person wants to study the relationship between smoking and lung cancer, so he collects data about people diseased with lung cancer from government hospitals and the number of cigarette packets sold at the same time period. Which type of study design is this?

a. Cross-sectional
b. Ecological
c. Experimental
d. Cohort study

Ans. b

Important Information

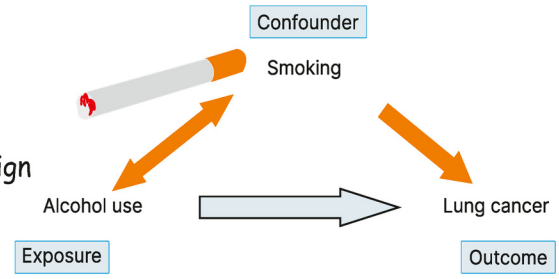
- Exposure has occurred, but outcome has not yet occurred = Prospective Cohort
- Both exposure and outcome have already occurred, but the outcome is determined at the time the study begins. Using historical records, comparison is made between exposed and non-exposed, and the outcome is determined at 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 (interviews) = Case Control
- Both exposure and outcome are determined at the same point of time using primary data= Cross Sectional
- Both exposure and outcome are determined at the same point of time using secondary data = Ecological study

Yourwish

TYPES OF ERROR

01.16.21

- A Confounder is a variable
  - Which is associated with both exposure and outcome
  - Is an independent risk factor for the outcome
  - Distributed unequally between the two study groups
  - Both known and unknown confounders are present in a study design
- Examples:
  - Smoking association with alcohol use and lung cancer
  - Association of age with OCP use and breast cancer
- Techniques to Eliminate Confounders



AIIMS 2019
NEET PG 2019

Method	Utility
Randomization	Eliminates both known and unknown confounders. Stratified Randomization
Restriction	Used for known confounders.
Matching	Used for only known confounders. Primarily used in case-control studies.
Stratification	Used for known confounders.
Multivariate Analysis (Statistical modeling / Regression)	Used for multiple confounders. Best method

Q. All are true regarding confounding factor except

NEET PG 2019

a. It is associated with exposure under investigation
b. It is distributed equally in study and control groups
c. It is associated both with exposure and disease
d. It is related to matching in case control study

Ans. b

Q. To study the association between smoking and lung cancer, a case-control study is done. Identify the incorrect statement?

a. Controls are selected from the same population as the cases
b. Multiple controls per case increase statistical power
c. Selection of controls from hospital will cause selection bias
d. Matching cases with controls will eliminate all confounders

Ans. d

Effect Modifier

- An Effect Modifier is a variable that aggravates or decreases the effect of an exposure on an outcome.
  - Examples:
    → Smoking is identified as the Risk Factor (RF).

Yourwish

→ Lung Cancer is identified as the Outcome.

→ Exercise acts as the Effect Modifier, sitting between the exposure and the outcome to change the strength or direction of the association.

Q. A study finds that exercise reduces the incidence of cardiovascular disease. However, it was found that the people who exercise also tend to consume a healthy diet, and a good diet itself lowers the risk of cardiovascular disease. What does a healthy diet represent here? INICET 2025

a. Healthy diet is a confounding factor
b. There is no association can be ignored
c. Diet is an effect modifier
d. Diet is a mediator for reducing cardiovascular disease

Ans. c

Q. A gym owner observed that most people who attend the gym also consume iced tea and concluded that drinking iced tea is the sole reason for weight loss. What is the nature of the relationship between iced tea consumption and weight loss? FMGE 2024

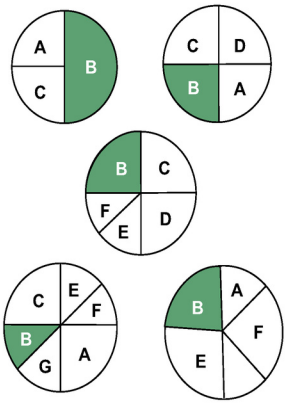
a. Direct
b. Indirect
c. Spurious
d. Multifactorial

Ans. c

- Maternal mortality is higher in hospital delivery than home delivery → Spurious.

Q. Which of the following models of disease causation is depicted in the image below? INICET 2022

a. Epidemiological triad
b. Web of causation
c. Theory of multifactorial causation
d. Sufficient component cause model



Ans. d

- Sufficient component cause model → By Rothman
  - It shows five circular "pies" divided into different segments labeled with letters
  - In each pie, Segment B is highlighted in green → Necessary Cause

BIAS

01.24.48

- Non-Random Error → Does not happen by chance
- Systematic error in the design, conduct, and analysis of the study that results in faulty association between exposure and outcome (Serious error)
- Key Sources of Bias:
  - Subject
  - Investigator
  - Analyzer — least common

- Types of bias
  - Subjects modify their behavior on being observed — Hawthorne bias
  - Differential ability to recall — Recall bias (Case Control)
  - Expectations or opinions of the interviewer interfere with the judgment of the interviewee — Interviewer bias
  - Individuals or groups in a study differ systematically from the population of interest, leading to a systematic error in an association or outcome bias — Selection bias
  - Different hospital admission rates — Berkson's bias (Type of Selection Bias)
  - A type of information bias in research where participants, exposures, or outcomes are incorrectly categorized, leading to distorted study results. — Misclassification bias
  - Least reported — Analyser bias
  - Prevalence-incidence bias
    → Type of selection bias. Also known as Neyman bias.
    → Occurs when individuals with severe or mild disease are excluded, resulting in an error in the estimated association between an exposure and an outcome.
    → E.g. If, when studying cardiac arrest, one only collects data on arrival at the emergency department, you would miss all the patients who were declared dead on scene, who may be systematically different from those who make it to the hospital.
  - Researcher bias
    → Increased motivation by a teacher increases the performance of a class: Pygmalion bias
    → Decreased motivation by a teacher decreases the performance of a class: Golem bias

Techniques To Eliminate Bias

- Blinding
  - Single blinding: Subject is unaware of the intervention.
  - Double blinding: Both subject and investigator are unaware of the intervention.
  - Triple blind: Subject, investigator, and analyzer are unaware of the intervention.
- Best form: Triple blinding
- Most common: Double blind

Q. Which is not a cause of bias in a case-control study?
a. Recall bias
b. Hawthorne bias
c. Interviewer bias
d. Confounding bias

Ans. b

Q. Hospital patient admission rates differ across hospitals for different diseases. This causes which type of bias?
a. Subject bias
b. Investigator bias
c. Berkesonian bias
d. Analyzer bias

Ans. c

BUZZ WORDS

- Burden, Load: Cross-sectional
- Prevalence, Survey: Cross-sectional
- Retrospective, Effect to Cause, Odds Ratio: Case Control
- Prospective, Cause to Effect, Follow-up Incidence Study, Relative Risk, Attributable Risk: Cohort
- Multiple Exposures: Case Control
- Matching: Case Control
- Multiple Outcomes: Cohort
- Rare Disease: Case Control
- Rare Exposure: Cohort
- Rare Investigations: Nested Case Control
- Follow-up: Cohort

Q. Which of the following studies progresses from cause to effect?

a. Cohort study
b. Case control study
c. Cross-sectional study
d. Ecological study

Ans. a

Q. A study found Odds ratio of maternal hypertension to have IUGR fetus to be 1.5. What is the interpretation drawn?

a. Positive association
b. Common association
c. Inverse association
d. Rare outcome

Ans. c

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2. EPIDEMIOLOGY-2

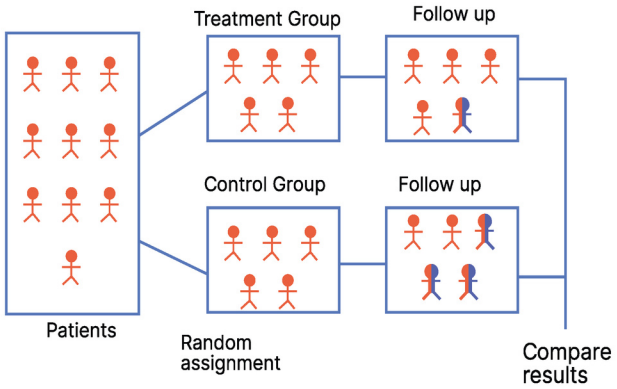
EXPERIMENTAL EPIDEMIOLOGY

00.20.00

- Investigator controls conditions directly
- 2 important steps include:
  - Exposure determination (e.g., intervention, manipulation)
  - Follow-up to assess outcomes.
- Uses
  - Provide scientific proof for risk factor control.
  - Measure the effectiveness and efficiency of health services in the prevention, control, and treatment of disease.

RANDOMIZED CONTROL TRIALS

01.10.00



- Type: Experimental
- Basic design: Always prospective
- Synonyms: Interventional study
- Meaning of Random in RCT
  - Every participant gets an equal and known chance of being allocated into either the experimental or the reference group, thereby it eliminates:
    → Selection bias by ensuring comparability.
    → Eliminates known and unknown confounders by distributing confounders equally
- Methods to achieve randomisation
  - Lottery Method
  - Flip a coin method
  - Table of Random Numbers (Best method)

Advantages Of Rct

- Ensures like is compared with like (eliminates selection bias)
- Achieves internal validity by eliminating confounders

Internal Validity vs External Validity	
Internal Validity:	Comparability within the study population by eliminating confounders
External Validity:	Generalizability to the reference population by increasing sample size

Q. 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
Ans. c. Randomization

Yourwish

Yourwish

Steps Of An Rct

- Drawing up a protocol
- Selecting reference and experimental populations
- Randomization
- Manipulation or intervention
- Follow-up
- Assessment of outcome

Q. Arrange the steps of a Randomized Controlled Trial in a sequential manner. NEETPG 2025

1. Randomization
2. Manipulation
3. Statistical assessment
4. Follow up

Options:

a. 1, 2, 3, 4
b. 4, 1, 2, 3
c. 2, 1, 3, 4
d. 1, 2, 4, 3

Ans. d. 1, 2, 4, 3

Q. What is the correct sequence of steps in an experimental study?

A. Blinding, B. Randomization, C. Defining inclusion and exclusion criteria, D. Statistical analysis INICET 2024

Options

a. C-B-A-D
b. C-A-B-D
c. A-B-C-D
d. D-C-B-A

Ans. a. C-B-A-D

Q. A new community-based health initiative is designed to reduce neonatal sepsis. In a community, 20 PHCs follow standard care and 20 are designated to implement this initiative. What study design does this represent? NEETPG 2025

a. Case-control study
b. Cross-sectional study
c. Cluster Randomized Controlled Trial
d. Quasi-experimental study

Ans. c. Cluster Randomized Controlled Trial

Intention to Treat	Per Protocol Analysis
Dropouts are included in the analysis and are analyzed in the same group as they were randomized.	Only patients who complete the trial according to protocol are analyzed.
Randomization impacted	Randomization not kept intact.
Not affected by attrition bias.	Affected by attrition bias.

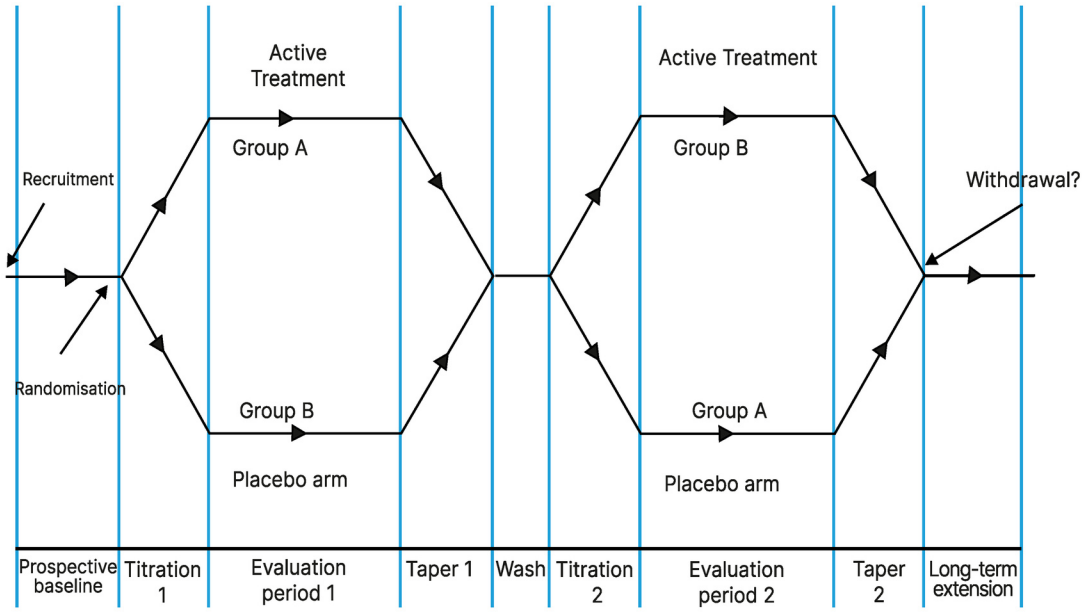
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Q. All are true about Randomized Control Trials except:
a. Baseline characteristics are comparable in both study and control groups
b. The required sample size for the trial depends on the hypothesis and the study protocol
c. The dropouts from the trial are excluded from the analysis
d. Double blinding can eliminate investigator bias

Ans. c. The dropouts from the trial are excluded from the analysis

CROSS OVER TRIAL

00:10.28



- Cases act as their own controls
- Titration phase 1
  - Group A receives treatment
  - Group B receives placebo
- Transition Phase: Washout Period to remove any residual effect
- Titration phase 2
  - Group A receives placebo
  - Group B receives treatment
- Advantage: More ethical and requires less sample size

NATURAL EXPERIMENTS

00.12.00

- Aka Quasi-Experimental
- Definition: Experimental study without randomization (no picking of chits).
- Individuals are exposed to experimental and control conditions that are determined by nature or by factors outside the control of investigators.
- There is use of naturally existing groups:
  - Migrant populations:- the study of the effect of environmental & genetic factors.
  - Religious/social/ethnic groups.
  - Atomic bombing of Japan: Long-term radiological and health impact studies.
  - Natural disasters: Famines, floods, and earthquakes.
  - John Snow's experiment: first ever natural experiment

Q. All are true about Natural Experiments except:
a. Researcher has no control over allocation of subjects
b. John Snow experiment is an example
c. Includes RCT
d. Done when experimental studies are not possible in human populations

Ans. **c.** Includes RCT

Q. 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 1 death? AIIMS 2019
a. 100
b. 10
c. 250
d. 160
Ans. **b.** 10

- Results in RCT are expressed as
  - ARR(Absolute Risk Reduction)= CER-EER
    → CER: event rate in control group=36/120
    → EER: event rate in experimental group=26/130
  - NNT(Number Needed to Treat)= 1/ARR
  - RRR(Relative Risk Reduction)
  - NNH(Number Needed to Harm) = 1/RRR
  - RRR= CER-EER/CER

SYSTEMATIC REVIEW & META ANALYSIS

00.17.15

- Systematic review
  - Type of literature review that collects and critically analyzes multiple research studies.
  - It does not include quantitative synthesis of data of all studies available.
- Meta analysis
  - Is a quantitative approach for systematically combining results of previous research to arrive at conclusions about the body of research.
  - SR + Quantitative analysis

Q. Which of the following quantitative methods is the best to study previous research studies? INICET 2021
a. RCT
b. Systematic review
c. Meta-analysis
d. Cohort study
Ans. **c.** Meta analysis

Q. Which of the following is not a step in meta-analysis? INICET 2021
a. Selection
b. Analysis
c. Randomization
d. Abstraction
Ans. **c.** Randomization

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STEPS OF A SYSTEMATIC REVIEW

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

Steps of a Meta analysis

Formulate review question and define inclusion criteria

Identify relevant studies:
- Literature searches
- Screen titles and abstracts
- Retrieve full text papers
- Apply inclusion criteria

Extract data and assess study quality

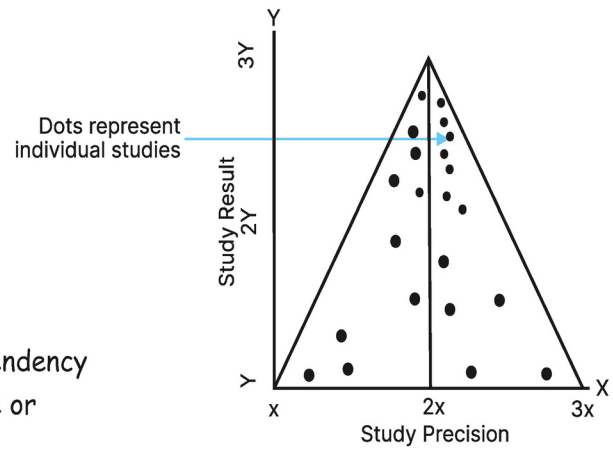
Analyse data
- Meta-analysis/narrative synthesis
- Assess risk of reporting bias

Present results
- Narrative summary
- Tabular overview of study features, quality and results
- Graphical display of results

Funnel Plots

00.22.15

- Funnel Plot checks for Publication Bias
- Used in both Systematic Review and Meta-Analysis
- Dots represent individual studies included in the analysis.
  - Dots scattered - no bias
  - Dots clustered in publication bias
- The graph shows a symmetrical distribution of studies, which suggests a lack of publication bias.



- Publication Bias / File Drawer Effect: This refers to the tendency of researchers and journals to publish studies with positive or significant results while leaving "null" or negative results unpublished (kept in the "file drawer").

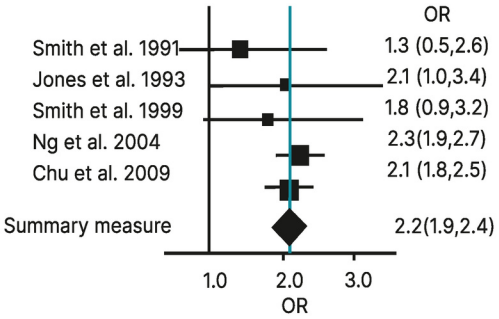
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Forest Plot

Q. A study was done to assess the risk factors for breast cancer in 100 females from urban cities. A statistical group and analysis are shown below. The values indicate the odds ratio and the 95% confidence interval. How many risk factors may be ascertained from the statistical analysis of research?

- Only for Metanalysis
- Look at the interval of Odds ratio
  - If includes 1: not significant
  - If excludes 1: significant
    - → If the value is <1: protective factor
    - → If the value is >1: risk factor



Q. The risk factor association with pancreatic cancer was studied in a case-control study. The values are: Group Odds ratio 95%, Confidence limits

A. 2.5(OR), 1.0 - 3.1(CL)

B. 1.4(OR), 1.1 - 1.7(CL)

C. 1.6(OR), 0.9 - 1.7(CL)

Which of the following is correct?

a. Risk is more associated with Group A

b. Risk is more associated with Group B

c. Risk is more associated with Group C

d. Risk is equally associated with all three groups

Ans. b. Risk is more associated with Group B

- In epidemiology, an Odds Ratio is considered statistically significant only if the Confidence Interval (CL/CI) does not include 1.0.
  - Group A includes 1.0.
  - Group C includes 1.0 (starts at 0.9).
  - Group B does not include 1.0 (1.1 to 1.7), making it the only statistically significant finding among the choices.

Type of Study	Reporting Guideline	
Case Report	CARE	Case Report
RCT	CONSORT	Consolidated Standards of Reporting Trials
Observational studies	STROBE	Strengthening the Reporting of Observational Studies in Epidemiology
Meta Analysis	MOOSE	Meta-Analysis of Observational 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 and Diagnostic Accuracy

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INICET 2023

Q. Which study method is incorrectly matched with its reporting guideline?

a. Observational study — MOOSE

b. Systematic review — PRISMA

c. Diagnostic Study - CONSORT

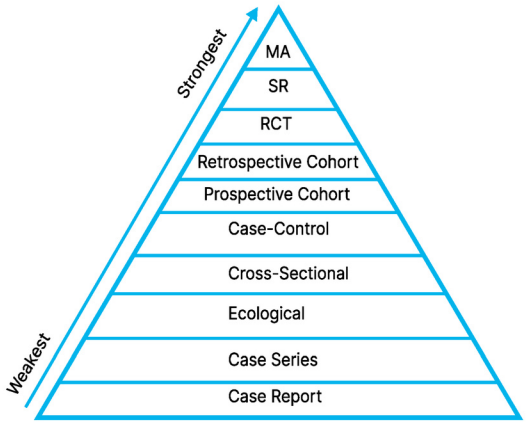
d. Case report — CARE

Ans. **c.** Diagnostic Study - CONSORT

EVIDENCE-BASED MEDICINE

00.25.05

- Father of Evidence-Based Medicine: David Sackett INICET 2021
- Evidence-based medicine (EBM) is the conscientious, explicit, and judicious use of current best evidence-primarily from systematic reviews and randomized controlled trials—to make decisions about individual patient care.
- The Hierarchy of Evidence (The Pyramid)
  - The pyramid illustrates the strength of different study designs, ranging from the weakest at the base to the strongest at the apex.
  - Prospective cohort: Concurrent cohort
  - Retrospective cohort: Non-concurrent cohort



INICET 2024

Q. Which study design ranks highest in the hierarchy of evidence?

a. Meta-analysis

b. Case control study

c. Cohort study

d. Large RCT (Randomized Controlled Trial)

Ans. a. Meta-analysis

- Meta-analysis is the gold standard of EBM (Evidence-Based Medicine)

Q. To test the association between risk factor and disease, which of the following is the weakest study design?

a. Case control study

b. Ecological study

c. Cohort study

d. Cross-sectional study

Ans. **b.** Ecological study

Important Information

- Best study design to demonstrate an association b/w risk factor & disease: Cohort
- Best study design to demonstrate an association b/w intervention & outcome: RCT

HILLS CRITERIA

00.31.06

- By Bradford Hill.
- The purpose is to establish causality
- Most important Hill's criteria is Temporality (Cohort)
- Least important or most difficult to establish Specificity
- Findings supported by natural pathogenesis in the body is Biological Plausibility
- Findings that are repeatable in similar settings is Consistency
- Researchers supporting each other's findings is Coherence of Association
- Exposure stopped, chances of outcome decrease - Cessation of Exposure
- Increase the dose, the chance of outcome increases: Dose-Response Relationship
- RR (Relative Risk) in Cohort, OR (Odds Ratio) in Case Control: Strength of Association

Q. All are components of Bradford Hill's causation criteria except?
a. Temporal association
b. Biological plausibility
c. Dose response relation
d. Sensitivity

Ans. d. Sensitivity

Q. A group of people worked at uranium mines for 5 years. Among them few developed cancer due to uranium exposure. What type of association would it be?
a. Biological plausibility
b. Coherence of association
c. Temporal association
d. Spurious association
Ans. c. Temporal association

DESCRIPTIVE EPIDEMIOLOGY

00.33.40

- Study of the distribution of disease in terms of time, place, person & identifying characteristics associated with it.
- 1st phase of Epidemiological investigation.
- Advantages:
  - First study of choice for a new disease or a disease of unknown etiology.
  - Helps in formulation of hypotheses. 1st phase of Epidemiological investigation.

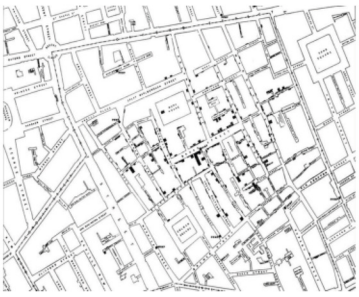
Important Information

- Helps in formulation of hypotheses: Descriptive study design
- Helps in testing of hypothesis: Analytical study design
- Helps in confirming a hypothesis: Experimental study design

Q. 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
Ans. **d.** Cyclical trend

Yourwish

1. Time Distribution	2. Place Distribution	3. Person Distribution

• Short-term fluctuations: Epidemic
• Periodic fluctuations
  ○ Cyclical and seasonal
  → Examples: Measles, Rubella, Influenza
  ○ RTA
• Long-term fluctuations
  ○ Secular trend: Progressive change in disease occurrence over a decade or longer
	• International Variation
	• National Variations
	• Rural vs Urban
	• Local distribution
	Eg, Spot Maps by John Snow
	
		• Distribution of disease according to person-related characteristics.

Important Definitions

- Endemic:
  - Constant presence of disease in a population
- Epidemic:
  - Disease occurs clearly in excess of normal expectancy
  - > 80% expected frequency
  - Mean + 2SD
  - Occurrence of a single case of a previously eliminated disease
  - Occurrence of a single case of an exotic disease
    → e.g., YF (Yellow Fever) in India
- Pandemic:
  - Worldwide distribution
  - Disease has crossed at least 2 continents or 2 WHO-specific regions
- Sporadic:
  - Haphazard distribution in the occurrence of a disease.
  - Cases are not epidemiologically related in terms of time, place, and person

Types Of Epidemic

00.37.10

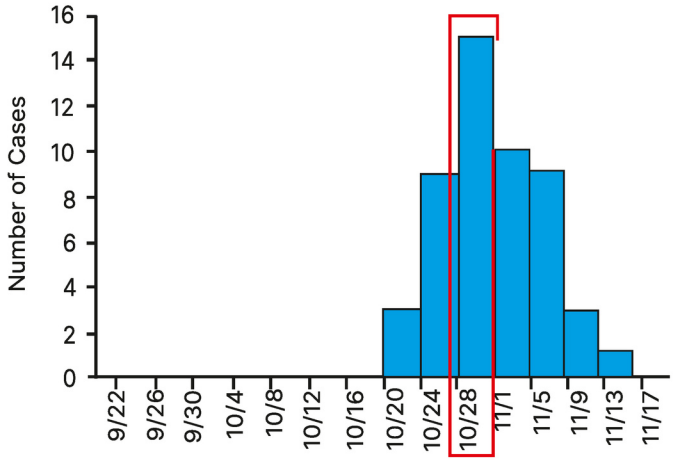
Point Source, Single Exposure	Common Source, Continuous Exposure	Propagated Epidemic
Rise & Fall Rapid rise and rapid fall of cases	Gradual smooth rise and gradual fall of cases	Gradual unsmooth rise of cases with multiple spurts
Cases occur over one incubation period of the disease	Cases occur over multiple incubation periods	
Explosive in nature	Non-explosive in nature	
Single peak reflecting a single incubation period (no secondary waves)	Multiple peaks reflecting multiple incubation periods (secondary waves present)	Secondary waves seen

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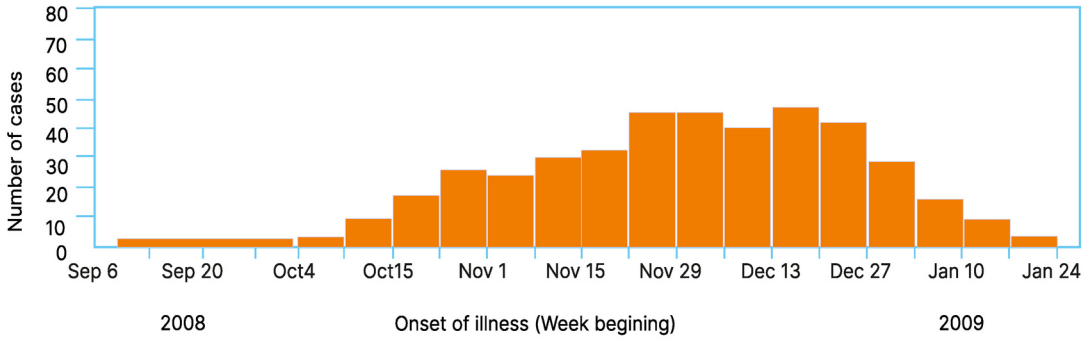
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No plateau phase	Prolonged plateau	Very short plateau
Single tall peak	Multiple short peaks	Taller peaks
Eg: Mostly infectious (e.g., food poisoning) Non-infectious: Bhopal Gas Tragedy	E.g., Contaminated well, CSW, Infected milk man	Person-to-person transmission Eg: epidemic of hepatitis A and polio

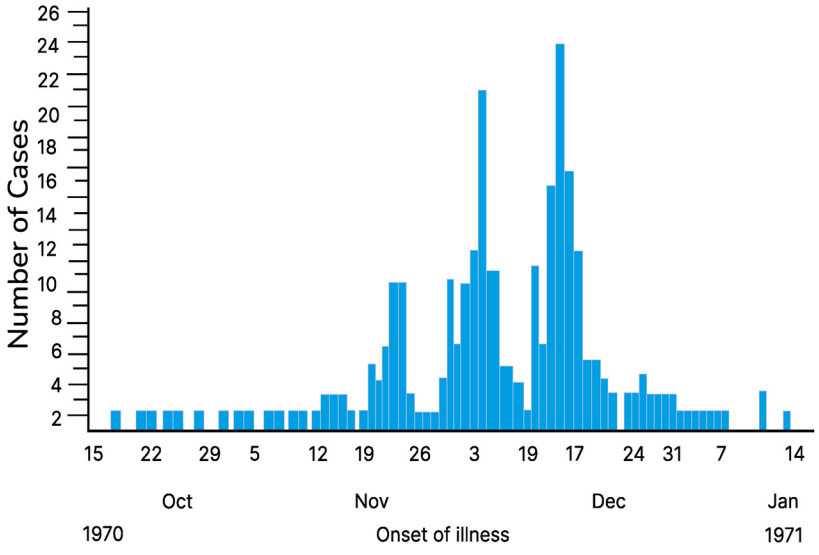
Point Source, Single Exposure



Common Source, Continuous Exposure



Propagated Epidemic



Yourwish

Q. Which of the following is not a characteristic of a common source epidemic with a single exposure?
a. The epidemic curve shows a rapid increase and decrease in cases
b. Cases are spread across multiple incubation periods of the disease
c. The epidemic often appears as explosive outbreak with cases clustered quickly
d. Single tall peak with no secondary waves

Ans. **b.**Cases are spread across multiple incubation periods of the disease

Q. 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

Ans. **d.** Common source, continuous exposure

Q. Best study of first choice for assessment of Unknown or New Disease with no etiological hypothesis?
a. Cohort study
b. Case control
c. Cross-sectional
d. Descriptive epidemiology

Ans. **d.**Descriptive epidemiology

Q. Which of the following is the initial step when an immunization survey is being conducted? FMGE 2021
a. Cluster identification
b. Conducting the survey
c. Completing the cluster and summary forms
d. Calculating the total fertility rate of the area

Ans. a. Cluster identification

- Five major steps of an immunization survey are:
  - Plan the survey
  - Conduct the survey
  - Tabulate data
  - Analyze data
  - Take action

Q. What are the steps of a research study, in chronological order? INICET 2025
1. Formulating the objective
2. Selecting the sample population
3. Finalizing the study analysis
4. Formulating the research question
a. 4, 1, 2, 3

b. 1, 3, 2, 4
c. 1, 4, 3, 2
d. 4, 1, 3, 2

Ans. a. 4, 1, 2, 3

- Steps in a Research Study
  - Define the Problem → Formulate the Research Question
  - Formulate the Objective
  - Select the Sample Population
  - Finalize and Conduct the Study Analysis
  - Analyze Data and Report Findings

Yourwish

3. CONCEPT OF HEALTH AND DISEASE

CONCEPT OF HEALTH

00:00:33

- According to WHO, health is a state of complete physical , mental and social well-being not merely the absence of disease or infirmity, leading to socially and economically productive life

CONCEPT	DEFINITION
Biomedical	• Health is the absence of disease or infirmity • Focuses only on biological factors and Germ theory of disease
Ecological	• Health is a dynamic equilibrium between humans and their environment • Interaction between agent - host - environment
Psychosocial	• Health includes ○ Biological ○ Psychological ○ Social well-being • Considers mental and social factors
Holistic	• Multidisciplinary approach • Recognizes the strength of social , economic and environmental influences on health

MCQ

Q.Which out of the following is not a concept of health ?

a.Biomedical concept

b.Ecological concept

c.Psychosocial concept

d.Physiological concept

CONCEPT OF WELL-BEING

00:02:11

Objective component of wellbeing	Subjective component of wellbeing
• Measurable	• Non-measurable
• It indicates standard of living • Indicator: GNP (Gross National Product)	• Quality of life

HEALTH & DEVELOPMENT INDICATORS

00:03:40

- Measures the health status and healthcare accessibility of a population
- It includes
  - Human development index (HDI)
  - Physical quality of life index (PQLI)
  - Multidimensional poverty index (MDPI)
  - Global hunger index (GHI)
  - Human poverty index (no longer used)

Yourwish

Yourwish

Difference Between Hdi & Pqli

00.04.11
FMGE 2022, INICET 2021, NEET PG 2024

	Human Development Index	Physical Quality of life Index	
Components	Longevity	Life expectancy at birth	Life expectancy at 1year
	Decent standard of living	GNI per capita	IMR (infant mortality rate) indicate the healthcare delivery
	Knowledge	EYS - Expected years of schooling MYS - Mean years of schooling	Literacy rate
Range		0-1	0-100
Values		Score - 0.685 Rank - 130th	Score - 65

MNEMONIC

PQLI	HDI
• I → IMR • L → Life expectancy at 1year • L → Literacy rate	• K → Knowledge / Education index(EYS & MYS) • I → GNI per capita • L → Life expectancy at birth

MCQs

Q. Which out of the following indicators is used to calculate both HDI and PQLI ? FMGE 2025

a. Life expectancy at birth

FMGE 2025

b. Standard of living

c. Life expectancy at age 1

d. Literacy rate

Ans. d

Q. Which is/are not components of PQLI ?

NEET PG 2024

1. Infant mortality rate
2. Life expectancy at birth
3. Literacy rate
4. Life expectancy at 1 year of age .
5. Under 5 mortality rate

a. 1 , 3 and 5

b. 2 and 5

c. 1 , 2 and 4

d. 1 , 3 and 4

Ans. b

Yourwish

Q. What is an appropriate heading for the following chart? INICET 2024

- **Dimension data**
- **Life expectancy 85 years**
- **Mean years of schooling 14years**
- **Expected years of schooling 18 years**
- **Per capita income (PPI) USD 75000**

a. PQLI
b. MDPI
c. DALY
d. HDI
Ans. d

HDI Calculation

Dimension	Maximum	Minimum
Life expectancy at birth	85 yrs	20 yrs
Mean years of schooling	15 yrs	0 yrs
Expected years of schooling	18 yrs	0 yrs
Combined education index	0.951	0
Per capita income (PPP $)	75000	100

- Step 1:
  - Calculate dimension indices
  - Dimension index = $\frac{\text{Actual value - Minimum value}}{\text{Maximum value - Minimum value}}$
- Step 2
  - Aggregating the subindices to produce the HDI ; HDI is geometric mean of three dimensions indices
  - HDI = Life expectancy index$^{1/3}$ x Education index $^{1/3}$ x Income index$^{1/3}$

Q. Which of the following demographic indicators is used to compare the life expectancy of two different countries? FMGE 2022

a. QALY
b. DALY
c. HDI
d. HPI
Ans. c
Explanation

- In India
  - LE at birth - 72 years
  - EYS - 13 years
  - MYS - 6.9 years

Q.Human development index includes INICET 2021

a.Life expectancy at one years , income , literacy rate

b.Life expectancy at birth , decent living standard , knowledge

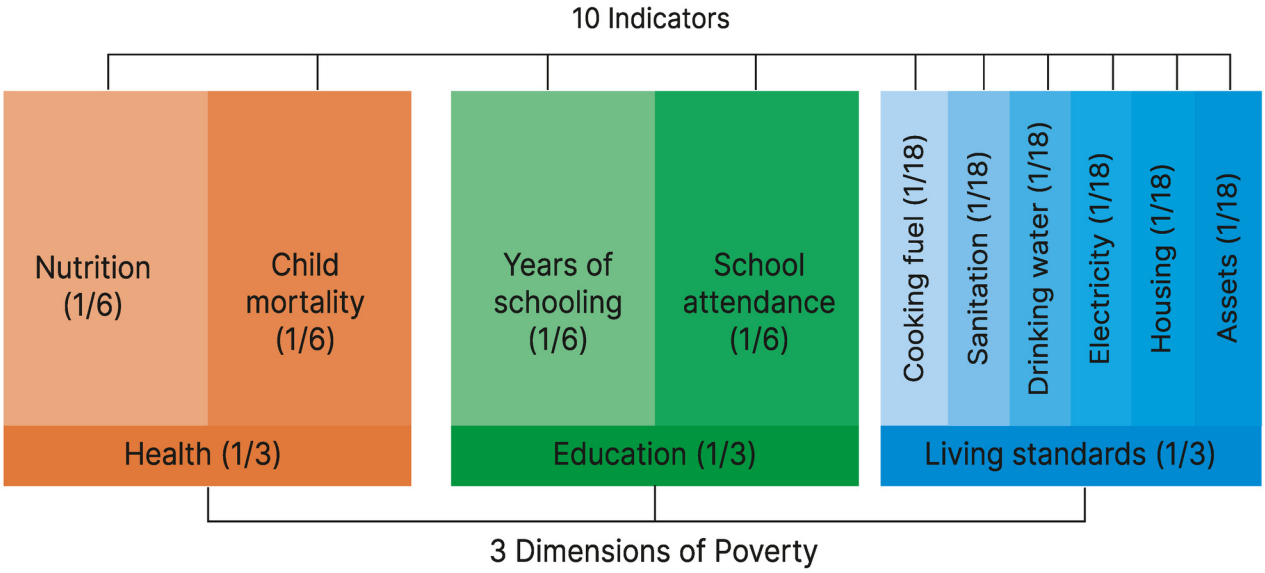
c.Life expectancy at one years , income , decent living standard

d.infant mortality rate , decent living standard , knowledge

MPI (MULTI - DIMENSIONAL POVERTY INDEX)

00:11:13

- Is an international measure of acute multidimensional poverty covering over 100 developing countries
- It complements traditional monetary poverty measures by capturing the acute deprivation in health , education and living standard that a person faces simultaneously .
- It has 10 indicators



- Range : 0 - 1
- India : 0.069 with 14.96 % poor population
- Interpretation of MDPI

MDPI	
20-33.3%	Vulnerability to poverty
>33.3%	Poverty
>50%	Severe poverty

- Overall deprivation in >1/3rd of indicators : Poverty in country

Global Hunger Index

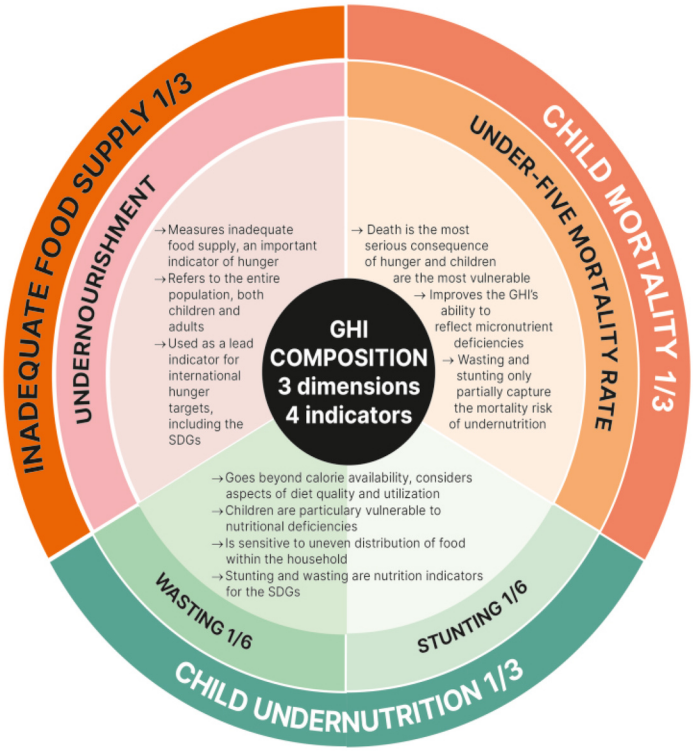
00:12:58

NEET PG 2019, 2024

- GHI has three dimensions which is measured by indicators

Dimensions	Indicators
Inadequate food supply	Undernourishment
Wasting , Stunting	Undernutrition
Child mortality	Under-5-mortality rate

Yourwish



- Range : scale 0-100
- GHI given by international fund policy research institute
- In 2025 : India GHI score - 25.8
  - Current rank : 102nd among 123 countries
  - State of serious hunger

$$GHI = \frac{\text{Proportion of undernourished population (PNU) + children underweight (CUW) (combines wasting and stunting) + child mortality in \% (CM)}}{3}$$

Q.Which is not a component of the global hunger index ? NEETPG 2024

a.Percentage of undernourished children under 5 years

b.Percentage of undernourished population

c.Under 5 mortality rate

d.Infant mortality rate

Ans. d

DISTINCTION BETWEEN DISEASE , ILLNESS & SICKNESS

00:15:21

- Disease: Physiological / psychological dysfunction
- Illness: Subjective state of the person who feels aware of not being well
- Sickness: State of social dysfunction i.e a role that the individual assumes when ill

THEORIES OF DISEASE CAUSATION

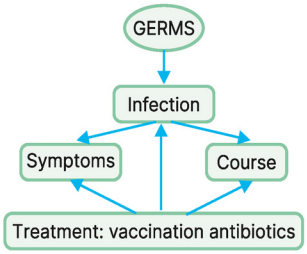
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NEETPG, FMGE

- Miasma theory
  - Given by William Furr
  - Disease happens due to bad clouds

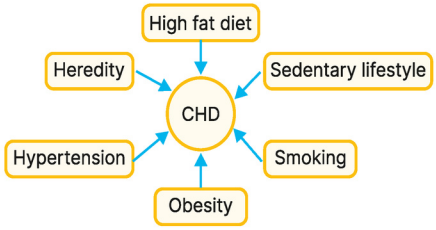
Yourwish

Yourwish

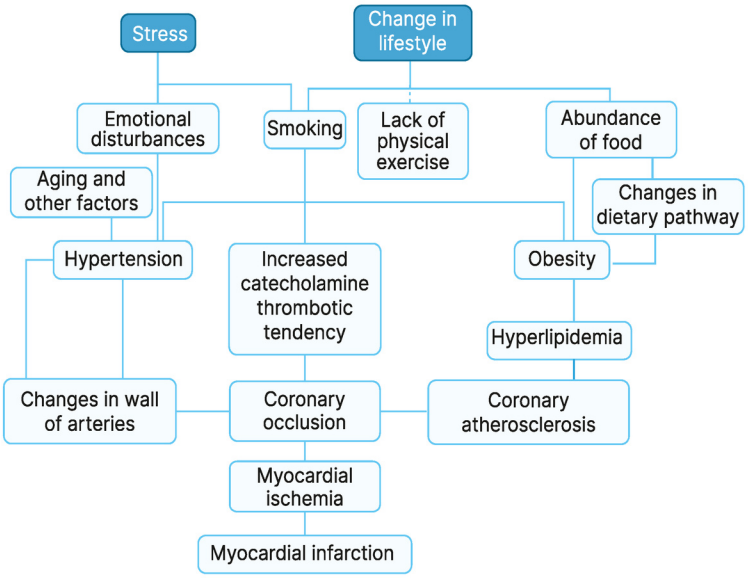
- Germ theory
  - Given by Louis Pasteur



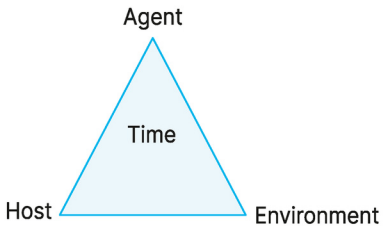
- Theory of multifactorial causation



  - Given by Pettenkofer
  - Reflects the possible etiologies of disease causation
- Web of causation

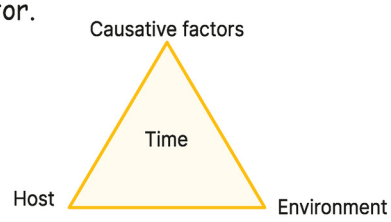


  - Given by MacMohan & Pugh
  - Possible modes of interaction among causation (Routes of transmission)
- Epidemiological triad
  - Interaction and interdependence between Agent, Host, and Environment
- Epidemiological triangle
  - Adds Time factor (e.g., incubation period)



Yourwish

- Advanced model of triangle of epidemiology
  - Agent is replaced by Causative Factor.



SPECTRUM OF DISEASE

00:20:00

- Graphical representation of variations in the manifestation of the disease

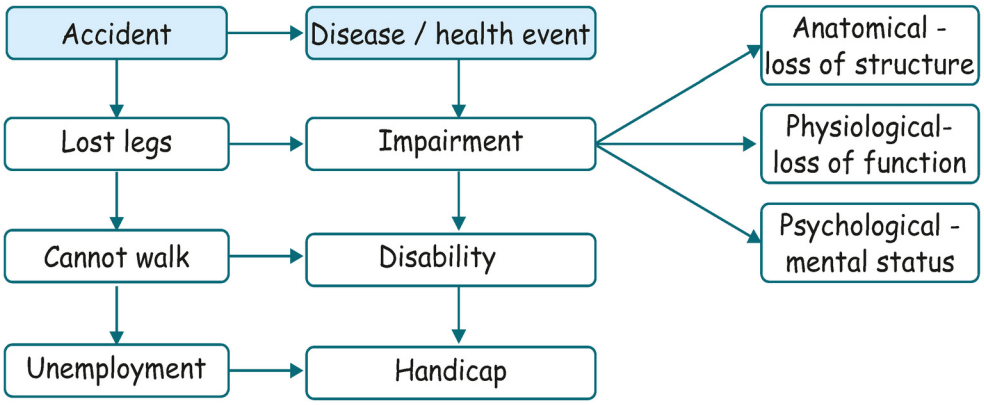
Spectrum of health

Positive health Better health Freedom from sickness	
	Unrecognized sickness Mild Severe Death

- Disease which is a good example of spectrum: Leprosy
- Disease that does not follow spectrum: Rabies

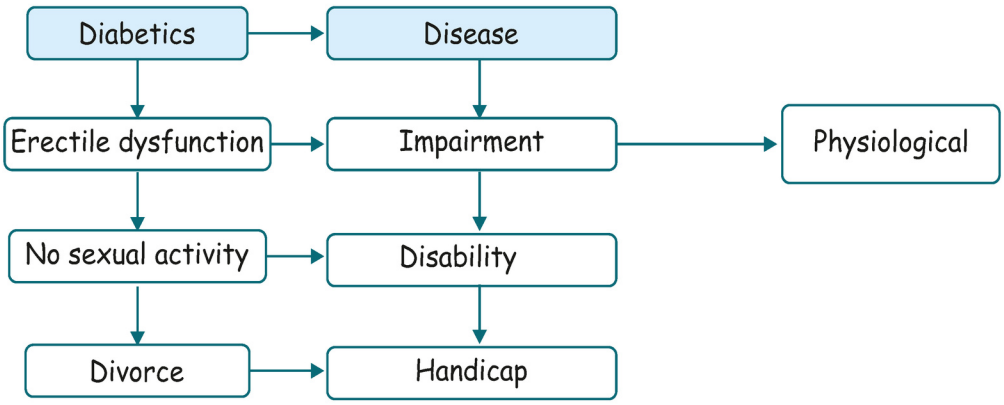
UNDERSTANDING CONSEQUENCES OF DISEASE

00:21:01



Q.A 35 year old man is unemployed because he is unable to walk after an accident . his unemployment is classified as a **FMGE 2022**

a.Disability
b.Handicap
c.Disease/Disorder
d.Impairment
Ans. b



CONTROL vs ELIMINATION vs ERADICATION OF DISEASE

00:24:23

CONTROL

NEET PG 2018, FMGE 2019, 2022

- The term 'Disease Control' describes ongoing operations aimed at Reducing:
  - Incidence of disease
  - Duration of disease
  - Modes of transmission of disease
  - Effects of infection including both physical and psychosocial complications
  - Financial burden to the community
- Till the disease ceases to be a public health problem

ELIMINATION

- Complete interruption of all modes of transmission in a defined geographic area
- Agent still present
- But no transmission
- Has a Regional preference
- Includes a country or WHO specific region

Disease eliminated from India	Disease targeted for elimination
• Polio (2014)	• Lymphatic filariasis(2027)
• Leprosy (2005) ○ Elimination criteria: Prevalence <1 case/1000 population	• Kala Azar(2027)
• Maternal & neonatal tetanus(2015) ○ Elimination criteria: <1case/1000 live birth	• HIV/AIDS(2030)
• Guinea worm(2000)	• TB(2025)
• Yaws (2016)	• Malaria(2030)
• Infectious trachoma(2024)	• Sickle cell(2047)

Eradication

- Complete extermination of the infectious agent through surveillance and containment
- "Tear out by roots"
- Worldwide

Disease eradicated	Disease targeted for eradication
Smallpox - 1980	Polio
wPV2 - sept 2015	
wPV3 - oct 2019	

- Eradication programmes fail due to
  - Hidden foci of infection
  - Unrecognized methods of transmission
  - Resistance of the vector or organism

Yourwish

Q. Disease elimination refers to

a. Extinction of disease agent
b. Termination of all disease
c. Global removal of disease agent
d. Regional removal of disease agent

Ans. d

Explanation

- Extinction: When agent is no longer maintained in CDC/WHO accredited labs
- Termination of all disease → Eradication
- Global removal of disease agent → Eradication

Q. Causative agent is present but there is no transmission is known as

a. Elimination
b. Control
c. Eradication
d. Endemic

Ans. a

Q. Cessation of infection and disease from whole world

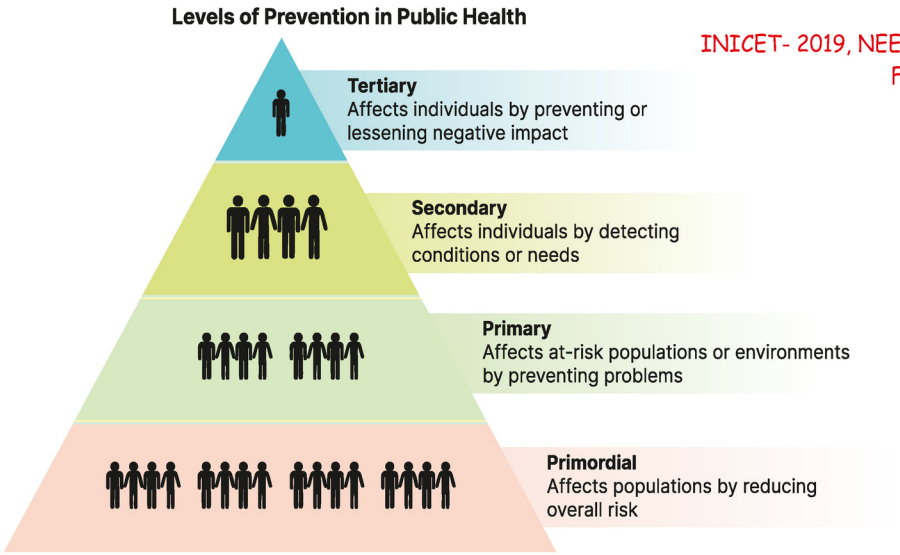
a. Control
b. Elimination
c. Eradication
d. Extinction

Ans. c

LEVELS OF PREVENTION

00:31:23

INICET- 2019, NEET PG- 2019, 2022, 2024,
FMGE- 2022, 2023, 2025



- Primordial Prevention: Risk factor is not yet present
- Primary level prevention: RF present, disease not started
- Secondary Prevention: Disease has started but is in the early stage.

Yourwish

Yourwish

- Condition is reversible.
- No complications present.

- Tertiary Prevention: Disease has progressed to an irreversible stage
  - Complications are present.

Levels of prevention	Interventions
Primordial prevention	• Individual education • Mass education
Primary prevention	• Health promotion • Specific protection
Secondary prevention	• Early diagnosis→ screening • Prompt treatment
Tertiary prevention	• Disability limitation • Rehabilitation

Levels of prevention	Risk factor	Disease	Disability	Mode of intervention
Primordial	Absent			• Health education • To prevent emergence of risk factors
Primary	Present	Absent		• Health promotion and specific protection • To prevent emergence of disease • Reduce incidence
Secondary	Present	Present	Absent	• Early diagnosis and treatment • To prevent progress of disease into disability • Reduce prevalence
Tertiary	Present	Present	Present	• Disability limitation and rehabilitation • To limit disability

- Quaternary prevention
  - Action taken to identify patients at risk of over treatment
  - Protect them from new medical procedures and ethically acceptable alternative to be advised

Important Information

- Prevention of occurrence of risk factors: Primordial
- Prevention of occurrence of disease: Primary
- Prevention of occurrence of complications from disease: Secondary
- Prevention of occurrence of disability or fatality due to a complication from disease: Tertiary

Yourwish

PRIMORDIAL PREVENTION	• Lifestyle education and modification
	  ○ Yoga and exercise
	• Health education to children for a balanced diet to prevent obesity in childhood
	• Discouraging children from adopting harmful lifestyle
	• For NCDs
	  ○ Salt restriction , no alcohol ,no smoking

PRIMARY PREVENTION	• Action taken prior to onset of disease
	• Health promotion: enabling people to lead healthy life
	• Health education
	  ○ Most cost effective interventions
	  ○ Target group - general public , patient health providers , community leaders , decision makers
	• Environmental modifications
	  ○ Provide safe water
	  ○ Sanitary latrines
	  ○ Control insects
	  ○ Rodents
	  ○ Improvement housing conditions
	• Lifestyle and behavioral changes
	  ○ Promoting small family norms
	  → Counselling for marriage
	  → Improvement in overall socio-economic status of the population
	• Nutritional interventions
	  ○ Promote breastfeeding
	  ○ Child feeding programs
	  ○ Food fortification
	  ○ Nutrition education
	• Examples of Primary prevention / specific protection
	  ○ Control air and noise pollution
	  ○ Chlorination of water
	  ○ Use of helmets and seat belts to protect against head injuries
	  ○ Use of mosquito nets
	  ○ Use of contraception to prevent unwanted pregnancy
	  ○ Avoidance of allergens
	  ○ Protection against occupational hazards
	  ○ Contact tracing for COVID 19
	  ○ Preplacement examination of workers
	  ○ Immunization
	  ○ Chemoprophylaxis
	  ○ Prophylactic IFA supplementation
	  ○ Vitamin A prophylaxis
	  ○ Protection against occupational hazards
	  ○ Protection from carcinogens
	  ○ Avoidance of allergens

SECONDARY PREVENTION	• Action which halts the progress of a disease at its incipient stage and prevents complication INICET 2022, FMGE 2020, AIIMS 2019 • Examples ○ Active search for malaria cases by MPW male ○ School health examination ○ Health camps ○ PAP smear ○ Self breast examination , dental filling and tooth extraction ○ Medical examination of industrial workers after placement ○ Monitoring of blood pressure ○ LASIK
TERTIARY PREVENTION	• All measures available to reduce or limit impairments, and disabilities, minimize sufferings caused by existing departures from good health and to promote the patient's adjustment to irremediable conditions. • Examples ○ Reconstructive surgery ○ School for blind ○ Crutches for patients suffering from polio ○ Muscle re-education and graded exercises in neurological disorders ○ Provision of artificial limbs ○ Providing hearing aids ○ Restoration of personal dignity and confidence ○ Physiotherapy ○ Contact lens and spectacles for stabilizing the vision

OTTAWA CHARTER FOR HEALTH PROMOTION

- Jakarta declaration
- 3 strategies
  - Enable
  - Mediate
  - Advocate
- 5 intervention
  - Strengthen community action
  - Develop personal skills
  - Create supportive environment
  - Reorient health services
  - Build healthy public policy



Longevity Dividend

- The positive return to society from investments in
  - Health
  - Aging research
  - Prevention that delay disease
  - Extend healthy lifespan

Yourwish

  - Maintain productivity
  - Independence in older age
- Targets biological ageing to delay age related diseases with an aim to delay disease onset
  - E.g., country invests heavily in cardiovascular disease prevention and age related disease research
- Average healthy lifespan increase by 5 years
- Fewer years are spent with disability or chronic illness
- Healthcare costs associated with late - life disease decline
- The combined economic savings , increased productivity , and improved quality of life represent the longevity dividend.

Q. All are examples of specific protection under primary prevention measures INICET 2019

a. Education about hand washing

b. Vaccination

c. Iodination of salt

d. Tab Rifampicin to those in contact with meningitis

Ans. a

Q. Mr Shyam's father suffered from colon cancer. Mr Shyam had bloody stool , so he came for a check-up . Before that,he had not undergone any screening . Shyam was advised colonoscopy as a screening modality.screening is which level of prevention ? FMGE 2025

a. Primordial

b. Primary

c. Secondary

d. Tertiary

Ans. c

Q. A person suffering from Rheumatic heart disease takes penicillin injection. this is which level of prevention ? NEET PG 2024

a. Primordial

b. Primary

c. Secondary

d. Tertiary

Ans. c

Q. Hand washing during COVID 19 is what level of prevention? FMGE 2023

a. Primordial prevention

b. Primary prevention

c. Secondary prevention

d. Tertiary prevention

Ans. b

Yourwish

Q.A government plans to outline tobacco control laws. What is the level of prevention here? FMGE 2023

a.Primordial prevention

b.Primary prevention

c.Secondary prevention

d.Tertiary prevention

Ans. b

Q.A person going for self health check up to a hospital as his father died last week due to ischemia . Which level of prevention is this ? FMGE 2023

a.Primary

b.Primordial

c.Secondary

d.Tertiary

Ans. c

Q. If counselling and screening for TB are done at an ICTC clinic for an HIV patient , as per NACO guidelines , what is the level of prevention ? FMGE 2022

a.Primordial

b.Primary

c.Secondary

d.Primary & secondary

Ans. d

Q.Vaccination and mass chemoprophylaxis represent FMGE 2019

a.Health promotion

b.Specific protection

c.Early diagnosis and treatment

d.Rehabilitation

Ans. b

Q. On republic day , a camp is organised ,people were screened for HTN by checking BP and for DM by checking their BMI and Blood sugar level,level of prevention is FMGE 2019

a.Primary

b.Primordial

c.Secondary

d.Tertiary

Ans. c

Yourwish

Q.Which of the following is the best level of prevention of breast cancer? NEETPG 2019

a.Specific protection

b.Early diagnosis and treatment

c.Disability limitation

d.Rehabilitation

Ans. b

Q.Image shown below indicates which level of prevention INICET 2022

a.primary prevention

b.Secondary prevention

c.Early diagnosis and treatment

d.Disability limitation



Ans. d

PALLIATIVE CARE

00.46.25

- Patient centred approach
- Aims to improve quality of life of patients and families facing life threatening illness
- By preventing and relieving suffering
- Principle
  - Patient is sovereign
  - Focus on quality of life , not cure
  - Neither hastens nor prolongs death
  - Addresses physical , psychological , social and spiritual needs
  - Given along with curative treatment
  - Supports family and caregivers

Q.Which of the following statements correctly describes palliative care ? INICET 2023

A.Disease is the centre of concern

B.The Patient is sovereign

C.Death should neither be prolonged nor hastened

D.The aim is to improve the quality of life

E.The intention is to cure

F.Imperative to do something than passively observe

a.A,B,C,D

b.C,E,F

c.B,C,D

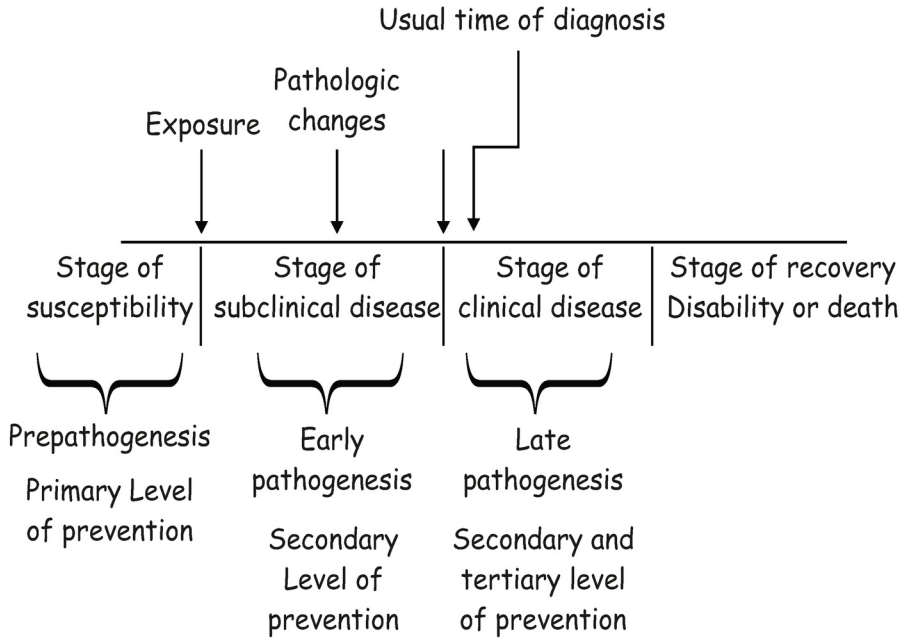
d.A,B,E,F

Ans. c

NATURAL HISTORY OF DISEASE

INICET 2022, NEET PG 2024 00:47:14

- Refers to Progression of disease over time from its beginning (pre-pathogenesis phase) to its termination as, Recovery, Disability, Death, in the absence of any treatment or prevention



- Explained by cohort study

Q. Match the following

INICET 2022

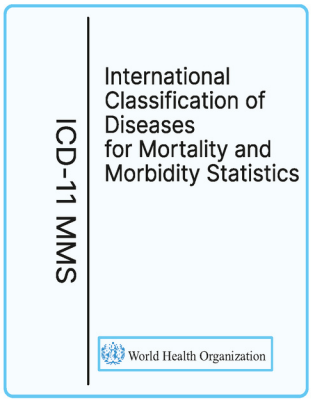
1.Prepathogenesis	a.Normal course without any intervention
2.Pathogenesis	b.Appearance of clinical signs and symptoms
3.Natural history of disease	c.Reaching normalcy with the help of community
4.Rehabilitation	d.Period before disease onset

a. 1-b, 2-d, 3-c, 4-d
b.1-a, 2-c, 3-d, 4-b
c.1-d, 2-b, 3-a, 4-c
d.1-c, 2-d, 3-a,4-d

ICD 11

00:50:17

- International classification of disease
- Released - 2018
- Came into effect - 2022
- Revised - every 10years
- In ICD - 11
  - 11 stands
    → Edition
    → Revision
- 3 volumes
- 26 chapters



Yourwish

- Volume 1 - Tabular list
- Volume 2 - Reference guide
- Volume 3 - Alphabetical index

- Key Changes/Additions:
  - Mental & Behavioral Disorders: Chapter 6.
  - Traditional Medicines: Chapter 26.
  - Gender Incongruence: Moved from Mental Health → Sexual Health.
  - Addictive Disorders: Gaming disorders added.
  - Immune System: Study of allergens added.
  - Supplementary Sections for Functional Assessment → V
  - Extension Codes (for added detail and specificity) → X

Yourwish

Yourwish

4. HEALTH INDICATORS

- Health indicators — INICET, NEETPG, FMGE
  - Helps to measure health
  - Reflect the current status of a community

CHARACTERISTICS OF A GOOD HEALTH INDICATOR

NEET PG 2023
00:01:05

Should actually measure what they are supposed to measure	Valid
Gives the same results if measured by different people in similar circumstances	Reliable
Detects changes in the situation concerned	Sensitive
Reflects changes ONLY in the situation concerned	Specific
Data can be obtained practically	Feasible
Contributes to understanding the phenomenon of interest	Relevant

TYPES OF HEALTH INDICATORS

00:02:15

- Mortality indicators
- Morbidity indicators
- Disability indicators
- Health care delivery indicators
- Utilization rates
- Nutritional indicators
- Environmental indicators
- Socio-economic indicators
- Indicators of social and mental health
- Health policy indicators
- Indicators of quality of life

Mortality Indicators

00:02:40

- First indicators to be calculated in any community — FMGE 2021

Crude death	$\frac{\text{Total no. of deaths}}{\text{Mid Year Population}} \times 1000$
Cause-specific death rate	$\frac{\text{No. of deaths from a specific cause in a year}}{\text{Mid Year Population at risk of that disease}} \times 1000$
Age-specific death rate	$\frac{\text{Total no. of deaths in a specific age group}}{\text{Mid Year Population of that age group}} \times 1000$

Yourwish

Standardized mortality ratio	$\frac{\text{Observed moratliy}}{\text{Expected mortality}}$ x 1000
Proportional mortality ratio (the simplest measure of burden of a disease)	$\frac{\text{Deaths due to a particular disease}}{\text{Total deaths}}$ x 1000
Case fatality rate (indicator of virulence)	$\frac{\text{Total deaths due to a particular disease}}{\text{Total cases due to a disease}}$ x 1000

Q. In a population of 10,000, 500 deaths were reported. 100 cases due to a disease X were reported, out of which 10 died. Calculate:

A. Crude Death Rate

B. Proportional Mortality Rate (X)

C. Case Fatality Rate (x)

Explanation

Crude death rate	$CDR = \frac{Total\ no.\ of\ deaths}{Mid\ Year\ Population}\ x\ 1000$ $= \frac{500}{10000}\ x\ 1000$ =50/1000 MYP
Proportional mortality rate (X)	$PMR = \frac{Deaths\ due\ to\ a\ particular\ disease}{Total\ deaths}\ x\ 100$ $= \frac{10}{500}\ x\ 100$ $= 2\%$
Case fatality mortality rate (x)	$CFR = \frac{Total\ deaths\ due\ to\ a\ particular\ disease}{Total\ cases\ due\ to\ a\ disease}\ x\ 100$ $= \frac{10}{100}\ x\ 100$ $= 10\%$

Important Information

- Proportional mortality rate is the simplest measure of the burden of disease in a community
- Life expectancy is a positive mortality indicator
- DALY is the best measure of disease burden
- QALY is the best measure of cost effectiveness of an intervention
- Under-5 mortality rate is the best indicator of the socio-economic status of a country

Other mortality indicators

00:09:05

Survival rate	$\frac{Total\ no.\ of\ patients\ alive\ after\ 5\ years}{Total\ no.\ of\ patients\ diagnosed\ or\ treated}\ X\ 100$ FMGE2022

Life expectancy	Avgerage no. of years a new born in expected to live based on the current age-specific mortality rate
Adult mortality	Probability of dying between the ages of 15 and 60 years per 100 population
Years of potential life lost	Years of life lost to premature death (using an arbitrary reference age, e.g., 75 years)

Morbidity indicators

00:10:55

NEETPG, FMGE

- Reflects on the burden of the disease
- Morbidity means spells of sickness due to disease
- Morbidity indicators:
  - Incidence/Prevalence
  - Notification rate
  - OPD attendance
  - Admission rate
  - Duration of hospital stay
  - Spells of sickness/sickness absenteeism

Disability indicators

00:12:06

- Disability means restriction of an activity of daily living
- Types:
  - Event type disability indicator
    → No.of days of restricted activity
    → Bed disability rates
    → Work loss days within the specified period
  - Person type disability indicator
    → Limitation of mobility and limitation of activity

Measures of disability indicators

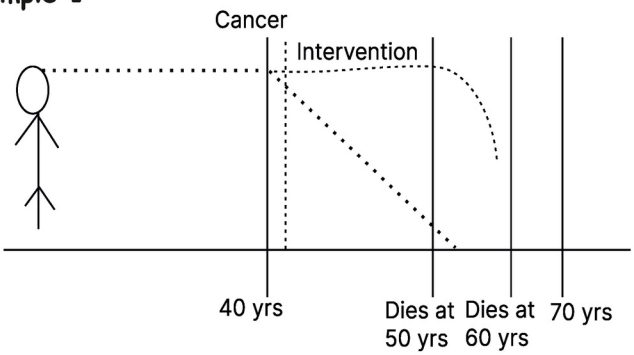
00:14:35

DALY (Disability Adjusted Life Years)	• A measure of the burden of disease, combining years of life lost to premature death and years lived with disability • Considers both mortality and morbidity of the disease • DALY = Years of Life Lost to premature death + No. of Years Lived with Disability • 1 DALY = 1 healthy year of life lost • Cardiovascular diseases contribute the maximum DALY
QALY (Quality Adjusted Life Years)	• No. of years added to life in quality and quantity due to a medical intervention • Measures quality of life in health gain • Quality of life: Expressed as Utility Value
HALE (Health Adjusted Life Years)	• No. of years a newborn is expected to live in full health, considering current rates of ill health and mortality • Lesser than life expectancy (adjustment for time spent in poor health)

Yourwish

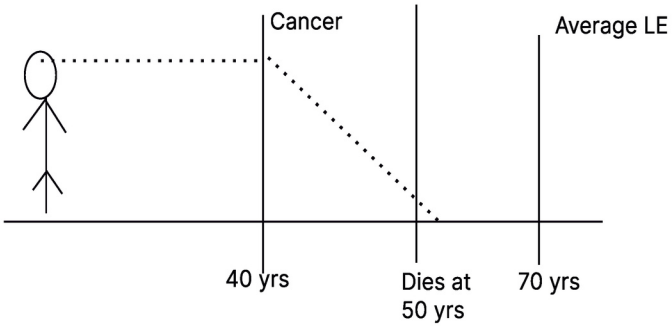
Sullivan's index	• Sullivan's index = Life expectancy – duration of disability • No. of years a newborn is expected to live in good health based on current rates of ill health and mortality • Disability free life expectancy

Example 1



Q. A person is diagnosed with cancer at 40 yrs and dies at 50 yrs. The average life expectancy in his country is 70 yrs. Calculate DALY.
DALY = Years of Life Lost to premature death + No. of Years Lived with Disability
= 20 + 10
= 30 yrs

Example 2



Q. The same person who is diagnosed with cancer at 40 yrs takes intervention, improving his quality of life, but he dies at 60 yrs. Calculate QALY
QALY= No. of years added to life in quality and quantity due to a medical intervention
= 10 yrs

Importance of utility value

INICET

- A numerical score representing the quality of life in a specific health state, ranging from 0 (death) to 1 (perfect health).
  - Examples: If a person lives for 1 year in utility value → 1: Health; 0: Death
- Perfect health → they gain 1 QALY (1 year × 1.0 utility = 1 QALY)
- If they live for 1 year with a health state having a utility value of 0.5 (e.g., bedridden), they gain 0.5 QALYs (1 year × 0.5 utility = 0.5 QALYs)

Q. The average life expectancy for a woman in Japan is 87 years. Due to recent advances in testing for cervical cancer, there is an increase in life expectancy by 15 years. The healthcare utility value is 0.8. Which of the following can be calculated from the parameters given? NEETPG 2022

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

Explanation:
D. QALY= Life years X Utility value = 15 yrs X 0.8 = **12 QALY**

Yourwish

Yourwish

Other indicators

00:23:27

INICET, NEETPG, FMGE

Healthcare delivery indicators	• Doctor population ratio, Nurse population ratio, Population bed ratio, Population per PHC
Health care utilization	• Bed occupancy rate, Bed turnover ratio, Average length of stay, % of infants immunized, % of couples using family planning
Environmental Indicator	• Proportion of population having access to safe water and sanitation facilities. • E.g., Percentage of households with safe water in the home or within 15 minutes of walking distance from a water standpoint or protected well
Health Policy Indicators	• % of GNP spent on health • WHO says 5% GDP should be spent on health • India says→ Will be spending 2.5% GDP by 2025 on health

Q. For maximum utilization of health services, the bed turnover interval should be: AIIMS

A. Slightly positive
B. Slightly negative
C. Largely positive
D. Equal to zero

Answer: A

Explanation:

- Bed turnover interval is a health care utilization indicator
- If a bed was empty, how soon should it be utilized

Health care utilization indicators

Bed turnover interval	• Average number of days a bed remains empty between patients
Bed occupancy rate	• Percentage of available hospital beds actually occupied by patients at a given time
Average length of stay	• Mean number of days that admitted patients stay in the hospital during a given period
Bed turnover ratio	• Number of patients treated per bed over a defined period (usually a year)

Socio-economic indicators

00:27:45

- **Socio-economic Indicators** are quantifiable measures used to assess the economic and social standing of individuals or communities.
  - H - Housing (number of persons per room)
  - F - Family size (number of children)
  - L - Literacy rate, especially female literacy rate
  - A - Availability of per capita calorie

Yourwish

- G - GNP per capita
- G - Growth rate of population (rate of population increase)
- E - Employment level (or Unemployment level)
- D - Dependency ratio

Q. All are socio-economic indicators of health except
A. Dependency ratio
B. GNP per capita
C. Growth rate of a population
D. Yearly family income

Answer: D

PYQs 00:29:14

Q. Years of potential life lost could be attributed to? NEETPG 2023
A. Years lost to morbidity
B. Years lost due to premature death
C. Years lost to disability
D. Years lost due to poor quality of life

Answer: B

Q. A total of 60 patients were diagnosed with COVID-19, out of which 12 deaths occurred. Calculate the Case Fatality Rate (CFR). FMGE 2025
A. 20%
B. 30%
C. 40%
D. 10%

Ans: A

Explanation:

$$CFR = \frac{Total\ deaths\ due\ to\ a\ particular\ disease}{Total\ cases\ due\ to\ a\ disease}\ x\ 100$$

$$= \frac{12}{60}\ x\ 100$$

$$= 20\%$$

Q. How much percent of GNP does the WHO recommend should be spent on the healthcare sector? FMGE 2023
A. 2.0%
B. 2.5%
C. 3.5%
D. 5%

Ans: D

Q. Which of the following indicators is best to measure the overall disease burden? FMGE 2021
A. Quality Adjusted Life Years
B. Health Adjusted Life Expectancy
C. Disability Adjusted Life Years
D. Disability Free Life Expectancy

Ans: C

Q. Which of the options below determines the severity of the disease? 2020
A. Proportional mortality rate
B. Incidence
C. Case fatality rate
D. Prevalence

Ans: C

Q. What is the denominator used in the calculation of the case fatality rate? FMGE 2019
A. Total number of deaths due to all causes
B. Total number of hospital admissions
C. Total number of cases due to the disease concerned
D. Total number of deaths due to the disease concerned

Ans: C

Q. Once clinically manifested, which of the following has the highest mortality? INICET 2020
A. Zika
B. Ebola
C. Rabies
D. Nipah

Ans: C

INICET, NEETPG, FMGE
00:32:05

NITI AAYOG

- National Institution of Transforming India
- NITI AAYOG is the premier policy think tank of the government of India, providing directional and policy inputs to drive sustainable economic growth and development
- Replaced planning comission of India
- It came into existence on 1st Jan 2015
- The chairperson is the prime minister
- Other members- Chief minister, governors

INICET, NEETPG
00:33:35

Health index

- Health Index, formulated by NITI AAYOG with MOHFW & World Bank, is used to compare and rank states and Union Territories on their overall health performance and year-on-year improvement
- This is done to ensure that India adheres to the Sustainable Development Goals (SDGs) for 2030

Yourwish

- Composed of 3 domains, 5 subdomains, and 24 indicators
- It is a composite index based on indicators in 3 domains:
  - Domain 1: Health outcomes (70%)
  - Domain 2: Governance and Information (12%)
  - Domain 3: Key input/process (18%)

Q. What is the primary objective of the usage of the Health Index by NITI Aayog? INICET2025

A. Assess the efficiency of government hospitals

B. To promote public-private partnerships, raise funds for private hospitals

C. Compare and rank states and UTs on their overall health performance

D. To identify districts for improvement

Answer: C

Yourwish

Yourwish

5. VACCINES & COLD CHAIN

VACCINES

00:00:30

- Level of prevention: Primary level (specific protection)
  - Exception- BCG vaccine for the t/t of Bladder cancer is a secondary level of prevention
- Type of Immunity: Active immunity
  - Ig's- Passive immunity

Louis Pasteur	Edward Jenner
• Coined the term "Vaccine" • Discovered the rabies and anthrax vaccines	• Discovered the first vaccine - Smallpox vaccine • Coined the term vaccination
	

Active and passive immunity

- Active and passive immunity can be given simultaneously in:
  - Rabies
  - Tetanus
  - Diphtheria
  - Hepatitis B
- Not given simultaneously: Measles vaccine
  - If 1st vaccine is given: Igs are given after 2 weeks
  - If 1st Ig is given: vaccine is given after 12 weeks

TYPES OF VACCINE

00:03:59

NEET PG 2021, INICET 2022

Live Vaccine	Killed Vaccine	Both Live & Killed Available
Live organisms are injected in attenuated (reduced virulence form while retaining immunogenicity)	Killed (using heat or chemicals) organisms are injected	

Yourwish

Mnemonic: I Love Chick E M B R Y O: • **I- Influenza** • **Love: Live** • **Chick: Chickenpox** • **E: JE** • **M: Measles, Mumps** • **B: BCG** • **R: Rubella, Rotavirus** • **Y: Yellow Fever** • **O: OPV**	**Mnemonic: K I L L E R** • **K: KFD** • **I: IPV** • **L: Influenza** • **L: Leishmania** • **E: JE** • **R: Rabies** Plague is also available as a killed vaccine	• Polio • JE • Influenza • Hepatitis • Cholera • Typhoid

Subunit Vaccine

Type	Mechanism	Examples
Toxoid	Purified toxins → Exotoxins	• TT (Tetanus Toxoid) • Td • Anthrax
Protiens	Single protein or a combination from a pathogen	• Influenza • Acellular Pertussis
Polysaccharide	Antibody produced against the capsular polysaccharide	• PPV23 (Pneumococcal polysaccharide) • Meningococcal • Typhim Vi • Hib
Conjugate	Polysaccharide antigen chemically linked to a protein recognized by T-cells.	• PCV13 (Pneumococcal Conjugate) • Meningococcal (MenACWY) • Hib
Recombinant	Use of DNA technology	• Hepatitis B (HBsAg), • Cervical cancer vaccine (Gardasil)
Combinations	More than one kind of immunizing agent is included	• Pentavalent vaccine (D, P, T, Hepatitis B, Hib) • MMR • MMRV

Q. All are live vaccines except:

INICET 2024

A. Hepatitis B
B. Measles
C. Yellow fever
D. Rubella

Ans. A

Q. Measles vaccine is which type of vaccine FMGE 2025

A. Killed vaccine
B. Live vaccine
C. Toxoid
D. Polysaccharide vaccine

Ans. B

Q. Which is not a polysaccharide vaccine? INICET 2024

A. Typhim Vi
B. PPV 23
C. Meningococcal Vaccine
D. HPV

Ans. D

Q. Pentavalent vaccine consists of? INICET 2021

A. Diphtheria, Pertussis, Tetanus, HBV, HiB
B. Diphtheria, Polio, Tetanus, HBV, HiB
C. Diphtheria, Pertussis, TB, HBV, HiB
D. Diphtheria, Polio, Typhoid, HBV, HiB

Ans. A

Q. Minimum period between two live vaccines? NEET PG 2018

A. 4 weeks
B. 8 weeks
C. 10 weeks
D. 14 week

Ans. A

Q. 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 dose gives life long immunity
D. Live vaccine contains both major and minor antigens

Ans. A

- Booster doses are not required when live vaccines are administered, and a single dose gives lifelong immunity except for OPV
- OPV requires booster doses
- Two live vaccines can be administered simultaneously, but given at different sites
- It cannot be given together gap of 4 weeks between two live vaccines is preferred

Yourwish

LIVE VS KILLED VACCINE

00:13:59

Characteristic	Live	Killed
Duration of immunity	Longer	Shorter
Effectiveness of protection	Greater	Lower
Immunoglobulins (Ig) are produced	IgA and IgG	IgG
Cell-mediated immunity produced	Yes	Weakly or more
Interruption of the transmission of the virulent virus	More effective	Less effective
Reversion to virulence	Possible	No
Stability at room temperature	Low	High
Excretion of vaccine virus and transmission to nonimmune contacts	Possible	No

Q. A polysaccharide vaccine against Streptococcus pneumoniae has 23 serotypes. In which of the following patients is the vaccine most effective?

INICET 2019

A. A child <2 years
B. A patient with sickle cell disease
C. A patient with cystic fibrosis
D. A patient with recurrent otitis media

Ans. B

- Pneumococcal conjugate vaccine is preferred over the polysaccharide vaccine in <2 years
- Post-splenectomy patients with sickle cell anemia are at risk to develop pneumococcal infection; hence, option B is correct.

Q. What does the BCG vaccine protect against?

INICET 2018

A. Pulmonary TB
B. Disseminated TB
C. Skeletal TB
D. CNS and Disseminated TB

Ans. D

- BCG vaccine is effective against extrapulmonary TB (CNS, disseminated TB)
- 0% effective in pulmonary TB

Yourwish

Yourwish

Q. A woman brought her 9-month-old baby to the medical officer, asking for another BCG vaccine dose for her child as the BCG vaccination scar was not visible. The doctor checked the vaccination card and confirmed that the birth dose was given. The Mantoux test was negative. What is the next step? FMGE 2025

A. Give BCG vaccination immediately
B. Vaccinate with BCG vaccine at 12 month age
C. Do Mantoux test and wait for the result
D. Reassurance to mother

Ans. D

STRAINS OF VACCINE

00:16:38

Vaccine	Associated Strain
BCG	DANISH 1331
Measles	Edmonston Zagreb
Mumps	Jeryl Lynn
Rubella	RA 27/3
Chicken Pox	OKA
Yellow Fever	17-D
Japanese Encephalitis	Live: SA-14-14-2 Killed: JEEV (SA-14-14-2), JENVAC (Kolar strain)
Dengue	CYD-TDV
Polio	SABIN (OPV), SALK (IPV)
Leprosy	Mycobacterium Prannii Indicus
HIV	Modified Vaccinia ANKARA
Malaria	Mosquirix, Lytic cocktail, RTSAS01
Influenza	A7/California/2009
Cholera	Dukoral, Shanchol

Q. A 32-year-old person travelled to Africa. He reported fever followed by chills. Which vaccine if he had taken before travel, he could not have developed the disease. What is the strain of the vaccine?

A. 17 D
B. Jeryll Lynn
C. Edmonston Zagreb
D. Oka

Ans. A

Yourwish

Q. A person is moving from Nigeria to the USA. He is advised to have a valid vaccine certificate that is valid. Which vaccine certificate will the US Embassy validate which vaccine certificate for VISA purposes?

FMGE 2025

A. COVID vaccine
B. 17 D vaccine
C. Japanese Encephalitis vaccine
D. Measles

Ans. B

- The yellow fever vaccine (17D) becomes effective 10 days after administration
- The vaccine certificate is valid for life long
- If a person is not vaccinated and is in an endemic country, 6 days of quarantine are required

Q. Shanchol vaccine consists of:

A. Monovalent, 2 doses
B. Monovalent, 1 dose
C. Bivalent, 2 doses
D. Bivalent, 1 dose

Ans. C

- Shanchol is effective against O1 and O139 strains of cholera

NATIONAL IMMUNISATION SCHEDULE

00:21:25

- Started on: November 19, 1985
- Beneficiaries: 0–16 years, Pregnant female

Immunisation Timeline

Age	Vaccine
Birth	• BCG, OPV-0, Hepatitis B
6 weeks	• OPV1, Penta1, RV1, PCV1, fIPV1 (fractional IPV: 1/5th of full dose, 0.1 ml)
10 weeks	• OPV2, Penta2, RV2
14 weeks	• OPV3, Penta3, RV3, PCV2, fIPV2

9 months	• MR1, JE1, PCV booster, fIPV3
	• Vitamin A Supplementation
	  ○ Initial Dose (9 months)- 1 ml or 1 lac IU
	  ○ Subsequent Doses: Every 6 months until 5 years of age- 2 ml or 2 lac IU
	  ○ Total Doses: 9
	  ○ Total Amount: 17 lac IU

16 - 24 months	• MR2, JE2, OPV booster, DPT 1st booster
5 - 6 years	• DPT 2nd booster
10 years	• Td1
16 years	• Td2

Q. Which of the following is the fIPV dose schedule under the National Immunization Schedule (NIS)?

A. 6 weeks, 10 weeks, 14 weeks

B. At birth, 6 weeks, 10 weeks, 14 weeks, 16-24 months, 5 years

C. 6 weeks, 14 weeks, 9 months

D. 6 weeks, 10 weeks, 12 weeks

Ans. C

Q. A 10-year-old child is brought to the clinic for regular immunization. Which vaccine is given as per the National Immunization Schedule (NIS)?

A. Td

B. BCG

C. MMR

D. DTP

Ans. A

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

A. DPT booster

B. OPV booster

C. Japanese encephalitis 2nd dose

D. PCV booster

Ans. D

Vaccination Protocol in Pregnancy

- Primi or Multi with last childbirth >3 years ago
  - 2 doses of Td vaccine:
    → 1st dose: As soon as possible
    → 2nd dose: 4 weeks later
- Multi with the last childbirth within 3 years:
  - Single booster dose Td: Administered in the 7th month of pregnancy

Yourwish

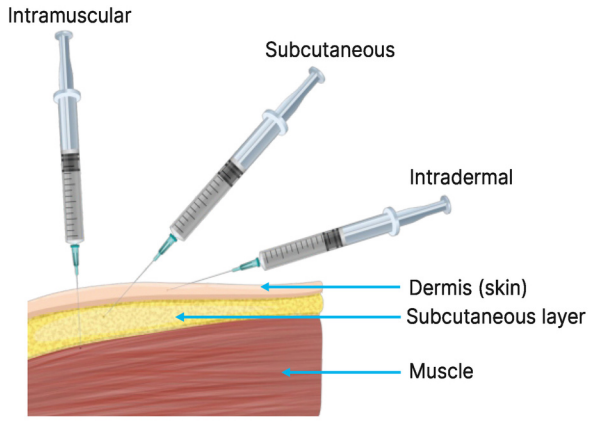
Q. A pregnant woman with a 2-year-old child gives a history of completing required antenatal vaccinations during her previous pregnancy. Which of the following would you recommend for her current pregnancy?

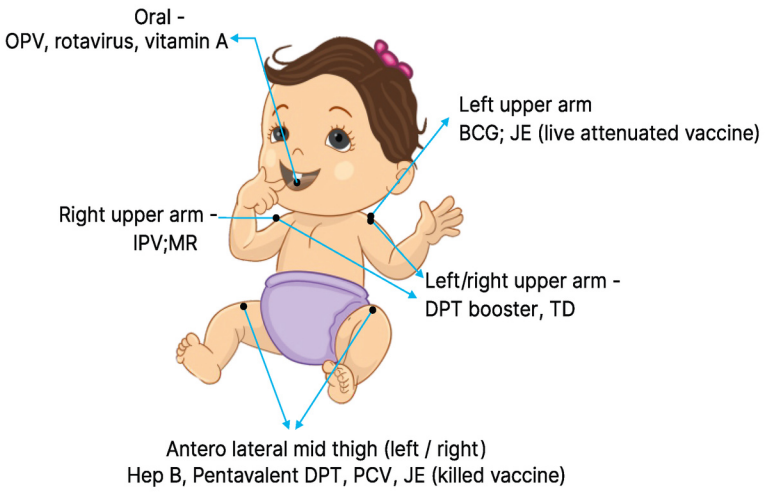
A. Give a booster dose of TT
B. Give a booster dose of Td
C. Give 2 doses of TT
D. Give 2 doses of Td

Ans. B

ROUTE, DOSE, & SITE OF VACCINE ADMINISTRATION

00:30:00



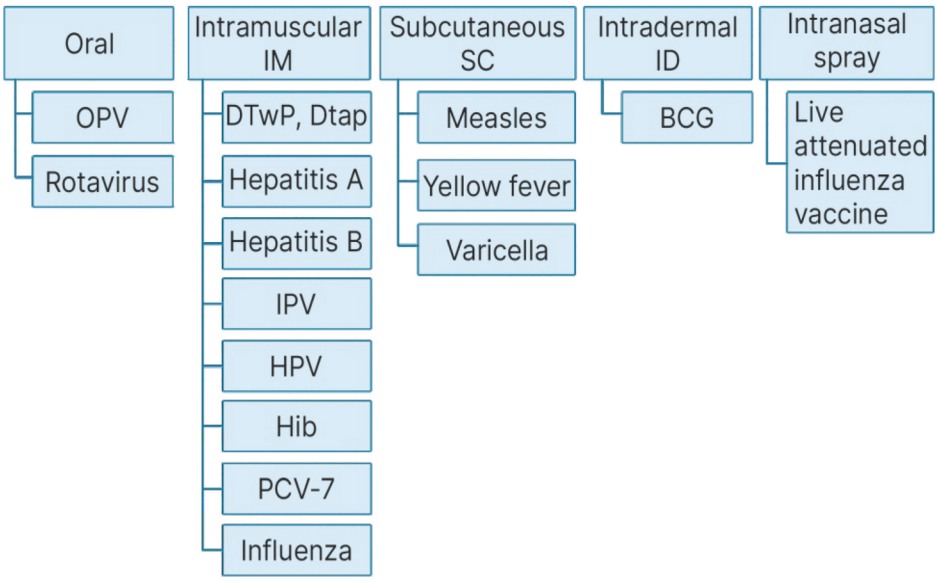


Oral Route	• OPV (Oral Polio Vaccine): 2 drops • RV (Rotavirus Vaccine): 5 drops

Intradermal Route (ID): at 10° to 15	• BCG Vaccine:
	  ○ Up to 1 month: 0.05 ml ID
	  ○ After 1 month: 0.1 ml
	  ○ Site: Left upper arm
	• f-IPV
	  ○ Dose: 0.1 ml
	  ○ Site: Right upper arm

Subcutaneous (SC) Route: at 45°	• MR: Right upper arm • JE Live: Left upper arm
Intramuscular (IM) Route: at 90°	• General Rule: All t-series vaccines are 0.5 ml • JE (Killed) - Left thigh • Hepatitis B, Pentavalent, and DPT - Left thigh • PCV: Right thigh • DPT 2nd Booster / Td- Arm (Deltoid)

Yourwish



Q. A mother brought her 6-month-old baby girl to an ICDS centre, where she met an Anganwadi worker and asked her for advice regarding the vaccination of her child. The last vaccines she had received were PENTA3, OPV3, IPV2, and ROTA3 at 14 weeks of age. The mother said her baby had received both BCG and Hepatitis B at birth. What advice should the Anganwadi worker give to the woman regarding the baby's next vaccination due date? INICET 2023

A. MR vaccine IM at left arm and Vitamin A drops at the end of 9 months
B. MR vaccine SC at right arm and Vitamin A drops at the end of 8 months
C. MR vaccine IM at left arm and Vitamin A drops at the end of 8 months
D. MR vaccine SC at right arm and Vitamin A drops at the end of 9 months

Ans. D

Q. What should be done when a 1-year-old child has only received the first dose of DPT at 6 weeks of age and has had no vaccination since? INICET 2022

A. Give the second dose of DPT
B. Do not give DPT
C. Restart DPT
D. Directly give the booster dose of DPT

Ans. A

- Do not restart the vaccination; resume the vaccination

Q. A 10-week-old infant is brought to the clinic for routine immunization. The healthcare provider discusses the rotavirus vaccine with the parents. Which of the following statements about the rotavirus vaccine is incorrect? NEET PG 2024

A. It is available in both monovalent and pentavalent forms
B. It is a live vaccine
C. Cannot be given after 6 months of age
D. It is administered orally

Ans. C

- The rotavirus vaccine can be given till 1 Year

Yourwish

NEET PG 2021

Q. What is true about vaccines given for an outbreak of Acute Encephalitis?

A. Live and intramuscular

B. Killed and intramuscular

C. Live and subcutaneous

D. Killed and subcutaneous

Ans. B

DELAYED IMMUNIZATION

00:36:38

Birth Doses

- OPV 0: Can be given up to 15 days
- Hepatitis B: Given up to 24 hours

Catch Up Deadlines

The following vaccines can be administered if delayed, up to the specified age limits:

- Till 1 year - BCG, Penta, Rota, PCV, fIPV
- 5 years -OPV, Measles, MR, Vit A
- 7 years -DPT
- 15 years -JE
- Lifelong- TT / Td

Q. As per NIS, which vaccines are indicated at the first visit for immunization of a 13-month-old baby who has not been previously immunized?

A. BCG, OPV 1st dose, Pentavalent 1st dose, Rota virus 1st dose

b. OPV 1st dose, Pentavalent 1st dose, Measles 1st dose

C. BCG, OPV 1st dose, Measles 1st dose

D. OPV 1st dose, DPT 1st dose, Measles 1st dose

Ans. D

ADDITIVES AND EXCIPIENTS IN THE VACCINE

00:38:41

- DPT / Hepatitis B
  - Aluminium compound: Adjuvants
  - Thiomersal: Prevents microbial growth
- OPV, Measles:
  - Magnesium compounds ($MgCl_2$ for OPV, $MgSO_4$ for measles): Stabilizing agents
- Measles, IPV:
  - Neomycin (antibiotic): To prevent microbial growth

CONTRAINDICATIONS OF VACCINES

NEET PG 2019, AIIMS 2019, INICET 2021 00:39:52

Conditions	Contraindications
Pregnancy	All Live Vaccines (LV) are C/I except the Yellow Fever vaccine
Lactation	Yellow Fever C/I
General Fever, diarrhea	No vaccines are C/I
PEM (Protein Energy Malnutrition)	No vaccines are C/I
Asymptomatic HIV	No vaccines are C/I
Symptomatic HIV Adults	All live vaccines except measles, MR, MMR, and Varicella Newborn: All live vaccines except OPV
Sibling of HIV + symptomatic child	OPV avoided
Progressive neurologic disease	DPT Vaccine C/I (specifically the Pertussis component)
Epilepsy	DPT Vaccine
Epilepsy controlled by anti-epileptics	No vaccine is C/I
Egg allergy	Yellow fever, Influenza
Neomycin allergy	MR
Abdominal surgery	Rotavirus vaccine
High-grade fever	Do not give vaccines
All vaccines (both live & killed)	Anaphylaxis to previous dose, Current serious illness
Live vaccine	Pregnancy, radiation therapy, severe symptomatic immunodeficiency, on steroids

Important Information

- Child with Cerebral Palsy (non-progressive disorder): Can give DPT / Penta
- Direct BCG- given till one year, i.e., no tuberculin test required
- Indirect BCG- given after one year, i.e., tuberculin test is performed before giving BCG

Q. Vaccine contraindicated in pregnancy.

FMGE 2025

A. Hepatitis B
B. Rabies
C. Yellow Fever
D. Japanese Encephalitis

Ans. C

Yourwish

Q. Which of the following is not a contraindication for OPV? FMGE 2020

A. Leukaemia
B. Diarrhea
C. Malignancy
D. Immunocompromised

Ans. B

Q. A girl child had recurrent yeast infections and respiratory viral infections since she was 3 months old. Which of the following vaccines is contraindicated considering her immune status? NEET PG 2021

A. DPT
B. Tt/Td
C. Measles/MMR
D. Killed IPV

Ans. C

- Recurrent yeast infections suggests immunocompromised state; therefore, live vaccines are contraindicated

ADVERSE EVENTS

00:45:40
INICET 2021, 2023, FMGE 2019

Vaccine	Adverse effects
BCG	• Ulcer formation - MC • Suppurative lymphadenitis • BCG osteitis • Disseminated BCG infection
Measles / MR / MMR	• Toxic shock syndrome (PYQ) • Febrile seizure • Thrombocytopenia (PYQ) • Encephalopathy
OPV	• VAPP (PYQ)
Tetanus toxoid / Td	• Brachial neuritis
Rotavac	• Intussusception (PYQ)
Pertussis	• Persistent (>3 hrs) screaming • Seizures • Hypotonic hyporesponsive episodes (PYQ) • Encephalopathy
Influenza (killed)	• Guillain-Barré syndrome (PYQ)

Yourwish

Yourwish

Q. A 8-months-old child had a history of unusual crying and convulsions following previous vaccination after BCG, DPT & OPV (first dose), and Hepatitis B. Now parents have brought the child for the next doses of vaccination. Which vaccine is contraindicated in this situation?

A. Measles
B. DPT
C. Hepatitis B
D. DT

Ans. B

Q. A child developed persistent, inconsolable crying after 6 weeks. What should be done at 10 weeks

A. Give the DPT vaccine
B. Do not give DPT
C. Call the child at 14 weeks
D. Give the DT vaccine

Ans. D

Q.Intussusception can be caused by which vaccine? FMGE 2021

A. Rotavirus
B. MR
C. Oral Polio
D. BCG

Ans. A

Aefi (Adverse Event Following Immunisation) Classification:

- An AEFI is any untoward medical occurrence that follows immunization and which does not necessarily have a causal relationship with the usage of the vaccine.
  - Product-related reaction – Limb swelling after DPT
  - Quality defect-related reaction – Failure to inactivate IPV leads to paralysis
  - Immunization error (most common) – Infection after contaminated vials: Toxic shock syndrome
  - Anxiety reaction – Vaso-vagal syncope
  - Coincidental – Fever due to malaria after vaccination session, but not related to vaccines

VACCINE AVAILABILITY 00:49:45

- Powdered form
  - Add diluent to make it liquid
  - Reconstituted vaccine/Lyophilized/freeze-dried vaccine

Vaccine	Diluent	Should be used within
Measles	Sterile water	4hrs
BCG	Normal saline	4 hrs
Live JE	Phosphate buffer	2 hrs
YF	Cold saline	30 minutes

Yourwish

- Liquid form
  - Rest all vaccines

OPEN VIAL POLICY

00:51:45

- Vaccine vials opened in the session site can be used in more than one immunization session up to 4 weeks (28 days), provided: INICET 2020, 2022 AIIMS 2018
  - The expiration date has not passed.
  - Vaccines are stored strictly under the appropriate temperature range, both during transportation and storage at the cold chain point (+2 to +8°C)
  - Aseptic technique has been used to withdraw all doses
  - Vaccine vial monitor has not reached the discard point

- Vaccines that follow Open Vial Policy:
  - All T-series vaccines + P I O + JE Killed
  - T series vaccine
    - → Hepatitis B
    - → DPT
    - → TT
    - → Rotavirus
  - P - PCV
  - I - IPV
  - O - OPV

- Vaccines that do not follow the Open Vial Policy
  - Reconstituted vaccines

Q. A healthcare worker is preparing for an immunization session in a rural community. She has two open vials from a previous session — one containing a pentavalent vaccine and the other an MR vaccine. What is the correct approach for using these vials? NEET PG 2022 FMGE 2025

A. Administer the MR vaccine and discard the pentavalent vaccine
B. Administer the pentavalent vaccine and discard the MR vaccine
C. Both vials can be used if stored properly
D. Both vials should be discarded

Ans. B

Q. Which of these vaccines does not follow the Open Vial Policy? FMGE 2021

A. OPV
B. DPT
C. TT
D. Measles

Ans. D

VACCINES SENSITIVE TO HEAT

00:54:56

Vaccines Sensitive To Heat	Vaccines Sensitive To Freezing	Vaccines Sensitive To Light
Mnemonic-RBOM • Reconstituted BCG -Most heat sensitive • OPV • Measles • DPT • BCG (before reconstitution) • DT, TT, Hep.B, JE -Least heat sensitive	• Hep B - Most freeze sensitive • DPT • DT • TT- Least freeze sensitive	• Measles • BCG

Golden rule

- The physical appearance of the vaccine may remain unchanged even after it is damaged
- The loss of potency due to either exposure to heat or cold is permanent and can not be regained

VACCINE VIAL MONITOR

00:56:40

- It is the heat sensitive label on vaccine vials that changes colour irreversibly over time with cumulative exposure to heat.

AIIMS 2018, INICET 2021

VVM Conditions and Actions

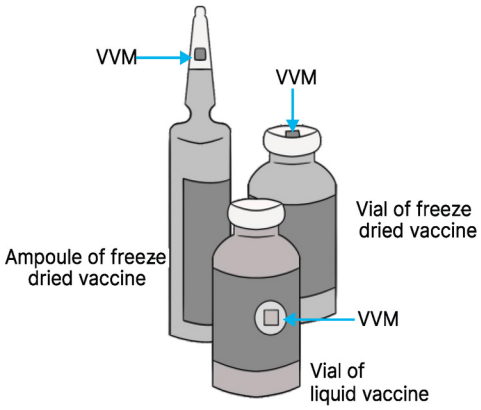


Conditions	Actions
Inner square is lighter than the outer circle	Use
Inner square starts to change colour but still lighter than Outer circle	Use
Inner square same colour as the outer circle	Discard
Inner square is darker than the outer circle	Discard

Yourwish

- VVM at the neck of the ampoule or cap of the vial
  - Indicates freeze dried or reconstituted vaccine
  - Single use

- VVM on the label/body of the vial
  - Vial of liquid vaccine
  - Follows open vial policy



TYPES OF VVM (UNICEF)

- Different types of Vaccine Vial Monitors (VVM), which are heat-sensitive stickers placed on vaccine vials to track their cumulative heat exposure over time
- The numbers (2, 7, 14, 30) represent the minimum number of days it takes for the inner square of the monitor to reach the "discard point" (matching the outer circle in color) when held at a constant temperature of +37°C

VVM2	The inner square reaches the discard point in 2 days at 37°C It is used for the most heat-sensitive vaccines, such as Oral Polio Vaccine (OPV)
VVM7	The inner square reaches the discard point in 7 days at 37°C
VVM14	The inner square reaches the discard point in 14 days at 37°C
VVM30	The inner square reaches the discard point in 30 days at 37°C It is used for the least heat-sensitive vaccines

Q. 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 the expiry of the 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. VVM tells about the efficacy of the vaccine
6. The expiry date of the vaccine can be relaxed if the VVM is intact

A. 1, 2, 4 are correct
B. 1, 3, 5 are correct
C. 3 and 4 are correct
D. All are correct

Ans. C

- The indicator is a heat-sensitive square inside a circle.
- VVM monitors heat exposure, not the chronological expiration date.
- VVM does not directly measure efficacy".
- Even if the VVM is perfect, a vaccine cannot be used past its printed expiry date.

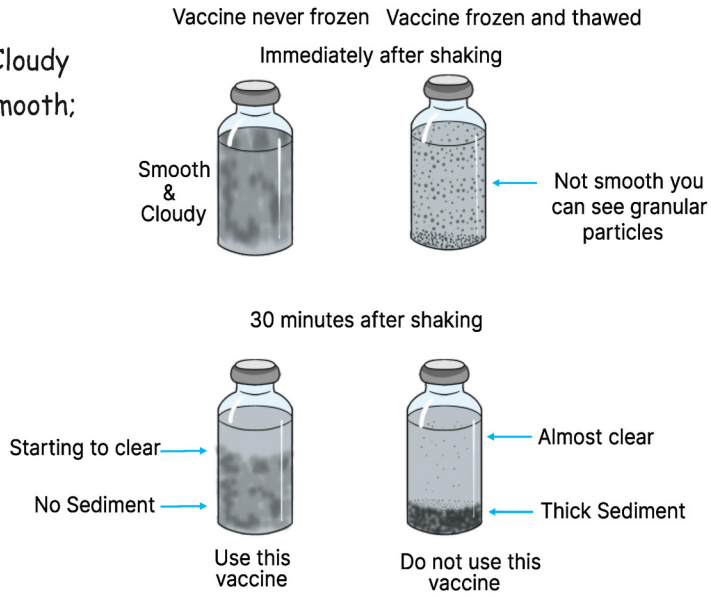
Yourwish

Yourwish

SHAKE TEST

NEET PG 2024 01:01:56

- Simple, validated method for determining if a freeze-sensitive, adsorbed vaccine has been damaged by exposure to freezing temperatures (below 0°C or 32°F)
- Freezing can damage the vaccine, reducing its effectiveness
- Adsorbed vaccines contain a mineral carrier (adjuvant) like aluminum, which, if frozen, tends to form large, heavy clumps that settle quickly after shaking
- An undamaged vaccine remains a uniformly cloudy liquid for a longer period after agitation
- Applicable: Freeze sensitive vaccines (Hepatitis B, DPT)
- Frozen Control: Use a separate vial from the same batch. Freeze it, then allow it to thaw
- Test Vial: The vial you suspect is damaged
- Shake Test: Check for Sedimentation Rate in the test vial
- If the rate of sedimentation is the same or faster in the test vial than in the control vial, indicatesthe vaccine is Damaged/Danger
  - 1. Immediately After Shaking
    - → Vaccine Never Frozen: Appearance is Smooth & Cloudy
    - → Vaccine Frozen and Thawed: Appearance is not smooth; you can see granular particles
  - 2. 30 Minutes After Shaking
    - → Vaccine Never Frozen:
      - Top: Starting to clear
      - Bottom: No Sediment
      - Action: Use this vaccine
    - → Vaccine Frozen and Thawed:
      - Top: Almost clear
      - Bottom: Thick Sediment
      - Action: Do not use this vaccine



STORAGE OF VACCINES IN COLD CHAIN

01:05:25

- The Cold chain is a process that keeps vaccines within the required temperature range(+2 to +8°C) at all times of storage and transport FMGE 2018, 2024
- Cold Chain Temperature: +2 to +8°C
  - Exception: OPV (for long-term storage) -15 to -20°C
  - YF - freezing temp



Yourwish

Level of storage	How is it stored
• National / Regional Level	• WIC (Walk-in Cooler): Storage for 3 months • WIF (Walk-in Freezer): Bulk storage
• CHC / SDH / DH (District Level)	• Large ILR (Ice Lined Refrigerator- 300Lt): Store vaccine for 1 month • Large DF (Deep Freezer): Used to prepare ice packs.
• PHC (Primary Health Centre)	• Small ILR (140 Lt): Store vaccine for 1 month • Small DF (Deep Freezer): Prepare ice packs (-15 to -25°C)
• SC & Village Level (Sub-Centre)	• Vaccine Carrier: 24 - 48 hours • Day Carrier: 24 - 48 hours • Ice Packs: 1 - 4 hours

Important Information

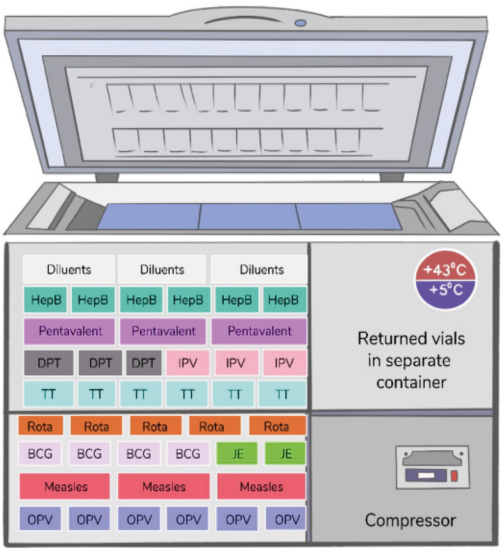
- One walk-in cooler room can supply vaccines to 4-5 districts
- Maximum chance of CC failure: SC & Village level

Cold Chain Equipment

01:09:55

Ice Lined Refrigerator (ILR)

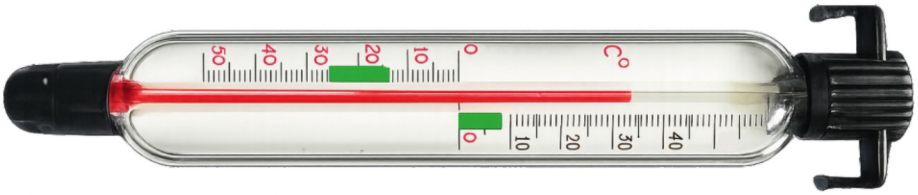
- The most important equipment of the Cold Chain



Key Features and Mechanisms

- Opened from the top
- Thermodynamics: Cold air is heavier, so it settles at the bottom
- Electricity Requirements: Requires 8 hours of continuous electricity to maintain cooling for 24 hours
- Internal Arrangement of Vaccines
  - Top-most Layer: For vaccines that are sensitive to freezing (t-series) or are used most frequently
  - Centre of ILR: TT and Td
  - Bottom of ILR: Heat-sensitive vaccines
- ILR temp monitoring twice a day by the Medical Officer



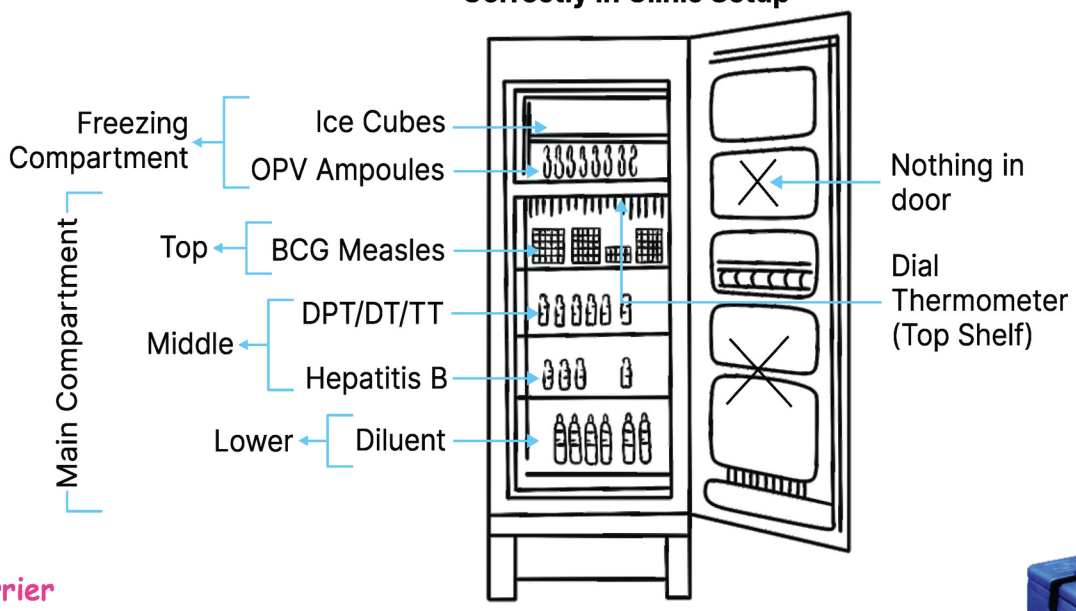


- Dial Thermometer
  - Ranges from -30°C to +60°C

- Principle of Thermocoupler
- Used for ILR
- Stem Alcohol Thermometer
  - Used for ILR and DF Thermometer

Refrigerator

Refrigerator showing vaccines stored Correctly in Clinic Setup



Vaccine carrier

- Lined by 4 ice packs
- Carries 16-20 VV (Vaccine Vials)



Vaccine carrier

Day Carrier

- 2 ice packs.
- 6-8 VV (Vaccine Vials)


Day Carrier

Cold Boxes

- Maintains temperature for 72-96 hours


Cold boxes

ICE Pack

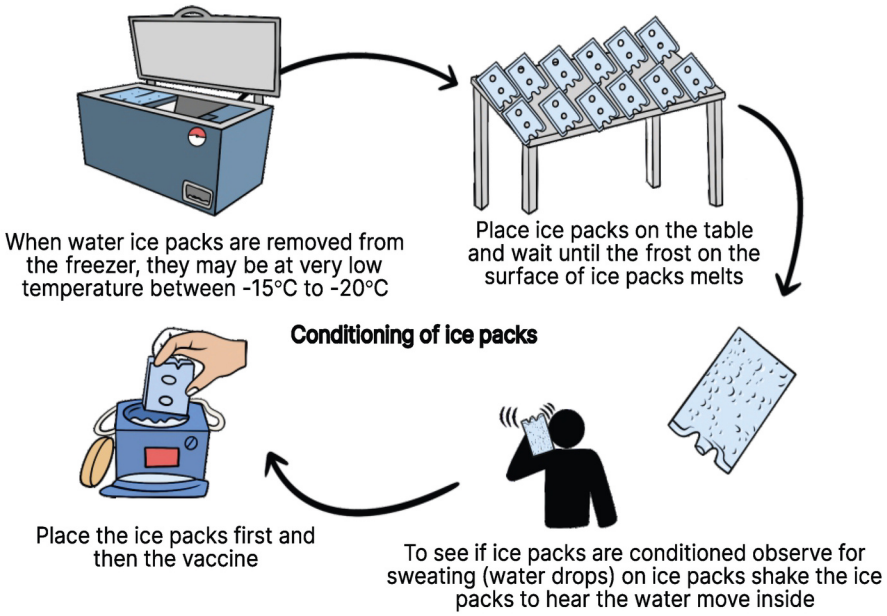
- Prepared in deep freezer at -15° to -20°C
- Water is filled up to the horizontal level
- Holes are meant for keeping heat-sensitive vaccines (OPV, Measles, BCG)


ICE Pack

Yourwish

Conditioning of ICE Pack

- Freezed ice pack is thawed and used once the water splash is heard on shaking the ice pack



Q. Which of the following vaccines is kept at the lowest level in the equipment shown below?

A. OPV

B. DPT

C. Hep B

D. Rota

Ans. A

TERMS

01:15:50

Reverse Cold Chain

- The specialized process of transporting fecal specimens from the field (like a patient's home or clinic) back to a central laboratory
- Maintaining specific cold temperatures (typically 2-8°C) to keep potential viruses, especially poliovirus, viable for accurate detection and surveillance



Warm Chain

- KMC (Kangaroo Mother Care)

Q. At a PHC, vaccine storage is done in?

A. Vaccine carrier

B. ILR

C. Walk in cold rooms

D. Ice packs

Ans. B

Yourwish

Yourwish

Q. An immunization session where 40 children are scheduled to be vaccinated in 2 hours by 2 ANMs is planned. Due to overcrowding, there is a long waiting time, missed opportunities, and increased vaccine wastage. Which of the following is the most appropriate measure to reduce missed opportunities and vaccine wastage?

A. Increase the number of cold chain points and extend the session time
B. Assign one ANM for documentation and one for vaccination
C. Limit the number of children to 25 per session
D. Increase the number of ANMs

Ans. B

MISSION INDRADHANUSH

01:17:00

INICET 2025



- Covers 12 diseases
- Cover 11 diseases, Pan India
- Because JE is given only in endemic zones

IMPORTANT POINTS

Ring Immunization

- Any suspected case in the centre vaccinate the susceptible children within a 100-yard radius of the infected case

Herd Immunity

- Break in the chain of disease transmission
- Threshold cut off: Measles, Pertussis, Chickenpox > 90%
- Polio, Mumps: 80-85%
- No role of herd immunityin Tetanus

Fully Immunised Child

- A child who has completed all due vaccines till 1 year of age, between 12 and 23 months

Efficacy of Vaccines

- **BCG**:
  - After 1 dose: 80%
- **MEASLES**:
  - >90% with one dose
  - >99% with two doses (India adopted the 2 doses of measles vaccine strategy called the Accelerated Measles Mortality Reduction Strategy)
- **RUBELLA**:
  - >95% (Vaccine with the highest efficacy with a single dose)

Q. During a measles epidemic in the community, a 6-month-old child was vaccinated against the same. When should the second dose be administered to this child?

FMGE 2022

A. The child should be given a second dose as soon as she reaches 9 months of age
B. The child should be given a second dose after 2 weeks of last dose
C. The child should be given a second dose after 6 weeks of the last dose
D. The child should be given the second dose of measles at 12 months of age

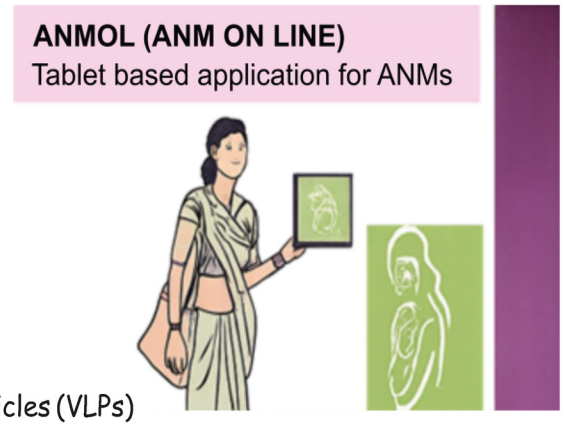
Ans. A

Yourwish

- Supplementary doses are given during an outbreak or PEM at 6-9 months.
- These do not replace the routine immunisation schedule
- Maintain a gap of at least 4 wk if the gap is very close to the supplementary dosing

Q. Which vaccine among the options exhibits a seroconversion rate that is quicker than the incubation period of the corresponding disease?

A. Coronavirus
B. Polio
C. Measles
D. Mumps



Ans. C

- Seroconversion for measles is 7-10 days
- Natural IP: 10-14 days
- Measles vaccine should be given within 3 days of exposure

Vaccine type: L1 VLP: based mon ajor capsid protein L1 virus-like particles (VLPs)
Age: 9-26 years, in females
Dose: 2 doses 6 months apart (3 doses for immunocompromised)

IT INITIATIVE

01:19:40

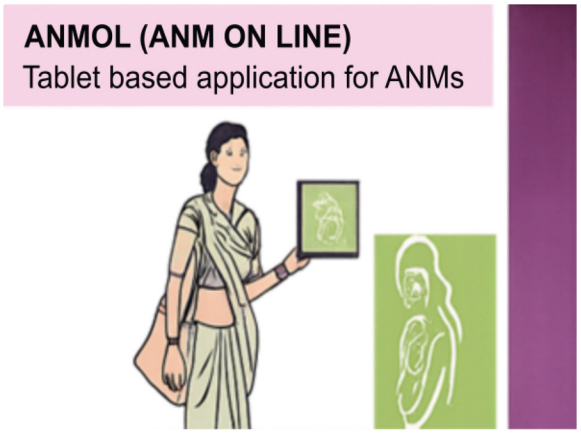
eVIN (Electronic Vaccine Intelligence Network)

- Monitors vaccine stock, distribution, and cold chain logistics

eVIN
ELECTRONIC VACCINE INTELLIGENCE NETWORK

ANMOL (ANM On Line)

- Tablet-based application for ANM



SAFE-VAC (Surveillance and Action For Events following vaccination)

- Monitors and reports adverse events following immunization (AEFI)

SAFE-VAC
Surveillance and Action For Events following vaccination

U-WIN

- A digital immunization registry to track immunization

KILKARI

- Mobile-based voice messaging service by the Government of India, providing weekly audio messages on maternal and child health, family planning, and nutrition(Mobile Academy)



VACCINES RECOMMENDED FOR ELDERLY

01:20:40

- Vaccine Schedule
  - Influenza: 1 dose annually
  - Pneumococcal: 1 dose (PCV15/PCV20 ± PPSV23)
  - Varicella Zoster: 1 dose (≥ 50 years)
  - Td/Tdap: Td booster every 10 years

DISPOSAL OF VACCINES

01:20:51

- Used vaccine vial: Blue
- Broken vaccine vial: Blue
- Live vaccine vials: Yellow
- Expired vaccine vials (left over vaccines): Yellow

Yourwish

NEW VACCINE CERVAVAC

01:21:13

- 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)

MISTAKES TO AVOID

01:21:27

- Mixing up types of vaccines
- Ignoring tables & important images
- Mixing up schedules
- Drop Outs: incomplete vaccination
- Left outs vaccination never reached

Yourwish

Yourwish

6. SCREENING

DEFINITION OF SCREENING

00:00:35

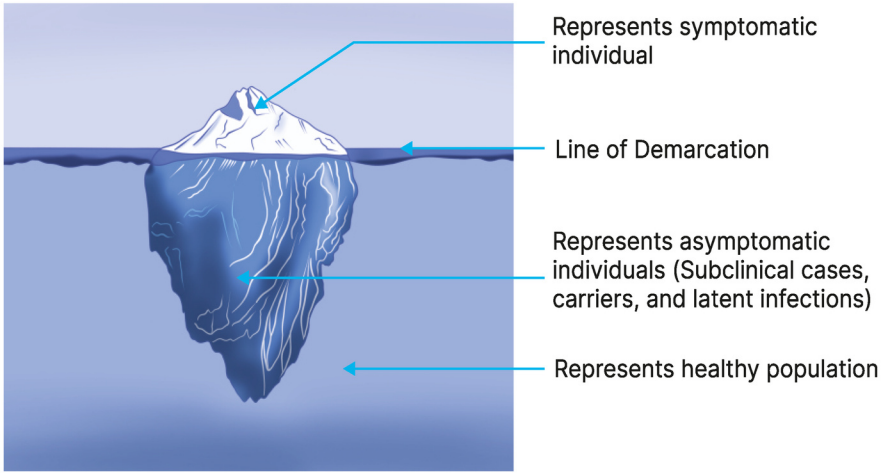
- The search for unrecognized disease or defect by means of rapidly applied tests, examinations or other procedures in apparently healthy individuals.
- Level of prevention? → Secondary level (to make early diagnosis)
- Screening test applied before or after signs & symptoms appear → before

ICEBERG PHENOMENON

00:01:57

- Disease compared to an iceberg

NEET PG 2019



Line of demarcation: Differentiate apparent Vs apparent infection

Apparent infection(above water)	Inapparent infection(below water)

• Tip of iceberg- truly diseased
• Symptomatically diagnosed cases
• Diagnostic test used
	• Hidden iceberg-Apparantly healthy
	  ○ Asymptomatic
	  ○ Subclinical cases
	  ○ Carriers
	  ○ Latent infection
	  ○ Undiagnosed
	  ○ Maximum burden/prevalence of the disease
	• Screening test used
	• Water underlying-True healthy

Yourwish

Q. Which of the following diseases best represents the submerged portion in the Iceberg Phenomenon?

NEET PG 2024

a. Influenza
b. Tetanus
c. Chicken pox
d. Rabies

Ans: A

Explanation

Disease that do not follow Iceberg phenomenon:(MTR)	Disease that follow iceberg
• Measles • Tetanus • Rabies	• NCDs • PEM • TB • HIV

DIFFERENCE BETWEEN SCREENING TEST AND DIAGNOSTIC TEST

00:07:43

SCREENING TEST	DIAGNOSTIC TEST
Done on apparently healthy individuals	Done on those with indications or sick persons
Applied to groups	Applied to individual patients
Test results are arbitrary and final	Diagnosis is not final but modified in light of new evidence (sum of all evidence)
Based on one criterion or cut-off point	Based on evaluation of multiple symptoms, signs, and laboratory findings
Less accurate	More accurate
Less expensive	More expensive
Not a basis for treatment	Used as a basis for treatment
Initiative comes from investigator or agency providing care	Initiative comes from a patient with complaint

Q. A characteristic of diagnostic test as compared to screening test is:

AIIMS 2019

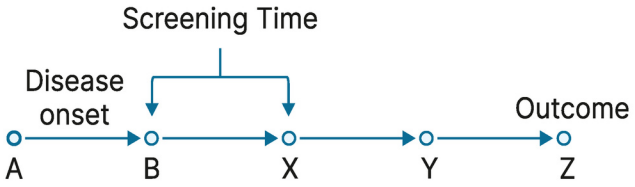
A. Test results are arbitrary and final
B. Based on one criterion or cut-off point
C. Less accurate
D. Done on those with indication or sick

Ans: D

CONCEPT OF LEAD TIME (INICET 2021)

00:10:10

INICET 2021
FMGE 2020
NEET PG 2020



- A → Disease onset
- B → 1st possible point of diagnosis (no sign & symptoms)
- X → Critical point of diagnosis
- Y → Usual time of diagnosis (sign & symptom present)
- B - Y → Lead time
- B - X screening time
- Best time / Ideal time to apply screening test- B
- Optimum time to apply screening test- X

Q. Lead time refers to the time between:

NEETPG 2019
FMGE 2020

a. Disease onset and first critical diagnosis
b. Disease onset and first possible point of detection
c. First possible point of detection and final critical point
d. First possible point of detection and usual time of diagnosis

Ans: D

Important Information

- Time gained by early detection of a disease: Lead time
- Time difference between the earliest possible point of diagnosis and critical point of diagnosis: Screening time
- Time difference between the earliest possible point of diagnosis and the usual point of diagnosis: Lead time

Lead time bias

NEETPG 2025

- When a disease is detected prior to symptom development but the treatment does not make the patient live longer, it appears like life expectancy increased but really it was simply detected earlier.
- Lead time bias can overestimate the survival time by early detection of disease.
- Example: In case of malignant tumor of lung, CT scan identifies the tumor earlier than chest X-ray. But early treatment does not enhance the overall survival rates in lung cancer patients. Any apparent improvement in 5-year survival rates of patients diagnosed via CT scan compared to those detected via X-ray results in lead time bias.

Lead time bias arises when:

- No treatment for the disease is available
- There is no change in prognosis of diseases, then simply an early diagnosis of a disease would mean an apparent increase in survival due to detecting a health condition like cancer at an early stage. Meanwhile, there is no actual effect on survival; instead, there is just a longer period with diagnostics
- Subjects the patient to added anxiety as the patient has to live with knowledge of the disease
- Distort the results and appear to decrease mortality rates or increase survival rates.

Yourwish

Q.As shown by a district survey, breast cancer screening increases 5 year survival rates. However no real change in mortality was seen in autopsy studies. What type of bias is demonstrated here?

NEETPG 2025

A. Detection bias
B. Survival bias
C. Lead time bias
D. Berkson bias

Ans: C

- Detection bias: Unblinded RCT - knowing treatment assigned causing systematic difference in detecting outcomes between study groups.
- Survival bias: Individually excluded from analysis of a trait because of mortality related to expression of that trait. e.g., studying only cancer survivors.

DISEASES SUITABLE FOR SCREENING (NEET PG)

00:16:53

- Public Health Importance: The condition should be an important public health problem.
- Recognizable Latency: There should be a recognizable latent or early asymptomatic period.
- Known Natural History: The natural history of the disease should be well understood, including the development from latent to declared disease.
- Available Test: There is a test to detect the presence of disease prior to the onset of signs and symptoms.
- Diagnostic Facilities: Facilities should be available to confirm the diagnosis.
- Effective Treatment: There should be an effective treatment for the disease.
- Proven Benefit: Evidence must show that early detection and treatment reduce mortality and morbidity due to the disease.
- Cost-Benefit Ratio: The expected benefits (e.g., number of lives saved) by early detection must exceed the risks and costs involved.

Q.Screening for conditions recommended when?

a. Low case fatality rate
b. Diagnostic tools not available
c. No effective treatment possible
d. Early diagnosis can change disease course because of effective treatment

Ans: D

TYPES OF SCREENING

00:19:05

NEETPG 2018

TYPE OF SCREENING	DEFINITION	EXAMPLE
Mass screening Least efficient	Screening an entire population, regardless of risk factors.	• Screening for HTN in all individuals in a community.
High Risk Screening (Selective Screening) Most efficient	Screening only high-risk individuals based on risk factors.	• Screening family members of patients with diabetes/hypertension. • >65 yrs for HTN. • Screening for TB in an urban slum.

Yourwish

Yourwish

Multiphase Screening	Application of two or more screening tests in combination to a large number of people at once rather than to carry out single tests for single diseases.	• Annual health checkups / Health Camps.
Multipurpose Screening	The screening of a population by more than one test done simultaneously to detect more than one disease	• ANC health checkup
Case-Finding (Opportunistic Screening)	• Screening done during routine doctor visits, not as part of a planned program. • Presumptive identification of unrecognized disease which does not arise from a patient's routine request	

Q.Which of the following is an exampe of a disease where mass screening is recommended ?
A. HTN
B. Lung cancer
C. Skin cancer
D. Prostate cancer

Ans: A

Q. After visiting a village where many people have diabetes and hypertension, what type of screening would you conduct for the family members of these patients who arrive in large numbers at your clinic?
A. High risk screening
B. Mass screening
c. Multiphasic screening
D. Anonymous screening.

Ans: A
- **High risk screening (also known as Selective screening).**

CATEGORIES OF SCREENING TEST

00:24:35

	PRESCRIPTIVE SCREENING	PROSPECTIVE SCREENING
Definition	Screening Test (ST) is applied for one's own benefit.	ST is applied for others' benefit.
Purpose	Early diagnosis	Disease control
Example	• Screening a neonate for neonatal hypothyroidism. • PAP Smear. • BSE (Breast Self-Examination) • RBS	• Immigrants for infectious diseases (e.g., COVID). • HIV test in a pregnant female. Food handlers check-up."
Level of prevention	Secondary	Primary

Yourwish

Q. Which out of the following is an example of prospective screening? NEET PG 2024

a. Pap smear in a 45-year-old woman
b. Neonatal screening for neonatal hypothyroidism
c. Screening of immigrants to a country
d. Screening for sugar in urine in a 40-year-old

Ans: C

Q. What is the current approach for the initial screening of women for cervical cancer at a Primary Health Centre (PHC)? 2021 2025

a. Colposcopy
b. Cervical biopsy
c. High vaginal biopsy
d. Visual inspection after application of freshly prepared 5% acetic acid solution (VIA)

Ans: D

Important Information

- Screening test of choice in breast cancer -
  - Mammography
  - If <40 yrs-USG
- Screening test of choice in breast cancer at Subcentre or PHC
  - Breast self-examination

PROPERTIES OF A SCREENING TEST 00:29:43

Mnemonic: ARV (Acceptability, Reliability, Validity)

Acceptibility

- Most important
- Painless /non-embarassing

Reliability

- Defined as the degree to which a test provides consistent results when repeated on the same individual or material under the same conditions
- Also known as Reproducibility, Repeatability, Consistency, or Precision
- Might vary due to
  - Within-observer variation: Referred to as Intra-observer variation.
  - Between-observer variation: Referred to as Inter-observer variation.
    → Kohen's kappa statistics used

Cohens kappa

- It is used to check the level of agreement between two observers beyond what would be expected by chance.
- The value of K typically ranges from 0 to 1.

Value of K	Strength of agreement
<0.20	Poor
0.20-0.40	Fair
0.40-0.60	Moderate
0.60-0.80	Good
>0.80	Very good

- K= (Agreement observed-Agreement expected by chance) /(1-Agreement expected by chance)

Q. 2 doctors were asked to read and report X Rays. Kappa value obtained is 0.71. What is the correct interpretation based on the value? INICET 2023

INICET 2023

a. Intermediate
b. Good
c. Poor
d. Bad

Ans: B

Validity / accuracy

- Ability of a Screening test to differentiate diseased (TP) from non-diseased (TN)
- Measure of closeness of a value to gold standard value.
- Depends on:
  - Sensitivity of a test
  - Specificity of a test
  - Predictive accuracy

ASSESSMENT OF A SCREENING TEST (DEFINATION,INTERPRETATION,FORMULA)

00:36:52

Sensitivity

INICET 2022

- Ability of a Screening Test (ST) to identify correctly all those who have the disease.

	Disease	
ST Result	YES	NO
Positive	a(TP)	b(FP)
Negative	c(FN)	d(TN)

- Formula-
  - a/a+c
  - TP/TP+FN
- Interpretation-

Yourwish

- Eg- A screening test has a sensitivity of 90%
  → If this test is applied to 100 diseased people, it will correctly identify 90 as positive (TP).
  → The remaining 10 will be missed and reported as negative (FN).

Specificity

- Ability of a Screening Test (ST) to identify correctly all those who do not have the disease.

	Disease	
ST Result	YES	NO
Positive	a(TP)	b(FP)
Negative	c(FN)	d(TN)

- Formula-
  - d/d+b
  - TN/TN+FP
- Interpretation-
  - Eg- A screening test has a specificity of 90%
    → If this test is applied to 100 non-diseased people, it will correctly identify 90 as negative (TN).
    → The remaining 10 will be missed and reported as positive (FP).

Predictive accuracy

- It reflects the performance and diagnostic power of the test in a specific population.
- It includes two primary values:
  - PPV: Positive Predictive Value.
  - NPV: Negative Predictive Value.

Positive predictive value (ppv)

- Definition: Out of all those who tested positive (+ve) on a Screening Test, how many actually have the disease.
- PPV=
  - a/a+b *100
  - TP/TP+FP*100

Negative predictive value (ppv)

- Definition: Out of all those who tested negative (-ve) on a Screening Test, how many actually do not have the disease.
- NPV=
  - d/d+bc*100
  - TN/TN+FN*100

Validity / accuracy

- TP+TN/TP+TN+FP+FN *10

FP=FP/FP+TN
FN=FN/FN+TP

Yourwish

Q. Which of the following is the most appropriate measure to assess the effectiveness of a screening test?

NEETPG 2019

a. Sensitivity
b. Specificity
c. Positive Predictive value
d. Negative Predictive Value

Ans: A

Q. A total of 2,000 patients were assessed for HIV. 200 were diagnosed positive. A new ELISA screening test was tested on the same group. It showed 260 as positive out of which only 130 had the disease. What is the specificity of the test?

NEETPG 2025

a. 96%
b. 80%
c. 72%
d. 68%

Ans: A

	HIV		
ELISA	YES	NO	
Positive	130(TP)	130(FP)	260
Negative	c(FN)	d(TN)	

- Specificity= TN/TN+FP=1670/1800=92.3%

Q. 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?

NEETPG 2018

a. 90/100
b. 100/110
c. 80/100
d. 100/100

Ans: A

Q. In a population, a screening test has a high false-positive rate. Which of the following is most likely to be affected?

FMGE 2020

a. Sensitivity
b. Specificity
c. Incidence
d. Prevalence

Ans: B

Yourwish

Q. Probability that a person out of those tested positive on a screening test has in fact the disease is known as? NEETPG 2019

a. Sensitivity
b. Specificity
c. Positive predictive value
d. Negative predictive value

Ans: C

Important Information

- Ability of a screening test to differentiate diseased from non-diseased, nearness tc true, actual or gold standard value: Validity
- Ability of a Screening test to identify all those who have the disease or probability of having test positive out of total diseased: Sensitivity
- Abilitv of a Screening test to identifv all those who do not have the disease or probability of having test negative out of total healthy: Specificity
- Most useful property of a screening test: Sensitivity
- Diagnostic power of screening test tc correctly include the disease is given by- PPV (Positive Predictive Value)
- Diagnostic power of screening test to correctly exclude the disease is given by: NPV (Negative Predictive Value)
- Reproducibility, repeatability, reliability, consistency, getting same results on repeat measurements: Reliability / Precision

Relation between validity and reliability

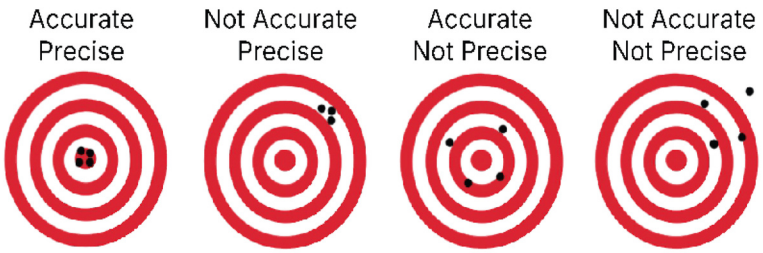
BASIS	VALIDITY	RELIABILITY
Synonym	Measures accuracy	Measures consistency
Definition	Extent to what a test measured what it is intended to measure/closeness to gold standard value	Extent to which attest gives same result
Question addressed	Is the test measuring the right thing?	Does the test give the same result every time?
Relationship	Depends on reliability	Independent of validity
Test	Mean chart Levy Jennings chart Shewart control chart	R charts(Tells about stability of tests results LJ chart- for quality control tests in lab

Q. Reliability of a screening test does not mean:

a. Reproducibility
b. Precision
c. Repeatability

d. Validity

Ans: D



Q. 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: AIIMS 2018

a. Lacks reliability
b. Lacks validity
c. Lacks both validity as well as reliability
d. Has both, adequate validity and reliability

Ans: B

RELATION OF THE PREDICTIVE VALUE WITH PREVALANCE OF THE DISEASE 00:56:30

- PPV (Positive Predictive Value) ∝ prevalence.
- NPV (Negative Predictive Value) ∝ 1/prevalence
- Sensitivity & Specificity of a test are independent of disease prevalence.

Q. Out of the following, positive predictive value of a test is most affected by: FMGE 2020

a. Sensitivity
b. Specificity
c. Prevalence
d. NPV

Ans: C

Q. All comprise inherent properties of a screening test except:

a. Sensitivity
b. Specificity
c. Yield
d. Predictive accuracy

Ans: C

YIELD OF A SCREENING TEST 00:58:50

- Definition: Yield is the measure of previously unrecognized disease, diagnosed as the result of screening and brought to treatment.
- Yield depends on 3 important parameters
  - Sensitivity of a test.
  - Specificity of a test.
  - Prevalence of disease.

Yourwish

- No. of people participating.

TESTS IN COMBINATION

01:00:30

TESTS IN SERIES	TESTS IN PARALLEL
Second test applied only those who are positive on fist test	Both tests are applied together at the same time
A person is diseased if both tests are positive	A person is diseased if either of the test are positive
Sequential testing	Simultaneous testing

	SERIES	PARALLEL
Specificity	↓	↑
Sensitivity	↑	↓
PPV	↑	↓
NPV	↓	↑

Q. If the Hemoccult test is negative for screening of colonic cancer, no further test is done. If the hemoccult 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

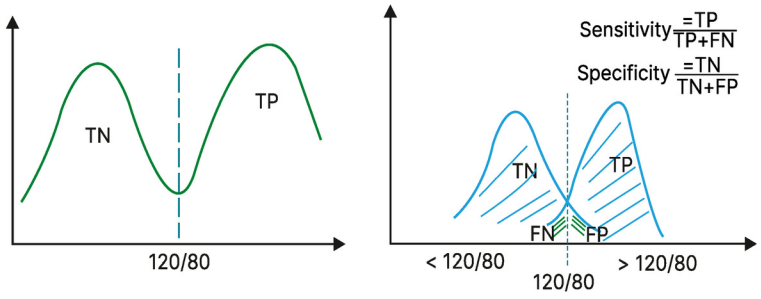
c. Net sensitivity is increased and net specificity is decreased

d. Net sensitivity remains the same and net specificity is increased

Ans: B

DECIDING THE CUT OFF OF A SCREENING TEST

01:04:25



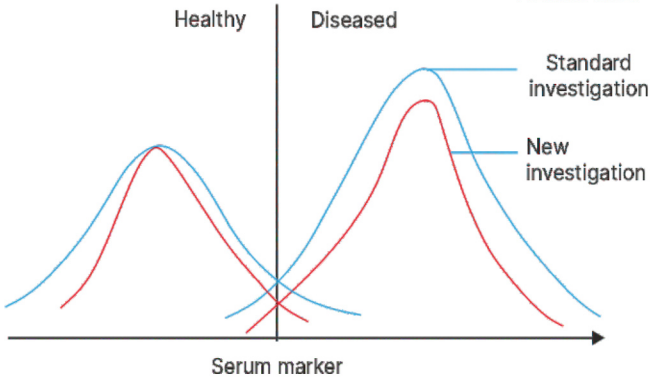
Lowering the Cut-off	Raising the Cut-off
• Increases True Positives (TP) • Increases Sensitivity • Decreases Specificity	• Increases True Negatives (TN) • Increases Specificity • Decreases Sensitivity

Yourwish

Yourwish

- High Prevalence: If the prevalence is high, the cut-off is typically set at a lower level to capture more cases.
- Lethal Disease: If a disease is lethal and early detection improves prognosis, the cut-off is set at a lower level.

Q. A new test in red line has been designated to diagnose a disease condition. The test is being applied to both normal and diseased population . The graph of which is given below. Which of the following is correct regarding the new test? AIIMS 2017

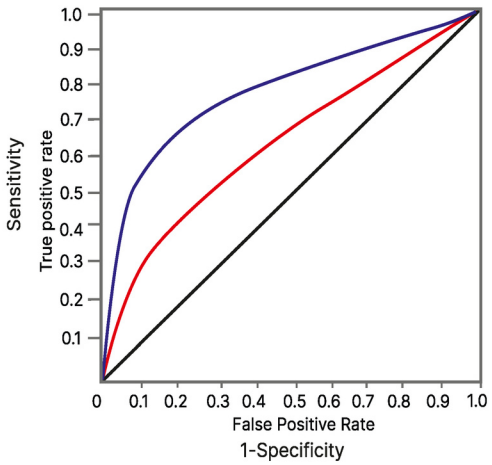


A. High sensitivity and high specificity
B. High sensitivity and low specificity
C. Low sensitivity and low specificity
D. Low sensitivity and high specificity

Ans: A

Roc curve

- Receiver operator Curve → decide cut offs
- It is a plot that illustrates the trade-off between sensitivity and (1 - specificity) across various cutoff points for a diagnostic test with continuous or ordinal results
- Area Under the Curve (AUC)
  - More area under curve → better cut off.
- Y axis- Sensitivity
- Xaxis :
- Index used to represent the area under the curve:
  - Youden Index.
  - Value ranges from: 0 - 1.
  - Youdens index=Sensitivity+Specificity−1



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

Q. Based on the principles shown in the slides, identify the incorrect statement regarding ROC Curves:
A. ROC curve can be used for comparing two or more diagnostic tests.
B. Can be used for deciding optimal cut off points
C. The best investigation is the one whose curve is the most upward and left
D. The test with the minimum surface area under the curve is most effective

Ans: D

Yourwish

Kaplans meyer curve

INICET 2021

- Estimator of survival curve
- Depicts the fraction of patients who are alive at a specific time (e.g., one year) after the onset of a treatment.
- Often used to calculate the 5-year survival rate.

Likelihood ratio

01:12:46

- 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 Likelihood Ratio (LR+)	Negative Likelihood Ratio (LR-)
• 1-Specificity/Sensitivity • TP/FP • Definition: The probability a person with the condition tests positive divided by the probability a person without the condition tests positive.	• Specificity/1-Sensitivity • FN/TN • Definition: The probability a person with the condition tests negative divided by the probability a person without the condition tests negative.

IMPORTANT TERMS

01:14:15

Pre test probability

- It is the probability that a person has a disease before any diagnostic test performed
- Given by prevalence
- The odds of having the disease prior to testing, derived from the pre-test probability (prevalence).
- Pre-test odds=p/ 1-p
  - where p is prevalence
  - 1-p is probability of a person does not having disease
- Example: If prevalence is 20% (p=0.2):
  - Odds= 0.2/1-0.2=0.2/0.8 =0.25
  - Fans odd of disease before testing is 1:4

Post test probability

- The probability that a person has the disease after the test result is known.
- For a positive test, the post-test probability is the probability that the disease is truly present (Positive Predictive Value -PPV)

Q. Post-test probability of disease after a positive test result is equal to:

a. Sensitivity
b. Specificity
c. Negative predictive value
d. Positive predictive value

Ans D

CRONBHACS ALPHA

01:15:42

- MC measure of internal consistency or reliability.

- Multiple Likert questions in a survey/questionnaire can form a scale, and the reliability of that scale is determined by Cronbach's alpha.
- Internal consistency should be determined before a test is employed for research or examination to ensure validity.
- Range: Expressed between 0 and 1.

Q. A screening test was carried out among 114 people out of which 15 have a disease. The test showed 22 people tested positive for the disease among which 14 actually had the disease. What is the sensitivity of the test?

A. 37%
B. 63%
C. 93%
D. 97%

Ans: C

	Disease		
ST Result	Yes	No	
Positive	14	FP	22
Negative	FN	TN	
	15		

Sensitivity=TP/TP+FN=14/15*100=93%

Yourwish

7. DEMOGRAPHY AND HEALTH, SOURCES OF HEALTH INFORMATION

DEMOGRAPHY

00:00:30

- Demography is the study of:
  - Size
  - Composition
  - Distribution of population

DEMOGRAPHY PROCESS

00:00:50

- Govern the changes in the demographic structure of the population

Q. Which of the following is not a demographic process?

a. Fertility
b. Morbidity
c. Marriage
d. Social mobility

Ans: b

- Demographic process includes
  - Marriage
  - Fertility
  - Migration
  - Social Mobility (Movement at socio economic level)
  - Mortality

DEMOGRAPHIC GAP

00:02:25

- Demographic gap= CBR - CDR
- CBR (Crude Birth Rate)= $\frac{Total\ no.of\ live\ births}{Mid-Year\ Population}\ x\ 1000$
  - India Current CBR: 18.4 / 1000 MYP
- CDR (Crude Death Rate)= $\frac{Total\ no.of\ deaths}{Mid-Year\ Population}\ x\ 1000$
  - India Current CDR: 6.4 / 1000 MYP
- SRS: Sample Registration System, provides CDR and CBR data
- MYP: Mid-Year Population, calculated as of 1st July

Q. Mid-year population is the denominator in:

a. CDR
b. CFR
c. MMR
d. NMR

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Ans: a

DEMOGRAPHY TRANSITION MODEL

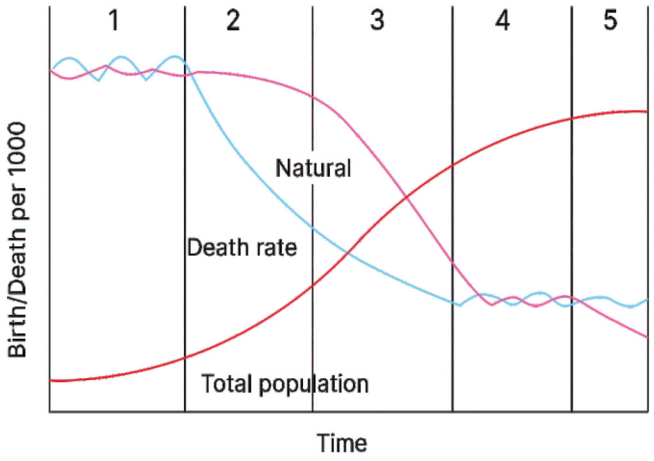
00:05:00

FMGE 2021, 2023

STAGES

STAGE	CBR	CDR
High Stationary (Stable)	High	High
Early Expanding (population grows at a faster rate- population explosion) Demography trap Population explosion Most undesirable stage	Still high	Starts to decline
Late Expanding (population grows at a slower rate)	Starts to decline	Continue to decline
Low Stationary (Stable) Most desirable stage	Low	Low
Declining	Less than CDR	More than CBR

DEMOGRAPHY TRANSITION MODEL



INTERPRETATION

- Demography gap (CBR - CDR):
  - Minimum: Stage 1, 4
  - Maximum: Late stage 2
  - Starts contracting: Early stage 3
  - Negative: Stage 5
  - Most desirable stage: Stage 4
  - Most undesirable stage: Stage 2

Q. India is currently in which phase and why?

Ans: Phase III- Late expanding

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Q. Late expanding stage of population in India due to?

a. Birth rate stationary, death rate continues to fall
b. Death rate declines faster than birth rate
c. Birth rate declines, death rate same
d. Birth rate is less than the death rate

Ans: b

- For example:
  - Crude Birth Rate (CBR): 30 / 100 →18.4 / 1000
  - Crude Death Rate (CDR):30 / 100 →6.4 / 1000

Q. Death rate continues to decline, and birth rate starts to decline, which reflects which phase of the Demography Transition Model?

a. Stage 1
b. Stage 2
c. Stage 3
d. Stage 4

Ans: C

Q. Write the correct sequence of the demographic cycle?

A. High Stationary, Early expanding, Late expanding, Low Stationary, Declining
B. Early expanding , Late expanding , High Stationary , Low Stationary , Declining
C. High Stationary, Low Stationary, Early expanding, Late expanding, Declining
D. Early expanding, Late expanding, Declining, Early expanding, Late expanding

Ans: A

Q. Highest birth rate is seen in which stage of the demographic cycle?

A. Stage I
B. Stage II
C. Stage III
D. Stage IV

Ans: A

- Stage II: birth rate remains the same
- Stage III: birth rate starts to decline

Q. Which of the following statements is true regarding the fifth stage of the demographic cycle? FMGE 2022

A. Birth rate remains unchanged
B. Death rate increases
C. Demographic gap is positive
D. Birth rate falls below death rate

Ans: D

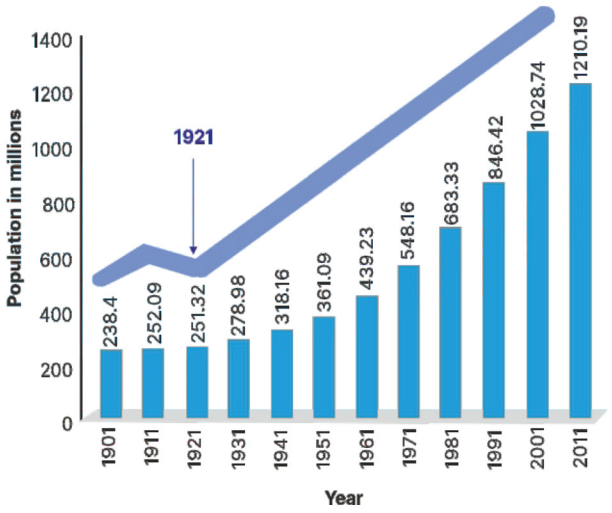
- Stage 5 (Declining) is characterized by a population decrease because the birth rate drops lower than the death rate, leading to negative natural growth

.

Q. In a European country, there are low births and high deaths reported. Which stage of the Demographic cycle will be present?

A. High stationary stage
B. Late expanding stage
C. Low stationary stage
D. Declining stage

Ans: D



- The Year 1921: The "Year of Great Divide"
- A Crucial Turning Point: 1921 marked the shift from population stagnation (up-and-down growth) to a consistent, rapid increase
- Falling Death Rates: Growth was driven by improvements in health and sanitation, which lowered mortality.
- High Birth Rates: While deaths decreased, birth rates remained high, leading to a population explosion.
- End of an Era: This marked the end of decades where famines and epidemics caused high mortality.

Stage	High Stationary	Early Expanding	Late Expanding	Low Stationary	Declining
Birth Rate	High	High	Starts declining	Low	Low
Death Rate	High	Starts falling significantly	Continues to fall	Low	Declining at a very slow rate (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 yrs)		Mixed (50 yrs)	Ageing (60 yrs)
Example	India before 1921	India 1921-1991	India 1991-currently	US, UK, Canada	European regions

Yourwish

IMPORTANT DEFINITIONS

00:20:24

Demographic Transition	• Shift from Stage 1 to Stage 4
Epidemiological Transition	• Shift from an era of communicable diseases to non-communicable diseases over a decade (Secular disease)
Epidemiological Ratio	• DALY due to Communicable diseases / DALY due to Non-communicable Diseases
Demography Trap	• High death rates and declining birth rates

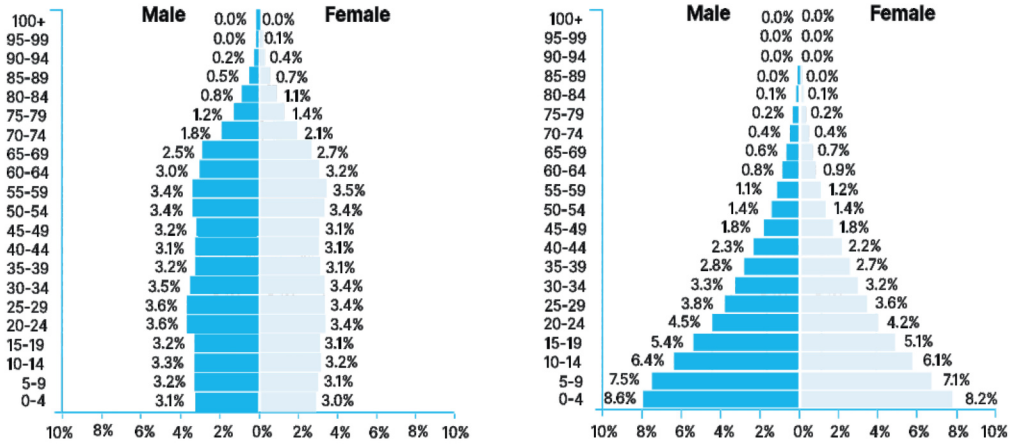
DEMOGRAPHIC INDICATORS

Population Statistics	Vital Statistics
• Population size • Sex ratio • Literacy rate • Dependency ratio • Population density	Important events of a population. • Birth rate • Death rate • Natural growth rate • Life expectancy at birth • Mortality rate • Fertility rate

POPULATION PYRAMID

00:23:19

NEET PG 2024
FMGE 2024



United States of America-2017
Population : 326,474,013

Nigeria -2017
Population : 191,835,936

- Represents the age and gender distribution of the population
- Represented by a histogram

Feature	Developed Countries	Developing Countries
Base	Narrow (Low fertility, good Family planning)	Broad (More fertility; poor Family planning)
Apex	Obtuse- More elderly	Acute: Fewer elderly
Height of the pyramid	Taller	Shorter

Yourwish

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Shape	Spindle-shaped (Constricting)	Upward triangular
Symmetry (ideal sex ratio)	Symmetrical	Asymmetrical
Span	More life expectancy	Low Life Expectancy (Expanding)

DEPENDENCY RATIO

00:28:20

FMGE 2021, 2022

$$\text{Dependency ratio} = \frac{Children < 15\ years\ (Young\ Age\ Dependency) + Elderly > 65\ years\ (Old\ Age\ Dependency)}{15 - 64\ years\ Productive\ Population\ (Working\ Class)}\ x\ 100$$

Demography Bonus	Demography Burden
Decline in DR (Dependency Ratio) ↓ Due to a decline in young age dependency ↓ Due to the low fertility rate ↓ Due to improved FP (Family Planning)	Increase in DR (Dependency Ratio) ↓ Due to an increase in old-age dependency ↓ Due to more life expectancy ↓ More elderly people

FMGE 2022

Q. The major contributor to demographic burden

a. Decreased old age dependency ratio
b. Increased young age dependency ratio
c. Decreased young age dependency ratio
d. Increased old age dependency ratio

Ans: d

Q. If older people die, then the Dependency ratio will?

a. Increase
b. Decrease
c. Remains the same
d. None

Ans: b

Q. Community X has 30% below 15 yrs of age and 10% over 65 years of age. Dependency ratio for community X is:

a. 20%
b. 40%
c. 66.6%
d. 3%

Ans: c

Yourwish

TERMS

The period when the dependency ratio declines due to a drop in fertility, before rising again due to increasing longevity.	**Demography Bonus**
The increase in the total dependency ratio over time is primarily caused by a rise in the old-age dependency ratio.	**Demography burden**
The rise in the economic growth rate due to an increase in the working-age population share	**Demography dividend**
A phase in a nation's demographic transition where the working-age population is significantly larger, providing economic potential.	**Demographic window**
The initial economic advantage of declining fertility rates, leading to a higher ratio of working-age individuals to dependents.	**Demographic gift**
Maximum population size of a species that a particular environment can normally and consistently support in terms of resources.	**Carrying capacity**
It is defined as the number of persons aged 15-64 years per one older person aged 65 years or more.	**Population Support**

Q. Marriage and Mortality belong under FMGE 2024

a. Demographic dividend

b. Demographic bonus

c. Demographic window

d. Demographic process

Ans: d

LITERACY RATE

00:37:15

- Definition of Literate
  - Any individual greater than or equal to 7 years of age who can read & write both with understanding in any one language.
  - Effective Literacy rate= $\frac{Total\ number\ of\ literate}{Population\ greater\ than\ and\ equal\ to\ 7\ years\ of\ age}\ x\ 100$

SEX RATIO

00:39:03

- Sex Ratio= $\frac{No.of\ Female}{No.of\ Males}\ x\ 1000$
  - According to NFHS-5: 1020 females / 1000 males
- Child Sex Ratio= $\frac{No.of\ Girls\ (0-6\ yrs)}{No.of\ Boys\ (0-6\ yrs)}\ x\ 1000$
  - According to SRS: 917 girls/1000 males

Q. For a population of 10,000, what does a sex ratio of more than 1000 mean? FMGE 2021

A. Males are less than 500

B. Females are less than 500

C. Males are less than 5000
D. Females are less than 5000

Ans: C

GROWTH RATE

00:41:05

- Annual growth rate: 1.2%

Rate /Phase	AGR	Population Doubling Time(yrs)
Stationary	No growth	-
Slow Growth	<0.5%	>139
Moderate growth	0.5-1%	139-70
Rapid growth	1-1.5%	70-47
Very rapid	1.5-2%	47-35
Explosive or population explosion	>2%	35-28%

POPULATION GROWTH MODEL

00:41:30

MALTHUSIAN MODEL

POPULATION DOUBLING TIME

- Rule of 70= 70/AGR
- Initial Year: 2025, Growth Rate: 2%
- Population doubling time=70/2=35yrs

Q. While conducting a study in a town, the Crude Birth Rate calculated was 32, and the Crude Death Rate calculated was 21. What is the current annual growth rate of this population?

A. 11%
B. 0.11%
C. 1.01%
D. 1.1%

Ans: D

- Growth rate= CBR-CDR/10

FERTILITY INDICATORS

00:43:25
FMGE 2021, 2024
NEET PG 2018

CRUDE BIRTH RATE (CBR)

- No. of live births per thousand mid year population
- Simplest measure of fertility
- CBR= No. of Live birth/MYP *1000

Yourwish

GENERAL FERTILITY RATE (GFR)

- No. of live births per 1000 women in reproductive age group (15-44 or 49 yrs)
- GFR: No. of Live birth/MYP of reproductive age women *1000

GENERAL MARITAL FERTILITY RATE (GMFR)

- No. of live births per 1000 married women in the reproductive age group
- GMFR: No. of Live birth/MYP of married reproductive age women *1000

TOTAL FERTILITY RATE (TFR)

- Average no of children a woman has through her reproductive years.
- Computed by summing age-specific fertility rates for all ages.
- CBR = (8 *TFR + 1)
- Best indicator for complete family size i.e no of children

GROSS REPRODUCTION RATE (GRR)

- Average no of girls that would be born to a woman throughout her reproductive span, assuming no mortality.
- GRR = TFR / 2

NET REPRODUCTION RATE (NRR)

- Number of daughters a newborn girl will bear during her lifetime, assuming fixed age-specific fertility and mortality rates
- NRR = 1 is the replacement level of fertility
- Best indicator of fertility
- Indicates the prevalence of contraceptive practice
- NRR = 1 achieved when CPR >60%

REPLACEMENT LEVEL FERTILITY

- It is the average number of children a woman would need to have to replace herself by bearing a daughter who survives to childbearing age
- NRR = 1 Replacement level fertility (Population stable)
- NRR < 1 Below replacement level fertility (Population decline)
- NRR > 1 Above replacement level fertility (Population increase)
- For a country to attain a stable population, NRR= 1, TFR= 2.1% (2 child norm)
- Ideal/Desirable TFR= 2.1%, current Indian TFR= 1.9%
- To attain TFR= 2, CPR should be >60%

FERTILITY RATE AND HEALTH INDICATORS

- Most important fertility indicator: TFR
- Most important epidemiological indicator: TFR
- Indicator of complete family size: TFR
- Most popular indicator for the impact of family planning: TFR
- TFR for girl child: GRR
- Sensitive indicator of family planning services implementation in a country: NRR
- Best indicator to evaluate the National Family Welfare Program: NRR
- Final Impact indicator: NRR

Yourwish

Yourwish

- Best measure for the growth of a population: NRR
- Best indicator of fertility: NRR
- Measuring changes in fertility over time in the same population: ASFR
- Mortality-dependent fertility indicator: NRR
- Functional and operational indicator: CPR (ASHA - ANM)

Q. What is the current ideal fertility rate in India? FMGE 2021

a. 2.3
b. 2.2
c. 2.1
d. 2.0

Ans: c

Q. To attain the two-child norm, the net reproductive rate to be obtained is

a. 0.5
b. 1
c. 1.5
d. 2

Ans: b

Q. Average number of children a woman would have if she were to pass through her reproductive years bearing children at the same rates as women now in each age group is known as FMGE 2021

a. General fertility rate
b. Total fertility rate
c. Gross reproduction rate
d. Net reproduction rate

Ans: b

HEALTH INFORMATION COLLECTION SYSTEM

00:52:20

CRS (Civil Registration System)	SRS (Sample Registration System)	NFHS (National Family Health Survey)	Census
Vital Registration System	Dual recording system: Part-time enumerator + full-time supervisor Conducted every 6 months	Large-scale multi-round survey Done every 5-6 years at the national and state levels Completed 5 rounds of NFHS	Union subject. Every 10 years Next census will be a digital census in 2027

Yourwish

Least efficient	Most efficient		
Birth registration: done within 21 days of birth by the hospital where the baby is born. NRI birth registration is done within 60 days of arrival Death registration is done within 21 days of death	Provides annual estimates of CBR, CDR, IMR, MMR, and Natural Growth Rate	Fertility, Infant & child mortality, the practice of family planning, maternal and child health, reproductive health, nutrition, anaemia, utilization and quality of health and family planning services, status data, Immunization	Demographic structure of the population Defacto method: Info collected based on location at time of enumeration. Dejure: Counted based on the permanent place of residence. India follows DeJURE
Under the Office of the Registrar General of India	Under the Office of the Registrar General of India	Institute of Population Sciences, Mumbai Under MOHFW	Under the Ministry of Home Affairs

Q. Which of the following is responsible for maintaining records of births and deaths in India?

FMGE 2021

a. Census
b. Death certificate
c. Lay reporting
d. Vital registration system

Ans: d

- Lay reporting- causes of death recorded by health workers

Q. Which out of the following Health Information collecting systems provides data on registration of births, deaths, infant mortality, abortions, pregnancies, marriage, and contraception use?

a. Census of India
b. Sample Registration System
c. National Family Health Survey
d. Civil Registration System

Ans: c

Q. In the 'De facto' method of census data collection, information is collected based on which of the following?

a. Place of birth
b. Place of employment
c. Usual place of residence
d. Location at the time of enumeration

Ans: d

Q. In a family, Mr. X is 69 years old, and his wife, Mrs. X, is 58 years old. They have a 30-year-old son, his 28-year-old wife, and a 5-year-old grandchild. Calculate the dependency ratio for this family?

a. 33
b. 66.6
c. 22.4
d. 44.6

Ans: B

MISTAKES TO AVOID

- Memorizing definitions without understanding
- Confusing similar indicators
- Ignoring units (per 100 vs per 1000)
- Ignoring numerical thinking, "PSM won't ask maths"

Yourwish

8. FAMILY PLANNING AND CONTRACEPTIVES

FAMILY PLANNING

00:00:27

- The ability of individuals and couples to anticipate and achieve their desired number of children while determining the spacing and timing of births FMGE 2018, 2019, 2020, 2021, 2023, 2025
- Family Planning services were voluntary in India from 1977 INICET 2022
- India was the first country to start the National FP program and Blindness Control Program

CONTRACEPTION

- The deliberate prevention of pregnancy through artificial or natural methods

SCOPE OF MODERN CONCEPT OF FAMILY PLANNING SERVICES

00:01:21

- Advice for sterility
- Spacing or terminal method
- Screening for cervical cancer
- Providing services for an unmarried mother
- Providing adoption services
- Sex education
- Parenthood, home economics, nutrition

Q. What is not included in the scope of the modern concept of family planning services? INICET 2019

A. Screening for HIV infection
B. Sex education
C. Education for parenthood
D. Providing adoption services

Ans: A

ELIGIBLE COUPLE VS TARGET COUPLE

00:02:26

- Eligible Couple: Currently married couples where the wife belongs to the reproductive age group (15-49 years) and requires family planning services FMGE 2019 INICET 2022
- Target Couple: Refers to eligible couples with more than two children
- No longer used as an official term in family planning programs
- Planned family:
  - Maintain a gap of 2 years between marriage and the first pregnancy
  - At least 3 years gap between 2 successive pregnancies

Q. At which of the following centres is the eligible couple register maintained? FMGE 2023

A. PHC
B. CHC
C. Sub Centre

Yourwish

Yourwish

D. District

Ans: C

- The Eligible couple register is aka Family Planning register

COUPLE PROTECTION RATE (CPR)

00:04:00

- Definition: It is the percentage of eligible couples using approved family planning methods to prevent pregnancy.
- Indicates Contraceptive Prevalence Rate

Q. A village has 180 Eligible Couples out of which: 10 couples use OCPs, 29 couples use condoms, 10 couples use IUDs, 3 use vasectomy, 8 use tubectomy. Calculatethe Couple Protection Rate.

Ans: CPR = $\frac{Total\ Eligible\ couples\ using\ contraceptive\ methods}{Total\ Eligible\ couples} x\ 100$

- (Total users)= 10 + 29 + 10 + 3 + 8 = 60
- (60 / 180) × 100
- 33.3%

UNMET NEED FOR FAMILY PLANNING

00:05:30

- Women who are sexually active but not using any contraceptive method despite wanting to avoid pregnancy or space births
- Common Reason: Side effects

Unmet need for spacing

- Women who wish to delay the next birth by >2 years but are not using any contraceptive method.

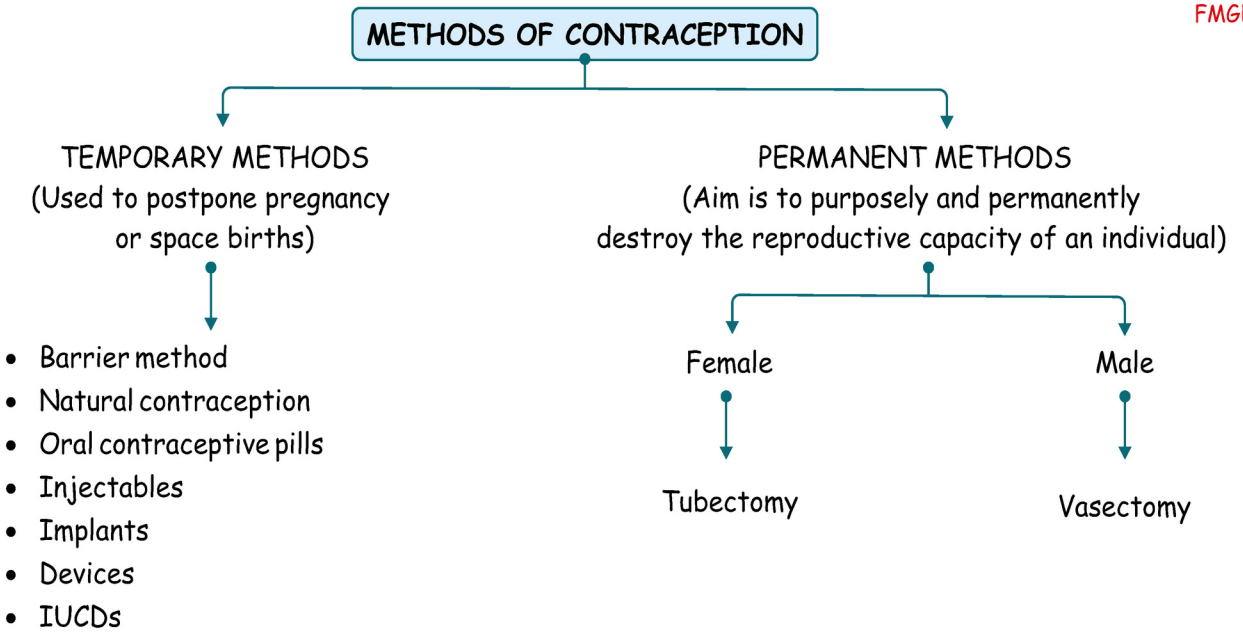
Unmet need for limiting

- Women who do not want any more children but are not using contraception.

CONTRACEPTIVES

00:06:24

FMGE 2020



Yourwish

- Used after intercourse: (e.g., Emergency Contraceptive Pills) — Interceptive
- Used at the time of intercourse: (e.g., condoms) — Conventional
- Non-Surgical — ESSURE.

Evaluation of contraceptive methods

Q. 100 couples use an 'X' for 2years. 20 accidental pregnancies reported. Calculate the Pearl index

- Evaluation Method 1: Pearl Index (Most common method)
- Evaluation Method 2: Life Table Analysis (Better method)

Pearl index (pi) calculation

- PI = $\frac{Total\ number\ of\ accidental\ pregnancies}{Total\ months\ of\ exposure}\ x\ 1200$
  - Step 1: 20 (pregnancies) / (24 months × 100 couples)
  - Step 2: (20 / 2400) × 1200
  - Step 3: 20 / 2 = 10
  - Result: 10 / HWY (Hundred Woman-Years)

THE INTERPRETATION

- If 100 women use this contraceptive 'X' for 1 year, then 10 accidental pregnancies occur.

Q. In a contraceptive study, 500 women were followed for 6 months. During this period, 4 pregnancies occurred. What is the Pearl Index? FMGE 2026

A. 2.5
B. 1.6
C. 5.0
D. 2.0

Ans: B

Q. The highest contraceptive failure is reported in?

A. Spermicidal methods
B. Implant
C. Oral contraceptive pills
D. IUD

Ans: A

Common pearl indexes

Contraceptive Method	Pearl Index (Failure Rate)
Male condom	5-14
Female condom	5-21
DMPA	0.3

CuT 380 A	0.5-0.8
Centchroman	1.8-2.8
MIRENA	0.2
Tubectomy	0.5
Vasectomy	0.15 (LEAST)
Vaginal Sponge	Nulliparous: 9-20 Multiparous: 20-40
Vaginal diaphragm	6-12
OCPs	0.1-0.5

Important Information

- Most prevalent contraceptive method in India- Tubectomy

Male condom

FMGE 2020



- Type: Barrier method
- MOA: Prevents fertilization
- Brand Name: NIRODH (means 'prevention')
- Freely available at the SC (Sub-Center) level
- Protects from HIV / STD
- Most common cause of failure of the male condom is: Incorrect use
- Number of condoms needed for effective protection in a year is: 72
- Material: latex

Female condom



- Type: Barrier Method
- MOA: Prevents fertilization
- Brand Name: FEMIDOM (invented by MD Hemsel)
- Protects from HIV / STD
- 2 rings:
  - Inner ring: Covers the cervix
  - Outer ring: Vulva
- Not recommended under: NFWP
- Recommended freely under: NACP, distributed free for Community sex workers
- Pre-Lubricated with silicone, so a spermicide is not required
- Material: Nitrile, Polyurethane

Q. All are true about the female condom except?

a. Should be used with a male condom
b. Invented By Hessel
c. Offers protection against the STDS

Yourwish

d. Reusable

Ans: A

Vaginal sponge

FMGE 2018, 2019





- Type: Barrier Method
- MOA: Prevents fertilization
- Brand Name: TODAY
- Spermicide: Nonoxynol 9
- Does not protect from HIV/STD
- Technique to use: Inserted into the vagina, then pushed gently to cover the cervix
- Inserted 2-6 hrs before sexual intercourse
- Left in place up to 6 hrs post ejaculation
- If a woman forgets to take it out beyond 24 hrs, leads to Toxic Shock Syndrome

Diaphragm





- AKA cervical cap, vault cap, and vimule cap
- A shallow cup of 5-10 cm in diameter made of synthetic rubber or plastic.
- Low failure rate
- Given for educated women

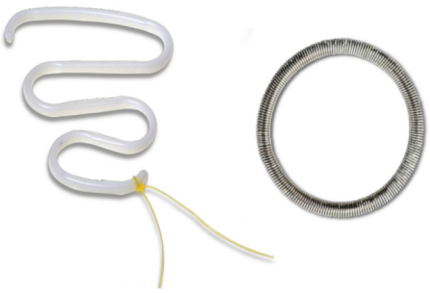
Intrauterine devices (iud)

00:17:55

FMGE 2019

- Primary Functions:
  - Prevent fertilization
  - Prevent implantation
  - Enhances foreign body reaction, cellular response in the endometriu, and affects enzymes in uthe terus
  - Alter cervical mucus, thus affecting sperm motility, capacitation & survival
- The core of the IUD is Barium Sulphate, hence detectable on radiological investigation.

1st Generation IUD: Inert	• These are non-medicated devices, typically made of polyethylene or stainless steel. • Lippes Loop • Grafenberg Ring: A silver/gold wire ring.
2nd Generation IUD: IUCD (Copper-T)	• These devices release copper ions, which are spermicidal. • The numbers (e.g., 380) represent the surface area of the copper wire in mm^2



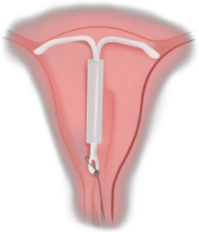
Yourwish

Yourwish

	CuT 380: Effective for 10 years 	**CuT 375/ Multiload:** Effective for 5 years 	**CuT 380Ag/Nova T:** Contains a silver core to prevent fragmentation of the copper wire 
3rd Generation IUD: Hormonal IUD	• Progestasert: Releases progesterone • Mirena: Releases Levonorgestrel (LNG)		

Hormonal iud

- Thickens Cervical Mucus: Increases the viscosity of mucus to prevent sperm from entering the cervix
- Endometrial Changes: Makes the endometrium unfavorable for implantation due to high progesterone and low estrogen levels

Mirena 	• Hormone: Contains 52 mg of levonorgestrel (a synthetic progesterone) • Release Rate: Releases 20 mcg of levonorgestrel per day • Shelf Life: 5 to 7 years • Least failure rate
Progestasert 	• Hormone: Carries 38 mg of progesterone in a silicone oil reservoir. • Release Rate: Releases 65 μg of hormone per day. • Shelf Life: 1 year 

Q. The duration for which copper T 380 A remains effective is referred to as its shelf life.

A. 3 years

FMGE Jan 2023

Yourwish

B. 5 years
C. 7 years
D. 10 years

Ans: D

- IUD Expulsion Rate:
  - Lowest: Progestasert
  - Highest: Lippes Loop
- IUD Removal Rate:
  - Lowest: Progestasert
  - Highest: Levonorgestrel
- IUD Pregnancy Rate:
  - Lowest: Levonorgestrel
  - Highest: Lippes Loop

Side effects

- There are no congenital malformations associated with an IUD in situ

Category	Side effects/Complication
1. Menstrual Disturbances	• Bleeding: Most common side effect • Management: Reassurance and iron tablets for 2-3 months
2. Pain	• Symptoms: Lower abdominal pain and backache • Note: Pain is the 2nd most common side effect, but is the most common cause for IUD removal
3. Infection	• Pelvic Inflammatory Disease (PID). • The highest risk is within the first 20 days after insertion • Associated with Actinomyces and Gardnerella • Rx: Put on antibiotics. If there is no relief in 24 hours, the IUD should be removed
4. Expulsion	• Can be partial or complete expulsion of the IUD • It is most common soon after insertion
5. Perforation (Rare)	• Uterine perforation usually occurs during the insertion process
6. Pregnancy-Related Complications	• Failure leading to pregnancy • There is a 50% risk of spontaneous abortion • There is an increased risk of ectopic pregnancy if conception occurs **Management (If pregnancy occurs):** • If the thread is visible: Pull the IUD and continue the pregnancy • If the thread is not visible: Rule out any intrauterine complications or infection
7. Systemic / Others	• Vasovagal reaction: May occur at the time of insertion • Anemia: Secondary to excessive bleeding

Q. At the PHC level, a woman who complains of spotting following IUCD insertion should be advised:

A. Analgesics and observation

B. Antibiotic and observation

C. Iron supplements and observation

D. Removal of IUCD

Ans: C

Contraindications of iuds

00:25:32

FMGE 2019, 2020

Absolute Contraindications	Relative Contraindications
• Suspected pregnancy • Current Pelvic Inflammatory Disease (PID) • Vaginal bleeding of undiagnosed etiology • Cancer of the cervix, uterus, adenoma, or other pelvic tumors.	• Anemia • History of PIDsince last pregnancy • Purulent cervical discharge • Uterine distortions • Menorrhagia • Unmotivated person • Previous Ectopic Pregnancy

Q. Which of the following is an absolute contraindication for the device shown in the image below?

FMGE June 2021

A. Anemia

B. Vaginal bleeding

C. Uterine malformations

D. Purulent cervical discharge

Ans: B

Hormonal contraceptives

00:26:33

- Hormonal contraceptives currently in use and/or under study may be classified as follows:

Oral pills	Depot (slow release) formulation
• Combined pill • Progesterone only pill (POP) • Post-coital pill • Once-a-month (long-acting) pill • Male pill	• Injectables • Subcutaneous implants • Vaginal rings

Depot formulations

- Highly effective
- Long-lasting and reversible
- Does not affect lactation
- Dosage & Frequency: 150 mg IM (Intramuscular) x 3 monthly
- Provided by the name ANTARA till the SC (Sub-center) level freely



Yourwish

- Disadvantage: Menstrual irregularity

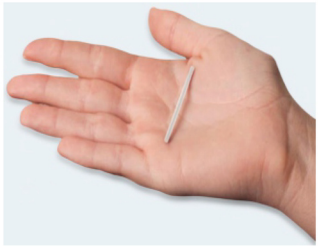
Q. A woman was on regular DMPA injection. She missed taking her next dose of DMPA by 14 days. What is the advice given to her?

A. Urine pregnancy test before DMPA
B. Give DMPA
C. Give DMPA with 7 days of barrier
D. Wait till next period

Ans: B

- < 14 days: Give injection, no backup needed
- > 14 days: Rule out pregnancy + backup contraception x 7 days

IMPLANT



- Norplant: Subdermal implant contraceptive
  - 6 Silastic capsules containing 35 mg LNG each
  - 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

PATCH



- Contraceptive patch: Is a 'transdermal patch' applied to the skin that releases synthetic estrogen and progestin hormones to prevent pregnancy
- Have the same effectiveness as the combined OCPs (Oral Contraceptive Pills)
- Composition: Ethinyl estradiol (an estrogen) and norelgestromin (progestin)
- 1 patch is applied for 7 days; 3 such patches are applied successively. No patch is applied in the 4th week
- Mechanism of action: Prevents ovulation

CENTCHROMAN: SAHELI

FMGE 2019

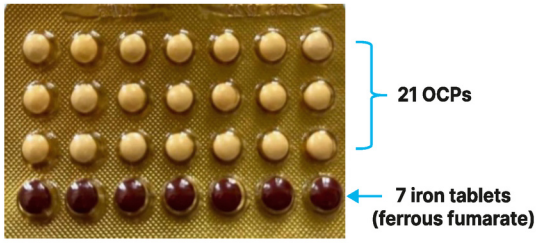


- Type: Synthetic non-steroidal oral contraceptive (also known as CHAYA — freely available till SC level)
- Brand name: SAHELI
- Chemical: Ormeloxifene
- MOA: SERM (Selective Estrogen Receptor Modulator)
- Developed by: CDRI (Central Drug Research Institute)
- Dosage and frequency: 1 tablet (30mg) twice a week for 3 months, then 1 tablet per week
- PI (Pearl Index): 1.83–2.84 / HWY
- Used for: DUB
- C/I: PCOD
- Also known as: Once a week pill

Yourwish

Yourwish

OCP (Oral Contraceptive Pill)



- The pack should be started on the 1st day of menses.
- Hormonal tabs are taken for 21 days.
- Iron Tablets (Ferrous Fumarate): 7 brown tablets located at the bottom of the pack, taken for 7 days

MALA-N & MALA-D

FMGE 2020



- Both medications share the same formulation of active ingredients:
  - Levonorgestrel: 0.15 mg
  - Ethinylestradiol: 0.03 mg
- Distribution and Access
  - Mala-N (The "N" stands for National Family Planning Programme)
    → This version is provided freely through government healthcare facilities
  - Mala-D (The "D" stands for Delivery/Distribution)
    → This version is promoted under Social Marketing scheme

Q. All of the following are protected by OCPs except?

FMGE Jan 2025

A. Carcinoma breast
B. Carcinoma endometrium
C. Colonic cancer
D. Ovarian cancer

Ans: A

- OCPs increase the risk of Cervical & breast cancer
- OCPs are protective for Ovarian & Endometrial cancer

Indications of ocp by who

- Age: Menarche to 40 years
- Postabortion
- Anemia (iron deficiency, malaria)
- GTN (Gestational Trophoblastic Neoplasia) following normal HCG level
- History of Ectopic Pregnancy, Endometriosis, uterine fibroid, ovulation or endometrial cancer
- Dysmenorrhea
- Pelvic inflammatory disease
- Epilepsy
- Thyroid disease
- Varicose veins
- Tuberculosis
- Benign breast disease
- HIV / AIDS (additional to condom use)

Contraindications to ocps (absolute)

Mnemonic: CULT

- Cancer of the breast and genitals (Cervical)

Yourwish

- Cardiac abnormalities
- Congenital hyperlipidaemia
- Undiagnosed abnormal uterine bleeding
- Liver disease
- Previous or present history of Thromboembolism

Important Information

- In OCPs, estrogen is linked to heart problems and Progesterone is linked to metabolic disturbances

Q. Choice of contraception in women with heart disease is:

INICET 2020

A. IUCD

B. MALA N

C. Inj. DMPA

D. Condom

Ans: A

Q. Which type of cancer won't be affected if a patient uses OCP, which is a protective factor for?

FMGE July 2023

A. Endometrial cancer

B. Cervical cancer

C. Breast cancer

D. Bladder cancer

Ans: A

Non-contraceptive benefits of ocps

00:34:40

FMGE 2023

- Protect against benign breast disorders (fibrocystic disease and fibroadenoma)
- Ovarian cysts
- Iron deficiency anemia
- Osteoporosis
- PID (Pelvic Inflammatory Disease)
- Ectopic pregnancy
- Ovarian cancers
- Endometrial cancer
- Used in DUB (Dysfunctional Uterine Bleeding), irregular menstrual cycles, dysmenorrhea

Q. All of the following are protected by OCPs except:

FMGE 2025

A. Carcinoma breast

B. Carcinoma endometrium

C. Colonic cancer

D. Ovarian cancer

Ans: A

Q. Minipill is a contraceptive of choice for?

A. Elderly females

B. Lactating females

C. Obese women

D. Menstruating women

Ans: B

- Minipill - progesterone only pill- Contraception of choice within 6 wk of delivery in a breastfeeding woman

Management of missed pills 00:35:46

- Missing 1-2 pills:
  - Take one pill as soon as possible, or take 2 pills at the scheduled time: no risk of pregnancy
- Missing ≥3 pills in the first or second week, or started a new pack 3 days late:
  - Take one pill as soon as possible,
  - Continue with the scheduled pill,
  - Use barrier method for the next 7 days
  - And incase unprotected sex in the last 72 hours, use an emergency contraceptive method
- Missing ≥3 pills in the 3rd week:
  - Take one pill as soon as possible
  - Finish rest of the hormonal pills
  - Last 7 pills non-hormonal pill should be discarded
  - Start a new pack the next day
  - Use barrier method for the next 7 days
  - In case of unprotected sex inthe last 72 hours, use an emergency contraceptive method

Q. In case women on OCP forgets taking 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

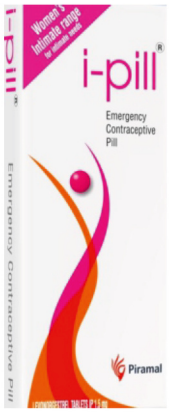
C. Use the barrier method for the rest of the cycle

D. Continue with the next pill next

Ans: C

EMERGENCY CONTRACEPTIVES

00:37:53



I-PILL

- Most commonly used
- Dosage: 1.5 mg
- Active Ingredient: Levonorgestrel
- Used within 72 hrs of unprotected sexual intercourse

Other emergency contraceptives

- Yuzpe method: Levonorgestrel 0.5 mg + ethinylestradiol 0.1 mg
  - 2 pills within 72 hours of unprotected sexual intercourse and 2 exactly 12 hours later
- Ulipristal: A selective progesterone receptor modulator taken within 120 hours of unprotected sexual intercourse

Yourwish

- Mifepristone: Single 10 mg dose within 72 hours
- IUCD can be used up to 5 days of unprotected sexual intercourse (Best)

Q. A 24-year-old woman from a low socioeconomic background is a victim of sexual assault. What is the ideal choice to prevent conception?

A. Mifepristone
B. OCP from next cycle
C. LNG 1.5 mg stat
D. Yuzpe & Lance method

Ans: C

Q. All are given as emergency contraceptives except: FMGE July 2023

A. LNG 0.75 mg 2 tab
B. Ethyline Estradiol tablet
C. Ulipristal
D. OCP 2 tab within 24 hrs, repeat dose after 14 days

Ans: B

Important Information

- Not used as an emergency contraceptive
  - Danazol
  - Nonoxynol 9
  - Medroxy progesterone acetate
  - LNG IUCD
  - Norgestre
  - Norplant

SUMMARY OF INITIATION OF FAMILY PLANNING PROGRAMMES POST PARTUM 00:39:43

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	• Can be started anytime after delivery, regardless of whether the mother is breastfeeding or not
Female Sterilization	• Can be performed within 7 days of delivery or after 6 weeks postpartum.

Yourwish

Yourwish

Q. Best contraceptive option available to a 28 year old breast feeding mother with 4 week old baby:

A. ANTARA

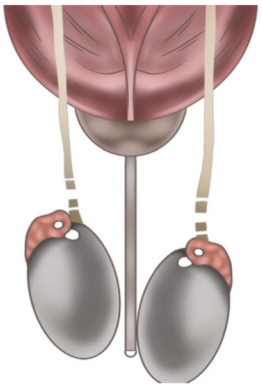
B. IUD 380 A

C. POP

D. OCP

Ans: C

VASECTOMY



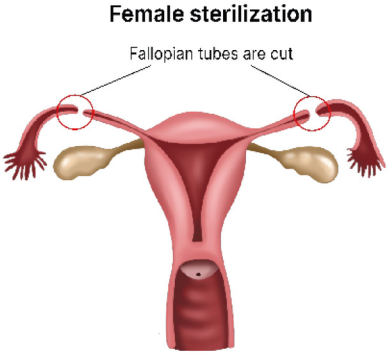
00:40:48

- Least failure rate
- Minimum of 1 cm of vas deferens is removed, andthe ends are ligated
- Advice: Use the barrier method for 3 months / at least 20 ejaculations free
- MC cause for failure of vasectomy in India: Misidentification of the vas deferens

Male sterilization

- Eligibility Criteria
  - Marital Status: Married (or ever-married)
  - Age: < 60 years of age
  - Children: At least one child > 1 year age
  - History: No history of sterilization of self/spouse
  - Mental State: Sound mind
- For the Mentally Ill
  - Certified by a Psychiatrist
  - Statement on soundness of mind by legal guardian/spouse
- Service
  - Conventional vasectomy by a trained MBBS doctor
  - No-scalpel vasectomy (NSV) by a trained MBBS doctor
- Complications
  - Failure rate: 0.15 per 100 person-year
  - Operative complication: Pain/infection
  - Sperm granules: Appear after 10-14 days, eventually subside
  - Autoimmune response: Antibodies to sperm may form, though these are harmless and carry no clinical significance
  - Psychological
  - Spontaneous recanalization (0-6%)

FEMALE STERILIZATION

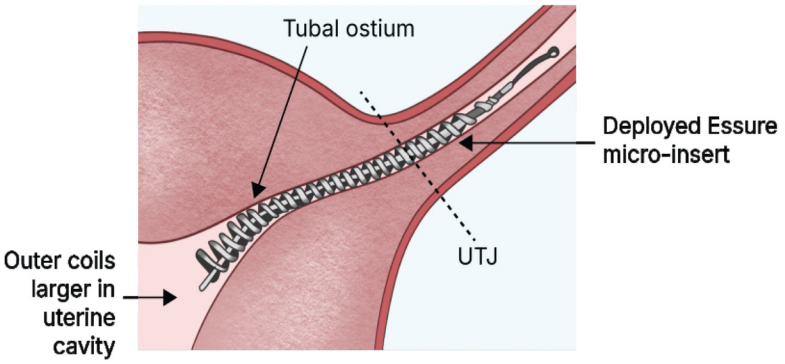


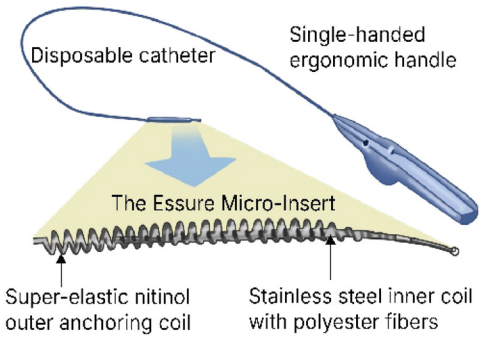
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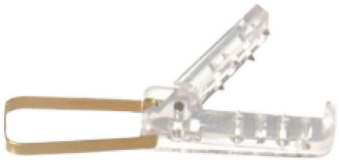
- Most common method with the least failure rate: Laparoscopic sterilization Procedure
- Eligibility Criteria (Who performs?)
  - Married (or ever-married) between 22 and 49 years of age
  - Must have at least one child who is over 1 year of age
  - No history of sterilization of self or spouse.
  - Must be of sound mind

Yourwish

Non-surgical methods









Procedure	Timing
Interval sterilization	Within 7 days of the menstrual period (in the follicular phase of the menstrual cycle)
Postpartum	Between 24 hours and 7 days
Sterilization with MTP	Concurrently
Sterilisation following	Performed if clients fulfill the medical eligibility criteria

Q. Choice of contraception for a newly wed couple is: NEETPG 2023

A. Condoms
B. Combined OCP
C. Copper T
D. DMPA Injection

Ans: B

Important Information

- Contraceptive of choice for couples meeting occasionally: IUCD (Lower failure rate)
- Contraceptive of choice for newly married couples: OCP
- Contraceptive of choice for adolescents: Barrier Method

Q. For Medical Termination of Pregnancy, consent from whom is necessary:

A. Both the husband and wife
B. Consent from the pregnant mother, irrespective of her age

C. Consent fromthe pregnant mother provided her age is > 18 years
D. Consent not necessary

Ans: C

MTP AMENDMENT ACT 2021

00:44:35

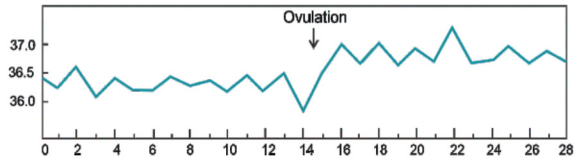
FMGE 2023

- Indications
  - Therapeutic: Continuation endangers the woman's life or causes grave physical/mental injury
  - Eugenic: Fetal anomaly
  - Humanitarian: Rape/incest; minor; mentally ill; marital status change (widow/divorce)
  - Social: Contraception failure (up to 20 weeks)
- Consent
  - ≥18 years: Woman's own written consent
  - Husband's/partner's consent: Not required
  - <18 years or mentally ill: Guardian's written consent
- Who can perform MTP
  - Obstetrician-Gynaecologist, or
  - Registered Medical Practitioner with any of:
    → 6-month OBG training / 1-year OBG house job/experience of 25 MTP cases.
- At a government facility or an approved place
- <20 weeks: 1 RMP - All indications
- 20-24 weeks: 2 RMP- All indications except Social (Contraceptive failure)
- >24 weeks: Medical Review Board - Therapeutic, Eugenic

PHYSIOLOGICAL (NATURAL CONTRACEPTIVE) METHODS

00:46:25

- Rhythm Method (Calendar Method) → track fertile days
  - Fertile Period Calculation
    → First fertile day = Shortest cycle minus 18 days
    → Last fertile day = Longest cycle minus 10 days



- Basal Body Temperature Method
  - BBT rises by 0.3-0.5°C soon after ovulation due to the release of progesterone
  - Avoid sexual intercourse during post ovulatory phase
- Ovulation method
  - Before Ovulation: Cervical mucus is opaque, thick, and sticky ("dry days").
  - During Ovulation :Cervical mucus becomes slippery, lubricative, transparent, and watery. Mucus resembles raw egg white, indicating peak fertility.
- 4. Symptothermal Method:
  - The most effective natural contraceptive method.
  - Combines the calendar (safe) method, cervical mucus observation, and basal body temperature monitoring for accurate identification of fertile and infertile periods



INITIATIVES UNDER THE PROGRAM

- **Nishchay-** Home based UPT Kit provided free by ASHA worker

Yourwish

- **Mission parivar vikas-** No contraceptives
- **Jansankhya sthirata kosh-** National population stabilization program







MISTAKES TO AVOID

- Confusing Indications & Contraindications
- Not correlating clinically
- Ignoring numerical

Yourwish

Yourwish

9. PREVENTIVE OBSTETRICS, PEDIATRICS, GROWTH AND DEVELOPMENT, GERIATRICS

PREVENTIVE OBSTETRICS

00:00:25

- Components
  - Antenatal care (ANC)
  - Intranatal care
  - Postnatal care

Essential Obstetric Care

- Early registration of pregnancy → **within 12–16 weeks**
- Minimum ANC checkups (GOI) → **4**
- Safe & hygienic delivery
  - Promote institutional delivery
  - Home delivery → safe method
- Postnatal care → **3–4 visits**

Emergency Obstetric Care

- Should manage sudden complications
  - Hemorrhage
  - Obstructed labour
- Facilities required
  - Emergency C-section
  - Anaesthesia
  - Blood transfusion
  - Newborn care

Antenatal care

FMGE 2019
AIIMS 2020

Antenatal visits

Ideal Anc Visits → 13–14

- First 7 months → monthly (7 visits)
- 8th month → twice/month
- 9th month onward → weekly

Minimum Anc (GOI) → 4

1. At registration
2. 14–26 weeks
3. 28–34 weeks
4. 36 weeks to term

WHO minimum → 8 (ANC contacts)

- 1st trimester → 1 visit

Yourwish

- 2nd trimester → 2 visits
- 3rd trimester → 5 visits

Q. According to WHO, what is the minimum number of antenatal visits? FMGE 2021

A. 8
B. 4
C. 12
D. 14

Ans: A

Supplements In Pregnancy

Supplement	Details
Folic acid	400 µg Start → 1 month before conception Continue → first trimester Prevents → Neural tube defects
Iron-Folic Acid (Anemia Mukt Bharat)	Minimum → 100 tablets Preferred → 4th month → upto delivery (~180 days) Technically → 2nd trimester → upto 6 months postpartum Anemic woman → 2 tablets/day Cut-off anemia in pregnancy: Hb <11 g/dL
Calcium tab	4th month onwards - upto 6 months postpartum

Q. How many mg of iron and mcg of folic acid should a pregnant woman be given? FMGE 2024

A. 60 mg / 500 mcg biweekly
B. 60 mg / 500 mcg weekly
C. 60 mg / 500 mcg daily
D. 60 mg / 500 mcg once a month

Ans: C

Nutritional Requirements

Nutrient	Non-Pregnant	Pregnant	Lactation
Protein (gm/day)	45.7	• 1st trimester: 45.7 • 2nd trimester: +9.5 • 3rd trimester: +22	—
Iron (mg/day)	30	27	23
Calcium (mg/day)	1000	1000	1200
Iodine (mcg/day)	150	250	280

Folate (mcg/day)	220	570	330
Vitamin A (mcg/day)	840	900	950
Carbohydrate (gm/day)	130	175	200

Pregnancy Stage	Extra calories to be added
1st trimester	70-85 kcal/day
2nd trimester	230-280 kcal/day
3rd trimester	390-470 kcal/day

- Calorie intake pregnancy : Average + 350 kcal/day

Q. The dose of iodine for lactating women in India according to the recommended dietary allowance (RDA) is:
A. 200 microgram/day
B. 220 microgram/day
C. 250 microgram/day
D. 280 microgram/day

Ans: D

Q. Additional energy requirement during pregnancy (kcal/day) FMGE 2018
A. +300 kcal
B. +600 kcal
C. +350 kcal
D. +520 kcal

Ans: C

Weight Gain In Pregnancy

- After 1st trimester → **~2 kg/month**
- >3 kg/month →
  - Preeclampsia
  - Twins
  - Gestational diabetes
- Average total gain → **9-11 kg**
- Low socioeconomic woman → 5-6 kg acceptable

Investigations

Sub-center

- Pregnancy test
- Hb
- Urine sugar
- Urine albumin

Yourwish

- Rapid malaria test

Not done: HIV, VDRL, HBsAg

PHC/CHC/FRU

- Blood group & Rh
- HIV testing
- VDRL/RPR
- HBsAg for Hepatitis B testing
- Blood sugar testing
- Rapid malaria test (if unavailable at SC)

First Referral Unit criteria

1. Blood storage facility
2. Emergency C-section capability
3. Newborn care facility

Q. A 26-year-old pregnant female visited the sub centre for her check-up. Which of the following tests is done at the sub-centre during pregnancy? FMGE 2019

A. USG
B. Haemoglobin
C. OGTT
D. Triple test

Ans: B

Intranatal Care 00:09:30

- Care during delivery → ensure safe delivery

7 Cleans (Home Delivery)

- Clean hands
- Clean surface
- Clean cord
- Clean tie
- Clean blade
- Clean water
- Clean staff

Purpose → **prevent neonatal tetanus**

POSTNATAL CARE 00:10:00

- Its is the care of the mother and baby after delivery
- Minimum visits (GOI) → **4**
  - Day 1
  - Day 3
  - Day 7
  - Day 42
- Low birth weight baby → **6 visits**

Yourwish

Q. A woman delivers a newborn in a rural setting with the help of a skilled birth attendant. After delivery, the attendant performs the following steps:

- Cuts the umbilical cord with a clean instrument and ties it using new threads
- Cleans the newborn's eyes with a sterile, wet cloth, wiping from the medial to lateral side
- Places the newborn in skin-to-skin contact with the mother
- Bathes the newborn with warm water soon after birth

Which of the following steps is incorrect according to recommended newborn care practices?
A. Using new threads to tie the ends of the umbilical cord
B. Wiping the newborn's eyes from the medial to lateral canthus
C. Placing the newborn in skin-to-skin contact with the mother
D. Bathing the newborn with warm water soon after birth

Ans: D

Essential Newborn Care

00:11:00

- Keep the baby warm
- Dry immediately
- Skin-to-skin contact
- Delayed bathing (≥24 hrs)
- Clean cord care
- Rooming-in- keeping the baby's cot next to the mother

Kangaroo Mother Care

- Skin-to-skin touch
- Aiway disease prevention
- Ambulatory benefit
- Nutritional benefit
- Emotional support

High-Risk Pregnancy

00:12:06

- Elderly primigravida ≥30 yrs
- Short stature primi Height ≤140 cm
- Malpresentation (Breech, Transverse lie)
- APH
- Threatened abortion
- Preeclampsia and eclampsia
- Anemia
- Twins
- Hydraminos
- Previous stillbirth
- Intrauterine death
- Manual removal of placenta
- Elderly grand multipara (14 days after expected date of delivery)
- History of previous cesarean or instrumental delivery

Yourwish

- History of 3 or spontaneous abortions
- History of infertility

Vertical Transmission (Timing Agents /Diseases)

- 1st trimester → Rubella, Chickenpox
- 2nd trimester → Parvovirus B19
- 3rd trimester → Toxoplasmosis, CMV, Hepatitis B, Syphilis
- During delivery → HIV, Herpes Simplex Virus (HSV)

Indicators

00:13:05

Maternal mortality

- **Maternal death**
  - During pregnancy or during delivery, up to **42 days postpartum**
  - Due to pregnancy and related causes
  - Exclude accidental causes → fall, electrocution, snake bite
- **Maternal Mortality Ratio (MMR)**
  - $\frac{\text{Total no of Maternal deaths}}{\text{Live births}} \times 100000$
- **Maternal Mortality Rate**
  - $\frac{\text{Total no of Maternal deaths}}{\text{Women in reproductive age group (15-49 yrs)}} \times 100000$
- Most sensitive indicator of delivery services under health care in India: MMR
- Most common direct cause → Postpartum hemorrhage
- Most common indirect cause → Anemia

Q. Maternal deaths / Women of reproductive age group is used for calculating:

NEET PG 2024

A. Total fertility rate
B. Death rate in reproductive women
C. Maternal Mortality Rate
D. Maternal Mortality Ratio

Ans: C

Q. In a town, there are 2,500 live births in the last six months. During the same period, there were:

- 5 deaths due to peripartum infection
- 5 deaths due to electrocution
- 2 deaths due to obstructed labour
- 3 deaths due to PPH

What is the Maternal Mortality Ratio (MMR)?
A. 4 per 1,000 live births
B. 6 per 1,000 live births
C. 40 per 1,000 live births

D. 60 per 1,000 live births

Ans: A

- Maternal deaths counted = 5 (infection) + 2 (obstructed labour) + 3 (PPH) = 10 (Electrocution not counted)
- MMR = 10 / 2500 × 1000 = 4 per 1000 live births

Q. In a town, during 6 months, 1000 live births took place. During the same time frame, 10 women died due to Sepsis (3), RTA (2), PPH (3), Snake bite (2), and Obstructed labour (2). Calculate the Maternal mortality ratio.

NEET PG 2024

A. 800/100000 live births
B. 20/1000 live births
C. 125/1000 live births
D. 400/100000 live births

Ans: A

- Maternal deaths counted = 3 (Sepsis) + 3 (PPH) + 2 (Obstructed labour) = 8
- MMR = 8 / 1000 × 100,000 = 800 / 100,000 live births

Q. Which of the following is not counted while calculating the Maternal Mortality Ratio (MMR)?

A. Maternal deaths due to road traffic accidents
B. Total number of live births
C. Deaths due to peripartum infections
D. Deaths due to postpartum hemorrhage

Ans: A

Calculating expected no. Of pregnancies in a specific area

Q. The birth rate is 20/1000 MYP. As a medical officer, you are to perform an audit of the sub-centre. You are conducting an audit at a subcentre. The number of pregnancies that should be registered with ANM at any one point in time is:

Explanation

- 50% pregnancies are to be registered with the ANM at any point in time
- Expected birth rate of the subcentre= 20/1000 x 5000 = 100
- Add pregnancy wastage factor → +10%
- Total expected pregnancies = 100 + 10 = 110
- No. of pregnancies registered with an ANM at any point in time= 110/2 = 55

PREVENTIVE PEDIATRICS

Indicators For Preventive Pediatrics

00:23:00

Period	Formula
Neonatal	$\frac{\text{No. of deaths 0-28 days of age in a year}}{\text{Total no. of live births in same year}} \times 100000$

Yourwish

Early neonatal	$\frac{\text{No. of deaths 0-7 days of age in a year}}{\text{Total no. of live births in the same year}} \times 100000$
Late neonatal	$\frac{\text{No. of deaths 8-28 days of age in a year}}{\text{Total no. of live births in the same year}} \times 100000$
Post-neonatal	$\frac{\text{No. of deaths 29 days - 1 year of age in a year}}{\text{Total no. of live births in the same year}} \times 100000$
Infant	$\frac{\text{No. of deaths 0 - 1 year of age in a year}}{\text{Total no. of live births in the same year}} \times 100000$

Under-5 mortality	$\frac{\text{Total no. of deaths 0-5 yrs of age in a year}}{\text{Mid-year population under 5 years}} \times 100000$
Child death rate	$\frac{\text{Total no. of deaths 1-4 yrs of age in a year}}{\text{Mid-year population (1-4 yrs)}} \times 100000$
Child Survival Index	$\frac{1000 - \text{Under 5 mortality rate}}{10}$
Perinatal mortality rate	$\frac{\text{Deaths} \geq 28 \text{ weeks gestation} + \text{Early neonatal deaths 0-7 days}}{\text{Total births (live + stillbirths)}} \times 100000$
Stillbirth rate	$\frac{\text{Deaths} \geq 28 \text{ weeks gestation / weight atleast 1 kg / length 35 cm}}{\text{Total births (live + stillbirths)}} \times 100000$

Q. The numerator of the Perinatal Mortality Rate (PNMR) consists of: INICET 2021

A. Post-neonatal period death
B. Early neonatal death of fetus > 1000 gm
C. Stillbirth of fetus < 500 gm
D. Abortion after 16 weeks

Ans: B

Q. Infant Mortality Rate is typically stated as a rate per how many live births? FMGE 2023

A. 100
B. 1000
C. 10,000
D. 100,000

Ans: B

Yourwish

Yourwish

Q. The total number of live births in a community in a year is 4000. FMGE 2020
40 newborns died within the first 7 days of life, whereas 40 died between 8 and 28 days of life.
50 deaths were reported between the ages of 1 month and 6 months of life.
Calculate Neonatal Mortality Rate (NMR) in this community:
A. 10
B. 20
C. 30
D. 40

Ans: B

- NMR= (40 + 40/4000) x 1000 = 20/1000 live births

Q. You are conducting an audit at a subcentre. How many infants should ideally be registered in a year with the health worker posted there? INICET 2018
A. 50
B. 100
C. 150
D. 200

Ans: C

Evaluation of The Cause of Deathin The Mother and Child

- Verbal Autopsy- Done in field areas by health care workers to find the cause of maternal deaths (if not a hospital death)
- RHIME :
  - Representative, routine, restructured, household interview for mortality and its evaluation.
  - Done to evaluate the cause of maternal deaths.

AT-Risk Infants

- Birth weight <2.5 kg
- Twins
- Birth order ≥5
- Infants in artificial feeding
- 2 and 3 degree malnutrition (Weight < 70 % of expected weight)
- Failure to gain weight in 3 successive months
- Children with PEM Diarrhea
- Babies of working mothers and single parents

Key points

- Most common cause of neonatal mortality: LBW/prematurity
- Most common cause of infant mortality is LBW/prematurity
- Most common cause of under 5 mortality: LBW/prematurity
- Most common cause of stillbirth: Placental cause, e.g., Antepartum hemorrhage
- Most common cause of perinatal mortality rate: Maternal & Fetal causes

Yourwish

Q. 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

Ans: D

Q. Most common cause of LBW in India? FMGE 2018
A. Smoking during pregnancy
B. Maternal tetanus
C. Intra-uterine growth retardation
D. Premature birth

Ans: C

Health Status Indicators

- Best indicator of the health status of a community: IMR
- Best indicator of the overall development of a nation: IMR
- Best indicator of overall development of a nation, as per UN: U5MR
- Best indicator of combined pediatrics and obs care: Perinatal Mortality rate
- Best indicator of availability, utilization, and effectiveness of Health services: IMR
- Best indicator for the quality of delivery services in a population: MMR
- Considered by the UN as the best single indicator of overall social development
- and well-being of entre society: U5MR
- Best indicator of the socio-economic development of a country: U5MR

Q. Most sensitive indicator to assess the availability, utilization, and effectiveness of healthcare in a community?
A. HDI NEET PG 2023
B. Infant mortality rate
C. Immunization coverage
D. DALY

Ans: B

Q. Best index for measuring health status in society: FMGE 2019
A. Under-5 mortality rate
B. Infant Mortality Rate
C. Child death rate
D. Maternal mortality rate

Ans: A

Q. The sensitive parameter of combined obstetric and pediatric care in the country is:
A. Post-neonatal mortality rate

B. Infant mortality rate
C. Neonatal mortality rate
D. Perinatal mortality rate

Ans: D

Indicators	Current (2023)	Target by 2030 (SDG)
NMR	19 /1000 LB	12 /1000 LB
IMR	25 /1000 LB	–
U5MR	31 /1000 LB	25 /1000 LB
MMR	88 /100000 LB	70 /100000 LB

Q. As per Sustainable Development Goal (SDG) 3, target 3.1 for MMR is to achieve maternal deaths of:
NEET PG 2020
A. <70 / Lakh live births
B. <100 / Lakh live births
C. <110 / 1000 live births
D. <130 / 1000 live births

Ans: A

Low Birth Weight

NEET PG 2024
FMGE 2018, 2024

- Birth weight <2.5 kg
- Causes
  - Prematurity
  - Small for gestational age (IUGR): major determinant
- Small for Date Babies
  - Babies weigh less than the 10th percentile for gestational age
  - Show retarded intrauterine fetal growth
  - SFD babies may be born at term or preterm
  - SFD babies have a high risk of death (PEM and infections)
- Gestational age classification
  - Preterm <37 wk
    - → Moderate 32–37 wk
    - → Very 28–32 wk
    - → Extreme <28 wk
  - Term 37–42 wk
  - Post-term >42 wk

Growth & development

00:38:10

Markers of malnutrition

Indicator	Meaning
Low Weight for height	Acute Emaciation(wasting/)
Low Height for age	Stunting
Low wt/age Underweight	Acute on chronic malnutrition

Yourwish

- Most sensitive/general marker for malnutrition → weight for age
- Best single parameters for assessing physical growth: Measurement of weight or rate of gain in weight

Q. An Anganwadi teacher takes the weight and height of a 4-year-old and finds that height for age <-2 SD. What is the likely cause?

NEET PG 2021

A. Chronic malnutrition
B. Acute malnutrition
C. Recent malnutrition
D. No malnutrition

Ans: A

FMGE 2019

Q. Chronic malnutrition in a child is best assessed by:
A. Weight for height
B. Weight for age
C. Height for age
D. Ponderal index

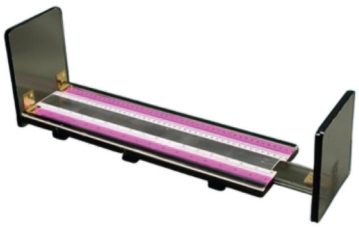
Ans: C

Growth Measurement Tools

- Salter scale → measure weight at fields (≤25 kg)
- Infantometer → measure lengths (<2 yrs)
- Stadiometer → standing height (>2 yrs)



Salter scale



Infantometer



Stadiometer

ICDS Growth Chart

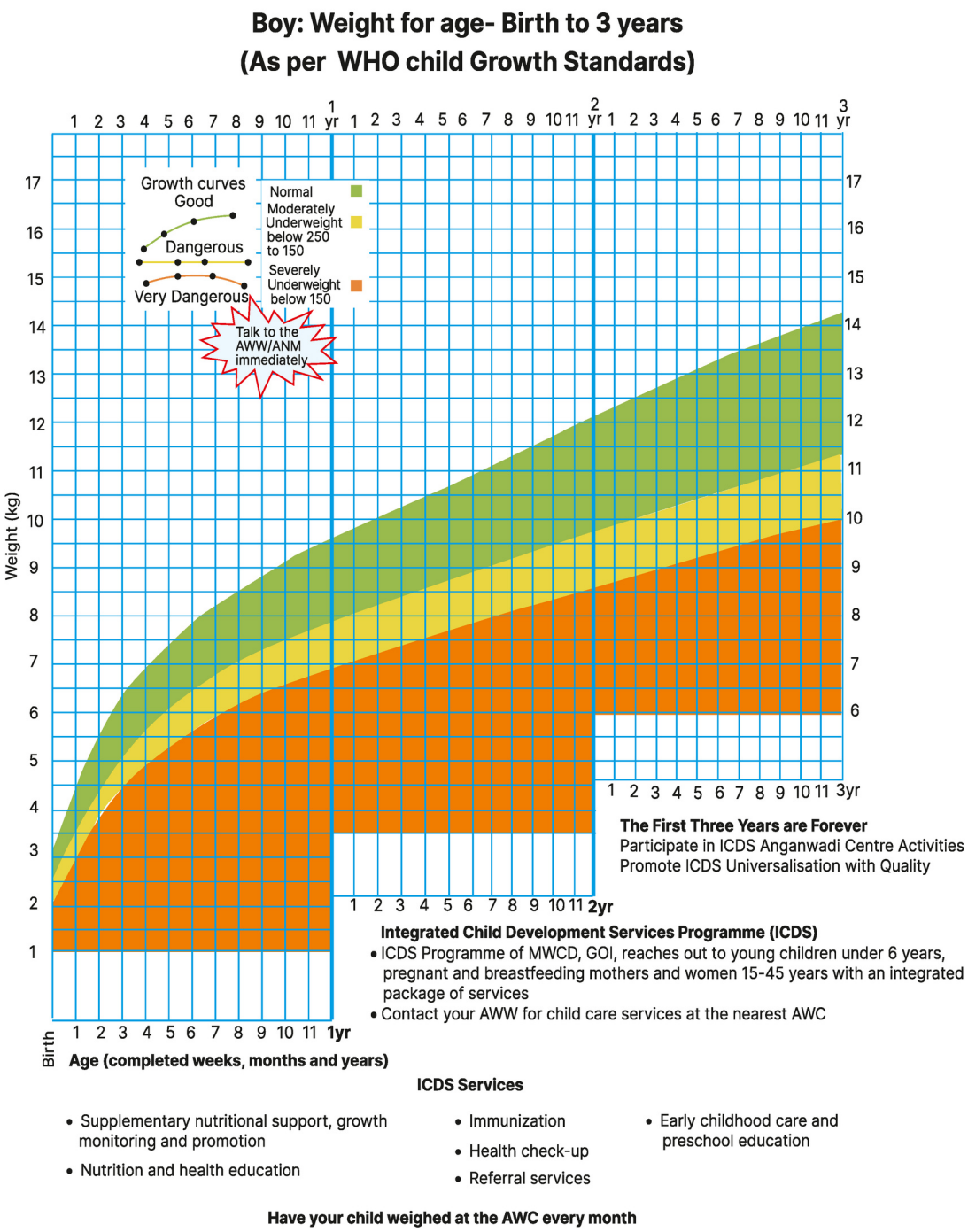
- Used in Anganwadi
- Adapted from the WHO chart- Based on multicentric growth reference study
- Concept given by **David Morley**
- Educational tool for mothers

Who Growth Chart

- URC → 50th percentile
- LRC → 3rd percentile
- Between curves → normal / road to health
- Below LRC → malnutrition

Yourwish

Yourwish



Zones

- Between ±2 SD → normal/ road to health (green)
- -2 to -3 SD → mild malnutrition (yellow)
- <-3 SD → severe malnutrition (red)
- **First sign of growth failure → flattening of the curve**
- **Direction of the dots in GC is more important than the position**

Q. A baby presents for a routine examination in the outpatient department. A growth chart is utilized to record the baby's weight, which falls within the 85th-95th percentile range. What is the present condition of the child?

A. Obesity

B. SAM

C. Overweight

Yourwish

D. Interpretation cannot be made without BMI

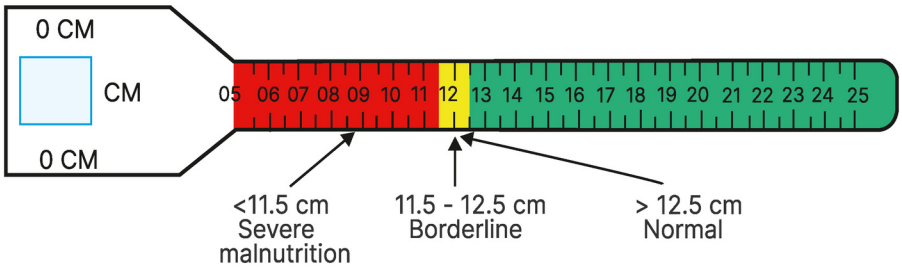
Ans: C

Mid-Upper Arm Circumference (Muac) — Shakir's Tape

- Triceps is the first muscle to lose/gain weight along with a child's growth
- Girth of mid upper arm (midway between acromion and olecranon
- Used by → Field health workers
- Age → **6 months to 5 years**
- Age-independent assessment

Values

- 12.5 cm → Normal
- 11.5-12.5 cm → Mild-moderate malnutrition
- <11.5 cm → Severe malnutrition



Q. In Marasmus, mid-upper arm circumference (MUAC) is less than: FMGE 2019

A. 11.5 cms
B. 12.5 cms
C. 13.5 cms
D. 15 cms

Ans: A

Q. Identify the spot?



Kwashiorkor Marasmus

Severe Acute Malnutrition (SAM) 00:47:15

- Criteria
  - Weight for height <-3 SD
  - MUAC <11.5 cm
  - B/L pitting edema

Kwashiorkor Vs Marasmus

Kwashiorkor	Marasmus
Deficiency of **protein**	Deficiency of **protein + calories**
Age: 6 months - 3 years	Usually < 1 year

Subcutaneous fat preserved	Subcutaneous fat absent
Oedema present	Oedema absent
Enlarged fatty liver is present	No fatty liver
Ribs are not very prominent	Ribs very prominent
Lethargic	Alert and irritable
Mild/absent muscle wasting	Severe muscle wasting
Poor appetite	Voracious appetite
Needs adequate protein	Needs adequate protein + calories

Sam management

Therapeutic feeding

Stabilization Phase (1–2 days)	• F-75 (Starter diet) • 75 kcal/100 ml • Protein: 0.9 g/100 ml
Transition Phase (2–3 days)	• F-100 (Catch-up diet) • 100 kcal/100 ml • Protein: 2.9 g/100 ml
Rehabilitation Phase	• F-100+ • Home diet • Phase duration: Variable

- **Micronutrient Supplementation In Sam Children**
- **Vitamin A supplementation**
  - <6 months → 50,000 IU
  - 6–12 months (<8 kg) → 1 lakh IU
  - 12 months (>8 kg) → 2 lakh IU
- **Other micronutrient supplementation**
  - Micronutrient Dosage/Schedule
  - Folic acid 5 mg on Day 1, then 1 mg/day
  - Zinc (Elemental) 2 mg/kg/day
  - Copper 0.3/kg/day
  - Iron 3 mg/kg/day
  - Iron 3 mg/kg/day (preferably between meals)
  - Other vitamins B12, C, D, E (as per need or protocol)

Q. Which of the following is a conditioning influence for malnutrition? NEET PG 2021

A. Child rearing

B. Food habits

C. Infectious diseases

D. Socio-economic factors

Ans: C

Breastfeeding

00:51:12

NEET PG 2024
FMGE 2024

- Exclusive → 6 months
- Continue → up to 2 years
- Start → within **1 hour of birth**
- Energy: 65kcal per 100ml
- Protein: 0.9 to 1.1 gms per 100 ml
- Ig, which is most abundantly secreted, is IgA > IgD (contains other Igs as well)

Component	Breast Milk	Cow Milk
Protein	1.1 gm %	3.3 gm %
Cysteine	Increased	Decreased
Taurine	Increased	Decreased
FAT	Decreased 3.4 gm %	Increased 4.1 gm %
DHA	—	—
Lactose	Increased (7.4 gm %)	Decreased (4.4 gm %)
Ca/P ratio	Increased	Decreased
Iron	Increased (70% bioavailability)	Decreased
Na	Decreased	Increased
Calcium	Decreased	Increased
Phosphorous	Decreased	Increased
Ig for local immunity	IgA	—
Vitamin deficient	Vitamin K, Vitamin D	Vitamin C
Energy	65-70 kcal/100 ml	67 kcal/100 ml
Infection	Very low	Very high

Q. Best alternative to mother's breastmilk for an LBW baby?

INICET 2022

A. Cow's milk
B. Preterm formula feed
C. Term formula feed
D. Breastmilk from a human donor

Ans: D

Q. A primigravida delivers a healthy baby by normal vaginal delivery. Breastfeeding should be initiated within how many hours?

FMGE 2023

A. Within 1 hour
B. After 1 hour

Yourwish

Yourwish

C. After 4-6 hours
D. After 24 hours

Ans: A

Q. Mark the correct statement about cow's milk (per 100 gm) when compared to breast milk: FMGE 2020
A. Lower sodium content
B. Higher lactose content
C. Lower protein
D. High protein

Ans: D

School Health Services

00:53:25
FMGE 2025

- Concept given by Joseph Bhore
- Modified given by Renuka Roy Committee - Recommended school health checups once/4 years
- Current checkup frequency → every **6 months**
- Responsibility → PHC medical officer
- Classroom capacity maximum of 40 students
- Area per student is >10 sq ft/student
- Desk minus type desk with leg space >30% below desk
- Doors and windows should allow good ventilation and natural light
- Windows : >2.5 ft above ground
- Total window area: >25% above ground

Sanitation

- 1 urinal/60 students
- 1 latrine/100 students
- Smoking is banned within 100 m

Lighting

- Light should come from the left side (most students are right-handed)
- Outer wall thickness: >10 inches
- Wall color: white
- Smoking regulation is prohibited within 100 meters of the school
- Canteen facilities are mandatory if the school has >250 students
- If not, then school approved vendros can provide food
- Visual acuity <6/9, referred to ophthalmologist

Q. Under the School Health Programme of Ayushman Bharat, several preventive and promotive health services are provided to school-going children and adolescents. Which of the following is not a component of this programme?
A. Provision of monthly iron folic acid supplementation to all students
B. Provide health screening of school children
C. Mass deworming of children attending school
D. Distribution of sanitary napkins to adolescent girls

Ans: A

Yourwish

Important Information

- Most common school-reported infection- Dental infections
- In visual acuity testing
  - Doctors look for Bitot spots
  - Teachers could screen up to 150 students and ask about night blindness

Q. School Health Program is under:

A. PHC

B. CHC

C. DH

D. Health and wellness centres

Ans: A

Q. Which of the following should not be included in the school health service? FMGE 2023

A. Doctor on premises

B. Dental and eye health services

C. School health records

D. Education of handicapped children

Ans: A

Q. School Health is the responsibility of PHC. Which of the following does not meet the minimum standards of School Health? FMGE 2020

A. Desks of 'Minus type'

B. Combined windows + doors area = 25% of floor space area

C. Maximum 40 students per classroom

D. One urinal for 10 students and one latrine for 25 students

Ans: D

Child Support Organizations

00:57:35

- Social organization for children without parents: Orphanage
- Children live and study here and can leave when they are >18 years old: Orphanage
- Distant relatives/friends/family members with whom children without parents live: Foster
- No legal obligation/inheritance between child and foster parent: Foster
- Child gets a new home with legal binding: Adoption
- Strict hostel for socially unadjusted children of >16 years; Residential schools with a high level of discipline providing education: Boostals
- Juvenile homes as part of punishment for crime: Remand home
- Mental doctor and psychiatrist to monitor the physical and mental health of children: Remand home

Child Rights Article

- Children <14 years of age cannot be employed- Article 24
- Children of tender age (14–19 yrs), if employed, should be provided with: Article 39

  - Appropriate work and work environment for age
  - Should not be employed in factories using hazardous chemicals
  - No night duties
  - One casual leave every 15 days
- Right to free primary or elementary education- Article 45

Child Handicap: Social Health Problem

- Mental Handicap: IQ <70
- Mental retardation is classified based on IQ levels: IQ severity of MR
  - 50-70 Mild
  - 35-50 Moderate
  - 20-35 Severe
  - <20 Profound

Q. A 75-year-old woman is brought to the hospital by her daughter due to frequent falls, episodes of confusion, persistent diarrhea, and a chronic cough. The resident decides to carry out a full geriatric evaluation. Which of the following features support the need for such an assessment? INICET 2023

A. Age, sex, falls
B. Age, sex, chronic diarrhea
C. Age, fall, confusion
D. Age, cough, sex, chronic diarrhea

Ans: C

Q. You are administering vitamin A supplements to an 8-month-old infant for two consecutive days. What is the recommended dose?

A. 25,000 IU
B. 50,000 IU
C. 100,000 IU
D. 200,000 IU

Ans: C

Yourwish

10. NUTRITION PART- 1

REFERENCE MEN & REFERENCE WOMAN

00:00:23

- Formulated by NIN (National Institute of Nutrition), headquartered in Hyderabad

New Guidelines		
Indian reference	**Man**	**Woman**
Age	19-39 yrs	19-39 yrs
Weight	65 kg	55 kg
Height	1.73 mts	1.62 mts
BMI	20.75 kg/m^2	20.95 kg/m^2
Activity level	• Sleep - 8 hours • Moderate work - 8 hours • Sitting/moving - 4-6 hours • Recreation - 2 hours	

Q. Which statement is correct regarding the reference woman representing the average healthy woman's nutritional needs and is used as a standard for setting the RDA?

INICET 2020

a. Weight: 60 kg
b. Height: 1.62m
c. Work: 10 hours/day
d. Age: 18-25 years

Ans: b. Height 1.62 mts

DIETARY REFERENCE INTAKES

- **RDA (Recommended Dietary Allowance)-** It is the daily requirement that satisfies the nutritional needs of nearly 97.5% (97-98%) of the population
- **EAR (Estimated Average Requirement)-** It is the daily requirement that satisfies the nutritional needs of nearly 50% of the population
- RDA = EAR + Extras
- Only with respect to calories, RDA = EAR

Q. The nutrient intake meeting the needs of 97-98% of healthy individuals is

a. Optimal nutrient intake
b. Standard dietary intake
c. RDA
d. Baseline nutrient requirement

Ans: c. RDA

Yourwish

Yourwish

ENERGY REQUIREMENTS

00:04:37

- The latest guidelines were formulated by NIN in 2024

New energy guidelines (cal/day or kCal/day)		
	Adult man	**Adult woman**
Sedentary (doctors, teachers, nurses)	2110≅2100	1660≅1700
Moderate (shopkeepers)	2710≅2700	2130≅2100
Heavy (labourers)	3470≅3400	2720≅2700
Additional Requirements		
Pregnancy		+350/day
Lactation • **0-6 months** • **7-12 months**		• +600/day • +520/day

Q. Rahul, 35 years, has brought his mother, who is 70 years old, 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 his weight is 65 kg; he 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

Ans. 2110kcal, 1500kcal

- Calorie requirement for,
  - Elderly male: 1700 kcal/day
  - Elderly female: 1500 kcal/day

Q. The additional calorie requirement for a sedentary pregnant woman in her second trimester is: NEETPG 2017

a. 650 kcal/day
b. 800 kcal/day
c. 350 kcal/day
d. 400 kcal/day

Ans: c. 350 kcal/day

Q. A 12-week primigravida comes to you for a checkup. What is the correct advice you will give to her regarding additional calorie requirements?

a. Additional calories of 400 are needed in the 3rd trimester
b. Additional calories of 100 in the second trimester
c. Additional calories of 350 in all trimesters
d. Additional calories of 400 in the second trimester

Ans. a. Additional calories of 400 needed in the 3rd trimester

Yourwish

PREGNANCY	Extra calories to be added
1st trimester	70-85 kcal/day
2nd trimester	230-280 kcal/day
3rd trimester	390-470 kcal/day
Average	310-375 kcal/day

Nutritional requirements during pregnancy & lactation	
Increased nutrients during pregnancy	Iron, Folic acid, proteins, zinc
Increased nutrients during lactation	Iodine, vitamin A, calcium, carbohydrates, and vitamin C

Q. Compared to a pregnant woman, a lactating female would require a higher level of nutrient supplementation for which of the following?

INICET 2022

a. Vitamin A
b. Iron
c. Folic acid
d. Calcium

Ans. d. Calcium

Daily Requirement Dose

	Weight (kg)	Protein (gm/day)	Carbohydrates (g/day)	Vit A (mcg/day	Vit D (IU/day)	Iron (mg/day)	Calcium (mg/day)	Iodine (mcg/day)	Folate (mcg/day)
Males	65	54	130	1000	600	19	1000	150	300
Females	55	45.7	130	840	600	29	1000	150	220
Pregnancy	55+1 0	+9.5(2 TM), +22(3TM)	175	900	600	27	1000	250	570
Lactation		+17(0-6 m) +13 (6-12m)	200	950	600	23	1200	280	330

ENERGY AND PROTEIN REQUIREMENTS

00:13:53

	0-6 months	6-12 months
Energy requirement	92 kcal/kg/day	80 kcal/kg/day
Protein requirement	1.16 gms/kg/day	1.69 gms/kg/day

Infants	530-660 kcal/day
Children	1000-1700 kcal/day
Adolescent	2200-3300 kcal/day

Nutrients	RDA
Proteins	0.83 g/kg/day
Fat intake (male)	25/30/40 g/day
Fat intake (female)	20/25/30 g/day
Carbohydrate	130 g/day
Dietary fibre	40 g/2000 cal

Q. Protein requirement of a 55 kg female:
a. 45 gm
b. 54 gm
c. 65 gm
d. 55 gm

Ans. a. 45 gm

Q. RDA of iodine for lactating women? NEETPG 2018
a. 280
b. 300
c. 120
d. 150

Ans: a. 280

NUTRIENTS

00:16:07

- Macronutrients (AKA proximate principles of diet): Proteins, fats, carbohydrates
- Micronutrients: Vitamins and minerals (major and trace elements)

	% of dietary intake	Energy value
Proteins	10-15%	4 kcal/gm
Fats	15-30%	9 kcal/gm
Carbohydrates	50-70%	4 kcal/gm

One-liners

- Micronutrient deficiency is often difficult to identify and occurs despite adequate intake, and is known as Hidden hunger
- Energy provided by alcohol and fibre: 7 kcal/gm and 2 kcal/gm, respectively
- A diet that contains all nutrients in adequate proportions to meet daily requirements: Balanced diet
- A temporary diet that adheres to dietary goals used for the prevention and management of diseases: a Prudent diet, particularly for cardiovascular diseases
- Primary and most frequently consumed foods in a person's or population's diet; provides a major portion of daily energy and nutrients: Staple diet

Yourwish

Minerals

00:19:53

- Major minerals: Calcium, phosphorus, sodium, potassium, magnesium
- Trace elements: Required in quantities less than a few milligrams/day, e.g., iron, iodine, fluorine, zinc, copper, cobalt, chromium, manganese, molybdenum, selenium, silicon, nickel, tin
- Trace contaminants with no known function: lead, mercury, barium, boron, aluminium

Proteins

00:20:46

Essential amino acids	Non-essential amino acids	Conditionally essential amino acids	Semi-essential

• These cannot be synthesized in the body in the required amount, so they must be obtained from the diet.
• Nine essential amino acids (mnemonic: PVT TIMHAL)
  ○ Leucine
  ○ Isoleucine
  ○ Lysine
  ○ Methionine
  ○ Phenylalanine
  ○ Threonine
  ○ Valine
  ○ Tryptophan
  ○ Histidine
	• Synthesized in our body.
	• Six essential amino acids:
	  ○ Arginine
	  ○ Aspartic acid
	  ○ Serine
	  ○ Glutamic acid
	  ○ Proline
	  ○ Glycine
		• Non-essential amino acids may turn essential if their precursors are limited in the body.
		• Tyrosine (derived from phenylalanine) and cysteine (derived from methionine) are CEAA.
		• Other CEAA include:
		  ○ Arginine
		  ○ Glutamine
		  ○ Taurine
		  ○ Glycine
			• Amino acids whose requirements increase during particular conditions, such as in infants, injury, illness, and pregnancy
			• These include,
			  ○ Arginine
			  ○ Histidine

Supplementary Action Of Proteins

Food item	Limiting amino acid
Cereals- CLT	Threonine (& lysine)
Pulse- PCM	Methionine (& cysteine)
Maize	Tryptophan (& lysine)

Sources

- Animal sources: milk, meat, eggs, cheese, fish
- Biologically complete proteins contain all essential amino acids in adequate amounts
- Egg proteins are reference proteins as they contain all essential amino acids
- Vegetable sources: pulses, cereals, nuts (biologically incomplete)
- Poor in EAA
- India: Cereals and pulses are the main sources of dietary protein, are cheap, easily available, and consumed in bulk

Yourwish

Yourwish

Protein Quality

- DIAAS (Digestible indispensable amino acids scores)
- PDCAAS (Protein digestibility-corrected amino acid score)
- AAS (Amino Acid score)
- NPU (net protein utilization): The amount of protein retained in the body after digestion and absorption.
- The best quality/currently used indicator for dietary protein supplementation is DIAAS.

$\frac{\text{Digestible dietary indispensable amino acid in 1g of dietary protein}}{\text{Same amino acid in 1g of reference protein}}$	DASS
$\frac{\text{mg of amino acid per g of test protein}}{\text{mg of same amino acid per g of reference protein}} \times 100$	Amino Acid score
$\frac{\text{It is the amount of amino acid absorbed from food}}{\text{Amount of protein ingested}}$ xternal protein quality indicator of a food product	Digestibility coefficient
$\frac{\text{It is the nitrogen retained for body mass}}{\text{Amino acid absorbed from food}}$ Internal protein quality indicator of a food product	Biological value

- 1 gm of nitrogen is equivalent to 6.2 gm protein

$\frac{\text{Nitrogen retained by body}}{\text{Nitrogen intake}} \times 100$ **OR** $\frac{\text{Digestible coefficient} \times \text{Biological value}}{100}$	NPU (Net protein utilization): 50-80
NPU values of common foods (ascending order)	• Soya - 61 • Rice - 65 • Milk - 75 • Meat - 80 • Egg - 100 (reference protein)
Ratio of weight gain to amount of protein consumed. Considered a laboratory indicator	Protein efficiency ratio

- PER (Protein Energy Ratio) % indicates the proportion of total energy in the diet that is derived from proteins
  - $\text{PER \%} = \frac{\text{Energy from protein}}{\text{Total energy in diet}} \text{X } 100$
- PE% <4% indicates inadequate protein intake
- PER >2.5 indicates a higher proportion of protein relative to energy (better protein utilization and enhanced growth). Seen in animal proteins
- PER = 0.5-2.5 supports life but is less efficient for growth. Seen in vegetable proteins
- Max PER comes from FISH

Yourwish

Egg

00:31:18

- Called the reference protein, as they contain all essential amino acids, and NPU is maximum
- Egg: Energy is in the rules of 6. The average weight of an egg is 60 gm
- Fats: 6 gm
- Proteins: 6 gm
- Energy: 60-70 kcal
- Calcium: 30 mg
- Iron: 1.5 mg
- Cholesterol: 250 mg
- Eggs are deficient in vitamin C and carbohydrates

Q. Which of the following has the maximum biological value?

a. Pulses
b. Soybean
c. Milk
d. Egg

Ans: d. Egg

Q. What's the best index for the calculation of the nutrient value of protein? NEETPG 2018

a. Serum albumin concentration
b. Arm-muscle circumference
c. Creatinine-height index
d. Serum transferrin level

Ans. a. Serum albumin concentration

- As this reflects long-term protein intake and synthesis rate.

Fats

00:33:02

- Rich source of energy-9 kcal/gm
- Include simple lipids (triglycerides), compound lipids (phospholipids), and derived lipids (cholesterol).
- The fats may further be classified as,
  - Saturated fats: Lauric, palmitic, and stearic (e.g., coconut oil and butter) should only be 7-10%.
  - Unsaturated fats: Always from vegetable oils
    → MUFA: Oleic acid (olive oil)
    → PUFA: Linoleic and linolenic (safflower and sunflower oil)

Sources Of Fats

- Most essential fatty acid: Linoleic acid (safflower oil)

Linoleic acid, arachidonic acid	Safflower oil, sunflower oil
Linolenic acid	Flaxseed oil, soybean oil, sunflower oil
Eicosapentaenoic acid	Fish oil
DHA (docosahexaenoic acid)	Breast milk

Omega 3	Omega 6
• Alpha-linolenic acid (flax seeds) -EPA (fish) -DHA (fish) • Anti-inflammatory • Growth and development • Cardioprotective	• Linoleic acid - AA (safflower oil, sunflower oil, soybean oil) • Proinflammatory • Regulation of cholesterol metabolism • Creates structure in cell membranes • Reduces the risk of heart disease or stroke

Phrenoderma

- Deficiency of essential fatty acids
- Presents with a toad-like skin
- More common in 5-15 years
- Also, seen in vitamin A, B, C, and E deficiencies, supplementing with these is mandatory



Q. A mother comes with her child who has papules on the extensor surface of the skin, which resolve with the administration of vitamins A and C and essential amino acids. What is the diagnosis? NEETPG 2024

a. Phrenoderma
b. Marasmus
c. Kwashiorkor
d. Rickets

Ans: a. Phrenoderma

Carbohydrates

00:37:41

- Major source of energy
- Glycemic index: GI of a food is defined as the area under the two-hour blood glucose response curve (AUC) following ingestion of a fixed proportion of test carbohydrate (usually 50 gm) as a proportion (% of a standard, either glucose or white bread)

Classification	GI index range	Examples
Low GI	55 or less	Most fruits and vegetables (except potatoes, watermelon, and sweet corn), whole grains, pasta foods, beans, and lentils.
Medium GI	56-69	Sucrose, basmati rice, and brown rice.
High GI	70 and above	Corn flakes, baked potato, some white rice varieties (e.g., jasmine), white bread, candy bars, and syrupy foods.

Q. A diabetic patient comes to you for advice regarding his diet. You advise him to include foods with a low glycemic index in the diet. Which of the following would you advise for the same? FMGE 2021

a. Corn flakes
b. Brown rice
c. Sucrose
d. Papaya

Ans: d. Papaya

Yourwish

Minerals

00:39:38

Calcium

- Grains richest in Ca concentration: Ragi
- Vitamin required for Ca metabolism: Vitamin D

Zinc

- It is a trace element.
- Deficiency:
  - Infertility
  - Hair loss
  - Delayed wound healing
  - Diarrhea
  - Acrodermatitis enteropathica
    → Inherited defect in the uptake of zinc by cells
- Requirement: 5-10 mg/day





Selenium

- Potent antioxidant
- Deficiency: Keshan's cardiomyopathy

Q. Which of the following mineral deficiencies is associated with sexual dysfunction? INICET 2024

a. Zinc
b. Copper
c. Magnesium
d. Molybdenum

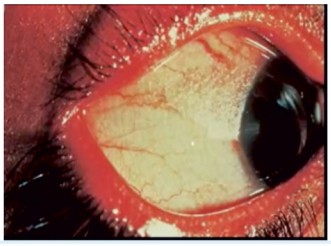
Ans. a. Zinc

Vitamin A Deficiency

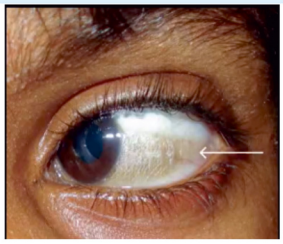
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- Refers to all ocular maintenance of vitamin A deficiency. FMGE Jan 2024
- A deficiency of vitamin A is called xerophthalmia.
- Most common age group: 1-3 years
- Sources:
  - Animal richest: Halibut fish (also the richest source of vitamin D)
  - 2nd richest: Cod liver oil
  - Plant source: Red palm oil
  - Cheapest: Green leafy vegetables

Who Classification Of Xerophthalmia FMGE Jan 2023

X1A	Conjunctival xerosis	

Yourwish

X1B	Bitot's spot	
X2	Corneal xerosis	
X3A	Corneal ulcers <1/3rd of cornea	
X3B	Corneal ulcers or keratomalacia > 1/3rd of the cornea	

- X1A, X1B, and X2 are reversible
- X3A and X3B are irreversible
- XN is the most common symptom, night blindness
- XF, fundal changes seen due to the degeneration of the retinal epithelium
- XS: Scars could be seen

Key Points:

- Most common presenting symptom: Night blindness
- Most common presenting manifestations: Night blindness
- First symptom of vitamin A deficiency: Night blindness
- Most common clinical indicator for vitamin A deficiency: Bitot spot (most specific or pathognomic)
- Most common clinical sign for screening: Bitot's spot
- Most sensitive screening test: Serum retinol level
- First clinical sign of vitamin A deficiency: Conjunctival xerosis
- Most specific presentation: Bitot's spot
- Reversible till which stage: X2

Prevalence Criteria For Determining Xerophthalmia As A Public Health Problem

Criteria	6 months - 6 years
Night blindness	>1%
Bitot's spot	>0.5%
Corneal xerosis/corneal ulcerations/keratomalacia	>0.01%
Corneal ulcer/corneal scar	>0.05%
Serum retinol < 10 mcg/dl	>5%

TREATMENT OF VITAMIN A DEFICIENCY

	Up to 6 months	6 months to 1 year	>1 year
Day 0	50000 IU	1 lakh IU	2 lakh IU
Day 1	50000 IU	1 lakh IU	2 lakh IU
Day 14	50000 IU	1 lakh IU	2 lakh IU

Yourwish

- If the weight is less than 8 kg, the dose is always 1 lakh IU
- IM doses will always be half of oral doses
- Oral doses are given in a white spoon that has an inner marking of 1 ml and an outer marking of 2 ml

Q. An 8-month-old baby on examination shows signs of vitamin A deficiency. What is the dose of vitamin A to be administered to the baby?

a. 25000 IU IM
b. 25000 IU orally
c. 100000 IU orally
d. 100000 IU IM

Ans: c. 100000 IU orally

Q. What is the dosage of vitamin A prophylaxis needed in children aged 1-5 years coming from areas endemic to vitamin A deficiency?

a. 1 lakh IU every 6 weeks
b. 1 lakh IU every 6 months
c. 2 lakh IU every 6 weeks
d. 2 lakh IU every 6 months

Ans: d. 2 lakh IU every 6 months

- At 9 months, we give 1 lakh IU vitamin A; thereafter, every 6 months till 5 years, we give 2 lakh IU or 2 ml.

Q. Vitamin A dose for a 2-year-old baby with keratomalacia?

a. 200000 IU immediately followed by 100000 IU after 24 hours.
b. 200000 IU immediately followed by 100000 IU after 12 hours.
c. 100000 IU immediately followed by additional doses at 24 hours and one week
d. 200000 IU immediately followed by the same dose 24 hours later, and after 2 weeks

Ans: d. 200000 IU immediately followed by the same dose 24 hours later, and after 2 weeks

Q. Xerophthalmia is considered a public health problem if the prevalence of Bitot's spot is more than? FMGE 2024

a. 0.01%
b. 0.05%
c. 0.5%
d. 1%

Ans: c. 0.5%

Q. A mother of a breastfeeding child only eats vegetables. Which deficiency is common in this case?

a. Vitamin B12
b. Vitamin A
c. Vitamin D
d. Vitamin K

Ans: a. Vitamin B12

VITAMIN B1 DEFICIENCY

00:51:09

- Deficiency causes Beri Beri
  - Wet beriberi - Cardiovascular symptoms
  - Dry beriberi - CNS symptoms
  - Infantile beriberi - Seen in babies breastfed by mothers with a deficiency
  - Seen among polished rice eaters (milling), particularly in AP
  - Among chronic alcoholics, it presents as ataxia, ophthalmoplegia, and mental retardation
  - Among chronically fasting people
- Prevention
  - By eating parboiled rice.
  - Rice is a good source of thiamine

Q. Which of the following substances should be eaten to prevent thiamine deficiency? NEETPG 2024

a. Rice and wheat
b. Curd
c. Salad
d. Sabzi (aloo)

Ans: a. Rice and wheat

- The richest source of thiamine is ginger seeds

Vitamin B2 Deficiency

Ariboflavinosis Triad

- Magenta-colored tongues, geographical tongue, or glossitis
- Angular stomatitis (most specific finding)
- Cheilosis



Important Information

- Beefy tongue is seen in vitamin B12 deficiency.
- Strawberry tongue is seen in Kawasaki disease/scarlet fever.

Vitamin B3 Deficiency



- Niacin deficiency leading to Pellagra
- Classic presentation in 4Ds or 6Ds
  - Diarrhea
  - Dementia
  - Dermatitis
  - Delirium
  - Depression
  - Death
- Seen in chronic maize eaters (jowar or sorghum eaters)
- Normally, Tryptophan (60 mg) gets converted to Niacin (1 mg), but in maize eaters, excess Leucine prevents this conversion
- A characteristic appearance known as a "Casal's necklace"

Yourwish

Vitamin B9 (folic Acid)

- Deficiency causes megaloblastic anemia (another cause is excess alcohol)

Summary

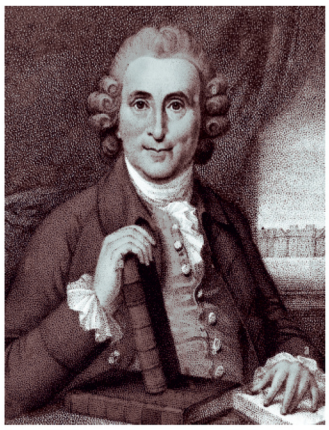
B1 (thiamine)	• Beriberi • Wernicke's encephalopathy
B2 (riboflavin)	• Angular stomatitis
B3 (niacin)	• Pellagra • Glossitis: loss of papillae • Casals necklace • Cereals responsible: maize and jowar
B5 (pantothenic acid)	• Burning feet syndrome
B6 (pyridoxine)	• Peripheral neuritis • Seizures in infants • Deficiency in isoniazid-consuming patients
B7	• Hair thinning, scaly red rashes around body openings (eyes, nose, mouth), and brittle nails. It is primarily caused by prolonged consumption of raw egg whites (avidin), smoking, pregnancy, or long-term anticonvulsant/antibiotic use
B9 (folic acid)	• Megaloblastic anemia • Glossitis • Severe deficiency: infertility/sterility
B12 (cyanocobalamin)	• Pernicious anemia • Peripheral neuropathy (SACD) • Megaloblastic anemia is most common in vegetarians
Vitamin E	• Progressive external ophthalmoplegia
Vitamin K	• Hemorrhagic disease of the newborn • Vitamin K1 given at birth

Vitamin C (ascorbic Acid)

00:59:06

- Deficiency: Scurvy
- Leads to a collagen defect, causing
  - Swollen and bleeding gums
  - Subcutaneous bruising
  - Bleeding into skins and joints
  - Delayed wound healing
  - Anemia
  - Weakness
- Requirement: 40 mg/day
- Richest source: Amla/indian gooseberries





Yourwish

Yourwish

Vitamin D

00:59:52

- Most active form: Calcitriol
- Deficiency: Rickets (children), Osteomalacia (adults)
- Richest source: Halibut fish

Iron

01:00:16

Diagnosis Of Anemia

- Adult males: Hb <13 mg/dl
- Adult females, non-pregnant: Hb <12 mg/dl
- Adult females, pregnant: Hb <11 mg/dl
- Children, 6 months to 6 years: Hb <11 mg/dl
- Children, 6-14 years: Hb <12 mg/dl
- EARLY ANEMIA: Hb <10-11 mg/dl
- Marked anemia: Hb <10 mg/dl

Iron Absorption

- Ferric iron (ingested) is converted to ferrous iron (absorbed)
  - Promoters of absorption: vitamin C and vitamin C-rich foods
  - Inhibitors of absorption: Tea, green leafy vegetables (oxalates, phytates), egg yolks (phosphates), milk

Evaluation

- Hemoglobin concentration: Epidemiological indicator, 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/dL indicate iron deficiency
- Most sensitive indicator of iron deficiency: Serum ferritin levels (MC used as well)
- Most sensitive tool for evaluating iron status, definitive and best clinical indicator: Serum ferritin levels
- 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: Complete absence of stored iron

One-liners:

- Richest source of iron: Dried pumpkin seeds, pistachio seeds
- Poor man's iron source: Jaggery
- Trace element that cannot be completely supplemented by diet during pregnancy, regardless of Hb and socioeconomic status: Iron
- In iron deficiency anemia, after Hb has returned to normal, iron stores should be replenished for up to 3 months
- For mass prophylaxis, considering operational aspects, tablet ferrous sulphate is more suitable
- HYP: In which conditions should prophylaxis with iron tablets not be given
- Prophylaxis with iron should be withheld in case of
  - Acute illness (fever, pneumonia, diarrhea)
  - Known case of thalassemia major
  - History of repeated blood transfusion

Yourwish

FMGE 2024

Q. Iron absorption is decreased in which of the following?

a. Amla
b. Sprouting
c. Tea
d. Lemon

Ans: c. Tea

NEETPG 2019

Q. Which of the following food items contains the lowest amount of iron?

a. Liver
b. Spinach
c. Beans
d. Milk

Ans: d. Milk

11. NUTRITION PART- 2

NATIONAL PROGRAM FOR PREVENTION AND CONTROL OF FLUOROSIS

00:00:20

FMGE Dec 2021

- Fluorine is a trace element
- The normal fluorine level in drinking water is 0.5-0.8 mg/L
- Double-edged sword
  - Excess causes:





→ Dental fluorosis: A fluorine level of >1.5 mg/L causes mottling of the upper incisors of the tooth

→ Skeletal fluorosis: Fluorine level >3-6 mg/L

→ Crippling fluorosis presents as genu valgum, or knock-knee syndrome, with a fluorine level of >10 mg/L. MC in Jowar eaters is causing retention of fluorine

  - Deficiency causes:



→ Dental caries: Fluorine <0.5 mg/L. MC school health reported infection

- Nalgonda technique: Removes excess fluorine from water, developed by NEERI (National Environmental Engineering Research Institute) in Nagpur
  - Lime
  - Alum
  - Bleaching powder
  - Floculation
  - Sedimentation
  - Filtration

Q. The frontal anterior incisors of a child who had white patches on them turned brown following over-supplementation of which of the following?

FMGE 2022

a. Vitamin A
b. Fluorine
c. Chlorine
d. Riboflavin

Ans: b. Fluorine

- Fluorosis is endemic in AP, Karnataka, Kerala, Tamil Nadu, Punjab, and Haryana

Yourwish

Q. A 60-year-old man residing in a village in AP presents to the health facility with genu valgum and requires a stick for walking. He also mentions that many other elderly individuals in his village have similar complaints. What should be the most appropriate next step in the investigation? NEETPG 2025

a. Measure serum calcium levels.
b. Do a parathyroid hormone assay
c. Check serum vitamin levels
d. Collect and analyse water samples for fluoride content

Ans. d. Collect and analyse a water sample for fluoride content

NATIONAL IODINE DEFICIENCY DISEASE CONTROL PROGRAM

00:06:36



Preventive Measures

- Iodized salt
  - Production level >30 ppm
  - Consumption level >15 ppm
- Life-saving Dots: Jeevan bindi, which is an iodine skin patch that continuously releases 100-150 mcg/day of iodine over 4-8 hours
- Preparation of iodine: Food fortification
  - Two in one salt or Twin salt (double-fortified salt): Iodine 40 mcg and iron 1 mg per gm of salt
  - Iodized oil injection: 1 ml provides an adequate supply for 3-4 years
  - Oral iodized oil: supplies for at least 2 years

Important Information

- Food fortification: Dalda, a fortified ghee with vitamins A and D.

Major Health Problem

- Prevalence of goitre >10%
- Criteria for surveillance
  - Prevalence of iodine deficiency in school-going children >10%: Endemic iodine deficiency disorder.
- Environmental indicator of iodine deficiency: Neonatal hypothyroidism rate
- Impact of the program: Check for urinary iodine excretion rate
- Serum T4 levels are a more sensitive indicator of iodine deficiency

Criteria For Elimination

- Median urinary iodine excretion below 100 mcg/L and <50% of the population
  - Insufficient iodine intake
  - Epidemiological assessment of iodine deficiency
  - An effective indicator of a national program

Yourwish

Yourwish

- Urinary iodine excretion below 50 mcg/L and <20% of the population
- Total goitre rate <5% of the population (Grade 1 + Grade 2)
- Proportion of houses consuming iodised salt >90% of the population
  - Quality check of iodine content done by MBI kits provided by UNICEF

FOOD ADULTERATION

00:12:57

FMGE Jan 2025

- Governed by the PFA Act 2005

Types

- Neurolathyrism
- Epidemic dropsy
- Endemic ascites
- Aflatoxicosis
- Ergotism

















	Adulterant	Food item	Clinical features	Management
Neurolathyrism (15-45 years)	Toxin: Beta-oxalyl aminoalanine in khesari dal	Khesari dal (Lathyrus sativus) mixed with arhar dal (channa dal). Staple food for the poor populations.	Chronic involvement of the knee joint Latent phase- no stick, 1 stick, 2 sticks, crawling (spastic paralysis) Osteolathyrism is not reported in humans.	Vitamin C, parboiling (partial boiling, soaking, steaming, and drying), and banning crops
Epidemic dropsy	Sanguinarine in argemone oil	Mustard oil mixed with argemone oil	Sudden non-inflammatory pitting edema, diarrhea, dyspnea, glaucoma, and cardiac failure. Mortality is 30% in the untreated	Nitric acid test, paper chromatography test (most sensitive to check for argemone oil contamination)

Yourwish

Endemic ascites	Pyrrolizidine in crotolaria/Jhunjhunia seeds	Millets	Liver involvement	Deweeding of jhunjunia, filtration, sieving
Aflatoxicosis	Storage fungus: Aspergillus flavus - aflatoxins	Groundnut, cereal, maize	HCC	Keep moisture content below 10%, use proper storage, and improve ventilation
Ergotism	Field fungus claviceps fusiformis - ergot alkaloids	Sorghum, rye, bajra	GI complaints, diarrhea	Float in 20% salt solution

Q. Which of the following is not caused by food adulteration? NEETPG 2025

a. Fluorosis
b. Epidemic dropsy
c. Neurolathyrism
d. Endemic ascites

Ans. a. Fluorosis

Q. A man from Chhattisgarh has progressive leg spasms and muscle weakness with pure motor paresis on examination. What history is most relevant? NEETPG 2021

a. History of similar illness in the past
b. History of fever
c. History of diet
d. History of vaccination

Ans: c. History of diet

Q. In a village, it is observed that several farmers have crossed gait and use a stick for support to stand up and walk. Due to poor farm yields, they consume only rice and pulses. Supplementing their diet with which of the following vitamins could have prevented this? NEETPG 2023

a. Vitamin A
b. Vitamin D
c. Vitamin C
d. Vitamin B

Ans. c. Vitamin C

Q. What is the likely reason for the food poisoning experienced by the worker in a groundnut factory who consumed spoiled groundnuts that were stored in the facility? FMGE 2021

a. Beta-oxalyl aminoalanine
b. Smoke from the factory
c. Sanguinarine
d. Aflatoxins

Ans. d. Aflatoxins

Q. A 40-year-old female presented with no comorbid complaints of swelling in both her legs, which was acute in onset. She also gives a history of loose stools. Her family members also have similar symptoms. On examination, there were no signs of inflammation in either of the legs. A detailed history revealed that mustard oil is a staple of their diet. Which of the following substances is responsible for her condition?

FMGE 2021

a. Clavine alkaloids
b. Sanguinarine
c. BOAA
d. Pyrrolizidine alkaloids

Ans: b. Sanguinarine

Q. In a population whose staple diet is Lathyrus sativus. To prevent an epidemic of lathyrism, all must be done at the public health level except
a. Toxin removal
b. Crop ban
c. DEC
d. Vitamin C

Ans. c. DEC, used in the treatment of filariasis

Q. If bajra is mixed with black seeds, what is used to separate them?
a. 20% salt water
b. Normal saline
c. 10% salt water
d. Water

Ans. a. 20% salt water

Q. A farmer with a history of successive crop failures develops spastic paraparesis, signs of upper motor neuron paralysis, and gait instability. Which toxin is responsible?
a. Aflatoxin
b. Beta-oxalyl aminoalanine
c. Sanguinarine
d. Fusarium toxin

Ans. b. Beta-oxalyl-aminoalanine

NEET PG 2025
00:22:08

ICDS (INTEGRATED CHILD DEVELOPMENT SCIENCES)

- Under the Ministry of Women and Child Development
- All the nutrient initiatives are a part of RMNCAH + N



Beneficiaries

- Anganwadi center: 0–6 years old, pregnant and lactating women, adolescent girls, reproductive age females.
- 6 services:
  - Supplementary nutrition

Yourwish

- Immunization for pregnancy and children
- Non-formal preschool education
- Health checkups
- Referral services
- Nutrition and health education
- Adolescent health, vocational training, food, and health programs

Organisation

- One AWC:
  - Plain areas: 400-800 population
  - Hilly araes: 300-800 population
- Mini-AWC: 150-300 population
- Anganwadi on demand: settlement has 40 children under 6 years of age, but no AWC

NUTRITIONAL NORMS

00:24:57

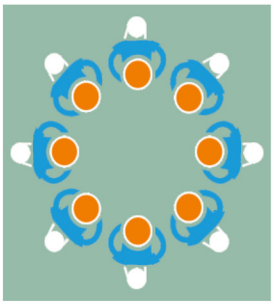
NEET PG 2022

- Supplementary nutrition is provided at AWC.

Category	Pre-revised		Revised (per beneficiary per day)	
	Calories (Kcal)	Protein (g)	Calories (Kcal)	Protein (g)
Children (6-72 months)	300	8-10	500	12-15
Severely malnourished children (6-72)	600	20	800	20-25
Pregnant women and nursing mothers	500	15-20	600	18-20

PRADHAN MANTRI POSHAN SHAKTI NIRMAN

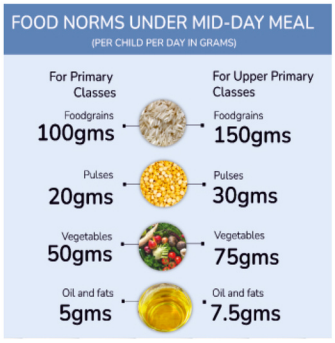
00:25:58



- Aka PM poshan
- Under the ministry of education
- Earlier called the mid-day meal program
- Purpose: One hot cooked meal to be provided to class 1-8 children in government and government-aided schools
- The name changed as the new inclusion,
  - Preschool children (balvatikas)
- Newer initiatives:
  - Tithi bhojan: Community participation where people provide food to children during festivals and special occasions
  - Nutrition garden in schools
- Every meal should provide $\frac{1}{3}^{rd}$ calories and $\frac{1}{2}$ protein

Key Points:

- Primary: 450 kcal, 12 gm
- Upper primary: 700 kcal, 20 gm
- "Every child in every place and government-assisted primary schools 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."
- Indraught-affected areas' midday provided even during holidays



Yourwish

- Food norms under Poshan PM
  - Pulses: 25-30 gm
  - Vegetables: 65-75 gm
  - Fat: 7.5 gm

Q. The meal provided in the midday meals program be supplied every day?
a. One-third of the energy requirement and half of the protein requirement
b. Half of the energy requirement and one-third of the protein requirement
c. Half of the energy requirement and half of the protein requirement
d. One third of the energy requirement and one third of the protein requirement

Ans. a. One-third of the energy requirement and half of the protein requirement

POSHAN ABHIYAN 2.0

00:30:12

- Integrated nutrition support program
- Under the Ministry of Women and Child Development
- The primary objective is to reduce underweight, stunting, and anemia among 0-6-year-old adolescent girls and pregnant and lactating women





- Initiatives:
  - Sakshan anganwadi: Modernisation of anganwadi, providing better facilities and infrastructure
  - Nutrition tracker: A technology-based tool for real-time monitoring of the nutrition status of children
- Started in 2018-2022, but has been extended now

Indicator	Target	Each year
Prevent and reduce stunting in children 0-6 years old	By 6%	By 2% every year
Prevent and reduce undernutrition and underweight prevalence in children 0-6 years	By 6%	By 2% every year
Reduce the prevalence of anemia among children 6-59 months	By 9%	By 2% every year
Reduce the prevalence of anemia among girls and women aged 15-49 years	By 9%	By 2% every year
Reduce low birth weight	By 6%	By 2% every year

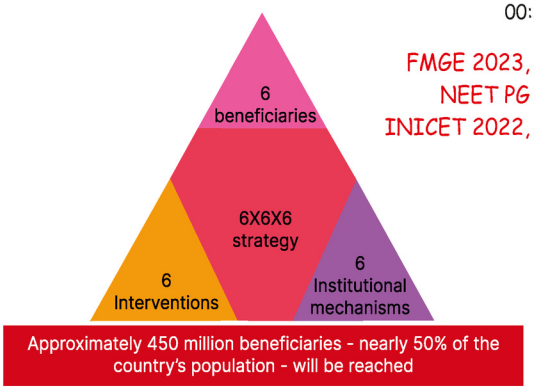
ANEMIA MUKT BHARAT

00:33:11

FMGE 2023, 2024
NEET PG 2025
INICET 2022, 2024

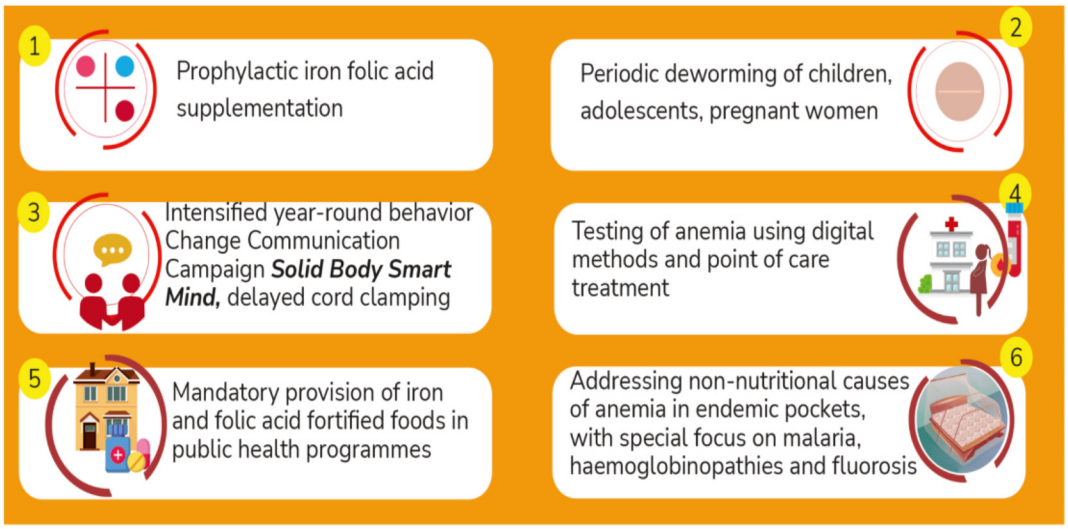
- I-NIPI: Intensified National Iron Plus Initiative
- Reduce iron deficiency anemia and megaloblastic anemia
- Follows 6*6*6 strategy





Yourwish

Six Interventions



Prophylactic Iron And Folic Acid Supplementation:

BENEFICIARIES	Fe (ferrous sulfate)	Folic acid	Color	Schedule
6-59-month-old	20 mg	100 mcg	Syrup	Biweekly
5-9 years	45 mg	400 mcg	Pink tablets	Weekly
10-19-year-old adolescents (both boys and girls) Under the WIFS initiative	60 mg	500 mcg	Blue tablets	Weekly
Reproductive-age females (from 20 years of age)	60 mg	500 mcg	Red color	Weekly
Pregnant and lactating woman	60 mg	500 mcg	Red color	Daily (from 2nd trimester to 6 months post-delivery)

Management Plan

Mild To Moderate Anemia Under Anemia Mukt Bharat

	Gestational age <34 weeks	Gestational age >34 weeks
Tolerant to IFA	2 tablets IFA	IV iron sucrose or IV ferric carboxymaltose
Not tolerant to IFA	IV sucrose or IV ferric carboxy maltose	

Severe Anemia Under Anemia Mukt Bharat

	Hb 5-6.9 gm/dl	Hb <5gm/dl
1st or 2nd trimester	IV iron sucrose or IV ferric carboxymaltose	Hospitalisation + IV infusion and/or blood transfusion
3rd trimester	Hospitalisation + IV infusion and/or blood transfusion	

Q. How many mg of iron and mcg of folic acid should a pregnant woman be given? FMGE 2024

a. 60 mg/500 mcg biweekly
b. 60 mg/500 mcg weekly
c. 60 mg/500 mcg daily
d. 60 mg/500 mcg once a month

Ans. c. 60 mg/500 mcg daily

Q. Not a part of Anemia Mukt Bharat?

a. 6 beneficiaries
b. 6 interventions
c. 6 mechanisms
d. 6 functionaries

Ans. d. 6 functionaries

Q. As part of the Anemia Mukt Bharat program, pregnant women with mild to moderate anemia who are less than 34 weeks pregnant are managed with the following treatment approach: INICET 2022

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 carboxymaltose (FCM)

Ans. c. IV iron sucrose for non-compliance with oral tablets

FOOD LOGOS

00:41:21

FSSAI • Headquarters in New Delhi • Set the national food standard. • Adopted from CODEX alimentarius	
CODEX • International food standards developed by the WHO • Headquarters in Geneva and Rome	
BIS • Bureau of indian standards • The National Standards Body of India, which ensures quality, safety, and standards of food products in India. • Under the Ministry of Consumer Affairs	
ISI • Indian Standards Institute • BSI ensures a mandatory certification mark for key products.	

Yourwish

AGMARK

- Particularly present for agricultural products

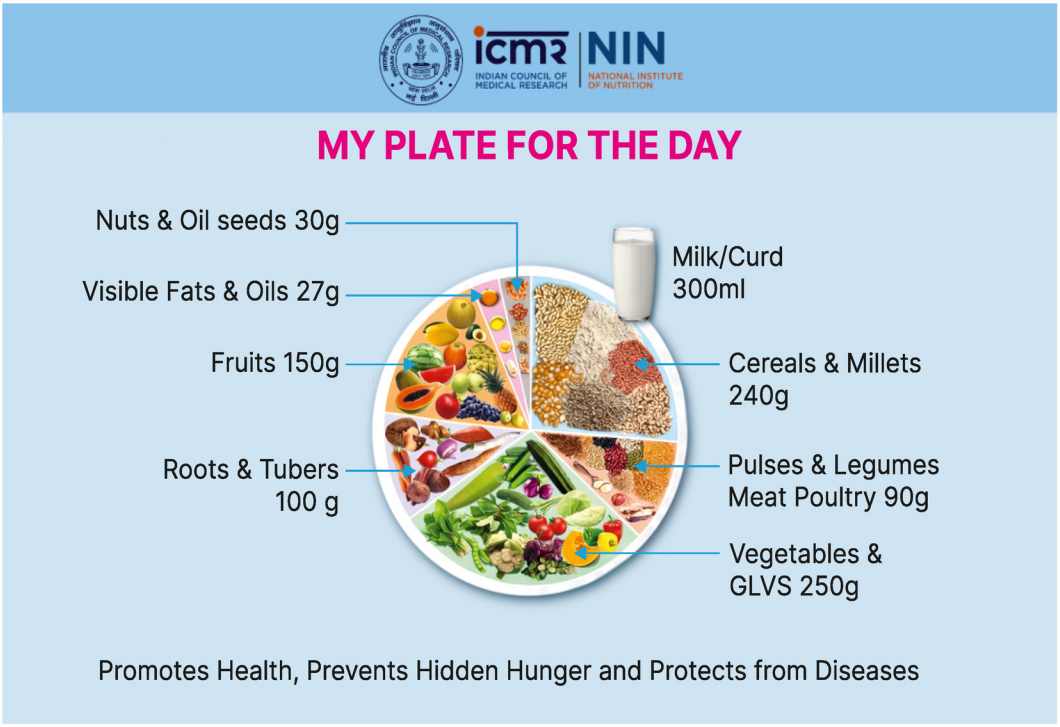
Q. The Food Standards and Safety Authority of India comes under?

a. Ministry of Agriculture
b. Ministry of health and family welfare
c. Ministry of Consumer Affairs
d. Ministry of Rural Development

Ans. b. Ministry of health and family welfare

My Plate For The Day

- "My plate for the day" is a dietary guidance for a 2000 kcal diet, emphasizing 45-50% calories from cereals/millets, 15% from pulses/flesh foods, 5% from nuts/seeds, 5% from oil, and 30% from vegetables/fruits, along with 300 ml curd/milk daily to prevent malnutrition.
- Released by NIN to prevent hidden hunger.



PASTEURIZATION OF MILK

00:44:38

- Pasteurization is done to destroy the pathogens that may be present in milk while causing minimal change in the composition. Flavor and nutritive value. INI CET Nov 2021
- Pasteurization kills nearly 90% of the bacteria in milk, including the more heat-resistant tuberculi bacteria, Q fever, brucellosis, coliform groups, and typhoid bacilli
- It does not kill the thermoduric bacteria

Yourwish

Methods Of Pasteurization

- 3 widely used methods.
- **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 at 72°C for 15 seconds and then rapidly cooled at 4°C (MC used)
- **Ultra-high temperature method:**
  - Rapidly heated in 2 stages to 125°C for a few seconds
  - The second stage is being under pressure
  - It is then rapidly cooled.

Q. The following tests are used to check the efficiency of pasteurization of milk, except?

a. Phosphate test
b. Standard plate test
c. Coliform count
d. Methylene blue reduction test

Ans. d. Methylene blue reduction test

Tests Performed On Pasteurized Milk

- 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
- Standard plate count: Used to determine bacteriological quality of pasteurized milk
  - Limit: 30000 bacterial count/ml of pasteurized milk
- Coliform count: The presence of coliform in milk indicates improper pasteurization or post-pasteurization contamination
- The methylene blue reduction test is done to confirm heavy contamination of animal milk (before pasteurization) and check for the time taken by bacteria to decolorize the methylene blue dye. The faster the reduction, the higher the bacterial count

Q. Nowadays, which is the most common pasteurization method?

a. Holder (VAT) method
b. Ultra-high temperature method
c. High temperature and short time method
d. Low temperature and long-time method

Ans. c. High-temperature and short-time method

Q. With regard to the pasteurization of milk, which of the following tests is not related? INICET 2021

a. Phosphatase method
b. Iodine test
c. Standard plate count
d. Methylene blue reduction test

Ans. d. Methylene blue reduction test

Yourwish

Q. A 45-year-old man living in Nellore, AP, presents with the following lesions in the teeth. What is the most likely diagnosis?



FMGE Dec 2021

a. Selenosis
b. Plumbism
c. Fluorosis
d. Lathyrism

Ans: c. Fluorosis

Q. A 3-year-old child presents with difficulty in walking, bowing of legs, underweight, and minimal sun exposure. Which of the following government schemes addresses nutritional deficiencies in children under 6 years of age?

a. Mid-day meal scheme
b. Anemia mukt bharat
c. Integrated Child Development Services (ICDS)
d. National nutritional deficiency control programme

Ans. c. Integrated Child Development Services (ICDS)

Q. In the context of a national public health initiative aimed at addressing anemia, which of the following programs follows the 6*6*6 strategy?

a. Anemia mukt bharat
b. Poshan abhiyan
c. Kishori Shakti Yojana
d. None of these

Ans. a. Anemia mukt bharat

Q. The Anemia Mukt Bharat program aims to address anemia across India through targeted interventions. Which statement accurately describes its administration of iron and folic acid (IFA) supplementation? FMGE Jan 2024

a. IFA is provided during the 2nd trimester of pregnancy and continues during lactation for 2 to 6 months
b. IFA supplementation is administered solely during pregnancy
c. A 100-day course of IFA supplementation is sufficient
d. Administering IFA during the 1st trimester is adequate

Ans. a. IFA is provided during the 2nd trimester of pregnancy and continues during lactation for 2 to 6 months

12. ENVIRONMENT 1

WATER

00:00:46

FMGE 2025

- Basic drinking water requirement: 2 litres per head per day (physiological requirement)
- Per Capita Water Supply
  - Urban domestic purposes: 150-200 litres per capita per day is adequate
  - Rural domestic purposes: 40-60 litres per capita per day is adequate

Important Definitions

Safe And Wholesome Water

- Water that is:
  - Colourless
  - Tasteless
  - Odourless
  - Contains NO pathogenic organisms
  - Can be used for domestic and cooking purposes

Potable Water

- Contains zero coliforms per 100 ML of water

Purest Form Of Water

- Rainwater is the purest form
- Rainwater is very soft water

Problem Habitation - Criteria

- An area is called a problem habitation when:
  - Drinking water source points are not within 1.6 kilometres in plain areas
  - Water source is over 100 metre elevation in hill areas
  - Water is available only at a depth of more than 15 metres

Q. Criteria for problem village include all except
a. Where no water source is within 1.6 km from the community
b. Water is available only beyond a depth of 15 meters
c. Presence of excess Na+, K+, or F- salts
d. Risk of Guinea worm infection

Ans. d. Risk of Guinea worm infection



- BecauseGuinea worm has been eliminated in India
- Banning step wells → Successful elimination of guinea worm infection in India

Yourwish

Sanitary Well



- Location Criteria
  - Should be within 100 metres of habitation (better if within 60 metres)
  - Should be more than 15 metres distance from source of contamination
- Lining Standards
  - Should be 20 feet deep
  - 2-3 feet above ground level
  - Parapet wall: More than 70-75 cm above ground
  - Platform: More than 1 metre in all directions

Sources Of Water

- Safe Yield of a Source: Yield that is adequate for 95% of the year
- Most Important Source in India: Wells
- Sources of water (particularly in rural areas) should be at a distance of 100 metres from households
- Time taken to fetch water: Should NOT be more than 30 minutes

Classification Of Wells

Based On Depth	• **Shallow Wells**
	  ○ M/c source of water used in rural areas because Easier and cheaper to construct
	  ○ Water taken from above the first impervious layer
	  ○ Disadvantages:
	  → More likely to get contaminated
	  → Moderately hard water
	• **Deep Wells**
	  ○ Drain water from below the first impervious layer
	  ○ Advantages:
	  → Less chance of contamination
	  ○ Disadvantages:
	  → Costly to construct
	  → Very hard water

Based On Construction	• **Dug Wells**
	  ○ Can be kacha or pucca wells
	• **Tube Wells**
	  ○ Can be shallow or deep tube wells
	  ○ Shallow tube wells = Driven wells
	  ○ Deep tube wells = Bore wells
	  ○ Chandigarh derives a lot of water supply from tube wells
	  ○ Life of Tube Wells : 5-10 years
	  ○ Should be 15 metres away from sources of contamination

Public Health Classification Of Water-related Diseases

00:08:42

Class	Route / Cause	Diseases
Waterborne	Drinking contaminated water	Cholera, Amoebic dysentery, Bacillary dysentery (Shigellosis), Cryptosporidiosis, Typhoid, Giardiasis, Paratyphoid, Balantidiasis, Salmonellosis, Campylobacter enteritis, Rotavirus diarrhoea, *E. coli* diarrhoea, Hepatitis A, Leptospirosis, Poliomyelitis

Yourwish

Water-washed	Lack of clean water for washing	Scabies, Typhus, Yaws, Relapsing fever, Impetigo, Trachoma, Conjunctivitis, Skin ulcers
Water-based	Caused by parasites found in intermediate organisms living in water(aquatic host)	Schistosomiasis(snail), Clonorchiasis, Dracunculiasis(cyclop, Paragonimiasis
Water-related insect vector	Transmitted by insect vectors which breed in water	Mosquito-borne: Malaria, Yellow fever, Dengue fever, Filariasis; Fly-borne: Onchocerciasis (river blindness), Trypanosomiasis (West African sleeping sickness), Leishmaniasis (Kala-azar), Loiasis

Water Based Diseases

Disease	Aquatic Host
Guinea worm infection (Dracunculiasis)	Cyclops
Schistosomiasis	Snail
Paragonimiasis	-
Fascioliasis	-

Mosquito-borne Diseases:

Disease	Vector	Breeding Water Type
Malaria	Anopheles	Clean water
Dengue	Aedes	Artificial collection of water
Japanese Encephalitis	Culex	Dirty water collection

WATER QUALITY STANDARDS (WHO Criteria)

00:10:35

- Water quality can be assessed based on these Criteria (4 Aspects)
  - Acceptability aspects
  - Microbiological aspects
  - Chemical aspects
  - Radiological aspects

Acceptability Aspects

PHYSICAL PARAMETERS	INORGANIC CONSTITUENTS

• Taste and Odour:
  ○ Should be tasteless
  ○ Should be odourless
• Turbidity:
  ○ Measured in Nephelometric Turbidity Unit (NTU)
  ○ Best level: Less than 1 NTU
  ○ Visible turbidity: More than 4 NTU
  ○ Maximum permitted level: Up to 5 NTU
	• Chloride:
	  ○ Standard prescribed: Up to 200 mg/L
	  ○ Maximum permissible level: Up to 600 mg/L
	  ○ Detectable taste: More than 250 mg/L
	• Hardness:
	  ○ Acceptable level: 100-300 mg/L
	  ○ Softening recommended at: 150 mg/LpH:

Yourwish

- Colour:
  - Should ideally be colourless
  - Measured in: True Colour Units (TCU)
  - Allowed: 15 TCU or 5 Hazen units

- pH
  - Acceptable level (WHO): 6.5-8.5
  - Best for chlorine action: pH 7
- Hydrogen Sulphide:
  - Taste and odour threshold:
  - Rotten egg smell: Due to hydrogen sulphide
- Iron: Up to 0.3 mg/L
- Copper: Up to 2 mg/L
- Sodium: 200 mg/L
- Fluoride: 0.5-0.8 mg/L
- Ammonia: 0.2 mg/L (same as copper amount)
- TDS
  - Standard prescribed (WHO): Up to 600 mg/L
  - Maximum permissible level (WHO): Up to 1000 mg/L
  - According to BIS (Bureau of Indian Standards): Up to 500 mg/L
    - Polyaromatic Hydrocarbons: Very very less amount

Microbiological Aspects

- Most reliable evidence of faecal contamination:E. coli
- Best indicator: E.coli
  - Of Recent Contamination: Faecal Streptococci
  - Of Remote/Intermittent Contamination:VClostridium perfringens

Q. The most reliable 'evidence' of faecal contamination of water is provided by?
a coliform bacterium
b. Cl. Perfringens
c . St. faecalis
d. Cl. welchii

Ans. A coliform bacterium

Screening Tests For E. Coli

- Multiple Tube Method (Presumptive Coliform Test)
  - Its checks Concentration of viable coliform bacteria in water
  - Procedure:
    → Samples are cultured in lactose broth
    → Gas production in the form of bubbles in Durham's tube → signals contamination
    → Each tube showing fermentation contains coliform
    → Result time: 72-96 hours
    → False Positive: Due to Klebsiella
- Membrane filtration technique
  - Procedure:
    → Measured volume of water filtered through membrane made of cellulose ester
    → Bacteria present in water retained on surface of membrane
    → Result time: Around 20 hours

Confirmatory / Diagnostic Tests For E. Coli

- Mnemonic: IMViC
  - I - Indole test
  - M - Methyl red test
  - V - Voges-Proskauer test
  - C - Citrate utilisation test

Q. All of the following about purification of water are true except?
a. Clostridium pores indicates remote contamination of water
b. Coliforms maybe detected by Multiple Tube Method and Indole production
c. Sodium thiosulphate is added to neutralize certain contaminants
d. Coliforms must not be detectable in any 1000 ml sample of drinking water

Ans. D Coliforms must not be detectable in any 1000 ml sample of drinking water

Q. Multiple Tube Method is done to:
a. Detect the presence of fecal streptococci in a sample of water
b. Detect the presence of Clostridium perfringens in a sample of water
c. Detect the presence of Coliform organisms in a sample of water
d. Do the colony count of bacteria

Ans. C Detect the presence of Coliform organisms in a sample of water

Chemical Aspects

Chemical Aspect (Constituent)	Recommended Maximum Limit
Arsenic	0.01 mg/L
Lead	0.01 mg/L
Cadmium	0.003 mg/L (0.3 microgram/L)
Chromium	0.05 mg/L (50 microgram/L)
Cyanide	0.07 mg/L
Fluoride	1.5 mg/L
Mercury	0.006 mg/L
Nitrate(remote contamination)	50 mg/L
Nitrite(Recent contamination)	3 mg/L
Selenium	0.04 mg/L

Radiological Aspects

- Gross alpha activity: 0.5 Becquerel/L of water
- Beta activity: Up to 1 Becquerel/L

Yourwish

Q. WHO has recommended acceptable limits for safe drinking water. Which out of the following is not within acceptable limit for safe drinking water?

a. Fluoride: 0.8 mg/l
b. Total Dissolved Solids: 300 mg/l
c. Nitrate: 20 mg/l
d. Cadmium 0.3 mg/l

Ans. : D Cadmium 0.3 mg/l

Water Sample Collection For Bacteriological Examination



- Equipment: Winchester bottle used for collection
- Procedure
  - Before collecting sample from regularly used tap: Let water flow for at least 2 minutes
  - Hold bottle at the base with one hand
  - Collect from gentle stream of water to avoid splashing
  - Avoid water from leaky taps
  - For taps not regularly used: Sterilise the tap by heating with blue lamp or cotton soaked in methylated spirit before collecting sample

PURIFICATION OF WATER – SMALL SCALE (HOUSEHOLD LEVEL)

00:22:40

NEETPG 2020

- Methods Available
  - Boiling
  - Chemical disinfection (Chlorination - only disinfectant with residual property)
  - Household filters
  - UV radiation
  - Membrane filters (RO process)
  - Solar disinfection

Boiling

- Best method against everything
  - Kills all ova, all cysts, all spores - EVERYTHING
- Disadvantages:
  - no residual property/activity
  - Water once boiled has to be re-boiled again after 4-6 hours
  - Its Costly
  - Not practical for urban slums

Chlorination

- Does not kill all ova, all cysts, all spores
- To kill poliovirus and hepatitis A virus → need to increase dose of chlorine a little
- Only agent with Residual property
  - Water once treated remains disinfected; you don't need to treat water again and again
- M/c form used: Bleaching powder
- Important Facts:

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- 100 grams of bleaching powder releases 33 grams of free/residual chlorine
- Best pH for chlorine action: pH 7 (can act between 6.5-8.5)
- If pH is not 7 (more or less) → HOCl will dissociate
- 2.5 grams of bleaching powder required for 1000 litres of water

- Advantages of Chlorination:
  - Oxidises unwanted elements (iron, manganese, hydrogen sulphide)
  - Controls algae, slime organisms
  - Aids coagulation

Mechanism Of Chlorine Action

- When chlorine (bleaching powder) is added to water:
  - Reaction: $Cl_2 + H_2O \rightarrow HOCl + Hcl$
    → HOCl = Hypochlorous acid
    → HCl = Hydrochloric acid (gets neutralised by alkaline nature of water)
  - Further breakdown: $HOCl \rightarrow H^+ + Ocl^-$
    → OCl^- = Hypochlorite
- Disinfecting Property:
  - Major disinfecting property (90%): Due to HOCl
  - Disinfecting property overall: Due to Both HOCl And Ocl^-
  - If pH is not 7 → HOCl dissociates → That's why chlorine acts best at pH 7

Chlorine Demand

- Amount of chlorine needed to disinfect water
- Scientific Definition: Amount of chlorine needed to
  - Destroy all bacteria
  - Oxidise organic matter
  - Neutralise ammoniacal substances present in water
- Estimated using: Using Horox Apparatus
- Break point chlorination : The point at which chlorine demand of water is met

Horox Apparatus 00:28:37



Components

- 6 white cups of 200 ML each
- 1 black cup with circular mark
- 2 metal spoons - each holds 2 grams of bleaching powder
- 7 glass stirring rods
- 1 special pipette
- 2 droppers
- Indicator used: Starch iodide

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Procedure

- Step 1: 2 grams of bleaching powder used to prepare thin paste in black cup → called chlorine stock solution
- Step 2: 6 white cups filled with water to be tested
- Step 3: Add:
  - 1 drop of stock solution to 1st cup
  - 2 drops to 2nd cup
  - 3 drops to 3rd cup
  - Continue until 6 drops added to 6th cup
- Step 4: Stir the cups and wait for 30 minutes
- Step 5: Add 3 drops of starch iodide indicator to each cup
- Result:
  - Development of blue colour indicates free chlorine
  - The first cup that develops this colour gives estimate of bleaching powder needed to disinfect 455 litres of sample of water
  - N × 2 grams of bleaching powder will disinfect 455 litres of water
    → Where N = First cup which shows colour change

Q: How many grams of bleaching powder needed to disinfect 3000 litres of water, where the 4th cup is first to show colour change in horrocks apparatus?

A. 40g
B. 53g
C. 64g
D. 100g

Ans. B 53 g

  - Solution:
    → N = 4 (4th cup is first to show colour)
    → 455 litres disinfected by = 4 × 2 = 8 grams
    → 1 litre disinfected by = 8/455 grams
    → 3000 litres disinfected by = (8/455) × 3000 = 53 grams approximately
- If the 3rd cup is first to show colour change, how much bleaching powder for 455 litres? Answer: N × 2 = 3 × 2 = 6 grams

Residual/free Chlorine

00:32:21

- After breakpoint chlorination is met → Some extra amount of chlorine is added to water → So that water remains disinfected

FMGE 2021, 2024

- This extra chlorine = Free chlorine or Residual chlorine
- Total Chlorine Formula
  - Total chlorine added to water = Combined chlorine + Free/Residual chlorine
    →Combined chlorine = Chlorine demand
- Estimated using Horox apparatus
  → Free/Residual chlorine = Extra chlorine to keep water disinfected
- Estimated using chloroscope or Orthotolidine test or Orthotolidine Arsenite test
- Free chlorine is released after breakpoint chlorination is met



Levels Of Residual Chlorine Required

- For a contact period of 1 hour

Purpose	Residual Chlorine Level
Drinking water	0.5 mg/L or 0.5 PPM
Post-disaster/Natural calamities	0.7-0.9 mg/L or 0.7 PPM
Cholera epidemic	0.5 mg/L
Swimming pool sanitation	1 mg/L or 1 PPM
To kill Cyclops and Poliovirus	2 mg/L or 2 PPM

- Note: 1 mg/L = 1 PPM

Q. What is the recommended free residual chlorine level after chlorination of a well to ensure adequate disinfection? FMGE 2024

a. 0.5 ppm after 1 hour
b. 0.5 ppm after 2 hours
c. 0.8 ppm after 1 hour
d. 0.5 ppm after hours

Ans. a 0.5 ppm after 1hour

Tests For Chlorination Of Water

Ot And Ota Tests

- Reagents: Analytical grade orthotolidine dissolved in 10% solution of hydrochloric acid
- Procedure: Add 0.1 ML of reagent to 1 ML of water
- Result: When OT/OTA reagent added to water containing chlorine → yellow colour produced
- First 10-15 seconds of yellow colour → Due to free chlorine only
- After 15 seconds → Due to both free and combined chlorine
- OTA test is better than OT test because:
  - Can detect free chlorine and combined chlorine seperately
  - Not affected by interfering substance
- **OT test:**
- Can detect free chlorine separately - true
- Can detect combined chlorine - true
- Can detect combined chlorine separately - false(cannot detect separately)
- Calculates combined chlorine by: Total minus free chlorine

Q. Orthotolidine test is used to determine: FMGE 2021

a. Nitrates in water
b. Nitrites in water
c. Ammonia content in water
d. Free and combined chlorine in water

Ans. D Free and combined chlorine in water

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Q. Color produced in the orthotolidine test after 5 minutes is due to the action of what?
a. Dissolved solids
b. Free chlorine
c. Combined chlorine
d. Free and combined chlorine

Ans. D Free and combined chlorine

Q. All the following statements are true about break point chlorination, except:
a. Free chlorine is released in water after break point chlorination
b. Chlorine demand is the amount needed to kill bacteria, oxidize organic matter and neutralize ammonia
c. 1 ppm free chlorine should be present in water after breakpoint has reached
d. Contact period 1 hour is necessary

Ans. C 1 ppm free chlorine should be present in water after breakpoint has reached

High Yield Points

- The disinfecting action of chlorine mainly due to:HOCL
- Disinfecting property with chlorine due to: HOCL & OCL-
- Minimum recommended concentration of free chlorine:0.5 mg/l 0.5PPM
- Total Dose of Chlorine: Chlorine demand + free residual chlorine of 0.5mg/l
- Breakpoint Chlorination: Point at which chlorine demand is met
- Most commonly used form of Chlorine: Bleaching powder
- Stabilized Bleach Bleaching powder mixed with excess of lime, it retains its strength

Household Filters

Chamberland Filter

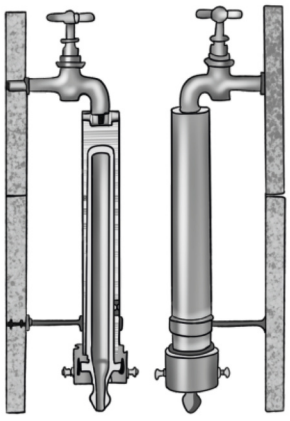
- Material used: Porcelain

Berkefeld Filter

- Material used: Kieselguhr or Infusorial earth

Katadyn Filter

- Surface coated with silver catalyst
- Filtration achieved by oligodynamic action of silver ions







Yourwish

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Disinfection Of Wells

- Chlorination is most widely and cheapest method

Q. Horrocks apparatus is used to disinfect a well. The diameter of the well is 1.5 meters and the depth is 10 meters. Considering 2 grams of bleaching powder (calcium hypochlorite) is needed per cubic meter of water for effective disinfection, how much bleaching powder is required to disinfect this well?

a. 28 gm
b. 35 gm
c. 42 gm
d. 50 gm

Ans. **b** 35g

Explanation

- Volume of the well: Formula: π (radius)^2 depth
  - The diameter of the well is 1.5 metres, so the radius is 1.5/2 = 0.75 metres.
  - Depth of the well = 10 metres.
  - Volume = $\pi * (0.75)^2 * 10 = 3.14 \times 0.5625 \times 10 = 17.67$ cubic metres.
- Amount of bleaching powder needed:
  - Bleaching powder required = Volume of the well x Amount of bleaching powder per cubic metre.
  - Amount: 17.67 cubic metres x 2 grams/cubic metre = 35.33 grams = 35 grams.

Q. In case of emergencies like Hepatitis A outbreak in a village where a contaminated well was found to be a potential source of infection, which out of the following methods would be recommended to disinfect the well?

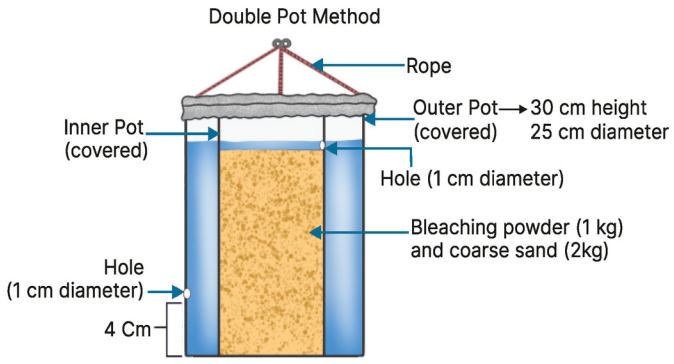
a. Disinfection using chlorine gas
b. Disinfection using chloramine
c. Disinfection using Perchloron
d. Double Pot Method

Ans. D Double Pot Method

- Double Pot method Used for emergency disinfection of wells in outbreak situations (emergency)

Double Pot Method

- Structure:
  - Has inner pot and outer pot
  - Both have holes
  - Lined with polythene foil
- Contents:
  - Inner pot: Contains bleaching powder with coarse sand
  - Outer pot: Surrounds inner pot
- Mechanism:
  - The pot is lowered into the well.
  - Allows mixing of water with disinfecting agent (bleaching powder)
- Criteria for use:
  - Suitable for 2-3 weeks



- The volume of well should be at least 4500-6000 litres
- Daily water requirement: 300-450 litres per day

- Superchlorination
  - Definition : Adding higher doses of chlorine (5-15 mg/L) to water systems
  - Used for : Clean wells and Swimming pools

Swimming Pool Sanitation

00:44:31

Q. Which of the following is not a recommended sanitation measure for swimming pool sanitation?
a. Recommended area per swimmer = 2.2 sq meter
b. Water to be refiltered in less than 6 hours
c. Residual level of free chlorine to be > 0.5 ppm
d. 15% water to replaced by fresh water every day

Ans. C Residual level of free chlorine to be > 0.5 ppm

- Technique used: Superchlorination
- pH to be maintained: 7.4-7.8

Q. Which of the following agents have 'residual germicidal effect' when used for disinfection of water?
a. Chlorine only
b. Chlorine and Ozone gas
c. Chlorine and UV radiation
d. Chlorine, ozone, and UV radiation

Ans. A Chlorine only

PURIFICATION OF WATER – LARGE SCALE

00:45:55

- Steps in Large Scale Purification
  - Storage
  - Filtration
  - Disinfection

Storage

- Water stored for 5-7 days
- Bacterial count decreases by 90%
- Ideal storage time: 10-15 days

Filtration

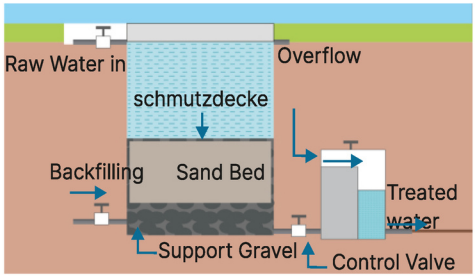
- Types:
  - Sand filters
  - Rapid sand filters

Disinfection (large Scale)

- Methods available:
  - Chlorination
  - Ozonation
  - UV light
  - Membrane process
  - Most preferred: Chlorination

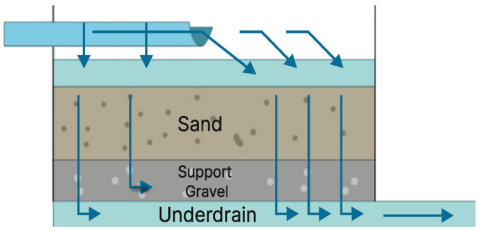
Slow Sand Filters And Rapid Sand Filters

Slow Sand Filter



- Features:
  - Has Schmutzdecke layer (also called biological layer/vital layer/zooglea)
  - Only used for smaller towns

Rapid Sand Filter



- Features:
  - Does NOT have Schmutzdecke/vital/zooglea layer
  - Used for cities and major towns

Parameter	Rapid Sand Filter	Slow Sand Filter
Space	Less space	More space
Rate of filtration	5-15 $m^3/hr/m^2$ (fast)	0.1-0.5 $m^3/hr/m^2$
Effective size of sand	0.4-0.7 mm	0.2-0.3 mm
Preliminary treatment	Yes	No
Preliminary storage	Yes	No
Washing	Backwashing	Scraping
Period of cleaning	1-3 days	1-3 months
Operation	Skilled operation	No skilled operation
Removal of turbidity	Good	Good
Removal of bacteria / purity	99%	99.9%
Removal of colour	Good	Good
Ideal for	Cities and bigger towns	Smaller towns
Depth of sand	2-3 ft	6-8 ft
Capacity	~200 MGD	2-3 MGD

- Rapid sand filter fulfills both: Less space + Fast rate of filtration

Disinfection (large Scale)

Chlorination:

- Most frequently used
- Most preferred form: Cheap, quick, efficient, easy to apply : Chlorine gas
- Superchlorination: Highly polluted water

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Ozonation:

- Supply ozone gas through tubes with water
- Ozone: powerful oxidising and strong virucidal agent
- 2-2.5 mg/L of ozone gas
- Contact time: 20 mins
- No residual property

Membrane Process

00:49:10

- High Pressure Process
  - Reverse Osmosis: pore size Less than 0.002 micron
  - Nanofiltration: pore size 0.001-0.01 micron
- Low Pressure Process
  - Ultrafiltration: Pore size is 0.002-0.003 micron.
  - Microfiltration : Pore size is 0.01 - 12 microns.

HARDNESS OF WATER

00:49:45

NEETPG 2018

- Definition: Soap destroying property of water

Types Of Hardness

TEMPORARY HARDNESS	PERMANENT HARDNESS

• Due to: Calcium and Magnesium Bicarbonates
• Methods to remove:
  ○ Boiling
  ○ Addition of lime (Clark's method)
  ○ Addition of sodium carbonate
  ○ Permutit process (Base exchange process)
	• Due to: Calcium and Magnesium salts of
	  ○ Mnemonic: CNS
	  → C = Chlorides
	  → N = Nitrates
	  → S = Sulphates
	• Methods to remove:
	  ○ Addition of sodium carbonate
	  ○ Permutit process (Base exchange process)
	  → Sodium
	  → Aluminium
	  → Silica

- Hardness of water is expressed in terms of milliequivalents per litre (meq/L) of Calcium Carbonate ($CaCO_3$)
  - 1 meq/L hardness = 50 mg $CaCO_3$ (50 ppm) per litre of water
- Hardness of water protects from cardiovascular diseases

Classification Of Water Hardness

- Soft water: < 1 meq/L (< 50 mg/L)
- Moderately hard water: 1-2 meq/L (50-150 mg/L)
- Hard water: 3-6 meq/L (150-300 mg/L)
- Very hard water: > 6 meq/L (> 300 mg/L)

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NEET PG 2018

Q. Which of the following does not cause hardness of water?

a. Calcium carbonate

b. Calcium sulphate

C. Calcium bicarbonate

d. Magnesium bicarbonate

Ans. A Calcium carbonate

AIR POLLUTION

00:52:18

Classification Of Air Pollutants

NEETPG 2020

PRIMARY AIR POLLUTANTS	SECONDARY AIR POLLUTANTS
• Released directly into atmosphere	• Formed by combination of primary air pollutants
• Examples: ○ Sulphur dioxide ○ Nitrogen dioxide ○ Carbon monoxide ○ Hydrocarbons ○ Particulate matter ○ Chlorofluorocarbons ○ Ammonia ○ Hydrocarbons ○ Metals → Lead → 'Cadmium → Copper → Nickel	• Example: ○ Peroxyacetyl nitrate ○ Particulate matter formed from primary pollutants ○ Ozone in stratosphere layer = Good (cuts harmful radiations) ○ Ground level ozone = Dangerous (secondary air pollutant)

Indicators Of Air Pollution

- Best indicator: Sulphur dioxide
- Smoke or Soiling Index (Not for soil - it's for air pollution)
- Grit and dust measurement
- Coefficient of haze
- Air pollution index
- Suspended particle count
- Most widely and commonly distributed air pollutant: Carbon monoxide
- Best biological indicator: Lichen (a growth)

Q. What are the most reliable indicators for regular monitoring of air pollution?

a. Carbon monoxide and hydrogen sulphide

b. Sulphur dioxide and carbon monoxide

C. Sulphur dioxide, lead, and particulate matter

d. Sulphur dioxide smoke, and suspended particles

Ans. D. Sulphur dioxide smoke, and suspended particles

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Q. All are indicators of air pollution except?

a. Soiling index

b. McArdle's index

c. Suspended particle count

d. SO_2 concentration

Ans. **B** McArdle's index

It measures permissible sweat rate = 4.5 L / Hr

Air Quality Index (aqi)

00:54:18

- The national air quality monitoring program is under: CPCB (Central Pollution Control Board)
- The air quality index takes into account the broad parameters:
  - Particulate matter (P.M 2.5 and PM 10), Sulphur dioxide, Nitrogen dioxide,
  - Carbon monoxide, hydrogen sulphide, ammonia, lead PAH

NEETPG 2021, INICET 2025

AIR QUALITY INDEX (AQI)	CATEGORY
0-50	Good
51-100	Satisfactory
100-200	Moderate
201-300	Poor
301-400	Very Poor
401-500	Severe

Q. Post Diwali air pollution index chart was created. Air quality index values on 4 different days were plotted. A AQI value of 407 indicates which level of air pollution?

a. Poor

b. Very poor

c. Severe

d. Moderate

Ans. C Severe

Q. While calculating AQI, PM 2.5 and PM 10 are two important components. On inhaling a PM 2.5 particle, it gets deposited in which part of the airway?

INICET 2025

a. Bronchial tree

b Alveoli

c. Trachea

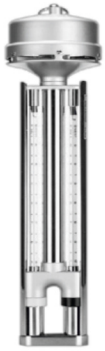
d. Nose

Ans. B Alveoli

Thermal Comfort

00:55:46

- Indicators of Thermal Comfort
  - Air temperature
  - Air humidity
  - Cooling power of air
  - Effective temperature
  - Corrected effective temperature
  - Air temperature alone is NOT a good indicator of thermal comfort
  - Thermal comfort = Feeling satisfied with the environment; being able to enjoy environment

Instruments To Measure Air Quality	NEET PG 2021
	• Hygrometer: Measures air humidity 
	• Sling Psychrometer 
	• Assman Psychrometer 
	• Dry and wet bulb hygrometer 

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Temperature Measurement

Globe Thermometer



- Thick wide bulb
- Measures:
  - Radiant heat OR
  - Corrected effective temperature

Kata Thermometer



- Thin narrow bulb (red colour/lal rang)
- Contains: Alcohol
- Measures: Low air velocity (primarily)
  - Can also measure cooling power of air
- Kata Thermometer Readings:
  - Dry Kata reading: More than 6
  - Wet Kata reading: More than 20
  - Used to record low air velocity

Atmospheric Pressure Measurement

- Anemometer



- Barometers measure atmospheric pressure
- Types:
  - Aneroid barometer
  - Mercury barometer





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Q. Which type of thermometer is used to assess the low air velocity rather than the cooling efficiency of the air?
NEET PG 2021

a. Globe thermometer
b. Kata thermometer
c. Dial thermometer
d. Wet globe thermometer

Ans. B Kata thermometer

Comfort Zone Criteria

Parameter	Ideal Range / Value
Corrected Effective Temperature	25°C - 27°C (77°F - 80°F)
Relative Humidity	30% - 65%
Dry Kata Reading	> 6
Wet Kata Reading	> 20
Predicted 4-hr Sweat Rate	≤ 4.5 litres

Ventilation

Types Of Natural Ventilation

- Wind (perflation and aspiration) - Natural phenomenon
- Diffusion movement
- Movement of Air

Mechanical Ventilation

- Exhaust Ventilation
  - Uses exhaust fans
  - Remove stale air from roof
  - Common in industries and auditoriums
- Plenum Ventilation
  - Uses centrifugal fans
  - Push fresh air inside the room
- Balanced Ventilation
  - Combination of both exhaust and plenum ventilation
- Air Conditioning

Q. All of the following are types of mechanical ventilation except?
a Perflation and aspiration
b. Exhaust ventilation
c. Plenum ventilation.
d. Air conditioning

Ans. A Perflation and aspiration

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NEETPG 2025

Standards Of Ventilation

Cubic Air Space

- De. Choman's Standard: Minimum fresh air supply of 3000 cubic feet per person per hour should be ensured
  - Purpose:
    → Removes bad odours from room
    → Ensures air purity
- It is Based on: CO_2 levels from respiration
  - Safe level: 2 parts per 10,000 parts of air
- Merely increasing room height beyond 10-12 feet is ineffective

Air Change Rate

- Air change rate is More important than cubic space

Room Type	Air Changes per Hour
Living rooms and drawing rooms	2-3
Workrooms and assemblies	4-6

- Less than 1 air change/hour → Causes stale air
- More than 6 air changes/hour → Leads to dryness

Floor Space

- Adequate for ventilation: 70-90 square feet per person

Q. De Chaumont advocated a fresh air supply of 3000 cubic feet per person per hour for standards of ventilation. It is calculated based on which parameter?

NEETPG 2025

a. Oxygen content of air
b. Co2 in the air
c.Air temperature
d. Air humidity

Ans. B Carbon dioxide content of air

GLOBAL WARMING

01:01:50

Greenhouse Gases

FMGE 2019

NATURAL GREENHOUSE GASES	NON-NATURAL GREENHOUSE GAS
• Maximum contribution by: Water vapour ○ Others: ○ Water vapour (max contribution) ○ Carbon dioxide ○ Methane ○ Ground level ozone ○ Nitrogen dioxide	• Chlorofluorocarbons (CFCs): • Deplete ozone in the stratosphere. • Deplete the GOOD ozone layer in the stratosphere.

Initiatives To Protect Climate



Kyoto Protocol

- Legal binding adopted by developed countries only
- Goal: Reduce greenhouse gas emissions
- Temperature goal: Limit global rise by 2 degrees

Paris Agreement



- By both developed and developing countries
- Temperature goal: Limit global rise below 2 degrees (wanted 1.5 degrees)

Montreal Protocol



- Goal: Prevent depletion of ozone layer
- Skypher Test: Measures: CO_2 in air

Q. Kyoto Protocol is for:
a. To improve water sanitation
b. To study food and nutrition
c. To reduce greenhouse gas emissions
d. To do water chlorination
Ans. C To reduce greenhouse gas emissions

FMGE 2019

Mistakes to Avoid

- Ignoring number and standards
- Ignoring diagrams
- Confusing similar terms
- Not revising enough

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13. ENVIRONMENT 2

WASTE DISPOSAL

Types Of Waste Disposal

00:00:22

Solid Waste - Refuse

Term	Meaning
Garbage	Processed food waste from the kitchen
Rubbish	Metals, plastic, paper, etc.
Ash	Not important for last-minute revision

Methods of Solid Waste Disposal

DUMPING	• Most unsatisfactory method of solid waste disposal		
CONTROLLED DUMPING / SANITARY LANDFILL	• Most satisfactory method of solid waste disposal Mnemonic- STAR		
	Method	**Conditions for Use**	**Advantages & Disadvantages**
	Trench Method 	Land available 1 acre/year for 10,000 population, 2 mt deep	Advantages- Best method, Produces manure (~6 months) - preferred in India for farming Disadvantages- Most costly
	Ramp Method	Hilly areas (sloping terraces available)	Suitable for terrain
	Area Method	Diffused lands, quarries, depressions, pits	Most commonly practiced Disadvantage: Needs supplemental earth

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INCINERATION	• High temperature dry oxidation process (Burning of waste) • USE: Preferred for Biomedical waste disposal • NOT PREFERRED FOR SOLID WASTE: Does not generate manure • Example: Yellow category BMW

COMPOSTING	• Integrated method to dispose of refuse & night soil
	• LIMITATION: Not preferred for a population of more than 1 lakh
	• Types
	  ○ Bangalore method- Anaerobic
	  ○ Indore method- Aerobic

MANURE PITS	• Used in: Rural areas/villages
	• METHOD
	  ○ Two pits were constructed behind the houses
	  ○ Depth: 1-2 meters
	• Each pit fills in 6 months

BURIAL	• Suitable for Camps
	• METHOD
	  ○ Trench dug 1.5 m wide and 2 meters deep
	  ○ For 200 persons
	  ○ 1 meter trench length
	• Filled within 1 week

Q. In controlled tipping, the amount of land required for the trench method to be practised for a population of 10000 is:

FMGE 2021

a. 4 acres
b. 5 acres
c. 2 acres
d. 1 acre

Ans: d. 1 acre

Sewage

00:09:00

- Liquid waste with excreta
- SALAGE: Liquid waste without excreta
- Composition: Water- 99.9 % + Solids 0.1%

Indicators of Sewage Strength

BOD - BIOLOGICAL OXYGEN DEMAND	• Amount of oxygen absorbed by a sample of sewage during a specified period (mostly 5 days) at a specified temperature of 20°C for aerobic destruction or use of organic matter by living organisms • BOD is the most important test for sewage • Values of BOD

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	<table><tr><th>Type of sewage</th><th>BOD value</th></tr><tr><td>Normal sewage</td><td>100 - 300 mg/L</td></tr><tr><td>Strong sewage</td><td>> 300 mg/L</td></tr><tr><td>Weak sewage</td><td>< 100 mg/L</td></tr></table>
COD - CHEMICAL OXYGEN DEMAND	• Measures the oxygen equivalent of that portion of organic matter in a sample which is susceptible to oxidation by a strong chemical oxidizer • Best for COD estimation: Potassium dichromate
SUSPENDED SOLIDS	• An indicator of solid matter present in sewage • **Values** <table><tr><th>Type of sewage</th><th>Suspended solids</th></tr><tr><td>Normal sewage</td><td>100 - 500 mg/L</td></tr><tr><td>Strong sewage</td><td>> 500 mg/L</td></tr><tr><td>Weak sewage</td><td>< 100 mg/L</td></tr></table>

Key Points

Test	Use
BOD	The most important test for sewage
COD	The most practical method for determining organic load when waste contains toxic substances
Aerobic process	Most efficient for reducing organic matter in sewage
Anaerobic process	Used for highly concentrated sewage

Sewage Disposal 00:12:45

Sewered Areas

Type of treatment	Methods	Process occurring
Primary	• Screening • Grit chamber • Plain Sedimentation (Primary sedimentation tank)	Anaerobic

Secondary	• Trickling filter • Activated sludge process- Preferred method	Aerobic

Other Methods Of Sewage Disposal

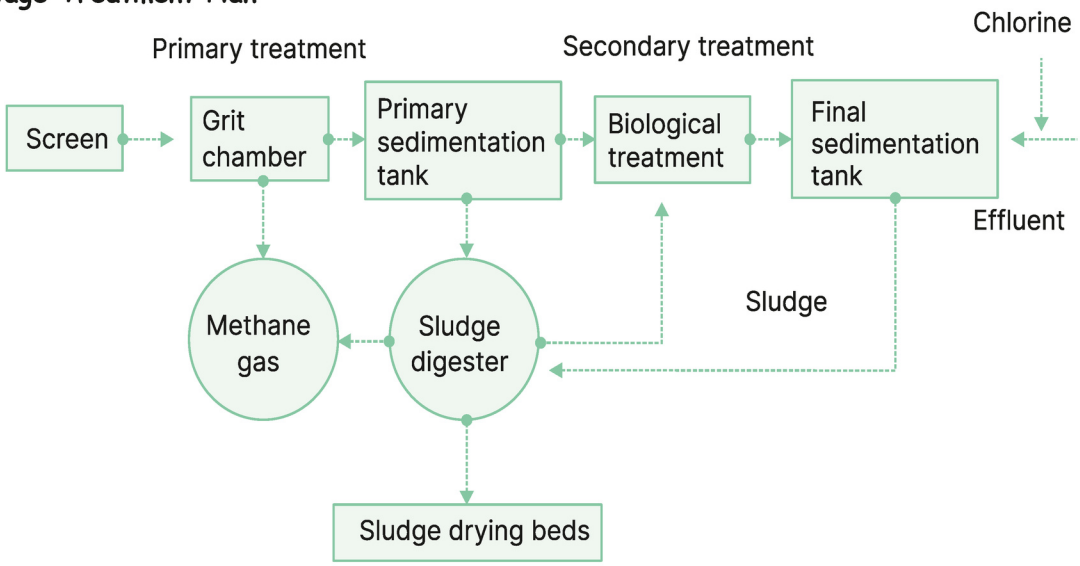
- Outfall
- Dural outfall
- Land treatment
- Sewage farming
- Oxidation ponds- Lagoons
- Oxidation ditches

Q. Mode of disposal of sewage groundwater: FMGE 2020

a. Activated sludge process
b. Grit chamber
c. Oxidation ponds
d. All of the above

Ans: d. All of the above

Modern Sewage Treatment Plan



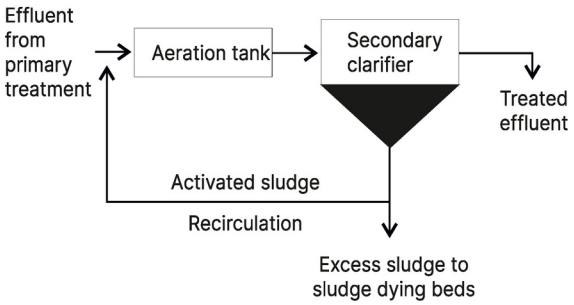
Flow diagram of a modern sewage treatment plant

SECONDARY TREATMENT METHODS

TRICKLING FILTER	ACTIVATED SLUDGE PROCESS
• Requires a large area • Not preferred for big cities • Preferred for smaller towns • Structure- Rock, Sand, Gravel	• Aeration tank = heart of the activated sludge process • Modern method of sewage treatment: Activated sludge process • Retention period in aeration chamber: 6-8 hrs • 1 acre of an activated sludge plant does the work of 10 acres of percolating filters

Yourwish





Oxidation Pond

- Used for small communities
- Also called the blue lagoon
- Population served: 5,000 – 20,000 people
- Structure- Two layers
  - Lower layer- Anaerobic
  - Upper layer- Aerobic
- DAY-NIGHT difference
  - Day- Aerobic process
  - Night- Anaerobic process
- For the treatment of waste of the population between 5000 and 20000
  - 1 acre of land is required for an oxidation ditch
  - 22 acres of land are required for the oxidation pond
  - 2.5 acres of land for aerated lagoons



Q. The process in an oxidation pond is: FMGE 2023

a. Always aerobic
b. Always anaerobic
c. Aerobic during the day, anaerobic during the night
d. Anaerobic during the day, aerobic during the night

Ans: c. Aerobic during the day, anaerobic during the night

Non-Sewered Areas 00:18:47

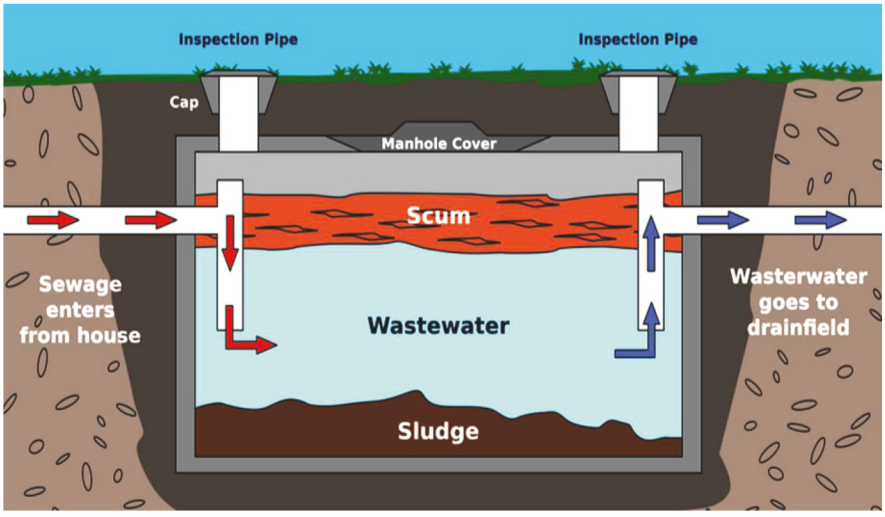
- Used where sewage treatment plants are not available
- **Systems used**

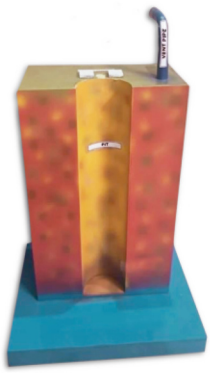
BOREHOLE LATRINE	• Oldest latrine type • 12-inch diameter • Serves one family
DUGWELL LATRINE	• 24-inch diameter • Serves one family • Replacement needed after 5-6 years

Yourwish

Yourwish

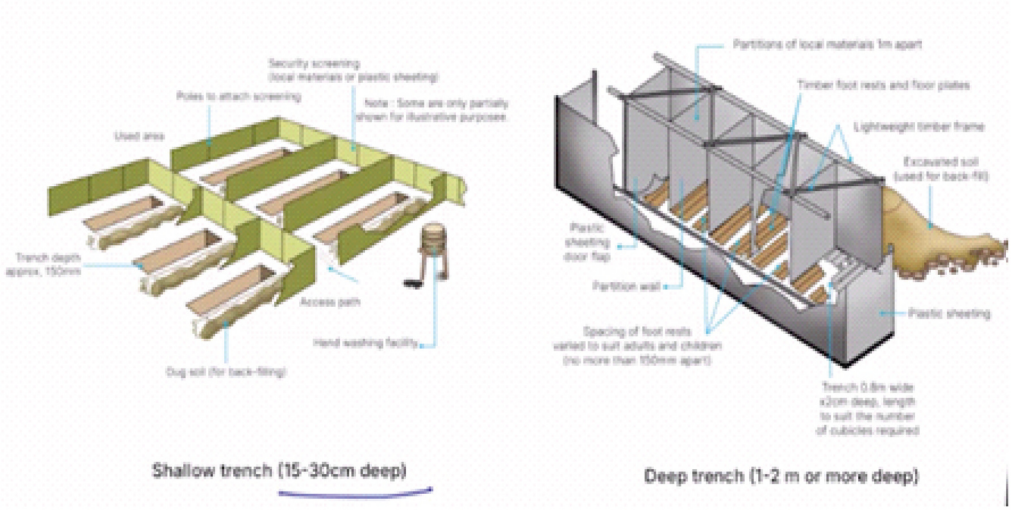
WATER SEAL LATRINE	• Types mentioned
	  ○ Planning Research Action Institute (PRAI)
	  ○ Research-cum-Action Institute (RCA)
	• Water seal
	  ○ Height of 2.5 cm
	  ○ Small water column in a bent pipe: Trap
	• Function: Prevents the entry of flies and the entry of odour

SEPTIC TANK	• Used for
	  ○ Household sewage treatment
	  ○ Very small communities
	• Capacity: Up to 500 gallons of sewage
	• Retention period: 24 hours
	• Processes in a Septic tank
	  ○ Inside the tank- Anaerobic digestion
	  ○ Outside the tank (drain field)- Aerobic process
	• Sludge management
	  ○ Heavy particles settle as sludge
	  ○ The contents of the tank should be cleaned every 1 year by a process called sludging
	  ○ The sludge should be disposed of by trenching
	

AQUA PRIVY	• Combines a toilet with a water-tight tank • Anaerobic digestion for waste treatment • Suitable for water-scarce areas: smaller footprint 

Yourwish

LATRINES FOR CAMP / EMERGENCY SITUATIONS	• Used in
	  ○ Disaster relief areas
	  ○ Refugee camps
	  ○ Emergency situations
	• Types used
	  ○ Shallow trench latrine- 15-20 cm depth
	  ○ Deep trench latrine- 1-2 mts depth
	• Basic Characteristic
	  ○ Low-cost human waste disposal system
	  ○ Used in temporary situations
	• Both types should be placed 15-30 meters away from water sources



Q. Type of sanitation facilities provided for soldiers returning from war?

a. Pit method

b. Dumping method

c. Aqua privy

d. Trench latrine

Ans: d. Trench latrine

Environmental Sanitation Initiatives

00:23:50

Program	Purpose
KAYAKALP	Sanitation and cleanliness in public hospitals
Swachh Bharat	For sanitation, cleanliness, and solid waste management in the country
Nirmal Gram	For sanitation and cleanliness with a safe water supply in villages

Q. All are methods of sewage disposal except
a. River outfall
b. Land treatment
c. Oxidation pond
d. Bangalore method
Ans: d. Bangalore method

Q. Trickling filter is used in?
a. Primary treatment of swegae
b. Secondary treatment of sewage
c. Sewage effluent treatment
d. Sewage farming treatment
Ans: b. Secondary treatment of sewage

NOISE (ENVIRONMENTAL HEALTH)

00:24:00

- Daily exposure limit people can tolerate without substantial damage to their hearing: 85 decibels
- Noise threshold for pain: 140 dB
- Auditory Fatigue: 90 decibels
- Rupture of tympanic membrane: Exposure > 160 dB
- Permanent deafness occurs with repeated exposure to around 100 decibels

Light And Illumination

00:25:05

- Adequate illumination for vision: 15-20 foot candles

Parameter	Term	Unit	Example/Values
Power/Brightness of Light Source	Intensity	Candela (cd)	Candle as a light source SI unit = Candela
Flow of Light	Luminous flux	Lumen (lm)	Total light output
Emitted Brightness from Surface	Lambert	Lambert	Surface reflectance brightness
Amount of light reaching the surface	Lux	-	
Daylight Illumination	Daylight factor	Percentage (%)	Living room: 8% Kitchen: 10%

Q. SI unit of brightness of a light source?

NEET PG 2021

a. LUX

Yourwish

b. Candela
c. Lumen
d. Luminance
Ans: b. Candela

Housing Standards

00:26:50

- Site requirement: The house should be at a higher level than the surroundings
- Set back: Open space around the house
  - Rural area- 2/3rd
  - Urban area- 1/3rd
- Floor area per person
  - 1 person- 72-90 sq ft
  - 2 persons- 100-110 sq ft
- Roof height: Minimum 10 feet
- Window height: Placed at 3 feet
  - The living room is provided with at least 2 windows with one opening directly to an open space
  - Windows- 1/5th of floor area
  - Doors + windows- 2/5th of floor area
- Cubic space
  - Minimum 500 cubic feet per capita
  - Preferred 1000 cubic feet
- Living rooms
  - Minimum 2 living rooms
  - One should be closed for security
- Lighting standards
  - Daylight factor >1% over half of the floor area
- Ventilation windows should be diagonally opposite

Overcrowding

FMGE June 2021

PERSON PER ROOM CRITERIA

Number of rooms	Maximum persons
1 room	2 persons
2 rooms	3 persons
3 rooms	5 persons

FLOOR SPACE CRITERIA

- Overcrowding occurs when :

Occupancy	Floor space below
1 person	<70 sq ft
2 persons	<100 sq ft

Yourwish

Yourwish

Sex Separation Criteria

- Overcrowding exists if two individuals aged 9 years, not husband and wife, sleep in the same room

Counting House Members

Category	Counting method
Infants (<1 year)	Not counted
Children (1–10 years)	Counted as half

Q. To avoid overcrowding, what is the maximum number of people allowed to live in a house with 2 rooms?
a. 2 people
b. 3 people
c. 4 people
d. 5 people
Ans: d. 5 people

RADIATION

00:31:24

- Skin dose to a patient from a single X-ray film varies from 0.02 to 3 rads
- The maximum permissible dose of radiation exposure for human beings is 5 rad per person per year
- Radiation exposure in the Chernobyl tragedy - Cs, I^2, Sr
- Thickness of lead apron to prevent exposure > 0.5 mm
- State receiving the highest solar radiation = Rajasthan
- State utilizing max solar radiation = Gujarat
- Total natural radiation received by humans is 0.1 rad /P/yr

Q. 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 on Radiological Protection?
a. 2 rad
b. 3 rad
c. 5 rad
d. 8 rad
Ans: c. 5 rad

Q. What is the required thickness of a lead apron used for radiation protection? FMGE 2021
a. 1 mm
b. 2 mm
c. 0.5 mm
d. 1.5 mm
Ans: c. 0.5 mm

Yourwish

14. COMMUNICABLE DISEASES

DEFINITIONS & TERMINOLOGIES

00:00:23

- The time interval between entry of organisms and appearance of first signs and symptoms: Incubation Period
- Incubation Period for Non-Communicable Diseases: Latent period
- The first case of infectious origin introduced into the population: Primary case
- Cases developing following exposure to a primary case: Secondary case
- Time interval between the occurrence of the primary case and the secondary case: Serial interval
- First case to come to the notice of the investigator/epidemiologist: Index case
- The time interval between the entry of organisms and maximum infectivity: Generation time
- The time interval between entry of the organism and 50% of cases to occur: Median incubation period
- The time interval between entry of the organism and coming laboratory positive: Window period

NEET PG 2025
INICET 2022

Q. The time period between the receipt of the infectious agent into the host's body and the period of maximum infectivity is known as?

NEET PG 2025

a. Median Incubation Period
b. Generation time
c. Serial interval
d. Incubation period

Ans: **b.** Generation time.

Q. A 5-year-old child, Ram, and his 3-year-old brother, Sham, develop rashes at different times. Sham had a rash first, which was ignored by their mother. Three days later, Ram also developed a rash along with a fever. At the primary health centre, measles is suspected. Which statements are correct?

INICET 2022

a. Ram is the index case, and post-exposure prophylaxis could have been given if brought earlier
b. Only Ram is the index case
c. Ram is the index case, Sham is the primary case, Ram got the infection from Sham, and postexposure prophylaxis was possible
d. Ram is the index case and got the infection from Sham

Ans: **a,b,c,d are all correct**

Types Of Carriers

00:03:49

- Becomes a carrier after a clinical infection: Case carrier
- Acquires and transmits infection from close contact, may not develop disease: Control carrier
- Develops disease from another carrier: Paradoxical carrier
- Transmitted before symptoms: Incubatory carrier
- Sheds organisms during recovery: Convalescent carrier
- Harbour specific infectious agents (like bacteria or viruses) in their body for an extended period, often lasting longer than 6 months, without exhibiting symptoms of the disease, while still being able to transmit it to others:

Chronic carrier

- Short-term carrier who eventually clears the infection, e.g., influenza, hepatitis A, common cold: Temporary carrier
- Carrier of avirulent organisms: Pseudo carrier

Q. A paradoxical carrier is defined as: 2019

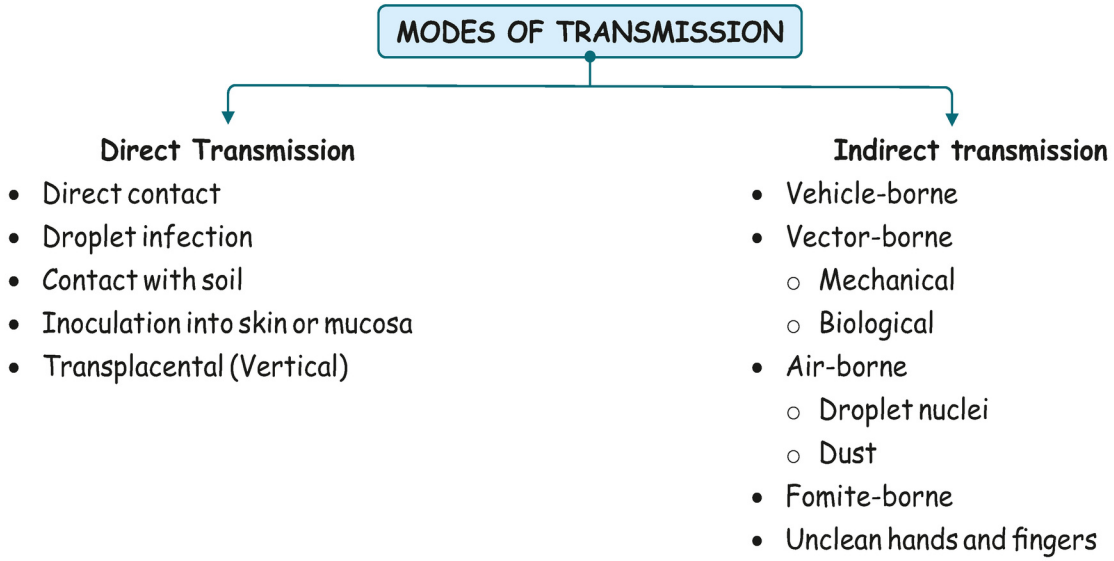
a. A person who sheds pathogens during the incubation period.
b. A carrier who acquired the pathogen from another carrier.
c. A person who acquired the pathogen from a patient.
d. A patient who became a carrier.

Ans: a. A carrier who acquired the pathogen from another carrier.

MODES OF TRANSMISSION

00:06.00

INICET 2020



Q. Which of the following is not a method of direct transmission of communicable diseases? 2018

a. Vertical transmission
b. Contact with soil
c. Droplet nuclei
d. Droplet transmission

Ans: c. Droplet nuclei

Droplet transmission	Droplet nuclei/Airborne transmission
Size of droplets > 5 microns	Size of droplets <5 microns
Heavier particles	Lighter particles
Fall to the ground under gravity	Remain suspended in the air
Travel < 1m	Travel >1m
	Eg: Measles, chicken pox, TB, Influenza, COVID

Yourwish

Q. Airborne transmission precautions are required for all of the following except:
a. Tuberculosis
b. Herpes Zoster
c. Measles
d. Chickenpox

Ans: b. Herpes Zoster

Types Of Biological Transmission

Types	Definition	Example
Propagative	The disease agent undergoes no cyclical change, but multiplies in the body of the vector.	Plague bacilli (Yersinia pestis) in rat fleas.
Cyclopropagative	The disease agent undergoes cyclical change and multiplies in the body of the arthropod.	Malaria parasite (Plasmodium spp.) in an anopheline mosquito.
Cyclodevelopmental	The disease agent undergoes cyclical change but does not multiply in the body of an arthropod.	Filarial parasite in the Culex mosquito.

Q. Cyclopropagative life cycle is seen in which disease? 2019
a. Malaria
b. Plague
c. Filariasis
d. Yellow fever

Ans: a. Malaria

MEASUREMENTS IN EPIDEMIOLOGY 00:09:50

- Attack Rate: (No. of new cases in population at risk/Total population at risk) x 100
  - Calculated during outbreaks
- Secondary Attack Rate (SAR):
  - Measures the transmissibility/communicability of a disease.
  - It represents the number of secondary cases that develop following exposure to a primary case within the Incubation Period (IP) of the disease.
  - SAR = (No. of secondary cases/Total no. of susceptibles) x 100

Q. The probability that infection will occur among susceptible persons following contact with an infectious person within the incubation period is known as the: NEETPG 2018
a. Secondary attack rate
b. Case fatality rate
c. Primary attack rate
d. Tertiary attack rate

Ans: a. Secondary attack rate.

Yourwish

Yourwish

Q. A couple has 4 children, all unvaccinated for Measles. A child got Measles on 5 August 2015. Two other children developed Measles by 15th August 2015. Secondary attack rate is:

a. 0%
b. 33%
c. 66%
d. 75%

Ans: c. 66%

- SAR = 2/(4-1) = ⅔ = 0.66 → 66%
- In a community, there are 100 children,60% vaccinated. On 5th April, 5 children developed measles.10 other children develop following exposure.
  - Safe: 60
  - Susceptible: 100 - 60 = 40
    → SAR=10/(40-5) = 0.28 → 28%

Q. Which of the following reflects the virulence of a disease? FMGE 2020

a. Proportional mortality rate
b. Incidence
c. Case fatality rate
d. Prevalence

Ans: c. Case fatality rate

Q. A disease with a 3-14 day incubation period has a median incubation of 10 days. A person who has not been vaccinated needs to travel abroad. How long should they be quarantined? NEETPG 2024

a. 20 days
b. 14 days
c. 28 days
d. 10 days

Ans: c. 28 days

Quarantine	Isolation	Modified Quarantine
• Applies to healthy contacts. • Duration is twice the maximum Incubation Period (IP) of the disease (Absolute quarantine) • Primary level of prevention.	• Applies to cases. • Duration is based on the Period of Communicability. • Primary level of prevention.	• Defined as the Partial limitation of movement.

Q. A 2-year-old girl is brought to the clinic with high fever, cough, red eyes, and rash. Parents mention that the rash started on the forehead and behind the ears, then spread to the neck and body. On examination, a confluent maculopapular rash is noted, as shown in the image. All are true regarding the child's condition except?

a. Koplik spots are pathognomonic FMGE 2020
b. Warthin-Finkeldey giant cells are pathognomonic

Yourwish

c. The period of infectivity is 3 days before and 5 days after the appearance of rash
d. Most common cause of death is subacute sclerosing panencephalitis



Ans: d. The most common cause of death is subacute sclerosing panencephalitis

MEASLES

00:19:10

FMGE 2018, 2020
NEET PG 2018

- Agent: RNA paramyxovirus (so far, only one serotype known) → No iceberg phenomenon.
- Source of Infection: Case of Measles, no carrier.
- Host factor: 6 months to 6 years (In India → 0–3 years).
- Koplik spot: Appears 24–48 hours before rash in buccal mucosa opposite the l ower second molar.
- Rash: Maculopapular confluent rash arising opposite the lower second molar, retroauricular in origin.
- MC complication in young children is Otitis Media.
- MC infection: Diarrhoea
- MC cause of death: Pneumonia.
- Long-term rare complication: SSPE (Subacute Sclerosing Panencephalitis).
- Period of Communicability: 4 days before and 4 days after appearance of rash.

Q. A school has a small outbreak where children are showing symptoms like a runny nose, cough, fever, and skin rash. The doctors identified it as a measles outbreak. Which of the following is the correct time to give the post-exposure measles vaccine?

FMGE 2018

a. 3-4 days
b. 7-10 days
c. 10-14 days
d. 1-6 months

Ans: a. 3-4 days

- Natural IP: 10-14 days
- Post vaccination: Antibodies develop within 7-10 days of exposure.
- In case of an outbreak, the medical officer should inform the district surveillance officer.

Outbreak Measures

- Isolation: 7 days after rash onset
- Susceptible contacts (9-12 months) may be protected by giving the measles vaccine within 3 days of exposure.
- Measles may be prevented by administering immunoglobulin early in the incubation period.
- Dose: 0.25 mL/kg of body weight
- Schedule: 3-4 days of exposure, then immunise the person by giving the vaccine 8-12 weeks later

Q. According to the WHO, what percentage of Immunization coverage is needed for the eradication of measles?

NEETPG 2018

a. 68%
b. 72%
c. 84%
d. 96%

Ans: d. 96%

Who Measles Elimination Strategy: Catch Up, Keep Up, Follow Up

- Catch up: Nationwide vaccination campaign targeting all children 9 months to 14 years of age, irrespective of history of measles or vaccination status.
- Keep up: Routine immunisation aimed at vaccinating more tha 95% of each successive birth cohort.
- Follow-up: Subsequent nationwide vaccination campaigns are conducted every 2-4 years, usually targeting all children born after the catch-up campaign.

RUBELLA

00:23.30

- Also called: German measles
- Organism: Belongs to the family Matonaviridae
- Mode of transmission: Droplet
- Incubation Period: 2-3 WEEKS
- Period of Communicability: 5-6 days after rash onset
- Rash may not be seen in 25% infections, seen on day 1
  - Maculopapular discrete rash
- Forchheimer spots: Tiny, rose coloured lesions in the oropharynx
- Most serious complication: Encephalitis
- Vaccination: RA 27/3

Rubella Vaccination Strategy

- 1st priority: Women of childbearing age (15-34 or 39 years of age)
- 2nd priority: Interrupt transmission by vaccinating all children 1-14 years old
- 3rd priority: Routine immunisation of all children <1 year (using combined MR or MMR vaccine)

Q. All are correct about Rubella Infection except?

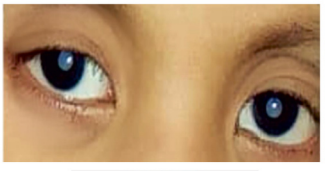
NEETPG 2019

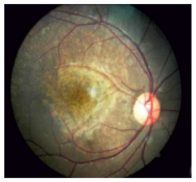
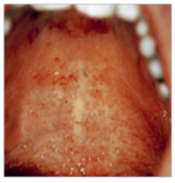
a. Type of droplet infection
b. Infection in early pregnancy results in a milder form of disease in the foetus
c. A fetus affected in late pregnancy may only have deafness
d. All are correct

Ans: b. Infection in early pregnancy results in a milder form of disease in the foetus

Congenital Rubella Syndrome

- Classic Triad:
  - Sensorineural Hearing Loss
  - B/L Cataract
  - PDA
- Other features:
  - Salt & pepper fundus
  - Blueberry muffin rash
  - Forchheimer spots



CHICKEN POX

00:26:38

- Agent: Varicella zoster virus (human [alpha] herpes virus-3)
- Source of Infection: Case of chickenpox

Yourwish

- Period of Communicability: 1-2 days before and 4-5 days after onset of rash
- Virus can be isolated from vesicular fluid during the first 3 days of illness
- Incubation period: 14-16 days
- Signs/symptoms:
  - Symmetrical, pleomorphic, vesicular rash, "dew drop on a rose petal", centripetal in distribution
  - Area of inflammation around the rash
  - Scabs of rash are not infectious
- Complication: Pneumonia-related deaths
- Prevention of chickenpox in high-risk exposed individuals: Immunoglobulin
  - Dose 12.5 units/kg (Max 625 units)
  - Repeat Dose After 3 weeks if the patient remains at high risk
- Indications for VZIG
  - HIV/AIDS or immunocompromised persons
  - Patients on immunosuppressive therapy
  - Congenital cellular immunodeficiency



Q. An outbreak of fever with headache and pleomorphic rash (sparing palms and soles) occurs in a boys' hostel. What is the next best step in management? NEETPG 2023

a. Isolate for 6 days after giving acyclovir, followed by VZIG within 72 hours
b. Isolate for 12 days after giving acyclovir, followed by VZIG within 48 hours
c. Isolate for 6 days
d. Only give VZIG

Ans: c. Isolate for 6 days

- Isolation of the child for a period of 6 days after the onset of rash and disinfecting all materials contaminated

Q. A pregnant woman living with her niece, who has varicella, tests negative for varicella antibodies. What does this indicate? NEETPG 2021

a. She is immune to zoster
b. She is susceptible to zoster
c. She is susceptible to chickenpox
d. She is immune to chickenpox

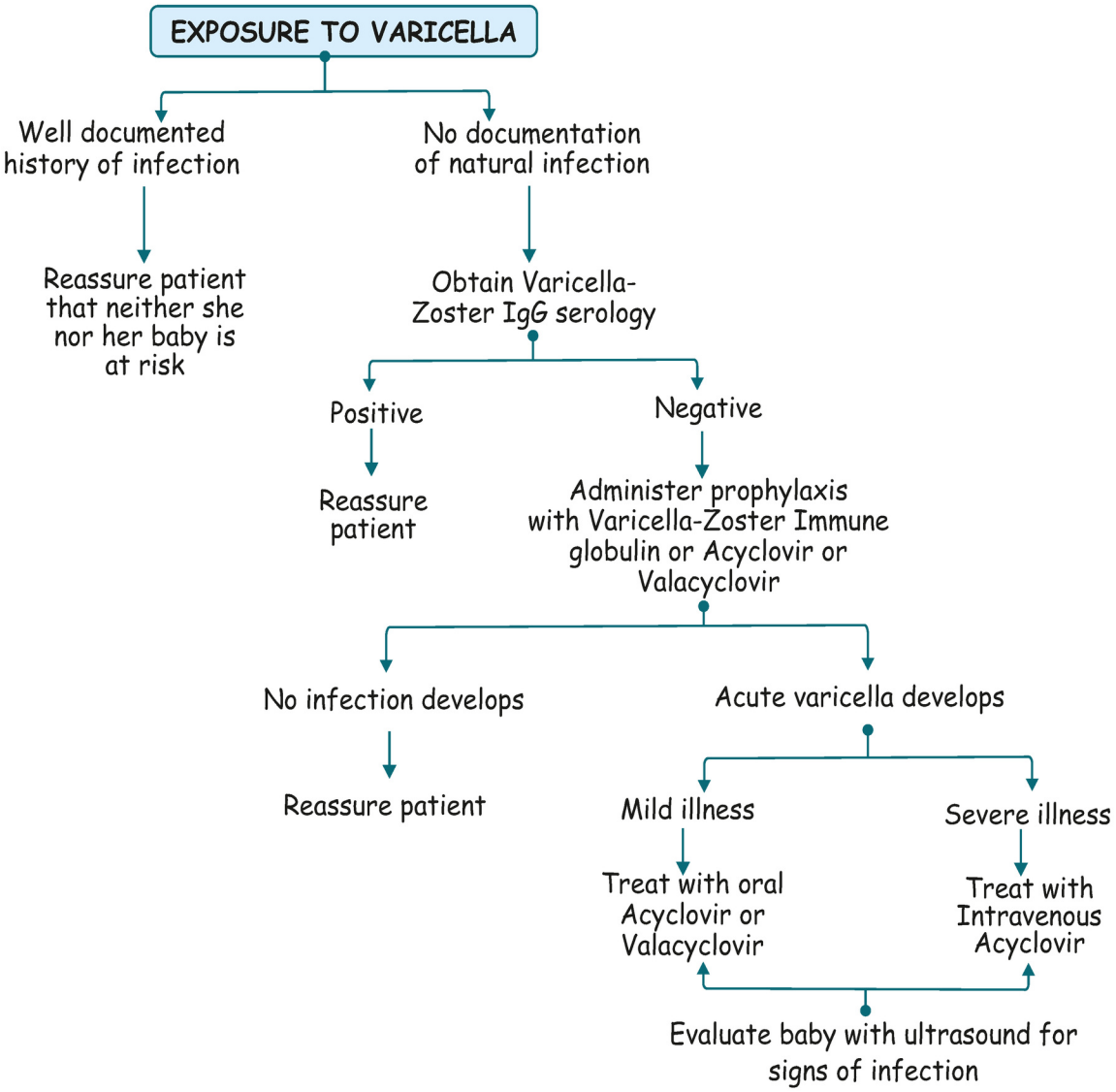
Ans: c. She is susceptible to chickenpox

Varicella In Pregnancy

- Varicella in the first 2 trimesters: Congenital varicella (more life-threatening if acquired in 1st trimester).
- Varicella at any stage of pregnancy, especially the 3rd trimester: Maternal varicella pneumonia
- Varicella <=5 days antepartum to 2 days postpartum: Neonatal varicella.

Yourwish

Yourwish



Q. After how many days is the polymorphic rash of varicella not contagious? FMGE 2020

a. 4 days after appearance of lesions
b. 7 days after the appearance of lesions
c. 14 days after appearance of lesions
d. After crust formation over lesions

Ans: d. After crust formation over lesions

DIPTHERIA

00:31:16

- Agent: Corynebacterium diphtheriae, a gram-positive, non-motile organism
- Source of Infection: Case, subclinical case, carrier
- The most important source of infection is chronic carriers
  - Nasal carriers are more dangerous than throat carriers
- Carriers account for 95% disease transmission
- (95:5) carrier: Case ratio
- Incidence of carriers in community: 0.1-5%
- "Bull's neck" is seen in diphtheria.
- Immunisation does not prevent the carrier state
- Period of Communicability: From infection till 14-28 days after



- Incubation Period: 2–6 days
- Mode of Transmission: Droplet, healthy carrier
- Host factor: Age: 1–5 years

Q. An unvaccinated 5-year-old presents with a sore throat and difficulty swallowing. Examination reveals a greyish membrane over the tonsils. Her vaccinated 2-year-old brother is asymptomatic. What is the appropriate management for the sibling? NEETPG 2024



a. No intervention
b. Booster dose of toxoid
c. Single dose of immunoglobulin
d. Prophylactic dose of penicillin

Ans: d. Prophylactic dose of penicillin

- Close contacts of diphtheria cases should receive prophylactic antibiotics.
- Do not scrape the pseudomembrane

Diphtheria Contact Management

NEET PG 2024

- All household contacts of diphtheria are closely monitored for 7 days.
- Culture taken from throat and nose.
- Antibiotic prophylaxis (Benzathine penicillin G or erythromycin) regardless of immunisation status.
- If fewer than 3 doses of diphtheria toxoid have been given or vaccination history is unknown: Immediate dose of diphtheria toxoid given and primary series completed according to current schedule
- If more than 5 years have elapsed since administration of the diphtheria toxoid-containing vaccine, a booster dose should be given.
- If the most recent dose was within 5 years: no booster required.
- At least 2 successive negative cultures obtained 24 hrs apart after completion of therapy.

Treatment

- Cases: Diphtheria antitoxin given IM or IV immediately after a preliminary test dose of 0.2ml/SC.
  - Mild disease: 20,000–40,000 units
  - Moderate disease: 40,000–60,000 units
  - Severe disease: 80,000–100,000 units
- Treatment with Benzyl penicillin or Penicillin G for 5–6 days.
- Carriers: Oral erythromycin for 10 days.

Important Information

- Unilateral parotid swelling: Characteristic of Mumps.
- MC complication of mumps in young children: Aseptic Meningitis.
- MC complication in young adults: Orchitis/Oophoritis.
- Infectious cause of Sensorineural hearing loss → Mumps



Disease	Incubation Periods	Period of Communicability	Causing agent
Measles	10-14 days	4 days before to 5 days after rash appearance	RNA Paramyxovirus
Chicken pox	14-16 days	1-2 days before rash to 4-5 days after the appearance of rash	Human herpes virus 3
Rubella	14-12 days	7 days before symptoms to 7 days after appearance of rash	RNA Togavirus
Influenza	18 hours- 72 hours	1-2 days before to 1-2 days after	Orthomyxovirus
Diptheria	2-6 days	Symptoms to 14-28 days	C. diptheria
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

ARI MANAGEMENT

Classification Of Pneumonia And Treatment - Imnci

00:37:29
NEET PG 2020
FMGE 2021

	For infants < 2 months:	For children 2 months to 5 years:
No chest indrawing and no fast breathing.	No pneumonia	No pneumonia
	Green: Home-based Rx	
Chest indrawing and/or fast breathing.	Severe pneumonia:	pneumonia
	Pink: First dose of syrup amoxicillin and refer to CHC	Yellow: Give syrup amoxicillin and return to follow up in 2 days
Danger signs include stridors in a calm child, cyanosis, lethargy, high-grade fever, and not breastfeeding.	Very Severe pneumonia	Severe pneumonia
	Pink: Refer to CHC	

- According to the SAANS Program for management of pneumonia:
  - Chest indrawing is taken as a danger sign.

Rule Of Fast Breathing

Rule of 60: RR >60/MIN	Applicable to infants < 2 months
Rule of 50:RR >50/MIN	Applicable to infants 2-12 months
Rule of 40:RR >40/MIN	Applicable to children 12-60 months

Yourwish

Q A 24-month-old child weighing 11 kg presents with a respiratory rate of 38/min and chest indrawing. What is the next step in management? NEETPG 2020

a. Oral amoxicillin for five days
b. Urgent referral to a tertiary care centre.
c. Administer IV antibiotics and reassess after 24 hours
d. Start antipyretics urgently

Ans: a. Oral amoxicillin for five days.

- Average birth weight: 2.8kg
- Weight doubles in 6 months
- Weight triples in 1 year
- Weight quadruples in 2 yrs
- Here for 2 years, the expected weight is 11.2 kg, and the observed is 11 kg
- Hence, no referral to CHC

Q. A one-year-old infant presents to the PHC. The infant is not taking feeds, has a cough, and fever for 2 days. On examination, he is calm with a respiratory rate of 52 breaths/minute, and stridor is also present. According to IMNCI, how is the child classified? FMGE 2021

a. Pneumonia
b. Cough and cold
c. Severe pneumonia
d. ARDS

Ans: c. Severe pneumonia

ZOONOTIC DISEASE

00:43:45

- Types of Zoonoses
  - Anthropozoonoses: Humans acquire infection from animals (e.g., Rabies)
  - Zooanthroponoses: Animals acquire infection from humans (e.g., Human TB in cattle).
  - Amphixenosis: Transmission occurs in both directions (e.g., Trypanosoma cruzi).

Q. An outbreak of bubonic plague is reported in the community. What is the primary vector responsible for? NEETPG 2021

a. Xenopsylla cheopis
b. Phlebotomus argentipes
c. Ixodes tick
d. Female Anopheles mosquito

Ans: a. Xenopsylla cheopis



Plague

NEET PG 2021

- Agent: Yersinia pestis
- Reservoir: Wild rodents: Tatera indica
- Vector: Rat flea: Xenopsylla cheopis- carries up to 5000 plague bacilli in 0.5 cu mm of blood
- Source of infection: Infected rodents, fleas, and cases of pneumonic plague
- Incubation Period



Xenopsylla cheopis
(oriental rat flea) engorged with blood

Yourwish

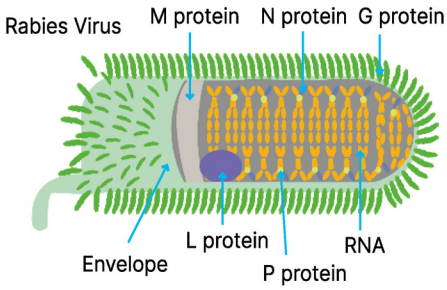
Yourwish

  - 2-7 days for septicemic, bubonic plague
  - 1-3 days for pneumonic plague
- Cheopis index: Average number of cheopis per rat
  - If it is more than one, it indicates the explosiveness of the plague disease
- Most common: Bubonic plague
- Most dangerous: Pneumonic plague
- Diagnosis:
  - Wayson's staining (bipolar staining)
  - Gold standard- blood culture
- Treatment:
  - Isolation for pneumonic plague
  - Drug of Choice: Injection Streptomycin, Tetracycline (alternate prophylaxis)
- Chemoprophylaxis: Tetracycline
- Vaccine: 2 doses, Haffkine salkhoy vaccine, 1 week before exposure
  - Can be given in an epidemic in large doses
- Control of vector: Flea index to be zero within 48 hours of outbreak reporting

Rabies

NEET PG 2022
FMGE 2018, 2021, 2024, 2025
INICET 2022, 2023

- Agent: Lyssavirus Type 1 (Bullet-shaped RNA virus)
- Types of rabies virus:
  - Street virus → Responsible for cases
  - Fixed virus → Vaccine production
- Reservoir: Wild animals
- Source of infection: Saliva of a rabid animal
- IP: 3-8 weeks
- Rabies-free states in India: Andaman and Nicobar, Lakshadweep
- Rabies-free countries: UK, Australia



Q: A child was bitten by a street dog. On examination, an eversion of 1.8cm is seen with slight oozing. Identify the correct statements:

INICET 2022

1. Category 3 wound.
2. Wash the wound with normal tap water for 15-20 minutes.
3. Clean the wound with spirit.
4. Loose suturing of the wound with a proper dressing.
5. Equine Immunoglobulin is given at a dose of 40IU/kg body weight twice.
6. Intradermal vaccine is administered on days 0, 3, 7, and 28.

a. 2, 3, 5, 6
b. 1, 2, 5, 6
c. 1, 2, 3, 5
d. 1, 2, 3, 6

Ans: d. 1, 2, 3, 6

Yourwish

Categories Of Exposure To Suspect Or Confirmed Rabid Animal Bite

Categories of contact with a suspect rabid animal	Post exposure prophylaxis
Category I • Touching or feeding animals • Licks on intact skin.	None.
Category II • Nibbling of uncovered skin; • Minor scratches or abrasions without bleeding.	• Local treatment of wounds and Anti-rabies vaccine. • IG given if HIV infected.
Category III • Single or multiple transdermal bites or scratches → Bleeding + • Licks on broken skin • Contamination of the mucous membrane with saliva from licks • Contacts with bats.	• Local treatment of the wound; • Immediate vaccination • Administration of rabies immunoglobulin.

Physical	Wash with running tap water for 15-20 minutes	For the mechanical removal of the virus from the wound
Chemical	Wash the wound with soap and water, then apply disinfectant	For inactivation of the virus.
Biological	Infiltrate immunoglobulin into the depth and around the wound in Category III exposures.	For neutralisation of the virus.

Wound Management

Rabies Vaccination(Recommended Regimens)

- Day 0→ 1st dose of vaccine

Type	Route of administration	Dose of vaccine	Day of dose	No of injections	Total No of visits	Site
Post-Exposure Prophylaxis	Intradermal • Updated THAI RED CROSS REGIMEN • Followed by India	0.1 ml per dose Intradermal	Days 0, 3, 7, 28	2	4	Deltoid muscle (Adults); Anterolateral thigh (Small Children/Infants)
	Intramuscular • ESSEN	1 entire vaccine vial-0.5 ml	Days 0, 3,7, 14,28	1	5	
Pre-Exposure Prophylaxis Goal: Antibodies > 0.5IU/ml.	Intradermal	0.1 ml per dose	Days 0, 7, and booster on either day 21 or 28.	1	3	

	Intramuscular	1 entire vaccine vial-0.5 ml	Days 0, 7, and booster on day 21 or 28.	1	3	
Re exposure Within 3 months: Wash the wound Greater than 3 months: vaccine	Intradermal	0.1 ml per dose	Day 0 and 3	1	2	
	Intramuscular	1 entire vaccine vial-0.5 ml	Day 0 and 3	1	2	

Q. A pregnant female was scratched by a street dog 2 hours ago. She sustained minor abrasions with no bleeding. What is the best line of treatment for her? FMGE 2021

a. No treatment required due to pregnancy
b. Only local wound cleaning
c. Local wound cleaning with rabies vaccine
d. Local wound cleaning, Rabies vaccine, and immunoglobulins

Ans: c. Local wound cleaning with rabies vaccine

Q. Which of the following is true about the management of an HIV patient with multiple dog bites? FMGE 2025

a. Wound management
b. Rabies vaccine + Immunoglobulin wound management
c. Wound management + Immunoglobulin
d. Rabies vaccine + wound management

Ans: b. Rabies vaccine + Immunoglobulin wound management

Q. A patient comes with a history of category 3 dog bites. He received prophylaxis for a monkey bite 6 months ago. What is the next step in management? FMGE 2024

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

Ans: b. Wound cleaning + rabies vaccine on day 0 & 3

Q. A person with an up-to-date dog bite vaccination and a splenectomy history five years ago is bitten by a dog. What is the best management? INICET 2023

a. Observation
b. Amoxiclav
c. Metronidazole
d. Ciprofloxacin

Yourwish

Ans: b Amoxiclav

- To prevent capnocytophagia infection present in the mouth of the dog

Q. Which of the following is a false statement regarding rabies immunoglobulin? INICET 2022

a. It is exclusively given in the deltoid
b. The dose is 20 IU/kg
c. It is not given after 7 days of the first vaccine dose
d. If human RIG is unavailable, equine RIG is preferred

Ans: **A.** It is exclusively given in the deltoid

- Human Rabies IG is given around the wound: 20 IU/Kg
- If human Ig is not available, equine Ig is used: 40 IU/kg

Q. An urban area has a higher number of rabies cases. The most cost-effective and logical approach to controlling Rabies is NEETPG 2022

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

Ans: b: Reduce stray dogs and vaccinate all dogs.

- 85% of dog population is easily accessible in an area
- Other Prevention Methods:
  - Registering and licensing of all domestic dogs.
  - Restraint of dogs in public places.
  - Immediate destruction of dogs and cats bitten by rabid animals.
  - Quarantine for 6 months for imported dogs.
  - Health education of people regarding care of dogs and prevention of rabies.

Q.Rapid diagnosis of Rabies in a Rabid living dog is by? FMGE 2018

a. Fluorescent antibody test,
b. Corneal impression
c. Inoculation in mouse
d. None of the above.

Ans: a.Fluorescent antibody test,

- The fluorescent antibody test is the most reliable and rapid test for detecting rabies antigen in brain tissue.

Diagnosis

- After death
  - Negri Body: Intracytoplasmic eosinophilic inclusion body.
    → 1st site: AMMON'S horn of Hippocampus.
    → 2nd site: Cerebellum.
- Alive Person:
  - Skin biopsy from the nape of the neck.
  - Viral antigen detection by fluorescent antibody test.

Yourwish

Yourwish

Rickettsial Diseases

00:58:29

FMGE 2024

Diseases	Rickettsial agent	vector	Mammalian host
Typhus Group			
Epidemic typhus:	R. Prowazekii	Louse	Humans
Murine typhus/ Endemic typhus	R. Typhi	Flea	Rodents
Spotted Fever Group			
Indian tick typhus	R. Conorii	Tick	Rodents and dogs
Rocky Mountain spotted fever	R. Rickettsiae	Tick	Rodents and dogs
Rickettsial pox	R. Akari	Mite	Mice
Orientia group			
Scrub typhus (Eschar formed)	O. Tsutsugamushi	Trombiculid mite	Rodents
Others			
Q fever:	C. Burnetii	Nil	Cattle, Sheep, and Goats
Trench fever	R. Quintana	Louse	Humans

Q: A soldier presents with fever, rash (no rash on palms and soles), and myalgia. There is also a history of louse infestation in the soldier barracks. The probable causative organism is?

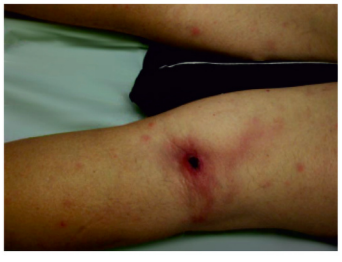
a. R. prowazekii
b. R. conorii
c. R. typhi
d. R. akari.

Ans: a. R. Prowazekki

Q. A female patient presented to OPD with a rash on her trunk. On examination, there is an eschar in the trunk region, and regional lymphadenopathy is noted. She reports that recently she experienced a mite bite during a camping trip in that area. What is the probable diagnosis?

FMGE 2024

a. Endemic typhus
b. Scrub typhus
c. Epidemic typhus
d. Rocky Mountain spotted fever



Ans: b. Scrub typhus

Yourwish

Treatment

- Doxycycline 100mg BD for 5-7 days

Other Zoonotic Diseases

	Leptospirosis	Brucellosis	KFD (Kyasanur Forest Disease)
Agent	L. interrogans	B. melitensis	Group B arbovirus
Vector	Urine of infected rat	Food, Airborne	Outside India: Soft tick India: Hard Tick.
Reservoir	Monkey, Rat, Squirrel	Domestic animal	Monkey, Rat, Squirrel.
Clinical Features	Mild: Fever with chills, Myalgia, Conjunctivitis, Headache, Renal/Pulmonary symptoms. Severe: Jaundice, Renal failure, CV collapse.	Acute: Swinging fever, sweating, arthralgia, headache. Chronic: Recurrence of symptoms for a long time.	Sudden onset of fever, headache, myalgia, bleeding skin, mucosa, and viscera.
Diagnosis	Leptospira in urine/blood; Serological test.	Bacteria by RT PCR, Rose Bengal test, Milk ring test.	Viral isolation by RT-PCR, Serological test.
Treatment	Mild: Doxycycline; Severe: Penicillin.	DOC: Doxycycline.	Supportive.
Prevention	Chemoprophylaxis: Doxycycline.	Live vaccine.	Killed vaccine.

TETANUS

01:01:47

NEET PG 2020

- Causative organism: Cl. Tetani
- IP: 6 - 10 days (8th-day disease)
- Reservoir & Source of Infection: Soil
- MOA: Toxin - blocks inhibitory spinal reflex - muscle spasm
- Neonatal tetanus has been eliminated from India
  - Criteria: < 1 case /1000 live births
- Treatment:
  - DOC: Penicillin
  - Ig: Human tetanus Immunoglobulin 250 IU
- Prevention:
  - Pre-Exposure Prophylaxis: Active Immunization
  - Goal: Antitoxin > 0.01 IU/ml
  - No role of herd immunity

Tetanus Management Protocol

Category	Clean wound	Unclean wound:
A: Full immunization within 5 Years	Only wound care	Only wound care
B: Full immunization > 5 years ago - < 10 years	Wound Care + TT single dose	Wound Care + TT single dose
Category C: Full immunization > 10 years ago	Wound Care + TT single dose	Wound Care + TT single dose + Human Tetanus Immunoglobulin
Category D: Unknown, not known, never taken immunization	Wound Care + TT complete course	Wound Care + TT complete course + Human Tetanus Immunoglobulin

Q. A patient sustains a clean-cut injury and reports receiving the last tetanus vaccine 10 years ago. What is the appropriate management?

NEETPG 2020

a. Full course of tetanus vaccination
b. Single dose of tetanus toxoid
c. Tetanus toxoid with immunoglobulin
d. No vaccination needed

Ans: **b** Single dose of tetanus toxoid

FMGE 2024
INICET 2025

HEPATITIS

01:04:17

Types	Incubation Period	Mode of Transmission:
Hepatitis A	10-50 days.	Faeco-oral route, Sexual
Hepatitis B	30-180 days	Sexual, perinatal, parenteral route.
Hepatitis C	2 weeks-6 months.	Parenteral route.
Hepatitis D	30-90 days	Sexual, perinatal, parenteral route.
Hepatitis E	3-8 weeks	Faeco-oral route.

Hepatitis B Serum Markers

• First evidence of Hepatitis B infection: • Persists for > 6 months • Epidemiological marker for Hepatitis B	HBsAg
• Most accurate index of viral replication • Rarely appears in serum	HBcAg
• Active viral replication signals acute high infectivity:	HBeAg
• First antibody to appear & is most important in the diagnosis of Acute Hepatitis B	Anti-HBc
• Good prognostic markers indicating low infectivity	Anti-Hbe

Yourwish

• Last to appear, marking the end of the communicability period, seen in immunised individuals	Anti-HBs

Q. The students of a hostel eat from the same canteen. One of the students developed abdominal pain, jaundice, and fever, following which other students presented with similar complaints. Which of the following investigations should the Medical Officer of the area check for to reach a diagnosis? 2020

a. IgA for Hepatitis A
b. IgM for Hepatitis A
c. IgM for Hepatitis B
d. IgG for Hepatitis B

Ans: b. IgM for Hepatitis A

- The above scenario represents an outbreak of Hepatitis A, which spreads by the fecal-oral route through contaminated food or water.
- The investigation of choice for diagnosis is IgM anti-HAV antibody.

Q. A previously vaccinated healthcare worker (HCW) sustains a needle-stick injury from a Hepatitis B surface antigen (HBsAg) positive patient. The HCW is a known non-responder. What is the next step in management?

a. Give 2 doses of Hepatitis B Immunoglobulin (HBIG) immediately, at separate sites INICET 2025
b. Give 2 doses of HBIG — one immediately and another after 4 weeks
c. Give 1 dose of HBIG + start a complete Hepatitis B vaccination series
d. No further action is required

Ans: b. Give 2 doses of HBIG — one immediately and another after 4 weeks

Post-Exposure Prophylaxis Of Hepatitis B

HCW Status	Source patient	Management
Previously vaccinated responder (anti-HBs >= 10 mIU/ml)	HBsAg +	No treatment needed.
Previously vaccinated — unknown response	HBsAg +	Test anti-HBs; if < 10, treat as non-responder.
Previously vaccinated — non-responder (anti-HBs < 10 after 2 full series)	HBsAg +	HBIG 2 doses (1 now, 1 after 1 month). No further vaccine since already proven non-responder.
Unvaccinated or incompletely vaccinated:	HBsAg +	HBIG X1 + Start vaccine series immediately.

Q. An HIV positive patient has the following serology results. What is the management of this patient? FMGE 2024

Serology Results:

HBsAg: Positive
Anti-HBc: Positive
IgM anti-HBc: Positive
Anti-HBs: Negative

Yourwish

Yourwish

a. Tenofovir + lamivudine + efavirenz
b. Tenofovir + lamivudine + dolutegravir
c. Lamivudine + emtricitabine + nevirapine
d. Tenofovir + emtricitabine + abacavir

Ans: **b.** Tenofovir + lamivudine + dolutegravir

HIV

01:08:44

ART Regimens	First-line
• All PLHIV with age > 10 years and body weight > 30 kg with HIV 1, HIV 2, or HIV-1 & 2 coinfection who have not yet received any ART. • Patients with HIV-TB and HIV hepatitis co-infections. • Pregnant women and breastfeeding women.	Tenofovir + Lamivudine + Dolutegravir
• All PLHIV with body weight < 30 kg. • All PLHIV with abnormal serum creatinine values.	Abacavir + Lamivudine + Efavirenz
• Antivirals effective against Hepatitis C infection	Sofosbuvir, grazoprevir and glecaprevir.

- Pre-exposure prophylaxis for high-risk groups
  - Tenofovir+Emtricitabine(oral) or
  - Tenofovir+lamivudune(oral)

TYPHOID

01:11:17

Q. A man occasionally eats outside due to traveling reasons. He presents to a physician with abdominal pain for 4 days, along with a history of fever and bradycardia. What test is used to confirm a diagnosis? NEETPG 2024

Options:
a. Blood culture.
b. Widal test.
c. Stool culture.
d. Urine culture.

Ans: **a.** Blood culture

- A history of fever and bradycardia with abdominal pain is suggestive of typhoid fever.
- Blood culture is the most reliable test to confirm the diagnosis in the early stages of typhoid, particularly within the first week of illness.

Diagnosis Of Typhoid

- Gold Standard: Blood culture
- Serology: Widal Felix test
- O antibody: day 6-8
- H antibody: day 10-12
- Rapid Serological Tests:
  - Tubex test

Yourwish

- Typhidot: Detects both IgM and IgG antibodies
- Mnemonic-BASU:
  - Blood culture>Ag-Ab>Stool>Urine culture

Q.Which of the following is the most effective measure to prevent typhoid transmission in a community? INICET 2022

a. Typhoid vaccine

b. Hygiene and sanitation control

c. Person-to-person transmission prevention

d. Drug resistance is not a major concern in typhoid

Ans: b. Hygiene and sanitation control

Treatment

- Isolation: Until 3 negative stool/urine cultures are obtained on 3 different days.
- Drug of Choice: Cefixime
- Resistant Cases: Ceftriaxone, Azithromycin
- Disinfection: (Feces, urine, vomit) using 5% cresol.
- In case of carrier, use Ampicillin/amoxicillin + probenecid.
- Best Management for Carrier State: Cholecystectomy + Ampicillin.

Prevention And Control

- Immunization

Ty21a	Vi Polysaccharide Vaccine
Oral	SC/IM
>5 Years	> 2 Years
3 Dose Regimen (Day 1, 3, 5) every 3 years	Single dose, revaccination every 3 years
Immunity: After 7 days	Immunity: After 7 days

Q. Cholera period of isolation? 2018

a. 3 days after starting Tetracycline till 48 hours of antibiotics

b. 7 days after starting Tetracycline

c. 7-14 days

d. Until 3 weeks of effective antibiotic therapy

Ans: a. 3 days after starting Tetracycline till 48 hours of antibiotics

Q. Cholera is a notifiable disease that should be reported to the World Health Organisation within? NEETPG 2020

a. 72 hours

b. 24 hours

c. 12 hours

d. 2 days

Ans: b. 24 hours

- Cholera should be notified to WHO within 24 hours of its occurrence.
- The number of cases and deaths should be reported daily and weekly until the area is declared free of cholera.
- An area is declared free when no new case, death, or recovery has occurred for twice the incubation period (10 days).

CHOLERA

01:13:07

Diagnosis

- Stool collection and transportation:
  - McCartney bottles for the transport of stool
  - Transport holding media: Venkatraman Ramakrishnan (VR) media
  - Rectal swabs transported in alkaline peptone water or Cary Blair media
- Culture methods:
  - Hanging drop preparation: Demonstrates scintillating movements
  - Dark Field illumination: Shooting Stars In Dark Sky

Treatment

- Isolation: Patient till 2-3 negative stool culture reports obtained
- Rehydration: ORS + Zinc
- Antibiotics:
  - Adults: Doxycycline
  - For children: Erythromycin
  - For pregnant women: Erythromycin or Azithromycin
  - Chemoprophylaxis: Tetracycline
- Disinfection: (Stool/vomitus) - 5% cresol

Cholera Vaccine

NEETPG 2024

- Oral killed vaccine
  - Monovalent (O1/O139 group): Dukoral
  - Bivalent (O1 + O139 group): Shanchol/Euvichol
  - 2 doses (Given 14 days apart for children 1 year and above and adults.)
    → Protection against cholera for up to 3-5 years.
  - Used in areas outbreak prone areas, refugee camps.
- Cholera is a notifiable disease under IHR.
- Most effective prophylactic measure: health education.

Q. A child is brought to the PHC with acute diarrhoea. The doctor suspects that the infection may be due to Shigella rather than Cholera and gives Ciprofloxacin as the antibiotic. Which of the following points on history apart from bloody stools favors the doctor's suspicion?

FMGE 2021

a. Absence of rectal pain
b. Presence of abdominal cramps
c. Presence of vomiting
d. Presence of fever

Ans: d. Presence of fever

Yourwish

Symptoms	Shigella	Cholera
Diarrhoea	>3 Acute bloody stools with blood or pus	>3 loose, Acute watery stools every day, like rice water
Fever	Yes	No
Vomiting	No	Yes
Rectal Pain	Yes	No

DIARRHEA

01:15:56

Composition Of Ors Solutions

Contents	Reduced Osmolarity (mmol/L):
Glucose	75
Sodium	75
Chloride	65
Potassium	20
Citrate	10
Osmolarity	**245**

Contents	Reduced Osmolarity (g/L)
Sodium chloride	2.6
Glucose, anhydrous:	13.5
Potassium chloride	1.5
Trisodium citrate, dihydrate	2.9
Total weight	**20.5**

- Single ORS packet dissolved in 1L of water and should be consumed in 24 hrs.
  - Best public education by demonstration
- ReSoMal: Rehydration solution of Malnourished (Na 45, K 40).
- Super ORS: Rice-based or non-starch sugars are used (Glycine, alanine).
  - Decreased shelf life

Degree Of Dehydration

Factors	Mild	Moderate	Severe
General Condition	Well, alert	Restless, thirsty, irritable	Drowsy, cold extremities, lethargic

Yourwish

Yourwish

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 decreased (> 2 sec)
Thirst	Normal	Drinks eagerly, thirsty	Unable to drink or drinks poorly
Pulse (N=110-120 beat/min):	Slightly increased	Rapid, weak	Rapid, sometimes impalpable
BP (N=90/60 mm Hg):	Normal	Decreased	Decreased, may be unrecordable
Respiratory rate	Slightly increased	Increased	Deep, rapid
Urine output	Normal	Reduced	Markedly reduced
Treatment	Plan A	Plan B	Plan C

Q. A 2-year-old child came in the OPD with severe diarrhea, vomiting, deeply sunken eyes, and no urine output. On examination, the baby is severely dehydrated, lethargic, with a high respiratory rate and BP of 80/60 mmHg. Which fluid is given for management?

a. ORS
b. Ringer lactate with 5% dextrose
c. Normal saline
d. All of the above

Ans: b. Ringer lactate with 5% dextrose

Management

- 3 Categories of management:
  - No signs of dehydration (Fluid loss <50ml/kg) – Treatment Plan A
  - Some signs of dehydration (Fluid loss 50-100ml/kg) – Treatment Plan B
  - Severe dehydration (Fluid loss more than 100ml/kg) – Treatment Plan C

- Plan A: For no or minimal dehydration, ORS is administered after each loose stool.
  - Age <2 years: 50-100ml
  - Age 2-10 years: 100-200ml
  - Age >10 years: As much fluid as they want
  - Zinc Supplementation
    → Age 2 months up to 5 years
    → 2 months to 6 months: ½ tablet daily for 14 days
    → 6 months and more: 1 tablet daily for 14 days
- Plan B: Treat some or moderate dehydration with ORS (Yellow)
  - 75ml/kg body weight

Weight	< 6kg	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 ml	450-800 ml	800-960 ml	960-1600 ml

- For infants under 6 months who are not breastfed, also give 100-200 ml of clean water during this period if you use standard ORS.
- Plan C: Treat severe dehydration (Pink)
  - IV Fluids: Ringer Lactate preferred. Normal saline can also be used as an intravenous fluid.

Age	30 ml/kg	70 ml/kg
< 12 months	1 hour	5 hours.
12 months - 5 years	30 min	2.5 hours.

- Most common worm infestation: Ascariasis (roundworm)
- Worm causes anemia: Ankylostomiasis (Hookworm)
- Worms related to step wells: Guinea worm
- National Deworming Days: of 10th February and August
- Chander Index:
  - No. of hookworm egg/gram of stool
  - Calculation: Kato-Katz technique
  - CI < 200: Non-significant
  - CI 200-250: Potential danger
  - CI 250-300: Minor Health Problem
  - CI > 300: Major Public Health Problem
  - DOC: Albendazole

Q. A 37-year-old woman from Bihar presents with fever, weight loss, and massive splenomegaly. Blood tests show anemia, thrombocytopenia, and hypergammaglobulinemia. What is the vector responsible for this condition?

NEETPG 2024

a. Phlebotomus species
b. Aedes mosquito
c. Mite
d. Female Anopheles mosquito

Ans: a. Phlebotomus species

- Kala-azar is endemic in Bihar, Jharkhand, West Bengal, and Uttar Pradesh.

DENGUE

01:22:27

Q. Re-infection with which of the following can lead to catastrophic symptoms despite the presence of antibodies?

FMGE 2021

a. Dengue
b. Yellow fever
c. Japanese encephalitis
d. Zika

Ans: a Dengue

- Croos immunity is not seen

Q. A patient from a mosquito-infested area presents with fever, chills, myalgia, low WBC, normal RBC, low platelets, and a maculopapular rash. What is the most likely diagnosis? INICET 2023

a. Dengue
b. Typhoid
c. Ebola hemorrhagic fever
d. Rift Valley fever

Ans: a Dengue

Undifferentiated fever	Simple fever with or without rash.
Classical Dengue Fever / Breakbone Fever	Abrupt onset of high fever, with headache, retro-orbital pain, myalgia, arthralgia, petechiae rash, and leucopenia. Maculopapular rash appears on trunk 3–4 days post-infection and spreads peripherally ("white islands in a red sea"). 7-day fever as symptoms persist for 7 days.
Dengue hemorrhagic fever	Dengue fever + hemorrhagic manifestations (hematocrit ≥ 20%, thrombocytopenia < 1 lakh/mm^3, positive tourniquet test with > 10 petechiae/sq inch with ≥ 20 petechiae a definitive finding).
Dengue shock syndrome	Rapidly increasing hematocrits, severe abdominal pain, persistent vomiting, narrow absence of blood pressure.

Q. A patient develops fever, arthralgia, and an extensive petechial rash for 3 days. Lab findings reveal Hb 9 g/dL, WBC 9000 cells/mm^3, platelet count 20,000 cells/mm^3, and prolonged bleeding time with normal clotting time. What is the most probable diagnosis? (FMGE 2012) FMGE 2025

a. Dengue
b. Malaria
c. Scrub typhus
d. Typhoid

Ans: a Dengue

Q. A 30-year-old man presents with a 5-day history of fever and is positive for NS1 antigen. He has no signs of bleeding. His hemoglobin level is 9 g/dL, platelet count is 20,000/μL, and ALT is 112 U/L. Which of the following is the most appropriate management for this patient? INICET 2025

a. Paracetamol
b. Platelet transfusion
c. Packed red blood cell (PRBC) transfusion
d. Steroids

Ans: a Paracetamol

Yourwish

Management Rationale

- This patient is NS1 positive, which indicates dengue infection. INICET 2025
  - Paracetamol:
    → Recommended for fever control in dengue.
    → Safe when used in appropriate doses.
    → NSAIDs (like ibuprofen, aspirin) are avoided due to bleeding risk.
  - Platelet transfusion:
    → Not indicated in the absence of active bleeding, even if platelets are < 20,000.
    → Prophylactic platelet transfusion is generally not recommended in stable dengue patients without bleeding.
  - PRBC transfusion:
    → Hb is 9 g/dL, which does not require transfusion unless there is active bleeding or hemodynamic instability.
    → No evidence of blood loss.
  - Steroids:
    → No role in routine dengue management.
    → Not shown to improve outcomes.

Recovery And Discharge

- Criteria for discharge of patients recovering from dengue:
  - Absence of fever for at least 24 hours without use of drugs
  - Return of appetite
  - Platelet count > 50,000 /cumm
  - Adequate urine output
  - Visible clinical improvement
  - Minimum 2-3 days after recovery from shock
  - No respiratory distress

VACCINATION OPV Vs IPV

01:26:57

Q. What are the benefits of transitioning from OPV to IPV? FMGE 2025

a. Easy to store
b. Side effects are less
c. Increased humoral immunity
d. Less incidence of vaccine-associated paralytic polio

Ans: d. Less incidence of vaccine-associated paralytic polio

Features	OPV	IPV
Prevents disease	Yes	Yes
Induces intestinal IgA	Yes	No
Induces humoral IgG	Yes	Yes
Responsible for herd immunity	Yes	No
Reverts to virulence	Yes	No
May cause disease in immunocompromised	Yes	No

Yourwish

Yourwish

INICET 2024

Q. Which test is commonly used for malaria detection in the field?

a. Thick smear

b. Thin smear

c. HRP2 antigen

d. Quantitative buffy coat

Ans: c. HRP2 antigen

SUMMARY

- Incubation Period of Diseases
  - Influenza: 18–72 hours
  - Measles: 10–14 days
  - Chickenpox: 14–16 days
  - Rubella: 2 to 3 weeks, average 18 days
  - Mumps: 2 to 4 weeks (14–18 days)
  - Diphtheria: 2–6 days
  - Pertussis: 7–14 days max unto 3 weeks
  - Bacillus cereus: 1–6 hours
  - Most upper respiratory diseases: 2–5 days
  - COVID-19: 3–21 days
  - Staphylococcal: 1–8 hours
  - Clostridium perfringens: 6–24 hours
  - Salmonella: 12–24 hours
  - Botulinum: 18–36 hours
  - Cholera: 1–2 days (3 days – 3 weeks)
  - Typhoid: 10–14 days
  - Polio: 7–14 days
  - Hepatitis A: 15–50 days
  - Most diarrheal disease: 1–5 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 non-immune women, using contraceptives should not be exposed
  - Influenza: 3 days after onset
  - Mumps: Until swelling subsides
  - 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
  - Chickenpox : 1–2 days before to 4–5 days after appearance of rash

Yourwish

- Measles: 4 days before to 5 days after rash appearance
- Rubella: 7 days before symptoms to 7 days after appearance of 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

15. NON-COMMUNICABLE DISEASES & NATIONAL PROGRAM FOR CONTROL OF NCD'S

OBESITY

00:00:41

OBESITY INDICATORS

BMI Meter square • Known as the Quetelet index	$\frac{\text{Wt in kg}}{\text{Ht in m}^2}$
Ponderal index	$\frac{\text{Ht in cm}}{\sqrt[3]{\text{body weight}}}$
Corpulence index • Height-independent obesity indicator	Should not exceed 1.2 $\frac{\text{Actual weight}}{\text{Desirable weight}}$
Brocas index	Ht(cm)-1000
Lorentz formula	$\frac{\text{Ht (cm)-100-ht (cm)-150}}{\text{2 for women or 4 for men}}$

HYP: THE RISK OF HEALTH PROBLEMS ASSOCIATED WITH OBESITY

GREAT RISK	MODERATE RISK
• Type 2 diabetes • Insulin resistance • Gallbladder disease • Dyslipidemia • Breathlessness • Sleep apnea	• Coronary artery disease • Hypertension • Osteoarthritis of the knees • Gout and hyperuricemia

BMI CLASSIFICATION

CLASSIFICATION	GLOBAL POPULATION (WHO BASED)	ASIAN/INDIAN POPULATION
Underweight	<18.5	<18.5
Normal	18.5-24.99	18.5-22.99
Overweight	25-29.99	23-24.99
Obesity	≥30	≥25
Class I obesity	30-34.9	25-29.9
Class II obesity	35-39.9	≥30
Class III obesity	≥40	

Yourwish

- **Super obesity:** BMI >50
- Morbid obesity: BMI >40
- Lethal BMI
  - Men- BMI=13
  - Women- BMI =11

MEASURING OBESITY

SKIN FOLD THICKNESS	• Four sites: Mid triceps, biceps, subscapular, and suprailiac • Most important: triceps • Sum of measurements <40 mm in boys and <50mm in girls

WAIST CIRCUMFERENCE	• Taken at the midpoint between the lower border of the rib
	• cage and iliac crest
	• Global
	  ○ Men: WC >102 cm
	  ○ Women: WC >88 cm
	• Indian
	  ○ Men: >90 cm
	  ○ Women >80 cm

WAIST HIP RATIO	• >1.0 in men • >0.85 in women

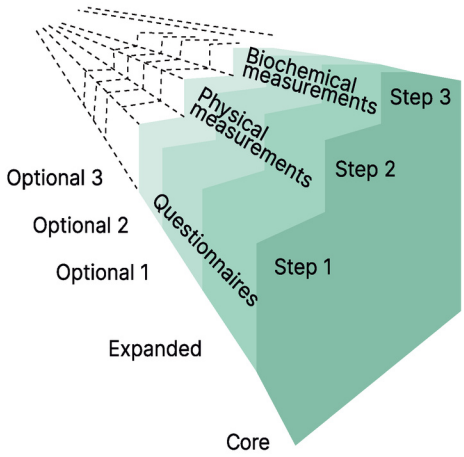
HERPENDERS CALLIPER

- Used to measure skinfold thickness



WHO STEPS APPROACH

- Based on surveillance of risk factors of NCDs
- Involves 3 steps
- Step 1
  - Lifestyle
  - Behavioural
  - Psychological
- Step 2
  - Anthopometry
- Step 3
  - Lab findings
- Helps identify the risk factors
- No relation to treatment



Q. WHO STEPS approach includes all except:

a. Behavioral

b. Psychological

c. Physical

d. Therapeutic

Ans. d. Therapeutic

Yourwish

Yourwish

NEET PG 2025

Prudent Diet

- Prevents cardiovascular diseases
- Prudent Diet Includes
  - Reduction of fat intake to 15-30% of total energy intake
  - Consumption of saturated fats is 7-10% of total energy intake
  - Reduction in dietary cholesterol to <200 mg/day
  - HDL >40 mg/dl
  - Increase in complex carbohydrate consumption
  - Reduction of salt intake to 5 gm/day
  - Avoidance of alcohol consumption
  - Physical Activity- At least 150 min/week
  - Cholesterol: HDL Ratio

Q. A prudent diet is the principal preventive strategy in Coronary Heart Disease prevention. In the WHO-recommended goal of a prudent diet, the Total Cholesterol: HDL ratio should be less than?

a 1.5
b. 2.5
c. 3.5
d. 4.5

Ans: c. 3.5

Q. A 50-year-old overweight man wants to know ways he can reduce the risk of developing CHD. Which of the following dietary modifications would you suggest to the individual? NEET PG

a. Dietary cholesterol increased to above 150mg/1000 kcal energy intake
b. Reduction of total fat intake to less than 5% of total energy intake
c. Reduction of salt intake to less than 10g/day
d. Consumption of saturated fats should be <10% of total energy intake

Ans: d. Consumption of saturated fats should be <10% of total energy intake

Dietary Modifications Suggested By The Who's Expert Committee For The Prevention Of Cad

- Reduction of total fat intake to 20-30% of total energy intake
- Consumption of saturated fats should be less than 10% of total energy intake
- Reduction of dietary cholesterol to below 100mg per 1000 kcal per day
- Avoid alcohol consumption and reduce salt intake to 5 gm daily or less
- Increase in complex carbohydrate consumption(vegetables, fruits, whole grains & legumes)

HYPERTENSION

00:10:00

Classification Of Hypertension

INICET 2025

CATEGORY	SYSTOLIC BP	DIASTOLIC BP
Optimal	<120 mmHg	<80 mmHg
Normal	120-129 mmHg	80-84 mmHg

Yourwish

High Normal	130-139 mmHg	85-89 mmHg
Grade I HTN	140-159 mmHg	90-99 mmHg
Grade II HTN	160-179 mmHg	100-109 mmHg
Grade III HTN	≥180 mmHg	≥110 mmHg

Q. A hypertensive patient is advised a diet plan that advises salt restriction. How much reduction in systolic blood pressure is expected by this intervention?

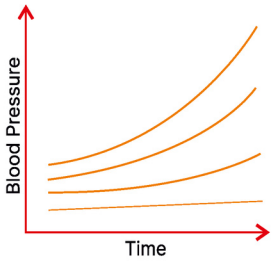
a. 5-20 mmHg
b. 8-14 mmHg
c. 4-9 mm Hg
d. 2-8 mm Hg

Ans: d. 2-8 mm Hg

RECOMMENDATION	REDUCTION IN SYSTOLIC BLOOD PRESSURE
Weight reduction	5-20 mmHg/10 kg weight loss
Consume a diet rich in fruits, vegetables, and low-fat dairy products with decreased saturated and total fats (DASH diet) DASH-dietary approach to stop HTN	8-14 mmHg
Reducing intake of dietary sodium to <5 gm/day	2-8 mmHg
Physical activity like brisk walking (at least 30 min per day), most days of the week	4-9 mmHg
Limit consumption of alcohol to no more than two drinks per day	2-4mmHg

Tracking Phenomenon

- Important to study HTN
- Tracking BP from childhood to adulthood
  - Hypertension in childhood remains hypertensive in adulthood
  - Hypotensive in childhood remains hypotensive in adulthood

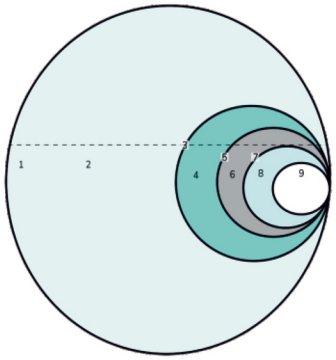


Q. It was observed that those individuals who had lower BP in childhood had low BP in adulthood, and those who had higher BP in childhood had high BP in adulthood. Which term best describes this?

a. Rule of Halves
b. STEPS approach
c. Tracking of Blood Pressure
d. Health Promotion

Ans: c. Tracking of Blood Pressure

Q. What is depicted by no 2 in the image representing the rule of halves?

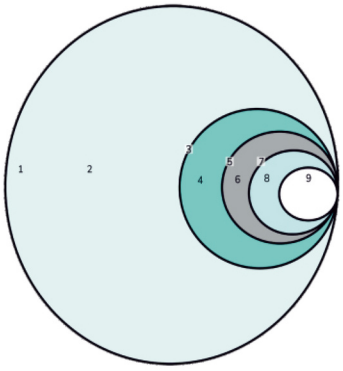


a. Normotensive individuals
b. Undiagnosed hypertensive subjects
c. Diagnosed hypertensive and treated
d. Whole community

Ans. a. Normotensive individuals

Rule Of Halves

- Half of hypertensive subjects in the general population are aware of the condition. and only half of those aware are being treated, and only half of those being treated are considered to be adequately treated



1. Whole community
2. Normotensive subjects
3. Hypertensive subjects
4. Undiagnosed hypertension
5. Diagnosed hypertension
6. Diagnosed but untreated
7. Diagnosed and treated
8. Inadequately treated
9. Adequately treated

Q. At a PHC under Ayushmann Arogya Mandir, a man presented with two successive BP readings of 140/904 mmHg and 152/92 mmHg. What is the next step in management that the medical officer should take? INICET 2025

a. Start Amlodipine 5 mg OD for 1 month and then follow up
b. Refer to the district hospital
c. Do nothing and wait for BP to rise above 160/100 mm Hg
d. Admit the patient and start parental hypertensive

Ans. a. Start Amlodipine 5 mg OD for 1 month and then follow up

DIABETES

00:16:07

- Prevalence: 7-8% of the population
- Glycosuria: Not used for screening in the community or for epidemiological purposes
- Random Blood Sugar (RBS): Commonly performed screening test
- Most Reliable Screening Test: Glucose Tolerance Test (GTT)
- Dietary factors that are protective for diabetes mellitus are
  - Higher intake of unsaturated fatty acids
  - A minimum daily intake of 20 gm of dietary fibre
  - Exclusive breastfeeding

Diagnostic Criteria For Diabetes Mellitus According To Who

- Diabetic
  - Fasting plasma glucose >126 mg/dl
  - 2-hour post-load glucose after 75 gm OGTT >200mg/dl
  - HbA1c >6.5%
- Prediabetic
  - Impaired fasting glucose 110-125 mg/dl
  - Impaired glucose tolerance 140-199 mg/dl

Yourwish

Interventions In Diabetes

- Glycaemic control in diabetes with HbA1c >9% reduces microvascular disease risk by 30% per 1% drop in HbA1c
- Lifestyle modification reduces the incidence of diabetes by 35-58%
- Blood pressure control in patients with BP >130/80 mmHg reduces microvascular and macrovascular disease risk by 35% per 10 mmHg drop in blood pressure
- Metformin administered as preventive therapy reduced diabetes incidence by 25-31%
- Proper foot care reduces the risk of foot disease by 50-60%
- Use of ACE inhibitors in diabetes reduced the risk of nephropathy by 42% and cardiovascular risk by 22%
- Annual eye examination in diabetes reduces the incidence of serious visual loss by 60-70%

RHEUMATIC HEART DISEASE

00:19:33

- NCD, which is infectious in origin
- RHD is a chronic condition caused by permanent damage to heart valves following rheumatic fever
- Rheumatic fever is a febrile disease affecting connective tissues in the heart and joints, initiated by infection of the throat by Group A beta-hemolytic streptococci
- RHD occurs as a complication of 2% (1-3%) streptococcal infection
- Coxsackie B4 virus is also suggested as a causative factor, and streptococcus as a conditioning factor

Management

Primary Prevention

- Benzathine Penicillin given to a child with a streptococcal throat infection is an example of primary level prevention

Secondary Prevention (long -term Prophylaxis)

- Benzathine Penicillin G is given to a patient with rheumatic fever to prevent further complications. IM injection every 3 weeks
  - Adults: 1.2 million units
  - Children: 0.6 million units

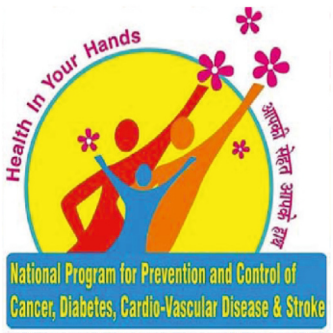
Jai Vigyan Mission

- Launched to study the prevalence of
  - Rheumatic heart disease
  - Streptococcal throat infection
  - Pathology of rheumatic fever
- Focussed on vaccine development
- Does not focus on treatment

NATIONAL PROGRAM FOR PREVENTION AND CONTROL OF NCD

00:22:10

- Tag line: Health in your hands
- Newer inclusions in the program
  - Chronic kidney disease
  - COPD
  - Asthma
  - Rheumatic heart fever
  - Non alcoholic fatty liver
  - Non ST elevation MI
  - Ayush modalities



Yourwish

Yourwish

- Best level of prevention to control NCD
  - Primordial: Don't let risk factors to develop
- Most NHPs rely on secondary-level prevention

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

Who Global Action Plan For Control Of Ncds

- 9 targets under the plan to be achieved by 2025, now modified and extended to be achieved by 2030:

1. 1/3rd relative reduction in overall mortality from NCDs
2. 20% relative reduction in harmful use of alcohol
3. 15% relative reduction in the prevalence of insufficient physical activity
4. 40% relative reduction in mean population intake of salt/sodium
5. 40% relative reduction in prevalence of current tobacco use
6. 33% relative reduction in prevalence of raised blood pressure
7. Halt the rise in diabetes and obesity
8. At least 50% eligible persons to receive drug therapy and counseling to prevent heart attacks and strokes
9. 80% coverage of essential NCD

CANCER

00:25:41

- Most Common Cancers:
  - Males: Lip/oral > Lung > Stomach
  - Females: Breast > Cervix > Ovary
- Most Common Cancer in Rural Areas: Cervical areas
- Most Common Cancer in India: Breast cancer
- Cancer Incidence: Breast > Lip/oral
- Cancer Mortality: Breast > Cervix > Lip/oral

Important Information
- Nationwide immunization campaign for 14-year-old adolescent girls for HPV vaccination
- A single shot of the Gardasil vaccine (quadrivalent vaccine) is effective against
  - Serotypes 6, 11, 16, 18

Q. The present strategy of initial screening of cervical cancer: FMGE Dec 2021

a. PAP smear
b. Cervical biopsy
c. High vaginal swab
d. Visual inspection after application of freshly prepared 5% acetic acid

Ans. d. Visual inspection after application of freshly prepared 5% acetic acid

- **HPV CO-TEST**
  - HPV and PAP tests for women between 30 and 65 years every 5 years

Yourwish

Screening Frequency To Detect Cervical Cancers

- 21-29 years
  - PAP test every 3 years
- 30-65 years
  - PAP test every 3 years
  - HPV test every 5 years
  - CO-TEST can be done
- Everything normal investigations stopped >65 years

Q. Under the NP-NCD program, which of the following is not a part of this programme?
a. VIA for cervical cancer
b. Screening beyond the age of 30 years
c. Direct oral inspection for oral carcinoma
d. Mammography for screening breast carcinoma at the primary level

Ans. d. Mammography for screening breast carcinoma at the primary level

Facility At Sub Centre

- Cervical cancer via VIA
- Breast Cancer via self-breast examination
- Oral cancer mouth cavity examination
- Blood sugar testing (RBS, FBS, Postprandial)
- HTN

Facility At Sub Centre

- Cervical cancer via VIA
- Breast Cancer via self-breast examination
- Oral cancer mouth cavity examination
- COPD (pulse oximeter)
- Blood sugar testing (RBS, FBS, Postprandial)
- HTN (sphygmomanometer, S. creatinine)

BLINDNESS

00:31:25

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 butterflies
• Category 4	<1/60 perception of light	Manifest blindness
• Category 5	No perceptions of light	Absolute blindness

- Visual acuity <3/60 in better eye with available correction- NPCB definition
- Visual acuity <3/60 in better eye with best possible correction- WHO definition
- Visual impairment- <6/18

Type Blindness

- Avoidable Blindness: Preventable or curable blindness
- Preventable Blindness: Can be avoided by preventive or prophylactic measures
- Treatable Blindness: Reversible with Prompt Management
- Economic Blindness: Inability to count fingers from 6 mts or 20 ft
- Social Blindness: VA 3/60 or visual field ≤10°
- Manifest Blindness: VA 1/60 to just perception of light
- Absolute Blindness: No perception of light

National Program For Prevention And Control Of Blindness Nd Visual Impairment

INICET May 2023

- DANIDA funds this program
- GOAL- Reduce the prevalence of blindness to 0.25% by 2025

- MC cause of blindness in India and worldwide- Cataract
- MC cause of visual impairment in India- Cataract
- MC cause of ocular morbidity- Uncorrected refractory error
- MC cause of preventable and treatable blindness in children- Vitamin A deficiency
- MC cause of preventable blindness in adults- Infective trachoma
  - Already eliminated in India
  - SAFE strategy was used
- MC cause of treatable blindness in adults- Cataract

Q. In the National Programme for Control of Blindness, which approach is not included in the reaching strategy for treating cataract patients? In

a. People with cataracts are treated in a makeshift operation centre
b. IOL placement by small incision cataract surgery is preferred
c. Reach-in approach has fewer postoperative complications
d. People with cataracts are identified and sent to a higher centre

Ans. d. People with cataracts are identified and sent to a higher centre

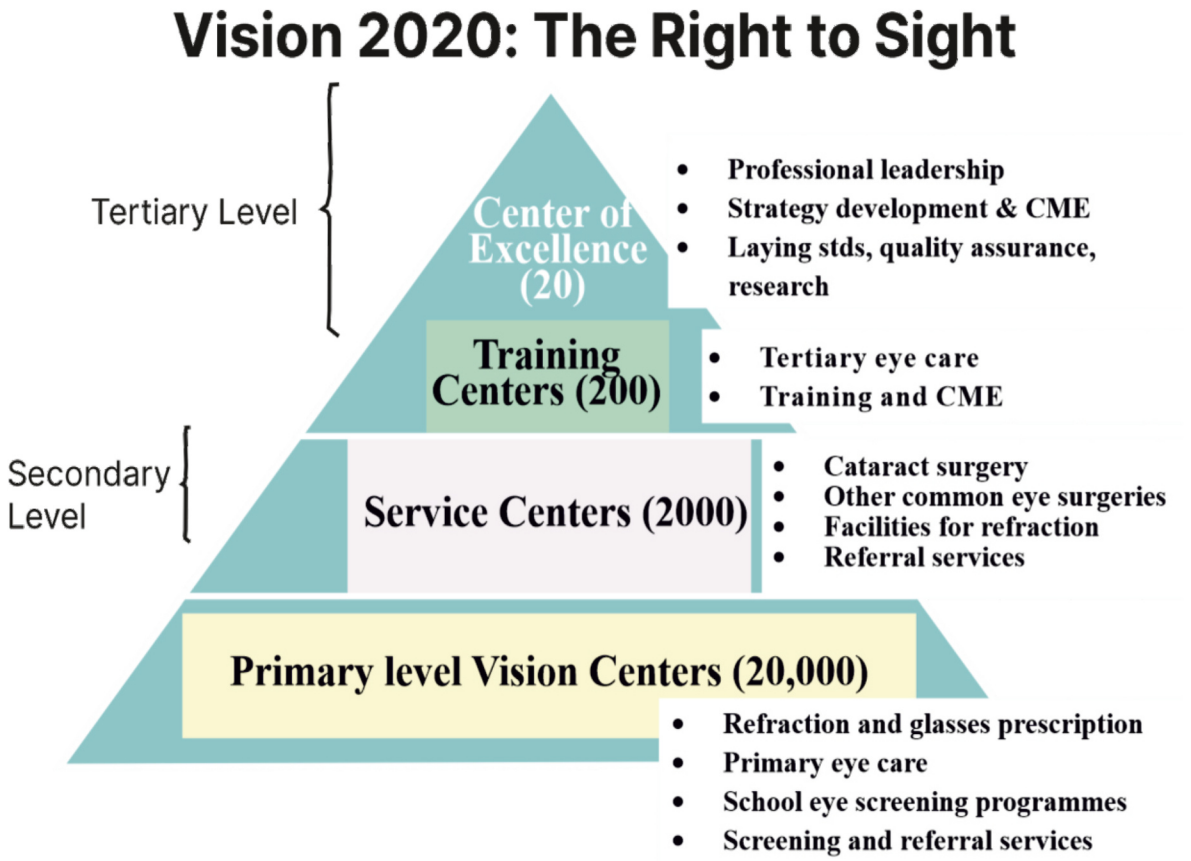
- Reach in strategy- Identified in the community and referred to the hospital
- Makeshift strategy
  - Camps were organised communities offering treatment
  - Reach out strategy

Vision 2020: The Right To Sight

- Diseases included
  - Cataract
  - Refractory errors
  - Childhood blindness

- Corneal blindness
- Diabetic retinopathy
- Glaucoma
- Trachoma

- Globally- Excludes glaucoma and diabetic retinopathy
  - Cataract
  - Refractory errors
  - Childhood blindness
  - Onchocerciasis
  - Trachoma



OTHER NATIONAL PROGRAMS

00:38:45

National Mental Health Mission

Components

- District Mental Health Programme (DMHP): Operational arm, launched in 1996 (Bellary Model)
- Early detection and treatment of mental illness in the community (OPD/Indoor & follow-up)
- Tertiary Care: Establishing Centres of Excellence to train more mental health professionals
- Training: Training for general physicians and health workers.
- Public Awareness: Information, Education, and Communication (IEC) initiatives.
- Monitoring: Data collection and sharing with central authorities for evaluation

National Mental Health Program

Yourwish

Q. What is the primary objective of the National Mental Health Program (NMHP) in India?
a. Establishment of new psychiatric hospitals
b. Integration of mental health care into general healthcare services
c. Increasing the number of psychiatrists in urban as
d. Providing only institutionalized care for psychiatric patients

Ans. b. Integration of mental health care into general healthcare services

Q. Which of the following is not included in the Mental Health Care Act, 2017, according to the WHO Mental Health Gap Action Programme?
a. Social support
b. Interpersonal therapy
c. Social support
d.Screening of family members

Ans. d.Screening of family members

- Most Common Illicit Drug: Cannabis
- Most commonly used legal addictive substance in India: Tobacco
- 2nd most commonly used addictive substance in India: Alcohol

National Program For Control Of Snake Bite (2030)

- Objective: To make snake bite a notifiable disease
- First aid following a snake bite consists of
  - Carry: Not allowed to walk even for a short distance
  - No: No tourniquet, no electrotherapy, no cutting, no pressure immobilisation, no suction at the bite site
  - Reassure: 70% bites are non-venomous species
  - Immobilize: Apply a splint in the bitten extremity to limit movement and assist positioning
  - Get to a hospital
  - Tell the doctor of any systemic symptoms

National Program For Prevention And Management Of Sickle Cell Disease (2023)

- **Goal:** Eliminate Sickle Cell Disease by 2047
- **Confirmatory Test**: High-Performance Liquid Chromatography (HPLC), Gel Electrophoresis
- **Prevalence**: 8-10% in tribal populations

Prevention Strategies

- Primary:
  - Premarital screening
  - genetic counseling
  - prenatal and perinatal testing
  - chorionic villus sampling
- Secondary:
  - 0-40 years: Extended family & population screening
  - 0-18 years: Antenatal care (ANC), solubility test

Yourwish

National Program For Injury Prevention

Haddens Matrix

	VICTIM PERSON	AGENT VEHICLE	ENVIRONMENT FACTORS
PREINJURY	Cycle training adult supervision	Reducing numbers and speed	Improved visibility around school entrances
INJURY	Helmet use	Separating vehicles and cyclists	Enabling children to cycle on footpaths
POSTINJURY	Access to the first aid	Vehicle redesign	Access to health services

Standardization Of Rates In Epidemiology

- standardization of rates is done to allow for comparison of the health statuses of two populations after adjustments for age and gender using a standard population

Direct Standardization

- Direct method uses actual age-specific death rates on the standard population
- Possible only if actual specific rates in subgroups of the observed population are available, along with the number of people in each subgroup

Indirect Standardization

- Uses standard age-specific death rates on actual populations.
- E.g., Standardized Mortality Ratio = Observed mortality/expected mortality
  - Ratio of the total number of deaths that occur in study groups to the number of deaths that would have been expected to occur if that study group had experienced death rates of a standard population
  - Values
  - >100- Greater risk
  - <100- Lesser risk

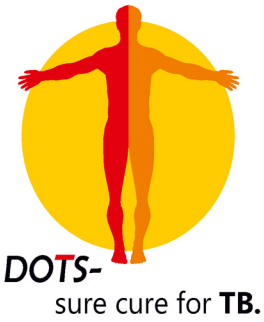
16. NATIONAL HEALTH PROGRAM PART 1

NATIONAL TUBERCULOSIS ELIMINATION PROGRAM

00.00.34
NEET PG 2023

- End TB in 2025
- Logo: TB Harega Desh Jeetega
- Earlier, the program was called RNTCP (Revised National Tuberculosis Control Program)
  - Logo of RNTCP has now been changed to the logo of DOTS
- Reduce mortality by <90%
- Reduce incidence by <80%





National Strategic Plan For Tuberculosis Elimination

- Launched from 2017 to 2025
- Vision → Zero death , Zero disease , Zero poverty
- Eliminate TB by 2025

Initiatives

- Strategic approach of DTPB → Detect , Treat , Prevent , Build

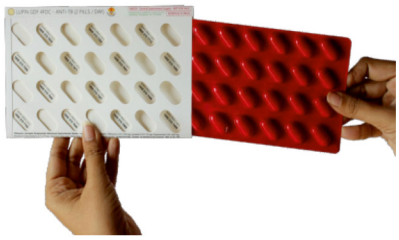
Important Information

- 1 case of TB can spread to 10-15 people in a year

- Pradhan Mantri TB Mukt Bharat Abhiyan
  - Launched in 2022
  - Developed Nikshay Mitra
  - Purpose: To accelerate the movements towards TB elimination
- 100 Day TB Elimination Campaign
  - Launched in 2024
  - Purpose: To improve Diagnostic and Treatment facilities
- Active surveillance
  - Enhanced active case finding and contact tracing supported by the Nikshay portal
- Therapeutic Upgrades → To bring shorter regimens
- Technological Initiatives

Technological Initiatives	
NIKSHAY 	• End TB • Nationwide, web-enabled, case-based, patient management & surveillance system for TB control • Notification of TB cases for both private and public practitioners

Yourwish

DOTS 99 	• Digital Adherence Technology to improve TB treatment compliance
MERM Box 	• Medicine Event Reminder Monitor Box • Digital pill box used by MDR TB patients to enhance treatment • It has a visual & audible reminder of daily dosing and refill sent out
JEET Strategy Joint Effort for Elimination of Tuberculosis	• Joint Effort for Elimination of Tuberculosis • Aim is to increase the notification rate by private practitioners • It is a multipronged strategy

Incentives

- Nikshay Poshan Yojna
  - Incentive of Rs 1000/month is provided as nutritional initiative to all notified TB patients
- Incentive to the treatment providers (DOTS provider) → except patients' own parents
  - Incentive of Rs 1000 to the treatment provider on completion of treatment of new and previously treated TB patients
  - Incentive of Rs 5000 to the treatment provider on completion of treatment of MDR/XDR patient
    → Rs 2000 is given at the end of the IP phase
    → Rs 3000 is given at the end of the CP phase
- Incentive for private practitioners → TB made a notifiable disease
  - Total incentive to the private practitioner → Rs 1000
    → Incentive given on notification of a TB case → Rs 500
    → Incentive given on notification of treatment completion → Rs 500
  - Private practitioners must notify a case of TB within 30 days to the District TB officer
  - Failure to notify is a punishable offense

Strategies

Tb case detection

- Active TB case finding

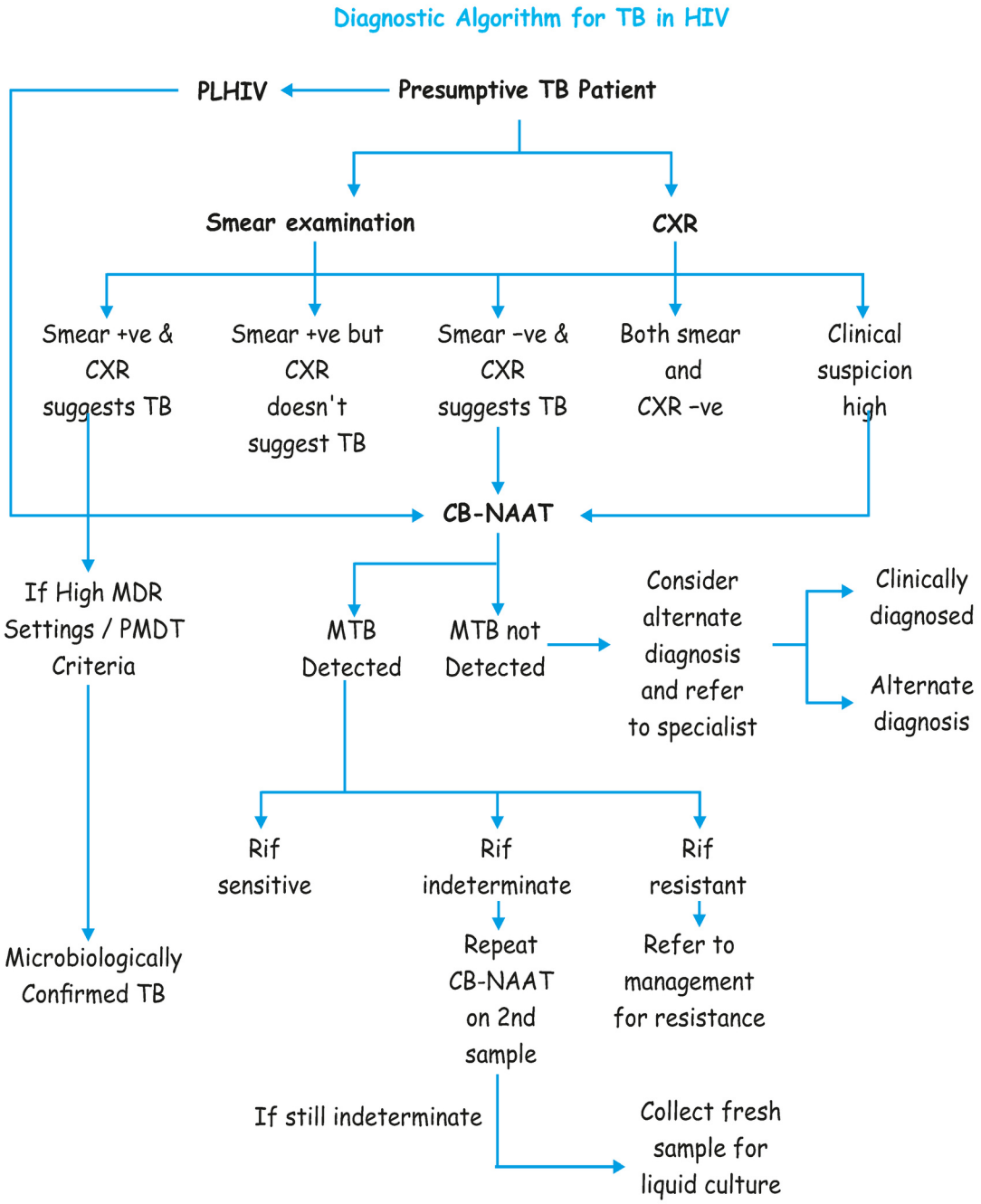
Yourwish

Yourwish

- Done among high-risk populations in slums, prisons
- Case detection done by Health workers and ASHA workers → on notification, they receive an incentive of Rs 500

- Intensified case finding
  - Provider-initiated TB case finding for patients attending health facilities with comorbidities
- Passive case finding → TB clinics

Diagnostic Modalities



- Sputum AFB
  - Screening test and 1st Investigation of choice
  - Turnaround time is faster
- CBNAAT (Cartridge-Based Nucleic Acid Amplification Test) / Gene XPERT
  - Confirmatory test

Yourwish

- Detects resistance to Rifampicin
- Turn-around time is 2 hours
- IOC in people living with HIV, Paediatric TB case, Recurrent TB case, Extrapulmonary TB case

- TRUENAT
  - India's version of CBNAAT
  - Turn-around time is 1 hr
- Liquid culture
  - Gold standard
  - Turn-around time is 6 weeks
- Line probe assay
  - Detects resistance to both Rifampicin and Isoniazid
  - Turn-around time is 72 hours

Q.A 35-year-old homeless man presents with fever, cough, and weight loss for a month. Despite negative sputum smears, his chest X-ray suggests TB. As per recent NTEP guidelines, what is the next best step? NEETPG 2023

A.Repeat sputum smears

B.Ask for CBNAAT

C.Ask for line probe assay

D.Wait until TB culture results to start ATT

Answer: b. Ask for CBNAAT

Latent Tb Infection

FMGE 2020

- Best test for diagnosis → IGRA (Interferon Gamma Release Assay)
  - More specific test
  - It is not affected by prior BCG vaccination
- Preferred test for diagnosis → CY TB test
  - Mycobacterium tuberculosis antigen-based skin test
  - Highly specific
  - Detects using recombinant protein (ESAT-6 and CFP-10)
  - Identify infected individuals, especially those BCG vaccinated, minimizing false positives
  - Intradermal injection similar to tuberculin skin test, read in 48-72 hours for an induration of 5mm or more

Classification

Classification based on drug resistance	
Drug-sensitive TB	• Patient is sensitive to all first-line TB drugs
Mono drug-resistant TB	• TB Patient who is resistant to one first-line anti-TB drug other than Rifampicin
Polydrug-resistant TB	• TB Patient who is resistant to more than one first line anti TB drugs other than Rifampicin and Isoniazid
Rifampicin-resistant TB	• TB patient who is resistant to Rifampicin alone with or without resistance to other first-line anti-TB drugs • Managed as MDR
MDR TB	• TB patient who is resistant to both Rifampicin and Isoniazid

Pre XDR TB	• TB patient who is resistant to Rifampicin, Isoniazid, and any fluoroquinolone (except Levofloxacin and Moxifloxacin)
XDR TB	• TB patient who is resistant to Rifampicin, Isoniazid, any fluoroquinolone, and any Group A drugs (Group A drugs : Levofloxacin , Moxifloxacin , Linezolid , Bedaquiline)

Treatment of Tb

- New TB cases → Detected sputum positive for first time or has taken treatment for < 1 month of duration
- Previously treated TB cases → Patient who has taken treatment for >1month of duration
- Recurrent TB cases → Patient who was detected cured or treatment complete and is now being sputum positive
- Treatment of TB is based on Drug Susceptibility testing, irrespective of new, previously treated cases, or recurrent TB cases.
- All cases of TB treated with the Drug Sensitive TB Regimen, as long as the patient is sensitive to Isoniazid and Rifampicin.

Type of TB case	Treatment
• New & Previously treated cases (R and H sensitive)	IP → 2HRZE (H - Isoniazid , R - Rifapentin , Z - Pyrazinamide , E - Ethambutol) CP → 4HRE As per WHO: • 4HR is given in CP • Drug-sensitive TB cases → older than 12 years or more are managed for 4 months ○ 2 HPMZ + 2HPM (P - Rifapentin , M - Moxifloxacin)
• H - Mono-resistant / Polydrug-resistant TB regimen • Inclusion criteria: Isoniazid-resistant TB with Rifampicin-sensitive	6ZERO 6 months of (Z - Pyrazinamide , E - Ethambutol , R - Rifampicin , O - Levofloxacin)
• RR / MDR / Pre XDR / XDR (Confirmed pulmonary TB, all forms of extrapulmonary TB except TB involving CNS, osteoarticular and Miliary TB, Patient >14 years age)	BPaLM regimen Bedaquiline • 400mg once daily for 2 weeks, then 200mg 3times per week or 200mg daily for 8 weeks, then 100mg daily Pretomanid • 200mg daily Linezolid • 600mg once daily Moxifloxacin • 400mg once daily
• RR / MDR / Pre XDR / XDR (Patient <14years of age & Pregnant female)	6 - 9 months of Bedaquiline , Delaminid , Linezolid , Levofloxacin , Clofazamine

Yourwish

• XDR TB patient: All oral longer BDQ regimen (not responding to BPaLM regimen, Rifampicin resistant + Isoniazid resistant, both InHA and KATG mutation)	18 - 20 months BC_2L_2 Bedaquiline, Clofazimine, Cycloserine, Levofloxacin, Linezolid

Follow Up

- On treatment → monthly follow-up is done
- After treatment → Follow up at 6, 12, 18, and 24 months
- A sputum smear examination must be done at the end of the intensive phase and at the end of treatment

Outcome

- TB cured → Person who has completed treatment and has a negative sputum test report.
- Treatment complete → Person who has completed treatment, but no documented negative sputum test report or sputum test report is not available
- TB treatment failure → After a previous Sputum Negative report, the person is Sputum positive anytime or Sputum positive even at the 5th month.
- Loss to follow up → Interruption of treatment for more than one month
- Recurrent TB → Patient is sputum positive any time after completing TB treatment

Prevention

- WHO has given End TB protocol → A world free of TB - zero TB death, zero TB disease, zero TB suffering
- End TB protocol → by 2035
  - Reduction in the number of TB deaths by 95%
  - Reduction in TB incidence rate by 90%
  - TB-affected families facing catastrophic costs due to TB by 0%
- SDG protocol → by 2030
  - Reduction in the number of TB deaths by 90%
  - Reduction in TB incidence rate by 80%
  - TB-affected families facing catastrophic costs due to TB by 0%
- WHO defines that Tuberculosis control would be achieved when the prevalence of natural order of infection in the age group 0 - 14 years is 1%
  - In India, it is currently 40%



Vision:
A world free of TB
Zero TB deaths,
Zero TB disease,
Zero TB suffering

Goal:
End the Global TB epidemic

	TARGETS			
	MILESTONES		SDG+	END TB
	2020	2025	2030	2035
Reduction in number of TB deaths	35%	75%	90%	95%
Reduction in TB incidence rate	20%	50%	80%	90%
TB-affected families facing catastropnic costs due to TB (%)	0%	0%	0%	0%

TB Mukt Bharat

- Launched in 2022
- Aim → To accelerate TB elimination
- Initiative is Nikshay Mitra → Adopt TB patients for 6months to 3years for nutritional support and treatment compliance.
- TB patients are adopted by Individuals, Corporate and NGO.

Yourwish

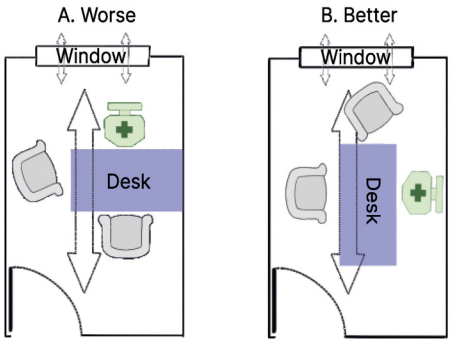
Yourwish

Organization

Ministry of health and family welfare
↓
Central TB Division
↓
State TB cell, 37 states/UTs
↓
District TB centre, 767 districts
↓
TB unit, One per 1.5-2.5 lakh population
↓
Designated Microscopy centre, 50000 to 1 lakh population
↓
Peripheral health institution
↓
Ayushman Arogya Mandirs

- TB unit → TB diagnostics, TB treatment, and laboratory supervisors
  - In plain / urban areas → 1 TB unit for 1.5lac to 2.5lac population
  - In Hilly / Difficult to reach area → 1 TB unit for 0.75 lac - 1.25 lac population
- TB Diagnostic centres → Diagnostic Microscopy centre
  - 1 DMC for 50,000 population
- 1 TB unit supervises 2-4 DMCs
- Most peripheral health institutions → DOTS center

Direction of Air Flow



Important Information

- Sputum sample collected
  - 2 sputum samples are collected → Spot sample and Early morning sample
- Sputum disposal
  - Sputum collected in a container with a lid, then add 5% phenol or cresol and left for 24 hrs.
- Spit on a piece of cloth, and then it is burnt

Q. The most rapid laboratory diagnosis of pulmonary TB can be done by? FMGE 2020

A.CB-NAAT

B.Sputum culture

Yourwish

C.BACTEC method
D.Sputum microscope

Answer: D

- On sample collection, 2 mL of good-quality sputum is collected

INICET 2025

00.39.04

NATIONAL AIDS CONTROL PROGRAM

- It was launched by NACO (National Aids Control Organization)
- The headquarters is in New Delhi



Important Information

- Red ribbon - HIV
- Pink ribbon - Breast cancer
- Blue ribbon - Prostate cancer
- Green ribbon - Mental health
- Orange ribbon - Suicidal prevention

History

- First case of HIV/AIDS in 1986 (Chennai, Tamil Nadu)
- National AIDS Control Programme (NACP) was launched in 1987
- National AIDS Prevention and Control policy (NAPCP) in 2001
- National strategic plan for HIV / AIDS elimination
- NACP merged with the National Health Mission in 2021
- Latest phase → NACP Phase V in 2021 - 2026

1	Reduce annual new HIV infections by 80% (from 2010 baseline)
2	Reduce AIDS-related mortalities by 80% (from 2010 baseline)
3	Eliminate vertical transmission of HIV and syphilis (mother-to-child)
4	Promote universal access to Quality STI/RTI services for at-risk and vulnerable populations
5	Eliminate HIV/AIDS-related stigma and discrimination

- In operational targets, this includes aiming for 95-95-95 coverage: 95% of people at riskuse prevention, 95% of HIV-positive know their status, 95% of those are on treatment, 95% of those achieve viral suppression.
- Also, for pregnant and breastfeeding women living with HIV-ensuring suppressed viral to enable elimination of vertical transmission.

Goal of Nacp Phase V

- Reduce annual new HIV infections by 80%
- Reduce AIDS related mortality by 80%
- Eliminate vertical transmission of HIV and syphilis (mother to child)
- Promote universal access to quality STI / RTI services for at-risk and vulnerable populations
- Eliminate HIV/AIDS related stigma and discrimination

Objective

- 95% of people who are most at risk of acquiring HIV infection should use comprehensive prevention
- 95% of HIV positive people should know their status
- 95% of those who know their status are on treatment
- 95% of those who are on treatment should have a suppressed viral load
- 95% of pregnant and breastfeeding women living with HIV have suppressed viral loads towards the attainment of elimination of vertical transmission of HIV
- Less than 10% of people living with HIV and key populations experience stigma and discrimination
- Promote universal access to quality STI/RTI services to at-risk and vulnerable populations
- Attainment of the elimination of vertical transmission of HIV

Epidemiology

- M/c route of transmission → Sexual (Heterosexual > Homosexual)
- Most efficient route of transmission → Blood & Blood products
  - Route which carriers the maximum risk of transmission
- M/c affected age group → 30-44 years

Strategies

- Prevent - Test - Treat
- High-risk groups
  - Commercial sex workers
  - Men having sex with men
  - Transgender
  - Injectable drug users
- Bridge populations
  - Single male migrants
  - Truck drivers
  - Clients of sex workers
- General population
  - ANC females are used as proxy indicators for HIV prevalence in populations
  - HIV Prevalence is identified using HIV sentinel surveillance

Prevention

- Specific targeted intervention directed towards the high-risk population
  - Providing female condoms to commercial sex workers
  - Opioid substitute therapy
  - Provision of lubricants

Q.According to the National AIDS Control Programme, which of the following is not a high-risk group?
A.Injectable drug users INICET 2025
B.Female sex workers
C.Men who have sex with men
D. Long-distance truck drivers

Answer: D

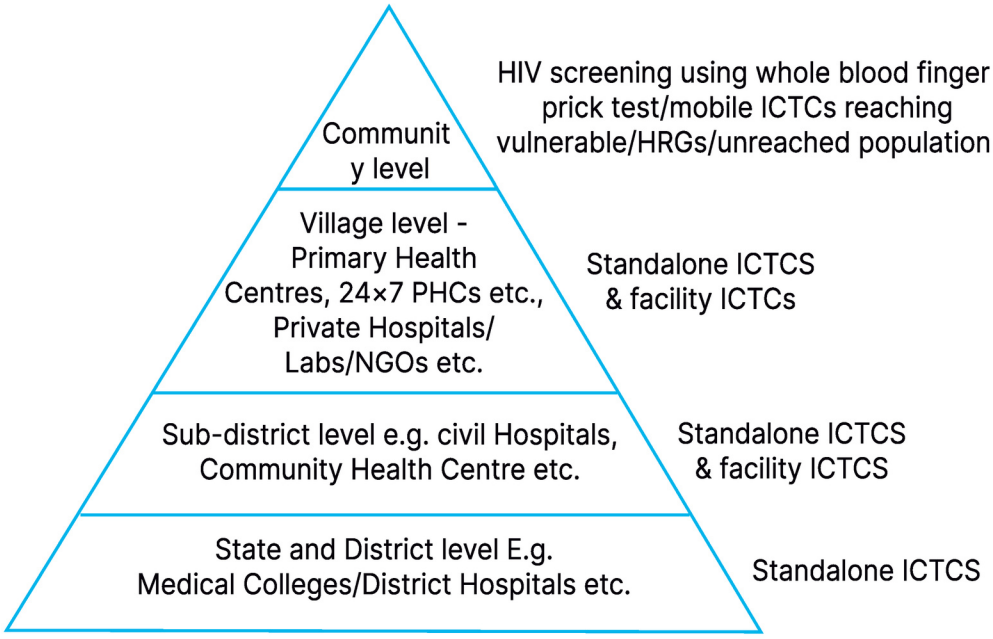
Yourwish

FMGE 2019

Counselling And Hiv Testing Services

- Integrated Counselling and Testing services → Care, support and treatment
- Prevention of parent-to-child transmission of HIV
- HIV TB Collaborative activities

Integrated Counselling And Testing Services (Ictc)



- They offer pre-test, post-test counselling, diagnostic services, and referral to treatment centres for HIV positive patients
- Standalone ICTCs
  - Seen in Hospitals offering comprehensive services
- Facility-integrated ICTCs
  - Seen in Smaller, peripheral health units

Testing

- Screening test
  - ERS → ELISA, Rapid, Simple test
    → 1/3 test positive → Blood donation
    → 2/3 test positive → Symptomatic individuals
    → 3/3 test positive → Asymptomatic individuals
- Diagnostic test
  - Western blot → Used when indeterminate result on ELISA test is obtained
- P24 viral antigen detection test
  - Detects P24 Structural protein
  - Used during Window period (Entry of organism to test becoming positive)
  - Detects HIV 1 within 2-4 weeks of exposure
- qPCR
  - Detects HIV 1 using RNA - PCR
  - Used in adults 10 to 33 days after exposure
- HIV DNA/RNA RT PCR

Yourwish

Yourwish

- Used in children, usually infants <1 year
- Done during Birth, 4-6 weeks, 3-6 months (after stopping breastfeeding to check infectious status)

- Viral load estimation using rt PCR technique is the best test → To assess response to treatment and the effect of ART therapy is
- CD4 count is a reliable test → To assess response to treatment and progression of disease

Q. A nurse suffered an accidental needle prick injury from an HIV+ patient. Which is the test that would lead to a confirmatory diagnosis? FMGE 2019

A. HIV Elisa
B. Western blot
C. PCR
D. P24 antigen

Answer: B

Testing	
Opt in Testing	**Opt out Testing**
• Testing is offered, and the patient is required to actively give permission before it can occur	• 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; assent is then assumed unless the patient declines testing • WHO and CDC recommend opt-out testing

Management FMGE 2018

- WHO: Treat all Strategy → All HIV positive individual are started on ART irrespective of CD4 count
- Fixed Drug Combination for HIV patients
  - Adults → Tenofovir + Lamivudine + Dolutegravir
  - Children → Zidovudine (or Abacavir) + Lamivudine + Dolutegravir
  - Newborn → Zidovudine + Lamivudine + Raltegravir (or Lopinavir / Ritonavir)
- People living with HIV and taking ATT medication → change ART protocol if the patient is on Rifampicin-based ATT
  - An additional 20mg Dolutegravir tablet taken 12 hours after the routine FDC tablet and continued for 2weeks after ATT completion

Important Information

- FDC is followed in Tuberculosis
  - To decrease resistance and increase compliance with treatment
  - Depending on the weight band category, the required number of TB drugs taken
    → In adults, there are 5 weight band categories
    → In paediatrics, there are 6 weight band categories

Q. Treatment of AIDS (ART) is started at the CD4 cut-off? FMGE 2018

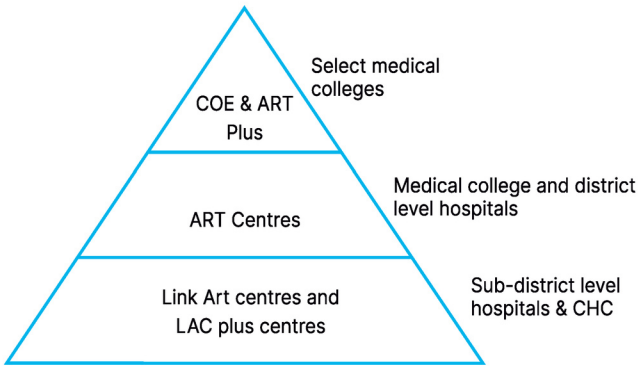
A. 250
B. 350
C. 500

Yourwish

D. No Cut-off

Answer: D

Model of HIV Treatment Services



- Link ART centres
  - Provide ART, provide ART refills, monitor and treat minor infections
- LAC plus centre
  - Pre-ART registration, counselling & monitoring done for patients not yet eligible for ART
- ART centre
  - Offer Comprehensive, free, confidential care, support, and treatment
  - Diagnose & register patients, provide ART, manage opportunistic infection, monitoring of ART, manage TB-HIV activity
- ART Plus
  - Offer 2nd line ART or alternative first line ART regimens

Prevention of Parent to Child Transmission



- Transmission of mother to child contributes 5% of total HIV cases
- Efficiency of transmission is 30% without treatment
- Efficiency of transmission is <1% with treatment

Management

- HIV positive pregnant female → Started on Tenofovir , Lamivudine , Dolutegravir
  - Irrespective of gestational age
- Low-risk infant → Born to mothers with a low viral load, which is detected after 32 weeks of pregnancy till delivery
- High risk infant → Born to HIV positive mothers, not on ART, with viral load not estimated beyond 32 weeks, viral load not suppressed after 32 weeks, or diagnosed with HIV within 6 weeks of delivery

HIV risk	ARV prophylaxis	Duration
Low risk infants: Mother on ART or ART > 4weeks	Syrup. Nevirapine Dose - 6mg/kg twice daily from birth, given within 72 hrs	6weeks irrespective of the type of feeding
High-risk infants: Mother not on ART or ART <4weeks	Syrup. Nevirapine + Syrup. Zidovudine	6weeks if on Exclusive replacement feeding 12weeks if on Exclusive breast feeding

- Child has increased chance of developing opportunistic infection → so given Cotrimoxazole prophylaxis from 6weeks till 18months

- Early Infant Diagnosis
  - At 6 weeks → DNA PCR, Confirmatory testing at 18 months

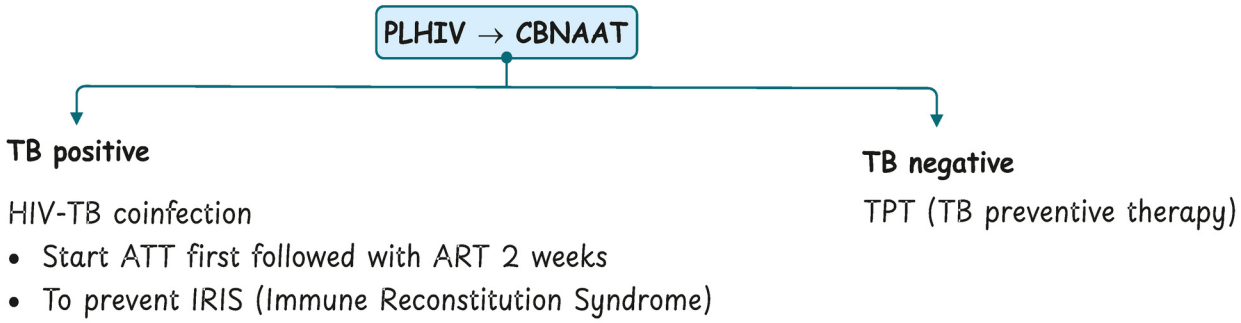
Q. A baby is born to an HIV-positive mother. The mother claimed that she is not on ART. What should be the management of the baby?
A.Baby is put on Syrup Nevirapine for 6 weeks
B. Baby is put on Nevirapine and Zidovudine for 6 weeks if exclusively on replacement feeds
C. Baby is put on Nevirapine and Zidovudine for 12 weeks if exclusively on replacement feeds
D. Baby is put on HAART

Answer: B

- Baby born to an HIV-positive mother → No mixed feeding is permitted

HIV TB Collaborative Activities

- M/c opportunistic infection among people living with HIV is TB



Tpt Therapy

Target population	Treatment
PLHIV (adults and children > 2 years) Household contacts of pulmonary TB patients	3 months weekly Isoniazid (300mg) & Rifapentine (300mg) in persons older than 2 years
Infants <12 months age and Children <2 years age	6 months daily Isoniazid (6H): 10 mg/kg /day

- The standard dose of pyridoxine when used prophylactically for the prevention of neuropathy among patients taking isoniazid is:
  - Children: 10 mg/day
  - Adults: 25 mg/day
  - PLHIV: 50 mg/day

Q. A 50-year-old man with HIV is screened for symptoms of TB. He reports no cough, fever, night sweats, or weight loss. What is the next step in management?
A. Start 5/kg/day Isoniazid daily for 9 months
B. Start mg/kg Isoniazid daily for 6 months
C. Tuberculosis preventive therapy not required
D. Start weekly dose of rifapentine and isoniazid for 3 months

Answer: D

Yourwish

Q. A patient on HAART presents with complaints of fever and expectorant cough for two weeks. What is the first investigation of choice?
A. Sputum microscopy
B. CBNAAT
C.Sputum microscopy and chest X-ray
D.Tuberculin test

Answer: B

Q. A person is HIV positive. The most common opportunistic infection among PLHIV in India is Tuberculosis. Sputum AFB for the patient is positive. In case of HIV-TB coinfection, what is the best line of management?

A.Start ART followed by ATT after 2 weeks
B.Start ATT followed by ART after 2 weeks
C.Start ATT followed by ART after 2 weeks
D.Start ART if the CD4 count less than 200

Answer: B

NEET PG 2019
INICET 2019

Prophylaxis

- Post-exposure prophylaxis is given in an accidental needle prick injury
- The risk of acquiring HIV from a needle stick injury is 0.3%
- In individuals >10 years or weighing > 30kg prophylaxis given is TLD → Tenofovir , Lamivudine , Doultegravir
  - Started within 72 hours, best if within 2hours
- In children >6 years, prophylaxis given is ZLD → Zidovudine, Lamivudine, Dolutegravir
- MC opportunistic infection worldwide is PCP / Pneumocystis jirovecii
  - Double-strength cotrimoxazole is given
  - Started when CD4 < 350 cells/mm^2
  - Stopped when CD4 > 350 cells for more than 6 months

Q. A resident doctor sustains a needlestick injury while drawing blood from an HIV-positive patient. What is the recommended post-exposure prophylaxis?

NEETPG 2019

A.Zidovudine + lamivudine for 4 weeks
B.Lamivudine + tenofovir + efavirenz for 4 weeks
C.Lamivudine + tenofovir + dolutegravir for 4 weeks
D.Zidovudine + Lamivudine + Nevirapine for 4 weeks

Answer: C

Q. Which incorrect step should be avoided in the management of a nurse's needle stick injury involving HIV-positive blood?

INICET 2019

A.Washing hands with soap and water
B.Administration of tenofovir monotherapy
C.Measure baseline viral markers of health care worker immediately
D.Measure viral markers after 6 weeks

Answer: B

Yourwish

HIV Sentinel Surveillance

INICET 2020

- It helps in assessing the burden of HIV in the community
- It is done among
  - High risk groups: Commercial sex workers, transgender/hijras, MSM, IV drug users
  - Bridge population: Truck drivers, single male migrants
  - General population: ANC surveillance
- STD Clinics are no longer used in surveillance
- Sample size: 400 among ANC females, 250 each for bridge population and high-risk groups
- Frequency of HIV sentinel surveillance is biennial.
  - ANC clinics → Sentinel sites

Q.Which high-risk group is not included in HIV Sentinel Surveillance?

INICET 2020

A.Single male migrants
B.Truck drivers
C.STD clinic attendees
D.Antenatal woman

Answer: C

Q.All are components of sentinel surveillance except?
A.Estimation of total infection in the community
B.Estimation of total cases in hospitals
C.Estimation of trend of disease
D.Classification of districts

Answer: B

SEXUALLY TRANSMITTED INFECTIONS

01.14.41

- Suraksha clinic is an initiative launched by NACP to control Sexual and Reproductive Health services

suraksha clinic
Sexual and Reproductive Health Services

KIT	Syndrome	Treatment
KIT-1 GREY	Urethral discharge, Cervical discharge, Painful scrotal swelling	Tab Azithromycin 1000 mg and Tab Cefixime 800 mg single dose
KIT 2 GREEN	Vaginal discharge (vaginitis)	Tab Secnidazole 2000 mg and Tab Fluconazole 150 mg single dose
KIT 3 WHITE	Non-herpetic Genital Ulcer Disease: Syphilis and Chancroid	Inj Benzathine penicillin G 2.4 MU and Tab Azithromycin 1000 mg single dose
KIT 4 BLUE	Non-Herpetic Genital Ulcer Disease: Syphilis and Chancroid with history of allergy to Benzathine Penicillin G	Tab Doxycycline 100 mg (28 capsules as twice/day dose for 14 days) and Tab Azithromycin 1gm single dose

Yourwish

KIT 5 RED	Herpetic Genital Ulcer	Tab Acyclovir 400mg (21 tablets as three times/per day, for 7 days)
KIT 6 YELLOW	Lower Abdomen pain / PID	Tab Cefixime 800 mg single dose and Tab Metronidazole 400 mg (28 tablets: BD x 14 days) and Cap Doxycycline 100mg (28 capsules: BD x 14 days)
KIT 7 BLACK	Inguinal Bubo	Tab Doxycycline 100mg (42 capsules: BD x 21 days)
KIT 8 BROWN	Anorectal Discharge	Tab Cefixime 800 mg stat dose and Tab Doxycycline 100 mg (14 capsules: BD x 7 days)

Q. Match the following STI kit colors and their use:

A. Lower abdominal pain	1. Grey, Kit 1
B. Urethral discharge	2. Green, Kit 2
C. Non-herpetic genital ulcer	3. White, Kit 3
D. Vaginal discharge	4. Yellow, Kit 6

A.A-1, B-4, C-3, D-2
B.A-4, B-3, C-2, D-1
C.A-4, B-1, C-3, D-2
D.A-3, B-2, C-4, D-1

Answer: C

17. NATIONAL HEALTH PROGRAM PART 2

NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAM

00.00.18

FMGE 2020
NEET PG 2019

- Logo → Ring with mosquito
- Disease targeted under this program
  - Malaria → Transmitted by Anopheles
  - Lymphatic filariasis → Transmitted by culex
  - Japanese Encephalitis → Transmitted by culex
  - Dengue → Transmitted by Aedes
  - Chikungunya → Transmitted by Aedes
  - Kala azar / Visceral Leishmaniasis → Transmitted by Sandfly

Targets

- Annual Parasite Incidence < 1 /1000 population
- Annual Blood Examination rate > 10%
- Eliminate kala azar and Lymphatic filariasis (2027)
- Control mortality and morbidity from dengue

National Strategic Plan For Malaria Elimination

- It was started from 2017 to 2030

Goals

- Eliminate malaria → zero indigenous cases throughout India by 2030
- Maintain malaria free status in areas where transmission has been interrupted
- Prevent the reintroduction of malaria

Global Targets

- 90% reduction in malaria incidence.
- 90% reduction in malaria-related deaths.

Classification Of States / Union Territories

Classification of states / Union Territories based on API
API → Burden of malaria

Category	States / UT	Definition
0	Prevention of re-establishment phase	Zero indigenous cases
1	Elimination Phase	Districts with API <1 per 1000 population
2	Pre-elimination	Districts with API in between 1-2 per 1000 population
3	Intensified control	Districts with API >2 per 1000 population

Yourwish

Integrated Vector Control Approach For Mosquito

- Anti larval measures
  - Environmental control
  - Chemical control
  - Biological control
- Anti adult measures
  - Space sprays
  - Residual sprays
  - Genetic control
- Against mosquito
  - Mosquito nets
  - Screening
  - Repellents
- Legislative
  - Civic laws

Anti Larval Measures

Environmental control

- A/k/a source reduction
- Permanent method
- Primordial level of prevention → prevents the risk factor (prevents breeding of larva)
- Engineering methods → Levelling of ground , Filling of ground , Eliminate the breeding places by intermittent irrigation , change alkalinity of water

Chemical control

- Mineral oil , Paris green and synthetic insecticide (Fenthion, Chlorpyrifos, Abate)
- Abate is Nerve poison, Paris green is Stomach poison
- Abate (Temephos) is preferred over Paris green due to its
  - Lower toxicity , Higher effectiveness
  - Ease of application

Biological control

- Larvivorous fish - Gambusia affine and Lebister reticulates
- Predator Mosquito - Toxorhynchites splendens for Aedes Aegypti
- Used in Burrow pits , sewage oxidation ponds , ornamental ponds , cisterns and farm ponds

Anti Adult Measure

- Space spray
  - Insecticide sprayed in form of mist / fogging
  - Malathion : 50ml/litre diesel
  - Pyrethrum extract: Indian fogging
- Residual spray
  - Indoor residual spray
  - DDT: 50% WP
  - Malathion : 25% WP
  - Synthetic pyrethroids: Deltamethrin, Cyfluthrin

Yourwish

Yourwish

NVBDCP: Malaria

- Areas with API > 2
  - Regular insecticide spray
  - Indoor residual spray
  - At the interval 6 weeks
  - 2 rounds of DDT 1gm/m2 in transmission season of month July to November
  - If the vector is refractory to DDT then 3 rounds of Malathion 2gm/m2 in transmission season
  - If the vector is refractory to DDT & Malathion, 2 Rounds of synthetic pyrethroids 0.25g/m2 at 6 week interval
- Areas with API < 2
  - Focal spray of DDT or BHC or Malathion if a case of P.flaciparum occurs in the area
  - Space spray in form of mist

Important Information

- National Malaria Month → June

NETS

- API < 2 → no nets
- API 2-5 → Conventional nets
  - Have chemical binder attached to it
  - Shelf life is 6 months - 1 years
- API >5 → Long Lasting Insecticide treated nets
  - Shelf life is 3 years

Insecticide Treated Nets

- Insecticide treated nets is a primary prevention
- Synthetic pyrethroids are the chemicals used in Insecticide treated nets
  - Deltamethrin: 2.5 % in dosage of 25 mg/m2
  - Cyfluthrin: 5 % in dosage of 50 mg/m2
  - Permethrin
- Number of holes per square inch >150
- Diameter of each hole < 0.0475 inches

MCQ

Q. Urban Malaria Scheme primarily based on?
a.Measurement of Annual Parasite Index
b.Anti adult measures
c.Anti larval measures
d.Active surveillance

Ans. c) Anti larval measures

- Malaria residing in urban areas → Anopheles Stephensi
- Anti larval measures is primarily followed in urban areas
  - Urban areas with a population of >50,000 and Slide Positivity Rate of >=5%
  - Most efficient anti-larval method to prevent urban malaria is Cover Overhead tanks
- Anti adult measures is primarily followed in rural areas
  - Most efficient method is Indoor residual spray

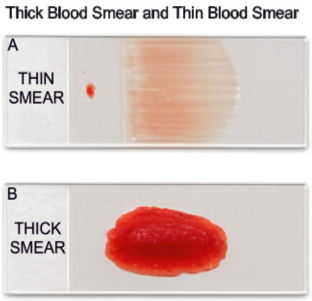
Yourwish

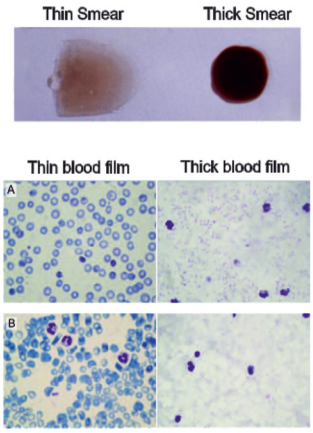
Disease Management In Malaria Control

Early Diagnosis

Active Case Detection

- Active Malaria Surveillance:
  - Done by MPW (Male), prepares malarial slides from suspected fever cases every fortnightly
- Gold standard for malarial diagnosis →Malarial slides
  - Stain used is JSB stain and Giemsa stain



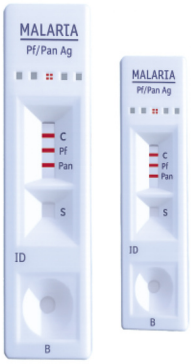


- Type of slide
  - Thick smear
    → Detects infection and parasite concentration
    → Sensitive
  - Thin smear
    → Detects species
    → Specific

Important Information

- 1 Malaria microscope is for 25000 population

Rapid Diagnostic Test



- Done by field health workers
- A/K/A Dipstick test
- Earlier it was based on Antibody detection which gives false positive reports
- At present it is based on Antigen detection
- Detects - P.falciparum & P.vivax
- Results are obtained within 3 - 5min
- It is based on HRP II (Histidine Rich Protein Antigen Detection)

Optimal Test

- Detects - P.falciparum & P.vivax
- It is based on Lactate Dehydrogenase
- More sensitive and faster than HRP II dipstick test
- It increases accuracy when parasite load is 60-100 / µL

Passive Case Detection

- Malaria Clinics under the Urban Malaria Scheme
  - Any suspected fever case is evaluated for malaria
  - Fever Treatment Depot (FTD) present as 1 per village
- Link Worker Scheme (HYP)
  - 1 Link Worker per 2000 population present in high P.falciparum areas

Treatment Of Malaria

00:19:46
FMGE 2021

	Non pregnant	Pregnant women
P.vivax and P.ovale	Chloroquine (25 mg/kg for 3 days) + Primaquine (0.25 mg/kg for 14 days)	Chloroquine, Primaquine is C/I
P.falciparum and P.malariae ACT for 3 days + Primaquine single dose on day 2	Other states: ACT - SP + Primaquine • Artesunate- 4 mg/kg BW for 3 days • Sulfadoxine- 25 mg/kg BW on Day 1 • Pyrimethamine- 1.25mg/kg BW on Day 1 • Primaquine (0.75 mg/kg) on Day 2 North east states : ACT - LM + Primaquine • Artemether (20 mg) + Lumefantrine (120 mg) • Primaquine (0.75 mg/kg) on Day 2	1st trimester : Quinine (10 mg/kg TDS for 3 days) 2nd & 3rd trimester : Primaquine is C/I • Other state : ACT - SP • North east states : ACT - LM

Mixed Infections

- In other states:
  - SP-ACT 3 days + Primaquine 0.25mg per kg body weight daily for 14 days
- In Northeastern States
  - ACT-LM for 3 days + Primaquine 0.25mg/kg body weight daily for 14 days

MCQ

Q. A patient from a Northeastern state was diagnosed to have an infection with P.falciparum malaria. What is the most appropriate treatment for this patient? FMGE 2021

a. Artemether plus lumefantrine
b. Sulfadoxine plus pyrimethamine
c. Chloroquine
d. Mefloquine

Ans. a) Artemether plus lumefantrine

Q. All preventive measures should be taken against malaria by a medical officer posted in a rural area except? FMGE 2020

a. Long Lasting Insecticide Nets(LLIN) provided in areas with Annual Parasite Incidence >=5
b. In case of DDT resistance,3 rounds of spraying with Malathion should be done to provide protection during entire transmission season
c. Indoor Residual Sprays are not suitable for vector control in rural areas
d. 2 rounds of spraying with DDT at 6 weeks interval during transmission season

Ans. c) Indoor Residual Sprays are not suitable for vector control in rural areas

Prophylaxis

FGME 2020

- Short term (if travel for < 6 weeks) : Doxycycline 100mg 1-2 days before travel and continue for 4 weeks post travel
- Long term (if travel for > 6 weeks) : Mefloquine 250mg 2-3 weeks before travel and continue 4 weeks post travel

Yourwish

MCQ

Q. An epidemiologist has to visit a malaria endemic zone for 5 weeks. Which drug is taken as prophylactic before visiting the malaria endemic region? FMGE 2020

a. Chloramphenicol
b. Doxycycline
c. Mefloquine
d. Artemisinin combination therapy

Ans. c) Mefloquine

Organizational Structure Of Malaria

00:25:51

Organisational structure	Function
Central government	• Supplies DDT and larvicides
State government	• Procures Indoor Residual Sprays for districts
District Malaria Office	• Key unit of implementation of the programme
District Malaria Officer	• Direct responsibility of IRS spraying operations
Medical Officer of PHC	• Overall responsibility for surveillance and laboratory services
MPW (M) & ASHA	• Case based surveillance and case detection in the community
Drug Distribution Centres	• Only for dispensing the antimalarial drugs
Fever Treatment Depots	• Collect blood slides and distribution of antimalarial drugs

Epidemiological Determinants Of Malaria

- Pre eradication era
  - Spleen rate
  - Infant parasite rate
- Eradication era
  - Annual parasite Incidence
  - Annual blood examination rate
  - Slide positivity rate

Determinants	Formula	Description
Annual Parasite Incidence	(Confirmed cases in a one year / population under surveillance) x 1000	• Measure of burden of malaria • Elimination strategies are based on API
Annual Blood Examination rate	(Number or slides examined / Population under surveillance) x 100	• Measure of operational efficiency of the program
Slide positivity rate	(No of blood slides positive for parasite / No of blood slides examined) x 100	• Calculated during outbreaks
Spleen rate	% of children (2-10 yrs) with spleen enlargement	• Determines the endemicity of malaria
Infant parasite rate	Percentage of infants showing parasites in blood films	• Indication of recent malaria transmission

Yourwish

Yourwish

MCQ

Q. Which parameter is used to assess the efficiency of malaria surveillance under the National Vector Borne Disease Control Programme?

NEETPG 2019

a. Annual Parasite Index
b. Annual Blood Examination Rate
c. Slide positivity rate
d. Slide falciparum rate

Ans. b) Annual Blood Examination Rate

Filariasis Elimination

00:29:15

- Targeting filariasis elimination by 2027
- Filariasis is transmitted by vector → Culex quinquefasciatus , Culex fatigans
- Filariasis is endemic in area like Bihar, Jharkhand, UP, Orissa, Telangana
- Elimination strategy : Mapping - MDA-Transmission Assessment Survey

Mapping

- Measure antigenemia using Immunochromatography test
- Done in all age group
- If prevalence is > 1% then it is an endemic area and MDA needed to be started

Mass Drug Administration

- Drugs - Albendazole + DEC + Ivermectin
- Once a year for 5 to 6 years
- Covers 80% of eligible population
- C/I - children < 2 years and Pregnant female

Transmission Assessment

- Done among children 6-7 years of age . if infection below threshold level < 1% in each district then MDA is stopped
- TAS is been done around 3 rounds

Elimination Criteria

- < 1 % Microfilarial carrier rate
- Children born after initiation of program are free from antigenemia i.e no adult form filarial worm seen in blood

MCQ

Q. Identify the correct statement regarding the elimination of lymphatic filariasis according to the Elimination of Lymphatic Filariasis Program?

a. WHO recommends dual therapy with Albendazole and Ivermectin for elimination of transmission
b. The target set by India for eliminating LF is 2025
c. Considered eliminated when the number of microfilaria carriers is less than 5%
d. Considered eliminated when children born after initiation of the program are free from antigenemia

Ans. d) Considered eliminated when children born after initiation of the program are free from antigenemia

Yourwish

One Liner

- Most commonly used method for epidemiological assessment of filariasis → **Thick film**
- Using thick film of capillary blood → Blood is collected between 8:30 pm up to 12 midnight
- Most sensitive method for detecting low density microfilaraemia → Membrane Filter Concentration Method
- Microfilaria can be induced to appear in blood during daytime and blood is examined one hour after using DEC → DEC Provocation test

Kala Azar Elimination

00:33:57

- Kala azar / Visceral Leishmaniasis
- Elimination target is by 2027
- Elimination criteria → Prevalence < 1 case / 1000 population
- Kala azar suspect → any person with Fever, hepatosplenomegaly, not responding to antimalarials
- Diagnosis → rk39 diagnostic kit
- Treatment
  - Single dose infusion of LAMB (Liposomal Amphotericin B) 10 mg/kg
  - Oral Miltefosine for 28 days in Visceral Leishmaniasis
  - Oral Miltefosine for 12 weeks in PKDL
- Active case finding → kala azar fortnight done by MPW (M)
- Control of vectors is by Pyrethroids

Types Of Leishmaniasis

Types of Leishmaniasis	Agent	Vector
Visceral leishmaniasis (Kala Azar)	L. Donovani	Phlebotomus argentipes
Cutaneous Leishmaniasis (Oriental sore)	L. Tropica	Phlebotomus papatassi
Muco cutaneous Leishmaniasis	L. Braziliensis	Phlebotomus sergenti

MCQ

Q. A patient reports a fever of 1-week duration and complains of abdominal distention, loss of appetite, and lymphadenopathy. The patient is responding poorly to antibiotics and antimalarials. The patient underwent a WIDAL test which was negative, but the rk39 test is positive. What is the most appropriate drug for the treatment of this patient?

a. Bedaquiline
b. Fluconazole
c. Linezolid
d. Liposomal Amphotericin B

Ans. d) Liposomal Amphotericin B

Yellow Fever

- It is a exotic disease
- Type of vaccine → Live
  - Strain: 17D
- Following vaccine administration immunity start from 10 days of vaccination

- Validity of vaccination certificate
  - Starts from 10 days and lasts life long
- Yellow fever is endemic in African region
- For travellers without vaccination Quarantine should be done for 6 days

Important Information

- Airports and seaports should be free from Aedes larvae upto 400m
- Quarantine is healthy contact
  - Quarantine for Plague is 40 days
  - Quarantine for yellow fever is 6 days

Indices

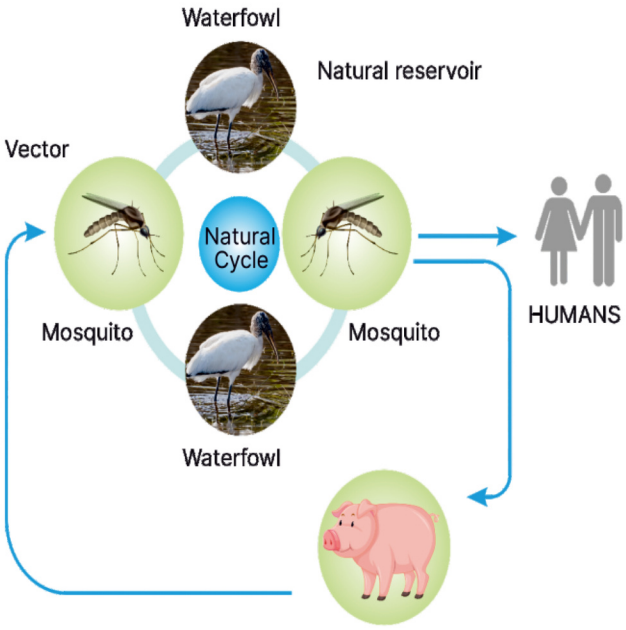
- Aedes aegypti index
  - A/k/a as House Index
  - Percentage of houses showing breeding of aedes larvae
  - Should be < 1% around 400m of ports
- Breteau index (No of containers positive for larvae / No of house inspected) x100

Japanese Encephalitis

- Vector → Culex tritaeniorhynchus, Culex vishnui

Lifecycle

- Birds (Pond herons , cattle egrets) → Natural reservoir
  - Agent multiples and grows
- Pigs → Amplifier
  - Maintain viraemia
- Culex → Vector
- Cattle → Mosquito attractants
- Man → Accidental / dead end host
  - No person to person transmission
- Horses
  - Only animal with symptoms



NATIONAL LEPROSY ERADICATION PROGRAM

00:41:16

INICET 2022

- Logo
  - Lotus → Resilience , purity
  - Rising Sun → Hope (free from leprosy)
  - Hand → breaking from chain of stigma
- Leprosy is been eliminated from India in 2005
- Elimination criteria
  - Prevalence of leprosy < 1 case / 10000 population
  - Current prevalence of leprosy 0.57 case / 10000 population

Yourwish

National Strategic Plan And Road Map For Leprosy

- Started from 2023 to 2027
- It is been targeted to achieve Leprosy Mukt Bharat by 2027

Vision

- Leprosy free India with zero infection and disease, zero disability, zero stigma and discrimination

Goal

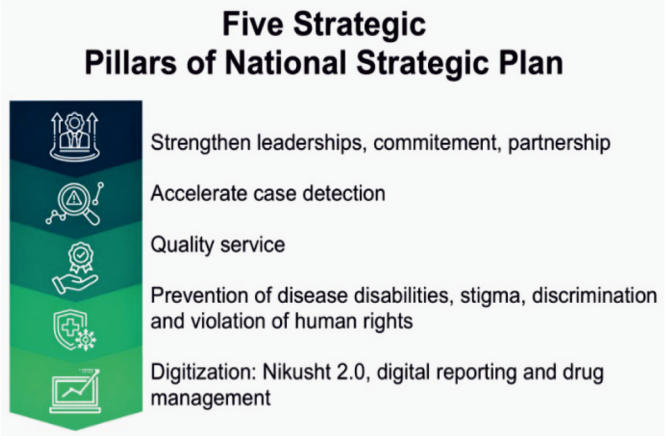
- Accelerate towards achieving Interruption of Leprosy Transmission in India

Objective

1. Strengthen leadership, commitment, and partnerships
2. Acceleration of Case Detection
3. Provision of Quality Services
4. Enhanced measures for Prevention of Discase, Disabilities, Stigma, Discrimination and Violation of Human Rights
5. Digitalization of Surveillance Systems

Strategic Pillars

- Strengthen leaderships , commitment , partnership
- Accelerate case detection
  - ABSULS → ASHA Based Surveillance for Leprosy subjects
  - Active case detection
- Quality services
- Prevention of Discase, Disabilities, Stigma, Discrimination and Violation of Human Rights
- Digitalization
  - Nikusht 2.0 → web enabled system , case based surveillance for leprosy patients
  - Digital reporting and drug management



Types Of Leprosy

	Paucibacillary	Multibacillary
Skin lesion	1-5 skin lesions	> 5 skin lesions
Nerve involvement	No nerve involvement	≥ 1 nerve involvement
Slit skin smear examination	Negative at all sites	Positive at one or more sites
Duration of treatment	6-9 month	12-18 month
Follow up	2 year	5 year

MCQ

Q. What are the clinical criteria for initiating multi drug therapy (MDT) for leprosy? INICET 2022

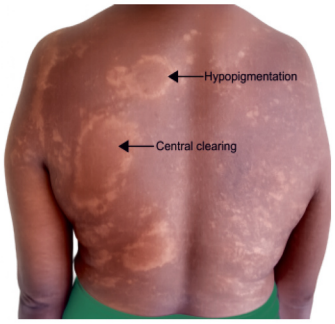
1. Hypopigmented patch with sensory loss
2. Peripheral nerve thickening
3. Peripheral nerve thickening with sensory loss
4. Skin biopsy demonstrating bacilli

Yourwish

Yourwish

a.1,4
b.1,3
c.1,3,4
d.1,2,3,4

Ans. b) 1,3



Presentation

- Skin lesions : Most common type → Hypopigmented
- Most specific type : Hypoesthetic
- MC nerve involved : Ulnar nerve
  - Sensory deficit> motor deficit

Revised Leprosy Treatment Guidelines

FMGE 2025

Age	Drugs	Dosage & schedule	Duration	
			Paucibacillary	Multibacillary
Adult  MDT for Adults	Rifampicin	600 mg once a month	6 months	12 months
	Clofazimine	300 mg once a month and 50 mg daily		
	Dapsone	100 mg daily		
Children (10-14 years)  MDT for Children	Rifampicin	450 mg once a month	6 months	12 months
	Clofazimine	150 mg once a month, 50 mg alternate days		
	Dapsone	50 mg daily		
Children <10 years or <40 kg	Rifampicin	10 mg/kg once a month	6 months	12 months
	Clofazimine	100 mg once a month and 50 mg twice weekly		
	Dapsone	2mg/kg daily		

Lepra Reaction

Type 1 Lepra reaction (Reversal / Upgrading)	Type 2 Lepra reaction (Erythema Nodosum Leprosum)
• It is seen mainly in borderline spectrum(BT,BB,BL) • Most severe in Borderline Lepromatous(BL)	• Mainly seen in LL>BL
• Seen mostly within 12 months of start of MDT	• Unrelated to MDT
• Type 4 hypersensitivity • D/t enhanced cell mediated response • Increased destruction of bacilli following treatment in reversal	• Type 3 hypersensitivity primarily humoral with immune complex deposition in tissues & vessels. • TNF involved

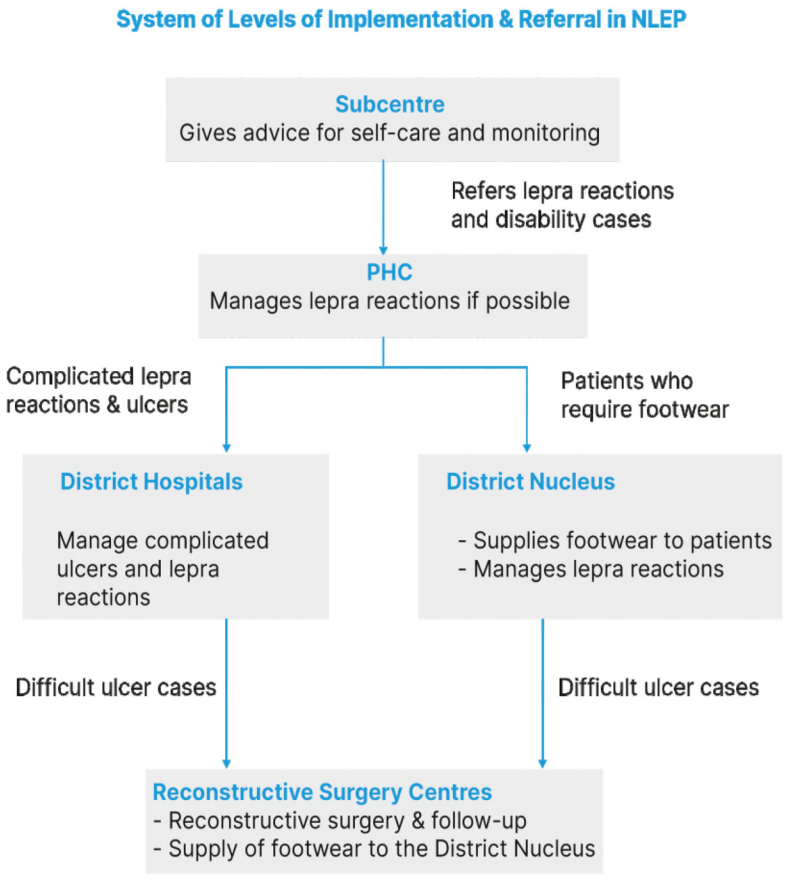
Yourwish

• Existing skin lesions may be inflamed and ulcerate(red, painful & erythematous) • New lesions rarely occur, neuritis, nerve abscesses	• Existing lesions do not change. • New erythematous and tender subcutaneous, dermal nodules occur over extremities and face
• No systemic involvement	• Systematic symptoms present

• Mild reactions: Supportive therapy with NSAIDs
• Severe reactions
  ○ Neuritis and eye Lesions: Oral corticosteroids
  ○ Nerve abscess: Surgical drainage
  ○ Other drugs: Clofazimine Cycloserine
	• First line of drug: Oral corticosteroid
	• Steroid dependent ENL: Clofazimine
	• Most effective: Thalidomide
	  ○ Not used due to side effects

System Of Levels Of Implementation & Referrals In Nlep

- Subcentre
  - Gives advice for self care & monitoring
- PHC
  - Manage lepra reaction if possible
- District hospitals
  - Manage complicated ulcers and lepra reactions
- District nucleus
  - Manage lepra reactions
  - Supplies footwear to patients
- Reconstructive surgery centres
  - Provide Rs.12000 for reconstructive surgeries and follow up
  - Supply footwear to the District nucleus (Quaternary level of prevention)



Prophylaxis

- It is a primary level of prevention
- Prophylaxis given to close contacts (Household Contacts, Social Contacts) → Single dose Rifampicin
  - ≥15 years - 600mg
  - 10-14 years - 450 mg
  - Children 6-9 years- 300 mg
  - Children <20 kg- 10-15mg/kg
- Contact time >20 hours/week

Initiatives

- SAPNA
  - A village school girl and a cured case or leprosy spreads awareness among leprosy
  - It was an initiative adopted by the Leprosy trust mission in India





Important Information

- MEENA → Launched by UNICEF for child's right & Empowerment



- SPARSH Initiative
  - Create awareness about leprosy using mascot of SAPNA
- ABSULS
  - ASHA Based Surveillance for leprosy subjects
  - ASHA detects a case without disability then an incentive of Rs 250 is provided
  - ASHA detects a case with disability then an incentive of Rs 200 is provided
- NIKUSHTH
  - Web enabled system for surveillance of leprosy

Important Information

- NISCHAY - provide free UPT kit

Core Indicators

- Annual new case detection rate (ANCDR)
  - Epidemiological indicator
  - It should be < 10/100000 in an area
    → Current ANCDR is 7/100000
    → >10/100000 suggest a high burden area
- Grade 2 Disability Indicator per 10 lac population
  - Operational indicator
  - Most important health awareness / Leprosy awareness indicator
  - Used for early case detection
- Treatment completion rate as a proxy to cure rate
  - Epidemiological indicator
- Prevalence rate
  - Long term impact indicator

Yourwish

Targets

- Prevalence rate → <1/10000 population at district, subnational level
- To reduce GRADE II disability % to < 1 among new cases at National level
- To reduce Grade II disability cases to < 1 case per million at National level

Key Points

- Most important epidemiological indicator: ANCDR
- Most important operational indicator: Grade II disability rate
- Most important health awareness /leprosy awareness indicator: Grade II disability rate

Quality Of Service Indicators

- Patient month blister calendar pack stock.
- Absolute number of patients released from treatment
- Number of relapses reported
- Proportion of cases who developed new or additional disability after starting MDT
- Proportion of treatment defaulters
- Proportion of new cases correctly diagnosed

Leprosy Mukt Bharat

- It is been targeted to achieve Leprosy Mukt Bharat by 2027
- 3 key focus
  - Early detection
  - Free of cost treatment to prevent development of disabilities and deformities
  - Medical rehabilitation of those with existing deformities

MCQ

Q. A patient with leprosy received treatment for 4 months and then discontinued it for 1 year. Now the patient presents again with a skin lesion. What should be the next step in management? FMGE 2025

a. Start rifampicin immediately
b. Increase the dosage for now and continue with the old regimen
c. Continue with the old treatment and give remaining doses
d. Start treatment with the new pack and new schedule

Ans. d) Start treatment with the new pack and new schedule

One Liners

- Treatment of patient on Anti leprosy drugs developed Lepra Reaction → Continue MDT + Steroid
- Treatment of Leprosy Defaulter → Not taken medicine > 12 months
  - Treatment → Start with a new pack & new schedule
- Adequately treated cases of leprosy:
  - Paucibacillary → Taken treatment of 6 months within 9 months duration
  - Multibacillary → Taken treatment for 12 months within 18 months duration
- Loss of sensation leprosy → Cold > Hot > Touch > pain
- Main infrastructure of Leprosy program → SET (Survey, Education, Treatment)
  - Treatment centre at PHC is for 35000 population
- Incentive to patient for reconstructive surgery → Rs 12000

Yourwish

Yourwish

MCQ

Q. Which of the following dosage regimens for adult leprosy treatment is not correct?

a. Dapsone 100 mg daily
b. Clofazimine 50 mg daily
c. Clofazimine 300 mg monthly
d. Rifampicin 450 mg weekly

Ans. d) Rifampicin 450 mg weekly

POLIO ENDGAME ERADICATION STRATERGY

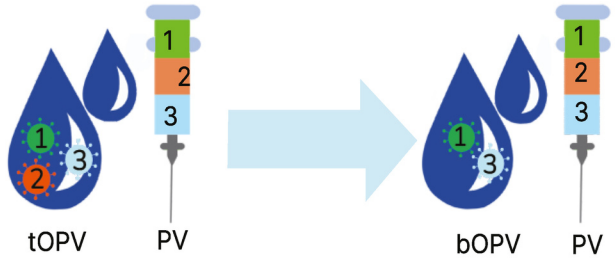
01:01:01

- Polio Endgame Strategy was launched in 2019-2023 and later WHO Revised Strategy 2022-2026
  - Its aim is to Replace OPV to IPV to prevent vaccine related paralytic polio due to OPV
  - Three main components
    → Eradication
    → Integration
    → Certification & Containment
- Polio Endgame strategy 2022-2026
  - Permanently interrupt all wPV transmission in endemic countries like Afghanistan & Pakistan
  - Stop cVDPV transmission and prevent outbreaks in non-endemic countries

Switch

- Initiated in April 2016
- tOPV is a live vaccine has wPV1 ,wPV2 and wPV3
- wPV2 has increased chance of causing cVDPV leading to outbreaks
- wPV2 is been eradicated in September 2015 , as a result a switch from tOPV to bOPV was done to reduce cVDPV

The switch from tOPV to bOPV



- tOPV and IPV protectagainst poliovirus types 1,2 and 3.
- The type 2 component of tOPV causes the majority of cVDPV cases.

- tOPV and IPV protect against poliovirus types 1,2 and 3.
- bOPV has a lower risk of cVDPVs.

VDPV (Vaccine derived Paralytic Polio)	VAPP (Vaccine associated Paralytic Polio)
• MC common in P2 (P2 strain was eradicated in September 2015)	• MC common in P3 (P3 strain was eradicated in October 2019)
• Rare , only 24 cVDPV cases across 21 countries	• 1 in 2.7 million doses due to single dose of OPV

• Associated with vaccine problem
  ○ De mutation
  ○ Re mutation
	• Aberrant change in vaccine virus leading to paralysis
	• It is due to low routine coverage leading to proliferation of virus

• Epidemic potential is present	• Epidemic potential is absent

Yourwish

One Liner

- Last case of Polio in India →Jan 2011, West Bengal
- India was declared Polio free on → 27th March 2014
- Sequential pulling back of OPV and start of IPV → Polio Endgame & Eradication Strategy

NATIONAL POLIO SURVEILLANCE PROGRAM

01:04:35

- Responsibility to the program is by Surveillance Medical Officer or District Immunization Officer
- Done by AFP Surveillance

Afp Surveillance

- Acute Flaccid Paralysis is a clinical syndrome, which refers to a collection of signs and symptoms, instead of a diagnosis.
- AFP is defined by the acute onset of weakness or paralysis with reduced muscle tone in children.
- A case of AFP reported to be put under investigation within 48 hrs
- Non probable causes of Polio →Transverse myelitis , GBS



Non-polio acute flaccid paralysis (NPAFP) is characterized by weakness, paralysis and sudden onset in children under 15 years old.

Process Of Afp Surveillance

- Active case finding and passive reporting of AFP in children of 0-15 years
- Start investigation within 48 hours of reporting of an AFP case by Medical officer
- 1st stool sample collected within 48 hours
  - Maintained at 2° - 4° C in red carrier box → Reverse Cold Chain
- 2 stool samples collected 24 hours apart ideally within 14 days of onset of paralysis but can be collected till 2 months
- Transported in Reverse Cold Chain to National Institute of Virology in Pune
- Check for residual paralysis on Day 60
- Isolation of wild poliovirus and mapping
- Confirmation of a case of Polio (confirmed/compatible/discarded) within 90 days
  - Confirmed case: Isolated polio virus in stool
  - Compatible case: Death within 60 days of paralysis or only 1 stool sample available with residual paralysis on 60th day
- Mop up operation if wild polio virus detected

Monitoring And Evaluation Of Afp Surveillance

AFP reporting rate

- Should be more than 1 AFP case / 100000 /year in all children < 15 years of age
- Sensitive indicator for ability to detect polio in community

Stool adequacy rate

- Should be more than 80%
- Indicator for operation efficacy of program
- The stool sample should reach the laboratory within 72 hours of collection

MCQ

Q.In Acute Flaccid Paralysis (AFP) surveillance for children aged 0- 15 years, which of the following is TRUE regarding the standard protocol for stool sample collection?

a. Only one stool sample is required, collected within 30 days of paralysis onset
b. Two stool samples should be collected 24 hours apart, ideally within 14 days of paralysis onset
c. Stool samples must be sent to the district hospital within 48 hours
d. Samples can be collected up to 3 months after onset of paralysis

Ans. b)Two stool samples should be collected 24 hours apart, ideally within 14 days of paralysis onset

Q.Under Integrated Disease Surveillance Project, sentinel surveillance is conducted for which of the following diseases? FMGE 2024

a. Malaria, Diphtheria
b. Measles, typhoid
c. HIV, Hepatitis B
d. HIV, Measles

Ans. c)HIV, Hepatitis B

Q.Ujjawala scheme is for prevention of?

a. Child abuse
b. Child trafficking
c. Child labour
d. Child marriage

Ans. b) Child trafficking

- Ujwala → Provide LPG gas cylinder to below poverty line women
- Ujala → LED bulb
- Ujjawala → Child trafficking under MoWCD

HEALTH DAYS

01.08.10

Health Days	Dates
National Deworming Days	10th February , 10th August
World Tuberculosis Day	24th March
World Health Day	7th April
World Malaria Day	25th April
National Anti Malaria Month	June
World Immunization week	Last week of April
World No tobacco Day	31st May
World Hepatitis Day	28th July
Breastfeeding week	1st week of August
World AIDS Day	1st December

Yourwish

18. NATIONAL HEALTH MISSION , RMNCAH+N , MATERNAL , CHILD, AND ADOLESCENT HEALTH INITIATIVES , AYUSHMAN BHARAT

NATIONAL HEALTH MISSION

00.00.14

- National Health Mission was formulated in 2013
  - NRHM → 2005
  - NUHM → 2013
- The name of the program is changed to Pradhan Mantri Samagra Swasthya Mission
- Aim → Strengthening Comprehensive Health care services, including building tertiary care capacity at the district level
- The program was extended till March 2026
- Logo → Couple with one Female child → represent NRR = 1

Goals of NHM

- Reduce MMR to 87 per 1 lakh live births
  - Current MMR 88 per 1 lakh live births
- Reduce IMR to 22 per thousand live births
  - Current IMR 25 per thousand live births
- Sustain TFR at 2.0 at the national level
  - Current TFR 1.9
- Reduce U5MR to 23 per thousand live births
  - Current U5MR 31 per thousand live births
- Prevent and reduce anemia in women aged 15-49 years
- End the epidemic of TB by 2025 (reduce incidence/mortality by half) → extended

Disease Control Targets

- Malaria → Control the disease
  - Annual incidence <1per 1,000 population with elimination efforts
- Leprosy → Already been eliminated, and to sustain the level
  - Prevalence <1per 10,000, zero incidence in all districts
- Kala-azar → Elimination effort by 2027
  - Target < 1case/10,000 in blocks
- Lymphatic filariasis → Elimination effort by 2027

Health System & Expenditure Targets

- Ayushman Arogya Mandhirs
  - Operationalize in 1.5 lakh centres
- Out-of-pocket expenditure (OOPE)
  - Reduce household OOPE on total healthcare
- Provide quality, affordable healthcare to all, especially to poor → Universal access

Yourwish

Yourwish

Components of Nhm

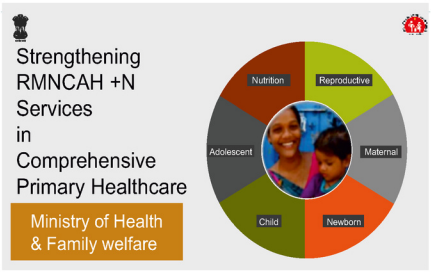
- NRHM
- NUHM
- RMNCAH + N
- Communicable Disease
- Non - Communicable Disease

INICET 2025

00.05.38

RMNCAH+N

- It was formulated in the year 2013
  - R → Reproductive
  - M → Maternal
  - N → Newborn
  - C → Child
  - A → Adolescent
  - N → Nutrition



Q.The RMNCAH+A strategy by MOHFW aims to provide comprehensive healthcare across various life stages. All are the target demographic for RMNCH + A except:

(INICET 2025)

A. Maternal and Child Health

B. Adolescent health

C. Family planning services

D. Geriatric Health

Answer : D.

NEETPG 2022
FMGE 2024

00.06.41

MATERNAL HEALTH INITIATIVES

Janani Suraksha Yojna (JSY)

Goal	• Reduce maternal mortality ○ Maternal mortality →Death of women during pregnancy, during labour, up to 42 days post delivery due to pregnancy and related causes, excluding accidental and incidental causes
Objective	• Promote institutional delivery by providing cash incentives to the mother and the ASHA worker

Services provided	• Incentive
	  ○ Mother → for institutional delivery
	  ○ ASHA → for promoting institutional delivery
	• Safe motherhood services under the Vandemataram scheme
	  ○ Safe Antenatal Checkups
	  ○ Tetanus and Diphtheria injection
	  ○ Iron and folic acid supplementation
	• Celebrate Village Health and Nutrition Day
	• Maternal death review
	• Pregnancy tracking by ASHA /AWW
	• Safe abortion services
	  ○ Mifepristone Followed by Misoprostol and Manual vacuum aspiration

Yourwish

Cash Assistance For Institutional Delivery

Category	Rural areas	Urban areas		
	Mother's package	ASHA's package	Mother's package	ASHA's package
LPS	Rs.1400	Rs.600	Rs.1000	Rs.400
HPS	Rs.700	Rs.600	Rs.600	Rs.400

Important Information

- LPS → Institutional delivery <25% → Bihar, UP, MP, Jharkhand, Rajasthan, Odisha, J&K, Assam, Chattisgarh
- HPS → Institutional delivery >25% → other states
- Eligible women
  - LPS → All pregnant women delivering in government health centres
  - HPS → BPL / SC/ST women delivering in the government health centre
- Cash assistance is provided irrespective of age of pregnant women and parity
- In case of home delivery, a cash assistance of Rs. 500 is given to BPL pregnant women

Q.A primigravida residing in an urban area of Madhya Pradesh undergoes institutional delivery after counseling by an ASHA worker. Enumerate the benefits she is entitled to under the Janani Suraksha Yojana (JSY):
NEETPG 2022

A.1000 for mother and 400 for ASHA
B.1400 for mother and 600 for ASHA
C.600 for mother and 400 for ASHA
D.400 for mother and 600 for ASHA

Answer: A.

Q.A pregnant woman residing in urban areas 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 counseling and testing

Answer: D.

Q.How often and where is the village Health Nutrition Day conducted?
FMGE 2024

A. Once a month in PHC
B. Once a month in anganwadi centres
C. Once every 2 weeks in PHC
D. Once every 2 weeks in anganwadi centres

Answer: B.

Janani Shishu Suraksha Karyakram (JSSK)

00:13:03

JSSK

NEET PG 2024



Goal	• Reduce Maternal Mortality
Objective	• Reduce out-of-pocket expenditure
Beneficiary	• Pregnant female • Infant upto age of 1 year

Services provided	• Cashless delivery, i.e., free (both normal & C section)
	• Free drugs and Diagnostics
	• Free diet
	  ○ 3 days during normal delivery
	  ○ 7 days during C-section
	• Free blood wherever required
	• Free transport from home to health institutions
	• Free transport between facilities in case of referral
	• Free drop back from institutions to home after 48 hours of stay
	• Exemption from all kinds of user charges

Q.Under the JSSK program, pregnant women receive a free antenatal check-up on the 9th of each month, along with free medicines and delivery services, including cesarean sections.What is the full form of JSSK?

NEETPG 2024

A. Janani Shishu Swasthya Karyakram
B. Janani Shishu Suraksha Kendra
C. Janani Shishu Suraksha Karyakram
D. Janani Shishu Swasthya Kendra

Answer: C.

Q.All are true about Janani Shishu Suraksha Karyakram (JSSK), except?
A. Free diet to mother during hospital stay
B. Free delivery
C. Free transport from home to hospital and back
D. Free treatment of sick infants upto 6months

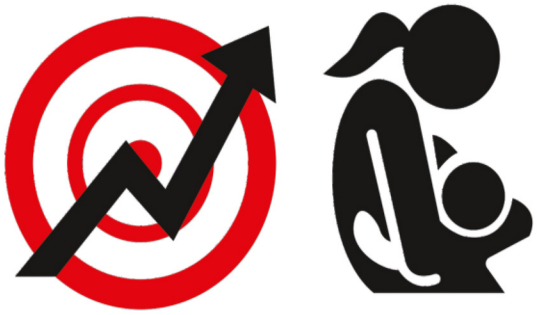
Answer: D.

Yourwish

Laqshya

00:15:26

LAQSHYA



Goal	• Reduce maternal mortality
Objective	• Provide quality-based services

Services	• NQAS (National Quality Assurance Standards) → assess → Quality improvement in labour room and maternity OT
	• Facilities achieving → 70% score on NQAS → certified as LaQshya certified facility
	• Facilities score
	  ○ >90% → Platinum badge
	  ○ >80% → Gold badge
	  ○ >70% → Silver badge
	• Facilities achieving NQAS certification, defined quality indicators, and 80% satisfied beneficiaries will be given incentives
	  ○ Rs. 6 lakhs → for medical college
	  ○ Rs. 3 lakhs → for District Hospitals
	  ○ Rs. 2 lakhs → for FRUs
	• PHC and SC are not part of this initiative

National Quality Assurance Program



- Guidelines published in 2018 → Initiatives included are
  - LaQshya → Quality of care during delivery & postpartum
  - MusQan → Child-friendly public health care facilities
  - SaQushal → Safety Quality Self-assessment tool for health facilities
  - KAYAKALP Award → For better hospital administration and patient satisfaction
  - Swach swasth sarvatra → Clean and safe drinking water



Yourwish

Yourwish

Pradhan Mantri Matru Vandana Yojana

00:18:19

Pradhan Mantri Matru Vandana Yojana

Goal	• Reduce maternal mortality
Objective	• Reduce out-of-pocket expenditure
Ministry	• Ministry of women and child development
Eligibility	• Pregnant women ≥19years and for the first live birth only (Rs. 5000)
Service	• 1st Installments → On registration of pregnancy and at least one Antenatal check up within 6month from LMP date at the Anganwadi centres / Approved health facilities → Rs. 3000 • 2nd Installments → child birth registered and child has received first cycle of BCG, OPV, DPT, and Hep-B → Rs.2000 • If 2nd child is a girl child then a cash incentive of Rs. 6000 will be given as a single installment

Important Information

- All maternal initiatives are under MoHFW except
- PMMVY under Ministry of women and child development

Pradhan Mantri Surakshit Matritva Abhiyan

00:22:00

Pradhan Mantri Surakshit Matritva Abhiyan

Goal	Reduce maternal mortality
Objective	Identify high-risk pregnancies
Services	• 9th of every month →Free ANC services provided to women in 2nd and 3rd trimester → in government set up and accredited hospital • Colour coded

Yourwish

	○ No risk factor - Green card ○ High-risk pregnancy - Red card ○ PIH - Blue card ○ Comorbidities like Diabetes, PID - Yellow card

Dakshata

00:23:33

Dakshata



Goal	Reduce maternal mortality
Objective	Ensure safe delivery
Strategy	• Train doctors and ANMs for intrapartum and immediate postpartum care

Q.What is the initiative known to train medical officers and ANMs for intrapartum care?
A. LaQshya
B. SPARSH
C. Dakshata
D. MAA

Answer: C.

- SPARSH → Leprosy

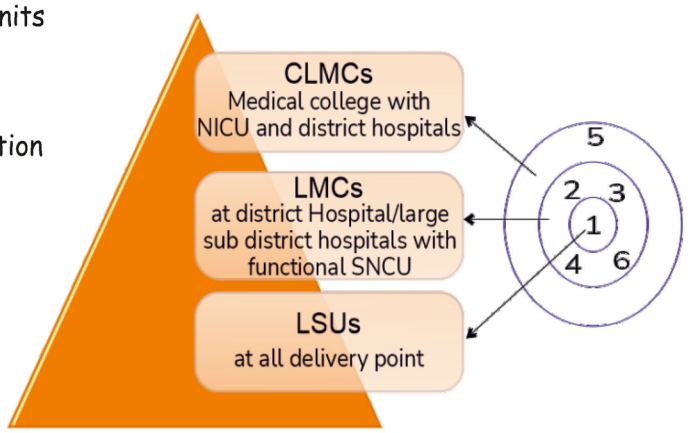
Maa Programme

MAA(Mother Absolute Affection) Programme



Goal	• Reduce maternal and child mortality
Objective	• Promote breastfeeding
Stratergy	• Exclusive breast feeding upto 6 months

Stratergy	• LSUs → Lactation Supportive units • LMCs → Lactation Management centres • CLMCs → Comprehensive Lactation Management centres ○ Have breast milk bank



SUMAN SCHEME

SUMAN (Surakshit Matritva Aashwasan) Scheme



Goal	• Reduce maternal mortality
Objective	• Zero preventable maternal and newborn deaths
Beneficiary	• Women during pregnancy, delivery, and 6 months post-delivery • Infants
Suman Charter (Service Guarantee Scheme)	• Assured • Dignified • Respectful • Good quality health care at no cost • Zero tolerance of denial of services to pregnant women and infants
Services	• Ambulance and referral services • Minimum 4 antenatal check-ups • Normal delivery or C-section • Medicines, diagnostic tests, and blood services to mother and for the baby upto 1 year • Proper care with respect and dignity • Grievance redressal mechanism (toll-free no 104)

Summary

- Increase Institutional delivery → JSY
- Free service for pregnant women and sick infants (diet , drugs , diagnostics , transport , delivery , food) → JSSK
- Free screening for ANC females on the 9th of every month, Labour room quality →LaQshya
- Train doctors and ANMs for intrapartum and immediate postpartum care → DAKSHATA

Yourwish

- Service guarantee charter, grievance redressal mechanism, zero tolerance policies with zero preventable maternal and newborn deaths, includes women upto 6month post delivery → SUMAN

CHILD HEALTH INITIATIVES

00.29.28
FMGE 2024

Navjat Shishu Suraksha Karyakaram (Nssk)

Navajat Shishu Suraksha Karyakaram (NSSK)



Goal	• Reduce child mortality
Objective	• 2 days of training for health workers in basic newborn care and resuscitation facilities
Beneficiary	• Newborn

Q.Navajat Shishu Suraksha Yojna focuses on which groups of people? (FMGE 2024)

A. Neonates
B. Children
C. Infants
D. Lactating women

Answer: A.

Home-Based Newborn Care

- Initiative by ASHA worker
- Role of ASHA
  - Promote colostrum feeding and exclusive breastfeeding
  - Ensure newborn warmth and adequate maternal nutrition
  - Timely vaccination
  - Maintain hygiene, handwashing with soap
  - Monitor and record newborn weight

Type of delivery	Number of visits	Days
Home Delivery	7	Day 1,3,7,14,21,28,42
Hospital Vaginal delivery	6	Day 3,7,14,21,28,42
Hospital C-section	5	Day 7,14,21,28,42

Home-Based Young Child Care

- Initiative under Poshan Maah
- Launched in September 2018

Yourwish

Yourwish

- Additional visits by ASHA from 3rd to 15th month of childbirth
- Aim:
  - Improve the nutritional status of young children
  - Ensure proper growth and early childhood development
  - Prevent childhood illness and death resulting from them
- Beneficiary
  - LBW babies
  - Babies who were admitted in special newborn care units



Facility-Based Newborn Care

Health facility	Newborns at birth	Sick newborn
MCH Level I - PHC, Subcentre	Labour room newborn care corner	Urgent referral
MCH Level II - CHC, First referral unit	Labour room and operation theatre newborn care corner	Newborn stabilization unit (Babies of BW 1.8-2.5kg are managed)
MCH Level III -District hospital	Labour room and operation theatre newborn care corner	Special newborn care unit (babies of BW <1.8kg are managed)

NBCC	NBSU	SNCU
• Care of normal newborn • Breastfeeding support • Care of sick newborn • Identification and prompt referral of risk and sick newborn	• Care of normal newborn • Breastfeeding support • Care of sick newborn • Phototherapy of newborns with hyperbilirubinemia • Management of newborn sepsis • Stabilization and referral of sick newborns and those with very low birth weight (Rooming in) • Referral services	• Care of normal newborn • Breastfeeding support • Care of sick newborn • Managing all sick newborns (except those requiring mechanical ventilation) • Follow up on all babies discharged from SNCUs • Immunization services • Referral services

Q.All facilities are provided in the newborn care corner except?
A.Care of sick newborn
B.Care of normal newborn
C.Breastfeeding support
D.Support to low birth weight babies

Answer: D.

Imnci

- Integrated Management of Neonatal and Childhood Illness
- Target children → 0-5 years
- Diseases managed are

Yourwish

- Acute Respiratory Infection → Pneumonia
- Diarrhoeal disease
- Measles → otitis media
- Malaria
- Malnutrition

- Colour coding based on severity of disease
  - Green colour → Home management
  - Yellow colour → OPD management
  - Pink colour → Referral

Indian Newborn Action Plan (Inap)

- To achieve single digit Still Birth rate and Neonatal mortality rate by 2030
- Stillbirth rate → 6.5 / 1000 live births
- Neonatal mortality rate → 19 / 1000 live births
- Services:
  - Preconception and Antenatal Care
  - Care during labour and childbirth
  - Immediate newborn care
  - Care of healthy newborn
  - Care of small and sick newborns
  - Care beyond survival





Rashtriya Bal Swasthya Karyakram (Rbsk)

FMGE 2024
INICET 2020

- It was launched in 2013
- Child health screening and early intervention services programme under national rural health mission
- Target children
  - 0-6 years old children in rural areas and urban slums
  - 6-18 years old children in government school
- Targets
  - Defects at birth
  - Developmental delays
  - Deficiencies
  - Disease
- Mobile health team
  - Medical officer
  - AYUSH officer
  - ANM/Staff nurse
  - Pharmacist

Defects at Birth	Deficiencies
• Neural tube defects	• Anemia
• Down's syndrome	• Vitamin A deficiency(Bitot spots)
• Talipes (club foot)	• Vitamin D deficiency(Rickets)
• Developmental dysplasia of the hip	• Severe acute malnutrition
• Congenital cataract	• Goiter

• Congenital deafness • Congenital heart disease • Retinopathy of prematurity Defect not screened - Congenital Glaucoma	
Disease of childhood • Skin condition(scabies, fungal infection, and eczema) • Otitis media • Rheumatic heart disease • Reactive airway disease • Dental conditions • Conclusive disorder • Leprosy and TB	**Developmental delay** • Vision impairment • Hearing impairment • Neuromotor impairment • Motor delay • Cognitive delay • Language delay • Behaviour disorder • Deficit hyperactivity disorder • Sickle anemia, beta thalassemia,congenital hypothyroidism

- Frequency of screening
  - Newborns → screened for birth defects at time of delivery
  - Children (6weeks -6years) → screened at Anganwadi centre by Mobile Health team
  - Children (6-18 years) → screened at Government schools by the Mobile Health team at least twice a year

Q.Program for screening development delay, deficiency, and neonatal genetic defect is?
A. Janani Suraksha Yojana
B. Janani Shishu Suraksha Karyakram
C. Rashtriya Bal Swasthya Karyakram
D. Rashtriya Kishor Swasthya Karyakram

Answer: C.

Q.Health checkups for children aged 9-18years should occur how often under Rashtriya Bal Swasthya Karyakram? (FMGE 2024)
A. Once a month
B. Once every six months
C. Semiannually
D. Annually

Answer: C.

Q.Which of the following conditions is NOT included in the RBSK screening program? INICET 2020
A. Congenital cataract
B. Congenital glaucoma
C. ROP
D. Vitamin A deficiency

Answer: B.

Yourwish

ADOLESCENTS HEALTH INITIATIVES

00.41.14

Rashtriya Kishor Swasthya Karyakram(Rksk)

- Kishor → 10-19 years
- India's first comprehensive adolescent health programme
- Targets adolescents
  - Both boys and girls
  - Married, unmarried
  - Poor, Affluent
  - School and out-of-school children
- Critical Components (7c)
  - Clinics → adolescent-friendly health clinics
  - Counseling → psychological, reproductive, and sexual health counseling
  - Communication → effective health messaging and awareness
  - Content → educational material for adolescents
  - Convergence, coordination with other health programs
  - Care → Direct health services for adolescents
  - Community engagement and outreach program
- Interventions
  - Adolescent-friendly healthy clinic(AFHC)
  - Menstrual hygiene scheme
  - Kishori Shakti Yojana
  - Weekly Iron and Folic acid supplementation

FMGE 2025

AFHC

- Provides clinical and counselling services on adolescent health issues
  - Sexual and reproductive health
  - Nutrition
  - Substance abuse
  - Injuries and violence (including gender based violence)
  - Non-communicable disease and mental health
- Timing of the clinic



SC	PHC	CHC	DH	Medical college
Walk-in clinics by ANMs	Weekly AFHCs from 2 to 4 pm by ANMs and MOs	Daily AFHCs from 9 am to 4 pm .Dedicated AH counselor	Daily AFHC from 9 am to 4 pm. Two-hour daily clinic from 2 to 4 pm by MOs with support from ANMs	AFHC with different specialities from 9 am to 1 pm and counselors from 9 am to 4 pm

- Two way role of the counselor placed at CHC onwards:
  - To ensure on ground linkages with community through pes
  - Forward linkages with specialist in hospital, in case medical care is needed by adolescent client

Yourwish

Menstrual Hygiene Scheme

- MoHFW has introduced a scheme for the promotion of menstrual hygiene among adolescent girls in the age group of 10-19 years in rural areas
- Objectives
  - To increase awareness among adolescent girls on menstrual hygiene
  - To increase access to and use of high-quality sanitary napkins among adolescent girls in rural areas
  - To ensure safe disposal of sanitary napkins in an environmentally friendly manner
- Freedays
  - Sanitary packs are provided to rural adolescent girls at a subsidized rate of Rs 6 for a pack of 6 napkins
  - The ASHA will continue to be responsible for the distribution of sanitary packs
    → Incentive → Rs 1 per pack and a free pack of napkins every month for her personal use

Kishori Shakti Yojana

- Initiative for adolescent girls for nutrition under the ICDS scheme



Weekly Iron And Folic Acid Supplementation

NEETPG 2025

- Component of Anemia Mukth Bharat
- Promoted by Ayushman Bharat
- Supplementation of weekly Iron and Folic acid to adolescents →Blue coloured tablet
- Composition → 60mg elemental iron and 500 mcg folic acid

Q.What dose of IFA tablets is provided to children in the 10-19 years age group as per the Weekly Iron and Folic acid Supplementation Programme?

NEETPG 2025

A. 100mg elemental iron and 500 mcg folic acid
B. 60mg elemental iron and 500 mcg folic acid
C. 100mg elemental iron and 500 mcg folic acid
D. 50mg elemental iron and 50 mcg folic acid

Answer: B.

Q.National Deworming Day is celebrated on
A.10th February & 10th March
B.10th March & 10th August
C.10th February & 10th August
D.10th February & 10th September

Answer: C.

AYUSHMAN BHARAT

00.46.43

- A/K/A Pradhan Mantri Jan Arogya Yojana (PM -JAY)
- Launched in 2018
- Objective → Universal Health coverage with financial protection → Quality affordable care
- Target → Build a new India by 2022, and it is now extended

Yourwish

- Initiatives subsumed within it:
  - Rashtriya Swasthya Bima Yojana → Financial support of Rs. 30,000/year upto 5 Family members
  - Senior citizen health insurance scheme
- Components
  - At the primary level → upgrading health facilities to provide comprehensive health care
    → Establish 1,50,000 Ayushman Arogya Mandhir → provide universal, free and comprehensive primary health care, wellness, and expanded services closer to communities
  - At secondary and tertiary level → Financial protection → National Health Protection scheme (MODI CARE)
    → Health insurance coverage of Rs. 5 lakh/family/year to poor and vulnerable families for secondary and tertiary level treatment

Ayushman Arogya Mandhir

NEETPG 2024

- Subcentres in PHCs are upgraded as Ayushamn Arogya Mandhir
- Earlier called Health and Wellness Centre(HWC)
- Provide a comprehensive range of services
  - RMNCAH + N services
  - Non-communicable disease, palliative and rehabilitative care
  - Oral, Eye, and ENT care
  - Mental Health Care
  - Emergencies & trauma first-level care
  - Free essential drugs
  - Diagnostic services



Rs. 5 lakh/family/year

- Cover 10 crore poor and vulnerable families and 50 crore beneficiaries
- All families listed in SECC (Socio-economic Caste Census) database as per the defined criteria will be covered
- No cap on family size or age of members
- Priority is given to girl child, women, and senior citizens
- Cover upto 3 days of pre-hospitalization and 15days post hospitalization expenses

Scope Of Coverage → Flexible Scheme

- Covers secondary and tertiary care hospitalisation
- Provides IPD (inpatient department) care
- Free treatment is available at all public hospitals and empaneled private hospitals in times of need
- Hospital with a minimum of 10 beds can provide services under the scheme
- 1350 medical packages covering medical, daycare treatment, surgery, medicines, and Diagnostics
- All pre-existing diseases are covered. A hospital cannot deny treatment
- Cashless and paperless access to quality health care service
- A hospital cannot charge any additional money from the beneficiary for the treatment

Q.Ayushman Arogya Mandhir provides which of the following facilities?
A.Water
B.Food
C.Security
D.Essential drugs

Answer: D.

Q.Which of the following services is not part of the School Health Programme under Ayushman Bharat?
A. Monthly IFA tablets for all children
B. Health screening
C. Deworming for school-going children
D. Sanitary napkins for adolescent girls

Answer: A.

Q.A 10 year old school going girl came for a health checkup. Her Hb is 9 g/dl. Which of the following government programs is likely to provide significant benefit to her health?
A. Rashtriya Bal Swasthya Karyakram
B. Janani Suraksha Yojana
C. Pradhan Mantri Matru Vandana Yojana
D. Navjat Shishu Karyakram Yojana

Answer: A.

Q.In the Ayushman Bharat scheme, what is the annual Health Insurance coverage offered to a qualifying family?
A. 5 lakhs per family per year FMGE Dec 2021
B. 4 lakhs per family per year
C. 6 lakhs per family per year
D. 3 lakhs per family per year

Answer: A.

LOGOS OF PROGRAMME

00.52.32

Pradhan Mantri Swasthya Suraksha Yojana(PMSSY)

- Setting up institutions like AIIMS
- Upgradation of AIIMS



Yourwish

e-Sanjeevani • Online OPD services	स्वस्थ भारत
Jan-aushadhi • Quality medicines at an affordable price	jan aushadhi Quality Medicines At Affordable Prices for All
m-Diabetes	
Mera Aspatal • Quality check of hospital	मेरा अस्पताल My Hospital

19. HEALTHCARE SYSTEM IN INDIA

PRIMARY HEALTH CARE

00:00:37

Definition Of Primary Health Care

FMGE Dec 2021

- Adopted in 1978 at Alma Ata conference
- It is the essential health care
  - Based on practical, scientifically sound, and socially acceptable methods and technology
  - Accessible to individuals and families in the community through their full participation
  - At a cost that the community and country can afford

Important Information

4As of primary health care:

- Availability
- Accessibility
- Acceptability
- Affordability

Elements/ components of primary health care

(mnemonic - elements)

- **E**ssential Medicine
  - Paracetamol is the most essential medicine
- Prevention and control of **L**ocally Endemic disease
  - E.g JE
- Health **E**ducation
- **M**aternal, Child Health, and Family Planning Services
- **E**PI → Expanded Program Immunization
  - Replaced by UIP →Universal Immunization Program
- **N**utrition
  - Iron and Folic acid
  - Deworming
  - ORS
- **T**reatment of common ailments
- **S**afe water supply and sanitation

Principles/Pillars Of Primary Health Care

- Community Participation
  - Grass root/Field level workers → ASHA, Anganwadi, Trained Birth attendants, Village health guides → who are residents of the village
- Appropriate Technology
  - Cost effective good quality services

  - E.g: ORS, VVM, Shakir's tape, KMC
- Intersectoral Coordination
  - Health sector supported by other sectors
- Equitable Distribution

Q. Which of the following is not considered a pillar of primary health care?
a. Health education
b. Intersectoral coordination
c. Appropriate technology
d. Equitable distribution

Answer: a.Health education

LEVELS OF HEALTH CARE

00:07:54
FMGE Jan 2025

- Rural area
  - Population upto 5000
  - 75% of the male working population is in the agricultural sector
- Urban area
  - Population > 5000
  - 75% of the male working population is in non - agricultural sector

Level	Rural	Urban
Tertiary	Medical college, Super specialty hospital	Medical college, Super specialty hospital
Secondary	District hospital Sub-District hospital Community Health Centre	Community Health Centre • Metro cities • Non-metro cities
Primary	Primary Health Centre Sub centres	U-Primary Health Centre U-Health and wellness centre

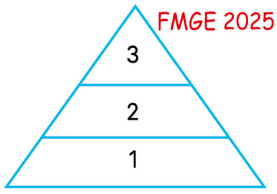
Sub-centres in PHC under Ayushman Bharat
↓
Health and Wellness Centre
↓
Ayushman Arogya Mandhir

Ayushman Arogya Mandhir

- Provide universal health care
- Provide a comprehensive range of services
  - RMNCAH + N services
  - Non-communicable disease, palliative and rehabilitative care
  - Oral, Eye, and ENT care
  - Mental Health Care
  - Emergencies & trauma first-level care
  - Free essential drugs
  - Diagnostic services



Q. Identify the correct statement for the levels of healthcare? FMGE 2025



a. 1-Medical colleges & Hospitals , 2-CHC ,3-Subcentres and PHC
b. 1-PHC , 2-Subcentres , 3-Medical colleges & Hospitals
c. 1-CHC , 2-Subcentres ,PHC ,3-Medical colleges & Hospitals
d. 1-Subcentres and PHC, 2-CHC, 3-Medical colleges & Hospitals

Answer: **d.**1-Subcentres and PHC, 2-CHC, 3-Medical colleges & Hospitals

Q. What are the first referral centres in India's healthcare system? FMGE 2021

a. Primary Health Centre and District Hospitals
b. Medical College and District Hospitals
c. Community Health centres and Medical colleges
d. Sub-district Hospitals and Community Health Centres

Answer: **d.**Sub-district Hospitals and Community Health Centres

Q. Among the following, the first contact for people seeking medical care in a community is FMGE 2022

a. Primary Health center(PHC)
b. Community Health center(CHC)
c. Sub-centre
d. District Hospital

Answer: **c.**Sub-centre

HEALTH CARE DELIVERY SYSTEM

00:15:01

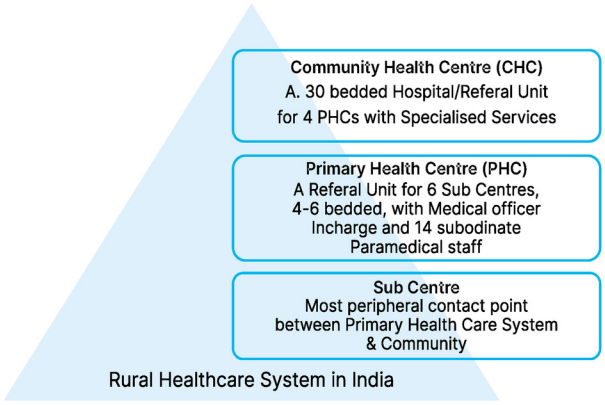
Health Care Delivery System In Rural Areas

	SC	PHC	CHC
Population	Plain → 1/5000 Hilly → 1/3000	Plain → 1/30,000 Hilly → 1/20,000	Plain → 1/120000 Hilly → 1/80000
Categorisation	Type A: no delivery Type B: delivery present	Type A: <20 deliveries/month Type B: ≥20 deliveries/month	
Staff	Type A: 3 Type B: 4	Type A: 13-18 Type B: 14-21	46-52
Responsibility of maintenance	Central government	State government	State government
No of villages	4	29	158
No of beds	Type A: 1-2Beds Type B: 2-3Beds	Type A: 4-6Beds Type B: 6-10Beds	30-50 Beds

Yourwish

Referral Unit

- 1 CHC is a referral unit for 4 PHCs
- 1 PHC is a referral unit for 6 SC
- SC is the most peripheral contact point between primary Health Care System and the community



Staff At Health Care System

Staff at Health Care System	
Sub Centre	• 1 Multipurpose worker Male (MPW M) / Health worker (M) • 1 Multipurpose worker Female (MPW F) / Health worker (F) / Auxiliary nurse midwives (ANM) • 1 Safai Karamchari Type A SC: 1MPW M, 1MPW F , 1 Safai Karamachari Type B SC: 1MPW M, 2MPW F ,1 Safai Karamachari

PHC	• 1 Medical officer - Essential
	• 2 Staff Nurse
	• Health Assistant (M)
	• Health Assistant (F) / Lady Health Visitor (LHV)
	  ○ 1 LHV=30,000 population
	• 1 Pharmacist
	• Lab Technician
	• Block Extension educator
	• Lower division clerk
	• Upper division clerk
	• Nurse midwife
	• ANM, 1 Dresser, 1 Accountant, 1 Data entry operator
	• Desirable staff
	  ○ 1 MO- MBBS, 1 MO- AYUSH, 1 MO -Dental, 1 staff nurse, 1 Ophthalmic assistant, 1 Health educator
	  ○ Ophthalmic assistant
	  → Referred when child VA <6/9

Yourwish

Yourwish

CHC	• 2 Medical officers, 1 Ayush Medical officer , Health supervisor (M) , Health supervisor (F) , 7 nurse midwives , Dresser , Lab technician , Pharmacist , Radiographer , Biostatistician , 1 Public health nurse , 10 staff nurses, Specialists • Specialists ○ Physician ○ Surgeon ○ OBG ○ Paediatrician ○ Anaesthesiologist ○ ENT specialist ○ 1 ophthalmologist → 5CHC (5 lac population) → According to WHO, 1 ophthalmologist → 50,000 population ○ 1 MD PSM ○ 1 MD (Hospital administration) ○ 1 Dental surgeon

Q. All of the following statements are true about a PHC except? FMGE 2022

a. There is 1PHC per 30,000 population in plain areas

b. Type A PHC Conducts delivery

c. Provides maternal and child health care, family planning, and MTP

d. Is the first referral unit

Answer: **d.**Is the first referral unit

Q. For a Type A PHC, identify the correct delivery criteria: FMGE 2023

a. More than 20 deliveries conducted per month

b. Less than 20 deliveries conducted per month

c. More than 30 deliveries conducted per month

d. Less than 30 deliveries conducted per month

Answer: **b.**Less than 20 deliveries conducted per month

Health Care Delivery System In Urban Areas

FMGE Jan 2023
FMGE July 2023

- Primary level: U-HWC and PHC
- Secondary level: U-CHC

	U-HWC	U-PHC	U-CHC	U -Polyclinic	
Population	1/15000 to 1/20000	1/50,000 {In densely populated slum 1/75,000}	Non metro cities: 1/2.5 lakh	Metro cities: 1/5 Lakh	1/2.5 lakh to 1/3 lakh
Responsibility	Municipal corporation / State government				
No of beds		6 beds	50 beds	100 beds	

- Tertiary level: Medical colleges, Superspeciality hospitals
- 1 U-ANM for 10,000 population → 2000 households
- 1 USHA for 1000-2500 population → 250-500 households

Staff At Health Care System

Staff at Health Care System	
U-PHC	• 2 Medical officer (1 Regular + 1 Part time) • 1 AYUSH officer • 3 Staff Nurse • Lady Health Visitor (LHV) • 1 Pharmacist • 1 Lab Technician • 4-5 ANM • 1 Program Manager

Q. Which is true with respect to Urban Community Health Center? NEET PG 2022
a. Minimum 100 beds in metropolitan areas
b. 2-3 PHC under the U PHC's
c. Should be in areas where there is no district/subdistrict hospital
d. One UCHC for 1-1.5 lakh population

Answer: **a.**Minimum 100 beds in metropolitan areas

Q. An urban primary health centre covers a population of: FMGE 2024
a. 1 per 10,000
b. 1 per 25,000
c. 1 per 50,000
d. 1 per 100,000

Answer: **c.**1 per 50,000

Q. Which of the following is not a part of the urban health care delivery system?
a. PHC
b. CHC
c. Swasthya chowki
d. Subcentre

Answer: **d.**Subcentre

Q. Urban social Health activist (USHA) workers are proposed to work for a population of : FMGE 2024
a. 1000-2500
b. 2000-3500
c. 4000-5000
d. 4500-6000
Answer: **a.**1000-2500

ROLES OF VARIOUS HEALTH CARE WORKERS

00:31:41

Health care workers	Roles

MPW (F)	• Eligibility → She should be 12th pass and should complete training for 12 months
	• Register the pregnant female in the ANMOL app
	• Conducts delivery
	• Maintain the eligible couple register / Family planning register
	• Conduct Hb & urine test
	• Insert IUCD
	  ○ CuT 380A
	  ○ CuT 375
	• Identify high-risk pregnancies and refer
	• Dai training
	• Treatment of minor ailments

MPW (M)	• Active Malaria Surveillance • Chlorination of wells and supply of safe drinking water • Collect sputum samples • Leprosy surveillance • Identify and follow up on cases of blindness
MPW (M) and MPW(F)	• Distribute contraceptives • Distribute ORS • Administer vaccines • Maintain vital records • Identify cases of communicable and non-communicable disease

Q. Who is primarily responsible under the national health system for registering eligible couples for family planning, maintaining their records, and distributing oral contraceptives FMGE 2025

a. Multipurpose worker(Female)
b. ASHA(Accredited Social Health Activist)
c. Anganwadi worker
d. Village Health guide

Answer: a.Multipurpose worker(Female)

FIELD LEVEL WORKER

00:34:39

Field-level Worker	Eligibility	Roles
ASHA (Accredited Social Health Activist)	• ASHA must be a local resident of the community • Age group: 25-45 years ○ Can be Married, Widowed, or Divorced	• Identify target beneficiaries and support ANM in conducting outreach sessions • Promote formation of women's health groups • Provide health information to community • Facilitate access to health and related services

Yourwish

	• Selected by the Village panchayat under the supervision of Medical officer
	• Accountable to Village Panchayat
	• Educational qualification → 10th pass
	  ○ If no candidates are available, the requirement can be 8th pass
	• Population norms
	  ○ Proposed → 2/1000
	  ○ Existing → 1/1000
	  ○ In tribal, hilly, and desert areas, 1 ASHA per habitation, 1 per village, 1 per 200-500 households
	• Period of training → 23 days
	• Training provided by ANM and Anganwadi workers under the supervision of the Medical officer.
	• Gets incentives
	• E.g of Community participation of primary health care
		• Accompany pregnant women and children requiring treatment/admission
		• Facilitate development of a comprehensive health plan → Village Health Action Plan
		• Facilitate construction of community/household toilets
		• Act as depot holder
		  ○ ORS
		  ○ Paracetamol
		  ○ Chloroquine
		  ○ Contraceptives
		• Maintain necessary information and records
		• Home visits by ASHA under Home-based Newborn care
		  ○ Incentive of Rs 250 on completion of Day 45
		• Home-based care of Young child
		• Incentives given if she motivates newly married couple
		  ○ To delay birth of 1st child by 2years → Rs 500
		  ○ Maintain a gap of at least 2 years between two successive pregnancies → Rs 500
		  ○ Adopt a permanent method of family planning → Rs 1000
		• Acts as DOTS provider
		  ○ On successful completion of new and previously treated TB Patients → Rs 1000
		  ○ On successful completion of MDR/XDR Patients → Rs 5000
		  → At end of IP → Rs 2000
		  → At end of CP → Rs 3000
		  ○ Patients' own parents cannot act as a DOTS provider
		• Distribution of contraceptive
		  ○ Emergency contraceptive → Rs 2
		  ○ OCP/Condoms → Rs 1
		• Leprosy- ASHA-based Surveillance for Leprosy Suspects (ABSULS)
		  ○ If ASHA detects a case without disability → Rs 250
		  ○ If ASHA detects a case with disability → Rs 200
		  ○ If ASHA follows a paucibacillary leprosy case throughout the treatment course of 6-9months → Rs 400

Yourwish

		○ If ASHA follows a multibacillary leprosy case throughout the treatment course of 12-18months → Rs 400 • Cannot conduct delivery and cannot give vaccines
Anganwadi workers (AWW) - (posted in ICDS)	• 10th pass • Population norms ○ Plain → 1/400-800 ○ Hilly → 1/300 -800 • Period of training → 4 months	• Health education and Health checkup • Growth charts monitoring • Counsel pregnant women on birth preparedness, safe delivery, immunization, contraception, and prevention of common infections, including reproductive and sexually transmitted infections • Nutrition • Immunize children and pregnant women • Non-formal school education • Referral services
Trained Birth Attendants	• Female • Population norms ○ 1/1000 • No educational qualification required • Period of training → 1 month ○ Conduct 2 supervised deliveries during training	• Register a pregnant female and conduct delivery • No role during Antenatal and Postnatal care
Village Health Guide	• Can be male/Female but preferrable Female • Population norms ○ 1/1000 • 6th pass • Period of training → 3 months	• Responsible for Health Education

Q. The minimum requirements of a health worker job are given: should be a woman, a resident of the village, 25-45years old, and have a formal education till 10th standard. What is the health worker called? FMGE 2021

a. Anganwadi worker
b. Nurse
c. Midwife
d. ASHA worker

Answer: **d.**ASHA worker

Q. A 30 week primigravida presents with complaints of reduced vision at night. She has been avoiding papaya, mango, and other fruits throughout her pregnancy as she thinks they could be abortifacients. It is the duty of which of the following workers to provide counselling and information to the patient to address these myths?

a. Anganwadi worker

NEET PG 2022

Yourwish

b. Auxiliary midwife
c. ASHA worker
d. Trained birth attendants

Answer: c.ASHA worker

MANAGEMENT OF HEALTHCARE SYSTEM IN INDIA

00:48:12

- Principal unit of administration in India → District
- Each district is divided into 6 administrative units
  - District → District collector
  - Subdivision → Subdivisional collector/ assistant collector
  - Talukas / Tehsils → Tehsildar: 1/ 200-600 villages
  - Community development block → Block Development officer: / 100 villages (1lakh population)
  - Municipalities & Corporations → Urban areas
  - Villages → Rural areas
  - Panchayat → Local self-government

PANCHAYAT RAJ INSTITUTION

00:49:19

- Institution of local self-government
- It was given by the Balwant Rai Mehta Committee
- 3-tier system of rural local self government of Indian linking the village to the district
  - Village level → Gram Sabha, Gram Panchayat, Nyaya Panchayat
  - Block level → Panchayat Samiti
  - District level → Zila Parishad



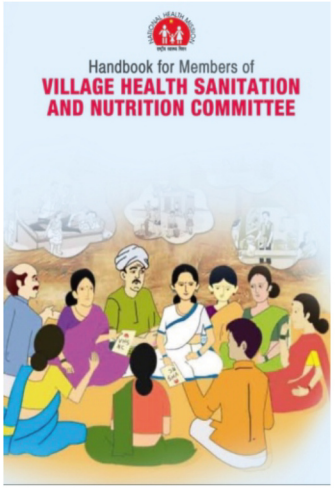
COMMUNITY PARTICIPATION

॥ सर्वे सन्तु निरामयाः ॥ 00:51:27

Rogi Kalyan Samiti



- A/K/A Patient welfare committee / Hospital Management committee
- Members
  - Local Panchayat Raj Institutions
  - NGOs
  - Local elected representatives
  - Government sector officials
- Ensures public health care facilities are accountable to the communities



Village health sanitation and nutrition committee

Responsibilities

- Facilitate access to health services
- Supports Immunization programs
- Monitor the health program
- Represent community concern
- Village Health and Nutrition Day → celebrated once a month at the Anganwadi centre.

Structure

- At least 15 members
  - Elected panchayat member
  - Local health workers (ASHA, AWW, MPW)

Mahila Arogya Samiti

- Community-based group for promoting behaviour change and awareness in slums
- Members
  - 8-12 women members
  - ASHA/AWW
- 1/ 100 households (250-500 population)

Q. Identify the correct statement on Village Health Nutrition Day? FMGE 2024

a. Conducted once a month in PHC
b. Conducted once a month in Anganwadi centres
c. Conducted once every two weeks in PHC
d. Conducted once every two weeks in Anganwadi centres

Answer: **b.**Conducted once a month in Anganwadi centres

Q. Which of the following is set up for health planning at the village level? INICET 2020

a. Panchayat Health Committee
b. Village Health Planning and Management Committee
c. Rogi Kalyan Samiti
d. Village Health Sanitation and Nutrition Committee

Answer: **d.** Village Health Sanitation and Nutrition Committee

Q. Which of the following represents the highest level of community participation?

a. Taking community suggestions into account
b. Addressing the felt needs of the community
c. Contributing resources for health care initiatives
d. Actively engaging in the planning of health-related programs

Answer: **d.** Actively engaging in the planning of health-related programs

Q.A city has a 70,00,000 urban population out of which 30% live in slums. How many U-PHCs are required for the slum population according to NUHM norms?

a. 22
b. 32
c. 42
d. 52

Answer: **c.**42

- 30% of 70,00,000 population = 2100000

Yourwish

- 1 U-PHC = 50,000 population
- For 2100000 population → number of PHCs required is 42

Q. Regarding Mobile Medical Units (MMUs), which of the following statements is correct?
1. MMUs are operated by the government
2. MMUs are managed by external agencies, with the government supplying medical resources
3. MMUs are run by the government, which also provides medical supplies
4. MMUs are entirely managed and supplied by external agencies

a. Only 1
b. 1 and 2
c. 1,2 and 3
d. 1,2,3, and 4

Answer: c.1,2 and 3

Tele-Manas

Q.A woman with a history of Schizophrenia presents to PHC.As a medical officer of the PHC, which government portal to book an appointment with a psychiatrist?
a. Nikshay
b. U-win
c. Tele-manas
d. Mera Aspatal

Answer: c.Tele-manas

- Nikshay → TB
- U-win → Immunisation
- Mera Aspatal → Quality assurance of the hospital
- Telemanas
  - Telemental Health assistance and Networking across sites → online platform
  - 24x7 mental health support helpline
- Telemanas Services include:
  - Immediate tele-counselling by trained professionals
  - Referral support to psychiatrists for severe cases
  - Mental health awareness campaign via digital platforms
  - Mobile-based mental interventions ensure accessibility in rural and remote areas

Urban Health Equity Assessment And Response Tool

FMGE 2020

Q. Urban HEART programme stands for
a. Urban Health Equity Assessment and Response Technique
b. Urban Health Evaluation Assessment and Response Technique
c. Urban Health Equity Assessment and Response Tool
d. All of the above
Answer: c.Urban Health Equity Assessment and Response Tool

Yourwish

- Address health inequalities across the world among targeted disadvantaged population groups or social classes.
- Elements
  - Sound evidence
  - Intersectoral action of health
  - Community participation

Q. Which of the following is not a responsibility of an Accredited Social Health Activist(ASHA) worker?

a. Identify target beneficiaries and support ANM in conducting outreach sessions

b. Promote formation of Women's Health groups / Mahila Arogya Samiti

c. Accompany pregnant women and children requiring treatment/admission

d. Water quality: Ensure chlorination and a safe water supply

Answer: **d.**Water quality: Ensure chlorination and a safe water supply

Yourwish

20. HEALTH EDUCATION & COMMUNICATION

HEALTH EDUCATION

00:00:10

- **Definition**
  - Process by which individuals learn to behave → promotes, maintains & restores health
  - The definition is given by **John Imbals**
- **Purpose**
  - → Promote **behavioral change**

Principles of Health Education

- Interest → topic should be interesting
- Participation → encourage people to participate
- Comprehension → audience must understand
- Motivation → motivate behavior change
- Reinforcement → repeat messages (revision)
- Known → Unknown
- Learning by doing → practice
- Gradual process → like growing a tree
- Use community leaders
- Develop human relationships
- Punishment is **NOT** a principle

Health Education Vs Propaganda

FMGE 2021, 2023, 2024
Neet PG 2024

Health Education	Propaganda
Knowledge and skills are actively acquired in the process	Knowledge is instilled in the mind in this process
Drives people to think for themselves	Prevents thinking in individuals
Primitive desires are disciplined in this process	Primitive desires are aroused and stimulated
Results in a reflective behaviour and makes people use judgment before acting upon it	Process results in reflexive behaviour and makes people aim at impulsive actions
Process appeals to reason	Process appeals to an emotion
Helps to develop individuality, personality, and a self expression	Develops different patterns of attitude and behaviours according to the medium used
Knowledge is acquired through self-reliant activity	Knowledge is passively received and spoon-fed
Aimed at developing good habits, favourable attitudes, and skills in individuals and is behaviour-oriented	No change in attitude or behaviour of the individual is seen, and the process is information-oriented

FMGE 2023

Q. Which of the following statements is true about health propaganda?
A. It is actively acquired
B. It appeals to emotions
C. It is behaviour-centred
D. It aids in developing a reflective behaviour

Ans: B

Q. In the motivational model of health education, sociologists have described three stages in the process of change in behavior, except:
A. Awareness
B. Action
C. Motivation
D. Decision making

Ans: D

Q. Use of helmet laws and smoking bans are example:
A. Preventive approach
B. Educational Approach
C. Regulatory approach
D. Primary Health Care approach

Ans: C

Q. Internalization occurs in which model of Health Education:
A. Service model
B. Medical model
C. Motivation model
D. All of the above

Ans: C

Q. In the motivation model of health education, what is the third stage of adopting new ideas, besides awareness and motivation?

NEETPG 2024

A. Action
B. Dedication
C. Reflection
D. Contemplation

Ans: A

Q. Adoption of ORS for diarrhea is an example of which approach to Health Education?
A. Regulatory approach
B. Service approach

Yourwish

C. Primary Health Care Approach
D. Health education approach

Ans: B

HEALTH COMMUNICATION

00:07:19

- Exchange of ideas, themes & information in the health field

Communication Cycle

Sender → Message → Channel → Receiver

Feedback

- Sender → Govt / NGOs
- Channel → medium/personality (example celebrity)
- Receiver → audience
- Feedback → response

Aieta Model In Communication

Awareness → Interest → Evaluation → Trial → Adoption

- Generates behavior change
- Motivation model
- Used in vaccination awareness

Q. A handwashing awareness session was conducted in a community. The correct sequence of events here is:
A. Awareness > interest > adoption > evaluation
B. Awareness > interest > evaluation > adoption
C. Evaluation > adoption > awareness > interest
D. Adoption > awareness > interest > evaluation

FMGE 2022

Ans: B

Barriers Of Communication

00:10:05

- **Physiological:** difficulties in hearing, expressions
- **Psychological:** Emotional disturbances, levels of intelligence, neurosis, language or comprehension difficulty
- **Environmental:** Noise, invisibility, congestion
- **Cultural:** Illiteracy, levels of knowledge/understanding, customs, beliefs, religion
- **Linguistic Barrier**
  - Related to language usage, technical words, or jargon
  - Example: Patient not understanding medical terminologies
- **Semantic Barrier (a subset of linguistic barrier):**
  - Words interpreted differently, leading to confusion
  - Example: Using "hypertension" instead of "high blood pressure" may confuse a patient

Q. During a vaccination drive, a male patient asks the presiding doctor if the recommended vaccine can lead to impotency. What type of barrier will the doctor be addressing?

FMGE 2023

Yourwish

Yourwish

A. Physical barrier
B. Environmental barrier
C. Physiological barrier
D. Cultural barrier

Ans: D

Q. What type of communication barrier occurs when words are interpreted differently? NEETPG 2024

A. Semantic barrier
B. Linguistic barrier
C. Psychological barrier
D. Cultural barrier

Ans: A

Types of Communication

00:12:19

ONE-WAY (Didactic)	TWO-WAY (Socratic)

• No feedback
• Examples:
  ○ TV
  ○ Radio
  ○ Newspaper
  ○ Internet
  ○ Lecture
	• Feedback present
	• Examples:
	  ○ Panel discussion
	  ○ Symposium
	  ○ Workshop
	  ○ Conference
	  ○ Seminar
	  ○ Role play
	  ○ Demonstration
	  ○ Focus group discussion (FGD)
	  ○ Delphi

Methods of Health Communication

Mass Approach	Individual Approach	Group Method
• TV, radio, newspapers • Posters • Print materials • Internet • Health exhibitions • Direct mailing	• Personal contact • Home visit • Personal letter • One-to-one counselling	• Lecture • FGD • Panel discussion • Workshop • Seminar • Demonstration • Role play

Q. Public awareness posters were pasted by the government in public places. What type of communication method does this approach represent? FMGE 2025

A. Individual approach
B. Group approach

Yourwish

C. Mass approach
D. Demonstration

Ans: C

Lecture Method



- One-way communication
- Chalk & talk
- Cheapest method
- Group size ≤30
- Duration → 15–20 min
- No audience participation

Demonstration

FMGE 2021, 2023
Neet PG 2024

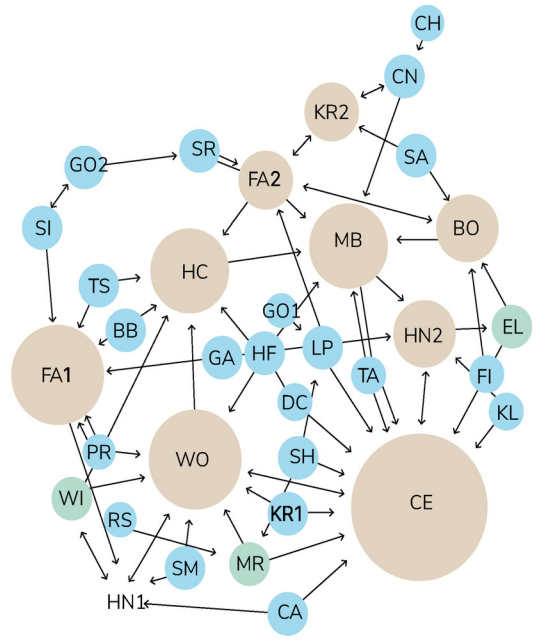
- Two-way communication
- Principle → **Seeing is believing & Learning by doing**
- Examples:
  - ORS preparation
  - Ointment application

Focus Group Discussion (FGD)

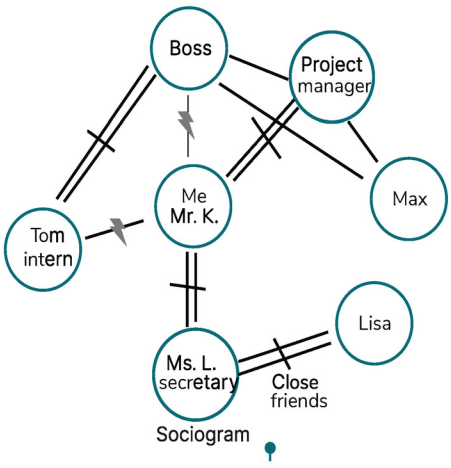
FMGE 2021

- Used for sensitive topics
- Collects community opinions
- Helps sustain behavior change
- Participants → **6–12 community members**
- Seating → circle arrangement
- Central person → **Moderator**
  - Guides discussion (does NOT dominate)
  - Brings **10–12 leading questions**
- Only **one specific topic** is discussed (focused)
- Qualitative data discussion
- **Team Members**
- Moderator → conducts discussion
- Recorder → records responses
- Observer → draws **sociogram**





Moreno's sociogram



Sociogram

Q. As a Medical Officer of a PHC, you want to talk and discuss health related issue with Antenatal mothers. How many members will you include in the focal group discussion? FMGE 2021

A. 4-6
B. 3-5
C. 6-12
D. 12-15

Ans: C

Panel Discussion Vs Symposium

00:19:53

Panel Discussion	Symposium
• 2 way • 4-8 experts • E.g. News channel • No fixed agenda • No fixed order of speaking • No fixed speakers • Experts can interrupt/intervene • Interactive (like a news debate)	• 2 way • 4-8 experts • Fixed agenda • Fixed order of speaking • Pre-decided speakers • No interruption among experts • Sequential talks





Q. An academic session in which a group of experts delivers talks sequentially on a common theme without any discussion between them, followed by a summary at the end by the moderator, is called? FMGE 2025

A. Seminar
B. Lecture
C. Symposium
D. Panel discussion

Ans: C

Q. 4-8 speakers talk about a specific topic in front of a large audience. There is no particular agenda, set speech, or order of speaking. In the end, there is interaction with the audience. What is this mode of communication best known as?

A. Panel discussion
B. Symposium
C Workshop
D. Seminar

Ans: A

Yourwish

Workshop



- Series of **≥4 meetings**
- Conducted under an expert
- Focus → **skill development**
- Real-life problem solving
- Requires extensive preparation
- Active participation

Conference



- Macro event
- Duration → 3–5 days
- Multiple activities:
- Lectures
- Papers
- Posters
- National / State / International level
- Develops social contacts

Seminar

- Micro event
- Smaller group
- Specific subject discussion

Role Play



- Active audience participation
- Audience size ≤ 25
- Useful for sensitive issues (e.g., HIV awareness)

Delphi Technique

FMGE 2020

- A systematic, interactive, exploratory, and detailed forecasting method, used to obtain a consensus forecast among a large number of people.
- Panellists discuss to build consensus.
- The method uses questionnaires, which are answered by experts in two or more rounds.

Q. What is the method employed to gather agreement on predictions among a substantial group of individuals?

A. Television

B. GATHER approach

C. Conferences

D. Delphi method

Ans: D

Yourwish

Yourwish

Key Points

- Economical: Lecture
- Most common mode of imparting education: Health education
- Seeing is believing and learning by doing: Demonstration
- Very effective where long term compliance or change in attitude is desired: Focus Group Discussion
- No discussion permitted among experts: Symposium
- Opportunity to improve effectiveness as a professional worker: Workshop
- Limited number of participants with lot of baseline preparation required: Workshop
- Active audience involvement: Role play
- Social interaction and long-term bonding/associations: Conference and seminar

Q. Confidentiality is maintained in which of the following conditions?
A. Group discussion
B. Counselling
C. Panel discussion
D. Seminar

Ans: B

Q. Giving a class in a village for wound care after a dog bite by enacting it is which mode of health communications?
A. Lecture
B. Group discussion
C Flash cards
D Demonstration

Ans: D

Q. Which one is an example of One-way communication?
A. Socratic method
B. Didactic method
C. Visual communication
D. Telecommunication

Ans: B

Q. All are true about Panel discussion except:
A. Panel of 4-8 experts discuss a health topic
B. Audience is present
C. Specific order, set speeches
D. Audience can take part

Ans: C

Q. Workshop is:
A. Discussion of 4-8 experts in front of audience

Yourwish

B. Discussion between 6–12 members
C. Series of 4 or more meetings
D. Series of speeches on given subject

Ans: C

Communication protocols

00:28:00

Gather approach (Contraceptive counselling)

- **G**reet couple
- **A**sk needs
- **T**ell options
- **H**elp choose
- **E**xplain use
- **R**eturn for follow-up

Note: Old method- Cafeteria approach → choosing from a basket)

Spikes Protocol (Breaking bad news)

- **S** → Set up interview
- **P** → Assess patients and family members' perception
- **I** → Invitation to discuss
- **K** → Share knowledge & address emotions
- **E** → Emotional support
- **S** → Strategy & summary

Speak Protocol

- Assesses the **health literacy** of the community
- Determines community understanding before intervention
  - **P** - perception
  - **E-** education
  - **A** - access
  - **K** - knowledge

Successful Communication

- Transtheoretical model
- Stages of Successful Communication for Behavior Change

Stage Description

- **Precontemplation**: Not thinking about changing behavior or the potential benefits
- **Contemplation**: Thinking about behavior change but not yet acting on intention
- **Preparation**: Ready to change behavior but have not yet acted
- **Action**: Beginning steps towards adopting the behavior, but with a high risk of relapse
- **Maintenance**: Sustaining the behavior; risk of relapse still exists

Q. Which of the following statements are correctly matched?

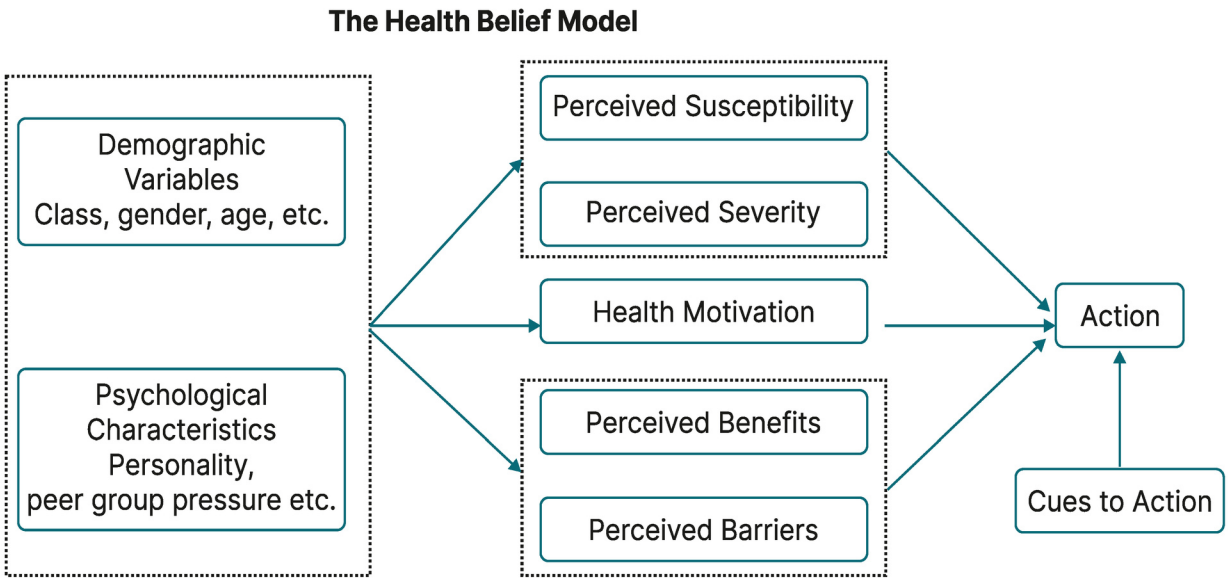
1. Pre-contemplation phase - A person is thinking about commencing morning walks due to their increased health benefits
2. Contemplation phase: A smoker is considered to have given up his habit of smoking
3. Maintenance phase: A person who quit smoking one year ago and has abstained from smoking ever since.
4. Action: A person who is overweight says he can't do anything as his entire family is overweight

A. Statement 1,2
B. Statement 3,4
C. Statement 2,3
D. Statement 1,2,3

Ans: C

Health Belief Model

00:32:25



Perceived Susceptibility

- A woman believes she is at risk of cervical cancer because she is sexually active

Perceived Severity

- She knows cervical cancer can lead to serious illness or death if not detected early

Perceived Benefits

- She believes that Pap smear can detect cancer early and improve the chances of a cure

Perceived Barriers

- She fears but is confident that she can visit the health center and undergo the test

Result: She undergoes Pap smear screening

Q. Giving a class in a village for wound care after a dog bite by enacting it is which mode of health communication?

A. Lecture
B. Group discussion

Yourwish

C. Flashcards
D. Demonstration

Ans: D

Yourwish

Yourwish

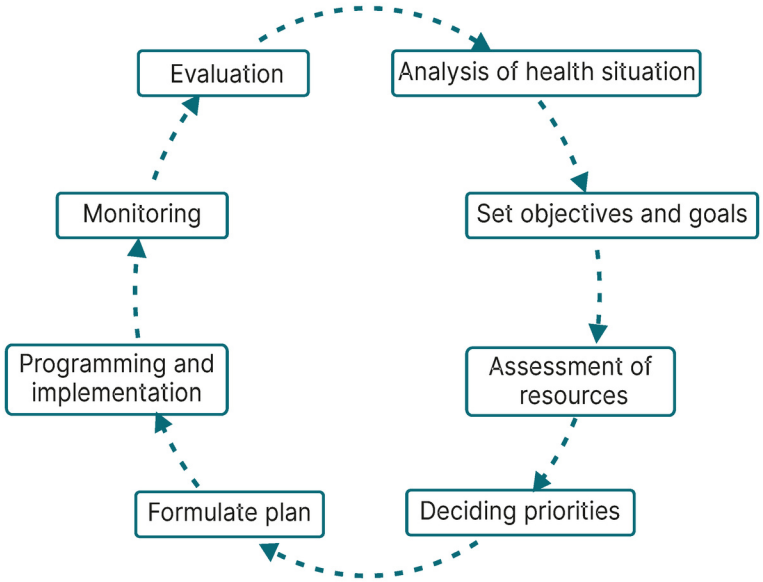
21. HEALTH PLANNING, PLANNING COMMITTEES & HEALTH MANAGEMENT TECHNIQUES

HEALTH PLANNING

00.00.19

- Defines community health problems
- Identify the unmet needs
- Surveying the resources to meet them
  - Resources include → Manpower, Money, and Material
- Establishing the goals, targets, and objectives
- Project the administrative action to accomplish the purpose of the proposed program.

Steps of Planning Cycle



- Monitoring is done daily to monitor the activities
- Evaluation is done at the end, by external body

Important Definition

- Goal
  - Ultimate desired state towards which all objectives and resources are directed
  - Goal is not constrained by time and resources
- Objectives
  - Specific preplanned endpoint of all activities
- Target
  - Degree of achievement of the objective over time
- Mission
  - Describes the cause of existence of the program, why the program exists, and its role in society
- Vision
  - What the programme wants to achieve in the future

Yourwish

- Plan
  - A blueprint for taking action in order to achieve the goal
- Procedures
  - Set of rules for carrying out work that helps to ensure maximum use of the resources and efforts
- Programme
  - A sequence of activities designed to implement policies and accomplish objective
- Schedule
  - A time sequence for the work to be done

Q. What is the ultimate desired state towards which objectives and resources are aimed in the medical field?
A. Target
B. Mission
C. Goal
D. Plan

Answer: C. Goal

Difference Between Monitoring And Evaluation

Monitoring	Evaluation
• Data collected on program activities ongoing • Routine • Focuses on activity and output • Done by an internal body • E.g → Are we doing the work we planned?	• Data collected to answer specific questions • Periodic • Focuses on outcome and impact • Done by external body • E.g → How effective were our activities?

Elements of Evaluation

Elements	Definition
Relevancy	• Appropriateness of the service based on location, time, and person
Adequacy	• Availability of the service in sufficient quantity
Accessibility	• Extent to which the service is usable by the target population
Acceptability	• Social and cultural acceptance of the service by the people
Effectiveness	• Degree of attainment of the objective and target • Used in community-based settings
Efficiency	• Optimal utilization of the resource to achieve desired outcomes • Used in Lab settings
Impact	• Achievement of long term goal and overall change produced

Q. The extent to which specific health care treatment, service, procedure, program, or other intervention does what it is intended to do when used in a community-dwelling population is termed:
A. Efficacy
B. Effectiveness

C. Effect modifier
D. Efficiency

Answer: **b.** Effectiveness

- Effectiveness → Performance in real-life community settings, not under control
- Efficacy → Performance under controlled conditions (e.g, lab / clinical trials)

Q. For analysis of the functioning of a health centre with respect to evaluation, which of the following is most important for assessing clinical management?

A. Input
B. Output
C. Process
D. Structure

Answer: **C.** Process

- Evaluation of health care establishment:
  - Structure: Facilities, Manpower, Equipment, Drug
  - Process: Diagnostics, Treatment, Clinical management, Prevention
  - Outcome: Improved survival, reduced disability

Q. Measuring the degree to which objectives and targets are met and the quality of the results obtained is:

NEET PG 2025

A. Monitoring
B. Planning
C. Evaluation
D. Surveillance

Answer: **C.** Evaluation

SURVEILLANCE

00.08.45

- Constant search for cases of a disease
- Look and notify the cases
- The ongoing systematic collection, analysis, interpretation, and dissemination of data about health related event
- It reduces morbidity and mortality
- It focussed at improving health
- Surveillance methods:
  - Active surveillance
  - Passive surveillance
  - Sentinel surveillance

Active surveillance	Passive surveillance	Sentinel surveillance
• Search for cases through proactive efforts • House-to-house visits •	• Data reported to health systems • Hospital reports or HIMS	• Data collected from sentinel sites • Medical college or labs • Done for missed cases e.g HIV/STD • Done for cases that are to be notified

Yourwish

Important Information

- Fortnightly visit for Malaria → Active surveillance → done by MPW-M
- AFP surveillance → Active surveillance
- Kala Azar fortnightly surveillance → Active surveillance
- Leprosy case detection campaign → Active surveillance
- TB active case finding → Active surveillance
- Identifying missed cases → Sentinel surveillance → HIV
  - Sentinel surveillance is done biennially → Every two years
  - HIV prevalence identified by ANC case → Sentinel sites
- Supplementing notified cases → Sentinel surveillance
- Most feasible form of surveillance → Passive surveillance

Q. Continuous scrutiny search of factors that determine the occurrence and distribution of disease and other conditions of ill health is defined as:

A. Monitoring
B. Surveillance
C. Evaluation
D. Disease control

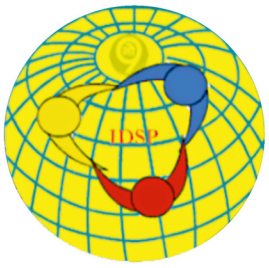
Answer: **b.**Surveillance

- Surveillance is being done to know
  - Trend of disease
  - Prevalence of disease
  - Distribution of disease

IDSP

00.12.54

- Integrated Disease Surveillance Programme
- It conducts surveillance
- Monitor, detect, and respond to outbreaks
- Cases are searched by
  - Susceptible form → Health workers
  - Probable forms → Medical Officers
  - Lab-based forms



Disease type	Disease name
Vector borne	Malaria, Dengue, Japanese Encephalitis (JE), Chikungunya, etc
Water borne	Acute Diarrheal Disease Cholera, Typhoid, Gastroenteritis, Hepatitis
Respiratory	Tuberculosis
Vaccine preventable	Measles
Under eradication	Polio
International commitments	Plague, Yellow fever

Yourwish

Unusual clinical syndrome	Meningoencephalitis, respiratory distress, Hemorrhagic fever, and other undiagnosed conditions
Sexually transmitted disease (under sentinel surveillance)	Blood-borne, HIV/HBV, HCV
Non-communicable disease	Cardiovascular, Diabetes, Stroke, Fluorosis, etc
Others	Water quality, Outdoor Air quality, Road Traffic accidents

Q. A 58year old man, a known case of Type II Diabetes mellitus, was admitted with high-grade fever and cough and was diagnosed with COVID 19. He succumbed to the illness on the 7th day. His death was routinely reported and recorded as part of the surveillance system. This type of surveillance is best classified as

NEET PG 2025

A. Active surveillance
B. Sentinel surveillance
C. Passive surveillance
D. Syndromic surveillance

Answer: C. Passive surveillance

Q. During the Mahakumbh Mela, the government established health camps and mobile medical units to monitor the health of pilgrims. Syndromic surveillance was carried out for symptoms such as fever, diarrhea, and respiratory complaints. What is the primary objective of conducting syndromic surveillance in this setting?

INICET 2025

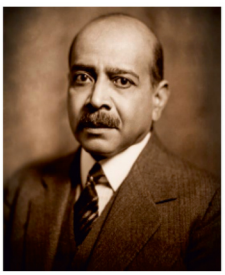
A. To reduce medical personnel
B. To confirm individual diagnosis with additional tests
C. For immediate quarantine of symptomatic individuals
D. Early detection of outbreaks and timely public health response

Answer: D. Early detection of outbreaks and timely public health response

FMGE 2019, 2020

HEALTH PLANNING COMMITTEES

00.15.56

Name of the Committees	Established year	Definition
Bhore Committee / Health survey and development Committee	1946	• Given by Joseph Bhore • 3 Million Plan • Comprehensive health care → Preventive, Promotive, Curative, and rehabilitative health care • 3-month training in PSM, Social Physicians, School health services • 1 PHC per 40,000 population 
Mudaliar Committee / Health survey and planning Committee	1962	• Strengthening district hospitals • Created all india health service cadre

Yourwish

Chadha Committee	1963	• Integrate malaria control with family planning programme • 1 Basic health worker per 10,000 population
Mukherji Committee	1965	• Delink Malaria from family planning
Jungalwalla Committee	1967	• Integration of health services → Preventive, Promotive, and rehabilitative health care • Ban on private practice for govt doctors • Equal pay for equal works • Special pay for specialized work
Kartar Singh Committee	1973	• Committee on multipurpose workers under health and family planning • 1 PHC per 50,000 population
Shrivastava Committee/ Medical & Health Education Commission	1975	• Strengthening rural health care • Village health guide scheme • Para-professional and semi - professional workers • ROME (Reorientation of Medical Education)
Krishnan Committee	1983	• Urban Revamping Scheme
Bajaj Committee	1986	• Focussed on Planning, Production, Training, and recruitment of health care manpower • Formulation of National Medical and Health Education Policy
Balwant Rai Mehta Committee	1957	• Establish Panchayat Raj Institution

High-level Expert group		• Universal health coverage → now being taken care of by Ayushman Bharat
		• Proposed 3.5-year Bachelor's degree course in medical education for rural health services
		  ○ BSc Community Health
		  ○ Rural health care practitioners → Community Health officer

Niti Aayog (National Institute For Transforming India)

00.20.22

- Replaced the Planning Commission of India
- Established during Jan 1, 2015
- Chairperson → Prime Minister
- Other person → Chief Minister of the state
- Health Index → according to this States are being ranked

National Institution for Transforming India

सत्यमेव जयते

NITI Aayog

HEALTH MANAGEMENT TECHNIQUES

00.21.15

NEET PG 2020
FMGE 2020, 2021

- Effective use of resources
- 2 Types
  - Quantitative method
  - Qualitative method

Quantitative method	Qualitative method → Based on behavioral science (MNEMONIC: POCIMon)

• Cost-effective analysis
• Cost-benefit analysis
• Cost accounting
• System analysis
• Work sampling
• Input Output analysis
• Network analysis
  ○ PERT (Programme, Evaluation and Review Technique)
  ○ CPM (Critical Path Method)
• Planning - Programming - Budgeting - System
• Zero budgeting
• Decision making
• Model
	• Personnel management
	  ○ Skillful use of resources
	• Organizational design
	• Communications
	• Information systems
	• Management of objective

Q. Which of the following is a method based on principles of behavior science?
A. Management of Objective
B. Network analysis
C. System analysis
D. Decision making

Answer: **A.** Management of Objective

Quantitative Method

Quantitative method	Input	Output
Cost-benefit analysis	• Cost	• Monetary terms

Cost-effective analysis	• Cost	• Outcome of the programme is measured in non-monetary terms
		  ○ Number of lives saved
		  ○ Incidence of the disease reduced

Cost-utility analysis	• Cost	• QALY(Quality adjusted life years) • Most comprehensive analysis
Input - Output analysis	• Manpower • Money • Material	• Number of lives saved • Incidence of the disease reduced

Cost accounting	• Cost structure of a program
	  ○ Recurring cost
	  ○ Non-recurring cost	

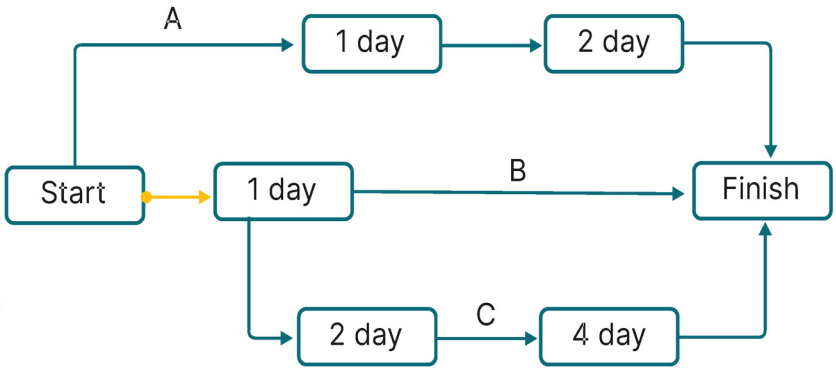
System analysis	• Finding cost effectiveness of available alternative	

Yourwish

Work sampling	• Observation of activities at predetermined random levels • E.g MO observing antenatal sessions at random intervals	
Network analysis	• Graphic plan of all activities to reach an objective ○ PERT ○ CPM	
Planning, Programming, Budgeting,System(PPBS)		

Network Analysis

- Graphic plan of all activities
- PERT → Programme, Evaluation and Review Technique
  - Event sequencing
- CPM → Critical Path Method
  - Event time sequencing
  - Set of activities taking maximum time: Critical path → Longest duration



Path C is critical path

PPBS

- Planning, Programming, Budgeting System
- Zero Base Budgeting
  - Ensure efficient allocation of resources starting from zero baseline
  - Budget for each new period is created starting from a zero base.
  - It does not rely on the data from the previous budget.

Important Information

- Cost-Effective Analysis:
  - Most widely used in health programs/services
  - Most easier to interpret

Q. From the given flowchart, identify which management technique is used, denoted by A, and the critical path, denoted by B:

A.A-Work sampling, B-Manpower training

B.A-Network analysis, B-Manpower training

C.A-Network analysis, B-Machinery installation

D.A-Work sampling, B-Machinery installation

Answer: C. A-Network analysis, B-Machinery installation

Yourwish

Q. A study was conducted among nursing staff to analyze time spent on different aspects of patient care, including bed preparation, monitoring vital signs, attending doctors' rounds, blood sampling, and drug administration. Which management technique is used?

A. Network analysis
B. Cost-Benefit Analysis
C. Work sampling
D. Systems analysis

Answer: C. Work sampling

Q. In which of the following analyses is financial advantage quantified?

A. Cost-effective analysis
B. Cost-benefit analysis
C. Network analysis
D. Input output analysis

Answer: B. Cost Benefit analysis

Q. ICER is a unit for which of the following economic analysis?

A. Cost-benefit
B. Cost effectiveness
C. Cost-utility
D. Cost margin

Answer: B. Cost Effectiveness

ICER

- Statistics used in cost-effectiveness analysis
- To summarize the cost-effectiveness of a health care intervention
- Defined as the difference in cost between two possible interventions, divided by the difference in their effect
- It represents the average incremental cost associated with 1 additional unit of the measure of effect
- Formula =(C1-C0/E1-E0)
  - C1 and E1 are the cost and effect in the intervention group
  - CO and E0 are the cost and effect in the control group
- Application of ICER
  - Cost-utility analysis

Q. The management technique that is a more promising tool for application in the health field is?

A. Cost-effective analysis
B. Cost-benefit analysis
C. Cost accounting
D. Input output analysis

Answer: A. Cost-Effective Analysis

Q. What is the optimal approach to assessing the injection practice of healthcare personnel?
A. Direct observation with a structured checklist
B. Closed-circuit camera surveillance
C. In-depth interview with the patient
D. In-depth interview with the healthcare provider

Answer: A. Direct observation with a structured checklist

STOCK MANAGEMENT / INVENTORY MANAGEMENT

00.33.24

STOCK ROTATION METHOD

- FIFO → First In, First Out
  - Items are sold or used in the order they are acquired
- GIGO → Garbage In, Garbage Out
  - Quality of input data determines the quality of output data
- EFFO → Earliest First, Earliest Out
  - Used for items with shorter shelf life

VED Analysis

- Categorized based on criticality
- Vital drugs
  - Items whose absence cannot be tolerated
  - Contributes 10% of the items
  - Adrenaline, Anti-snake venom
- Essential drugs
  - Items whose absence can be tolerated for some time
  - Contributes 40% of the total items
- Desirable drugs
  - Items whose absence can be tolerated for some time
  - Contributes 50% of the total items
  - PCM, ORS

ABC Analysis

- Always Better control
- Items are divided into 3 categories according to their cost

Category	Label % of items	Cost (% of overall value)
Class A - Outstandingly important	15	70
Class B - Average importance	30	25
Class C - Relatively unimportant	55	5

SDE Analysis

- Scarce to obtain
- Difficult to obtain
- Easy to obtain

FSN Analysis

- Fast moving
- Slow moving
- Non moving

ARTICLES

00.36.16

Q. Which specific article in the Indian Constitution grants the Right to Life to the residents of India?

A. Article 11

B. Article 21

C. Article 23

D. Article 25

Answer: **b.**Article 21

- Article 21
  - Right to life
  - Grants the right to life to the citizens of India
- Article 11
  - Right to citizenship
  - Defines Parliament's right to regulate citizenship laws
- Article 23
  - Prohibition of forced labor
  - Prohibits human trafficking and forced labor
- Article 25
  - Freedom of Religion
  - Grants the freedom to practice, propagate, and profess any religion

Q. Which of the following is the primary objective of the usage of the Health Index by Niti Aayog?

A. Raise funding for private hospitals to improve the public - private partnership

B. Rank the state according to health status

C. Assess the efficiency of the government hospital

D. Identify the aspirational districts

Answer: **B.** Rank the state according to health status

Yourwish

22. Social Science & Health

SOCIAL SCIENCES

00:00:17

Term	Description
Social Science	Scientific examination of human behavior.
Sociology	Component of social science; the study of human relationships and human behavior.
Society	A group of individuals who share common values and interests and lead a certain way of life.
Community	Society within a geographical boundary.
Social Structure	Pattern of inter-relationships among members of society.
Socialization	The process by which individuals adopt culture, customs, and beliefs to become part of society.
Social Pathology	Study of social causes leading to disease occurrence.
Social Institution	Organized a complex pattern of behavior in which a number of people engage to further common interests

Social Control Mechanisms

00:02:25

- Purpose: Ways to Govern behavior

Formal

- Laws and enactments of parliament
- Rules & regulations

Informal

- Incentives for behavior change
  - Example → incentives for sterilization by the Government of India

Acculturation

- Exchange of culture / cultural contact

Occurs During

- Marriage
- Education (going elsewhere to study)
- Conquest
- Industrialization

Yourwish

Yourwish

Culture & Customs

Culture

- Learned pattern of behavior

Customs

- Established pattern of behavior
- Types:
  - Mores → strict customs (punishment if not followed)
  - Folkways → less stringent customs

Social Medicine & Related Terms

00:04:15

Social Medicine

- Organized investigation of the social environment and genetic factors affecting disease patterns & disabilities

Socialized Medicine

- Provision of medical service & education by the state

State Medicine

- Provision of free health camps by the government

Social & Economic Systems

Socialism

- An economic doctrine or a system of governance that favors the use of the property and resources of the country for public welfare through public ownership

Capitalism

- A system based on private ownership of the means of production, aiming for maximum private profit, often at the expense of the working class

Social Psychology

Opinion

- Temporary
- Subjective
- Changes frequently

Belief

- Permanent subjective
- Acquired from parents

Attitude

- More or less permanent
- Objective
- Related around belief

Folklore

- Passage of customs & beliefs of a community through generations, merely by word of mouth

Yourwish

Maslow's Hierarchy of Needs

1. Physiological → air, water, food, shelter, sheep, clothing, reproduction
2. Safety → personal security, employment, resources, health, property
3. Love & belonging → friendship, intimacy, family, sense of connection
4. Esteem → respect, self-esteem, status recognition, strength, freedom
5. Self-actualization → desire to become the most that one can be

Learning

00:06:52

- Accustomed way of doing things
- Permanent

Types

- Cognitive → knowledge-based
- Affective → attitude-based
- Psychomotor → skill-based
  - Examples:
    → reflex examination teaching
    → handwashing steps

Emotions

- Most common → fear> love

MCQ

00:07:47

Q. The socially acquired learned behaviour is known as? NEETPG 2023

a. Custom
b. Culture
c. Socialisation
d. Urbanisation

Ans. b

Q. Which of the following explains social factors and disease causation? FMGE 2022

a. Sociology
b. Social pathology
c. Society
d. Community

Ans. b

Q. An organized group of people with social relationships?

a. Community
b. Association
c. Society
d. Family

Ans. c

Q. Pattern of interrelationships between persons in a society is known as?

a. Socialism
b. Socialization
c. Social structure
d. Medical sociology

Ans. c

Q. Learned behavior, which is socially acquired, is known as?

a. Customs
b. Acculturation
c. Standard of living
d. Culture

Ans. d

Q. A couple brought their son to the doctor. They were worried because their son likes to eat food from multinational companies. What is this shift from traditional food to Western fast food called? FMGE 2021

a. Food transition
b. Social pathology
c. Acculturation
d. Demographic change

Ans. c

Q.Teaching an intern proper technique of knee reflex demonstration and its significance in clinical practice is an example of which type of learning? FMGE 2020

a. Cognitive learning
b. Psychomotor learning
c. Affective learning
d. Repeated learning

Ans. b

Q. What does acculturation mean?

a. Culture contact
b. Study of various cultures
c. Cultural history of health and disease
d. Exchange of ideas

Ans. a

Yourwish

Theories of Sociology

00:09:08

Marxist Theory	Emphasises profit over health For example, cigarettes are not completely banned.
Parsonian Theory	Focuses on social constraints such as poverty, migration, and industrialization.
Feminist Theory	The role/status of women is shaped by patriarchal norms.
Foucauldian Theory	Argues that society segregates populations into groups to exert control.
McKeown Theory	Attributes the reduction of diseases like TB to improved socioeconomic conditions.

Temporary Social Groups

00:10:50

Crowd

- A group of individuals without any leader often gathered for a brief period of time out of common interest or curiosity

MOB

- A crowd led by a leader usually gathered for an emotional/aggressive cause

Herd

- A crowd led by a leader with unquestioned following
- Lacks emotional component
- Example → tourists following a guide

Permanent Social Groups

FMGE 2025

- Band:
  - Most elementary community of a few families living together.
  - Groups have organized itself and follows a pattern of life
  - e.g., gypsies in India
- Village: A small collection of people permanently settled with cultural values
- Town: Permanent settlement of a large, dense urban settlement
- City: Heterogeneous population >100000
- State:
  - A social group based on a defined geographical boundary
  - Usually with common culture, language, and code of conducts

Q. What is it called when a tour guide leads a group of tourists as they follow him through various attractions?

FMGE 2025

a. Crowd
b. Band
c. Mob
d. Herd

Ans. d

Yourwish

Yourwish

FAMILY

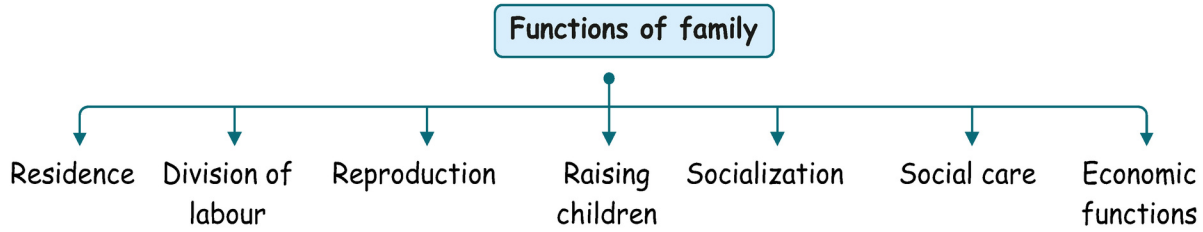
00:12:21

FMGE 2021, 2023, 2024, 2025

INICET 2025

Definition

- A group of individuals living under the same roof, related by blood or law (marriage/adoption), eating from the common kitchen



Residence

- Patrilocal → father's side
- Matrilocal → mother's side

Head of Family

- Major decision maker
- Not necessarily:
  - Oldest
  - Most Educated
  - Most Honest

Family Types

00:12:20

FAMILY OF ORIGIN	FAMILY OF PROCREATION
• The family into which a person is born	• Family formed after marriage

Q. A study was conducted on the Family Education Model. Which of the following are recognized roles of the family in health apart from biological reproduction?

INICET 2025

1. Ensuring a clean and safe home environment
2. Close monitoring of sexual activity
3. Caring for family members during illness
4. Transmitting cultural and health-related practices across generations

a. 1, 2, and 3
b. 1, 3, and 4
c. 2, 3, and 4
d. 1 and 4

Ans. b

- Families contribute to health beyond reproduction by:
  - Maintaining hygiene
  - Close monitoring of sexual activity is not a universally recognized health role; it's more of a social or behavioral supervision
  - Providing care during illness
  - Transmitting cultural and health-related beliefs

Nuclear / Elementary Family
- Single married couple + their dependent children

Joint Family
- ≥2 married couples living together
  - Males related by blood
  - Females are either wives/daughters/widows
- Common kitchen
- Common purse (shared money)

Three-generation Family
- Grandparents + parents + children

New Family
- Nuclear family <10 years duration

Problem Family
- A family that lags behind the rest of community

Broken Family
- A family where either parent is dead, or the couple is divorced/separation

Communal Family
- Roles and responsibilities are divided like a community

Dysfunctional Family
- Abuse is common, and family members have adjusted to it.

Important Information
- PHASES OF FAMILY CYCLE
  1. Formation: Marriage → birth of first child
  2. Extension: Birth of first child → birth of last child
  3. Complete extension: Birth of last child → first child leaves home
  4. Contraction: First child leaves home → last child leaves home
  5. Complete contraction: Last child leaves home → first spouse dies
  6. Dissolution: First spouse dies → death of survivor
- Every phase is reflected by the first event of the stage

Q. A surveyor visits a household consisting of a 35-year-old man, his wife, who is 6 weeks pregnant, and a 3-year-old child. The man's brother, along with his wife, is currently visiting them for a month owing to the winter vacation. What type of family would the surveyor classify the household as? FMGE 2023

a. Joint family
b. Nuclear family
c. Extended family
d. Third-generation family

Ans. b

Q. Mr. Ram joined the Indian Navy in 1997, married Sita in 1999, and had two children—Rocky in 2002 and another child in 2009. After retiring from service in 2020, he took up employment in the State Bank of India. Subsequently, his parents moved in to live with the family. Which of the following statements best describes this family?

FMGE 2025

a. 2020-Dissolution
b. 2020-Contraction
c. 2002-Formation
d. 2002-Extension

Ans. d

Q. In a nuclear family of husband, wife, and three children, a new child is born. The period being considered extends from the birth of the last child up until the point when the first child leaves the household. What is this stage of the family life cycle known as?

FMGE 2024

a. Extension
b. Complete extension
c. Contraction
d. Complete contraction

Ans. b

Q. A couple has given birth to their first child. Based on the nuclear family cycle, which phase is the family entering

FMGE 2021

into?

a. Extension
b. Complete extension
c. Contraction
d. Complete contraction

Ans. a

SOCIOECONOMIC STATUS SCALES

00:19:45

INICET 2024

- Uday Parekh Scale: Rural India
  - Independent of Income
- Bg Prasad Scale: Rural + Urban
  - Based on Per Capita Income
- Modified Kuppuswamy Scale: Urban India

1. Urban SES scales	2. Rural SES scales
• Modified Kuppuswamy Scale • Kulshrestha Scale • Srivastava Scale • Jalota Scale, Gaurs	• Udai Pareek Scale • Modified B. G. Prasad Scale • Radhukar Scale • Shirpurkar Scale

Yourwish

3. STUDENT's scale	4. Non-Indian SES scales
• Bhardwaj Scale	• Hollingshead (Occupation-based) Scale • Henderson Scale

Modified kuppuswamy scale (Urban)

Components

- Education of head of family → score 1-7
- Occupation of head of family → score 1-10
- TotalMonthly family income → score 1-12
- Total score: 3-29

Classification of Socioeconomic Class

- Upper → 26-29
- Upper middle → 16-25
- Lower middle → 11-15
- Upper lower → 5-10
- Lower → <5

Q. All are components of the Kuppuswamy scale?
a. Income, Housing, Education
b. Income, Livestock, Housing
c. Housing, Livestock, Land
d. Income, Occupation, Education

Ans. d

HEALTH ECONOMICS

00:21:39

- GNP (Gross National Product):
  - Income generated within the country + net income from abroad
- GDP (Gross Domestic Product):
  - Gross Income generated within the country
- NNP (Net National Product):
  - GNP – depreciation (value of capital consumed)
- NDP (Net Domestic Product):
  - GDP – depreciation on fixed assets

DOCTOR-PATIENT RELATIONSHIP

00:22:12

Paternalistic	The doctor is dominant and makes decisions; the patient plays a passive role.	Emergency Care
Consumeristic	The patient is dominant and makes decisions with minimal input from the doctor.	Elective or Cosmetic Surgery

Yourwish

Yourwish

Mutualistic	Doctor and patient collaborate to make health decisions together.	Chronic disease management, Mental health
Defaulter	Neither the doctor nor the patient is actively involved in decision-making.	Preventive care neglect

Communication Principles

- Best icebreaker for patients with fear and anxiety: Humor
- Communicate on:
  - Emotional plane
  - Cultural plane
  - Intellectual plane
- Not psychological plane
- Respect patients' cultural & religious beliefs
- Do not ignore beliefs
- Do not rely only on the interpreter

MCQ

Q. All are communication levels in doctor patient relationship except?

a. Communication on an emotional plane
b. Communication on a cultural plane
c. Communication on an intellectual plane
d. Communication on a psychological plane

Ans. d

Q. India is a culturally diverse country with multiple languages and belief systems. To ensure effective doctor-patient interaction and better health outcomes, which of the following approaches should a physician adopt?

1. Insist on good communication with the patient INICET 2024
2. Communicate with the patient only through an interpreter
3. Provide treatment without considering the patient's cultural beliefs
4. Respect and incorporate the patient's religious and cultural beliefs while providing care

a. 1, 2
b. 2, 3
c. 3, 4
d. 1, 4

Ans. d

SOCIAL SECURITY 00:24:01

- A social insurance program providing protection against socially recognized conditions such as poverty, old age, disability, and unemployment

Yourwish

Approaches to Social Security

Social Assistance

- Non-contributory support aid to the vulnerable group at critical timeS
- E.g.: Financial aid without prior contributions

Social Insurance

- Contributory benefit to individuals as a matter of right
- E.g.: pension, provident fund

Social Security Measures for Industrial Workers

- Workmen's Compensation Act, 1923 – Compensation for injury or death at the workplace
- Factories Act, 1948 – Ensures safety, health, and welfare of workers
- Employees' State Insurance (ESI) Act, 1948 – Medical and disablement benefits
- Maternity Benefit Act, 1961 – Paid leave and benefits for working mothers
- Family Pension Scheme, 1971 – Pension for dependents after employee's death

Global History of Social Security

- First social security act: Germany, 1881, for industrial workers
- Bismarck introduced a system of social insurance in Germany in 1883: It became a model for other European countries to introduce similar social security systems
- Sweden is the only country where the entire population is under social security schemes

POVERTY LINE

00:25:20

Criteria for Below Poverty Line (Tendulkar Committee)

Category	Rural Areas	Urban Areas
Per capita calorie intake	< 2400 kcal per day	< 2100 kcal per day
Per capita income	< 27/- INR per day	< 33/- INR per day

- Extreme Poverty Line (According to the World Bank): < $3 per person per day

23. ALLIED HEALTH SCIENCES

OCCUPATIONAL HEALTH

FMGE 2025

00:00:18

Pneumoconiosis

- Pneumoconiosis is the inhalation of dust particles
- **Most Dangerous Dust Particle Size: 0.5-3 microns**
  - 0.5-3 micron particles → Settle in the lower respiratory tract → can affect alveoli
  - 3-5 micron particles → Gets arrested in the middle respiratory tract

Types of pneumoconiosis

Pneumoconiosis	Due to Inorganic dust particles
Asbestosis	Asbestos dust fibers
Anthracosis	Coal dust
Aluminosis	Aluminium dust
Silicosis	Silica dust
Siderosis	Iron dust
Baritosis	Barium dust
Lead poisoning (Plumbism)	Lead dust

Pneumoconiosis	Due to organic dust particles
Byssinosis	Cotton fiber dust
Bagassosis	Sugarcane/bagasse dust
Tobaccosis	Tobacco dust
Farmer's lung	Moldy hay/grain dust
Fancier's lung	Bird droppings

Industries associated with pneumoconiosis

Condition	Causing Factors / Exposure
Silicosis	Sandstone industry, cement industry, granite work, pottery & ceramic industry, gold/mica mining, steel & glass factories, building construction, rock mining

Yourwish

Asbestosis	Fireproof industry, construction & demolition, shipbuilding & repair, brake lining manufacturing, clutch manufacturing, boiler furnace work
Anthracosis	Coal mining
Siderosis	Iron mines, iron & steel industries
Baritosis	Photography, printing industry, barium diagnostic work
Byssinosis	Textile industry, weavers, packers, jute & cotton textile factories
Bagassosis	Sugarcane factories, paper & cardboard industries
Farmer's Lung	Agricultural work
Fancier's Lung	Bird handlers, pigeon breeders, and poultry exposure

X-ray changes in pneumoconiosis

Pneumoconiosis	X-ray Finding
Asbestosis	Ground-glass appearance
Anthracosis	Black lung with multiple nodular opacities
Bagassosis	Mottling of lung fields
Silicosis	Fine nodular opacities Snowstorm appearance (S for S) Eggshell calcification

Epidemiology of pneumoconiosis in india

- **SILICOSIS is:**
  - Most common pneumoconiosis in India
  - Most common cause of death due to pneumoconiosis
  - Responsible for maximum disability

Buzzwords/specific findings

- **ASBESTOSIS:**
  - Mesothelioma of the lungs (specific finding)
  - Adenocarcinoma of the lung
- **ANTHRACOSIS:**
  - Progressive Massive Fibrosis (PMF)
- **SILICOSIS:**
  - Progressive Massive Fibrosis
  - TB associated → Silico-tuberculosis

Yourwish

Yourwish

Risk of pneumoconiosis

00:02:54

Feature	Details
Silicosis	• Most common pneumoconiosis • Risk factor for TB (patients are more prone to TB) • Upper part of the lung fields affected • Snowstorm appearance on imaging • Nodular fibrosis • Silica is commonly used as quartz

Asbestosis	• Two types of fibres:
	  ○ Curly fibres- Serpentine (most common)
	  ○ Needle-like fibres- Amphibole (most dangerous)
	• Most common presentation: Adenocarcinoma of the lung
	• Most specific association: Mesothelioma
	• Basal part of lung fields affected (B for Basal)
	• Ground glass appearance on X-ray
	• Diffuse fibrosis

Anthracosis	• Seen in coal miners • Progressive Massive Fibrosis (PMF) in the advanced stage • Simple Coal Worker Pneumoconiosis (CWP) is reversible in the early stage • After progression to PMF → NOT reversible
Byssinosis	• Seen in workers in jute textile and cotton dust industries • Cotton spinners are more affected
Bagassosis	• Caused by sugarcane dust • Seen in cardboard/paper factories • Organism: Thermoactinomyces sacchari • Not notifiable under the Factory Act (others are notifiable) • Preservation: Spray 2% propionic acid (not 1% or 5%) • Moisture content in waste: >20%
Farmer's Lung	• Exposure to green dust / mouldy hay • Organism: Micropolyspora faeni

Pneumoconiosis with organisms/environment

Condition	Organism	Exposure
Bagassosis	Thermoactinomyces sacchari	Sugarcane dust
Farmer's Lung	Micropolyspora faeni	Green dust/mouldy hay
Compost Lung	Aspergillus fumigatus	Aspergillosis infestation
Fancier's Lung	-	Bird droppings (contain Aspergillus)

Yourwish

Q. Which of the following statements about silicotuberculosis is FALSE?

1. Silicosis patients are more prone to TB → **TRUE**
2. Sputum rarely/never shows TB → **TRUE** (Cannot demonstrate TB bacilli in sputum of silico-TB patients)
3. Children and women with silicosis do not develop TB → **TRUE**
4. Postmortem finding suggests TB → **FALSE** (Will not be able to demonstrate TB bacilli in postmortem findings either)
    - **Diagnosis:** Clinical presentation + history of exposure to silica industry

Occupational exposures and associated cancers

Exposure	Associated Cancer/Condition
Benzene	Leukemia
Ethylene oxide	Leukemia
Asbestos	Mesothelioma
Arsenic	Skin cancer
cadmium	lung
Chromium	Lung
Benzidine	Bladder cancer (D for bladder)
Polycyclic aromatic hydrocarbons (PAH)	Skin, scrotum, lung
Vinyl chloride	Liver angiosarcoma
Wood dust, nickel, chromium	Nasal sinus carcinoma

Lead poisoning

00:11:11

INICET 2021

- **Also Known As:**
    - Plumbism
    - Saturnism
    - Painter's Colic
- **Source:** Lead exposure via
    - Lead fumes in gasoline and petroleum products
    - Lead paints
    - Seen only with organic lead
- **Major Source:** Industrial exposure
- **Industries at Risk**
    - Storage battery manufacturing (where batteries are manufactured)
    - Paint
    - Printing
    - Lead pipes
    - Dyes

- Potteries
- Shipbuilding
- Glass manufacturer

- **Non-industrial**
  - Accidental ingestion of lead paints from wooden toys by children
  - Gasoline from automobile exhausts
  - Drinking water through lead pipes

Clinical picture of lead poisoning

Mnemonic: A-B-C-D



- **Earliest and Most Consistent Sign:** Facial pallor
- **A - Anaemia**
  - Microcytic hypochromic anaemia
- **B - Burtonian Line**
  - Deposition of lead sulphide on gums
  - Lead sulphide is the least toxic form of lead
  - The presence of the Burtonian line indicates Chronic lead exposure (NOT acute) & Basophilic stippling of RBCs
- **C - Colic**
  - Mostly constipation (rarely diarrhoea)
- **D - Drops**
  - **Wrist drop** → Due to involvement of the radial nerve
  - **Foot drop** → Due to involvement of the common peroneal nerve
- **E - Encephalopathy:**
  - Lead encephalopathy
  - CNS effects mostly due to organic lead compounds

Investigations for lead poisoning

Test Type	Details	Test Name
Screening test	Check coproporphyrin levels in urine	Coproporphyrin in urine
Sensitive test	Lead absorption test ALA levels in urine	ALA (Aminolevulinic acid) in urine
Quantitative indicator	For both lead exposure and absorption	Lead in urine
Confirmatory test		Blood lead levels
Sensitive parameter for haematological response	To check if the treatment is working To see if the patient is doing better	Basophilic stippling of RBCs

- **Lead exposure in pregnancy**
  - Can lead to **stillbirth**
  - Can lead to **prematurity**

Yourwish

Treatment

- Chelating agents (will learn in forensic)
- EDTA

Important Information

- **Mees Line:** Seen in **Arsenic poisoning**

Q. What is the most common route of inorganic lead absorption in industries that leads to lead poisoning?

a. Absorption through skin INICET 2021
b. Inhaled lead dust
c. Ingestion of contaminated food and water
d. Contaminated hands

Ans: b

Explanation:

- Inhalation → Most common route in industry
- Ingestion → Most common route in children
- Absorption through skin
- Maximum toxicity: Also due to inhalation

Occupational-related cancer 00:15:56

- **Most common occupational cancer:** Skin cancer (Not lung)
  - Variety: Squamous cell carcinoma

Q. All of the following are characteristic features. of occupational cancers except

A. The period between exposure and development may be 10-25 years → **TRUE**
   a. Not immediate
   b. For some (silicosis/asbestosis), it could be shorter
   c. Generally 10-25 years
B. Disease may develop even after cessation of exposure → **TRUE**
   a. Even after stopping work in that industry, they are still exposed to developing a disease
C. Average incidence earlier than cancer in the general population → **TRUE**
   a. Not everybody is exposed to coal mining industries
D. Localisation of tumour is variable in one occupation → **FALSE**
   a. Localisation of the tumour is fixed
   b. Every occupation will have the same presentation
E. Changes due to occupational exposure cannot be reversed → **TRUE** (ideally)
   a. Whatever changes occurred cannot be reversed
   b. That's why in severe cases → lung transplant

- **Exceptions to irreversibility**
  - Simple Coal Worker Pneumoconiosis → can be reversed
  - Metal Fume Fever → can be reversed
    → Acute presentation in 24 hours
    → Develops among welders

Yourwish

Yourwish

Bladder cancer

00:17:47

- **Exposures Leading to Bladder Cancer:**
  - Working in the dye industries
  - Rubber
  - Gas
  - Electric cable industries
  - Naphthalene dyes
  - Cyclophosphamide (cancer treatment drug)
- **Most Common Type:** Transitional cell carcinoma
- **Most Common Symptom:** Painless hematuria (blood in urine)
- **First Test to Recommend:** Urine examination (Not a blood test)

Occupational exposure causing cancer

Type of Carcinoma	Predisposing Occupational Exposure
Lung	Arsenic, Beryllium, Cadmium, Chromium, Asbestos, Silica, Radon, Nickel, Aromatic hydrocarbons
Liver	Vinyl chloride, Arsenic
Bladder	Benzidine, Auramine, Beta-naphthylamine, Para-aminodiphenyl, Magenta
Leukemia	Benzene, Ethylene oxide, Roentgen rays, Radioactive substances
Skin	Arsenic, Ionizing radiation, Polycyclic aromatic hydrocarbons

Sickness absenteeism

00:19:10

- The sickness absenteeism rate predicts the **state of health of workers**
- **Rate in India:** 8-10 days per person per year
- **High sickness absenteeism rate means:** The person is not happy
- **Reasons for Sickness Absenteeism:**
  - Medical cause → Least common reason
  - Social cause (more important) → Not happy with work culture
  - Economic cause → Not happy with salary
  - Ergonomics:
    → Fitting the job to the worker
    → Ensuring the health worker is happy in the work environment

Prevention of occupational diseases

Q. To prevent occupational diseases, the concept of 4Ps is adopted. Which of the following does not belong to it?

a. Protection
b. Personal hygiene
c. Pre-selection check-up
d. Post-selection check-up

Ans: d

Yourwish

Pre-placement vs post-placement examination

Feature	Pre-Placement Examination	Post Placement Examination
Purpose	Determines whether the person is fit for the job	Detects health changes due to the job at the earliest
Timing	Done once at the time of employment	Mostly annually
Frequency (special exposures)	—	Lead, radon, and dyes: Monthly; Dichromate: Daily
Level of Prevention	**Primary level** prevention (exception to the rule that health checkup = secondary)	**Secondary level** prevention

- **Post-Placement Examination Frequency:**
  - Most occupational exposures: **Annually**
  - Lead, Radon, Dyes: **Monthly**
  - Dichromates: **Daily**

Q. Dust particles of what size range are involved in pneumoconiosis? FMGE 2025

a. 3-5 microns
b. 0.5-3 microns
c. 5-10 microns
d. 6-8 microns

Ans: b

Q. A chronic smoker who worked in a cement factory for almost 20 years presents with mesothelioma. Which occupational exposure is most likely responsible for this?

a. Asbestosis
b. Silicosis
c. Bagassosis
d. Farmer's lung

Ans: a

Q. A man working as a mason in a stone factory presents with dyspnea and eggshell calcifications on chest X-ray. Which occupational exposure is most likely responsible for this condition? FMGE 2025

a. Asbestosis
b. Silicosis
c. Anthracosis
d. Tuberculosis

Ans: b

FMGE 2023

Q. What does the sickness absenteeism of workers in industry evaluate?

a. Health of family
b. Health of the worker
c. Industrial environment
d. Health of the community

Ans: b

NEET PG 2018
FMGE 2019, 2024

Factory act 1948

00:23:30

- Under the Ministry of Labour
- A Factory is a place where 10 or more people work with electricity/power, or 20 or more people work without electricity/power
- According to Article 24 of the Constitution, no child up to the age of 14 years can be employed in any factory
- **Adolescents (15-18 years):** Can be employed
  - But must be certified fit to work by a certifying surgeon
  - Appropriate work given: According to Article 39

Work-related norms

00:25:10

- **Adults:**
  - Can work up to 9 hours per day (Not 8) or 48 hours per week
  - Including overtime: 60 hours per week maximum
- **Adolescents:** Can work up to 4.5 hours per day
- **Women and Adolescents:**
  - Can work between 6 AM and 7 PM only
  - Should not do dangerous or hazardous work

Leave conditions

- **Adolescents:**
  - 1 day leave for every 15 days of work
  - Can accumulate up to 40 days
- **Adults:**
  - 1 day leave for every 30 days of work
  - Can accumulate up to 30 days

Other factory act provisions

- **Minimum Cubic Feet Space:** 500 cubic feet per person (Not floor space - cubic feet space)
- **Safety Officer:** 1 safety officer for more than 1000 workers
- **Welfare Officer:** For more than 500 workers
- **Canteen:** For every 250 workers
- **Crèche:**
  - Now under the Maternity Benefit Act
  - For 250 workers

Notifiable diseases under the factory act

- 29 diseases are notifiable

Yourwish

  - Pneumoconiosis
  - Silicosis
  - Anthracosis
  - Asbestosis
  - Byssinosis
- Bagassosis is not notifiable
- Noise-induced hearing loss is notifiable

Q. As per the Factories Act, which of the following statements is correct? NEET PG 2018

a. Children under 14 years of age must not be employed in factories
b. A child of 16 years can be employed only between 6 AM and 8 PM
c. The maximum working hours for an adult are 72 hours per week
d. A child of 16 years can work till 5 hours per day

Ans: a

Q. Minimum per capita space required for each worker according to the Factory Act? FMGE 2024

a. 100 cuft
b. 200 cuft
c. 500 cuft
d. 1000 cuft

Ans: c

Q. Under the Factory Act of 1948, what is the recommended limit for the maximum number of working hours per week? FMGE 2019

a. 42 hours/week
b. 48 hours/week
c. 54 hours/week
d. 60 hours/week

Ans: b

Employees' state insurance (esi) act, 1948

00:28:00

FMGE 2019, 2025

- Under the Ministry of Labour
- **Type:** Social security scheme for the wellness of labourers
- ESI Act is an important measure of social security and health insurance in India.
- Scope of ESI Act: The Act covers all factories in India, excluding **Railways, Defence, and Mines**
- The Act, in the first instance, applies to all non-seasonal factories employing 10 or more persons for wages on any day in the implemented areas
- It also covers shops, hotels and restaurants, cinemas and theatres, road-motor transport establishments, and newspaper establishments.
- Now it covers medical institutions in a few states and Uts.



Yourwish

Financial contribution to esi

Contributor	Percentage	Base
Employer	**3.25%**	Of the daily wage
Employee	**0.75%**	Of the total wage bill
Total	**4%**	-

- **Applicable to**
  - Employees earning up to ₹21,000 per month
  - In case of disability: up to ₹25,000 per month
- **Exemption from Employee Contribution:** Employee earning a daily wage of ₹176 or less
- The medical expenditure is shared between the Central and State Governments as follows:
  - **Central Government:** 7/8 (maximum contribution)
  - **State Government:** 1/8

Benefits under esi act

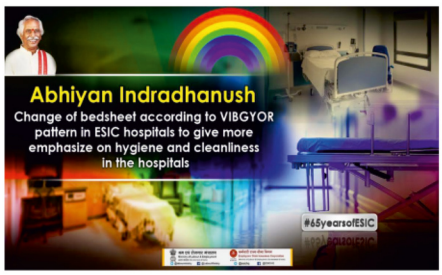
Benefit	Details
Medical benefit	Cashless benefit: Full medical care Direct Medical Benefit: If provided by the ESI hospital Indirect Medical Benefit: If provided by empaneled hospitals
Sickness	70% of the daily wage is payable for 91 days. (To qualify, the worker must contribute for 78 days in a contribution period of 6 months)
Extended Sickness	80% of daily wages payable for 2 years (730 days) for 34 diseases (TB, leprosy, HIV, malignancies, plegias, empyema, >20% burns with infections & complications)
Enhanced Sickness	Full wage for up to 7 days for vasectomy and 14 days for tubectomy
Maternity	Full daily wages. Up to 26 weeks for confinement (can be availed 8 weeks before delivery). Up to 6 weeks for miscarriage or MTP. Up to 4 weeks for sickness arising out of pregnancy, confinement, or premature birth.
Temporary Disablement	90% of the daily wage till recovery
Permanent Disablement	90% of the daily wage
Dependent	Pension at 90% wages
Funeral Expenses	Rs 15,000
Rehabilitation benefit	On payment of ₹10 per month An ESI employee can avail medical benefits even after retirement Also, in the case of permanent disability

Yourwish

Abhiyan indradhanush

00:33:04

- Bedsheets in the hospital should be changed according to the colours of the rainbow



Esi medical facilities setup

Family Units	Facility
≥1000	1 Doctor Dispensary
≥2000	1 Doctor Dispensary
≥5000	Diagnostic Centre
≥15,000	100-bedded hospital

Q. A factory worker sustained burns involving 25% of his body while on duty. He later developed infections and related complications. Under the ESI Act, which benefit is he entitled to? FMGE 2001 FMGE 2025

a. Sickness benefit
b. Dependents benefit
c. Extended sickness benefit
d. Disability benefits

Ans: a

Q. Under which benefit in the ESI Act do beneficiaries receive 70% of their wages for a duration of 3 months? FMGE 2019

a. Sickness benefit
b. Medical benefit
c. Maternity benefit
d. Dependents benefit

Ans: a

Q. An employee diagnosed with TB gets extended sickness benefit for: NEET PG 2020

a. 1 year
b. 2 years
c. 3 years
d. 4 years

Ans: b

DISASTER MANAGEMENT

Definition of disaster (who)

00:35:12

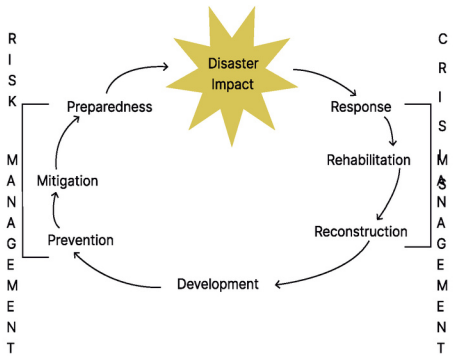
- A disaster is any occurrence that causes damage, ecological disruption, loss of human life, or deterioration of health and requires a response from outside the affected area.
- Minimum Number of People Affected: 30 people (definition by Colin Grant)

Hazard vs disaster

- Hazard has the potential to become a disaster
- Hazard = danger/potential threat
- Disaster = actual catastrophe
  - Example: An earthquake occurs
    → Building not earthquake-resistant = HAZARD
    → Even a minor earthquake → building falls = DISASTER
- Most Common Disaster Reported in India: Hydrological disaster
- Worst Man-Made Disaster:
  - Bhopal Gas Tragedy
  - Due to the leakage of Methyl Isocyanate (MIC) gas
  - Single-exposure epidemic

Disaster management cycle

- **Sequence:**
  - Disaster Impact
  - Response (3 R's - Response, Rehab, Reconstruction)
  - Development
  - Prevention
  - Mitigation
  - Preparedness
- **Important:**
  - Prevention, Mitigation, Preparedness → Happen Before disaster strikes
  - Response, Rehab, Reconstruction → Happen After disaster



Post-disaster phases (all after disaster)

PRIMARY PHASE (First 6 Hours)	• Rescue the person first • Provide first aid • Triage and tagging

SECONDARY PHASE (6-24 Hours)	• Most common disease post-disaster: GI infections
	• Activities:
	  ○ Ensure safe water supply and sanitation
	  ○ Best method: Chlorination
	  ○ Residual chlorine level post-disaster: 0.7 mg/L

TERTIARY PHASE (1-60 Days)	• Rehab and Reconstruct • Ensure everybody has access to: Food, Clothing, & Shelter • Recreating everything

Yourwish

NEET PG 2019
FMGE 2020

Triage

- Categorisation of victims
- Based on:
  - Severity of injury
  - Likelihood of survival (chances of survival)

Colour coding system

RED Category	• **Priority:** Highest to High priority • **Intervention needed:** Within the first 6 hours • **Examples:** ○ Immediate limb-saving surgery is needed ○ Immediate resuscitation needed → Hemothorax → Pneumothorax → Airway obstruction → Acute circulatory collapse → Intra-abdominal bleed → Intraperitoneal bleed
YELLOW/BLUE Category	• **Priority:** Medium priority • **Intervention needed:** Within 24 hours • **Examples:** ○ Stabilized patients ○ Stabilized fractures ○ Compound fractures ○ Simple fractures ○ Spinal injuries ○ Degloving injuries ○ Surgery can wait
GREEN Category	• Priority: Low priority Characteristics: • Ambulatory (walking about) • Suffered minor injuries
BLACK Category	• Priority: LEAST priority • Because dead or moribund patients (likely to die) • Reason for Prioritisation: ○ To focus manpower, money, and material accordingly

Reverse triage

- It is practised during wars- Military settings
- The GREEN color is given priority
- Soldiers who suffered minor injuries → look after them → send them back to fight again

Yourwish

Yourwish

Start - simple triage and rapid treatment

- Done: Inaccessible remote areas
- Where the team cannot go immediately
- Even health workers can start assisting if they are safe

Post-disaster disease pattern

00:42:42

- **Most Common Disease:** GI infections
  - Typhoid
  - Cholera
- **Disease Taking Time to Report:** Vector-borne diseases (incubation period is long)
  - Malaria
  - Dengue
- **Most Common Vitamin Deficiency:** Vitamin A (due to malnutrition)
- **Most Common Long-Term Sequel:** Protein Energy Malnutrition (PEM)

Vaccination protocol post-disaster

- All vaccines are contraindicated post-disaster
- Except: Measles vaccine
- Given only to children because the seroconversion rate is faster
- **Explanation:**
  - Natural incubation period of measles: 10-14 days
  - Post-vaccination antibodies form: Within 7-10 days
  - 7-10 days < 10-14 days
  - If vaccinated before the incubation period, over → effective
- **Timing:** Should be given within the first 3 days of exposure

Vaccines for workers in a disaster-endemic zone

- **Give ALL vaccines** to keep them safe
  - Typhoid vaccine
  - Cholera vaccine
  - Tetanus vaccine
  - Hepatitis vaccine
  - **EXCEPT: Measles vaccine** (only for children)

Most effective step post-disaster

00:45:25

- **Chlorination**
  - To ensure a safe water supply
  - To ensure a safe water supply and sanitation
  - **Residual level of chlorine:** 0.7 mg/L

Shelter and accommodation

- Minimum shelter space per person: 3.4 square meters
- Total shelter area minimum: 300 square feet

Yourwish

Disaster mitigation

00:45:54

NEET PG 2020, 2022, 2024
INICET 2019, 2022
FMGE 2018, 2024, 2025

- **Done:** BEFORE disaster strikes/happens
- **Purpose:** To prevent a hazard from becoming a disaster
- **Examples of Mitigation:**
  - Land use planning
  - Improve building codes (make buildings earthquake-resistant)
  - Flood mitigation works
  - Protection of vulnerable populations and structures
- Achieved through engineering modalities

Disaster preparedness

- **Also Known As:** Surge capacity
  - How well is the country equipped to fight a disaster
  - How well the country/government prepared
- **What to Check:**
  - Do we have adequate manpower?
  - Do we have adequate money?
  - Do we have adequate resources/material to fight a disaster?
  - Have we conducted enough drills?

Disaster management in india

- Disaster Management Act: **2005**
- **Established:**
  - National Disaster Management Authority (NDMA)
  - State Disaster Management Authority (SDMA)
- **World Disaster Reduction Day:** 2nd Wednesday of October
- **Nodal Ministry:** Ministry of Home Affairs
  - (Homes get disrupted in disaster → Ministry of Home Affairs)
- **Chairperson for Disaster Management in India:** Prime Minister

Q. True about triage is:

NEET PG 2019

a. Least priority is given to ambulatory patients
b. Least priority is given to moribund patients
c. First-come, first-treated basis
d. The three-colour coding system is used

Ans: b

Q. Vaccine to be given after a disaster?

NEET PG 2020

a. Vaccination against typhoid
b. Vaccination against cholera
c. Vaccination against typhoid and cholera in the community
d. Vaccination against tetanus, typhoid, and cholera for health workers

Ans: d

Q. What does the recovery phase consist of in a disaster? NEET PG 2024

1. Preparedness
2. Mitigation
3. Response
4. Rehabilitation

a. 1, 2, 3, 4
b. 2, 3, 4
c. 1, 3, 4
d. 3, 4

Ans: d

Q. Following a chemical plant leak, toxic fumes are released into the surrounding atmosphere. What should be the most appropriate immediate advice given to the local residents? NEET PG 2025

a. Ask residents to telephone friends and relatives to spread the information
b. Advise residents to evacuate the area without waiting for official instructions
c. Encourage residents to open windows and doors to improve ventilation
d. Instruct the residents to remain indoors and seal doors, windows, and all possible openings

Ans: d

Q. Which amongst these are done as part of preparedness in a high seismic area? NEET PG 2022

1. Disaster preparedness, ensuring all financial and other resources are available
2. Increase awareness through campaigns
3. Conduct disaster simulations
4. Follow telecommunication orders by higher officers

a. 1, 2, 3, 4
b 2, 3, 4
c. 1, 2, 3
d. 1, 2, 4

Ans: c

Q. In Kerala, after the flood, people are complaining of fever. Doxycycline is distributed as a prophylactic measure. Which insecticide is preferred alongside it? NEET PG 2021

a. Malathion
b. Lindane
c. Paris green
d. Zinc Phosphide

Ans: a

Explanation:

- Zoonotic diseases commonly reported post-disaster
- Leptospirosis (very commonly reported)
  - Due to Leptospira interrogans

Yourwish

- From rat urine
- Contaminates rice fields

Q. The building codes were changed to make buildings earthquake-resistant following a major earthquake. This action falls under which phase of disaster management? INICET 2022

a. Disaster response
b. Disaster reconstruction
c. Disaster rehabilitation
d. Disaster mitigation

Ans: d

Q. Assertion: WHO recommends the typhoid vaccine for disaster management in endemic areas. INICET 2019
Reason: Vaccination is a cost-effective way of disaster control.

a. Assertion and Reason are true, and Reason is the correct explanation of Assertion
b. Assertion and Reason are true, but Reason is not the correct explanation of Assertion
c. Assertion is true, Reason is false
d. Both are false

Ans: d

Q. Which is the nodal ministry for disaster management in India?

a. Ministry of Health & Family Welfare
b. Ministry of Home Affairs
c. Ministry of Human Resources and Development
d. Ministry of Education

Ans: b

Q. Arrange the correct sequence of the Disaster Management Cycle:

a. Impact - Response - Rehabilitation - Mitigation
b. Rehabilitation - Response - Impact - Mitigation
c. Response - Disaster - Rehabilitation - Mitigation
d. Impact - Mitigation - Response - Rehabilitation

Ans: a

Q. Gujarat recently reported a massive earthquake disaster, causing loss of life and leading to suffering. Which of the following is the most common reported disease in the post-disaster period? FMGE 2019

a. Acute gastroenteritis
b. Pneumonia
c. Leptospirosis
d. Malnutrition

Ans: a

Yourwish

Yourwish

Q. Phase(s) of the Disaster cycle before disaster impact include?

a. Disaster response
b. Medial relief and rehabilitation
c. Mitigation and preparedness
d. Rehabilitation

Ans: c

BIOMEDICAL WASTE MANAGEMENT

00:52:10

- Any waste generated during diagnosis, treatment, immunisation of human beings or animals, research activities pertaining thereto, or the production or testing of biologicals
- Quantity of waste generated in India
  - 1-2 kg per day per bed (hospital)
  - 600 grams per bed (clinic)
- Under the Ministry of Environment and Climate Change

INICET 2018, 2019, 2020, 2021, 2022, 2024
FMGE 2021, 2022, 2024, 2025
NEET PG 2021, 2022

Healthcare waste generation

- General healthcare waste: 80%
- Infectious waste: 15% (what we're concerned about)
  - Pathological waste
  - Infectious waste
- Sharps waste: 1%
- Chemical pharmaceutical/pharmacological waste: 3%
- Radioactive waste/Cytotoxic waste, Pressurized containers, Broken thermometers/used thermometers: <1%

Important symbols



Biomedical waste categories

00:53:43

YELLOW BAG (Non-Chlorinated)	• **Type:** Infectious waste
	• **Pre-treatment:** May or may not be pre-treated (some need pre-treatment)
	• **Treatment Method:**
	  ○ Incineration
	  ○ Plasma pyrolysis
	  ○ Deep burial (particularly in THCs)

Yourwish

RED BAG (Non-Chlorinated)	• **Type:** Infectious waste (recyclable plastic/rubber tubes)
	• **Contents:** RPT (Rubber Plastic Tubes)
	• No pretreatment- recycling or reuse
	• **Treatment:**
	  ○ Autoclave
	  ○ Microwave
	  ○ Hydroclave
	  ○ Followed by shredding or mutilation
	  ○ Waste sent to registered recyclers
	  ○ Can be used in road-making

BLUE BAG (Containers)	• Cardboard boxes with blue-colored markings or blue colored puncture proof, tamper-proof containers • Glass and metallic implants: recycling or reuse

WHITE BAG (Sharps)	• **Characteristics:**
	  ○ Puncture-proof
	  ○ Leak-proof
	  ○ Tamper-proof containers
	• **Treatment:**
	  ○ Autoclave or Dry heat sterilization, followed by shredding, mutilation, or Encapsulation
	  ○ Can be sent for final disposal to:
	  → Iron foundries
	  → Sanitary landfill
	  → Designated concrete waste sharp pit

Color Category	Items
Yellow	Fetus, organs, tissues; soiled cotton, gauze, dressings, bandages; casts, plasters; expired/discarded medicines; cytotoxic waste; body secretions (sputum, pus, feces); X-ray developer fluids; disinfectants; linens, beddings, mattress, gowns; culture plates; blood bags; BT sets; live vaccine vials; blood products; masks, shoe covers, head covers; discarded linens/beddings contaminated with blood or body fluid; lab cultures; silver X-ray film developing liquid, unopened vaccine vial, discarded/expired vaccine vial
Red	Recyclable plastics; tubes; vacutainers without blood; syringes without needles; urobags; catheters; Ryle's tubes; IV drip sets; face shields; goggles; dialysis kits; gloves (soiled or unsoiled)
White	Sharps and other metals, syringe with needle
Blue	Orthopedic implants; glassware; artificial pacemaker; broken glass; ampoules; lab slides, broken vaccine vial

Waste treatment methods

00:57:50

FMGE 2018, 2024

INCINERATION

- Burning at high temperature, a dry oxidation process
- **Reduces:**
  - Volume: 85-90%
  - Weight: 30%
- **Pre-treatment:** Not required
- **Cannot Be Incinerated:**
  - Pressurized gas containers
  - Large amounts of reactive chemicals
  - Silver salts
  - Halogenated plastics
  - Waste with high mercury content
  - Broken thermometers
  - Anything containing cadmium
  - Red bags (contain some cadmium)
  - Sealed ampules containing heavy metals
  - Sharps
- **DUAL CHAMBER INCINERATOR**
  - Primary Chamber: 800-1100°C
  - Secondary Chamber: Higher temperature needed



Autoclave

Temperature	Pressure	Time (minutes)
Not less than 121°C	15 pounds per square inch	60
Not less than 135°C	31 pounds per square inch	45
Not less than 149°C	52 pounds per square inch	30



Inertization

00:59:08

- Mixing waste with cement and other substances before disposal
- **Used For:** Pharmaceutical waste
- **Composition:**
  - 65% pharmaceutical waste
  - 15% lime
  - 15% cement
  - 5% water

Screw feed technique

- Biomedical Waste + Auger + Heat + Rotate
- Weight reduced 20-25%
- Volume reduced 80%
- Used for Infectious Wastes and Sharp Wastes

Yourwish

- Contraindicated for Radiological Waste, Cytological Waste & Pathological Waste
- Particularly Used For: Sharp waste

Methods of sterilization and disinfection

Mode of Sterilization / Disinfection	Examples	Uses
Heat	Hot air oven	Glassware, swabs and dressings, oils, and sterilizing powders
	Autoclave	Surgical instruments, linen, laboratory ware, media, and pharmaceutical products
	Pasteurisation	Plastic hospital equipment, beverages
	Boiling	Rubber, plastic equipment, metal tools, and cloth
Radiation	UV, Ionising	Plastic syringes, catheters, laboratory cabinets, surgical supplies, food
Gas	Ethylene oxide gas	Heat-sensitive equipment like heart-lung machines, artificial valves, fabrics, respirators, and cardiac catheters
Aldehydes	Glutaraldehyde	Endoscopes, bronchoscopes
Chemicals	Alcohol, Hydrogen peroxide, Iodophores, crude phenols	Skin disinfection, wounds and ulcers, disinfect blood culture bottles, and medical equipment

Sterilization temperatures

Method	Temperature	Duration
Hot Air Oven	160°C	2 hours
Classic Autoclave	121°C	10-15 minutes
Flash Autoclave	134°C	3 minutes
Ethylene Oxide	50 - 60	1 - 6 hours

Q. What is the immediate step taken for a blood spillage? INICET 2018

a. Call infection control team
b. Mop it with clean water
c. Cover it with disinfectant
d. Clean with an absorbable material

Yourwish

Ans: d

Q. While measuring a patient's blood pressure at a primary health centre, the sphygmomanometer accidentally fell and broke, resulting in spilled mercury on the ground. Which of the following is the most appropriate step to clean this spillage? INICET 2022

a. Collect it by using a card on a sheet of paper and put the mercury into a jar
b. Collect it by sweeping it with a broom and throwing it outside
c. Collect it by sweeping it and flush it in the toilet
d. Collect it by hand and then wash it with water

Ans: a

- **Critical Steps:**
  - Switch off all fans (FIRST STEP)
  - Wear PPE
  - Never use a broom
  - Never flush in the toilet
  - Never collect by hand
  - Remove metallic things from the body (otherwise they can stick)
- **Collection Method:**
  - Collect spilled mercury pieces with a card or a sheet of paper
  - Put mercury in a jar half- filled with water
  - Send back to the manufacturer
- **Floor Cleaning:**
  - Clean floor with Sodium Thiosulphate (NOT sodium hypochlorite)

Q. Sister in the ward has been instructed to keep these buckets in the ward for waste management. What would go into a black colour bag? INICET 2021

a. Gloves
b. Wrapper of hand gloves
c. Soiled linen
d. Mattress

Ans: b

Q. In which of the following should a cotton swab with pus be discarded? FMGE 2025

a. Yellow chlorinated bag
b. Yellow non-chlorinated bag
c. Red chlorinated bag
d. Red non-chlorinated bag

Ans: b

Q. Broken vaccine vial should be discarded in which bin? NEET PG 2022

a. Blue bin
b. Yellow bin

Yourwish

c. Red bin
d. White puncture-proof bin

Ans: a

Q. A child presents with pharyngitis to the OPD. A throat swab is collected and sent for culture. The swab should be disposed of in which color bin? NEET PG 2021
a. Red
b. Yellow
c. White
d. Blue

Ans: b

Q. A patient admitted following a road traffic accident has left a blood spill on the floor. Which disinfectant is most appropriate for effectively decontaminating the area?
a. Ethyl alcohol
b. Chlorhexidine
c. Formaldehyde
d. Sodium hypochlorite

Ans: d

Q. During a field visit to monitor training given to ANM on safe immunization practices, you observe that she has used a syringe with a needle, a vaccine vial, and a cotton swab. After completing the immunization, which of the following statements about biomedical waste disposal is correct?
a. The syringe with the needle should be disposed of in a black translucent container
b. The used vaccine vial should be discarded in a blue bag
c. A used cotton swab should be discarded in a red bag
d. The needle should be bent and thrown in a red bag

Ans: b

Q. Which of the following combinations of biomedical waste management is correct regarding the disposal of an expired tablet?
a. Red bag-hydroclaving
b. Blue bag- incineration
c. Yellow bag - incineration
d. Yellow bag - burial

Ans: c

Q. The needle with the syringe is disposed of in which container? FMGE 2024
a. Yellow
b. Red

c. Blue
d. White

Ans: d

Q. What is used to clean up blood spills in the operating theatre? FMGE 2022
a. Chlorine compounds
b. Phenolic compounds
c. Quaternary ammonium compounds
d. Alcoholic compounds

Ans: a

Q. How to collect spilled mercury at a CHC?
a. Collect in a tube filled with water and send it back to the manufacturer
b. Sweep it and mop it
c. Flush it in the toilet
d. Use your hands

Ans: a

Q. Which of the following biomedical wastes is disposed of in a yellow bag?
a. Blood bag
b. Gloves
c. Sharps
d. Urine bag

Ans: a

Q. As per the guidelines for disposing of biomedical waste, what colour bag should be used to discard used cotton swabs?
a. Yellow
b. Red
c. Blue
d. Black

Ans: a

Q. Cytotoxic drug is disposed in: FMGE 2020
a. Yellow bag
b. Red bag
c. Blue bag
d. Black bag

Ans: a

Yourwish

FMGE 2020

Q. Which of the following items is disposed of in the white bag as biomedical waste?
a. Anatomical waste
b. Sharp waste
c. Glassware
d. Plastic waste

Ans: b

Q. Inertisation is:
a. Reducing organic and combustible waste to inorganic waste
b. Burning biomedical waste
c. Biomedical waste converted into non-harmful
d. To avoid water contamination

Ans: c

Q. Which one of the following methods does not effectively prevent the transmission of COVID-19?
a. Face mask
b. 1% glutaraldehyde
c. 70% alcohol
d. Hand washing

Ans: b

Q. Pacemaker is disposed of in which bag?
a. Red bag
b. Blue box
c. Yellow bag
d. White box

Ans: b

INICET 2019

Q. Match the following biomedical waste types with their appropriate

A. Paper waste	1. Green
B. Catheter	2. Red
C. Expired drug	3. Yellow
D. Antibiotic bottle	4. Blue

a. A-1, B-2, C-3, D-4
b. A-3, B-2, C-1, D-4
c. A-4, B-1, C-2, D-3
d. A-2, B-4, C-1, D-3

Yourwish

Yourwish

Ans: a

GENETICS

01:06:56

Eugenics

- Social philosophy
- Advocates for the improvement of human hereditary traits through genetic manipulation

Types of eugenics

- **Negative Eugenics**
  - Aimed at lowering fertility among genetically disabled
  - Methods: Sterilization, abortions, and methods of family planning
- **Positive Eugenics**
  - Encourages reproduction among genetically advantaged
  - Examples: Egg transplants, gene cloning, in vitro fertilization, targeted demographic analysis, financial and political stimuli

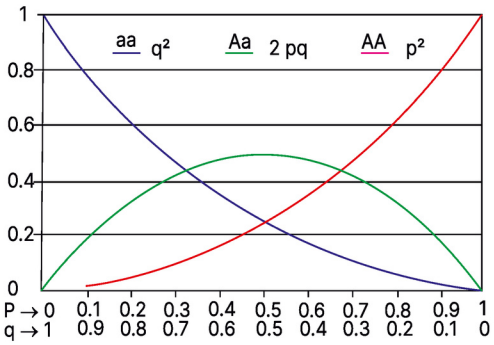
Euthenics

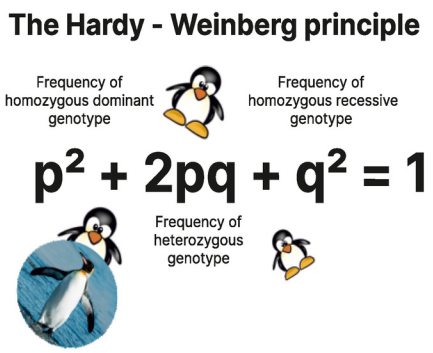
- Deals with human improvement through altering external factors such as education and the controllable environment, including the prevention and removal of contagious disease and parasites, environmentalism, education regarding home economics, sanitation, and housing (environmental manipulation)

Hardy-weinberg law

01:07:56

- **Principle**
  - States that the genotype frequencies in a population remain constant or are in equilibrium from generation to generation unless specific disturbing influences are introduced
  - Genetic equilibrium (HW law) is a basic principle of population genetics; the entire principle is based on Mendelian genetics
  - The HW law assumes that the human population is static
- **Formula**
  - $p^2 + 2pq + q^2 = 1$
- **Law fails if**
  - Changing populations
  - Dynamic populations
  - **Small populations**
  - Lot of mutation
  - Genetic drift
  - Migration
  - Random mating





Yourwish

Genetic counselling

Type	Definition	Useful in
Prospective genetic counselling	Identify heterozygous individuals for a particular defect (through screening) and explain the risk of having affected children if they marry another heterozygote for the same gene	Thalassemia, Sickle cell anemia
Retrospective genetic counselling	Seeking genetic advice after a hereditary disorder has already occurred in the family	Congenital anomalies, Mental retardation, Psychiatric illness, Inborn errors of metabolism

24. BIOSTATISTICS PART 1

DEFINITION

00.00.31

- Application of statistics in the field of medicine
- Variable: Anything which can take up a value
  - E.g → Gender, Blood group, Age

Q. The branch of statistics that describes the internal collection of data is called? INICET 2022

A. Theoretical statistics
B. .Descriptive statistics
C. Analytical statistics
D. Interventional statistics

Answer: **B.** Descriptive statistics

Difference Between Descriptive Statistics And Interventional Statistics

Descriptive statistics	Interventional statistics
Concerned with describing the target population	Make inference/conclusion from the sample and generalize it to the population
Organize, analyze, and present the data in a meaningful manner	Compare, tests and predict future outcomes
Final results are shown in the form of charts, tables, and graphs	The final result is the probability score
Describe the data which is already known	Tries to make conclusions about the population that are beyond the data available
Tools • Measures of central tendency → Mean/Median/Mode • Measures of dispersion (spread of data) → Range / Standard deviation	Tools • Hypothesis tests • Analysis of variance • Tests of statistical significance

TYPES OF VARIABLES

00.03.18

Quantitative	Qualitative
• Can be measured → has units	• Cannot be measured → has no units but countable
• Can be compared	• Cannot be compared
• E.g : weight , height , Hb , age , BP , RBS	• E.g: Gender, religion, blood group, any disease like hypertension and diabetics

Yourwish

Continuous	Discrete
• Can take many possible values, and also in-between values • Can be expressed as decimals	• Can take fewer values and no in-between values • Cannot be expressed as decimals
• Quantitative variables are continuous	• Qualitative variables are discrete
• E.g : weight , height , Hb , age , BP , RBS	• E.g: Gender, religion, blood group, any disease

Dichotomous	Polytomous
• Can take up two values	• Can take up more than two values
Can be Quantitative or Qualitative	
• E.g: Rh status, presence or absence of disease	• E.g: Blood group, religion, gender, age

- Pulse rate: Quantitative, Continuous, and Polytomous

Q. Which is the continuous variable?
A.Blood group
B.Weight
C.Religion
D.Sex

Answer: B. Weight

SCALES OF MEASUREMENT

00.09.10

Categorical Scale	Dimensional / Metric Scale		
Qualitative variables are measured by categorical scale	Quantitative variables are measured by a dimensional scale		
Nominal	**Ordinal**	**Interval**	**Ratio**
Data classified into categories without any order	Data classified into Ordered categories	Data without an absolute zero and no start point	Data with an absolute zero or below
Based on names	Rank variables	Value can be zero or below zero	Value can never be zero
E.g • Presence/absence of disease • Gender • Religion • Blood group	E.g • Stage of cancer • Grade of HTN • Severity of anemia • Likert scale • Guttman scale • GCS score • APGAR score • Child Pugh score	E.g • Temperature scale (℃ or ℉)	E.g: All Quantitative variables except temperature: • Height • Weight • Hb • Age

Yourwish

Q. Vaccination status, gender of students, and pain scale scores are measured using which scale of measurement?

FMGE 2025

A. Nominal, Nominal, Ordinal
B. Ordinal, Nominal, Nominal
C. Ordinal, Ordinal, Nominal
D. Nominal, Ordinal, Nominal

Answer: **A.** Nominal, Nominal, Ordinal

Q. Blood cholesterol shown as mg/dL value is in which type of data?

A. Ordinal
B. Nominal
C. Discrete
D. Continuous

Answer: **D.** Continuous

Q. 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 (Likert scale)

Q. A study wishes to assess birth characteristics in a population. Which of the following variables describes the appropriate measurement scale or type?

A. Continous
B. Ordinal
C. Nominal
D. Dichotomous

A. **Continuous**: Birthweight in grams
B. **Ordinal**: Birthweight classified as low, medium, or high
C. **Dichotomous**: Birthweight classified as low, not low (can be nominal)
D. **Nominal**: Delivery type classified as cesarean, natural, or induced

MEASURES IN STATISTICS

00.16.49

INICET 2025

Measures of Location → Measures of central tendency	Mean, Median, Mode
Measures of Dispersion → Measures of spread of data	Range, Mean deviation, Standard deviation, Coefficient of variation, Variance, Standard error
Measures of Position	Quartiles, Pentiles, Centiles, Percentiles

Yourwish

INICET 2025

Q. Quartiles, Deciles, and Percentiles are measures of

A.Central tendency

B.Position

C.Dispersion

D.Variability

Answer: B. Position

Important Information

- Central tendency → Central value → Value which is most representative

MEASURES OF CENTRAL TENDENCY

00.18.14

Mean

FMGE 2021

- The sum of all observations in the distribution divided by the total number of observations
- Mean is statistically the best measure of central tendency →Because it includes all observations

Median

NEET PG 2024
FMGE 2021

- The middle or central value when data is arranged in ascending or descending order
- If the number of observations
  - Odd → Median is the central value
  - Even → Median is the average of the two middle values

Q. The ages of children undergoing a health checkup are: 2, 3, 4, 4, 5, 6, 7, 8. What is the median age?

NEET PG 2024

A. 4.5

B. 4.8

C. 5

- The number of observations is 8, which is even
- Median = 4+5 / 2 = 9/2 = 4.5

Important Information

- Outlier means too high or too low values in a data set
  - Normal Data → No outlier in the data set
    → Best central tendency is → Mean
  - Skewed Data → Outlier present in the data set
    → Best central tendency is → Median
- Test used for identification of outliers
  - Dixon Q test
  - Grubbs test
  - Chauvenet's criteria
  - Pierce criteria

Q. 18, 20, 22, 24, 26, 28, and 30. Best central tendency is determined by

A. Mean

B. Median

C. Mode

D. Range

Answer: **A.** Mean

Q. The number of malaria cases reported during the last 10 years in a town is given as 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

Mode

- Most frequently occurring (most repeated) value in a data set
- To convert bimodal to unimodal → Average of the two values

Q. If a wide range of values are present in a community, what is the best measure of central tendency?

A. Mean
B. Mode
C. Median
D. Standard deviation

Answer: **C.** Median

Q. Out of 11 births in a hospital, 5 babies weighed over 2.5kg, and 5 weighed less than 2.5kg. What value does 2.5 represent?

A. Geometric average
B. Arithmetic average
C. Median
D. Mode

Answer: **C.**Median

Q. All of the following statements are true for descriptors of central tendency except INICET 2023

A. Mode is affected by extreme values
B. Mean is affected by extreme values
C. Median is calculated by the overall observations
D. Mode can be used as a qualitative data descriptor

Answer: **A.**Mode is affected by extreme values

Q. In a survey of sleep apnea scores among 10 persons, the highest value 58, was wrongly recorded as 85. This will affect the final result as FMGE 2021

Yourwish

A. Mean will be affected
B. Median will be affected
C. Both mean and median will be affected
D. Both mean and median will not be affected

Answer: **A**.Mean will be affected

Q. Bimodal distribution is represented by
A. Mode = 3Median - 2Mean
B. Mode = 3Median + 2Mean
C. Mode = 2Median + 2Mean
D. Mode = 3Mode - 3Median

Answer: **A**.Mode = 3Median - 2Mean

Important Information

- Statistically best measure of central tendency → Mean
- Best measure of central tendency for a skewed data set, i.e., when outliers are present → Median
- Most affected measure of central tendency by outliers in a data set → Mean
- Least affected measure of central tendency (most robust) → Mode
- Best measure of central tendency for nominal data → Mode
- Best measure of central tendency for ordinal data → Median
- Test to identify outliers → Dixon Q test, Grubbs test

Measures Of Dispersion / Variability

00.31.15

FMGE 2019
INICET 2020, 2025

- Dispersion → Spread or scattering of values around a central value in a data distribution.
- Values should be closer to the central values → More reliable

Individual observation	Sample observation
• Range • Mean Deviation • Standard Deviation • Coefficient of variation • Variance	• Standard error of the mean • Standard error of proportion • Standard error of the difference between 2 means • Standard error of the difference between 2 proportions

Range

- Range = Maximum value - Minimum value
- E.g If there are 100 students (N) in a class, and among the students, if the maximum weight is 120kg and the minimum weight is 50kg, calculate the range of weight of the students in class?
  - Range: 120-50 = 70kg
  - Interpretation → No two students' weights in the class would differ by >70kg

Mean Deviation

- Average of the absolute deviations of individual observations from a central value (usually mean or median)
- Formula:

Yourwish

Yourwish

- μi = each data point , μ = mean

$$\text{Mean Deviation} = \sum \frac{\mu i - \mu}{N}$$

or

$$\text{Mean Deviation} = \sum \frac{xi - \bar{x}}{N}$$

Standard Deviation

- M/c used measure of Dispersion
- Square root of the mean of the squared deviations of observations from their arithmetic mean
- Formula:
  - μi = each data point , μ = mean
  - σ = Standard deviation
  - If sample is <30 then N becomes N-1

$$\text{Standard Deviation } (\sigma) = \sum \sqrt{\frac{(\mu i - \mu)^2}{N}}$$

- E.g
  - In a class of 100 students, the mean weight is found to be 60kg, and the standard deviation is found to be 5kg
  - Interpretation: The weight of the student lies between 55kg - 65kg $\rightarrow 60 \pm 5$

Coefficient of Variation

- To compare data sets
- Ratio of standard deviation to the mean, expressed as a percentage, indicating the extent of variability in relation to the mean of a dataset
- Formula:

$$\text{Coefficient of Variation} = \frac{\text{Standard deviation}}{\text{Mean}} \times 100$$

Variance

- Variance is calculated as the average of the squared differences from the mean
- Formula:

$$\text{Variance} = \sigma^2$$

Standard Error

- The standard deviation of the sample means is called Standard errors
- It includes
  - Standard error of the mean
  - Standard error of proportion

Standard error of mean	Standard error of proportion
• Estimates how much the sample mean is likely to differ from the true population mean • Formula $\text{SE of mean} = \frac{\sigma}{\sqrt{N}}$	• Estimates the variability of a sample proportion from the true population proportion • Formula $\text{SE of proportion} = \sqrt{\frac{Pq}{N}}$ P = prevalence , q = 100-P

Yourwish

E.g In a class of 100 students (N = 100), the mean weight of students in class (μ)=50kg, SD of students in a class (σ) = 5kg, prevalence of obesity is 10%

- SE of mean = 5/ $\sqrt{100}$
  = 5/10 = 0.5
- SE of proportion = $\sqrt{9}$ =3

SE of difference between 2 sample means	SE of difference between 2 proportion
• Statistical measure that estimates how much the difference between two sample means is likely to vary across different samples drawn from the sample population • SE difference (2 means) = $\sqrt{\frac{\sigma^2_1}{N_1} + \frac{\sigma^2_2}{N_2}}$	• Estimates the variability of the difference between two sample proportions when compared to the true population difference • SE difference (2 proportion) = $\sqrt{\frac{p_1q_1}{N_2} + \frac{p_2q_2}{N_2}}$

Interpretation

- Lower the values of dispersion → Lesser spread is the data set
  - More is the reliability of data (more precision)
- Values of dispersion can be lowered → By increasing the sample size
- Precision is inversely related to the measure of dispersion

Q. Not a measure of dispersion? FMGE 2019

A. Standard error
B. Variance
C. Range
D. Mean

Answer: D. Mean

Q. The data that best explains the difference between the highest and the lowest values is? INICET 2020

A. Variance
B. Coefficient of variation
C. Range
D. Interquartile range

Answer: **C.** Range

Q. There are 50 individuals in the population, and they have the same hemoglobin level, that 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

Q. Village 1 (1000population total) has a mean age of population of 20 years and SD of 2 years
Village 2 (2000population total) has a mean age of population of 40 years and SD of 1 year.

A. VARIATION in village 1 is 10
B. Variation in village 2 is 2.5
C. Village 1 has a higher variation
D. Village 2 has a higher variation

Use the following key to mark the correct answer
A. If a, b, and c are correct
B. If a and c are correct
C. If b and d are correct
D. If all four (a,b,c, and d) are correct

Answer: **A.** If a, b, and c are correct

Explanation

$$\text{Coefficient of Variation} = \frac{\text{Standard deviation}}{\text{Mean}} \times 100$$

- COV : For village 1 = 10%; For village 2 = 2.5%
  - For village 1 Coefficient of variation is high and is less reliable
  - For village 2 Coefficient of variation is low and is more reliable

Variance = σ^2

- Variance: For village 1 = $2^2 = 4$; For village 2 = $1^2 = 1$
  - Village 1 has a higher variation

Relative Deviate (Z Score)

- Indicates how many standard deviations an individual value is away from the mean of a dataset
- Formula:

$$\text{Z score} = \frac{\mu i - \mu}{\sigma}$$

Q. If N=100, μ weight = 60kg, SD = 2.5kg, and weight follows a normal distribution. What is the relative deviate of a student whose weight is 62.5kg

- Z Score = (62.5 - 60) / 2.5
  = 2.5/2.5 = 1
- Interpretation → Student weight is 1 SD above the mean

Measures of Position

00.48.38

- These measures give the position of specific data in relation to other data in the set

AIIMS 2005

Type of Quantiles

Tertiles	Divide a distribution into 3 equal parts
Quartiles	Divide a distribution into 4 equal parts (quarters)
Quintiles	Divide a distribution into 5 equal parts

Yourwish

Deciles	Divide a distribution into 10 equal parts
Vigintiles	Divide a distribution into 20 equal parts
Centiles (Percentiles)	Divide the data into 100 equal parts Commonly used for ranking (e.g marks in exam)

Q. Blood pressure was measured for 200 people. The first quartile BP was 94mmHg and the third quartile BP was 110mmHg. How many people will have BP between the 3rd and 4th quartile?

A. 100
B. 50
C. 25
D. 150

Answer: B. 50

Explanation

- Quartile → Divide a distribution into 4 parts → 200/4 =50
  - Q1 = 1:3 → 25% : 75%
  - Q2 = 2:2 = 1:1 → 50% : 50%
  - Q3 = 3:1 → 75% : 25%

Q. Identify the incorrect statement?

A. Mean, Median: Dispersion
B. Standard error: Variability
C. Correlation coefficient: Relationship
D. Moments: Skewness

Answer: A. Mean, Median: Dispersion

- Central tendency

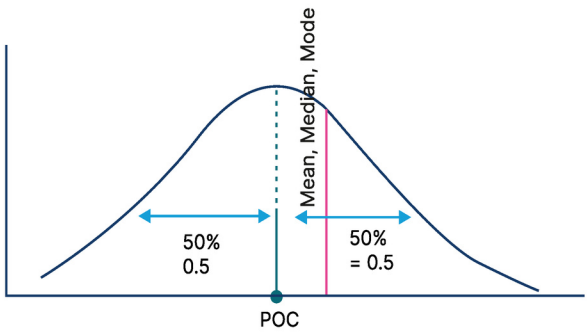
TYPES OF DISTRIBUTION

00.52.45

NEET PG 2020
FMGE 2022, 2025

Normal Distribution

- No outlier
- A/K/A: Gaussian curve
- Bell-shaped curve
- B/L symmetrical
  - 50% data above and 50% data below the point of coincidence
- Point of coincidence
  - Mean = Median = Mode
- Standard normal curve
  - Mean = Median = Mode = 0
  - Total spread of data
    → 0.5 + 0.5 = 1
    → SD = 1
- Mean = 0, SD = 1 , Variance = (σ^2) = 1



Yourwish

- Mean ±1SD = 68% observation
- Mean ±1.64SD = 90% observation
- Mean ±2SD = 95% observation
- Mean ±3SD = 99% observation
- Mean ±Infinity. SD = 100% observation
  - Tails of the curve never touch the baseline

Q. 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

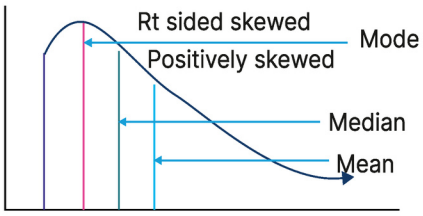
Answer: B. The total area under the curve is 2
- Total area under the curve is 0.5+0.5 = 1

Q. In a normal curve, what is the percentage of distribution that falls within one standard deviation of the mean?
A. 68% FMGE 2022
B. 34%
C. 99%
D. 95%

Answer: A. 68%

Q. A study had a normal distribution with the median value as 200 and standard deviation of 20. 68% will fall between: NEET PG 2020
A. 160-240
B. 170-230
C. 180-220
D. 190-210

Answer: C.180-220
Explanation
- Mean ±1SD = 68% observation
- 200 ±20 (Mean = Median = 200 , SD = 20)
- 180-220



Q. In a group, the mean blood glucose level is 105mg/dl with a standard deviation of 10mg/dl. Assuming the normal distribution, what is the expected range of blood glucose values for approximately 95% of the population?
A. 101-110mg/dl FMGE 2025
B. 90-125mg/dl
C. 95-115mg/dl
D. 85-125mg/dl

Answer: D.85-125mg/dl

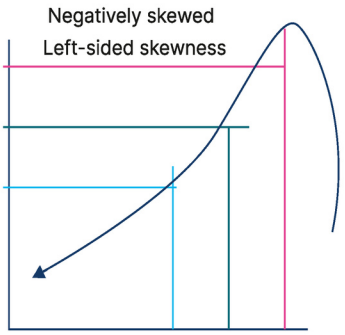
Yourwish

Explanation

- Mean ± 2SD = 95% observation
- 105 ± 2x10 (Mean =105 , SD = 10)
- 85-125

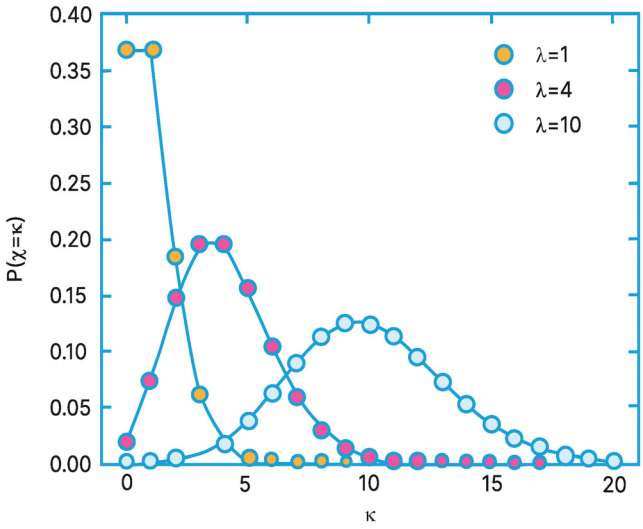
Skewed Distribution

- Right-sided skewness
  - Positively skewed
  - Mean>Median>Mode
- Left-sided skewness
  - Negatively skewed
  - Mean<Median<Mode



Poisson's Distribution

- A discrete probability distribution that expresses the probability of a given number of events occurring in a fixed interval of time
- If the events occur with a known constant mean rate and independently of the time since the last event



ESTIMATION

01.03.03

- The process of using sample data to infer the unknown values of population parameters
- Measured by using the standard error
- Involves calculating statistics from a sample to approximate characteristics of a larger population
- Confidence interval
  - An interval estimate with a specified level of confidence, within which a population parameter is expected to lie, using a sample statistic
  - A 95% confidence interval for the population mean provides a range within which the true population mean is likely to fall with 95% confidence

Q. Intraocular pressure(IOP) was measured in 400 people. The mean was found to be 25mmHg and the standard deviation was recorded as 10 mmHg. 95% confidence interval would be:

A. 22-28
B. 23-27
C. 24-26
D. 21-29

Answer: C. 24-26

Explanation

- Mean $\pm 2SE_{mean}$ = 95% CI
- $25 \pm 2 \times \sigma/\sqrt{N}$ (Mean =25 , SD(σ) = 10 N=400)
  - $25 \pm 2 \times 10/\sqrt{400}$
  - 25 ± 2 x10/20
  - 25 ± 1 = 24-26
- Interpretation → 95% confident that the mean IOP of the population lies between 24-26mmHg

Q. What will be the 95% confidence interval in a study with an estimated prevalence of 10% and a sample size of 100?

A. 4-16

B. 2-18

C. Inadequate information to calculate 95% ci

D. 7-13

Answer: A. 4-16

Explanation

- $p \pm 2SE_{proportion}$ = 95% CI
- $10 \pm 2 \times \sqrt{pq/N} \rightarrow (p = 10, q = 100\text{-}p = 90, N = 100)$
- $10 \pm 2 \times \sqrt{9}$ = 4-16

Q. If the confidence limit is increased, then:

A. Previously insignificant data becomes significant

B. Previously significant data becomes insignificant

C. No effect on significance

D. Any change can happen

Answer: **B.** Previously significant data becomes insignificant

Explanation

- When the confidence limit is increased, the CI becomes wider
- A wider interval is more likely to include the null hypothesis (no effect value)
- If the interval includes the null value, the result is statistically insignificant
- Thus, data that was significant with a narrower CI can become insignificant when the confidence level is raised

Yourwish

25. BIOSTATISTICS PART 2

TYPES OF ERROR

00.00.26

INICET 2017, 2018, 2019, 2025
NEETPG 2018

- In a statistical test, there are 2 types of error
  - Type 1 error → Alpha error
  - Type 2 error → Beta error
- H_0 → Null Hypothesis
  - No difference in the treatment of a disease between 2 drugs
- H_A → Alternate Hypothesis
  - The new drug is better than the existing drug

Type I Error (Alpha error)	Type II (Beta error)

• H_0 True but rejected
  ○ In reality, Newer drug is not better than existing drug
  ○ Result of clinical trial → New drug better than existing drug
• False positive
• More serious type of error
	• H_0 false but accepted
	  ○ In reality, Newer drug is not better than existing drug
	  ○ Result of clinical trial → Not shown
	• False negative
	• Less serious type of error

Q. Type I 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 accepted

Answer: C. Null hypothesis is True but is rejected

Q. 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

- $p<0.05$ → Means that the test is significant

P VALUE

00.06.23

- Probability of committing a Type I error
- Maximum threshold of P value → 5% → 0.05% → α level of significant

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- P-value can be
  - P< α →<0.05 → Statistically significant
    → Rejecting a null hypothesis
  - P= α → not significant
  - P>α → not significant
- E.g p = 0.02
  - If a study is repeated 100times then it's only 2times a true H_o is rejected, which could be due to chance
  - Rest 98 times → it favours the alternative hypothesis
    → i.e., the new drug is good & that is what is shown
  - Chance of committing a false positive trial → 2%, which could be by chance

Q. P-value is the probability of which of the following? INICET 2017

A. Not rejecting a null hypothesis when it is true

B. Rejecting a null hypothesis when it is true

C. Not rejecting a null hypothesis when it is false

D. Rejecting a null hypothesis when it is false

Answer: b.Rejecting a null hypothesis when it is true

Q. A study was conducted to assess the relationship between air pollution and asthma. The analysis yielded a p-value of 0.03. What inference can be drawn from the result? INICET 2025

A. There is 97% confidence that the null hypothesis is true

B. The observed difference is statistically not significant

C. 3% probability that the result occurred due to chance

D. The alternative hypothesis is rejected as the probability of chance is less than 3%

Answer: C.3% probability that the result occurred due to chance

Q. When we say that the difference is significant, it means that?

A. It is likely by chance, and when p>0.05

B. It is unlikely by chance, and when p>0.05

C. It is unlikely by chance, and when p<0.05

D. It is likely by chance, and when p<0.05

Answer: C. It is unlikely by chance, and when p<0.05

Q. A well-designed cancer study showed similar remission rates for a new treatment(33.2%) and the usual treatment (32.2%), with a p-value of 0.04. What does this indicate? NEETPG 2018

A. Both the treatments are equally effective

B. Neither of the treatments is effective

C. The new treatment is more effective than the usual treatment

D. The information given is not adequate to compare the efficacy of the treatments

Answer: C.The new treatment is more effective than the usual treatment

Yourwish

Power of Study

- The ability of a test to detect a statistically significant difference if it exists
- Power is the ability to reject a false null hypothesis
- Power = 1 - β

Q. Power of a study can be increased by
A.Increasing alpha error
B.Decreasing beta error
C.Decreasing alpha error
D.Increasing beta error

Answer: B.Decreasing beta error

TEST OF STATISTICAL SIGNIFICANCE

00.14.56
NEETPG 2018

- 2types
  - Parametric test
  - Non parametric test

Parametric test	Non parametric test
• Quantitative data ○ Measurable ○ Has units	• Qualitative data ○ Countable ○ Has no units
• Compare Mean and Standard Deviation	• Compare percentage & proportion
• Normal distribution	• Skewed distribution
• More powerful	• Less powerful

Q. Which of the following is true about non-parametric tests?
A. ANOVA is an example of a non-parametric test
B. It is used for skewed distributions
C. It involves the assumption that the data has a normal distribution
D. It cannot be used for a small sample size

Answer: B. It is used for skewed distributions

Types of Parametric and Non-Parametric Test

Parametric test	Non-parametric test
• Quantitative data • Normal	• Qualitative data • Non normal
• Paired T test → compare one group before and after intervention • Unpaired T test → compare two groups • ANOVA → compare more than two groups • Pearsons rank correlation test	• Compare One group ○ Wilcoxon sign rank test ○ Mc Nemar test • Compare Two groups ○ Wilcoxon Rank sum test

	○ Mann-Whitney U test ○ Chi-Square test → M/C used • Compare more than two groups ○ Kruskal wallis test ○ Friedmann test ○ Chi-Square test • Spearman Rank correlation test

Q. In a Primary health centre (PHC), a researcher records the body weight of 100 patients with Diabetes mellitus. After providing nutritional counselling, the same patients were followed up, and their weight is measured again after 6months. To determine whether there is a statistically significant difference in body weight before and after counselling, which statistical test should be used? INICET 2025

A. ANOVA
B. Paired t-test
C. Unpaired t-test
D. Chi-square test

Answer: B.Paired t-test

Q. Statistical test to compare mean hemoglobin values of two independent groups ? NEETPG 2025

A. Chi-square test
B. Unpaired t-test
C. ANOVA
D. Paired t-test

Answer: B. Unpaired t-test

Q. A drug trial for cholesterol levels includes 30 volunteers who underwent lifestyle modifications before starting statin therapy for 9months. Which test should be used for analysis ? NEETPG 2024

A. Chi-square test
B. Paired t-test
C. Mcnemar's test
D. Unpaired t-test

Answer: B. NPaired t-test

Q. A study was conducted to evaluate the effectiveness of a new anti-hypertensive drug. Participants were divided into two independent groups: one group received the new drug while the other received a different antihypertensive medication. After treatment, the mean blood pressure of the two groups was compared. Which statistical test should be used for this analysis?

A. Chi-square test
B. ANOVA
C. Unpaired t-test
D. Paired t-test

Answer: C. Unpaired t-test

Yourwish

Q. A study investigates the relationship between diet and disease incidence. Among 100 vegetarians, 30 have the disease, while among 100 non-vegetarians, 50 are affected. Which test determines if diet and disease incidence are significantly associated?

A. Mann-Whitney test
B. Correlation coefficient
C. T-squared test
D. Chi-square test

Answer: D. Chi-square test

Q. Study is done on a group of children to check the seasonal variation of Sudden Infant Death Syndrome (SIDS) in summer, from June to July, and from August to September in another group with similar characteristics from the same area. Which test is used to compare the data?

A. Chi-square test
B. Paired t-test
C. Wilcoxon Rank test
D. ANOVA

Answer: A. Chi-square test

Calculation Of Chi Square Test

Q. Compare the proportions of overweight boys and girls in class

	Overweight	Not Overweight	Total
Boys	30	70	100
Girls	20	80	100
Total	50	150	200

$$\text{Chi Square formula} = \sum \frac{(O - E)^2}{E}$$

- Expected value = (Row Total x Column total) / Grand total
- Expected frequency of each cell is calculated as
  - Boys - Overweight = (100x50)/200 = 25
  - Boys - Not Overweight = (100x150)/200 = 75
  - Girls - Overweight = (100x50)/200 = 25
  - Girls - Not Overweight = (100x150)/200 = 75
- Applying the obtained values in the above formula
  - Chi Square = $(30-25)^2/25 + (70-75)^2/75 + (20-25)^2/25 + (80-75)^2/75$
  - Chi Square = 1+0.33+1+0.33
  - Chi Square = 2.66
- Degree of freedom/df= (c-1) x (r-1)
  - df= (2-1) x (2-1)
  - df= 1
- At df=1 and p=0.05 , $X^2 = 3.84$

Yourwish

- Interpretation
  - Since 2.66 < 3.84 → Not significant
  - There is no significant association between gender and overweight status in this class

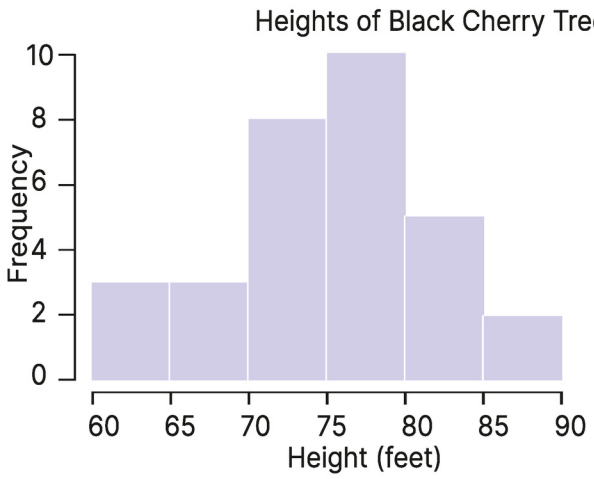
Test	Definition
Independent sample t-test	Comparing two independent groups with parametric (quantitative) data
Kolmogorov smirnov analysis	For assessment of data distribution to check for normal distribution in data
Wilcoxon rank sum test	Used to compare independent groups with ordinal (non-parametric data)
Chi-square test	Used to compare two or may be more groups with non-parametric (qualitative) data
Kaplan Meier curve	Used for survival analysis
Kappa statistical analysis	To compare levels of agreement between independent groups
Z test	Parametric test used in place of t test if N>30
Fisher's exact test	Non-parametric test used in place of chi square test if N<30

GRAPHICAL REPRESENTATION OF DATA

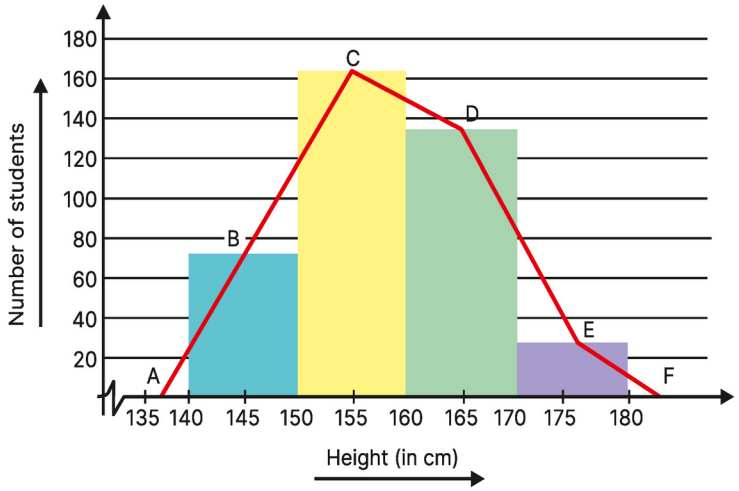
NEETPG 2023, FMGE 2022, INICET 2023 00.28.01

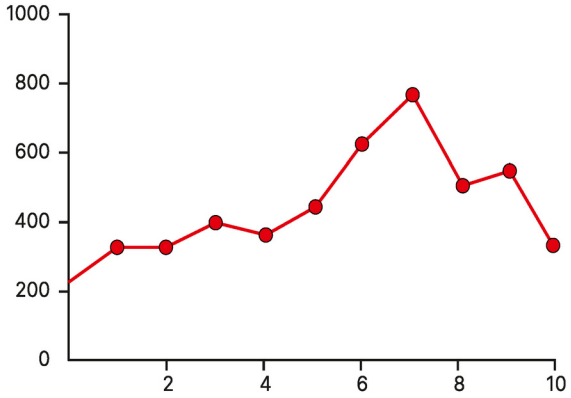
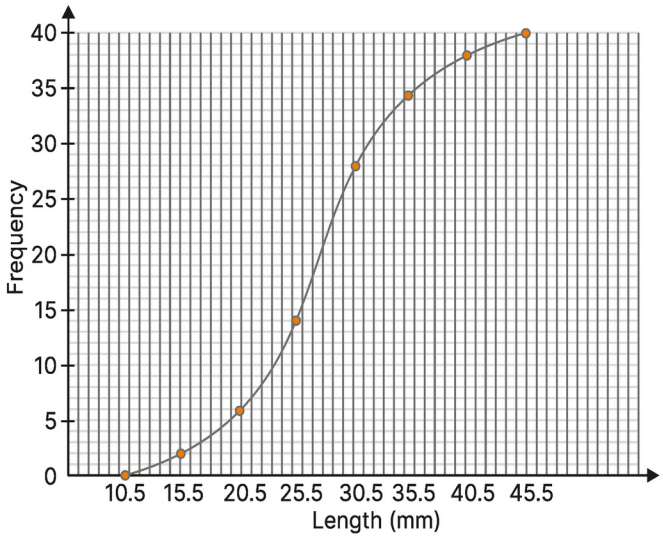
Quantitative	Qualitative
• Histogram • Frequency polygon • Line diagram • Cumulative frequency curve (OGIVE) • Scatter diagram	• Barr graph → Most versatile • Pie chart • Pictogram • Spot maps

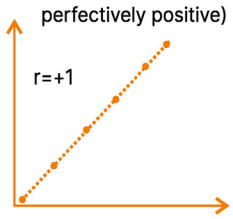
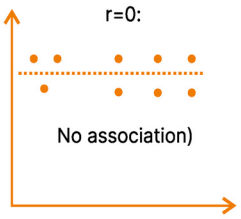
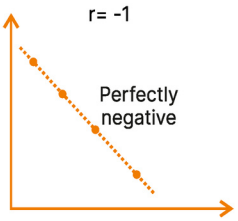
Graphical Representation of Quantitative Variable

Graphical representation	Description
Histogram	• Frequency of quantitative/continuous variable • The columns are joined 

Yourwish

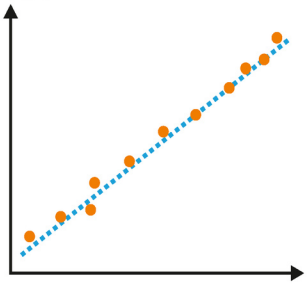
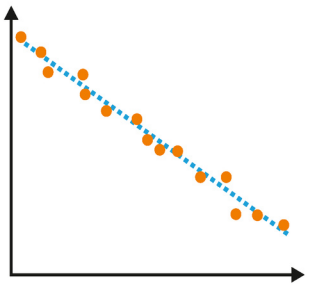
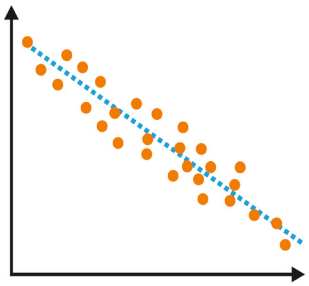
Frequency polygon	• Obtained by joining the midpoints of columns with a straight line over the Histogram
	• Frequency curve
	  ○ If number of observations is large and the class intervals are reduced → frequency polygon loses its angulations → and will closely approximate a curve
	  ○ A/K/A smoothed frequency polygon → due to loss of angulation
	

Line diagram	• Represents the trend/ incidence of a disease over time 
Cumulative frequency curve (OGIVE)	• Constant increase → No dip • E.g Recurrent TB cases 

Scatter diagram	• Depicts the strength or direction of relationship between two continuous variable • Depicts association and direction • Represented by Pearson's correlation coefficient → r ○ r = -1<0<+1 ○ If r = +1.64 → researcher calculated wrong value		
	r = + 1 • Perfectly positive association 	r = 0 • No association 	r = - 1 • Perfectly negative association 

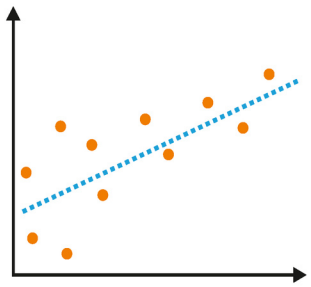
Correlation

- Indicates the relationship between two sets of data

Positive Correlation	Negative Correlation
r = + 1 → Perfectly positive	r = - 1 → Perfectly negative
r ≥ 0.7 → Strong positive  STRONG POSITIVE CORRELATION	r ≥ -0.7 → Strong negative  STRONG NEGATIVE CORRELATION
r = 0.4 to 0.6 → Moderate positive	r = -0.4 to -0.6 → Moderate negative  MODERATE NEGATIVE CORRELATION

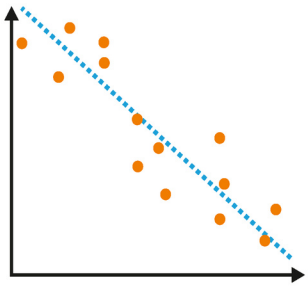
Yourwish

r ≤ 0.3 → Weak positive



WEAK POSITIVE CORRELATION

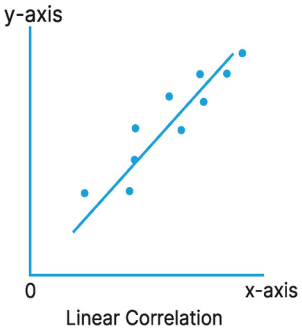
r ≤ -0.3 → Weak negative



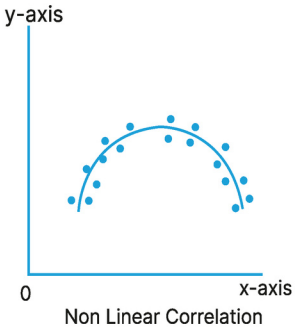
WEAK NEGATIVE CORRELATION

- Linear correlation
  - Rate of change between two variables is constant
  - Represented by Pearson's correlation coefficient
  - E.g → hours worked vs income earned

- Non-Linear correlation
  - Rate of change between two variables is not constant
  - Represented by Spearman correlation coefficient
  - E.g → dose of drug vs its effect



Linear Correlation



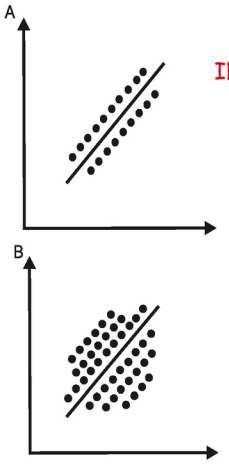
Non Linear Correlation

Q.Best chart to represent the incidence of disease over a period of time? FMGE 2021

A. Histogram
B. Bar chart
C. Scatter plot
D. Line diagram

Answer: D.Line diagram

Q.The bone marrow density, along with the gestational age, is plotted from two different studies. Which of the following is true for the relation between bone marrow density and gestational age? INICET 2019



A. Strength of correlation is the same in A and B
B. Strength of the correlation is more in A than B
C. Strength of the variation is more in B than A
D. Variation in variables is more with A than B

Answer: B. Strength of the correlation is more in A than B

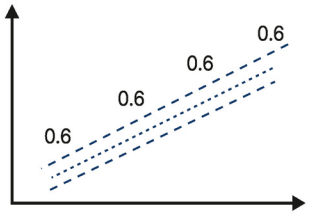
Q. A homogeneous sample of 4 groups was taken as shown below. The height and weight of each group had a correlation coefficient of 0.6. What will be the total coefficient of correlation of the whole group? INICET 2021

A. Equal to 0.6
B. Less than 0.6

Yourwish

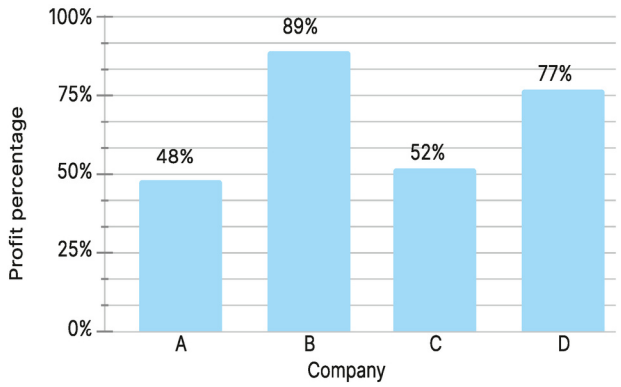
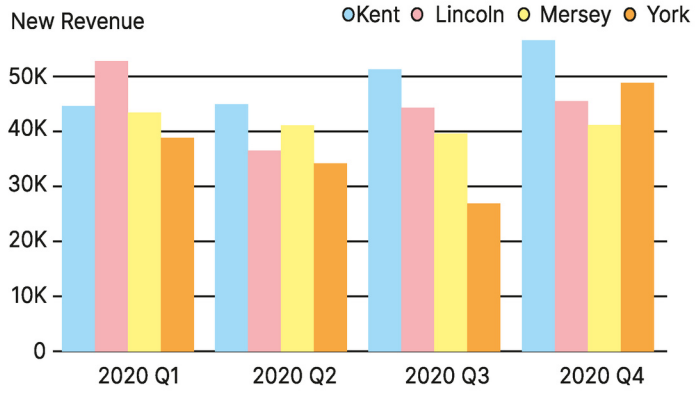
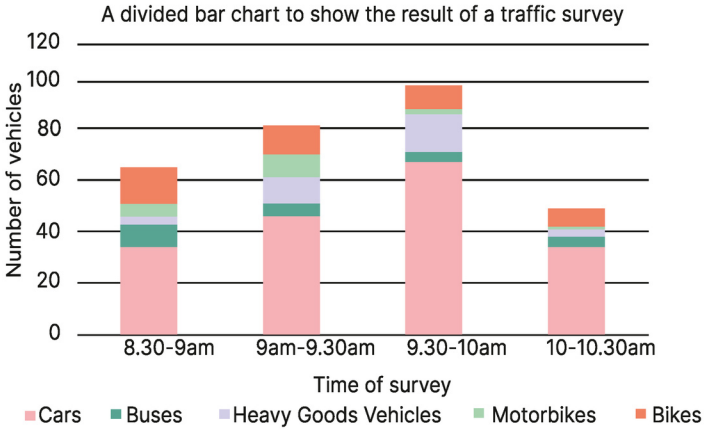
C. More than 0.6
D. Skewed coefficient of 0.6

Answer: A. Equal to 0.6

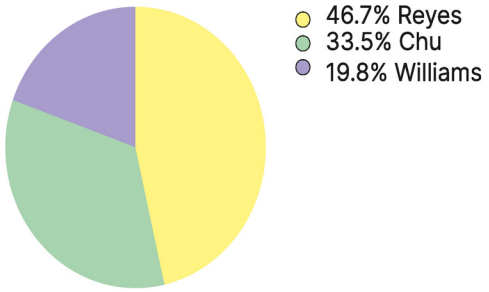


Graphical Representation of Qualitative Variable

Graphical representation	Description

Bar graph	• Frequency of qualitative/discrete variable
	• The columns are distantly placed
	• Types of bar graphs
	  ○ Simple bar
	
	  ○ Multiple bar
	
	  ○ Component bar
	

Yourwish

Pie chart	• Represent percentage and proportion • Graph used to represent a balanced diet of a meal 
Pictogram	• Represented by picture • Used for easy understanding of illiterate people 

Q. During your rural posting, you are asked to educate a small, uneducated village about the importance of routine antenatal care for pregnant mothers. You want to deliver some statistical data to emphasize its importance. Which of the following is the best way to do so?

A. Pictogram

B. Line diagram

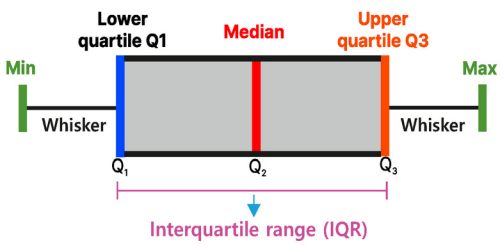
C. Histogram

D. Frequency polygon

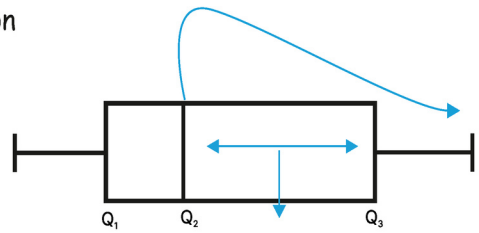
Answer: A. Pictogram

Other methods of graphical representation of the data

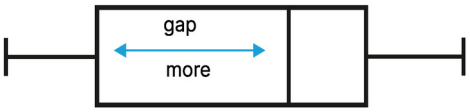
Box and whisker plot



- It represents the quartile
  - Lower Quartile - Q_1
  - Median - Q_2
  - Upper Quartile - Q_3
  - Interquartile range (IQR) = Q_1-Q_3
- Commences both the Normal distribution and the Skewed distribution
- Normal Distribution
  - Box on either side of the median are equal
  - Tails are of equal length on both sides
- Skewed distribution

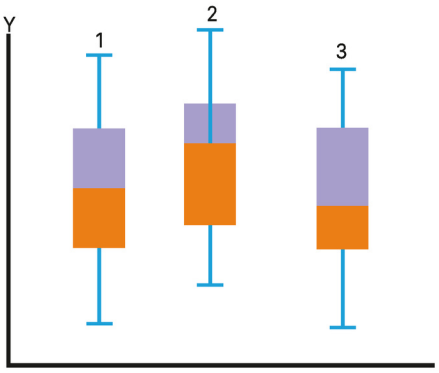


- Right-sided skewness
  → Q_2-Q_3 gap is more
- Left-sided skewness
  → Q_1-Q_2 gap is more



Q. Identify the correct sequence of inference from the box plots shown in the figure

a.1-Normal distribution, 2- positive skewed, 3-Negative skewed
b.1-Normal distribution, 2-Negative skewed, 3-positive skewed
c.1-Negative skewed, 2-positive skewed, 3-Normal distribution
d.1-positive skewed, 2-Normal distribution, 3-Negative skewed



Answer: b.1-Normal distribution , 2-Negative skewed , 3-positive skewed

Venn Diagram

- A visual tool using overlapping circles



Steam And Leaf Plot

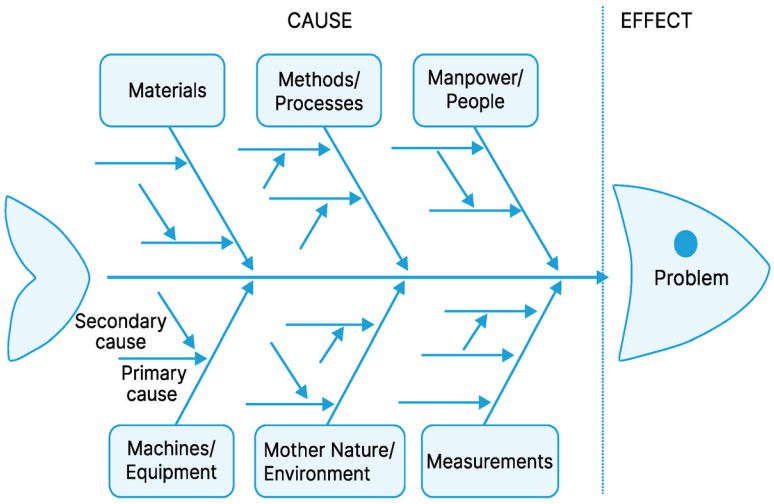
- Splitting into a stem and a leaf

Stem and Leaf Plot

4	1
5	2 7 8
6	5 6
7	0 5 8 8 8
8	0 0
9	5

Fish Bone Diagram

- A/K/A Ishikawa diagram
- Used for identifying, exploring, and displaying the root causes of a particular problem
- Used in operational research



Q. Which of the following best helps assess the quality of healthcare provided?
A.Multiple logistic regression
B.Bar graph

NEETPG 2023

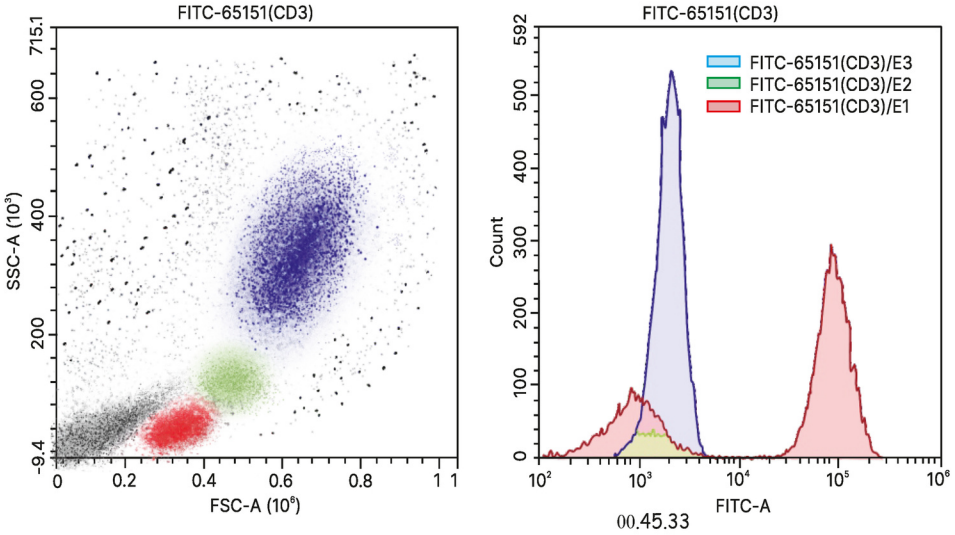
Yourwish

C.Scattergram
D.Ishikawa diagram / Fishbone diagram

Answer: d.Ishikawa diagram / Fish bone diagram

Q. The graphical representation for flow cytometry analysis is done by which of the following? INICET 2021

A.Bar diagram, dot plot
B.Line diagram, dot plot
C.Histogram, dot plot
D.Pie chart, dot plot



Answer: C. Histogram , dot plot

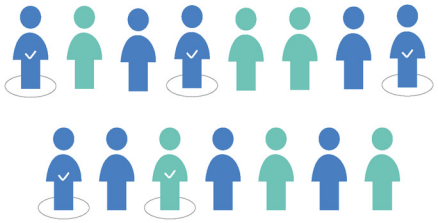
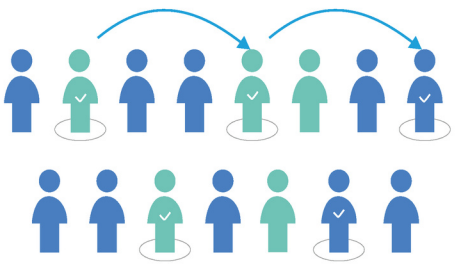
- Dot plot → represent multiple parameters
- Histogram → represents single parameters

NEETPG 2024, FMGE 2021

SAMPLING

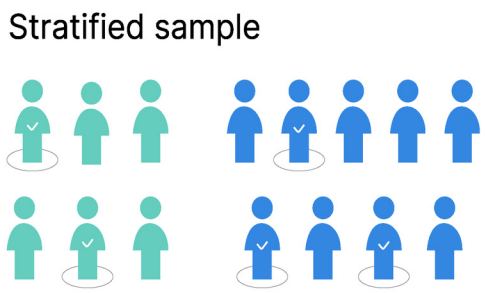
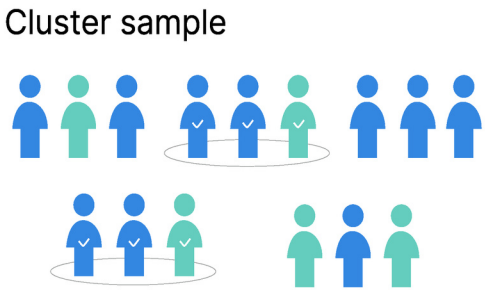
- It is of two types:
  - Random sampling/probability sampling
    → Better than non-random sampling because everyone has an equal chance of being selected
  - Non - Random / Non-probability sampling

RANDOM SAMPLING

Types	Description
Simple random Simple random sample 	• Small , homogenous , readily available population with sampling frame available • E.g De addiction practice in students of a medical college
Systematic random Systematic sample 	• Large , scattered and heterogenous population • Sampling interval/ fraction = kth interval ○ Every n^{th} or k^{th} person is selected • Disadvantages → do not adequately represent the entire population

Yourwish

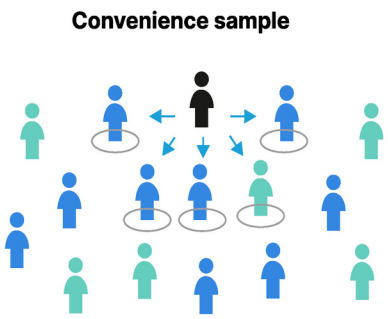
Yourwish

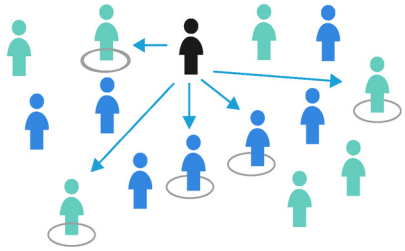
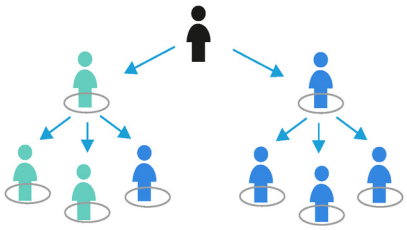
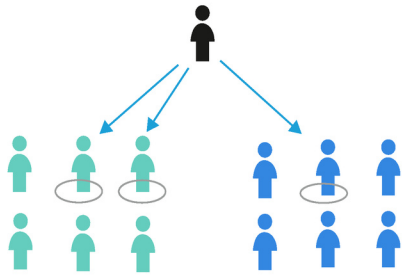
Stratified random 	• Most efficient type • Heterogenous population converted to Homogenous population
Cluster random 	• It is the easiest type to perform • Disadvantages → more errors can occur • Used in Immunization coverage ○ 30 cluster from which 7 children of 12-23months are selected • Dividing the specific population of interest into geographically distinct groups or clusters such as neighborhoods or families • Sampling units are clusters • Clusters → Randomly selected group • Population like → Blocks , Wards , Villages , Slums , Schools , Mohallas • A/K/A area sampling

Multi-stage sampling	• Selection is done in stages using different sampling methods at each stage
	• Used to study a large population efficiently
	  ○ Stage 1: select district randomly
	  ○ Stage 2: select villages within district
	  ○ Stage 3: select households within villages
	• E.g NFHS, DLHS

Multiphase sampling	• Sampling techniques in which different information is collected in successive phases from the same sample
	• Saves time and resources
	  ○ Phase 1: screen all households for smoking habits
	  ○ Phase 2: From the smokers identified, collect details on tobacco use and health effects

Non - Random Sampling

Convenience sample	

Purposive sample	**Purposive sample** 
Snow ball sample	• Used for hidden population ○ Commercial sex workers , Homeless people **Snowball sample** 
Quota sample	**Quota sample** 

Q. A Pharmacist selects medicine from three categories: plant-based, animal-derived, and synthetic. What method of sampling is being used? NEETPG 2024

A. Simple random
B. Stratified random sampling
C. Systemic sampling
D. Cluster sampling

Answer: b.Stratified random sampling

Q. The urban area of Delhi has 4000 people 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? NEETPG 2021

A.Cluster random sampling
B.Stratified random sampling
C. Simple random sampling
D.Systematic random sampling

Answer: **b**. Stratified random sampling

PROBABILITY AND ODDS

00:53:55

- Probability → Chance of an event to occur
  - Represented by p
- Odds → chance of an event not to occur
  - Represented by 1-p

Rule of multiplication	Rule of addition
• Probability of two or more statistically independent events occurring together • Key words: And, Both	• Probability of any one of several particular events occurring is the sum of their individual probabilities ○ Provided, events are mutually exclusive → events cannot occur at the same time • Key words: Or, Either
P (A and B) = P(A) X P(B)	P(A or B) = P(A) + P(B)
E.g chance of Blood group A =20% chance of DM =33% chance of a person with blood group A and having DM =0.2x0.3 = 0.6(60%)	E.g chance of Blood group A =20% chance of Blood group B =30% Probability of two people with Blood group A or B =0.2+0.3 = 0.5

Q. Chance of getting a genetic disease 'y' trait by the affected parents to children is 0.16. The couple plans to have two children. Probability of both children having 'y' trait?

A. Zero
B. 0.16
C. 0.32
D. 0.0256

Answer: D. 0.0256

- Rule of multiplication
- 0.16x0.16 → 0.0256

Q. For Mrs.Rekha, the probability of having a baby of birth weight <2500g is 0.50, and having a birth weight of 2500-2999g is 0.20. Therfore the probability for Mrs.Rekha to have a baby of birth weight <3kg is:

A. 0.30
B. 0.70
C. 0.10
D. 1.0

Answer: D. 0.70

- Rule of addition
- 0.50+0.20 → 0.70

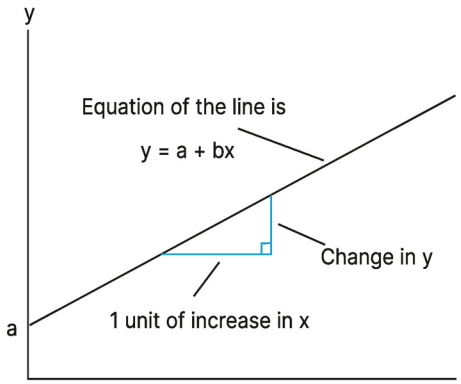
REGRESSION

00.57.31

- Unitary change in one variable being predicted from another variable — INICET 2019, NEETPG 2020
- Functional linear relationship between a dependent variable and one or more independent variable

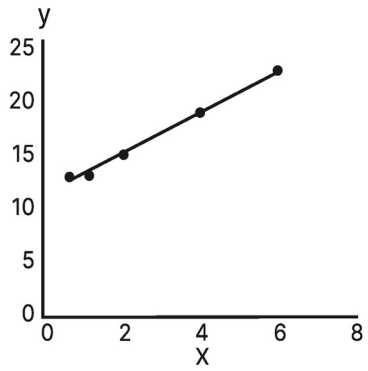
Yourwish

- y = a + bx
  - y = dependent variable
  - x = 1 or more independent variable
  - a = intercept representing the value of y when x is 0
  - b = slope indicating the change in y per unit change in x



Q. Look at the image below and select the linear regression equation corresponding to the graph: INICET 2019

A. y = 10-x
B. x = 10+y
C. y = 11 +2x
D. x = 11+2y



Answer: **C.** y = 11 +2x

Q. Which statistical method is used to predict one variable based on another? NEETPG 2020

A. Coefficient of correlation
B. Coefficient of regression
C. Coefficient of variation
D. Coefficient of determination

Answer: b.Coefficient of regression

- Coefficient of regression
  - Unitary change in one variable predicted from other
- Coefficient of correlation
  - To identify where two variables are not associated
- Coefficient of determination
  - r^2
  - Expressed as percentage
  - Proportion of variance in a dependent variable predicted from an independent variable

TYPES OF REGRESSION EQUATIONS

- Linear regression
  - Describes the effect of one independent variable on a dependent variable
  - y = a + bx
- Multiple linear regression
  - Describes the effect of two or more independent variables on a dependent variable
  - $y = a + bx_1 + bx_2$
- Non linear regression
  - Complex mathematical forms, including logarithmic functions

Yourwish

Yourwish

- Simple curvilinear regression : $y = a + bx_1^2$
- Multiple curvilinear regression : $y = a + bx_1^2 + bx_2^3$

- Logistic regression
  - Describes the effect of multiple independent (Qualitative, Quantitative, or Mixed) variables on a dichotomous qualitative variable
- Regression coefficient
  - Average change in the dependent variable for each unit of the independent variable

Q. An investigator finds out that 5 independent factors influence the occurrence of a disease. Comparison of multiple factors responsible for a disease can be assessed by:

A. Multiple linear regression
B. ANOVA
C. Chi-square test
D. Multiple logistic regression

Answer: d.Multiple logistic regression

- Outcome variable for Multiple logistic regression → Qualitative
- Outcome variable for linear/non-linear regression → Quantitative

Q. All of the following may be used to find the normalcy of data except:

A. Plot histogram
B. Mantel-Haenszel test
C. Box whisker
D. Shapiro-Wilk test

Answer: B. Mantel-Haenszel test

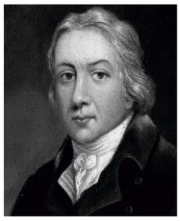
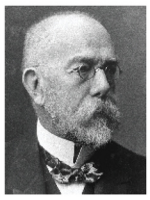
Yourwish

26. HISTORY OF PUBLIC HEALTH, ENTOMOLOGY, INTERNATIONAL HEALTH

HISTORY OF PUBLIC HEALTH

00:00:14

Scientists And Their Contribution

Scientists	Contribution
John snow 	• Father of epidemiology • Father of modern epidemiology • Worked during Cholera epidemic in London using spot maps which showed the local distribution of diseases • Natural experiment study design
Edward Jenner 	• Discovered the Smallpox vaccine • Coined the term vaccination
Robert koch 	• Koch postulates • Discovered Anthrax bacilli and Vibrio cholera
Louis pasteur 	• Germ theory of disease • Coined the term vaccine • Discovered anthrax and rabies vaccine
James Lind 	• Use of citrus fruits in the prevention of scurvy ○ First human experiment

Walter Reed 	• Showed that Yellow fever is transmitted by the Aedes mosquito
Ronald Ross	• Showed that malaria is transmitted by the anopheles mosquito
Alfred Grotjahn	• Defined social pathology ○ Study of social factors leading to the occurrence of disease
Cea Winslow	• Defined public health
Edwin Chadwick	• Great sanitary awakening in UK, Enactment of the Public Health Act,1848
Fracastorois	• Founder of epidemiology • Explained the cause of epidemic • The mode of transmission of syphilis is through sexual route • Theory of contagion
David Morley	• Gave the growth chart

Q. Pair the following scientists with their respective discoveries INICET 2022

1. Walter Reed	a. Prevention of scurvy by citrus fruits
2. Edward Jenner	b. Yellow fever
3. James Lind	c. Smallpox vaccination

a. 1-a , 2-b , 3-c
b. 1-b , 2-a , 3-c
c. 1-c , 2-b , 3-a
d. 1-b , 2-c , 3-a

Ans: d

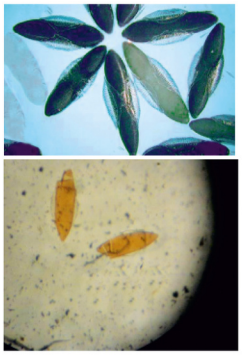
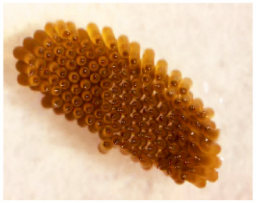
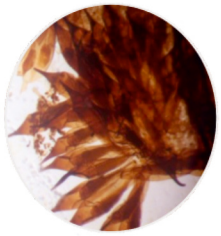
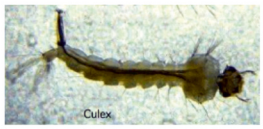
NEET PG 2025
FMGE Jan 2025
INI CET May 2022

ENTOMOLOGY

00:02:45

	Anopheles	Aedes	Culex	Mansonia
Breeding zone	Clean stagnant water(overhead tanks)	Artificially collected water	Dirty, polluted water, paddy fields, long standing water collections	Large water bodies under aquatic plants

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Adult (resting position)	Inclined at 45 degree to skin, head is down, spotted wings 	Hunchback with white stripes on the body 	Hunchback with no white stripes on body, short body 	Squatting position, large body and legs 
Eggs	Single, boat shapes with lateral floats 	Single, cigar-shaped 	Cluster, 100-250 eggs in one raft/cluster 	Cluster, star-shaped 
Larvae	Rest parallel to water surface, no siphon tube 	Siphon tube (shorter) is present inclined at an angle to water surface 	Siphon tube (long) present, inclined at an angle to water surface 	Attached to roots of aquatic plants
Bite	Relatively less painful	Painful	Stingy and burning	Painless
Biting time	Morning and evening (dawn and dusk)	2 hrs after sunrise and 2 hrs before sunset	Nocturnal (midnight)	Morning and evening (dawn and dusk)
Flight range	2-3km	100-200meters	11-13km	2-3km
Habitat	Exophilic (outside houses)	Endophilic (inside houses)	Exophilic (at daytime) Endophilic (at nighttime)	Exophilic

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Transmit	Malaria	Dengue , Chikungunya , Yellow fever , Zika virus , Rift Valley fever	Japanese encephalitis, Bancroftian filariasis, and West Nile fever	Malayan/ Brugian filariasis

Important Information

- Airport and seaport surrounding 400m should be free from breeding places of mosquitoes

Q. Water from a stagnant drain is collected in a container and observed for breeding mosquitoes. The image of a larva is shown below. Identify the species of mosquito?

a. Anopheles
b. Aedes
c. Culex
d. Mansonia



Ans: c

Q. The insect shown below is a vector for which disease:

a. Chikungunya
b. Visceral Leishmaniasis
c. Malayan filariasis
d. Japanese encephalitis



Ans: d

Q. Match the following question:

Vector	Disease
1. Black Fly 2. Sandfly 3. Rat flea 4. Louse	a. Visceral Leishmaniasis b. Bubonic plague c. Epimedic Typhus d. Onchocerciasis

a. 1-a , 2-b , 3-c , 4-d
b. 1-a , 2-d , 3-c , 4-b
c. 1-d , 2-a , 3-c , 3-b
d. 1-d , 2-a , 3-b , 4-c

Ans: d

Yourwish

Vectors And Disease Transmitted

Vector	Disease transmitted

Sandfly 	• Leishmaniasis
	  ○ Visceral / Kala azar
	  ○ Cutaneous / Oriental sore
	• Sandfly fever
	• Oraya fever

Hosefly (Musca domestica) 	• Acute gastroenteritis • Polio • Trachoma • Yaws • Anthrax
Tse Tse fly (Glossina palpates) 	• African sleeping sickness / African trypanosomiasis
Reduvid 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) • Hymenolepis diminuta
Trombiculid mite (Head visible) 	• Scrub typhus
Itch mite	• Scabies

Hard tick (Scutum present)	Soft tick (No visible head)

• Tick typhus (RMSF)
• Tularemia
• Tick fever
• Tick paralysis
• KFD
• Human Babesiosis
• Viral encephalitis

	• Q fever
	  ○ No vector in humans.
	  ○ Transmitted by inhalation of dust or contamination of aerosols by Coxiella burnetii and by consuming raw dairy products
	• Relapsing fever
	

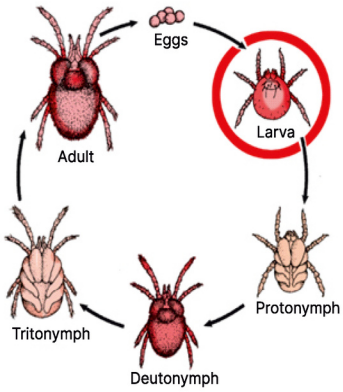
ONE LINERS

- Scrub typhus
  - Transmitted by the Trombiculid mite
  - Agent - Orientia tsutsugamushi
  - Adult form → does not transmit the disease

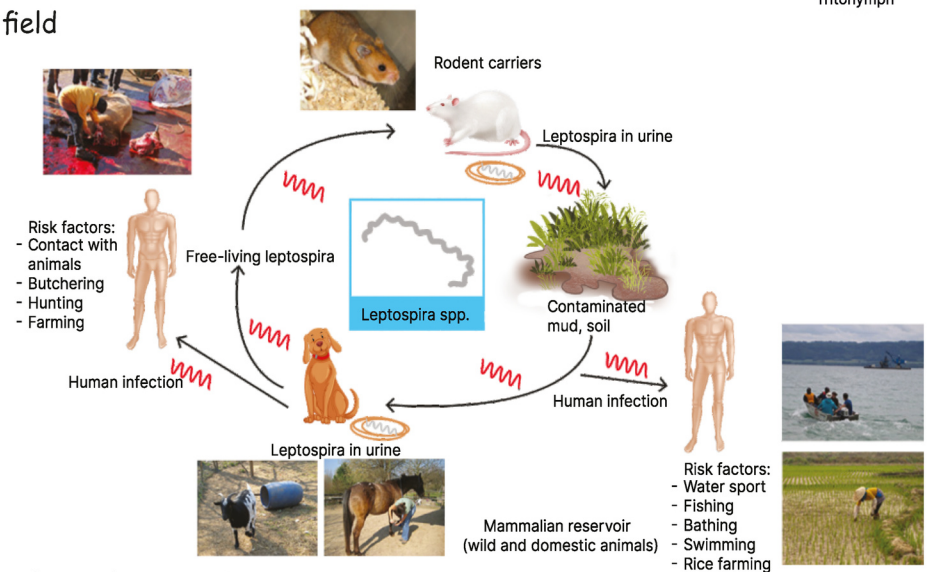
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→ Identified by having 4 pairs of legs
→ A/k/a Chiggerosis

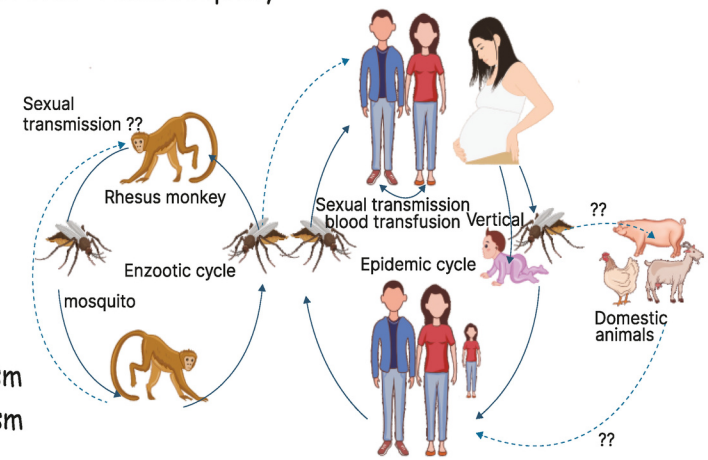
- Larvae form → transmit the disease
  → Identified by having 3 pairs of legs
  → A/k/a Chiggers



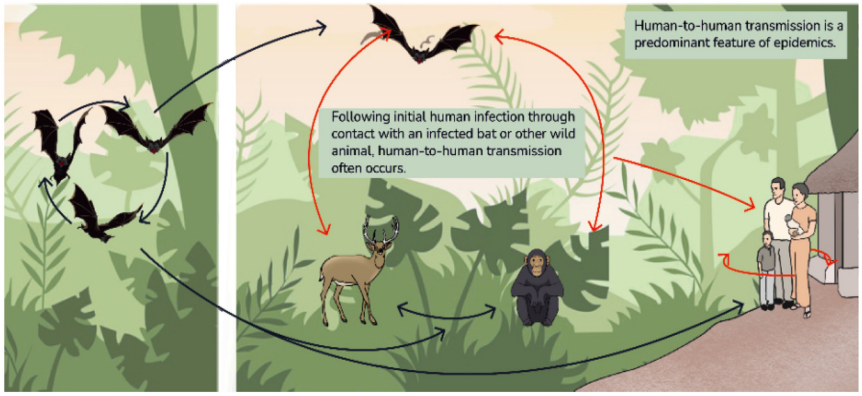
- Leptospirosis
  - Leptospira interrogans is transmitted in the urine of the rat in the mud
  - Rat, Rain, Rice field

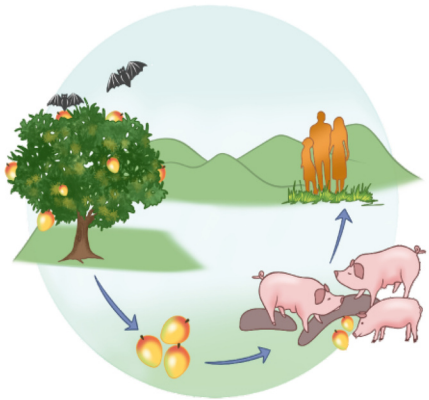


- Zika virus
  - Transmitted by the Aedes mosquito
  - Sexual transmission
  - Congenital transmission to the fetus → Microcephaly



- Ebola virus → Type A Bioterrorism
- Nipah virus → Type C Bioterrorism





Yourwish

Yourwish

INSECTICIDES

Sandfly	• Pyrethrum • DDT
Housefly	• Environmental control • Source reduction • Safe water supply • Sanitation
Louse	• 0.5% Malathion (Resistant to DDT)
Fleas	• 10% DDT dust (cheapest and widely used) • Carbaryl • Diazinon
Itch mite	• 25% Benzyl benzoate

Q. Match the following INICET 2025

Vector / Agent	Disease caused
1. Louse	a. Epidemic typhus
2.Tick	b. Rocky Mountain Spotted fever (RMSF)
3. Mite	c. Scrub typhus
4. Poxvirus	d. Molluscum contagiosum

a. 1-A , 2-B , 3-C , 4-D
b. 1-B , 2-A , 3-C , 4-D
c. 1-D , 2-B , 3-C , 4-A
d. 1-C , 2-B , 3-A , 4-D

Ans: a

Q. Which of the following vectors is responsible for transmitting Orientia tsutsugamushi ? FMGE 2024
a. Mite
b. Tick
c. Louse
d. Flea

Ans: a

Q. What is the vector that causes the occurrence of buboes in the community? NEETPG 2021
a. Xenopsylla cheopis
b. Phlebotomus argentipes
c. Ixodes tick
d. Female Anopheles mosquito

Ans: a.
- Xenopsylla cheopis is a/k/a Rat flea

Yourwish

Q. Disease transmitted by Sandfly includes all except? FMGE 2019

a. Kala azar
b. Oriental sore
c. Chagas disease
d. Cutaneous leishmaniasis

Ans: c

Q. Paris green dust is commonly used to kill which of the following? FMGE 2024

a. Housefly
b. Anopheles adult
c. Anopheles larvae
d. Bedbugs

Ans: c

Q. Zika virus is transmitted by? FMGE 2020

a. Aedes aegypti
b. Culex
c. Anopheles
d. Phlebotomus papatasi

Ans: a

INTERNATIONAL HEALTH

00:21:52

International health	Headquarters	Function

WHO(World Health Organization)	Geneva	• WHO was formed on 7th April 1948
		  ○ Celebrated as World Health Day
		• Administrative Body: World Health Assembly
		• There are 6 WHO-specific regions
		  ○ India belongs to southeast asian region → Headquarters → Delhi

UNDP (United Nations Development Programme)	New York	• Part of the UN • Framed SDG

UN(United Nation)	New York	• Framed SDG and HDI
World Bank	Washington	• Assisting every country financially
UNFPA(United Nations Fund for Population Activity)	New York	• Population control
UNICEF	New York	• GOBI FFF ○ G - Growth monitoring ○ O - ORS ○ B - Breastfeeding ○ I - Immunization ○ F - Female Literacy ○ F - Family planning ○ F - Food supplement • ICDS • Child health • Applied Nutrition Programme
FAO(Food and Agricultural Organization)	Rome	• Food, forest fisheries, nutrition

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ILO(International Labour Organization)	Geneva	• Works for Labour
USAID	Washington	• Family planning, TB, and HIV programme • Active participation in Swatch Bharat Abhiyan
UNAIDS	Geneva	
International Red Cross	Geneva	• War victims, Disaster, and First aid
Suraksha clinic		• Initiative under NACP to promote sexual health
The Rockefeller Foundation	New York	• Hookworm control- Madras • All India Institute of Hygiene and Public Health - Kolkata • Rural health • Toilets • Sanitation
Ford Foundation	New York	• Family planning, Construction of toilets and sanitation, Rural health, Drainage system (Calcutta) • NIHAE: National Institute of Health Administration and Education (Delhi)

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Yourwish

Sida(Swedish International Development Cooperation Agency)	Sweden	• Assisting TB Programme
Care	Geneva	• Disaster relief , Food security , Health care access , Education
DANIDA(Danish International Development Agency)		• Controls Blindness Programme
Colombo plan		• AIIMS in Delhi • Cobalt Radiotherapy units in the medical college
WFP(World Food Programme)		• Supplied Indiamix ○ 40% Maize, 40% Wheat, and 20%Full fat soya bean fortified by micronutrients (Iron, Calcium, Vitamin A) distributed through ICDS project

Yourwish

Q. Cobalt therapy units are set up in? NEETPG 2023

a. Rockefeller
b. DANIDA
c. SIDA
d. Colombo plan

Ans: d

Q. Which of the following agencies provides seed and manure in the Applied Nutrition Program?

a. CARE
b. UNICEF
c. WHO
d. UNDP

Ans: b

Q. Which of the following health programs is supported by DANIDA?

a. TB
b. Blindness
c. Malaria
d. HIV

Ans: b

Q.Which organization is not involved in providing funding for India's national TB program?

a. Government of India
b. World Bank
c. Global Fund
d. UNICEF

Ans: d

Q.What is the maximum population size observed in relation to reproductive programs?

a. World Bank
b. UNFPA
c. UNESCO
d. UNICEF

Ans: b

Q. In India, which organization is responsible for promoting health awareness? FMGE 2021

a. Central Bureau of Health Intelligence
b. Indian council for medical Research
c. Central Health Education Bureau
d. National Health Library

Ans: c

- Central Bureau of Health Intelligence → Nodal body for timely dissemination of health-related data
- Indian Council for Medical Research → Research purpose
- National Health Library → Resource for medical professionals

Q. The full form of the Urban HEART programme is? FMGE 2020

a. Urban Health equity assessment and response technique
b. Urban Health evaluation assessment and response tool
c. Urban Health equity assessment and response tool
d. Urban Health evaluation, assessment, and response technique

Ans: c

SUSTAINABLE DEVELOPMENT GOALS

00:31:37

- Framed by UN and UNDP
- 17 Goals, 169 targets
- Direct health-related goals
  - Goal no 3 → have 13 targets
- Indirect Health-related goals
  - Goal no 1 → No Poverty
  - Goal no 2 → Zero hunger
  - Goal no 4 → Quality Education
  - Goal no 5 → Gender equality
  - Goal no 6 → Clean water and sanitation



Q. As per the Sustainable Development Goals, the target for MMR is to achieve maternal death of?

a. <70 /lac live birth
b. <100 /lac live birth
c. <7/1000 live birth
d. <10/1000 live birth

Ans: a

- Other goals
  - Reduce NMR to 12/1000 live births
  - Reduce U5MR to 25/1000 live births
  - Reduce premature mortality due to NCDs to 33%

Q. Under which health organization are Sustainable Development Goals (SDGs) implemented? FMGE 2021

a. United Nations Development Program
b. United Nations Children's Funds
c. United Nations Educational, Scientific, and Cultural Organization
d. World Health Organization

Ans: a

Yourwish

BIOTERRORISM AGENTS

00:33:37

Category	A	B	C
Definition	Pose the highest risk to national security because they • Can be easily disseminated or transmitted from person to person • Result in high mortality rates Have potential to cause public panic and social disruption • Require special preparedness action	Pose the second-highest risk because they • Are moderately easy to disseminate • Result in low mortality rates Requires enhancement of diagnostic and surveillance capability	Emerging pathogens that could be engineered for mass dissemination because they • Are available • Are easily produced and disseminated Have potential for high mortality rates
Examples	• Anthrax • Botulism • Plague • Smallpox • Tularemia • Viral hemorrhagic fever (e.g., Ebola, Marburg)	• West Nile virus • Caliciviruses • Hepatitis A • Ricin toxin • Salmonella • Diarrheagenic E.coli • Brucellosis • Psittacosis • Typhus fever	• Nipah virus • Hanta virus

DISEASE UNDER INTERNATIONAL HEALTH REGULATIONS

- Chance of becoming Public Health Emergency of International Concern (PHEIC):
  - Cholera
  - Plague
  - Yellow fever
  - Wild polio
  - SARS
  - Smallpox
  - Human influenza

DISEASE UNDER INTERNATIONAL SURVEILLANCE BY WHO (REPORTED WITHIN 24 HOURS)

- Louse-borne typhus fever
- Relapsing fever
- Polio
- Human influenza
- SARS
- Smallpox
- Ebola

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Yourwish

TROPICAL DISEASE TARGETED BY WHO FOR RESEARCH AND TRAINING

- Malaria
- Schistosomiasis
- Trypanosomiasis
- Filariasis
- Leishmaniasis
- Leprosy

Q. Which disease is considered a notifiable condition under the World Health Organization? FMGE 2019

a. Yellow fever
b. HIV
c. Malaria
d. All of the above

Ans: a

PYQs

00:36:06

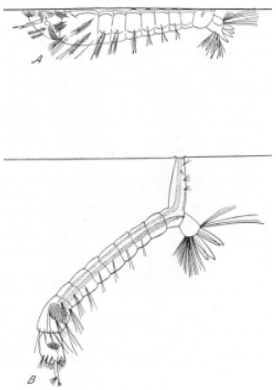
Q.Which mosquito larva has no siphon tube and rests parallel to the water surface? NEET PG 2025

a. Anopheles
b. Culex
c. Aedes
d. Mansonia

Ans: a

FMGE Jan 2025

Q. Identify A and B in the image of the mosquito larvae given?



a. A-Culex , B-Aedes
b. A-Anopheles , B -Culex
c. A-Culex , B-Anopheles
d. A-Anopheles , B-Mansonia

Ans: b