Name: ________________________________

Subject: ______________________________ PSM

Website: http://mbbshelp.com
Website: http://www.youtube.com/mbbshelp
Website: http://www.facebook.com/mbbshelp.com
SCREENING

Gold std

2x2 Table

TP  FP

FN  TN

2 columns x 2 rows.

DEGREE OF FREEDOM: 
-factor on x variable depend: 

\[
\begin{bmatrix} C & -1 \\ R & -1 \end{bmatrix}
\]

\[3 \times 4 \text{ Table} = 6\]

FN is more DANGEROUS than FP.

SENSITIVITY = \( \frac{TP}{TP + FN} \)

SPECIFICITY = \( \frac{TN}{TN + FP} \)

PPV = \( \frac{TP}{TP + FP} \)

NPV = \( \frac{TN}{TN + FN} \)

→ For a test to be screening test, sensitivity should be high.

→ More sensitivity = Less False Negative.

→ Person labelled as Diseased on the basis of Gold Std.
Sensitivity & Specificity are Column Parallels
PPV & NPV are Row Parallels

SN ~ TP
SP ~ TN

Probability
PPV = have disease
NPV = Don't have disease

PRACTICAL APPROACH TO QUESTIONS OF SCREENING

1) Draw 2x2 Table *Label properly
2) Write the total population
   * If Total Population is not given then we most commonly assume it as 100
3) Write the column 1 Total
   This can be obtained from 3 Sources
   a) those who are true & cases
   b) those who are labelled as diseased
   c) those who contribute to prevalence
4) Fill the 4 cells & apply the formula.
Baye's Theorem

\[
PPV = \frac{SN \times PHeN}{SN \times PHeN + (1 - SP)(1 - P)}
\]

NPV = f from CRs.

\[
S.T. \\
\begin{array}{cc}
\uparrow & \\
\hline
a & b \\
\downarrow & c \\
\end{array} \quad Q.S. \\
\begin{array}{cc}
\uparrow & \\
\hline
\downarrow & \quad \begin{array}{cc}
S.T. & \uparrow \\
\hline
a & e \\
b & d \\
\end{array}
\end{array}
\]

S.T. = screening Test
Q.S. = gold std.

NORMAL

DISEASED

To decide best cut off we draw ROC
Receiver Operator Curve

Idealistic Point

$S_N = 1$
$1 - Sp = 0$
$Sp = 1$

$(0,0)$

Cutoff line nearest to idealistic point is "Best Cut Off"

Lead Time

Screening Time

A [Onset of Disease]

Earliest Point of Diagnosis 30yrs

Final Critical Point 30yrs

Improvement In Prognosis $B - C$ Screening Time

Early Diagnosis $B - D$ Lead Time

Early Rx

Ex. Rabies $\rightarrow$ No Rx

Pancreatic Cancer $\rightarrow$ Rapid progression

No Improvement in Prognosis
FINAL CRITICAL POINT:

Last point after there is no improvement in prognosis
ex. golden time in stroke CAD

PRINCIPLES OF SCREENING — WHO

<table>
<thead>
<tr>
<th>DISEASES</th>
<th>TESTS</th>
<th>Rx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imp. Public Health problem</td>
<td>cost-effective</td>
<td>cost effective</td>
</tr>
<tr>
<td>Latent/Asymptomatic phase</td>
<td>diagnostic Std must be</td>
<td>Definitive &amp;</td>
</tr>
<tr>
<td></td>
<td>present</td>
<td></td>
</tr>
</tbody>
</table>

Measles
Rubella
Rubies
Tetanus

No latent/ asymptomatic
No iceberg phenomenon

SCREENING DONE
Ca Colon
Ca Breast
Ca Cervix
Ca Prostate

NOT DONE
Ca Uterus
Ca Ovary
Ca Pancreas
Ca Testes
Ca Brain
Null Hypothesis from Discussion Paper

**p-value**

It refers to chance.

A p-value of 5% or 0.05 means only <5% of people were benefitted from the therapy due to chance.

**INTERPRETATIONS**

1) **PREDICTIVE VALUE = Diagnostic Power of a Test**

   Depend on:
   a) **Prevalence (max)**  not on Incidence
   b) \( SN \times Sp \)

2) **PRE·TEST PROBABILITY \( \Rightarrow \) Prevalence**

3) **POST·TEST PROBABILITY \( \Rightarrow \) Predictive Value**

4) \[ SN \propto \frac{1}{Sp} \]

   \[ PPV \propto \frac{1}{NPV} \]

5) \( \text{Prevalence} \uparrow \rightarrow \text{PPV} \uparrow \text{NPV} \downarrow \)

   \( \text{Prevalence} \downarrow \rightarrow \text{PPV} \downarrow \text{NPV} \uparrow \)

   \[ SN \text{ constant} \]

   \[ Sp \text{ constant} \]
5. \[ SN \uparrow \rightarrow TP \uparrow \rightarrow FP \uparrow \]
But revenue doesn’t happen.
\[ FP \uparrow \rightarrow SN \uparrow \rightarrow XXX \rightarrow MCA Book Editor \rightarrow Prevalence \]

6. ii. Screening is always done in High Risk Population.

<table>
<thead>
<tr>
<th>TEST IN SERIES</th>
<th>TEST IN PARALLEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>M_M_M_M_</td>
<td>M_M_M_M_</td>
</tr>
<tr>
<td>One after other</td>
<td>all at same time</td>
</tr>
<tr>
<td>Ex. Fever + Burning miction</td>
<td>LDL</td>
</tr>
<tr>
<td>Urine (\downarrow) Routine Microscopy</td>
<td>T4</td>
</tr>
<tr>
<td>Urine culture (\downarrow) sets</td>
<td>SN’ (\downarrow) PPV’ (\downarrow)</td>
</tr>
<tr>
<td>SP’ (\uparrow) NPV’ (\downarrow)</td>
<td>SN’ (\uparrow) PPV’ (\downarrow) (\frac{1}{SP'}) NPV’ (\uparrow)</td>
</tr>
</tbody>
</table>
HIV DIFFERENCE BTW SCREENING & DIAGNOSTIC TEST

TYPES OF SCREENING

1) People screened for own's benefit
2) OBJECTIVE: case control
3) eg.: Neonatal screening Pap smear

SCREENING TEST
1) High Sensitivity
2) For apparently healthy
3) Based on 1 criteria
4) Relatively cheaper
5) Not sufficient basis for treatment
6) Initiative from investigation
7) Applied to groups

PROSPECTIVE
1) People screened for others' benefit
2) Disease Control
3) eg.: Immigrants' screening, HIV screening among sex workers

DIAGNOSTIC/GOLD STD TEST
1) High Specificity
2) For persons with signs, symptoms
3) Based on signs, symptoms, lab finding
4) Expensive
5) Sufficient basis for treatment
6) Initiative from a person to complain
7) Applied to individual
Topic-1

MEASURE OF CENTRAL TENDENCY

MEAN (arithmetic)
Add all divided by sample size

GEOMETRIC

HARMONIC

MEDIAN - Arrange in Ascending / Descending value.
A middle value is selected

MODE - Most frequently occurring.

NORMAL DISTRIBUTION
Mean = Median = Mode
Preferred measure L MEAN

NON-NORMAL DISTRIBUTION
Mean ≠ Median ≠ Mode
Preferred measure L MEDIAN

OUTLIERS - Any extreme value
Most affected → Mean
Least affected → Mode (But not preferred as no statistical test can be applied)
Most preferred → MEDIAN
Q TEST
Statistical Test used to see outliers

BIMODAL = 2 modes

Bath-Tub Distribution

MODE = \frac{3 \times \text{MEDIAN} - 2 \times \text{MEAN}}{\text{Summary}^2}

\text{Mode}_1 \quad \text{MEAN} \quad \text{Mode}_2
**Topic 2**

**MEASURE OF DISPERSION / DEVIATION**

**FORMULAE:**

1) \( SE = \frac{SD}{\sqrt{n}} \)
\[
SE = \sqrt{\frac{pq}{n}}.
\]

Quantitative Data:

Qualitative Data:

- \( n \): sample size
- \( p \): prevalence (percentage)
- \( q \): (1 - p) or (100 - p)

3) \( COV = \frac{SD \times 100}{\text{mean}} \)

- Coefficient of variance
- Unit free measure to compare 2 dissimilar variables

4) \( Z \text{ score} = \frac{X - \text{Mean}}{SD} \)

- Growth chart
- BMD of osteoporosis
**Topic 3: Distribution of Data**

- **Normal**
  - **Gaussian**

- **Non-Normal**
  - **Skewed**
  - **Poisson**

1. Bell shaped
2. Bilateral symmetrical
3. Tails touch X-axis from $-\infty$ to $+\infty$
4. Area under curve 100% or 1
5. Mean = Median = Mode → Not the absolute value
6. S.D. = 1, Variance = $1^2 = 1$

**Theorems**

- Mean $\pm 1\text{S.D.} = 68\%$
- Median $\pm 2\text{S.D.} = 95\%$
- Mode $\pm 3\text{S.D.} = 99\%$
Mean ± 1SD = 68%

Mean ± 2SD = 95%
**SKewed**

MODE = Highest Point

NORMAL

MEAN = MEDIAN = MODE

LEFT/SKEWED / -ve

MEAN < MEDIAN < MODE

eg. APGAR

RIGHT / +ve SKEWED

MODE < MEDIAN < MEAN

eg. Hb of children in slums
Poisson Distribution

It is a probability distribution

No diagram/curve

E.g. - No. of emails or phone calls received in a day.

- No. of head trauma pts admitted in Hospital in a day

Topic 4A Variable

(Any characteristic)

Quantitative

(How much)

* Majority of variables can be both.

Depending upon "How much they are measured"

Wt - 120 kg / 70 kg / 40 kg

Qualitative

(How is it)

Overwt / N / Under wt

* But some variables are purely

Qualitative - like race, religion,

Gender

only No.

↓

Frequency / Sample Size

↓

Quantitative variable
G. In a class of 400 students, 220 are boys and 180 are girls.

Variable = Gender

220 + 180 are frequency of sample size

II. BINARY/DICHOTOMOUS

2 Answers

Ex.
Yes/No
Rh +/−

III. DISCRETE

Can't take in between values

Ex.
No. of Siblings
Pulse Rate

A variable can take any of these 3 classifications

eg. WT can be Quantitative, Continuous.

Polytomous

IV. POLYTOPUMOUS

>2 Answers

Tall/Med/Short
ABO Bl. Group

V. CONTINUOUS

Can't take in between values

Ex.
WT = 80.2
Temp = 37.9
Hb = 11.2
BP
**Scale of Measurement**

**Categorical**
- Qualitative Data
  - Nominal
    - Names Only
    - Race
    - Religion
    - Gender
  - Ordinal
    - Ordered Data
    - Severity of Disease
    - TNM Staging
    - Socioeconomic Status

**Metric/Dimensional**
- Quantitative Data
  - Interval
    - In stats we don't use them separately.
  - Ratio
    - Weight (kg)
    - Height (cm)

**Mode**
- **Nominal**
- **Ordinal**

**Median**
- **Nominal**
- **Ordinal**

**Mean**
- **Nominal**
- **Ordinal**

**Likert Scale**
- Type of Ordinal Scale
  - Summative Scale

**Summative Scale**
- Summarise human behaviour.

**Ordinal Scale**
- Median
- Mode
- Mean

**Example:** Visual Analogue Pain Scale
Topic 5: Graphical Representation of Data

Qualitative
1. Bar Line
   - 400 students
   - 220 Boys
   - 180 Girls
2. Pie

Quantitative
- Histogram
- Frequency Polygon
- Line Diagram
- Cumulative Frequency Polygon / Ogive
- Scatter Diagram

Quantitative Data

<table>
<thead>
<tr>
<th>Height (cm)</th>
<th>Frequency</th>
<th>Cumulative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>140.1 - 150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>150.1 - 160</td>
<td>100</td>
<td>250</td>
</tr>
<tr>
<td>160.1 - 170</td>
<td>130</td>
<td>380</td>
</tr>
<tr>
<td>170.1 - 180</td>
<td>20</td>
<td>400</td>
</tr>
</tbody>
</table>

Freq Table
Cumulative Freq Table
FREQ TABLE

Join mid points.

HISTOGRAM

↓

FREQ POLYGON/CURVE

LINE DIAGRAM (provides trends)

MISCELLANEOUS DIAGRAMS

Suppose I want to explain to an illiterate person:

1) Complexity of DM → PICTOGRAM
2) Progression of DM → TREE
3) Complexity of DM + HTN → VENN
4) Geographical Distribution of DM in Delhi → SPOT MAP
QUARTILES

NORMAL D.

**EQUAL**

1st 2nd 3rd 4th

\[ Q_1 \quad Q_2 \quad Q_3 \]

**INTERQUARTILE RANGE**

\[ Q_3 - Q_1 \]

**BOX + WHISKER PLOT**

\[ Q_2 - Q_1 = Q_3 - Q_2 \]

ON-NORMAL D.

**UNEQUAL**

\[ Q_2 - Q_1 < Q_3 - Q_2 \]

\[ Q_2 - Q_1 > Q_3 - Q_2 \]

\[ \Rightarrow \text{POSITIVE SKEW} \]

\[ \Rightarrow \text{NEGATIVE SKEW} \]
**TOPIC- 6**

**PROBABILITY**

\[
P_{\text{TOTAL}} = P(A) + P(B)
\]

**DEPENDENT**

\[
P_{\text{TOTAL}} = P(A) \times P(B)
\]

**INDEPENDENT**

**TOPIC-7A.>**

**SAMPLE SIZE**

\[
n = \frac{4pq}{d^2} \quad \text{At 95% confidence interval for all observational studies}
\]

\[
n = \frac{Z^2pq}{d^2}
\]

Where: \( Z = \) 1, at 68% confidence

\( Z = 2, \) at 95% confidence

\( Z = 3, \) at 99% confidence

Where, \( p = \) prevalence \( \leq \% \)

\( q = (1-p) \) or \( (100-p) \)

\( \alpha \) error if given

\( \int \) remember to get confidence \( \Delta \)
\( a = \text{ABSOLUTE PRECISION} \)

\[ \text{SBP} \pm 10 \text{mm Hg} \]

<table>
<thead>
<tr>
<th></th>
<th>180</th>
<th>F</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>110</td>
<td>??</td>
<td>P</td>
</tr>
<tr>
<td>3</td>
<td>114</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>4</td>
<td>120</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>5</td>
<td>128</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>6</td>
<td>130</td>
<td>??</td>
<td>P</td>
</tr>
<tr>
<td>7</td>
<td>130</td>
<td>F</td>
<td>F</td>
</tr>
</tbody>
</table>

\( \text{RELATIVE PRECISION} \)

\[ 180 \text{cm} - 18 \text{cm} = 162 \text{cm} \]

\[ 162 \text{cm} \times 0.1 = 16.2 \text{cm} \]

\[ 180 \text{cm} - 16.2 \text{cm} = 163.8 \text{cm} \]

\[ 18 \text{cm} - 10 \text{cm} = 8 \text{cm} \]

\[ (\text{ABSOLUTE PRECISION}) \]

A UNIT OF ABSOLUTE PRECISION IS THE SAME AS THAT OF VARIABLE.

E.g. Prevalence variable, absolute precision will be in \( \% \).
If no prevalence is available or if we are doing the study for the 1st Time, we take \( p = 0.5 \) or 50%.

Being it yields maximum sample size for a given absolute Precision.

POWER affects sample size in case of INTERVENTIONAL STUDIES

\[ S.E. = \sqrt{\frac{pq}{n}} \]

\[ S.E. = \frac{SD}{\sqrt{n}} \]

Mean \( \pm 1SD = 68\% \)
Median \( \pm 2SD = 95\% \)
Mode \( \pm 3SD = 99\% \)

\[ \pm 1s \quad 68\% \]
\[ \pm 2s \quad 95\% \]
\[ \pm 3s \quad 99\% \]

SAME THEOREM
Whenever population/confidence is mentioned, we need to calculate **Standard Error**.

**CONFIDENCE**

Research is done on sample; results are generalized to the population.

95% confidence means ⇒ 95% sure that my results will be true to the population.

To achieve 100% confidence, the entire population has to be studied.

**CONFIDENCE LEVEL = 1 - α or 100 - α**

**INTERPRETATION OF CONFIDENCE**

A --- B --- C

**A** - If CI touches/Includes 'NULL VALUE' it is statistically insignificant.

- No Association
- No Relationship
- RR, OR = 1
- \( \alpha = 0 \)

**B** - More the distance of null value from point estimate, more is the statistically significant

- OR = 1
- OR_{CIG} = 1.4
- OR_{NOR CIG} = 2.4
- OR_{RIDS} = 3.4

- OR = 1
- OR_{EXE} = 0.8
- OR_{Diet} = 0.6
- OR_{Vite} = 0.4 → 6%
- Smaller the CI, more is the significance
  sample size LARGE.

\[
\text{SE} = \frac{SD}{\sqrt{n}} \Rightarrow 10 CI = t_{25}SE
\]

INSIG/WORST = D ← touches null value
MAXIMUM "N" = A ← minimum CI
MINIMUM "N" = B ← max. CI
BEST/MAX SIG = E ← doesn't touch null value
Max. dist from null value smaller CI:
STATISTICAL TESTS
- from Discussion paper.

SUMMARY

1. DISCRETE QUALITATIVE DATA — BAR
2. Continuous Quantitative Data — PIE
   ↓
   Histogram
   ↓
   FREQ POLYGON

3. Relationship Scatter Diagram, Correlation, Regression
4. Progression of Disease — Tree Diagram
5. Overlap of some features — Venn Diagram
6. Geographical Distribution — Spot Map
EPIDEMIOLOGY

I) Validity & Reliability from Discussion Paper

II) Bias also from Discussion Paper.

MORBIDITY INDICATOR

INCIDENCE

4. Population at Risk

2. Rate

3. Calculated from Cohort Studies

4. New Cases/Pop at Risk

5. Imp. for Preventive Services/Planning

PREVALENCE

3. Total Population

2. Proportion

4. Calculated from Cross Sectional

5. New + Old Cases/Total Population

6. Imp. for Curative Services/Planning

INTERPRETATION:

1) Prevalence is of 2 types

POINT

- Calculated from Cross Sectional Study

PERIOD

- Calculated from Longitudinal Study

2) If nothing is mentioned we take it as Point Prevalence
3) \[ \text{Period} \quad \text{Prevalence} = \text{Incidence} \times \text{Duration} \]

- MORE
  - Chronic Diseases
- LESS
  - Acute Disease
- \approx 0
  - Suicidal/Homicidal Accidental Deaths

4) Prevention is Better Than Cure

- Preventive strategies
  - ↓ Incidence
  - ↓ Prevalence
- Curative strategies (100% cure)
  - ↓ Prevalence

5) If for a Previously Fatal Disease, a new & is initiated, it prevents mortality. But long-term morbidity persists, Prevalence ↑

Before 1920, any person who developed DM used to die. But after discovery of insulin, in 1920, the deaths were prevented but insulin doesn't cure diabetes. But as cure & DM duration rises, Prevalence ↑ too.
MORTALITY INDICATORS

FORMULAE:

1. CDR = \frac{\text{Total Death}}{\text{Total Population}}

2. Specific Death Rate = \frac{\text{Total No. of Deaths in Specific Age Group/Occupation/Gender/Location}}{\text{Total Population}}

3. Proportional D.R. = \frac{\text{Total No. of deaths in Specific Age Group/Occupation/Gender/Location}}{\text{Total Deaths}}

4. Case Fatality Rate = \frac{\text{Total Deaths due to Particular Disease}}{\text{Total No. of cases due to same Disease}}

MULTIPLICATION FACTOR

For all Mortality/Morbidity Indicator:
If total Population is not given, we take it as \times 1,000,000 except MMR → 1,000,000 EF
Case Fatality Rate
Survival Rate
\{ \}
Couple Protection Rate
2nd attack Rate
Pearl Index \rightarrow 1200

RATE
Proportion + Time component

PROPORTION
Prevalence = \frac{\text{Total cases}}{\text{Total Population}}
Numerator is part of denominator.

RATIO
Sex Ratio = \frac{\text{Female}}{\text{Male}}
Numerator is not the part of Denominator.

CFR & Proportional D.R. are MISNOMER.
As no time component is taken

<table>
<thead>
<tr>
<th>\text{MM RATE}</th>
<th>\text{MMR}</th>
<th>\text{MM RATIO}</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = M.M.</td>
<td>D_1 = \text{No. of L.B.}</td>
<td>D_1</td>
</tr>
<tr>
<td>D_2 = \text{No. of female of reproductive age group}</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
IMPORTANCE OF MORTALITY INDICATORS

1) BEST INDICATOR OF DISEASE BURDEN
   a) mortality indicator \rightarrow \text{PROPORTIONAL DR}
   b) morbidity indicator \rightarrow \text{PREVALENCE}
   c) Health Index \rightarrow \text{HALE}

27 CFR-
   a) ↑ Killing Power of disease \rightarrow ↑ prevalence \rightarrow ↑ CFR
   b) Acute Disease
   c) \text{CFR} = 1 - \text{Survival Rate}
      \text{or}
      \text{CFR} = 100 - \text{Survival Rate}

SURVIVAL RATE \rightarrow \text{Cancers}
   a) \text{Prognosis}
   b) \text{Yardstick for assessment of therapy}

A{\text{IIMS}}\overset{\text{KAPLAN MEIR CURVE}}{\rightarrow} \text{survival}

Special Type of Regression = ‘Cox’s STEPLADDER PROPORTIONAL HAZARD PATTERNS

\begin{tikzpicture}
\draw[->] (0,0) -- (6,0) node[anchor=north] {Years};
\draw[->] (0,0) -- (0,10) node[anchor=east] {Survival (%)};
\draw[thick] (0,10) -- (0,8) -- (1,8) -- (1,6) -- (2,6) -- (2,5) -- (3,5) -- (3,4) -- (4,4) -- (4,3) -- (5,3) -- (5,2) -- (6,2) -- (6,0);
\node at (0.5,10) {100};
\node at (1,9) {80};
\node at (1.5,8) {50};
\node at (2,7) {40};
\node at (2.5,6) {20};
\node at (1,5.5) {5yr survival = 0.}
\node at (1.5,5.2) {Median survival = 2yrs.}
\node at (2,4.8) {Max. Death occurs in 5 yr.}
\node at (1,4) {Syr survival = 50% \rightarrow 2yrs.}
\end{tikzpicture}
37 SPECIFIC D.R.

a) 'AT RISK' Population
b) Comparison of Deaths In SAME Population

Standardised/ Adjusted D.R.

\[ \text{ADJUSTED/STANDARDISED} \]

* STD- POPULATION -
  - National Population is not the Std. Population
  - Population where no. in each age * sex groups are known

\[ \text{Standardisation} \]

\[ \text{DIRECT} \]

\[ \text{INDIRECT} \]

When no. of People * No. of Deaths In each age * sex. Group In known

When it is unknown

\[ \text{SMR [Standardised Mortality Rates]} \]

\[ \text{SMR} \gt 100\% \text{ Hazardous Occupation} \]

Standardisation removes confounding effect of different age structures &

* Age Standardisation D.R. is Best to compare vital statistics of a country.

'Details not Imp.'
1) **DEF** -
   * Applying best available evidence gained from scientific methods to clinical decision making
   * Seeks to assess quality of clinical practice objectively (no subjectivity)

2) **IMP** - Gold std. of clinical practice

3) Father → David Sackett

4) **ICD**
   - International Classification of Disease - ICD
     1. Consists of 22 chapters
     2. Revised every 10 years
     3. Arranged in ≤ volumes
        - ICD XI → 2013

5) **SDG**
   - Sustainable Development Goals
     1. 17 Goals (Goal No. 3)
        - Health
     2. Targets → To be achieving by 2030
GLOBAL

- MMR ≤ 70/1 Lakh L.B.
- NMR ≤ 12/1000 L.B.
- U5MR ≤ 25/1000 L.B.

↓ By 33% Premature mortality from NCD's
↓ By 50% Global Deaths & Injuries from RIA's

MATCHING AIIMS

DEF'n:
Process of selecting controls so that they are similar to cases in regard to certain variables

CAUTION:

OVER MATCHING

Don't match for variable of interest as won't be able to get statistical test

ELIMINATION - It eliminates known confounding

DONE IN - Case Control vs Cohort
CAUSATION / CASUALITY

10 FACTORS

Most Imp Study Design to Study

1. CAUSALITY → Double Blend RCT
2. TEMPORALITY → COHORT

A. TEMPORALITY - Most Imp. (Mandatory)

Exposure → Disease
Smoking → Lung Ca
MBBS → MD/MS

B. DOSE RESPONSE -
Smoke 10 cigarette → Ca in 1 year
Smoke 1 cigarette → Ca in 10 year

C. REVERSABILITY -
Stop smoking → Relapse

D. BIOLOGICAL PLAUSIBILITY - Feasibility

E. SPECIFICITY -
Weakest → Most Difficult
Only 1 Risk Factor is associated with 1 disease.
Not possible to prove in non-communicable Disease
F7 Strength $\rightarrow$ Relative Risk
G7 Consistency
H7 Coherence
I7 Study Design
J7 Judging by Evidence

Grading of Study Designs

Top

Meta Analysis \& Systematic Review
Double Blind RCT
Cohort
Case Control
Longitudinal
Cross-sectional
Ecological
Case Series
Case Report

Bottom

International Death Certificate

Ia $\rightarrow$ Immediate Underlying cause of Death
Ib $\rightarrow$ Underlying cause of Death
Ic $\rightarrow$ Main underlying cause of death
II $\rightarrow$ Other cond. not directly leading to death
Ia \rightarrow I_c \rightarrow MANDATORY
I \rightarrow II \rightarrow OPTIONAL
I_c \rightarrow \text{most imp. as we do ICD - classification based on it.}

\text{STUDY DESIGNS}
\text{[\textit{WHO CLASSIFICATION}]}

\text{OBSERVATIONAL} \downarrow \text{INTERVENTIONAL}
\text{DESCRIPTIVE} \downarrow \text{ANALYTICAL}
\text{CASE REPORT} \downarrow \text{ECOLOGICAL}
\text{CASE SERIES} \downarrow \text{CASE CONTROL}
\text{CROSS-SECTIONAL} \downarrow \text{COHORT}
\text{LONGITUDINAL}
\downarrow \nonrandom \downarrow \text{RANDOM}
\downarrow \text{QUASI} \downarrow \text{RCT}
\downarrow \text{EVALUATION STUDIES}
\downarrow \text{CEASATION STUDIES}
\downarrow \text{NATURAL EXPERIMENTS}
\downarrow \text{PRE-POST CLINICAL TRIAL}

*For all study design, unit of study is an individual except for ecological study (whose unit of study is population)

*Park *MCA Book consider cross-sectional & longitudinal study as Analytical study & is wrong
DESCRIPTIVE STUDY

No Comparison
No Temporality

1) CASE REPORT
   Single
   [Ab @ c/F/ Diagnostic/ Prognostic]
   1st study done for any research

2) CASE SERIES
   Multiple

3) CROSS-SECTIONAL
   Single
   Point Prevalence
   Snapshot studies i.e. both exposure & disease are measured at same time

4) LONGITUDINAL
   Multiple
   Period Prevalence

Done for Chronic Disease
CASE CONTROL

1. Exposed \rightarrow \text{CASES} \\
   \text{Non-Exposed} \rightarrow \text{POPULATION} \\
   \text{Exposed} \rightarrow \text{CONTROLS} \\
   \text{Non-Exposed}

\[ \begin{array}{cc}
\text{CASE} & \text{Exposed} & \text{Non-Exposed} \\
\text{CONTROL} & a & b \\
 & c & d \\
\end{array} \]

\[ \text{Odds} = \frac{a \times d}{b \times c} \]

RATIO \[ \text{Odd of Being Exposed in Cases} \]

\[ \text{Odds} = \frac{P}{1-P} = \frac{\text{Probability that event will occur}}{\text{Probability that event will not occur}} \]
(i) Population

\[ \begin{array}{ccc}
\text{Exposed} & \text{Non-Exposed} \\
\text{Diseased} & a & b \\
\text{Non-Diseased} & c & d \\
\end{array} \]

\[ RR = \frac{a}{a+b} \]

\[ \frac{c}{c+d} \]

Relative Risk = \frac{\text{Incidence of Disease in Exposed}}{\text{Incidence of Disease in Non-Exposed}}

\[ IE - INE = AR. \]

Extra risk & can be attributed to smoking / exposure

Proportion = \frac{IE - INE}{IE}

\[ [AR \ do \ not \ have \ denominator] \]

RR = Imp. for Clinicians

AR, PAR = Imp. for Both

Population AR = Imp. for Disease / Public Health Specialists.
COMMON POINTS

INTERPRETATION OF OR * OR ≥

<table>
<thead>
<tr>
<th>OR, RR</th>
<th>ASSOCIATION</th>
<th>RISK FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;1</td>
<td>+ve</td>
<td>Risk Factor</td>
</tr>
<tr>
<td>=1</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>&lt;1</td>
<td>-ve</td>
<td>Protective Factor</td>
</tr>
</tbody>
</table>

* In both cohort and case-control study, multiple comparison groups can be taken. For 1 case up to 4 controls can be taken.

TYPES OF COHORT

* If nothing is mentioned in question then we take it as Prospective Cohort

CONCURRENT

PROSPECTIVE AMBISPECTIVE

NON/CURRENT HISTORICAL/ RETROSPECTIVE

1) At the start of study neither the exposure nor the disease has occurred.
   After the start of study 1st derivative will be exposure then derivative will be disease.

2) At the start of study exposure has already occurred but disease has not yet occurred.
   At the start of study any person who is diseased would be excluded.
Prospective

2. If any person is exposed and diseased at the start of study, they would be excluded.

HISTORICAL

1. At the start of study both exposure and disease have occurred.

2. It is differentiated from case-control study by the direction of arrow. Retrospective study is record based whereas case-control exposure is asked.

PROSPECTIVE

E → D

AMBI-PERSPECTIVE

E → D

RETROSPECTIVE

E → D

CASE CONTROL

E → D

Start of Study
**ECOLOGICAL STUDY**

Population is the unit of study

**ECOLOGICAL FALLACY**

Generalising the findings of the population to an individual is wrong.

Example: People from Japan have a high risk of stomach cancer (ECOLOGICAL STUDY)

Any person from Japan will develop stomach cancer (wrong generalisation → ECOLOGICAL FALLACY)

---

**INTERVENTIONAL STUDIES**

<table>
<thead>
<tr>
<th>POPULATION</th>
<th>Exposed (NON-RANDOM)</th>
<th>Non-Exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>POPULATION (Random)</td>
<td>Exposed</td>
</tr>
<tr>
<td></td>
<td>COHORT</td>
<td>ARTIFICIAL INTERVENTION</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DOUBLE BLINDING**

1. It removes interviewer bias
2. Blinding done before data collection

**MATCHING**

1. It removes selection bias
2. Randomizations done before recruitment
Blinding

OPEN/UNBLINDED
  ↓
BLINDED
  ↓
SINGLE PARTICIPANT
  ↓
DOUBLE M/C (6-Level)
  ↓
Participant Interviewer

*Single Blinding Doesn't Remove Interviewer Bias*

Ises Internal Validity
Makes Groups comparable at Baseline

POPULATION (400)

Selected By Defined Criteria

ELIGIBLE (Smokers 300) ↓

POtential Participants

Consent taken

Accepted (80)

RANDOMISATION

(40) A (BLINDED) → B (40)

R (UNBLINDED) → Placebo

→ Metaanalysis, systematic review.
→ Nested case control.
→ Case-cohort.
→ Types of RCT.
<table>
<thead>
<tr>
<th>Chapter Name</th>
<th>Imp. Topics</th>
<th>NEE7</th>
<th>AIIMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 History</td>
<td>Images</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>21 Health &amp; Disease Prevention, HDI/PQLI/MIPI</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>37 Epidemiology</td>
<td>Entire chapter</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>47 Screening</td>
<td></td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>57 Common Disease</td>
<td>Bases Vaccination</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>67 NCD</td>
<td>Cancer</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>77 Health Programme</td>
<td>TB, HIV, New Prog</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>87 Demography</td>
<td>Demographic pyramid, Fertility Indicators</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>95 Obs &amp; pedi</td>
<td>one liner</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>107 Nutrition</td>
<td>MUG UP</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>117 Sociology</td>
<td>useless</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>127 Environment</td>
<td>Images MUG UP</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>137 BMW</td>
<td>Guideline</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>147 Occupational Health</td>
<td>New Est guideline</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
15 Disaster 
17 Mental Health 
17 Genetics 
18 Statistics 
19 Communication 
20 Management 
21 Health Care of Community Health System 
227 International Health

Types of RCT

Factorial RCT
In 1 RCT 2 Interventions are tested & are not related to each other.

Planned Cross-over RCT

\[ \text{Rx} \times 1 \text{month} \]
\[ \text{Placebo} \times 1 \text{month} \]
\[ \text{Without Period} \times 2 \text{months} \]
\[ \text{Rx} \times 1 \text{month} \]
\[ \text{Placebo} \times 1 \text{month} \]

It remove the ethical issues.
Rx should not involve Sx.
UNPLANNED CROSS OVER

Intention to Rx

50 chemo

50 Rx

100 cancer

50 chemo

50 Rx

55 cancer

50 Rx

10 urgent Rx

10 refusal Rx

10 chemo

50 + 10 - 5 = 55

50 - 10 + 5 = 45

ANALYSIS

Intention to Rx

50 chemo

50 Rx

Per Protocol Analysis

55 chemo

45 Rx

(± per actual Rx)

METAANALYSIS & SYSTEMIC REVIEW

1) When multiple studies on a single topic are combined, then sample size ↑ x hence power of study ↑

2) Summary statistic → I²

3) Summary Diagram → Forest Plot

4) Limitation → a) GIGO (Garbage In Garbage Out)
   b) Publication Bias → Funnel Plot
ADVANCED COHORT STUDY

1) Predominantly cohort (Because of forward direction)
2) Nested study design (Cohort + Case Control Study)

\[
\begin{align*}
\text{Cohort} \\
\text{Temporality} \quad \text{int} \quad \text{Rare Disease} \\
\text{Recall Bias is eliminated} \quad \text{whose} \quad \text{tests} \quad \text{are costly}
\end{align*}
\]

\[\text{TYPES}\]

\[
\begin{align*}
\text{NESTED CASE CONTROL} \quad \downarrow \\
\text{Control will be allotted} \quad \text{the moment case occurs} \\
\text{matched for type of follow-up} \\
\text{case} \quad \text{control} \quad \downarrow \quad \downarrow \\
\text{CASE COHORT} \quad \downarrow
\end{align*}
\]

\[
\begin{align*}
\text{Control is allotted at end of study} \quad \downarrow \\
\text{Cohort control} \quad \downarrow \quad \downarrow \\
\text{Control assigned at end} \\
\end{align*}
\]
E \xrightarrow{3^{rd} \text{ Factor}} D

Pathology \xleftarrow{\text{Latent/Pre-cancerous}}

C

CONFOUDING

E \xrightarrow{3^{rd} \text{ Factor}} D

Related to Both 'E' & 'D'

1940 \xrightarrow{\text{Pancreatic Cancer}}

Rich \xrightarrow{\text{Smoking}}

USA \xrightarrow{\text{Coffee Drinkers}}

EFFECT MODIFIER

E \xrightarrow{\text{EM}} D

Related to 'D' only

Unprotected Intercourse (EM-ve) \xrightarrow{\text{Circumcision}}

Asbestos \xrightarrow{(EM+ve)} Lung (a)

Smoke
METHODS OF REMOVING 3rd FACTOR

1) Randomisation - Best
   (Remove both known & unknown)

2) Matching - Remove only known

3) Stratification - y, unadjusted.
   - 3rd factor
     ↓ stratification by 3rd factor
     2 groups will be formed

  ↓ 3rd Factor

If adjusted OR is same in both groups
   ↓ confounder

OR adj = 1, OR adj = 1
   in Group 1
   in Group 2

OR adj = 1.5
   in Group 1
   OR adj = 1.1
   in Group 2
OBSTETRICS

ANC

I> ANC visits

IDEAL

1 visit /Month till 7th month → (3)

1 visit /every 15 days
in 8th month (2)

1 visit /every week
9th month (4)

9 months + 7 days = 1.

MIN

WHO

1st visit < 12 wk
(early registration)

2nd visit 14-26 wk

3rd visit 28-34 wk

4th visit > 36 wk

GOI

(4)

PNC Visit = No schedule

HB PNG = Home Based Post Natal Care
ANM & ASHA WORKER MAKE HOME VISITS TO PROVIDE PNC CARE.

SCHEDULE

Hospital Delivery

3, 7, 14, 21, 28, 42

ANC SERVICES UNDER RMNCHA

LAB INV.

SUB CENTRE

a) UPT KIT
b) Hb
  c) Urine (albumin, sugar)
d) RDT (malaria)

NISCHAY → UPT KIT
NIKSHAY → T.B.

INTERVENTIONS –

1) Deworming - Albendazole is c.i. in 1st Trimester
   Doc in 1st Trimester
   ↓
   MEBENDAZOLE
   100mg BD x 3 days

Home Delivery

Day 1 (extra)

HIV same

PHC ABOVE SUBCENTRE +

1) DRL
2) Hbs Ag
3) HIV
4) Blood Grouping
5) RBS

NEET 2018
2. **CALCIUM**

   RDA: 1200 mg/day

   Calcium is given as supplement in form of
   \[CaCO_3\] 500 mg BD from Day 1 of 14th week PO.
   Tell 6 months post delivery. (1 yr).

3. **TETANUS TOXOID**

   a) Every ♀ In her 1st ♀ will receive 2 doses of T.T.

   1st Dose @ point of contact

   2nd Dose @ an interval of 4-6 weeks.

   b) If ♀ had received 2 doses of T.T. at an
      interval of < 3 yrs ➔ SINGLE BOOSTER DOSE GIVEN

   c) If ♀ who is completely unimmunised come to
      see at PCT

      P04 < 36 weeks ➔

      P04 > 36 weeks ➔

      Give T.T. & would be given

      give 1st dose of T.T. & explain to mother that
      this dose won't protect
      her baby from
      MNT (maternal neonatal
      Tetanus)
New born is given

750 IU of anti-toxin within 4 hours of birth

Give 2nd dose after 4 weeks irrespective of the outcome.

47) IFA:

> 100 mg of elemental Iron + 500 μg Folic Acid

by 300 mg of Ferrous Sulphate Salt

(33% of elemental Iron = 33%)

> Red coloured capsule/tablet

> To be consumed in LEMON WATER after food

> from Day 1 of 14th week POC till 6 months post delivery (1yr)

\[
\begin{align*}
\text{Hb} & > 11 \quad \rightarrow \ OD \quad \rightarrow 365 \\
9-11 & \rightarrow \ BD \quad \rightarrow 365 \times 2 \\
& = 730
\end{align*}
\]
CALCULATION

* No. of + in a Year -

\[ x = \text{Birth Rate} \times \text{Population of an area (per 1000 Pop)} \]

\[ y = x + \frac{10\%}{\text{abortion}} \]

Q. B.R. = \frac{20}{1000} \quad \text{Subcentre Popu.} \quad y = ?

\[ y = \left( \frac{20}{1000} \times 5000 \right) - \frac{10}{100} \left( \frac{20}{1000} \times 5000 \right) \]

\[ = 100 + 10 \]

\[ = 110 \]

No. of + at any given point = \frac{y}{2}

DELIVERY

Cleans of Safe Delivery :-

Clean Hand  Cord - cut
" Table  Tie
" Towel  Stump
" Water
MATERNAL MORTALITY

Any female during delivery or post-delivery till 42 days dies due to causes not related to accident or trauma irrespective of period of gestation is called MATERNAL MORTALITY.

\[ \text{MMR} \]

\[ \text{MM RATE} \]

\[ \text{MM RATIO} \]

\[ \text{Numerator = M.M.} \]

\[ \text{Denominator} \]

No. of \( \text{f} \) in Reproductive age group

M/c type of Maternal Death \( \Rightarrow \) Post Partum.

CAUSES

DIRECT

Haemorrhage (37%) (APH + PPH)
Abortion
Sepsis
Eclampsia
Others

INDIRECT

Anaemia (35%)
McC of MM -
Haemorrhage
Anaemia
PPH

PROGRAMMES

⇒ PMSMY (Pradhan Mantri Swakshetra Matritva Yojna)
Every 9th month → every ♀ female is provided free of cost ANC services @ all levels of health system in Govt. setup where doctor is available & enrolled private health facilities

27 COLOUR CODED PROGRAMME
RED = High Risk ♀
GREEN = Normal
BLUE = PIH
YELLOW = Systemic Diseases

37 O AIM YOJNA SCHEME
Every ♀ female for a successful 1st ✯
Would get 6000 Rps as Incentive
1000 = JSY
5000 ✯ under this programme
INFANTOMETER
used to measure ht of Baby till 2 years

I- NIPI (V.V.I.)
(Intensified National Iron Plus Initiative)
This is under POSHAN ABHIYAAN

PM's overarching scheme for Holistic Nourishment

SLOAN - Sahi Poshan, Desh Roshan
VISION - Anaemia mukt Bharat

6 X 6 X 6 PYRAMID
6 Intervention 6 Beneficiaries 6 Institutional Mech

OBJ - To ↓ anaemia by 18% in each Beneficiary Group by 2022

→ 6 BENEFICIARY GROUPS
6 - 59 months
15 -19 O
15 -19 O
♀ In Reproductive age group
♀ Female
♀ Lactating ♀
6 INTERVENTION

1) Prophylactic IFA Supplementation
2) Deworming
3) Intensified Year Round Behaviour Change
   Communication Campaign
4) Anaemia Testing
5) Mandatory Provision of IFA fortified foods under public health programmes
   like Mid-Day Meal & Anganwadi Supplementary Nutrition Programme

6) Addressing Non-nutritional causes of Anaemia

   Malariac → Sickle cell → Falciparum

DEWORMING → ALBENDAZOLE (Dox)

<1yr → 0.1
1-2yr → 200mg OD to chew stat
>2yr → 400mg OD to chew stat

NATIONAL DEWORMING DAY = 10/02
                          10/08
<table>
<thead>
<tr>
<th>AGE</th>
<th>DOSE</th>
<th>COLOUR</th>
<th>OTHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-59 mths</td>
<td>20mg IRON + 100µg FOL Folate</td>
<td>Liquid</td>
<td>Biweekly</td>
</tr>
<tr>
<td>5-9 yrs</td>
<td>45mg IRON + 400µg FOL Folate</td>
<td>PINK</td>
<td>Weekly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Colours</td>
<td>1 IFA</td>
</tr>
<tr>
<td>10-19 yrs</td>
<td>100mg IRON + 500µg FOL Folate</td>
<td>Blue</td>
<td>Weekly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 IFA</td>
</tr>
<tr>
<td>20-49 yrs</td>
<td>100mg IRON + 400µg FOL Folate</td>
<td>RED</td>
<td>Weekly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 IFA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Itab/day of FOL Folate (400 µg)</td>
</tr>
<tr>
<td>6 yrs</td>
<td>100mg IRON + 500µg FOL Folate</td>
<td>RED</td>
<td>Daily from Day 1 of 14th week PO4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TILL 6 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post Natal Delue</td>
</tr>
</tbody>
</table>
WIFS

- Weekly IFA Supplementation.
- On every MONDAY every adolescent 6th & 7th going to a govt. or govt.-aided school is provided a blue colour capsule.
- To all adolescent 6th not going to school @ Anganwadi

- Both Married & unmarried 10th are covered under this programme
  (Adolescent male not going to school are left out)

PAEDIATRICS

BREAST FEEDING

⇒ EXCLUSIVE BREAST FEEDING

- Baby is only on Mother’s Milk & may be
  naturally feed or artificial feed using spoon or paladai.
  8-10 times a day
  mandatory 1 right feed for duration of 6 months

- Oral vaccine & medications if prescribed are allowed.
no water or artificial food are allowed

⇒ **LAM CRITERIA**

Lactational Amenorrhea

- If undergoing exclusive breastfeeding for 6 months gets advantage of lactational amenorrhea till 6-12 wks
- It is a natural mode of contraception

⇒ **BFHI (Baby Friendly Hospital Initiative)**

- **a)** By WHO & UNICEF
- **b)** 10 Steps

Critical **Mi** Procedures  →  Key Clinical Practices

1. [a]
2. [b]
3. [c]

Objective ⇒ Successful Breast Feeding Practice

1) MFHI = Mother Friendly Hospital Initiative (MFHI) only in USA.

Breast Feeding wk ⇒ 1st week of August
**ADVANTAGE**

- Neonate
  - Diarrhea
  - Pneumonia
  - Better Dentition
  - Type 2 DM in adulthood
  - IQ

**MOTHER**

- Breast Ca
- Ovarian Ca
- Type 2 DM
- Post Partum depression

**BIRTH WEIGHT**

1. **LBW** < 2.5 kg
   - a) H/c cause = PREMATURITY
   - b) No. of Babies to be weighed randomly to calculate % age of LBW = 500
   - c) B.w. of <2.0 Kg is a Clf for Hep B Vaccine
   - d) % In India = 18.5% (data may change)

2. **VLBW** < 1.5 Kg

3. **ELBW** < 1.0 Kg

4. Avg. B.w. In India = 2.8 Kg

5. Cut off for Prophylactic Admission into NICU = 1.8 Kg
6) KMC = Kangaroo Mother Care
Supportive care to newborns <2.5 kg

GROWTH MONITORING /
LONGITUDINAL FOLLOW UP STUDY

NORMAL CHILD

↓

IMAL NOURISHED CHILD

Mod. mal. = every week
Severe mal. = Admission in
NRC (Nutritional Rehab.
Centre)
↓
Free & for children
< 5 yrs. of age

0-1 yr = [Every] Month
1-2 yr = Every alternate month
2-5 yr = Every 3rd month
PAEDIATRIC MORTALITY

PERINATAL

28 wk
Birth
7 day
28 day
1 yr
P.O.U.
EARLY LATE
STILL BIRTH INFANT

DENOMINATOR

WHO

No. of Live Births

CAUSES

ENDOGENOUS

1) Prematurity (33%)
2) LBW (28%)
3) Infections (Touch)
4) Birth Asphyxia
5) Birth Trauma
6) Still Birth

Perinatal Mortality

Neonatal Mortality

IMR

(Endo > Exo)

EXOGENOUS

1) Pneumonia
2) Diarrhoea
3) Malnutrition
4) Accident
5) Child Birth
6) Under 5 mortality

QUI

No. of Live Births

except for "Perinatal M.R.
& Still B.R."

[No. of Live Birth + Still Birth]
Most Imp. Indicator for Socio-economic Development

IMR

IMR

Most Imp. Indicator of health status

a) health status of community

b) level of living

c) effectiveness of MCH services

d) Best Predictor of Govt. failure

a) Combined Parameter for Pediatric + Obstetric care in country

b) Sensitive Indicator of availability and utilization of health service

\[
\text{CHILD SURVIVAL INDEX RATE} = \frac{1000 - \text{Under 5 MR}}{10}
\]
CONGENITAL DISORDERS OF NEWBORN

1st H/c - Cong. Heart Disease
2nd H/c - Cong. Deafness
3rd H/c - Neural Tube Defect

LANDMARK PROGRAMMES

IMNCI (Integrated Management of neonatal, childhood illness)

- Colour Coded
  - Pink: Most Severe
  - Yellow: OPD Rx
  - Green: Least & Home Rx

Inj. Gentamicin
By ANM & VR.

Referral for Admission into Hospital

IMNCI MODULE

0-2 mnths

2mnths - 5yr

Website: http://mbbshelp.com
WhatsApp: http://mbbshelp.com/whatsapp
KEY FEATURES OF INDIAN IMNCI

1) Inclusion of 0-2 day in programme
2) Incorporation of
   national guidelines on
   Malaria
   Anaemia
   Vet A supplementation
   Immunisation schedule
3) Skill Based Training
4) Training starts to 0-2 month age group
   but same amount of time is devoted
   to 2 months - 5 yr age agency

SCHOOL HEALTH PROGRAMMES

1) HEALTH DISORDERS AMONG SCHOOL CHILDREN
   Dental Defects > Goiter > Malnutrition
2) Medical "exam" → To be done every 6 months
3) **School children Eye Screening** -
   a) 5<sup>th</sup>-8<sup>th</sup> class / 10-14yr age Grp
   b) *Teachers* perform screening (1/150 students)
   c) **Visual Acuity** cut off: PHC Reference < 6/9

   **ICDS**
   [Integrated Childhood Development Scheme]

47) **Beneficiaries** - Irrespective of Social Status
   (ICDS + JSSK)

27) **Aanganwadi**

27) **Under 'WCD' Ministry**

**INTERVENTIONS** -

S - Supplementary nutrition
H - Health checkup
I - Immunization
N - Non-formal Education
R - Referral
H - Health Education
3 - 6 yr = SHINER
≤ 3 yr = SHINER
11 - 18 yr ♀ = SHE
15 - 45 yr ♂ = HE

HEALTH & DISEASES

Disease → IDH
- IMPAIRMENT
  - Hand is cut
- ORGAN LEVEL
- IMPAIRMENT
- DISABILITY
  - Unable to write
- PERSON LEVEL
  - M/e Disability - Blindness / visual impairment
- HANDICAP
  - Lost job

MODERN EPIDEMIC - CORONARY ARtery DISEASE
SILENT ⬡ ALZHEIMER'S DI.
LITERACY -
Any person > 7 yrs of age who can read, write and comprehend at least 1 single Indian language.
* MAX. LITERACY = TRIPURA.
* India has achieved threshold of literacy 75%

HEALTH INDEX
SULLVIAN/DFLE → Obsolete
DALY → Disability Adjusted Life Year
L → DALY = YLL + YLD

YLD = Years of Life With Disability
YLL = Years of Life Lost due to premature mortality.

QALY - Quality Adjusted Life Years
HALE - Healthy Life Expectancy.
* Best Indicator of Burden of Disease
PQLI - Physical Quality of Life Index
HDI (Human Development Index)
Range 0-1
Value 0.624#
Rank 131th

Components
1) Life Expectancy At Birth
2) Knowledge
   Mean years of expected schooling + yr. of schooling
3) Income - GDP/CPP/GNI

PQLI (Physical Quality of Life Index)
Range 0-100
Value 70

Components
P
Q
Literacy
L1 - Life Expectancy at birth
L2 - IMR

HPI - Human Poverty Index
1) Complement of HDI
2) Developed by WHO + UN
3) HPI → 1 - Development Developing & underdeveloped countries
   2 - Developed countries
4) HPI - 3 Indicators
   1) Knowledge
   2) Adult illiteracy rate

Website: http://mbbshelp.com
WhatsApp: http://mbbshelp.com/whatsapp
b) Life Exp. = Probability of survival till age of 40 years

c) Deprivation of Std. of Living if:
   i) % Age of children underwt. for age
   ii) % Age of people not using clean drinking water.

Multidimensional Poverty Index is the Best Indicator.

**DEMOGRAPHY & FAMILY PLANNING**

**DEMOGRAPHIC PYRAMID**

![Demographic Pyramid Diagram]

AGE, SEX - PYRAMID - A Double Histogram

SHAPE → I & IV ⇒ Stationary

II & III ⇒ Upright / Expansive

V ⇒ Constrictive / Inverted
CRUDE BIRTH RATE

\[ \frac{\text{No. of people at Live Birth}}{\text{No. of People/Total/Mid yr Population}} \times 1000 \]

\[ \text{CBR} = 8 \times \text{TFR} + 1 \] (simplest measure of fertility)
\[ \text{CBR} = \text{GFR} \times 0.2 \]

SOCIETAL DEPENDENCY RATIO

\[ \frac{<15\text{yrs} + >65\text{yr}}{15-65\text{yr}} = \text{SDR} \]

↓ SDR = BETTER

[India is having currently having the lowest SDR of all times.]

HEALTH STATISTICS REPORTING

**SOURCES**

17 [CENSUS]

a) 1st - 1881
b) Last - 2011

Census Stop 00:00 HRS 1st March
(Reference date: Tenso)

MID YEAR POPULATION - 1st July
**CIVIL REGISTRATION SYSTEM**

- Births & deaths to be registered within **31 day**
- Marriage in **30 days**
- Born outside in **60 days** of return to India

**SRS (Sample Registration System)**

- Continuous Enumerator
- Continuous counting of births & deaths
- Supervisor
- Celebration of births, deaths every 6 months

**Main Indicators**

- Mortality Indicator + CBR
- CBR/IMR/NMR/SBR/Still
- U5MR/MMR

**NFHS**
National Family Health Survey

- Completed 4 rounds
- Immunization
- NFHS - Fertility Rate (TFR, GFR)
- Mortality Rate
FERTILITY INDICATORS

TFR = 2
GRR = 1

TFR / TOTAL FERTILITY RATE = No. of children

GRR / GROSS REPRODUCTION RATE = No. of girls

NRR / NET REPRODUCTION RATE = Real-time Fertility of a child

i.e. GRR + Mortality Pattern + Life Expectancy

IMPORTANCE

TFR -
1. Standardised Index of fertility
2. Magnitude of Completed family size
3. To achieve Stable Population

TFR = 2.1 (called as Replacement Level)

TFR OF COUNTRY

> 2.1
↓
Population ↑

< 2.1
↓
Population ↓
NRR—
1. Best indicator of fertility
2. To achieve NRR = 1, CPR = 60%.
3. TFR = \( \frac{2 \times GRR}{NRR} \)

Haryana = TFR > \( 2 \times GRR \)
Kerala = TFR ≤ \( 2 \times GRR \)

GFR [General Fertility Rate]:
\[ \frac{\text{No. of live births in given year}}{\text{No. of females in 15-44 yr age group}} \times 1000 \]

ASFR [Age Specific Fertility Rate]:
\[ \frac{\text{No. of live birth in specific age group}}{\text{Mid-year population of females of same age}} \times 1000 \]

TFR = \( \sum \text{ASFR} \times \text{interval in age group} \)
**ELIGIBLE COUPLE**

Married couple & in reproductive age groups

- [Widow, commercial sex worker] [female] &

- Not eligible

**COUPLE PROTECTION RATE**

No. of eligible couples using 4 methods of contraception.

- OCP
- Condom
- IUDs
- Sterilization

\[ CPR = \frac{\text{No. of eligible couples using 4 modes}}{\text{No. of eligible couples}} \times 100 \]

**EFFECTIVE COUPLE PROTECTION RATE**

- Condoms = 0.5
- IUDs = 0.95
- OCP = 1
- Sterilization = 1

In a community, there are 20 eligible couples using condoms.

Effectiveness = \( 20 \times 0.5 = 10 \)
CONTRACEPTIVE EFFICACY

PEARL INDEX (P.I.) \( \left( \frac{M}{C} \right) \) LIFE TABLE (Best But Complex)

\[ P.I. = \frac{Total \ Accidental \ F}{Total \ Months \ of \ Exposure} \times 1200 \]

FAMILY PLANNING UPDATES

1> BRAND NAME OF CONDOMS IN INDIA = ASHA

2> TAG LINE = 'ACHI AADAT HAI'
   [It is a good habit]

3> PUNCH LINE = PLAN BANATE HAI
   [Let's make a plan]

4> DMPA Jay → ANTRA
   CENTROCHROMAN = CHHAYA. SADHGI

5> M/C CONTRACEPTIVE USED IN INDIA
   = 0 STERILIZATION

6> MISSION PARIVAR VIKAS = Tying
   Contraceptive Accessible in Areas where TFR > 3.
### Non-Communicable Disease

<table>
<thead>
<tr>
<th></th>
<th>Incidence</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Tobacco**

Nicotine & co are non-carcinogenic

Carcinogenic Substances

- P: Polynuclear aromatic Hydrocarbons
- A: Aromatic Amines
- N: Nitrosamines
- T: Tar

**Preventive Strategies**

1. WHO MPOWER® Strategy
   - Raising Taxes (most effective)
   - 75% of the Pack Price should be Tax
   - In India - 7.5%
2) PICTORIAL WARNING

WHO

INDIA

Plain Packaging of 85% on Both Sides Tobacco Product

PREVENTION OF BREAST CANCER

1° Any female >25 yrs of age →
   a) monthly self breast exam
   b) 3 yearly clinical breast exam

2° Any female >40 yrs of age → annual mammography

PREVENTION OF CERVICAL CARCINOMA

1° PREVENT

9-13 yrs old female (class VI) are given
2 doses of cervicaloca vaccine

2° PREVENT

Any female >29 yrs of age

PHC → Visual inspection &
acetic acid (VIA)

↓ If Ab (N)

District Hosp. → Pap smear

↓ If (N)

Repeat Pap smear

Best - <3 yrs
Max - <5 yrs

↓ If Ab (N)

Rx as per clinical guideline
OBESITY

NEW BMI GUIDELINES

Under wt  < 18.5
Normal  18.5 - 22.99
Over wt  23 - 26.99
Obese  > 27

OBESITY ASSESSMENT TOOLS

1) QUETELET INDEX

\[ \text{BMI} = \frac{\text{wt (in kg)}}{\text{ht (m)}} \]

2) PONDERAL INDEX

NOT USED IN INDIA

3) CORPULANCE INDEX

\[ \frac{\text{Actual wt}}{\text{Ideal wt}} \]

\[ \mathbb{N} \leq 1.2 \]

4) BROCA'S INDEX

\[ \text{Ideal wt} = \text{ht (cm)} - 100. \]

5) LORENTZ FORMULA

\[ \text{Ideal wt} = \text{ht (cm)} - 100 - \left[ \frac{\text{ht (cm)} - 150}{2(\varphi)} \right] \]
SKIN FOLD THICKNESS:

1) Rapid non-invasive method of fat assessment
2) Harpenden skin caliper
3) Measured at 4 sites: Med Triceps (single belt), Med Biceps, Subscapular, Suprailiac

CUT OFFS

<table>
<thead>
<tr>
<th>Measure</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin Fold Thickness</td>
<td>&gt; 40 mm</td>
<td>&gt; 50 mm</td>
</tr>
<tr>
<td>Waist Hip Ratio</td>
<td>&gt;1</td>
<td>&gt; 0.85</td>
</tr>
<tr>
<td>Waist Circumference</td>
<td>102 cm</td>
<td>88 cm</td>
</tr>
<tr>
<td>Waist Height Ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Best) Age [Sex] Indepen dent</td>
<td>0.5</td>
<td></td>
</tr>
</tbody>
</table>
MISCELLANEOUS

1) JAI VIGYAN - Pilot Programme for RHD
2) HADDON'S MATRIX - Prevention of Road Traffic Accident
3) STEPS - WHO NCD Surveillance of Risk Factors

HOSPITAL WASTE Mx

NON-INFECTIONOUS 97.5%
  ↓
  BLACK BAG.
  ↓
  CONTROLLED TIPPING / SANITARY LANDFILL

BIO-HAZARD 2.5%
  ↓
  1.5%
  INFECTIONOUS
  ↓
  SHARPS
  ↓
  WHITE BOX

  ↓
  MISCELLANEOUS
  ↓
  BURNT
  ↓
  RECYCLE
  ↓
  RECYCLE
  ↓
  RED

  ↓
  GLASSWARE
  ↓
  IMPLANTS
  ↓
  BLUE
**Household Wastes**

- **Solid** (Refuse)
  - Black Bag
  - Sanitary Landfill/Controlled Tipping

- **Liquid**
  - Sewage Stool
  - Sewage
  - Sullage
  - Out sewage
  - Drains

  - Home
  - Community

  - Septic Tank
  - Sewage Rx Plant

**Health Planning**

**Targets:**
1. Discrete Activity helps to measure extent of objective attainment
2. Concerned with factors involved in a problem.

- Ex. Revise PSM in next 5 days

**Objective:**
1. Planned Precise end point of all activities
2. Concerned with the problem.
- Ex. Qualify next for 2019
GOAL:
1) ultimate desired state to be achieved
2) may or may not be achieved
3) not constrained to time
ex: to stay happy

PLANNING CYCLE

EVALUATION

REVIEW ASSESSMENT RESULTS AGAINST PROGRAM NEEDS

PLANS

REVIEW PLANS AGAINST PROGRAM INTENDED OUTCOMES

IMPLEMENTATION

MONITORING

ME

MONITORING

1) Int. Person
2) Continuous
3) What is happening?
4) Present Tense

EVALUATION

1) Int. / Ext. Person
2) Intermittent
3) How well it happened?
4) Past Tense

Principal

LOGISTICS

ASSESSMENT / SITUATIONAL ANALYSIS
SURVEILLANCE

Ongoing systematic collection, analysis, and interpretation of data. Use of this information to take action for prevention and disease control.

ACTIVE

Health worker visits home of people.

MAX. RESOURCES

BEST QUALITY OF DATA

Eg. Polio
TB
Leprosy

PASSIVE

Pt. visits the hospital.

MIX. RESOURCES

POOREST QUALITY OF DATA

Eg. Majority of health programmes

SENTINEL

Methodology sources from disease to disease.

OBJ - to find missing cases

2. To find trend of disease

3. Estimate total burden of disease

Eg. HIV

BLINDNESS & MALARIA are the only 2 diseases in India & utilise all the free types of surveillance.
SURVEILLANCE IN MALARIA

ACTIVE
Health worker make visit the home of people, & any person who has fever in last 15 days MP slide is made.

TARGET - No. of slide per year = 10% of entire population surveyed.

PASSIVE
Pt visits the hospital. Any pt. if fever has to go for malaria Paracte Stid.

TARGET - Expected 10% of entire OPD cases have fever.

SENTINEL
In hard to reach areas & difficult areas Sentinel surveillance is performed.

Deaths due to PUD are investigated in detail.

QUANTITATIVE METHODS OF MANAGEMENT

17 NETWORK ANALYSIS
Graphie Plan of all events & Activities.

PERT
Program Evaluation & Review Technique

updated Progress Report card.

CPM
Critical Path Method

Longest Path
If any activity along critical path is delayed entire project will be delayed.
ECONOMIC EVALUATION

INPUT

Money

\[ Q_\text{DUED} - \text{cost effective} \]
\[ QALY = \text{Cost Utility A} \]

Best for health \( \rightarrow \) \[ \text{Daly = Cost Effective A} \]

Systems Analysis - Best Mx. technique to find out cost effectiveness

WORK ANALYSIS

3) DEF - systematic observation + recording of individual activity

by provides quantitative assessment of various activities

6) Done by IT companies mainly now started in medical sector also. But mainly done in junior staffs
PPBS PLANNING, PROGRAMMING & BUDGETING

SYSTEM

TRADITIONAL / INCREMENTAL
HISTORIC

1) Only variances in budget from past yrs. are justified.
   Baseline expenditure is automatically approved.

2) Proceed from resource to target

3) Time is less.

4) Corruption & money laundering.

ZERO PRIORITY BASED
BUDGETING

1) Every item of the budget has to be justified.

2) Proceed from target to resource (reverse direction)

3) Time is more

4) Most efficient manner of financial management
ENTOMOLOGY

METHODS OF TRANSMISSION OF DISEASE BY VECTORS.

1) BITING - Only ♀ Bite - Mosquito
   ♂ Sandfly
   Both Sexes Bite - Tsetse Fly

2) REGENERATION - Housefly

3) SCRATCHING / RUBBING OF INFECTIVE SURFACE - Scabies

4) CONTAMINATION OF HOST & BODY FLUID OF VECTORS
   Lower Animals
   Ingestion

LIFE CYCLE OF MOSQUITO -

♂ = Short lived.
♀ = 8-34 days
Larval = 5-7 days
Egg = 1-2 days
Adult = 2 weeks
Mosquito Control

I) Anti-Adult

1) ITN/LLIN
   Long Lasting Insecticidal Treated Bed Nets ↓
   Deltamethrin

   NO. OF HOLES/INCH² = 150
   SIZE OF EACH HOLE OF MOSQUITO NET
   = 0.0475 INCH

2) IRS: - DDT, Malathion
   Indoor Residual Spraying

3) Space Spraying / Fogging - Pyrethrum.
   Predator [Toxorhynchites] → Biological Method
   Mosquito Splendens for Bede
   Egypt to control

II) Anti-Larval

1) Larvicidal
   Oils
   Paris Green
   Temephos

2) Fishes
   Gambusia
   Barbados Millions → Labister

3) Intermittent Irrigation
### Insecticides

#### Classification

<table>
<thead>
<tr>
<th>Organic P.</th>
<th>Organic Chlor.</th>
<th>Carbamates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yheons</td>
<td>DDT</td>
<td>Carbaryl</td>
</tr>
<tr>
<td>Diazuron</td>
<td>Dieldrin</td>
<td>Phoxon</td>
</tr>
<tr>
<td>Chlorpyrifos</td>
<td>BHC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lindane</td>
<td></td>
</tr>
</tbody>
</table>

#### Residual Sprays

<table>
<thead>
<tr>
<th>Toxicant</th>
<th>Dosage (g/m²)</th>
<th>Duration of Effectiveness (mths)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDT</td>
<td>1-2</td>
<td>Max: 18</td>
</tr>
<tr>
<td>Lindane</td>
<td>0.5</td>
<td>Avg: 12</td>
</tr>
<tr>
<td>Malathion</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

#### Colour Coding

<table>
<thead>
<tr>
<th>Colour</th>
<th>Toxicity</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Extremely</td>
<td>Zn. Phosphorous</td>
</tr>
<tr>
<td>Yellow</td>
<td>Highly</td>
<td>Endosulphan</td>
</tr>
<tr>
<td>Blue</td>
<td>Moderately</td>
<td>Malathion</td>
</tr>
<tr>
<td>Green</td>
<td>Slightly</td>
<td>Mosquito Repellent</td>
</tr>
</tbody>
</table>
DDT

1. Sandfly - Insecticide of choice
2. Pyrethrum - Synergize Effect
3. Zeioler - Discovered it
4. Paul Miller - Discovered Insecticidal Property
   - Given Nobel Prize

4. Strong Active form of DDT - Para-isomer (70-80%)

Paris Green
- Copper Acetoarsenite
- Only for Anopheles

Abate
- Anopheles & Aedes

Malathion-
- Least Toxic OP for Man
- Most Toxic OP for Insects

Deet-
- Diethyl Tobramide
  - (ODOMOS)
  - All Purpose Repellants
  - Anti fly / Flea / Haemophaque / Mosquito
WATER

1) MIN. DISTANCE BETWEEN WELL & SOURCE OF CONTAMINATION = 50 feet (15 m)

2) Safe Yield of water = Adequate for 95% of year

3) Problem Village:
   a) Drinking water source pt.:
      >1.6 km in plains
      >100 m in hilly areas

   b) Depth > 15 m

4) Adequate Water Requirement
   a) Domestic Use
      URBAN: 150-160 L/p/day
      RURAL: 40-60 L/p/day

   b) Drinking Water: -2-3 L/p/day

5) Unsuitable in Water -
   Lead - Most Unsuitable
   Nitrate: < 50 mg/dL
   Nitrite: < 3
   Contamination: remote
   Disease: Methemoglobinemia
   Blue Baby Syndrome
6. WATER PURIFICATION

URBAN

Sand Filters

A) SLOW SAND FILTER.

Element responsible for yielding Bacteria free water → VITAL / ZOOLOGICAL / SCHMUTZDECKE LAYER.

Present on Sand Bed Surface
Made of algae /Planktons/ Diatoms
Heart of slow sand filter.

Formation → Ripening of filter

* When river water is stored for 1st 5-7 days;
  Bacterial count drops by 90% due to sunlight

* VENTURI METER - Device used to measure Bed resistance in slow sand filter.
CHLORINATION OF WATER

1. Active molecule: Hypochlorous acid.
2. Has residual germicidal effect
   \[ \text{[O}_3\cdot\text{UV have no such property]} \]
3. Recommended contact period for free residual chlorine in water > 1 hour.
5. Fresh bleaching powder has 33% chlorine.
6. 1 CHLORINE TABLET = sufficient to chlorinate '20 L of H}_2\text{O}'
7. Orthotoluidene Arsenite = measure level of both free & residual chlorine.
8. Chlorine = kills bacteria only.
9. Chlorine doesn't kill bacterial spores, protozoal cysts, helminthic ova, viral agents (Hep A, Polio), cyclops.
10. Amount of Bleaching Powder Required
    \[ \text{[CHLORINE DEMAND]}, \]
    \[ n \times 2 \text{gm} \rightarrow \text{disinfect 455L of } 'H}_2\text{O}' \]
    No. of 1st cup of shows distinct blue colour.
    Indicator: Starch Iodide.
9. 3rd cup is the 1st cup \( \frac{1}{2}\) can become \( \frac{1}{104} \) base.

How much bleaching powder required for 1820 L of water.

\[
\text{Ans.} \quad 3 \times 2 = 455
\]

\[
\begin{align*}
455 L & = 3 \times 2 \\
1820 L & = \frac{3 \times 2}{455} \times 1820 \\
& = 24 \text{ gm}
\end{align*}
\]

147. HARDNESS OF WATER

- Soap: Destroying Power of water
- Hard water → Protective for non-communicable disease
- Due to Ca & Mg salts
- Softening is recommended when hardness >3 mEq/L or >150 mg/L of CaCO₃

**TYPES**

- TEMPORARY (carbonate)
  - \( \text{HCO}_3^- \) salts
- Removal By:
  - Boiling
  - Lime
  - Sodium carbonate
  - Permutit

- PERMANENT (non-carbonate)
  - \( \text{SO}_4^{2-}, \text{Cl}^- \) salts
  - Removal By:
    - Sodium carbonate
    - Base exchange
BACTERIOLOGICAL INDICATORS OF WATER QUALITY

1) COLIFORMS -
   1° most Reliable Indicator of faecal pollution.
   E. Coli → Most Imp.
   Fecal streptococci → Recent contamination
   Clostridium → Remote contamination

2) TESTS,
   Presumptive → MPN
   (most probable No)

   INDICATOR - BROMOCRESOL PURPLE
   Confirmatory - EIKMANN

BIOLOGICAL WATER QUALITY STANDARDS
In 100 ml water,
1) No sample should have E. Coli.
2) No sample should have >3 coliforms
3) NOT >5% samples throughout year should have coliforms
4) No 2 consecutive samples should have coliform organism.
AIR

CET/CORRECTED EFFECTIVE TEMP.

1) Imp: Index of Thermal Comfort

2) COMBINES: Temperature
   - Mean Radiant Heat
   - Movement/Velocity of air
   - Humidity

3) 'McARDLE', MAX Allowable Sweat Rate: \( \frac{4.5L}{4 	ext{ hours}} \)
   FROM CRS

Water Quality

Sound Level

Housing Std.

Type of Transmission

Vector (Disease Transmitted)

- Mosquito
  - Disease by Ticks
  - Insecticides

Website: http://mbbshelp.com
WhatsApp: http://mbbshelp.com/whatsapp
ENVIRONMENT

VENTILATION:
1) SPACE = Fresh air supply of 3000 ft³/hr/person
2) Air change = 2-3 changes/hr. (living room)
3) 4-6 changes/hr. (work place)

GLOBAL WARMING:
Due to Green House Gases
1) Water vapour → Highest
2) CO₂ → 2nd Highest → Measured by KIFFER's TEST
3) O₃ → Protector, CFC → Deleter

AIR POLLUTION
1) Max in winters (due to Temp Inversion)
2) Best indicator of air pollution:
   a) Chemical → [SO₂]
   b) Biological → Lichens
3) AQI - (Air Quality Index):
   EED & INDICATORS
   DARK GREEN - Good
   MAROON - Severe
4) Air Quality is monitored by CPCB (Central Pollution Control Board)
5) WHO Annual PM\(_{2.5}\) Guideline = 10\(\mu\)g/m\(^3\).

\[\text{Particulate (2.5 \mu m)}\]
\[\text{PM Matter (most dangerous)}\]

**OVERCROWDING**

- **AGE**
  - 0-1 yr = 0
  - 1-10 yr = \(\frac{1}{2}\)
  - >10 yr = 1

- **AREA (ft\(^2\))**
  - 110
    - 2
  - 90-100
    - 1.5
  - 70-90
    - 1
  - 50-70
    - 0.5
  - <50
    - 0

- **ROOMS**
  - 1
    - 2
  - 2
    - 3
  - 3
    - 5
  - 4
    - 7
  - 5
    - 10

Website: http://mbbshelp.com
WhatsApp: http://mbbshelp.com/whatsapp
NUTRITION

OBSOLETE:
1) NPU/BV/PER
2) Food Pyramid
3) PFA, AGMARK, ISI
4) BAWADI NUTRITION / special nutrition Programme
5) BBD Balanced/Prudent Diet

HEALTHY DIET -
WHO Definition of 2015:
ADULTS

Total fats <30%
Saturated fat <10%
Sugar <50gm/day

CVS DISEASE

<20%
<7%
<30 gm/d
Dietary cholesterol <200mg/d
Chol./HDL Ratio <3.5

Salt Intake <5 gm/day
400 gm (5 portion) of fruits - veg - a day

DISTRIBUTION OF CALORIES IN □ DIET -

Carbohydrate → 55-65%
Protein → 15-20%
FATS → 20-25%

Elderly
Fiber, Iron, Calcium
Carbohydrate
Energy
Same
Fat: Calorie

Website: http://mbbshelp.com
WhatsApp: http://mbbshelp.com/whatsapp
Dietary Fibre

RDA Normal = 40mg/dL

RDA Diabetes = 48mg/dL

RDA 87.5% Population

Never alternate calorie intake as per RDA

Protein Assessment

Best Indicator - DIAAS (Digestibility Indispensable Amino acid score)

Host accepted - PDCAAS (Protein Digestibility corrected Amino acid score)

Individual Foods

1) Soyabean

⇒ Richest Pulie
48% Protein (Quantity ↑) But utilization (55%)
⇒ Poor Quality
⇒ Limiting AA = Methionine
Eggs

1) Utilization ~ 96% ~ 100% (Reference Protein)

2) 6 gm of protein
   6 gm of fat
   30 mg calcium
   1.5 gm Iron
   250 mg Cholesterol

3) wt = 60 gm, Energy = to kcal

4) Richest source of cholesterol

5) Poor source of Vit C & Carbohydrate.

Fish

1) Richest source of Vit A, D

2) Rich source of proteins, calcium, phosphorus, iodine

3) Poor source of Carbohydrate & Iodine.

Banana

1) Good source of Vit A, B6, C, Carbohydrate, Energy, fibre, Potassium, Phosphorus

2) Not a good source of Iron, calcium, zinc due to phytates
Iodine

1) RDA Normal = 150 μg/d
   RDA Φ = 250 μg/d
   RDA Lactation = 290 μg/d

2) As per FSSAI,
   Amount of iodine @ point of production = 30 ppm
   @ point of consumption = 15 ppm

3) Iodised oil - Poppy seed oil
   (production for 4 years)

4) DFS/2 in 1 Salt = Double fortified salt
   40 μg Iodine + 1 mg Iron/ gm of salt

5) Iodine Def. is a matter of major public health
   problem when Goiter prevalence >10%

6) Iodine Def. leads to ↓ in IQ by 13 points

7) Global 100 Day : 21st October

8) Pandemic Criterion - When Iodine uptake < 20 μg/day

9) KI = Wed foriodination.
FOOD STANDARDS

GLOBAL

Global Codex Alimentarius
(Int Govt Body of FAO, WHO)

FORTIFICATION
1) Small amount
2) Daily consumption
3) Salt fortification

NIK D in Vanadale
2500 IU / 125 IU (100)
9 gm of vanadale

SUPPLEMENTATION
1) Large amounts
2) Intermediate consumption
3) Vit A supplementation

INDIAN

FSSAI (Food Safety & Std Authority of India)

MID-DAY MEAL PROGRAMME

1) PRINCIPLE - 1/3rd of Carbohydrate : 1/2 Protein

2) MINISTRY - Human Resource & Development

3) MINIMUM - 250 days / year

4) 1st SCHOOL - 450 kcal
   12 gm Protein

5) UPPER 1st - 700 kcal
   20 gm Protein

6) Age Group - 4-12 years

7) Upto class 8

Images + Mug-up
PART- 3
VACCINES

FULLY IMMUNISED CHILD

Child < 1yr of age who has received:
1 Dose of BCG
3 doses of DPT, OPV, Hep B
1 dose of Measles.

BENEFITS: Provide max chance of survival
INDIA has largest no. of unvaccinated children
Drop out = Total - not fully immunized

VVM (VACCINE VIAL MONITOR)

1) IMPORTANCE - a) Direct marker of heat exposure +
   efficiency of cold chain.
   b) Indirect marker of potency of vaccine

2) Direct Relationship betw
   Rate of colour change
   Temp.
   → Lower Temp → slower rate

3) 10% of area of outer circle
   Temp. sensitive material.
4) Ex. of Nominal Scale < usable non usable

5) Validation — Optical Densitometer

MISSED DOSES

1) If a single dose is missed
   a) No need to restart vaccine schedule again
   b) Give the missed at earliest opportunity

   e.g. 6 wk → DPT 1, OPV 1, Hep B - 2
       10 wk → missed
       Came at:
       12 wk → DPT 2, OPV 2, Hep B - 2
       (Next dose of k4 wk given at 16 wk)

2) If not a single dose is taken.
   < 1 yr → Give as per NIS

NEW GUIDELINE

1st Visit  |  1-5 yr  >  5 yr [DPT causes biological anti-
               |        in > 5 yr]
OPV, DPT, Hep B  |  DT/TT, Hep B
2nd Visit (after 4 weeks) | OPV, DPT, Hep B  |  DT/TT, Hep B
3rd Visit      | OPV, DPT, M/MR  | M/MR
1 yr Later | 1-5 yr | OPV, PPT, HepB | >5yr | Hep B

Cold Chain (Storage of Vaccines)

District → Cold Box → CHC → PHC

Day Carrier, House to House

Subcentre

WIC [Walk in Cold Room]

Large IRPs (Ice Lined Refrigeratory)
(Store for 1 month)

Max. Damage to Vaccine Occurs in Subcentre or Village Level

Deep Freezer

PHC/CHC

Prepare Ice Packs

Dist. Hosp.

Preparing Ice Packs

+ Storing Vaccines like OPV & BCG for Long Time Periods
ICE PACK:
1) Prepared in deep freezer
2) 320 ml in capacity, horizontal mark, water & filled, nothing else to be added.
3) 2 holes on surface for
   - Reconstituted bag
   - OPV
4) Day carrier → 2 Ice Packs
   Vaccine carrier → 4 Ice Packs

ILR (Ice Lined Refrigerator)
1) With an uninterrupted power supply of 8 hrs, ILR can maintain temp for 24 hrs
2) Instrument & we use in kmla DIAL THERMOMETER
3) Measured twice a day, even on Holidays
4) Temp +2 to +8°C
5) SEQUENCE

PRINCIPLE
Thermocouple
SEQUENCE OF STORAGE:

Diluents
Hep B
IPV
Penta
DPT
TT
BCG
Measles
OPV

De
Humein
Stnc
Permanent
Daya
Teri
Bhagwan
Here
OH

Temp. Sensitive
Reconst BCG > Yellow Fever

OPEN VIAL POLICY

Reconstituted Vaccine

+ Rota

BCG, Measles, JE
(Yellow Fever, Rabies)

NEVER REUSED after 4hrs of Reconstitution.

Other Vaccines

If VVM 24 intact then can be used till 28 days
EVIN (Electronic Vaccine Intelligence Network)

'SMS' Based Yemp. Monitoring System where ILR is connected to a computer & sends messages. In case of Temp. Fluctuation To Medical Officer Incharge + District Immunisation Officer Number.

"Lowest Level it is Being Used is PHC"

**NATIONAL VACCINE REMINDER**

1) Free & SMS Service
2) Where child's name & DBB are sent to helpline no.
3) Reminder for Vaccination of child is received '2d' in advance
4) continued till child is 12 yrs old.

**WASTAGE MULTIPLICATION FACTOR (WMF)**

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>WMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG</td>
<td>2</td>
</tr>
<tr>
<td>RoTA</td>
<td>-1.33</td>
</tr>
<tr>
<td>Measles</td>
<td>-1.33</td>
</tr>
<tr>
<td>JE</td>
<td>-1.33</td>
</tr>
<tr>
<td>Others</td>
<td>-1.11</td>
</tr>
</tbody>
</table>
VER (VACCINE EFFECTIVENESS RATIOS)

VER = 1 - RR
(Relative Risk)

IPV

India started with 0.5 mL I.M. Dose of IPV single dose at 14 wk.

Now we give fractional IPV

0.1 mL I.D. 2 doses of IPV at 6, 14 wk.

VIT A supplementation

<1 yr = 1 lakh IU/1 mL

>1 yr = 2 lakh IU/2 mL

9 months → 1 mL given

Then every 6 months till 5 yr we give

VIT A 2 mL 2 lakh IU.

Total = 9 Doses

1 × 1 + 8 × 2 = 17 lakh IU.
**BCG**

1) **DANISH 1881 STRAIN**  
   *Mycobacterium Bovis*

2) **Dose**: 0.1 mL  
   < 1 month: 0.05 mL

3) **Route**: I.D. (Tuberculin Test)

4) **Site**: (Upper) arm

5) **Diluent**: NS

6) **Adverse Rxn**: Ulceration  
   Suppurative lymphadenitis  
   Osteomyelitis  
   Disseminated TB

**DPT/DT**

1) **DT**: Tetanoid  
   P = killed acellular

2) **AlPO₄/AlOH** (Adjuvant - ↑sea Immuno generosity)

3) **Thiomersal** (Preservative)

4) **Route**: I.M. 0.5 mL middle part of Anterolateral thigh

5) **Adverse Rxn**: neurological  
   Shock
1) Severe Rxn in previous dose 124
   Screening up to 48 hrs. after vaccination.
   a) Scream

   b) Fever > 40°C

   i) Neurological

**MEASLES**

1) EDMONSTON ZAGREB

2) Diluent - Sterile/Distilled Water

3) Stabilizer - Sorbitol,
   Neomycin,
   Hydrolyzed Gelatin.

4) Route - 0.5 mL s.c. @ arm

5) C/I - High Fever
   Anaphylactee Rxn
   @

6) Complication - TSS
   ITP.
VACCINATION IN ELDERLY

NO GUIDELINES IN INDIA

1) Influenza I.M. (live attenuated - c/I)

2) Pneumococcal (single dose)

3) dT Booster (every 10yr)

4) High Risk Pt
   a) Shingles/ Zoster/ Varicella
   b) Hep A & B
   c) MMR
   d) Meningococcal
   e) Yellow fever

GENERAL GUIDELINES

a) All 'LA' vaccines are c/I in @ except
   Yellow fever
   OPV
   cholera
   Travel/ Outbreak + Rabies

2) Any vaccine (except OPV & Yellow fever)
   If accidently frozen are discarded

3) Any no. of vaccines (live or killed) can be
   given together (no need for any form of gap)
4) No spirit is to be used to clean vaccination site.

5) Minor fever, diarrhoea are not contraindicated for acute vaccination.

HIV

PPTCT
Prevention of Parent to Child Transmission of HIV

MOTHER

If a Q is on `TEL' therapy from 1st trimester, no need to go for prophylactic LSCs.

(unless obstetrically indicated)

CHILD

- Nevirapine prophylaxis start at birth.
  - Min. 6 weeks
  - Max. 18 months

  2) Cotrimoxazole prophylaxis therapy
  - Start → 6 weeks
  - Continue → till clinical discretion

  3) Exclusive Breast Feeding for 6 months.
  - Abrupt stop
  - Switch to artificial feed
  - No formula feeding is allowed

Website: http://mbbshelp.com
WhatsApp: http://mbbshelp.com/whatsapp
In India, there is NO CI for Breast Feeding.

4) Early Infant Diagnosis
Done using HIV DNA PCR +
Confirm” of HIV -ve status of child is done only @ 18 months

POST-EXPOSURE PROPHYLAXIS

- Any person who has come in parenteral or mucosal contact & infective secretion of Body
  (all secretions of human body is infective except urine, sweat, tear & not blood stained saliva)

- PEEP to be started as soon as possible. (Max 72 hrs)
- Given till 28 days
- Confirm” of HIV status can only be done at 3 months.

REGIMEN

>10 yrs - Adults

TEL

<10 yrs

ZIDUVOXINE + TENOFOVIR + LAMIVUDINE

+ RITONAVIR / LOPINAVIR.

Zidsudoxine Based
Regimen is preferred.
HIV Rx IN INDIA

India now follows Test & Rx Policy
i.e. there is no cut off for Initiating HIV Rx
in India.

CD4 is only used for monitoring Response to
HIV Rx.

HIV + → CD4 every 6 month
HIV + TB + → CD4 done every 3 month

≥ 3 yr → Adults
↓
TEL

< 3 yr → LOPINAVIR/
→ RITONAVIR.

HIV Rx SERVICES UNDER PROGRAMME:

ART+ Select Medical College 3rd Line ART + CD4 Count

ART All Medical College 1st Line ART + CD4 Count + Dist Hospital

LAC
Link ART All Subdistrict 1st Line ART
CENTRE Hosp + CHC
Rx
NATIONAL STRATEGIC PLAN FOR HIV/AIDS & STIs

2017-24

VISION - Paving way for AIDS free India

GOAL -
- 0 new Infections
- 0 AIDS Related Deaths
- 0 Discrimination

TARGETS -

By 2020

1. 75% Reduction in new HIV Infections

2. 90-90-90
   - 90% of people who are HIV+ know their status
   - 90% of people who know their status are on ART
   - 90% of people who are on ART should have viral load suppression

By 2024

3. Elimination of Stigma & Discrimination

4. Elimination of PICT of HIV & Syphilis
HIV SENTINAL SERVICES (2016-17) 130

PREVALENCE OF HIV INF.

100 → 6.26%

ANC CLINIC ATTENDEES → 0.28%

3 GROUP OF POPULATION

HIGH RISK GROUP

↓

Inject Drug User

Trans-Gender

Hijeras

Men having sex with men

Commercial sex workers

n = 250

Sampling Random

BRIDGE POPULATION

↓

Long Distance Truck Driver

Single Migrant Men

250

Consecutive

GENERAL POPULATION

↓

ANC

400

Consecutive

TESTING STRATEGY

Linked Anonymous 2 Test Strategy
POLIO

POLIO ELIMINATION

HISTORICAL

1. Routine Immunisation (RI) → Under NIP
2. Supplementary Immunisation Activity (SIA)
   → Pulve Polio
   (0-5yrs)
3. AFP Surveillance
   (0-15yrs)
4. Mop Ups → Difficult Areas

V.V. Imp
VAPP
[Vaccine associated Paralytic Polio]
Rare
Less Dangerous
Doesn't cause outbreak
Due to Type 3 strain

PATHO- OPV is a live attenuated vaccine → gut vaccine virus converts to wild vaccine

STRATEGY-

NEW/END GAME

1. SWITCH [2016]
   OPV → bOPV
   Type 2
2. SHIFT [2018]
   OPV → IPV
3. Continue AFP surveillance

VDPV
[Vaccine derived Polio Virus]
Rarer
More Dangerous
Causes Outbreak
(C VDPV)
Due to Type 2 strain
Unknown but commonly seen in areas of low
**Variant & Camel Paralysis**

**Solution:**
- *Shift* (2018)

**ACUTE FLACCID PARALYSIS**

DEF**°** - Onset of Paralysis is < 4 weeks in onset (acute) leading to flaccid/floppy limbs

**Causes**

4 causes

1. Acute Paralytic Polio
2. Transverse Myelitis
3. Traumatic Neuropathy
4. Guillain Barre Syndrome

**Timeline**

1. Ca in **2 days** of notification AFP Surveillance must be done
2. Ca in **2 weeks** of onset of paralysis
3. Checking for residual paralysis has to be done after **2 months** of onset of paralysis
STOOL SAMPLE COLLECTION:

→ 2 samples 24 hrs apart are collected
EACH SAMPLE BEING 8g IN AMOUNT
(SIZE OF DIGITAL PHALANX OF THE THUMB)

→ IS COLLECTED IN A CLEAN, DRY, SCREW CAPPED
CONTAINER CONTAINING NO PRESERVATIVE.

→ TRANSPORTED IN RED COLOURED VACCINE CARRIER
(TEMP. OF +2 TO +8°C) [REVERSE COLD CHAIN]

INFECTIVE	EPIDEMIOLOGY

EPIDEMIC
ψ
>1 MEAN + SD

ENDEMIC
ψ
< MEAN ± 2 SD

PADEMIC
ψ
>1 COUNTRY INVOLVED AT A TIME

HYPERENDEMIC

POINTER SOURCE

PROPAAGATED ONLY IN PAEDIATRIC POPULATION

HOLENDEMIC

ALL AGE GROUPS EQUALLY AFFECTED

RAPID RISE
RAPID FALL
1 INCUBATION PERIOD
CLUSTERING OF CASES

SLOW RISE
SLOW FALL
MULTIPLE I.P.
PART 4
DISASTER

> DEF: Extra-ordinary Response from outside

25 M/c DISASTER/ MAX FATALITY:
- Hydrological (cyclone & flood)

37 Dis. & Max Morbidity / M/c Dist.
- Acute Gastroenteritis

47 M/c Vit. Deficiency Post Disaster
- Vitamin A

57 Most Preventive Strategy for AGE-
   a) Clean drinking post water
   b) Safe disposal of stores.

67 Clean Drinking Water
   is ensured by Chlorination

* Amount of Residual Chlorine

1. Drinking water
   Pre-Disaster 0.5 ppm
   Post Disaster 0.7 ppm
7) Potassium Iodide → Drug to be consumed prophylactically post natural disaster. Replaces radioactive 'Iodine' from thyroid gland.

8) TRIAGE CLASSIFICATION OF DISASTER

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
<th>Priority</th>
<th>Rx Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLACK</td>
<td>Dead</td>
<td>Least Priority</td>
<td>In 4-6 hrs</td>
</tr>
<tr>
<td>RED</td>
<td>Max. Priority</td>
<td>→ RX In 4-6 hrs</td>
<td></td>
</tr>
<tr>
<td>YELLOW</td>
<td>Intermediate</td>
<td>→ RX In 24 hrs</td>
<td></td>
</tr>
<tr>
<td>GREEN</td>
<td>Ambulatory Pts.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reverse Triage: GREEN (Max. Priority) in Defence/wars.

9) VACCINES TO BE GIVEN

- DISASTER VICTIMS (After Disaster)
  - Measles
  - Varicella
  - Chicken Pox
  - ROTA
  * Typhoid & cholera useful

- DISASTER RELIEF TEAM (Before Disaster)
  - Hep B
  - Tetanus
  - Typhoid
  - Cholera
NODAL

HEAD → PM

Ministry → Home

Agency → National Disaster Mgmt agency /
           Authority

Health Unit → District

DISASTER CYCLE

Disaster Impact
           (EARTHQUAKE)

Preparedness
           (Mock Drills)

Investigation
           Lowering the Impact

Mitigation
           (Quick Resistant
           Building)

Rehabilitation

WOUND

SUTURE

PLASTER

Response + Relief
           (TRIAGE)
INTERNATIONAL HEALTH

UNICEF GOBI FFF

G - Growth Monitoring
O - Oral Regulation
B - Breast Feeding
I - Immunisation
F - Female Edu.
F - Family Planning
F - Food Supplementation

HQ

GENEVA

ORGANISATION

WHO,
International Red. Cross
International Labour Organisation

UNICEF; UNPP

NEW YORK

ROME

FAO (Food & Agriculture Org.)
ERGONOMICS → Right Man in Right Job

NOSOLOGY → Classification of Disease

EMPORIATRICS → Study of International Disease of Travellers

UNDP → Development

UNFPA → Family Planning, Reproductive Health

WORLD BANK → Economic Loan.

WHO

① 07/04/1948 → Constitution of WHO adopted

② ⚪ celebrated as WORLD HEALTH DAY

2018 (Theme): - UNIVERSAL HEALTH CARE

3 COMPONENTS

→ ↑ coverage to no. of people served

→ ↑ coverage of services being provided

→ ↓ cost
3) Olive Leaf - Emblem of WHO

4) Who has 6 Regions
   India come in South East Asian Regions [SEAR]

5) SEAR has 11 countries → India & neighbour (No Pakistan)

COMMUNICATION

Most Imp. Component = Feedback / Effect

**Types**

<table>
<thead>
<tr>
<th>ONE WAY</th>
<th>TWO WAY</th>
<th>FACE TO FACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Didactic</td>
<td>Socratic</td>
<td>1 to many</td>
</tr>
<tr>
<td>T.V., Internet, Newspaper</td>
<td>Focused Group Disc. (FGD), workshop, Pannel Discussion, Symposium</td>
<td>Advice Counseling</td>
</tr>
<tr>
<td>Min. Resources, Max. Audience</td>
<td>Intermediate</td>
<td>Min. audience</td>
</tr>
<tr>
<td>Min. Behaviour Change</td>
<td></td>
<td>Max. Behaviour Change</td>
</tr>
</tbody>
</table>

Advice → One to Many
Counseling → One to One

Gathering Approach. Gather. Approach
Emergency Contraceptive Pox
Two-Way

\[ FGD \]

a) Min = 6 participants
b) Max = 12 "
c) Should know each other from before
d) Should discuss on the same issue

e) Socio Gram

i) Provides details of Participation of Participants

\[ \text{Diagram} \]

\[ \text{Diagram} \]

III Workshop

a) Practical Skill Development Demonstrating Place
b) 30-40 participants.

c) Cataract
d) Laparoscopic Workshops.
PANEL DISCUSSION

SYMPOSIUM

is sequential

3-4 Participants who discuss in
front of a large audience

DELPHI'S METHOD

1) Systematic Interacting /forecasting method

2) a) Group of Experts
   b) Independent
   c) Geographically dispersed
   d) Brought to a consensus

3) Ex: Dengue
SOCIOLOGY

1) ACCULTURATION -
   Mixing of 2 cultures

2) OPINION - Temp. subjective view
   BELIEF - Permanent subjective view
   ATTITUDE - Permanent objective acquired
   HABIT - Acquainted acquired automatic way of doing a thing

3) LEVELS OF LEARNING -
   COGNITIVE - Knowledge \[ \rightarrow \text{H/C Q. (Lowest Level)} \]
   AFFECTIVE - Attitude
   PSYCHOMOTOR - Skill \[ \rightarrow \text{Highest (USMLE Step III)} \]

4) TYPES OF FAMILY - CENSUS DEF:
   a) NUCLEAR - MA + PA + Bacha
   b) JOINT - 2 Eligible couple
   c) EXTENDED - Nuclear + Any extra family member
   d) NEW - Nuclear \& (10 yr of marriage)
      (Imp. for family planning)

5) SOCIO ECONOMIC STATUS
   URBAN MODIFIED
   RURAL MODIFI-UDAI PAREEK
   KUPPUSWAMI
III) **SOCIAL SAFETY NET**
- Collection of services provided by Govt. prevents individuals from falling into poverty.
- Includes:
  - Welfare
  - Employment
  - Universal Health Care
  - Shelter homes

IV) **SOCIALISED MEDICINE**
- Govt. provides all aspects of healthcare.
  - (Jules Guerin, Russia)

  - Pt. doesn't pay any amount.
  - Employ all Dr's.
    - Std. of care, no private practice, competition maintained.

  - **UNIVERSAL HEALTH CARE**
OCCUPATIONAL HEALTH

M/c occupational D/a In India →
LUNG DISEASE

G. Lung Disease
Pneumoconiosis
Silicosis

Occupational Cancer
Skin cancer
Lung Ca

OCCUPATIONAL HEALTH EXAMINATION

PRE PLACEMENT

1) Ergonomics
   (Right man in Right Job)
2) Occupational Dermatitis

POST PLACEMENT

1) Annual - Majority
   2) Monthly - Lead
      Radium
      Dyes

FACTORIES ACT 1948

1) Factory is an establishment
≥ 10 persons + usage of electricity
   or
≥ 20 persons

2) 29 Diseases are notifiable
   a) all pneumoconiosis [except Bagassosis]
   b) all occupational carcinomas

3) Work Related NORMS
   a) AGE - <14 yrs - Prohibited
15-16 yrs - Declared by Dr. can only work between 6am - 7pm

b) Hours of work
15-16 yrs - Max 4.5 hrs/d
Adults - 9 hrs/d
60 hr/week including overtime

c) Health, Safety & Welfare Recommendations
Min - 500 ft³/worker
1 Safety officer /1000 workers
1 Welfare officer /500 workers
1 Canteen > 250 workers
1 Canteen > 50 0 workers

ESI (Employees State Insurance) 1948

1) Includes
a) All factories
b) All educational institutions
(Both govt. & private)
c) Restaurants & Hotel
d) Cinemas & Theatres
e) Newspaper agency
f) Road motor transport

2) Excludes
Miners
Defence
Railways
② Covers all employees earning <21,000 /mth.

③ Union ministry of Labour

④ Employer - 4.75% of Total wage
   Employee - 1.75% of Total wage

⑤ ESI BENEFITS from CRS
RNTCP

Ministry changed - RNTCP has been transferred to Additional Secretary (Director General) of NACO

TB NOTIFICATION

1) On 7/5/2012, GoI made it mandatory to notify TB cases

2) In 1 month of A to District TB officer (DTO)

3) In 2019, Govt. declared failure to do so is a criminal offence under sec 269 + 270 IPC with 6 months - 2 years of imprisonment or fine

NATIONAL STRATEGIC PLAN FOR TB ELIMINATION (2017-25)

1) Vision - TB free India

2) Goal - To achieve rapid 1% of T.B. burden, morbidity & mortality By 2025.

   DTPB approach [Detect Treat Prevent Build]

3) Expected outcome - By 2025:
   a) 60% reduction in TB incidence
   b) 90% I in TB mortality
   c) 0% pt. having catastrophic expenditure due to TB
**FINANCIAL INCENTIVES**

- Every TB pt. will receive 500 Rs/month for purpose of meeting TB-related expense.
- 1000 Rs./pt. one time is provided for notification.

**RT-MERM**

- Real-time Medication Event Monitor Device
  - This records date & time of Med intake by patient & provides details about adherence to TB Rx.

**HIV-TB Rx**

5 Interventions:

1. A using CB NAAT only
2. Daily fixed dose combination
3. 9A DOTS
4. Pharmacovigilance
5. Isoniazid Preventive Therapy -
   - Every HIV pt. is given 10mg of Isoniazid (in India, Isoniazid is MDR opportunisti; in case of HIV pts)

*In case of HIV-TB co-infection, we always start I TB therapy 1st for 1st 15 days & to avoid Immune Reconstitution Syndrome.*
TB Rx

i

Intensive 4 FDC

Anti-TB Schedule 9 drugs

Confirmation 3 FDC

Anti-TB Schedule 10 drugs

smaller p tablet

* There are 4 wt bands for Adult &
starting from 25 kg
whereas in pediatric age group - 6 wt bands
ranging from 4 to 39 kg.

* In case of pediatric age group if there is a
change in wt band then dose of TB medicine
has to be modified.
But not done in case of adult

DOSSING

H - 75 mg
R - 150 mg
Z - 400 mg
E - 275 mg
DRUG SENSITIVE NEW
2 (HRZE) +
4 (HER) +

DRUG SENSITIVE PREVIOUSLY Rx
2 (HRZE) +
1 (HRZE) +
5 (HER) +

GOALS OF RNTCP
Cure
Prevent
Resistance
Break chain of Transmission

TARGETS
Detection - 90%
cure rate ->
Drug sensitive NEW = 90%
Drug sensitive previously Rx = 85%

Presumptive TB
Sputum smear (SS)

SS +ve
CXR +ve
Microbiologically confirmed TB
RIF sensitive

SS +ve
CXR -ve

SS +ve
CXR +ve
PL HIV
CBNAAT/Gene Expert

SS +ve
CXR -ve
M-TB +nt
RIF resistant
High alter
DR TB
Degree of clinical suspicion
Pulm. Med.
L clinical A of TB

SS -ve
CXR -ve
M-TB -nt
CASE DEFINITIONS:

Microbiologically:
Presumptive TB pt. AFB/ Culture +ve/ CNAAAT +ve

Clinically Aced:
Presumptive TB Pt. not microbiologically confirmed
But Aced on CXR/ HPE/ c/f.

FAILURE
Person is ss +ve even at end of Rx.

FOLLOW-UP
Drug Sensitive New & Previously Rx
1) SS only at the end of Intensive Phase, Continuation phase
2) If pt is +ve on ss. at end of Intensive Phase
   a) no need to extend I.P. at By 1 month
   b) Sputum sent for DST (Drug Sensitive TB)
3) Monthly wt.
   a) CXR. (if required)

DRUG RESISTANT
Sputum smear monthly 3, 4, 5, 6, 7 months in I.P.
& at 3 monthly interval in c.p. at 9, 12, 15 months
99 DOTS PROGRAM

Def: Online monitoring of Rx adherence

2) Pilot programme in HIV - TB
3) Each Anti-TB Blister Pack is wrapped in a custom envelope, & includes hidden phone no. that are visible only when doses are dispensed.
4) After taking medication pt. makes free call to hidden phone no.

NV BDCP

1) Malaria
2) Filaria
3) Dengue
4) Chikungunya
5) JE
6) Leishmania

MALARIA -
National Framework for malaria elimination in India (2016 - 2030)
(Aggressive Target 2016 - 2022)

GOAL - Eliminate malaria ['0' indigenous case throughout entire country by 2030]
CAT  PHASE  STATES/ UTs
0  Prevention of Re-establishment  '0' Indigenous cases of Malaria
1  Elimination  State API < 1/1000
2  Pre-Elimination  State API < 1/1000 & some districts having API > 1/1000
3  Intensified Control  State API > 1/1000

Malaria Control Strategies: June (Malaria Control month)

National Dengue Day on 16th May.

1) Surveillance → Mx
2) Case management
3) IVMe (Integrated Vector Management)
   a) IRS (Indoor Residual Spray)
      - DDT & Malathion
      Mainstay in rural areas
   b) ITN/LLIN → Urban areas
   c) Anti-Larval (Both the areas)

2) Case - Mx: Non-† state
   - P. vivax
   - P. falciparum
**P. vivax**

\[ CQ \times 3 \text{ days} + PQ \times 14 \text{ days} \]

**P. falciparum**

\[ \text{NORTH-EASTERN} \quad \text{OTHER STATES} \]

\[ \text{ACT - AL} \quad \text{ACT + SP} \]

- [Artemether + Lumefantrine] + [Artesunate + Sulfadoxine + Pyrimethamine]

---

Single dose of PQ on Day 2

---

**Uncomplicated**

**Complicated**

- PQ in Cl

**P. vivax**

\[ CQ \times 3 \text{ days} \]

**P. falciparum**

1st Trimester

2nd & 3rd Trimester

**Doc:** Quinine

**Doc:** Area Specific ACT

---

**MALARIOMETRIC INDICATORS**

1. **Spleen Rate** - Best indicator of malaria prevalence in a community

2. **Infant Parasite Rate** - Most sensitive index of recent transmission in a locality

3. **API (Annual Parasite Index)**

   \[ \text{API} \geq 2/1000 \text{ population} \rightarrow \text{High Risk Area} \]
API = confirmed cases during 1 year \times 10^3 \text{ per population under surveillance}

47 ABER [Annual Blood exam Rate]

\[
\frac{\text{No. of slides examined}}{\text{Population}} \times 100
\]

Ims - Index of operational efficiency

AIMs - to screen 10% of entire population

CHEMOPROPHYLAXIS

\begin{align*}
<6\text{wks} & \quad \text{(Short-term)} \\
\downarrow & \\
\text{Doxycycline (daily)} & \quad \text{or} \\
\text{Chloroquine (wkly)} & \\
\geq 6\text{wks} & \quad \text{(Long-term)} \\
\downarrow & \\
\text{Mephalquine} & \\
\end{align*}

JE CONTROL

1) Human Vaccination \rightarrow Most effective [SA-14-14-2]

\[
0.5\text{mL s.c. (in upper arm)}
\]

Deluent: Phosphate Buffer

2) Vector Control \rightarrow JE Vector are outdoor vectors,

\[\begin{align*}
\text{IRE} & \text{ is of no benefit} \\
\text{a) outdoor spraying} & \\
\text{b) Pigs to kept away from human dwelling}
\end{align*}\]
**FILARIASIS CONTROL**

1. **Chemo Prophylaxis**
   - DEC + Albendazole single dose annually for 4-6 yr
   - Given to all except female children <2 yr

2. **Chemotherapy**
   - DEC - 6 mg/kg x 12 days
   - DEC medicated salt ⇒ mass R of filariasis consumed for 6-9 months
   - 1 gm DEC/kg of salt

**LEISHMANIASIS**

1. **LAB & RDK PK 39**
2. **Doc** - Liposomal Amphotericin B (I.V.)
3. **Alternative** ⇒ miltefosine
4. **Obsolete** ⇒ NA stroboglucoronate
5. **Financial Compensation** ⇒
   - 500/mnth ⇒ cases
   - 2000/mnth ⇒ PKDL
   - 300/mnth ⇒ 1st worker of patients
   - 200/mnth ⇒ generating awareness in community
67. **CONTROL** → **A) Sandfly Control**
   (Done by Residual Insecticide)

   a) DDT / 1st choice.
      2mtr, 2 Rounds/yr
      @ 2gm/m²
   alternative → BHC

   **B) Personal Prophylaxis**
   Avoid sleeping on floor
   Fine mesh nets < 0.2mm

CRS → Health care of community