

SCREENING

5/6/18

3

		Gold std	
		+	-
SCREENING TEST	+	TP	FP
	-	FN	TN

2x 2 Table

2 columns x 2 Rows.

DEGREE OF FREEDOM -

factor on c variable depends

$$[C - 1] [R - 1]$$

eg. $3 \cdot 3 \times 4$ Table = 6.

FN is more DANGEROUS than FP.

$$\text{SENSITIVITY} = \frac{TP}{TP + FN}$$

$$\text{SPECIFICITY} = \frac{TN}{TN + FP}$$

$$\text{PPV} = \frac{TP}{TP + FP}$$

$$\text{NPV} = \frac{TN}{TN + FN}$$

- 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 Parameters

→ PPV + NPV are Row Parameters

$S_N \approx TP$

$S_p \approx TN$



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 $+ve \bar{c} GS$

b> those who are $labelled\ as\ diseased$

c> those who contribute to $prevalence$

4> Fill the 4 cells & apply the formula.

BAYE'S THEOREM

$$PPV = \frac{S_N \times P_{disease}}{S_N \times P_{disease} + (1 - S_p)(1 - P_{disease})}$$

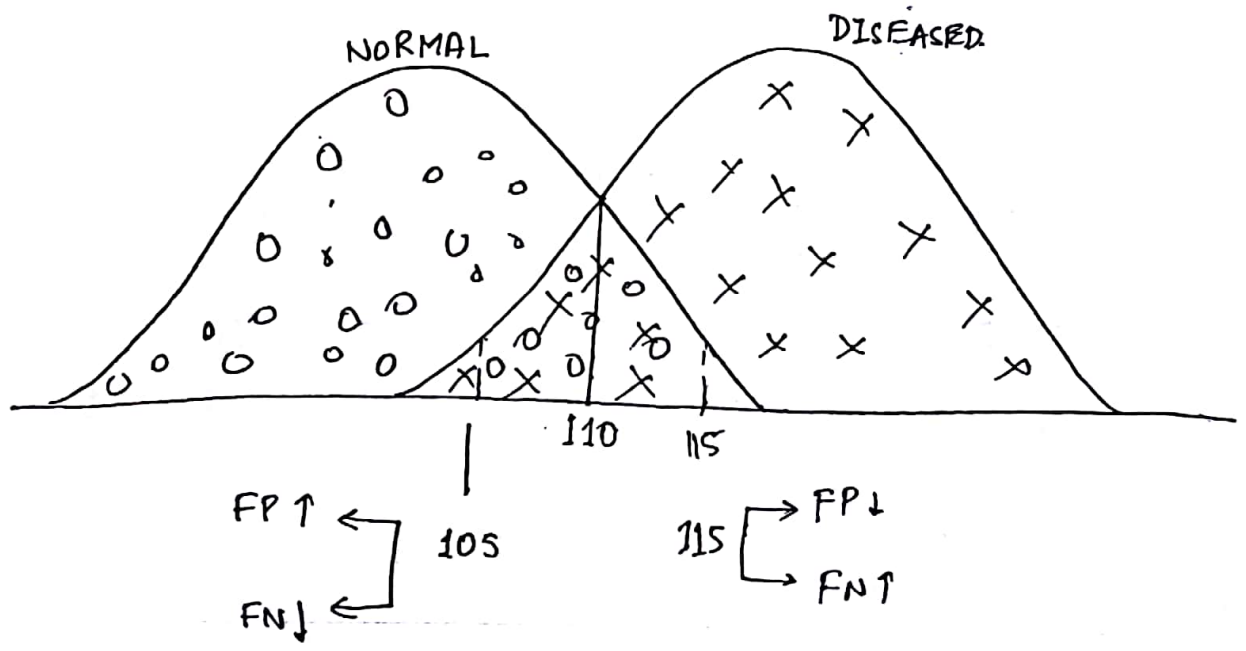
NPV = from CRS.

		S.T.	
		+	-
Q.S.	+	a	b
	-	c	d

		Q.S.	
		+	-
S.T.	+	a	e
	-	b	d

S.T = screening Test

Q.S. = Gold std.



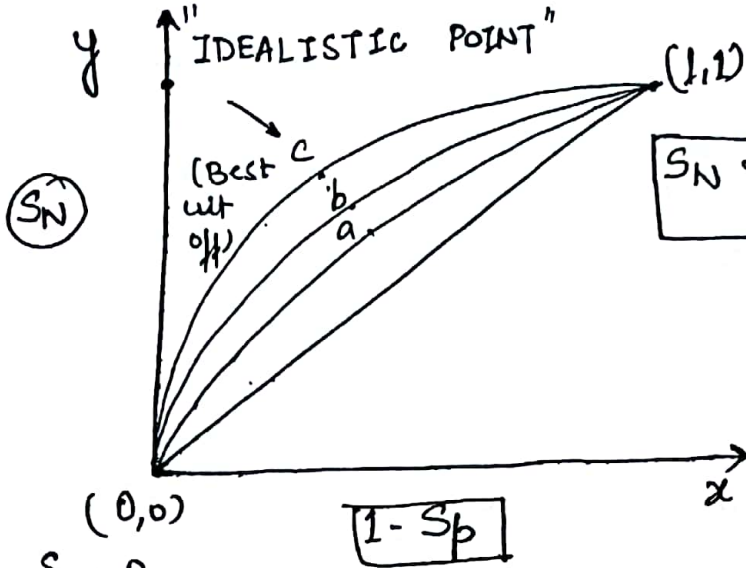
To DECIDE BEST CUT OFF WE DRAW ROC

RECEIVER OPERATOR CURVE

ATIMS

$$\frac{SN=1}{1-Sp=0}$$

$$Sp=1$$



$$SN=1$$

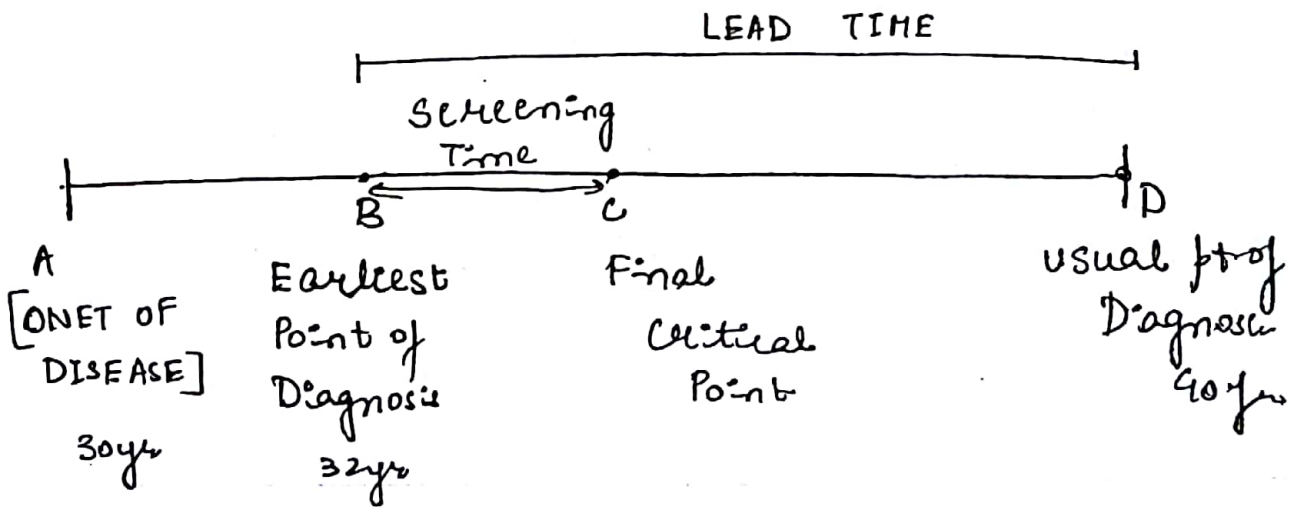
$$1-Sp=1 \Rightarrow Sp=0$$

$$SN=0$$

$$1-Sp=0$$

$$Sp=L$$

⇒ cut off line nearest to Idealistic point is "BEST CUT OFF"



Early Diagnosis [B - D]

↓ LEAD TIME

early Rx

No improvement in prognosis

Improvement in prognosis (B-C)
Screening Time

Ex. Rabies → No Rx

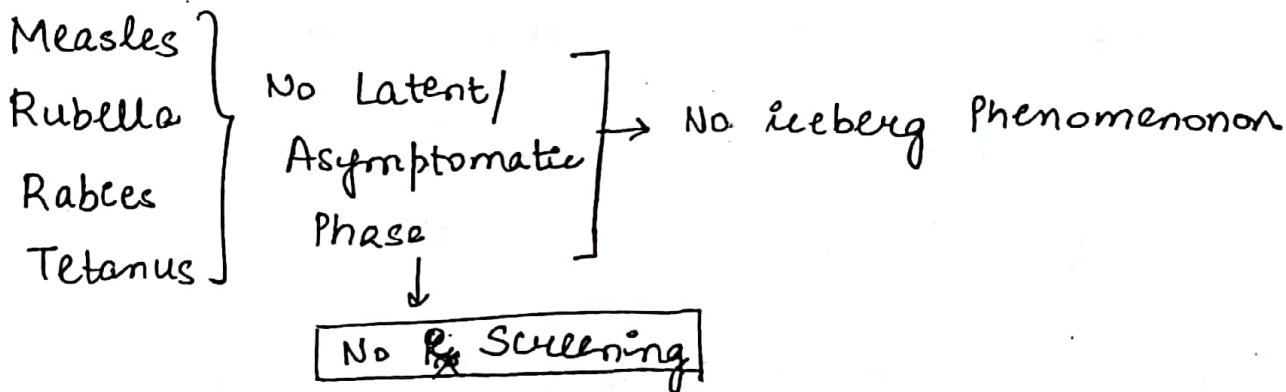
Pancreatic Cancer
→ Rapid progression
(LEAD TIME BIAS)

FINAL Critical Point.

↓
Last point after which there is no improvement in Prognosis
ex - golden Time in stroke / CAD

PRINCIPLES OF SCREENING :- WHO

DISEASES	TESTS	Rx
- Imp. Public Health problem - Latent / asymptomatic phase must be +ve	- cost-effective - Gold std must be present	cost effective Definitive Rx



SCREENING DONE

Ca

NOT DONE

Ca Colon

Ca Breast

Ca Cervix

Ca Prostate

Ca uterus

Ca ovary

Ca Pancreas

Ca Testis

Ca Brain

Null Hypothesis from Discussion Paper⁸

p value

It refers to chance

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

INTERPRETATIONS

1) PREDICTIVE VALUE = Diagnostic Power of a Test

Depends on-

a) Prevalence (max)

not on Incidence

b) $SN + Sp$

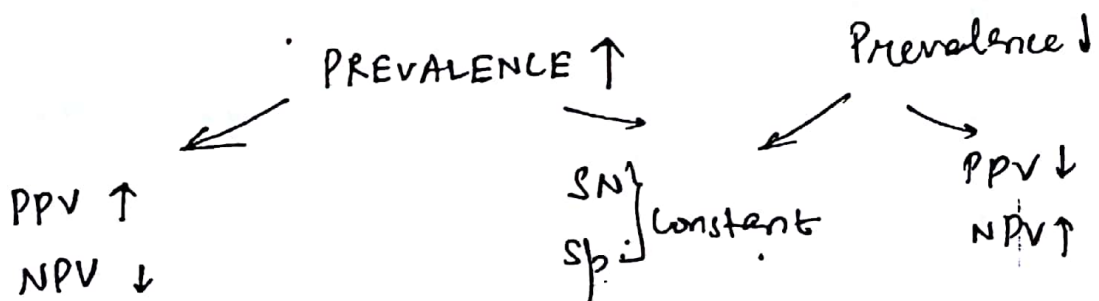
2) PRE TEST PROBABILITY \Rightarrow Prevalence

3) POST TEST PROBABILITY \Rightarrow Predictive Value.

4) $SN \propto \frac{1}{Sp}$

$$PPV \propto \frac{1}{NPV}$$

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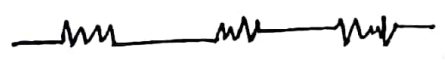
⑤ $SN \uparrow \rightarrow TP \uparrow \rightarrow FP \uparrow$

But reverse doesn't happen.

[$FP \uparrow \rightarrow SN \uparrow$ XXX MCA Book error]
[$FP \uparrow \rightarrow Prevalence$]

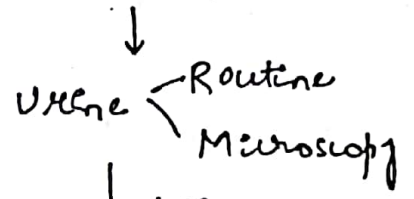
⑥ ∴ Screening is always done in High Risk Population.

TEST IN SERIES



one after other

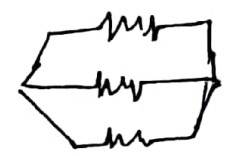
Ex. Fever + Burning micturition



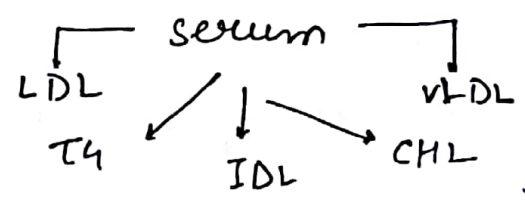
$SN \downarrow$ & $PPV \uparrow$ spec

$Sp \uparrow$ $NPV \downarrow$

TEST IN PARALLEL



all at same time



Vice-versa in parallel

$SN \uparrow \propto \frac{1}{Sp \downarrow}$ $PPV \downarrow \propto \frac{1}{NPV \uparrow}$

⑦ Concept of Likelihood Ratio + Yield is obsolete ^{to} now

H.W DIFFERENCE BTW SCREENING + DIAGNOSTIC TEST
TYPES OF SCREENING

TYPES OF SCREENING

PRESCRIPTIVE

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

PROSPECTIVE

- 1) People screened for other's benefit
- 2) Disease Control
- 3) Eg:- Immigrants screening
HIV screening among
sex workers

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

DIAGNOSTIC/GOLD STD TEST

- 1) High Specificity
- 2) For persons \bar{c} signs + symptoms
- 3) Based on signs, symptoms + Lab findings
- 4) Expensive
- 5) Sufficient basis for t/x
- 6) Initiative from a person \bar{c} complaint
- 7) Applied to individuals

MEASURE OF CENTRAL TENDENCY

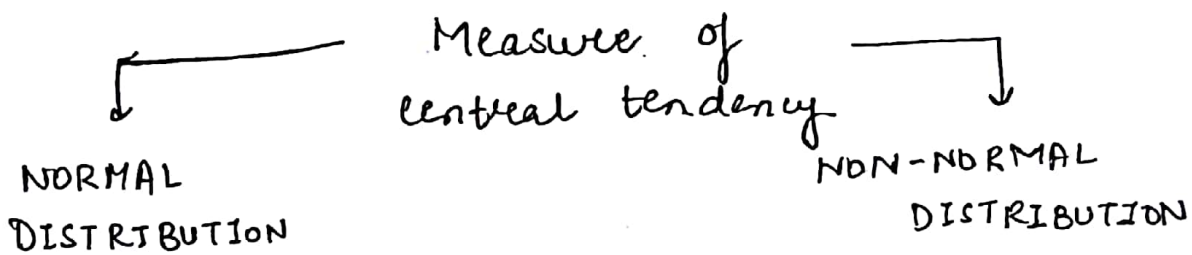
MEAN (arithmetic)

Add all divided by
sample size

~~Geometric~~
~~Harmonic~~

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

MODE - Most frequently occurring.



Mean = Median = Mode

Mean \neq Median \neq Mode

Preferred measure
↳ MEAN

Preferred measure
↳ MEDIAN

OUTLIERS - Any extreme value

Most affected → Mean

Least affected → Mode (But not preferred as
no statistical test can be
applied).

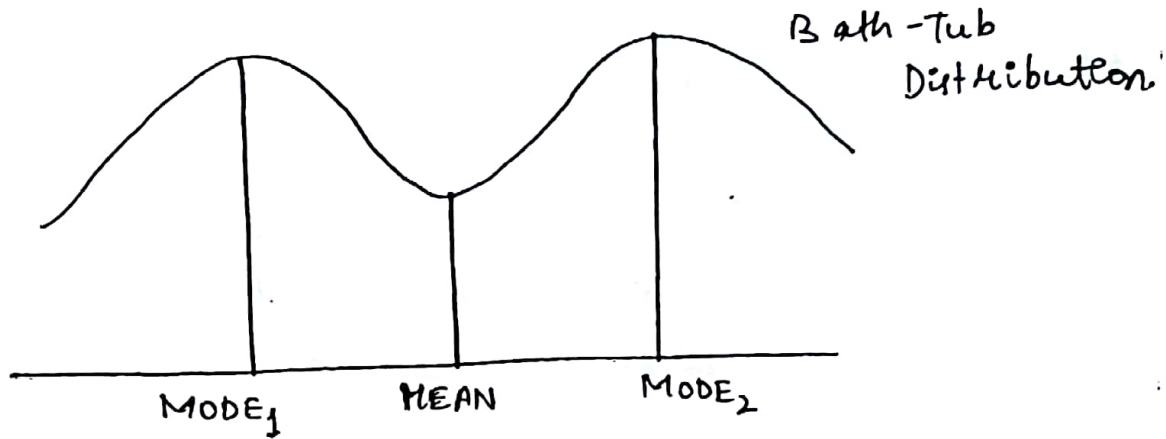
Most preferred → MEDIAN

Q TEST-

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Statistical Test used to see outliers

BIMODAL \rightarrow 2 modes



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

Topic-2

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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 { %age
Proportion.

$$q = (1-p) \text{ or } (100-p)$$

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

↓

→ coefficient of variance

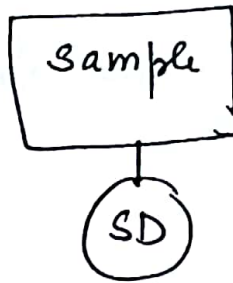
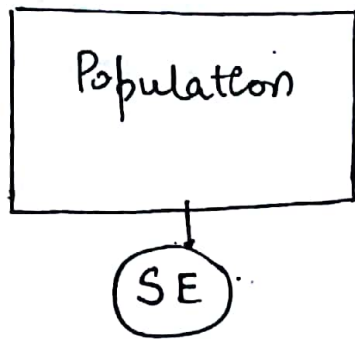
→ Unit free measure to compare 2 dissimilar variables

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

↓

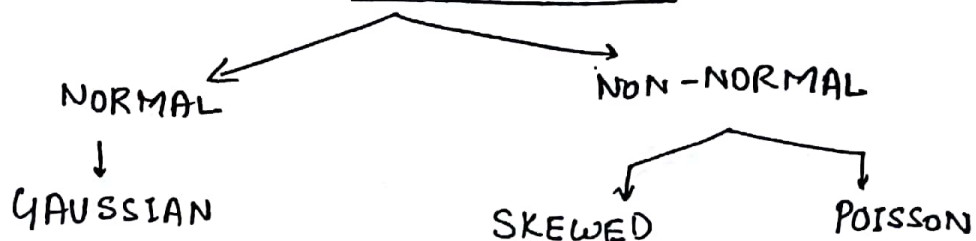
✓ Growth chart

✓ BMD of osteoporosis

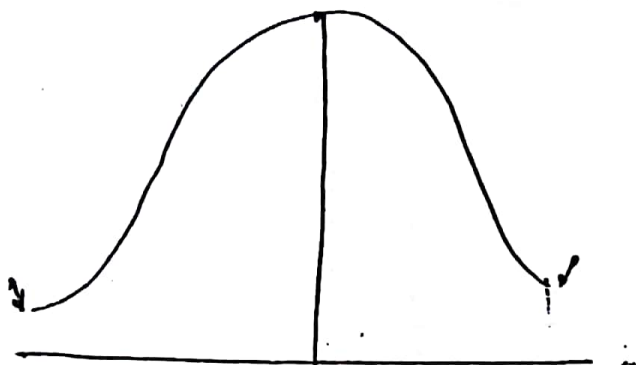


TOPIC-3 DISTRIBUTION OF DATA

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GAUSSIAN



- 1) Bell shaped
- 2) B/L Symmetrical
- 3) Tails Touch x -Axis from $-\infty$ to $+\infty$
- 4) Area under curve 100% or 1
- 5) Mean = Median = Mode \rightarrow Not the absolute values
- 6) S.D. = 1, Variance = $1^2 = 1$

THEOREMS

$$\text{Mean} \pm 1\text{S.D.} = 68\%$$

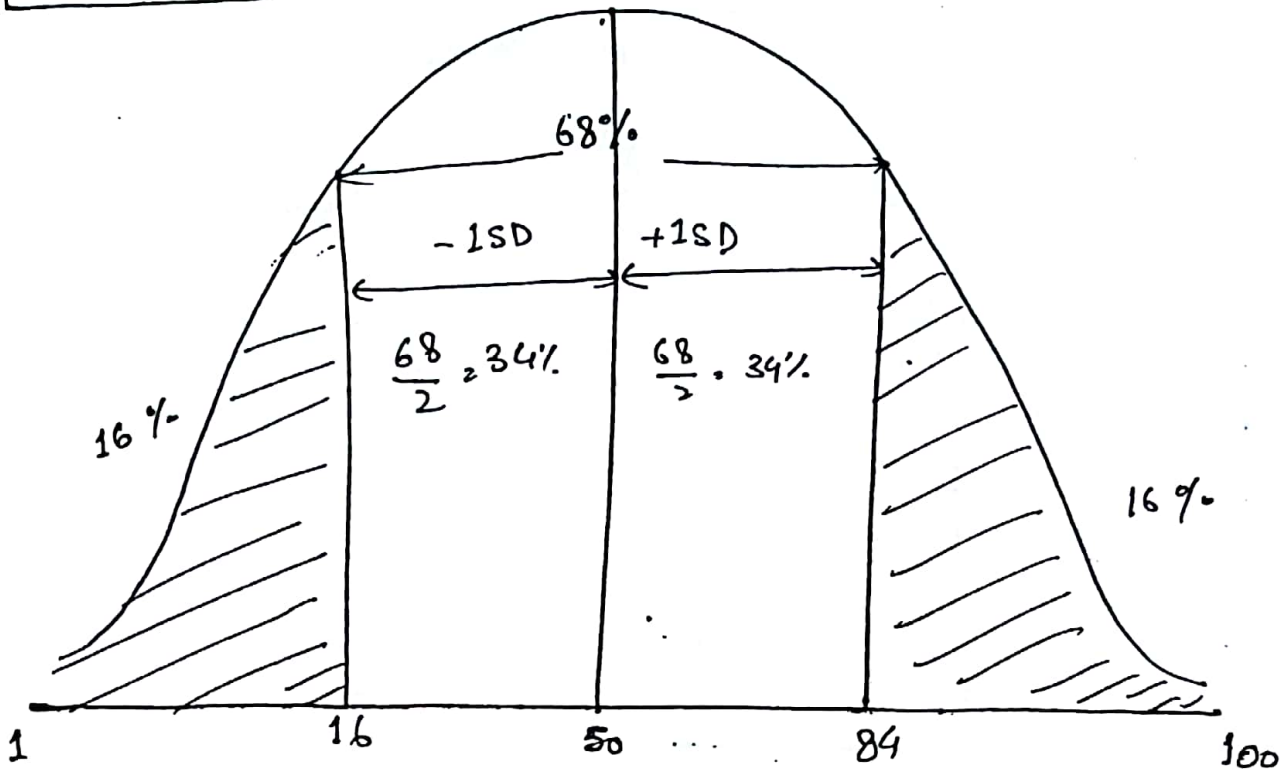
or

$$\text{Median} \pm 2\text{SD} = 95\%$$

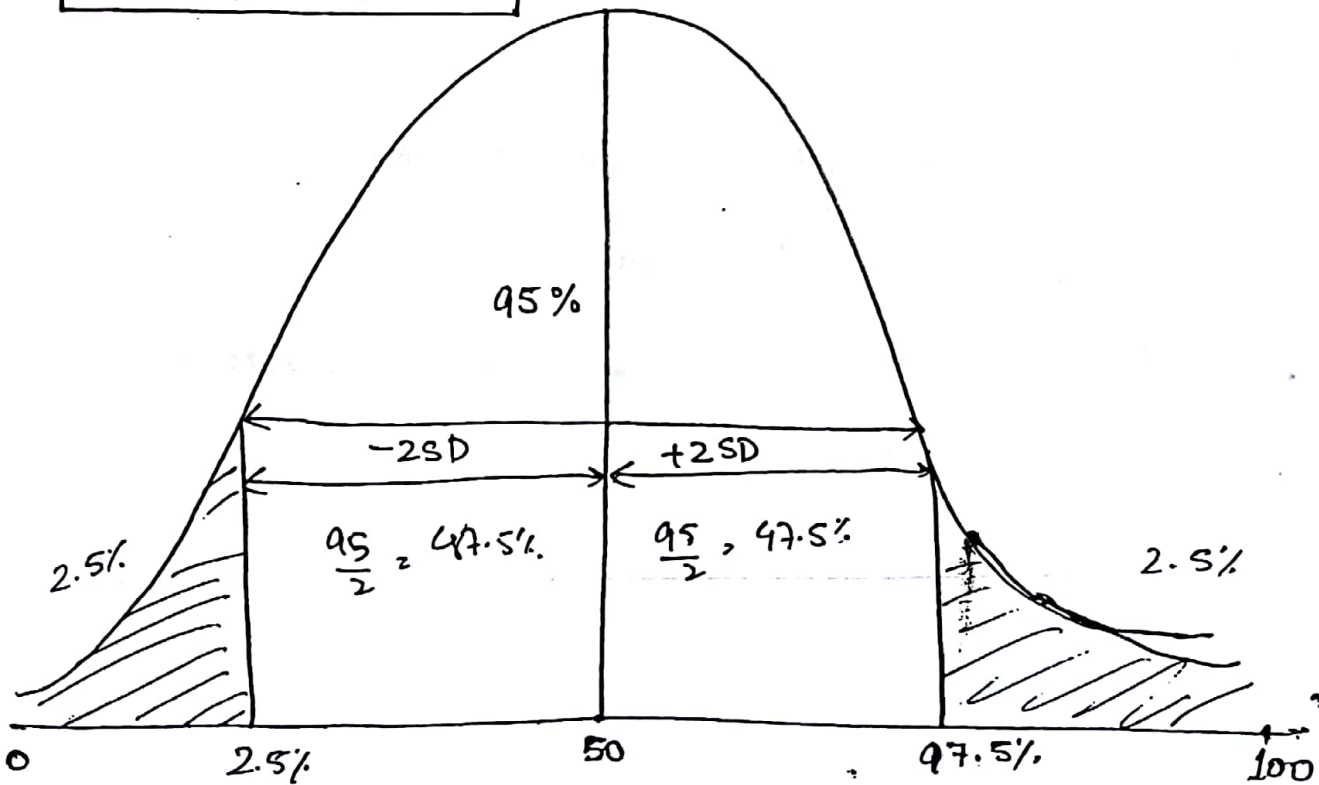
or

$$\text{Mode} \pm 3\text{SD} = 99\%$$

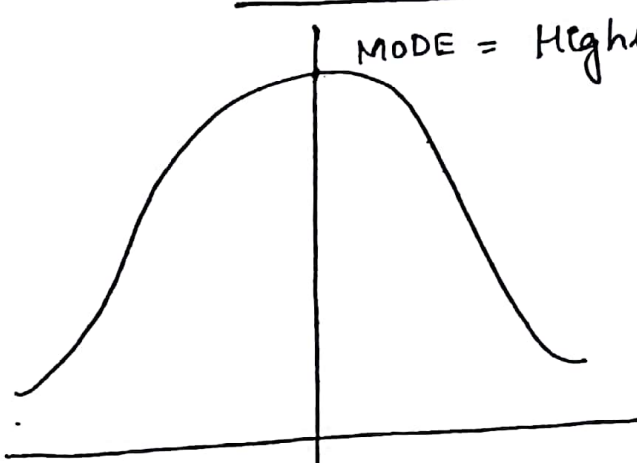
Mean \pm 1SD = 68%



Mean \pm 2SD = 95%

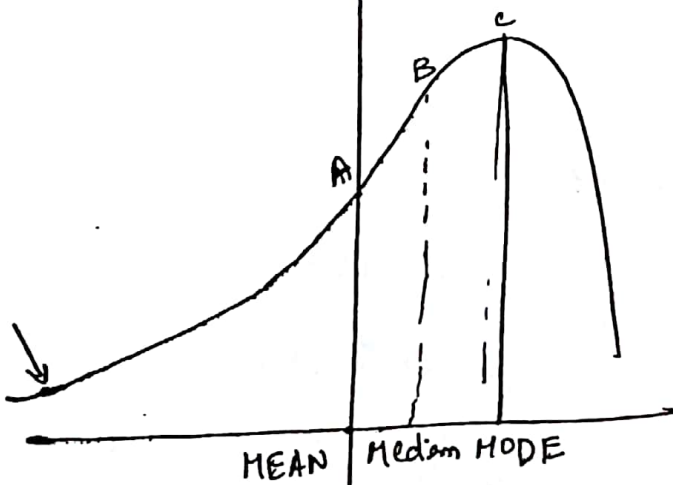


SKEWED



NORMAL

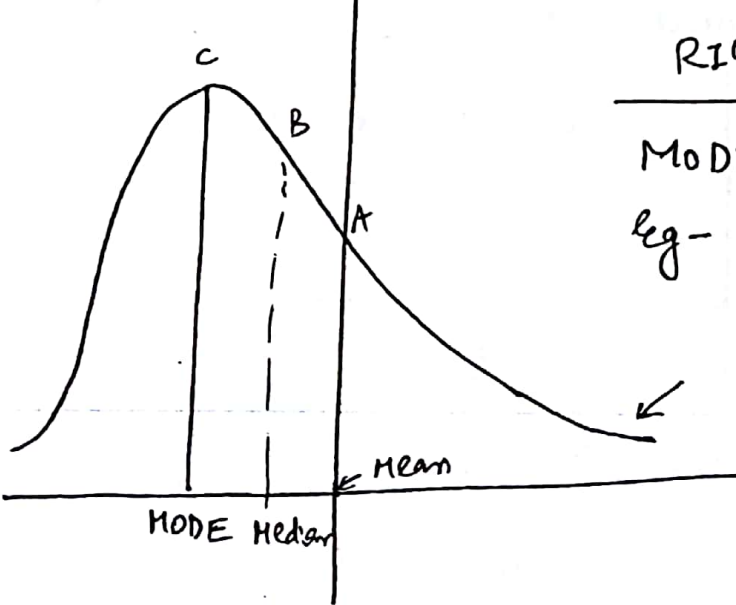
MEAN = MEDIAN = MODE



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

eg. → No. of email 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)

QUALITATIVE
(How is it)

* Majority of variables can be both.
Depending upon 'How much they are measured'

wt - 120kg / 70kg / 40kg

overwt / (N) / under wt

* But some variables are purely Qualitative - like race, religion.

Gender

only No.
↓

Frequency / sample size

No. + METRIC SCALE

↓

Quantitative variable

Q. In a class of 400 students, 220 are boys¹⁹
+ 180 are girls

Variable \Rightarrow Gender

220 + 180 are frequency of sample size

II \rightarrow BINARY/DICHOTOMOUS
2 ANSWERS
ex. Yes/No
Rh +/-

POLYTOMOUS
> 2 ANSWERS.
Tall/Med/short
ABO Bl. Grp.

III \rightarrow DISCRETE
 \downarrow
can't take in between values
ex. No. of siblings
Pulse Rate

CONTINUOUS
can take in between values
wt. - 80.2
Temp - 37.9
Hb - 11.2
BP

A variable can take any of these 3 classifications
eg. wt can be Quantitative, continuous.
Polytomous

Topic 4b 7 SCALE OF MEASUREMENT 20

CATEGORICAL

METRIC / DIMENSIONAL

Qualitative Data

Quantitative Data

NOMINAL

ORDINAL

INTERVAL

RATIO

Names Only

Ordered Data

In stats we don't use them separately.

Race
Religion
Gender

Severity of Disease
TNM staging
Socioeconomic status

Wt. (kg)
Ht (cms)

MODE

MEDIAN

MEAN

1) LIKERT SCALE

1) Type of Ordinal Scale



→ ~~Summative~~ scale

2) SUMMATIVE SCALE

Summarise human behaviour.

3) Ordinal scale → median
mode

4) Ex - visual analogue & Pain scale

TOPIC 5) GRAPHICAL REPRESENTATION OF DATA

QUALITATIVE

① BAR LINE

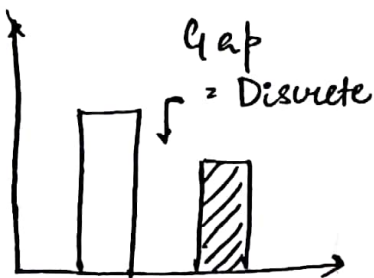


400 students

220 Boys

180 Girls

② PIE



QUANTITATIVE

HISTOGRAM

FREQ POLYGON

L LINE DIAGRAM

CUMULATIVE! FREQ

POLYGON / OGIVE

SCATTER DIAGRAM

MISC

PICTOGRAM

TREE

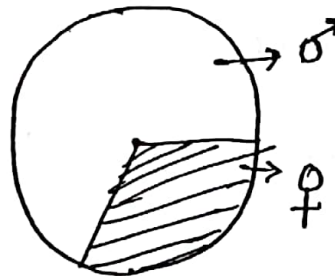
SPOT MAP

VENN

STEM &

LEAF

QUARTILES



PIE

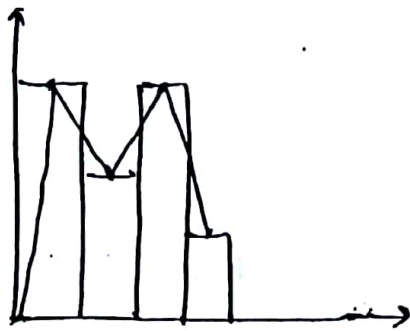
QUANTITATIVE DATA

Ht (cm)	f	n	cumulative frequency
140.1 - 150	150		150
150.1 - 160	100		250
160.1 - 170	130		380
170.1 - 180	20		400
	400		

FREQ TABLE

CUMULATIVE FREQ TABLE

FREQ TABLE



Join mid points.

HISTOGRAM

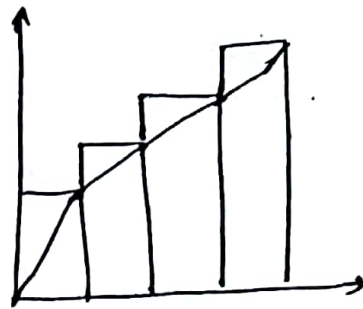


FREQ POLYGON / ~~CURVE~~
CURVE



LINE DIAGRAM
(provides trends)

CUM. FREQ TABLE ²²



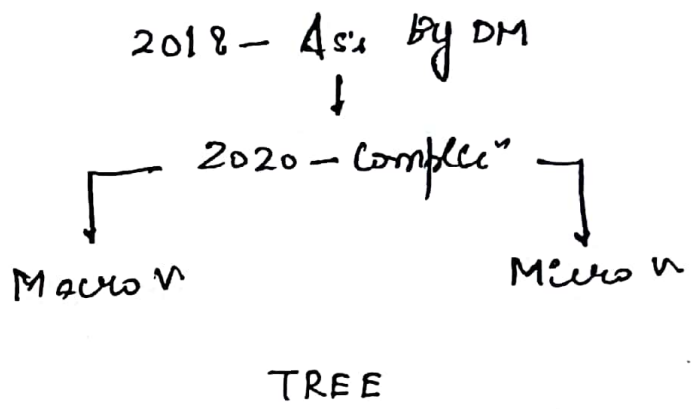
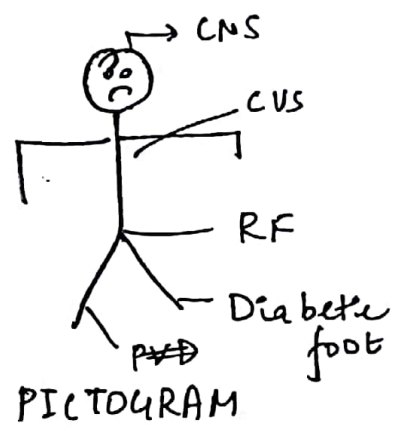
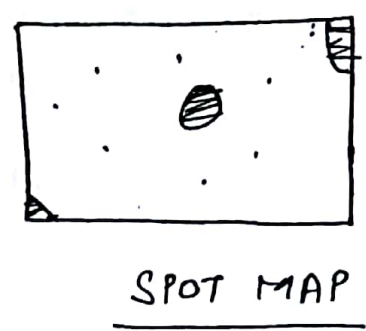
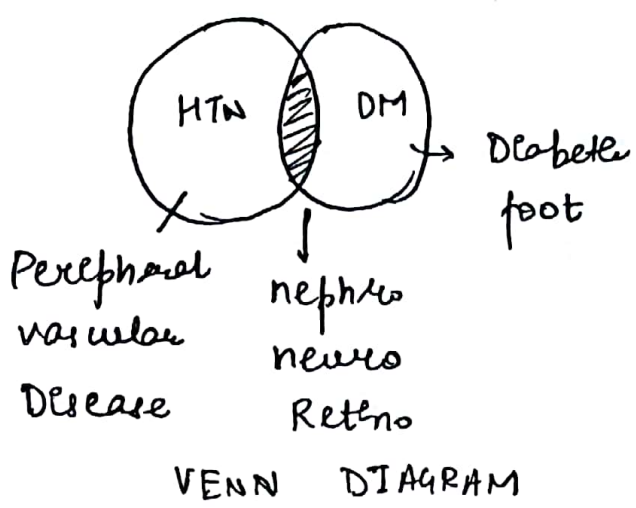
Join end points.

OGIVE / CUM. FREQ
POLYGON

MISCELLANEOUS DIAGRAMS

Suppose I want to explain to an illiterate person-

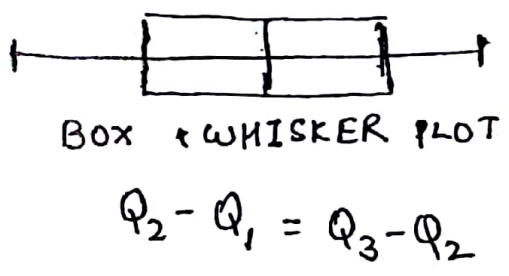
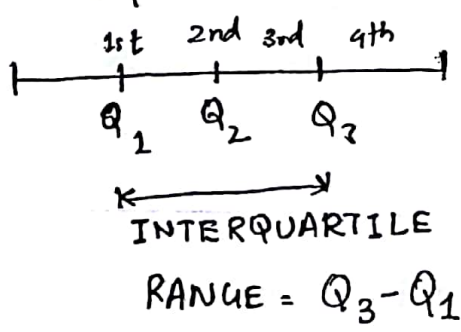
- 1) Complicaⁿ of DM → PICTOGRAM
- 2) Progression of DM → TREE
- 3) Complicaⁿ of DM + HTN → VENN
- 4) Geographical Distribution of DM in Delhi → SPOT MAP



QUARTILES

NORMAL D.

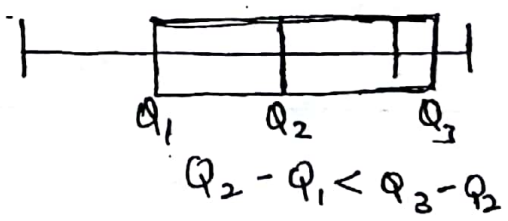
EQUAL



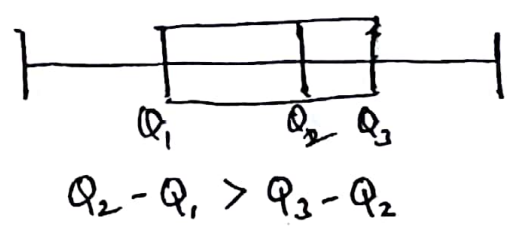
ON-NORMAL D.

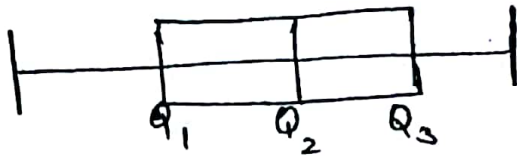
UNEQUAL

⇒ POSITIVE SKEW



⇒ NEGATIVE SKEW





TOPIC-6

PROBABILITY

DEPENDENT

↓
ADD

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

INDEPENDENT

↓
MULTIPLY

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

TOPIC-7A.

SAMPLE SIZE

$$n = \frac{4pq}{d^2}$$

At 95% confidence interval for all observational studies

AIMS

$$n = \frac{z^2 pq}{d^2}$$

↓ d error if given
remember to get
confidence *

where $z=1$, at 68% confidence

$z=2$, at 95% confidence

$z=3$ at 99% confidence

where, p = prevalence proportion
%

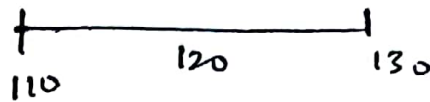
$$q = (1-p) \text{ or } (100-p)$$

I) $SBP_A = 120 \text{ mmHg}$

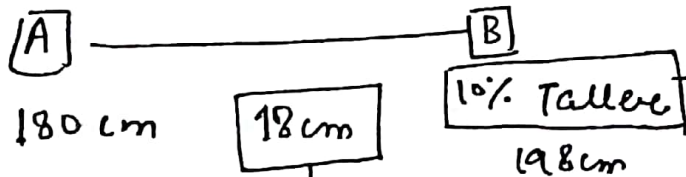
$\pm 10 \text{ mmHg}$

ABSOLUTE PRECISION

1	- 100	F	F
2	- 110	??	P
3	- 114	P	P
4	- 120	P	P
5	- 128	P	P
6	- 130	??	P
7	- 140	F	F



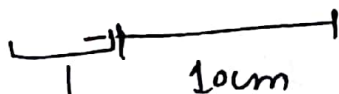
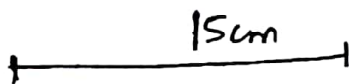
II



(RELATIVE PRECISION

Relative Difference

Absolute Difference
(ABSOLUTE PRECISION)



RELATIVE PRECISION

* UNIT OF ABSOLUTE PRECISION IS SAME AS THAT OF VARIABLE.

eg. 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%.

↓
 Bcoz it yields maximum sample size for a given absolute precision.

⇒ POWER effects sample size in case of
 "INTERVENTIONAL STUDIES"

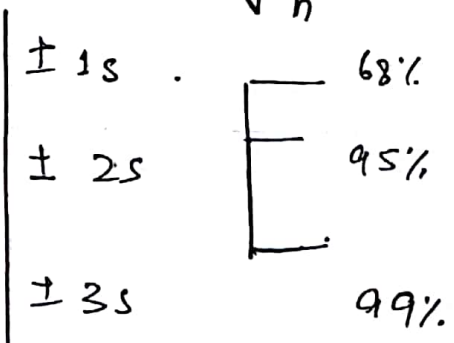
⇒ 1

TOPIC 8A7 CONFIDENCE



$S.E. = \sqrt{\frac{pq}{n}}$ $S.E. = \frac{SD}{\sqrt{n}}$

Mean $\pm 1SD = 68\%$
 or
 Median $\pm 2SD = 95\%$
 or
 Mode $\pm 3SD = 99\%$
 or
 Prevalence



SAME THEOREM.

⇒ Whenever Population / confidence is mentioned, we need to calculate **Standard ERROR**.

CONFIDENCE

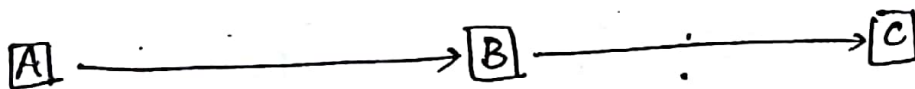
Research is done on sample & Results are generalised to the population.

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 = $1 - \alpha$ or $100 - \alpha$

INTERPRETATION OF CONFIDENCE



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

No Association
RR, OR = 1

No Relationship
 $\alpha = 0$

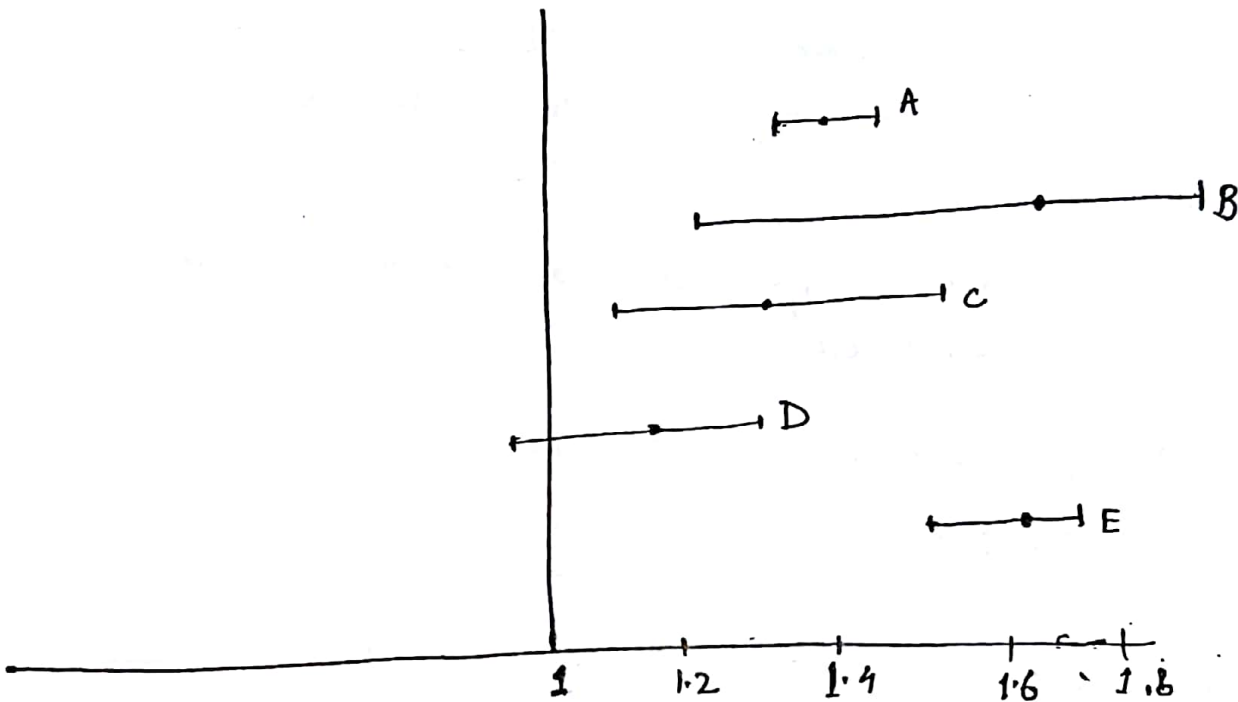
B - More the distance of null value from point estimate, more is the statistical significance

OR = 1, OR_{c-cig} = 1.4 OR_{NOB cig} = 2.4 OR_{BIDI} = 3.4

OR = 1. OR_{EXE} = 0.8 OR_{DIET} = 0.6 OR_{vitc} = 0.4 → $\frac{60}{100}\%$

C - Smaller the CI, more is the significance
 Sample size LARGE.

$$\left[\textcircled{\downarrow} SE = \frac{SD}{\sqrt{n} \textcircled{\uparrow}} \Rightarrow \downarrow CI = \pm 2SE \right]$$



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:

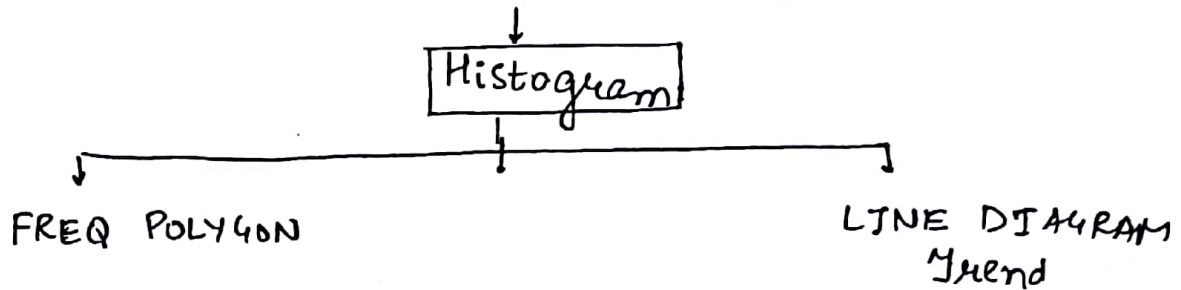
STATISTICAL TESTS

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- from Discussion paper.

SUMMARY

- 1> DISCRETE QUALITATIVE DATA — BAR
2> Continuous Quantitative Data — PIE



- 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

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I> Validity & Reliability from Discussion Paper

II> Bias . also from Discussion Paper.

MORBIDITY INDICATOR

INCIDENCE

- ① ~~POPULATION AT RISK~~
- ② RATE
- ③ CALCULATED FROM COHORT STUDIES
- ④ NEW CASES / POPⁿ AT RISK
- ⑤ Imp. for preventive services / planning

PREVALENCE

- ① ~~TOTAL POPULATION~~
- ② PROPORTION
- ③ CALCULATED FROM CROSS SECTIONAL
- ④ NEW + OLD CASES / Total Population
- ⑤ Imp. for curative services & planning

INTERPRETATION:-

1) Prevalence is of 2 types

POINT

→ Calculated from cross sectional study

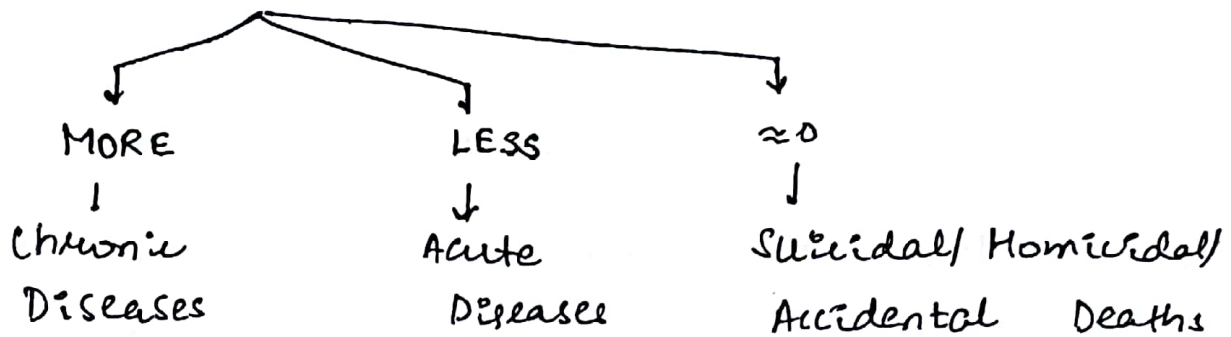
PERIOD

→ Calculated from longitudinal study

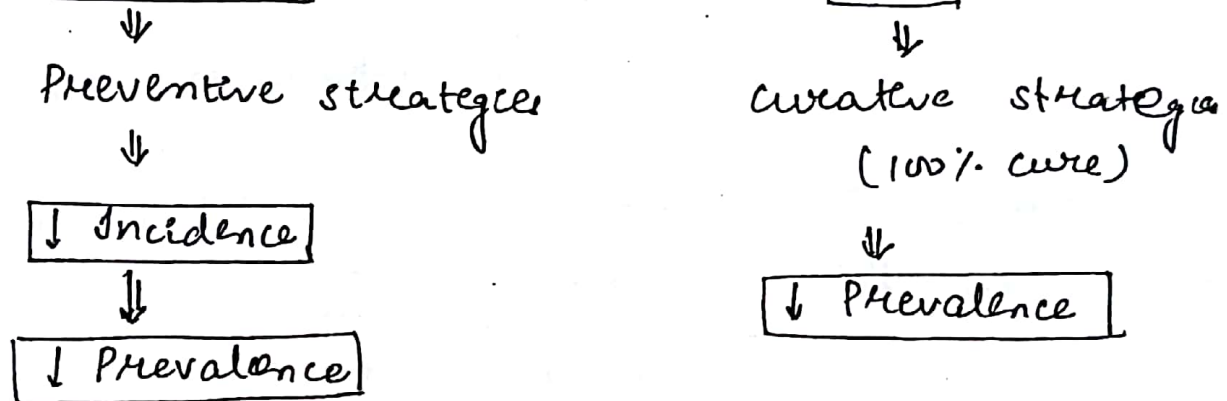
2) If nothing is mentioned we take it as point prevalence

3)
$$\frac{\text{PERIOD}}{\text{PREVALENCE}} = \text{INCIDENCE} \times \text{DURATION}$$

31



4) Prevention is Better than Cure



5) If for a previously fatal disease, a new Rx is initiated & prevents mortality but long 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 DM but ↑ses duration.

∴ Prevalence ↑ses.

MORTALITY INDICATORS

32

FORMULAE :

$$1) \text{ CDR} = \frac{\text{TOTAL DEATH}}{\text{TOTAL POPULATION}}$$

$$2) \text{ SPECIFIC DEATH RATE} = \frac{\text{TOTAL NO. OF DEATHS IN SPECIFIC AGE GROUP / Occupation / Gender / Location} \dots}{\text{Total Population}}$$

$$3) \text{ PROPORTIONAL D.R.} = \frac{\text{Total No. of deaths in specific age group / Occupation / Gender / Location} \dots}{\text{Total Deaths}}$$

$$4) \text{ CASE FATALITY RATE} = \frac{\text{Total Deaths due to Particular Disease}}{\text{Total No. of cases due to same Disease}}$$

MULTIPLICATION FACTOR

→ For all mortality & Morbidity Indicators
If total Population is not given, we take it
as $\times 1000$.

except MMR \rightarrow 1,00,000
et

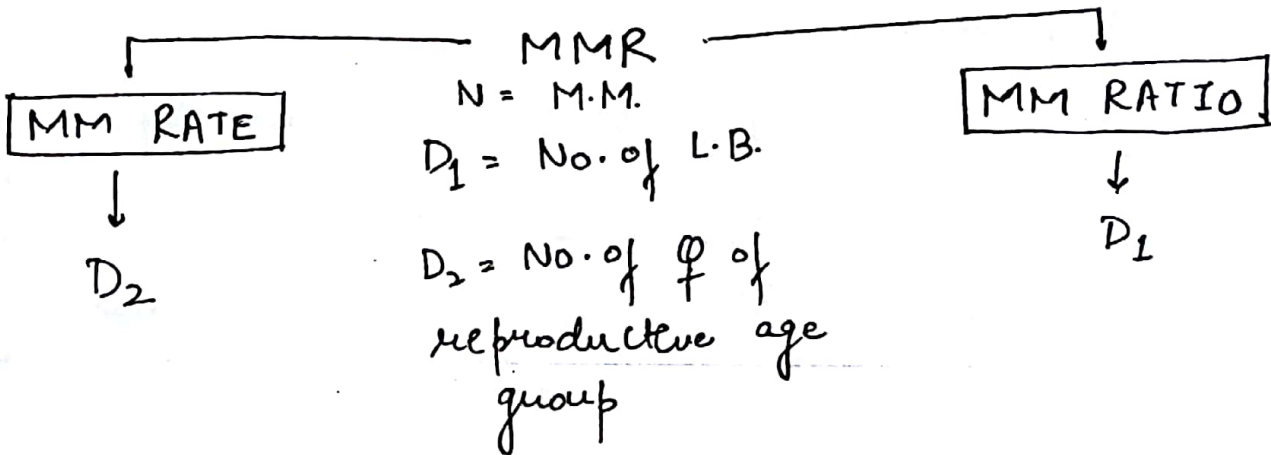
Case Fatality Rate
Survival Rate
Couple Protection Rate
~~Surv~~ 2° attack Rate

} → ·100

Pearl Index → 1200

RATE	PROPORTION	RATIO
Proportion + Time component	Prevalence = $\frac{\text{Total Cases}}{\text{Total Population}}$ Numerator is part of denominator.	Sex Ratio = $\frac{♀}{♂}$ Numerator is not the part of Denominator.

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



IMPORTANCE OF MORTALITY INDICATORS

34

1) BEST INDICATOR OF DISEASE BURDEN

a) mortality Indicator \rightarrow PROPORTIONAL D.R

b) morbidity Indicator \rightarrow PREVALENCE

c) Health Index \rightarrow HALE.

2) CFR-

a) \uparrow Killing Power of disease \rightarrow \uparrow virulence \rightarrow \uparrow CFR

b) Acute Disease

c) $CFR = 1 - \text{Survival Rate}$

or

$$CFR = 100 - \text{Survival Rate}$$

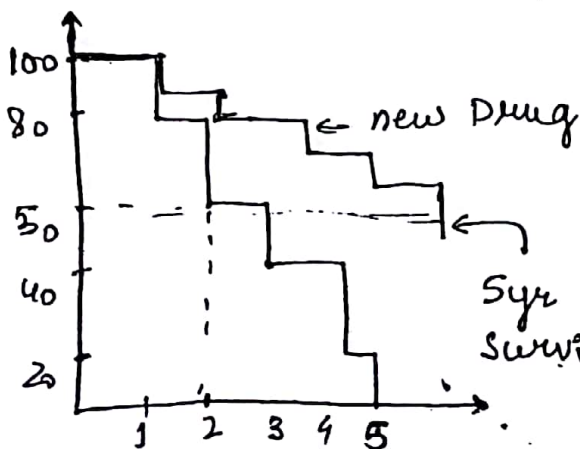
SURVIVAL RATE \rightarrow Cancers

a) prognosis

b) Yardstick for assessment of therapy

AIIMS KAPLAN MEIER CURVE \rightarrow survival

Special Type of Regression = 'COX'S STEPLADDER
PROPORTIONAL HAZARD PATTERNS



5yr survival = 0.

Median survival = 2 yrs

Max. Death occurs in 2 yrs
= 2 year.

a) 'AT RISK' Population

b) Comparison of Deaths in same Population

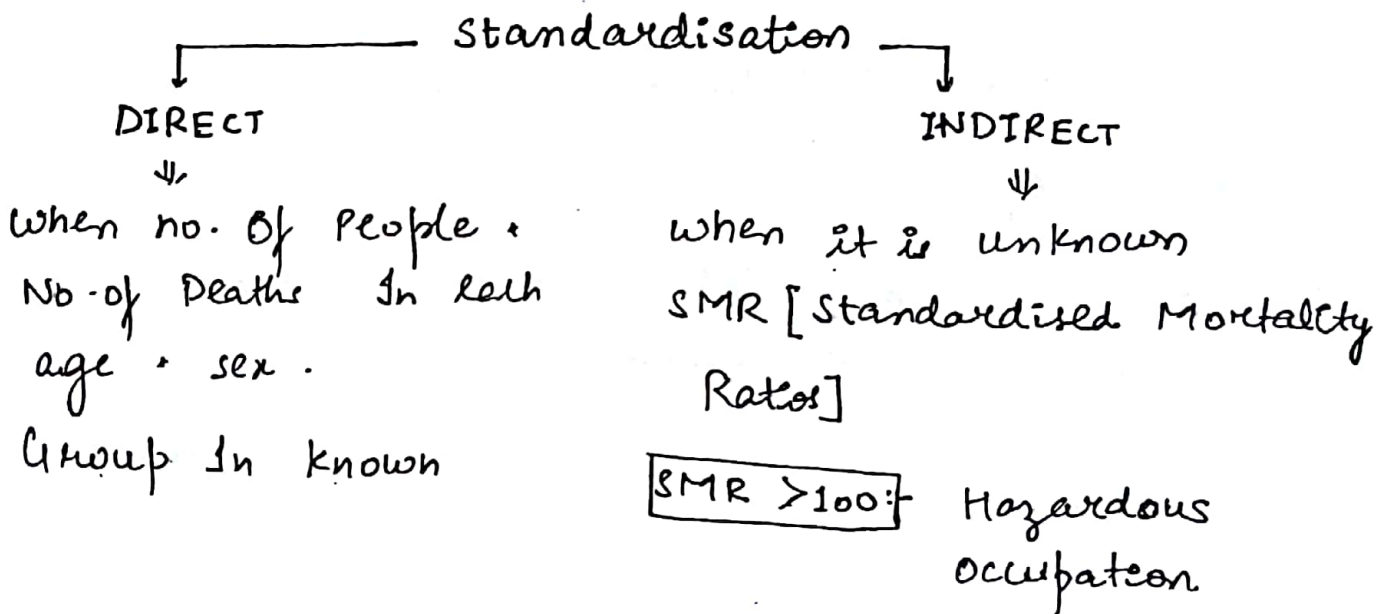
Standardised/ Adjusted D.R. ← Two Different Population

ADJUSTED/STANDARDISED

* STD. POPULATION -

→ National Population is not the Std. Population

→ Population where no. in each age & sex groups are known



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) DEFⁿ -

* 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 Diseases - ICDX

① consists of 22 chapters

② Revised every 10 yrs

③ Arranged in 3 volumes

ICD XI → 2018

SDG

Sustainable Development Goals.

17 Goals (Goal No. 3)
↳ health

27 TARGETS → To Be achieving By 2030

GLOBAL

37

→ MMR $< 70/1$ Lakh L.B.

→ NMR $< 12/1000$ L.B.

→ USMR $< 25/1000$ L.B.

↓ By 33% Premature mortality From NCD's

↓ By 50% Global Deaths & Injuries from RTA's

MATCHING AIIMS

1) DEFⁿ:-

Process of Selecting controls so that they are similar to cases \bar{c} regards to certain variables

2) CAUTION:-

OVER MATCHING



Don't match for variable of Interest as won't be able to get statistical Test

3) ELIMINATION - It eliminates Confounding known

4) DONE IN -

Case Control >> Cohort

CAUSATION / CASUALITY

38

10 FACTORS

Most Imp Study Design to study

1) CAUSALITY → Double Blind RCT

2) TEMPORALITY → COHORT

~~3)~~

A) TEMPORALITY - Most Imp. Mandatory

Exposure → Disease

Smoking → Lung Ca

MBBS → MD/Mc

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 to 1 disease.

Not possible to prove in Non communicable Disease

F) STRENGTH → Relative Risk

39

G) CONSISTENCY

H) COHERENCE

I) STUDY DESIGN

J) 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 → Immediate ~~underlying~~ cause of Death

Ib → Underlying cause of Death

Ic → Main underlying cause of Death

II → other condⁿ not directly leading to Death

Ia & Ic \Rightarrow MANDATORY

40

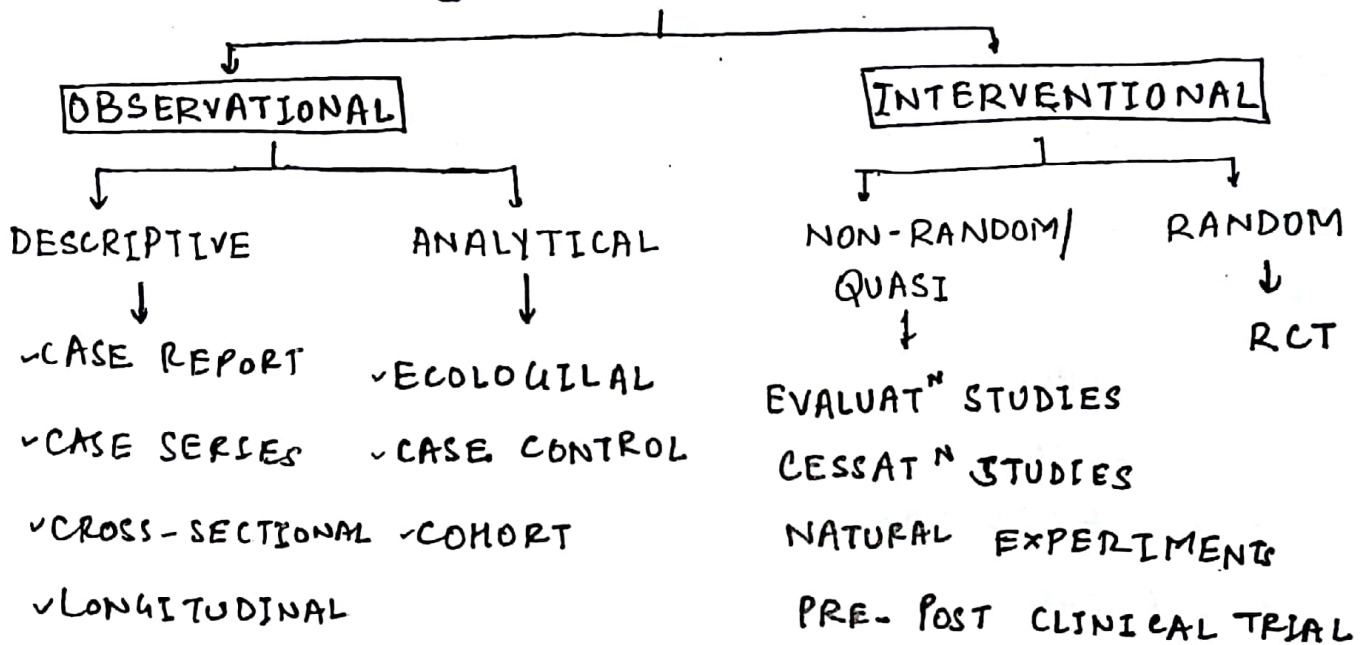
I & II \Rightarrow OPTIONAL

Ic is most imp. as we do ICD - classification

Based on it.

STUDY DESIGNS

[WHO CLASSIFICATION]



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

* PARK & MCG BOOK consider cross-sectional & longitudinal study as Analytical study is wrong

DESCRIPTIVE STUDY

41

No Comparison

No Temporality

1) CASE REPORT

single

2) CASE SERIES

Multiple

↓ [Ab (N) C/F / Diagnostic / Prognostic] feature.

1st study Done for any research.

3) CROSS - SECTIONAL

single

↓
Point Prevalence

4) LONGITUDINAL

Multiple

↓
Period Prevalence

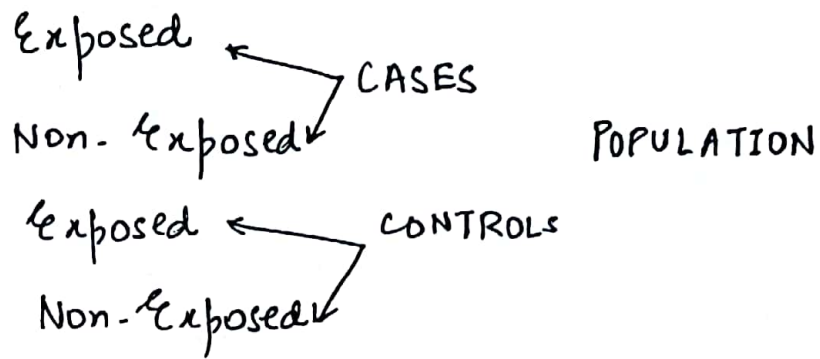
Snapshot studies i.e. Both exposure & Disease are measured at same time

← Done for Chronic Diseases →

CASE CONTROL

42

(I)



(II)

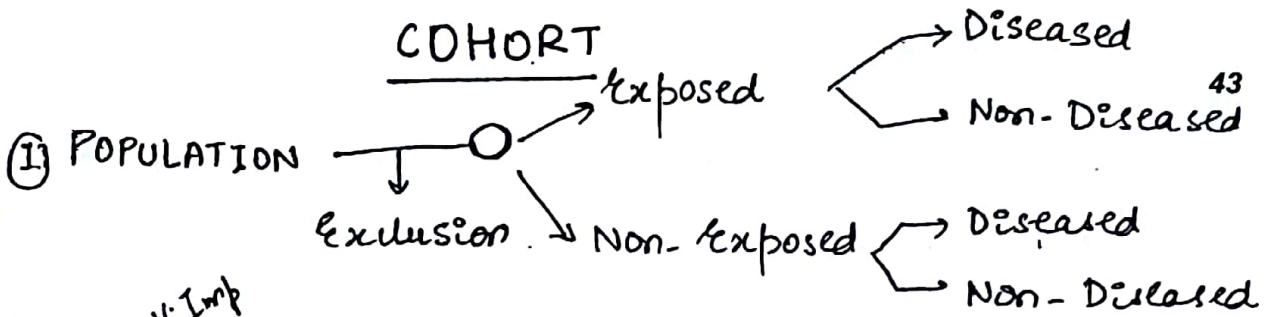
	Exposed	Non-exposed
CASE	a	b
CONTROL	c	d

(III)

$$\text{ODD's RATIO} = \frac{ad}{bc}$$

$$\text{ODDS RATIO} = \frac{\text{ODDS of Being Exposed in Cases}}{\text{ODDS of Being Exposed in Controls}}$$

$$\text{ODDS} = \frac{P}{1-P} = \frac{\text{Probability that event will occur}}{\text{Probability that event will not occur}}$$

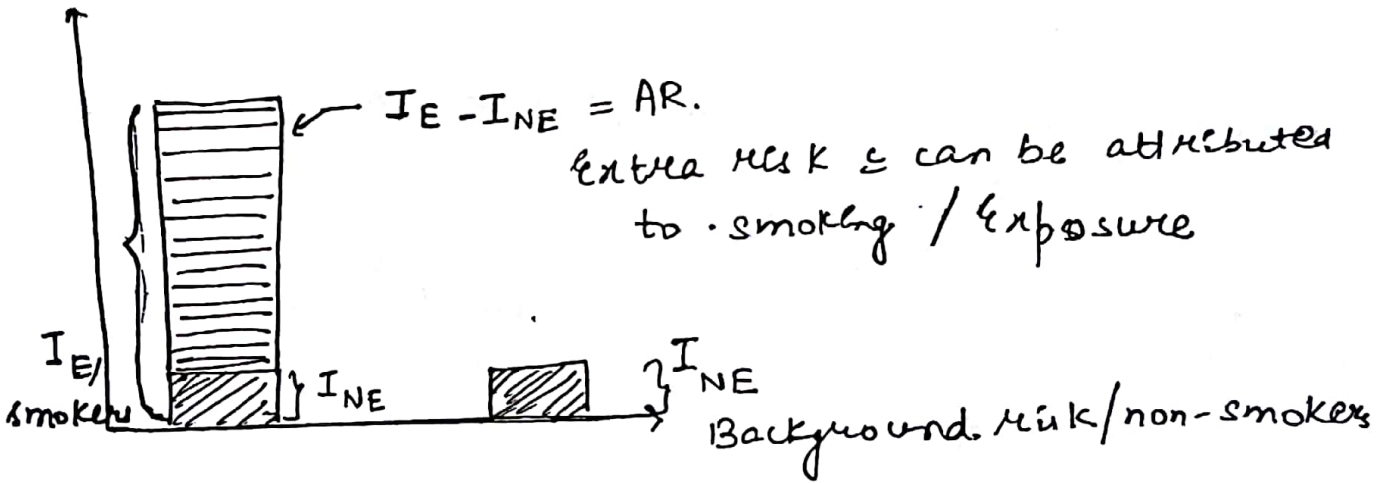


(II) V.V. Imp

	Dise	Non-Dise
EXPOSED	a	b
NON-EXPOSED	c	d

(III) $RR = \frac{a}{a+b} \div \frac{c}{c+d}$

RELATIVE RISK = $\frac{\text{Incidence of Disease In Exposed}}{\text{Incidence of Disease In Non-Exposed}}$



PROPORTION AR = $\frac{I_E - I_{NE}}{I_E}$ [AR do not have denominator]

RR = Imp. for clinicians

AR, PAR = Imp for Both

Population AR = Imp. for ~~clinicians~~ Public Health Specialists.

COMMON POINTS

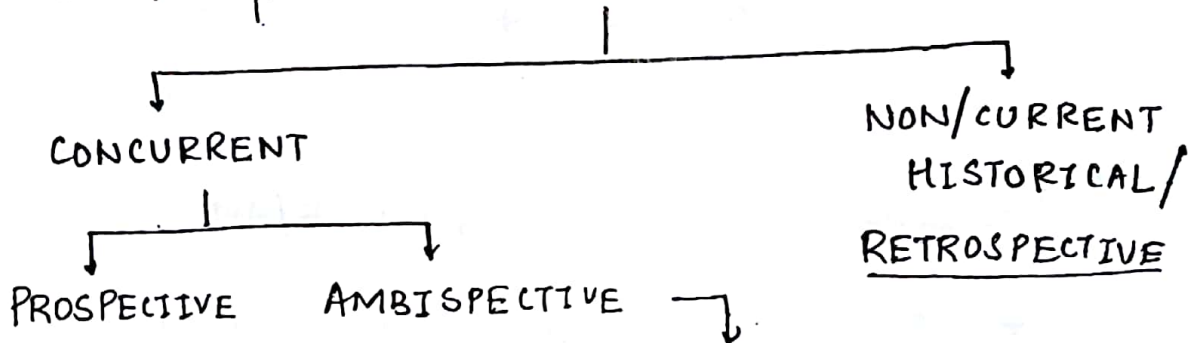
INTERPRETATION OF OR & OR ⇒

OR, RR	ASSOCIATION	
>1	+ve	RISK Factor
=1	NO	-
<1	-ve	Protective Factor

* In Both cohort + case-control study, multiple comparison groups can be taken For 1 case upto 4 controls can be taken.

TYPES OF COHORT

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



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

① At the start of study exposure has already occurred but disease has not yet occurred.
② ∴ at the start of study any person who is diseased would be excluded

Prospective

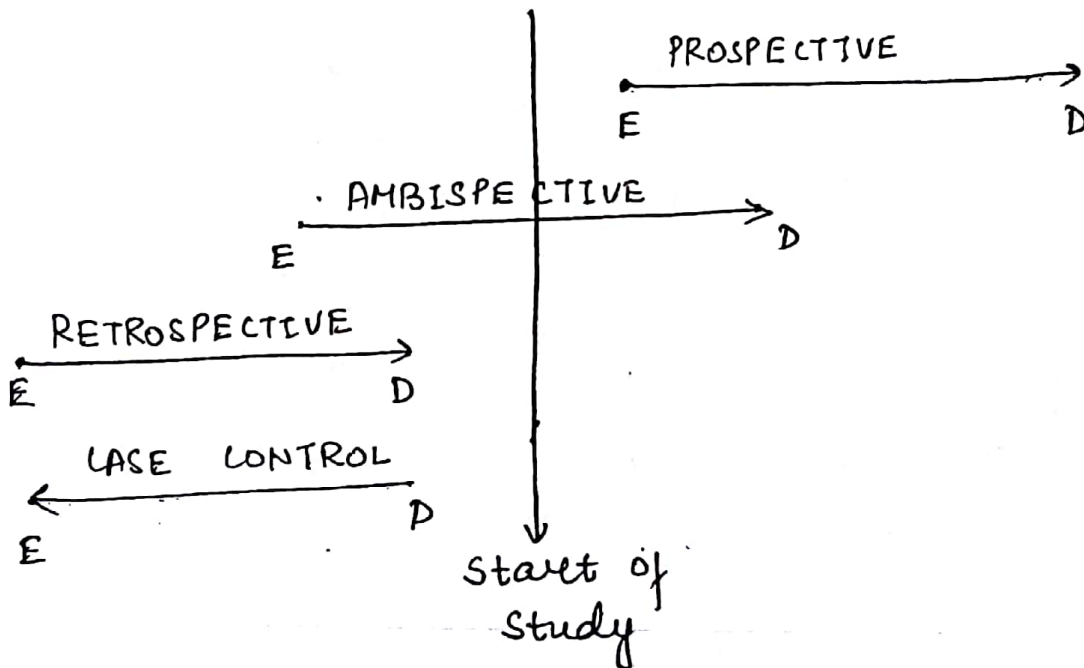
2) If any person is exposed & or diseased at the start of study they would be excluded

HISTORICAL

45

① At the start of study both exposure & diseased have occurred.

② It is differentiated from case-control study by the direction of arrow & retrospective study is ~~not~~ record based whereas case-control exposure is asked.



ECOLOGICAL STUDY

46

Population is the unit of study

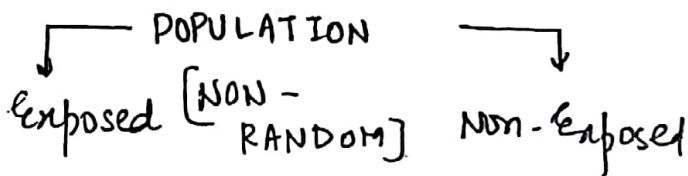
ECOLOGICAL FALLACY -

Generalising the findings of the population to an individual is wrong

Example - People from Japan have ↑ risk of Stomach cancer (ECOLOGICAL STUDY)

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

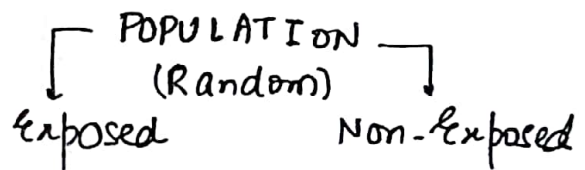
INTERVENTIONAL STUDIES



[COHORT]



NATURAL INTERVENTION



[RCT]



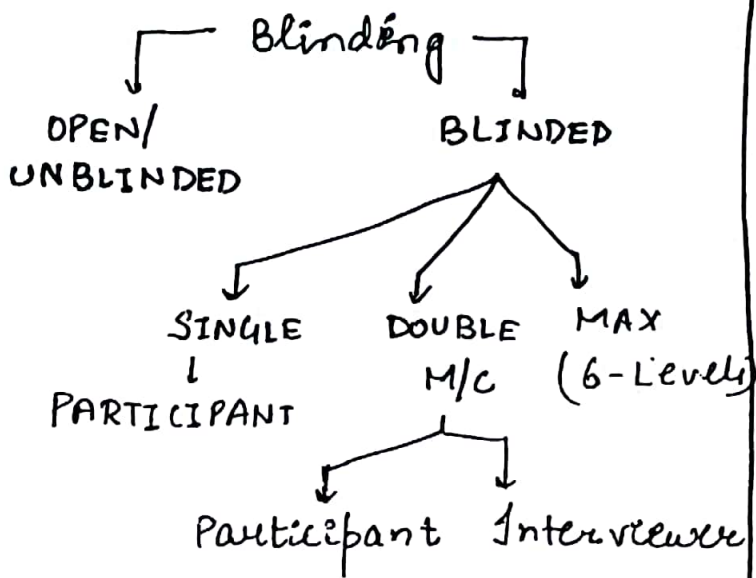
ARTIFICIAL INTERVENTION

DOUBLE BLINDING

- 1) It removes Interviewer Bias
- 2) Blinding Done Before Data collection

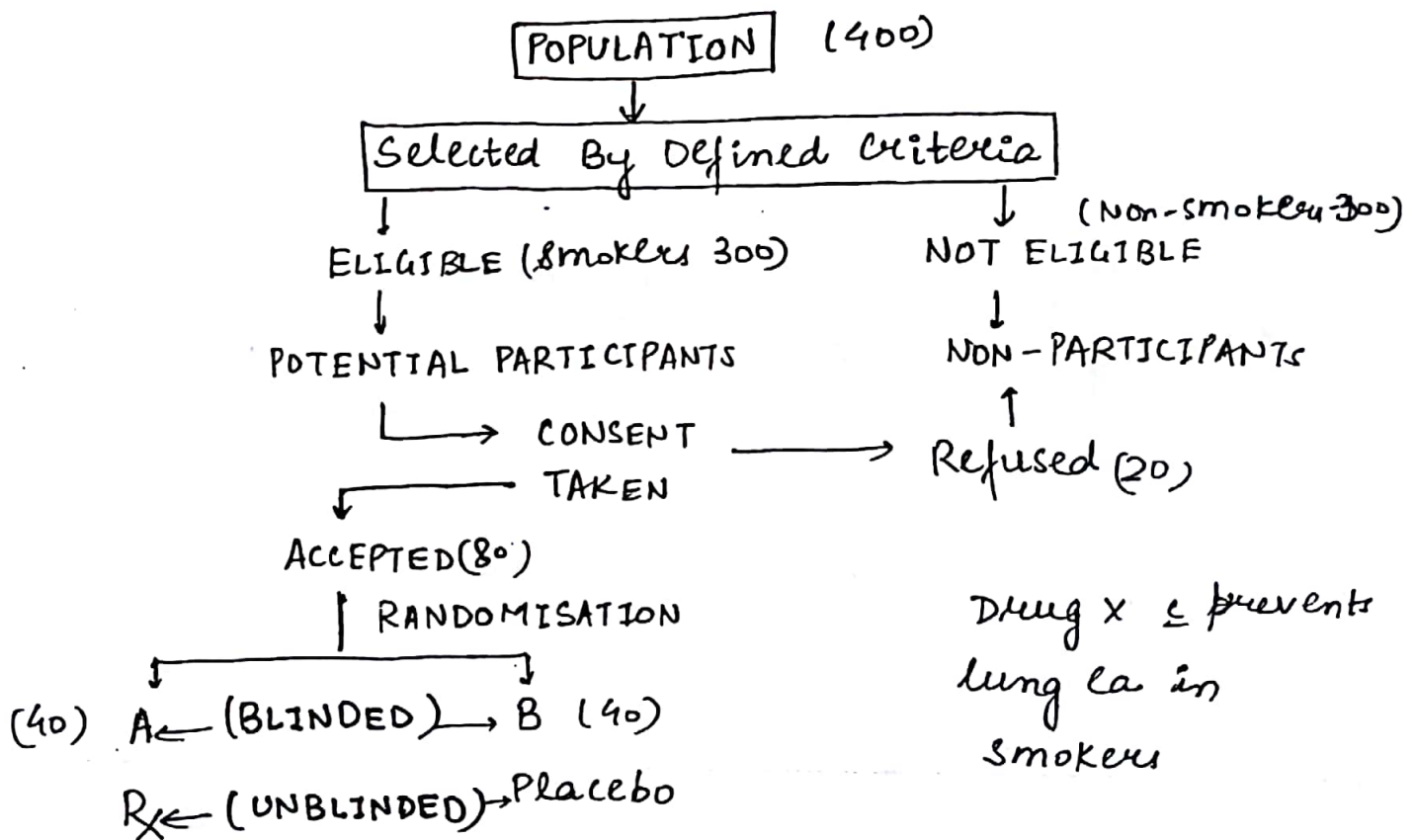
MATCHING

- It removes SELECTION BIAS
- Randomization done Before Recruitment.



↑ Uses Internal Validity
47
Makes Groups comparable
at Baseline

*[Single Blinding Doesn't Remove
Interviewer Bias]



- Metaanalysis & systematic review.
- Nested case control.
- Case-cohort.
- Types of RCT.

Chapter.	Chapter Name	Imp. Topics	NEET	AIIMS ⁴⁸
1)	History	Images	2	0
2)	Health & Disease	Prevention. HDI / PQLI / MPI	2	1
3)	Epidemiology	} — entire chapter	5	4
4)	Screening		4	3
5)	Common Disease	Basics Vaccination	4	1
6)	NCD	Cancers	1	0
7)	Health Programme	TB, HIV, New Prog	4	1
8)	Demography • Infertility Indicators	Demographic pyramid Fertility Indicators	2	1
9)	Obs & ped	one lines	5	1
10)	Nutrition	MU4 UP	2	0
11)	Sociology	useless	0	0
12)	Environment	Images MU4 UP	3	0
13)	BMW	Guidelines	2	1
14)	Occupational health.	NEW EST guideline.	1	0

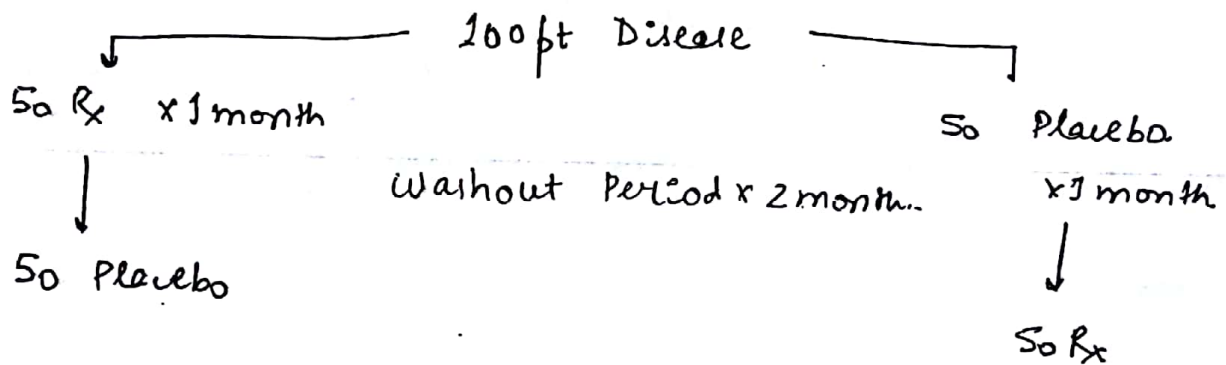
15>	Disaster	}	useless	0	49 0
16>	Mental Health				
17>	Genetics				
18>	Statistics		entire chapter	6	5
19>	Communication	}	Types, Delphi method. Mrz methode	1	0
20>	Management				
21>	Health care of community		community health system	2	1
22>	International health		useless	0	0

TYPES OF RCT

FACTORIAL RCT

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

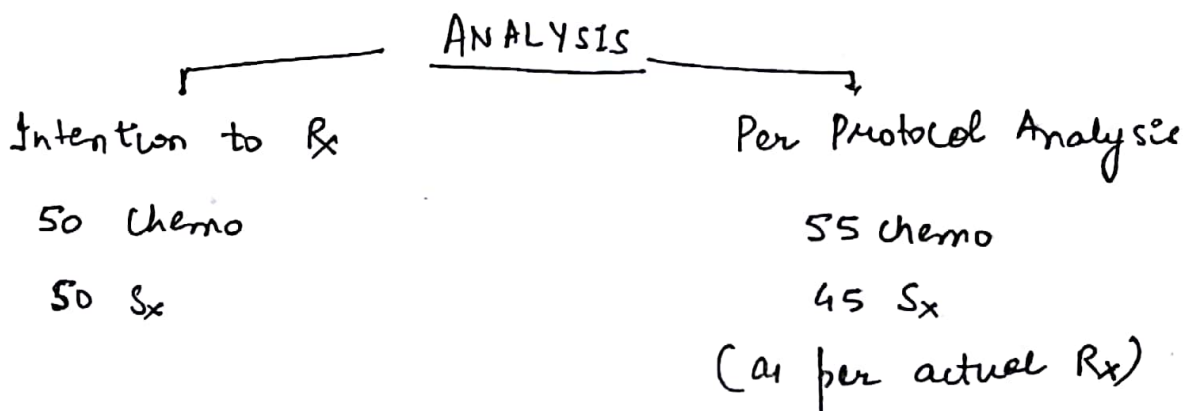
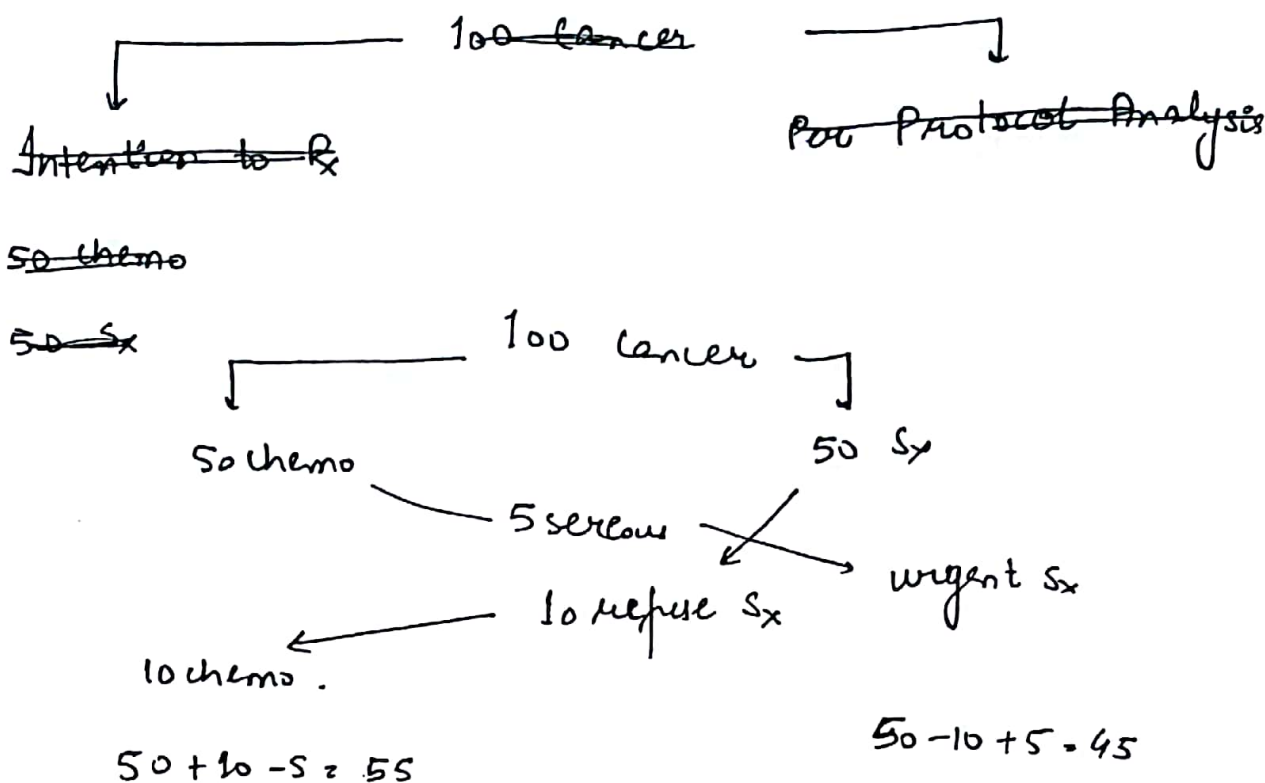
PLANNED CROSS-OVER RCT



It remove the ethical issues.
Rx should not involve Sx.

UNPLANNED CROSS OVER

50



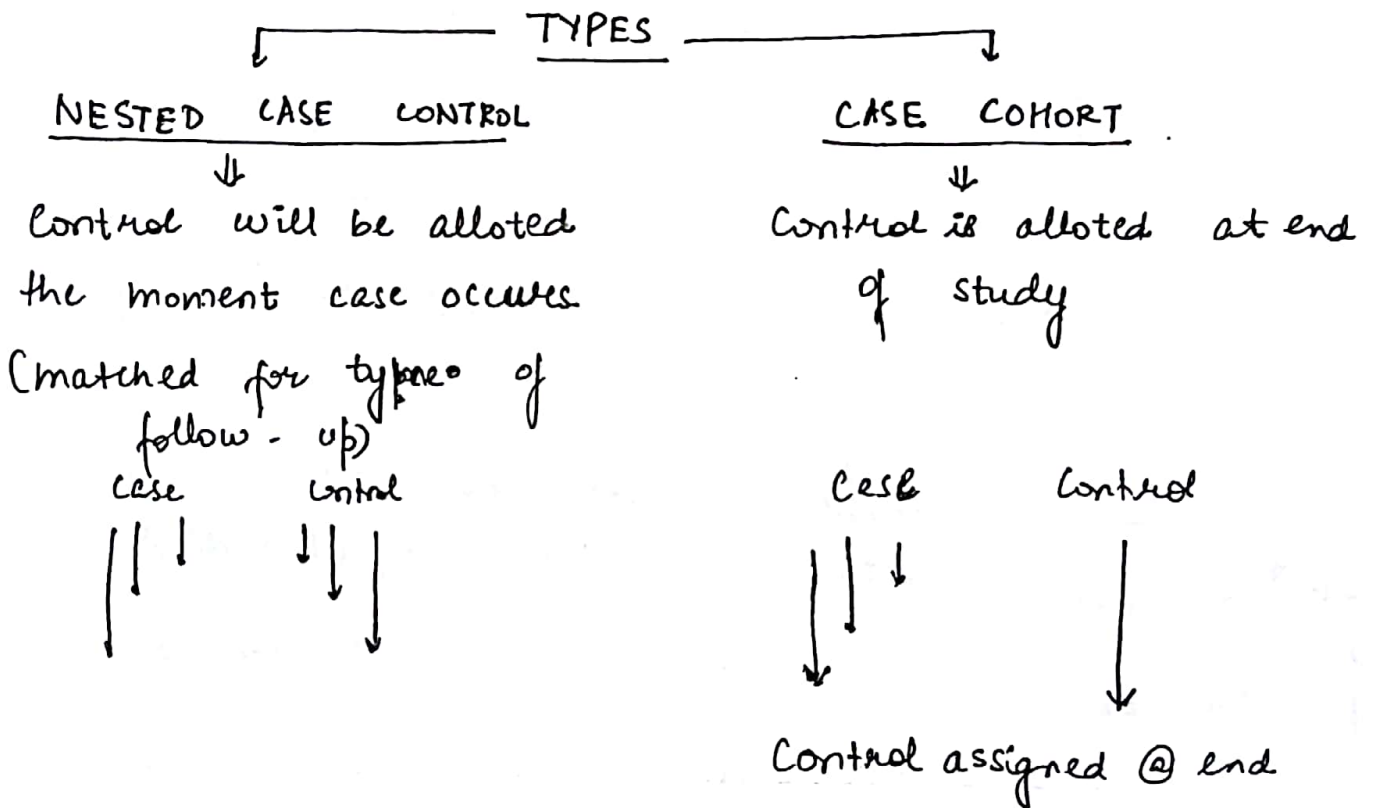
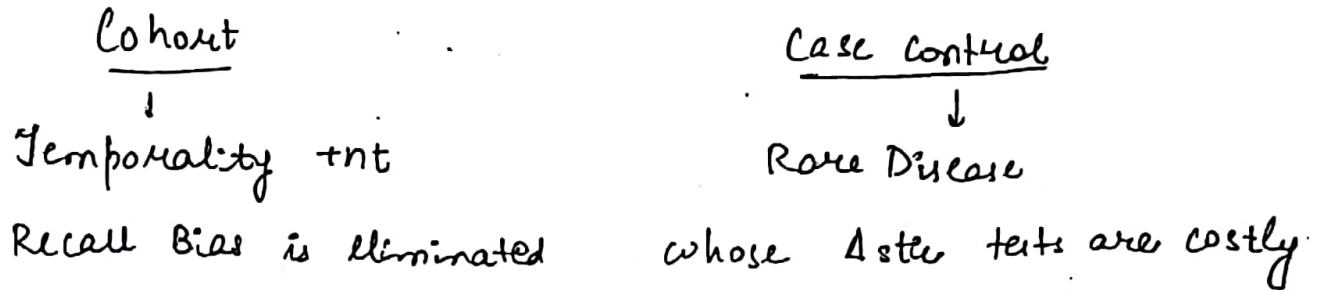
METAANALYSIS & SYSTEMIC REVIEW

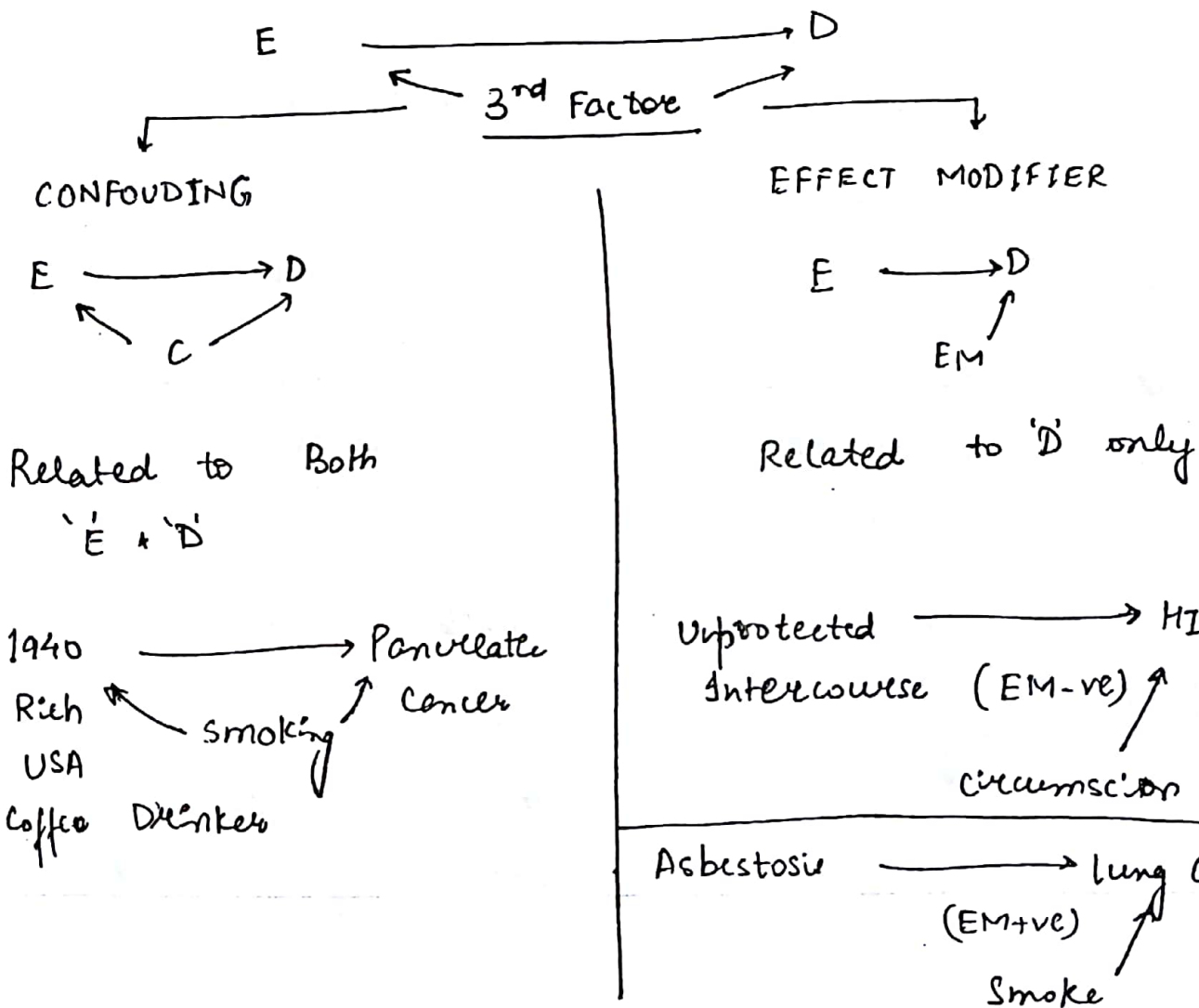
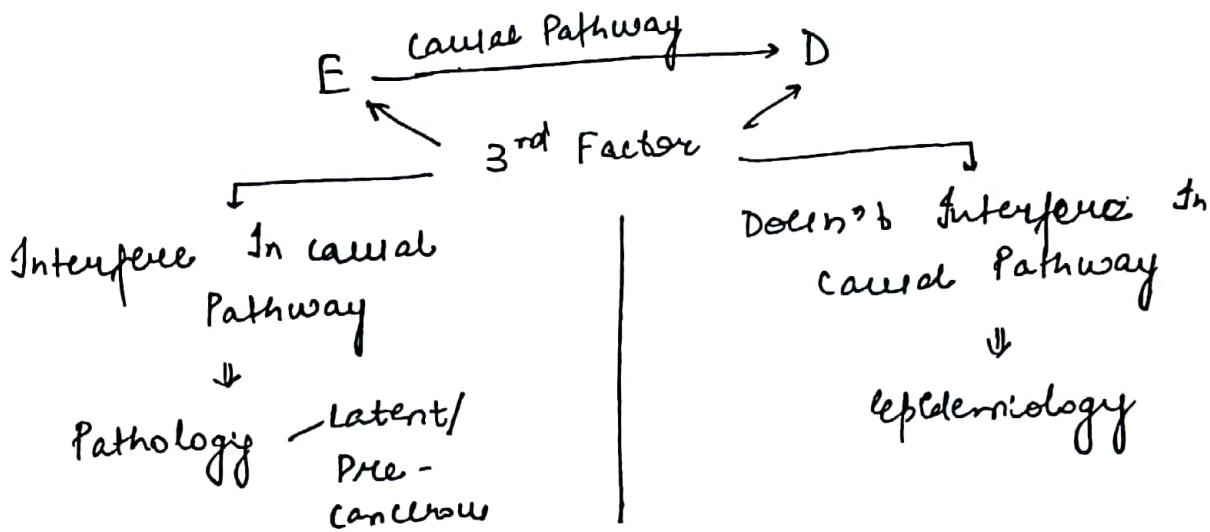
- 1) When multiple studies on a single topic are combined then sample size \uparrow \times hence power of study \uparrow
- 2) Summary statistics $\rightarrow I^2$
- 3) Summary Diagram \rightarrow Forest Plot
- 4) Limitation \rightarrow
 - a) GIGO (Garbage In, Garbage out)
 - b) Publication Bias \rightarrow Funnel Plot

c) apple + orange effect - Compare dissimilar things ⁵¹

ADVANCED COHORT STUDY

- 1) Predominantly cohort (Because of forward direction)
- 2) Mixed study design (Cohort + Case control study)





METHODS OF REMOVING 3rd FACTOR -

- 1) Randomisation - Best
(Removes Both Known & Unknown)
- 2) Matching - Removes only known
- 3) Stratification - g. unadjusted.

or
1.9.

↓ stratification By 3rd factor

2 Groups will be formed

\bar{c} 3rd Factor

If Adjusted OR is same
In Both Groups

↓
Confounder

OR_{adj} = 1, OR_{adj} = 1
In Grp 1 In Grp 2

\bar{c} out 3rd factor

Diff. in Both Groups

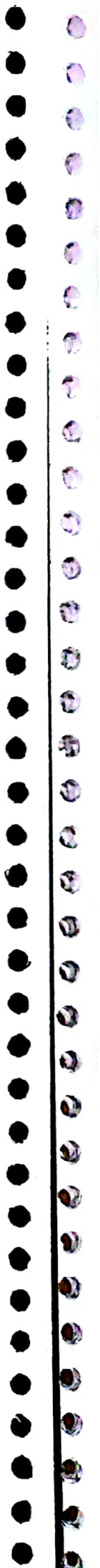
↓
Effect Modifier

OR_{adj} = 1.5
In Group 1

OR_{adj} = 1.1
In Group 2





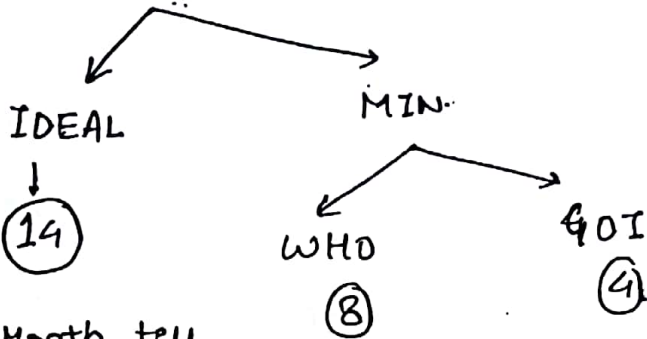


OBSTETRICS

57

ANC

I> ANC visits



1 visit / Month till
7 month → (7)

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

1 visit / every week.
9th month (4)

$$9 \text{ month} + 7 \text{ day} = \frac{1.}{14}$$

1st visit < 12 wk
(early Registration)

2nd visit 14-26 wk

3rd visit 28-34 wk

4th visit > 36 wk

PNC Visit = No schedule

HBPNC = Home Based Post Natal Care

ANM + ASHA WORKER MAKE HOME VISITS TO 58
PROVIDE PNC CARE.

SCHEDULE

Hospital Delivery

3, 7, 14, 21, 28, 42

Home Delivery

Day 1 (Extra)
Rest same

ANC SERVICES UNDER RMNCHA

I> LAB INV.

SUB CENTRE

a) UPT KIT

b) Hb

c) Urine → albumin
 → sugar

d) RDT (malaria)

PHC + ABOVE
Subcentre +

1) VDRL

2) HbsAg

3) HIV

4) Blood Grouping

5) RBS

NISCHAY → UPT Kit
NIKSHAY → T.B.

NEET 2018

II> INTERVENTIONS -

1) Deworming - Albendazole is c/I. in 1st Trimester

DOC in 1st Trm

DOC in 2nd + 3rd Trm.

↓
MEBENDAZOLE

100mg BD x 3 days

↓
ALBENDAZOLE

400mg OD to chew
stat

2) CALCIUM

59

RDA ♀ = 1200 mg/day

Calcium is given as supplement in form of

CaCO_3 500mg BD from Day 1 of 14th week POC.
till 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

@ an interval of
4-6 weeks.

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

c) If ♀ who is completely ~~un~~ unimmunised comes to
you at ~~POC~~

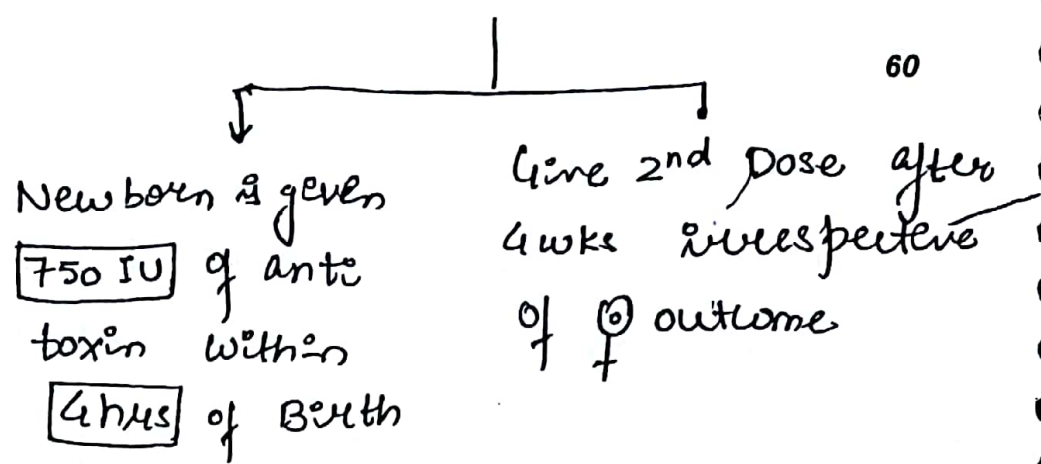
POC < 36 wks

POC > 36 wks



Give T.T. as would be given
to N ♀

Give 1st Dose of T.T. &
explain to mother that
this dose won't protect
her baby from
MNT (maternal neonatal
Tetanus)



4) IFA :- ★★

a) 100mg of elemental Iron + 500 µg Folic Acid

b) In 300mg of FERROUS SULPHATE SALT
(% of elemental Iron = 33%)

c) Red coloured capsule / Tablet

d) To be consumed with LEMON WATER

e) after food

f) from Day 1 of 14th week POC till 6 months post Delivery (1yr)

Hb	> 11	→ OD	→	365
	9-11	→ BD	→	365 x 2
				= 730

CALCULATION

61

* NO. OF $\textcircled{+}$ IN A YEAR -

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

$$y = x + \underbrace{10\% x}_{\text{abortion}}$$

Q. B.R. = $\frac{20}{1000}$ subcentre Popu. $\rightarrow (5000)$ $y = ?$

$$y = \left[\frac{20}{1000} \times 5000 \right] + \frac{10}{100} \left[\frac{20}{1000} \times 5000 \right]$$

$$= 100 + 10$$

$$= 110$$

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

DELIVERY

CLEANS OF SAFE DELIVERY :-

Clean Hand

Cord-cut

" Table

Tie

" Towel

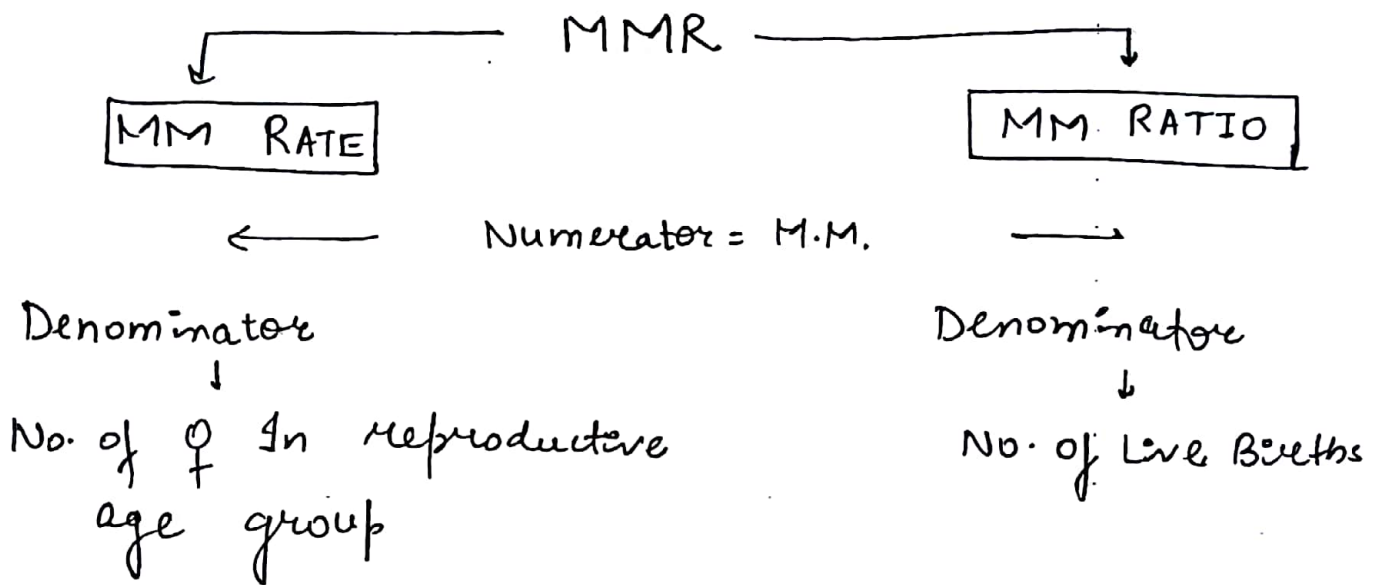
Stump

" Water

MATERNAL MORTALITY

62

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



Most type of Maternal Death is ⇒ POST PARTUM.

CAUSES

DIRECT

Haemorrhage (37%)
(APH + PPH)

Abortion

Sepsis

Eclampsia

Others

INDIRECT

Anaemia (55%)

MCC of MM -
Haemorrhage
Anaemia
PPH

63

PROGRAMMES

1) PMSMY (Pradhan Mantri Surakshit Matritva Yojna)

9th ~~April~~ ^{Every} 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

2) COLOUR CODED PROGRAMME

RED = High Risk ♀

GREEN = Normal

BLUE = PIH

YELLOW = Systemic Diseases

3) 1st ♀ AID YOJNA SCHEME

Every ♀ female for a successful 1st ♀ would get 6000 Rps as Incentive
1000 = JSY
5000⁺ under this Programme

INFANTOMETER

64

used to measure ht of Baby till 2 years

I-NIPI (V.V.I.)

(Intensified National Iron Plus Initiative)

This is under POSHAN ABHIYAN



PM's overarching scheme for
Holistic Nourishment.

SLOAN - Sahi Poshan, Desh Roshan

VISION - Anaemia mukt Bharat

6 x 6 x 6 PYRAMID

6 Interventions 6 Beneficiaries 6 Institutional
Mech.

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

→ 6 BENEFICIARY GROUPS

6 - 59 months

15 - 19 ♀

15 - 19 ♂

♀ In reproductive age group.

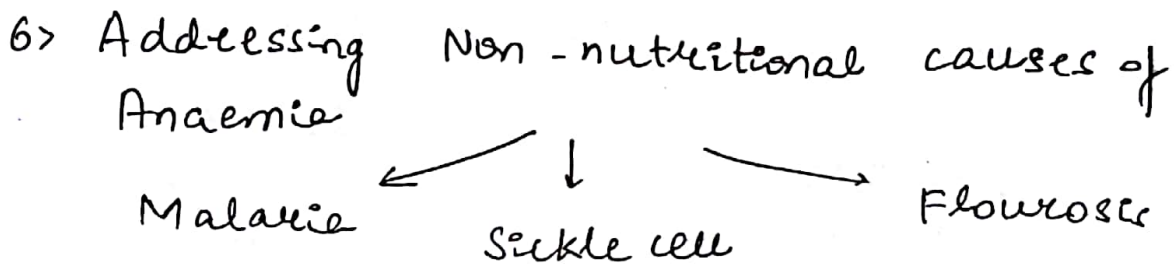
♀ female

Lactating ♀.

6 INTERVENTION

65

- 1) Prophylactic IFA supplementation
- 2) Deworming
- 3) Intensified Year Round Behaviour ^{change} ~~change~~
- 4) ^{change} Communication Campaign
- 5) Anaemia Testing
- 6) Mandatory Provision of IFA fortified foods under public health programme.
like Mid-Day meal +
Anganwadi Supplementary Nutrition Programme



DEWORMING ⇒ ALBENDAZOLE (DOZ)

< 1yr - 91

1-2yr → 200mg OD to chew stat

> 2yr → 400mg OD to chew stat

NATIONAL DEWORMING DAY = 10/02

10/08

<u>AGE</u>	<u>DOSE</u>	<u>COLOUR</u>	<u>OTHERS</u> ⁶⁶
6-59 months	20mg IRON + 100 µg Folic acid	Liquid formulation	Biweekly
5-9 yrs	45mg IRON + 400mg folic acid	PINK colour	Weekly 1 IFA
10-19 yrs	100mg IRON + 500mg Folic acid	Blue	Weekly 1 IFA
20-49 yrs	100mg IRON + 400mg Folic Acid	RED	Weekly + 1 tab / day of folic acid (400mg)
♀	100mg IRON + 500µg Folic acid	RED	Daily from Day 1 of 14 th week PO4 till 6 months Post Net Delivery

WIFS

67

- Weekly IFA Supplementation.
- On every MONDAY every adolescent ♂ & ♀ going to a govt. or govt. aided school is provided a Blue colour capsule
- To all adolescent ♀ not going to school
(a) Anganwadi
- Both Married & unmarried ♀ & ♂ 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

artificially feed with spoon
or paladai

8-10 times a day
mandatory 1 right feed for
duration of 6 months

→ Oral vaccines & medications if prescribed are allowed.

no water or artificial feeds are allowed⁶⁸

⇒ LAM CRITERIA

Lactational Amenorrhoea

• ♀ undergoing exclusive breast feeding for 6 months gets advantage of ~~lactational~~ lactational amenorrhoea till 6-12 wks

• It is natural mode of contraception

⇒ BFHI (Baby Friendly Hospital Initiative)

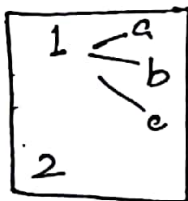
a) By WHO & UNICEF

b)

10 steps

Critical M_x Procedures

Key Clinical Practices



3-10

c) Objective ⇒ successful Breast feeding Practice

d) MFHI = mother friendly Hospital Initiative (MFHI) only in USA.

Breast Feeding wk ⇒ 1st week of August

⇒ ADVANTAGE

69

NEONATE

MOTHER

↓
Diarrhoea
Pneumonia
Better Dentition
Type 2 DM In adult-hood

↓
Breast Ca
Ovarian Ca
Type 2 DM
Post Partum depression

↑ IQ

BIRTH ~~WEIGHT~~ WEIGHT

① **LBW** < 2.5 kg

a) M/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 C/I for Hep B⁰ 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 70
Supportive care to new Born $< 2.5 \text{ kg}$

GROWTH MONITORING /
LONGITUDINAL FOLLOW UP STUDY

NORMAL CHILD

↓

0-1 yr = Every Month

1-2 yr = Every alternate month

2-5 yr = Every 3rd month

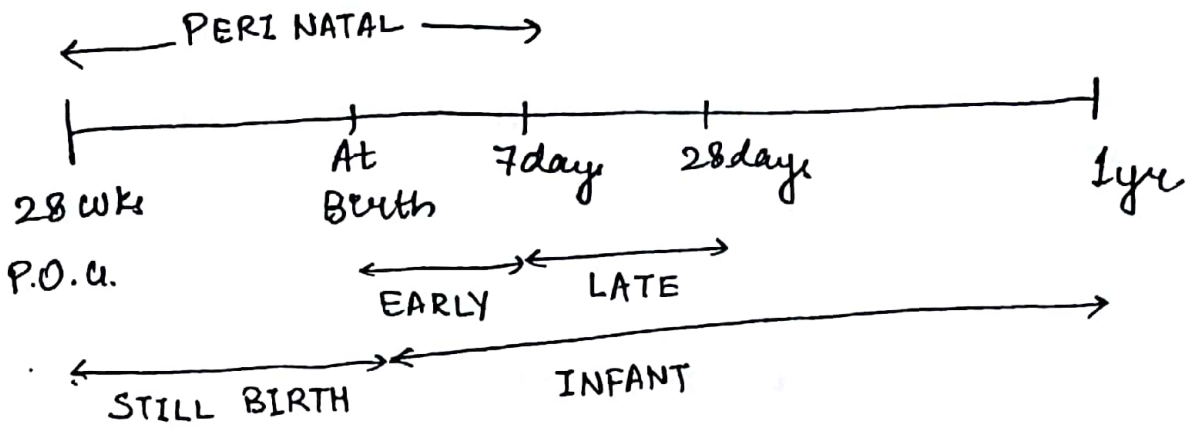
MALNOURISHED CHILD

Mod. mal. = every week

Severe mal. = Admission in
NRC (nutritional Rehab.
centre)

↓
Free Rx for children
 $< 5 \text{ yr of age}$

PAEDIATRIC MORTALITY



DENOMINATOR

WHO
↓
No. of Live Births

CIOT
↓
No. of Live Births
except for 'Peri-natal M.R.
& 'still B.R.'

↓
[No. of Live Birth + Still Birth]

CAUSES

ENDOGENOUS



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

EXOGENOUS



- 1) Pneumonia
- 2) Dehydration
- 3) Malnutrition
- 4) Accident
- 5) Child Abuse
- 6) Under 5 mortality

Perinatal Mortality

Neonatal Mortality

IMR
(endo > exo)

Most Imp Indicator for Socio-economic 72

Status



IMR

Development



Under 5 mortality
Rate

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
- e) Combined Parameter for Paediatric + Obstetric care in country
- f) Sensitive Indicator of availability + utilization of health services

$$\text{CHILD SURVIVAL INDEX / RATE} = \frac{1000 - \text{Under 5 MR}}{10}$$

CONGENITAL DISORDERS OF NEW BORN 73

1st M/c → Cong Heart Disease

2nd M/c - Cong. Deafness

3rd M/c - Neural Tube Defect

LANDMARK PROGRAMMES

IMNCI (Integrated Management of neonatal, childhood illness)

Colour Coded

Pink

YELLOW

GREEN

Most severe

OPD Rx

Least &

Home Rx

Injⁿ Gentamicin

By ANM & UR.

Referral for
Admission into
Hospital

IMNCI MODULE

0-2 months

2 months - 5 yrs.

KEY FEATURES of INDIAN IMCI

74

- 1) Inclusion of 0-7 days in programme
- 2) Incorporation of national guidelines on
Malaria
Anaemia
Vit A supplementation
Immunisation schedule
- 3) Skill Based Training
- 4) Training starts \bar{c} 0-2 months age group.
But same amount of time is devoted
to 2 months - 5 yrs. age group

SCHOOL HEALTH PROGRAMMES

- 1) HEALTH DISORDERS AMONG SCHOOL CHILDREN
Dental Defects > Goiter > Malnutrition
- 2) Medical Examⁿ → To be done every 6 months

3) School children eye screening -

75

a) 5th - 8th 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]

1) Beneficiaries → irrespective of social status
(ICDS + JSSK)

2) Aanganwadi

3) Under 'WCD' Ministry

4) INTERVENTIONS-

SHINER He

S - Supplementary nutrition

H - Health checkup

I - Immunization

Ne - Non-formal education

R - Referral

He - Health education.

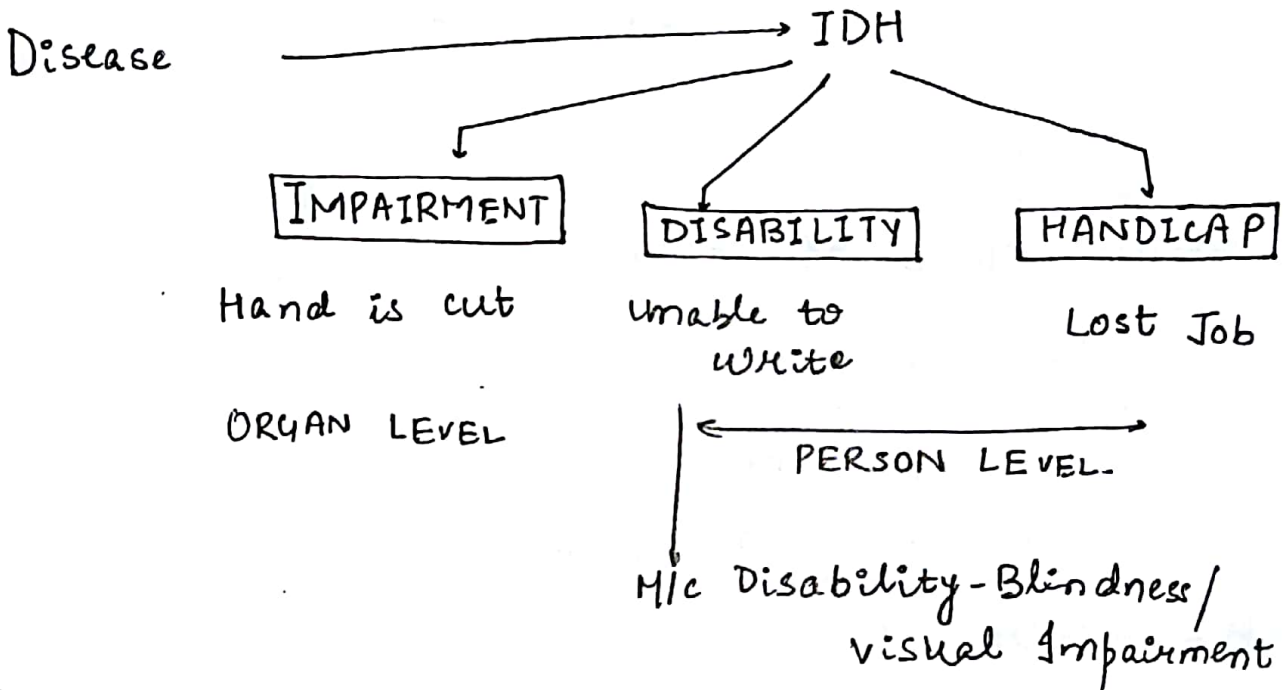
3-6yr = SHINER

< 3yr = SHINER

11-18yr ♀ - SHE

15-45yr ♀ = He

HEALTH & DISEASES



MODERN EPIDEMIC : CORONARY ARTERY DISEASE

SILENT " - ALZHEIMER'S DS.

LITERACY-

Any person > 7 yrs of age who can read, write & comprehend at least 1 ~~single~~ Indian Language.

* MAX. LITERACY \Rightarrow TRIPURA.

* India has achieved threshold of literacy 75%

HEALTH INDEX

SULLIVAN/DFLE \rightarrow Obsolete

DALY \rightarrow Disability Adjusted ~~Life~~ Life Year

$$\hookrightarrow \text{DALY} = \text{YLL} + \text{YLD}$$

YLD = Years of Life with Disability

YLL ~~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)

PQLI (Physical Quality of Life Index)

RANGE 0-1

0-100

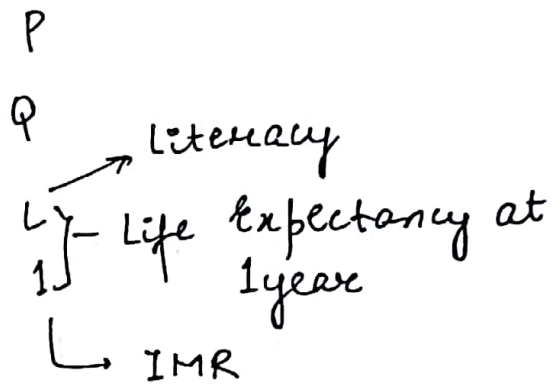
VALUE 0.624 #

70

RANK 131th

COMPONENTS

- 1) Life expectancy At Birth
- 2) Knowledge
↓
Mean years of expected schooling + yr. of schooling
- 3) Income - GDP/GPP/GNI



HPI :- Human Poverty Index

- 1) Complement of HDI
- 2) Developed by WHO + UN

- 3) HPI $\left\{ \begin{array}{l} \rightarrow 1 - \text{Development} \\ \rightarrow 2 - \text{Developed countries} \end{array} \right.$ Developing + under developed countries

- 4) HPI-1 - 3 Indicators

Deprivation of

a) Knowledge \Rightarrow Adult Illiteracy Rate

b) Life Exp. \Rightarrow Probability of survival till Age of 40 years

c) Deprivation of Std. of Living :-

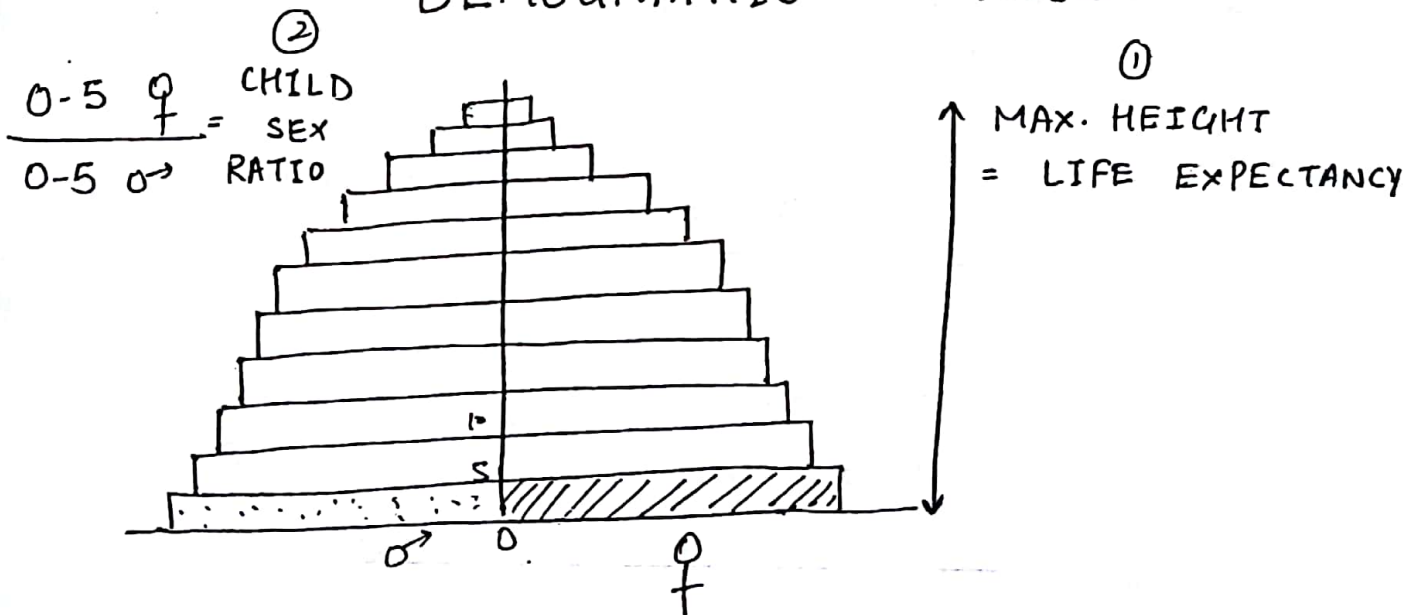
i) % Age of children underwt. for age

ii) % Age of people not using clean drinking water.

Multidimensional Poverty Index is the Best Indicator.

DEMOGRAPHY & FAMILY PLANNING

DEMOGRAPHIC PYRAMID



AGE, SEX - PYRAMID - Double Histogram

SHAPE \rightarrow I & IV \Rightarrow Stationary

II & III \Rightarrow Upright / Expansive

V \Rightarrow Constrictive / Inverted

CRUDE BIRTH RATE

80

$\frac{\text{No. of } \cancel{\text{people}} \text{ Live Births}}{\text{No. of People / Total / Mid yr Population}} \times 1000$

No. of People / Total / Mid yr Population

$$\text{CBR} = 8 \times \text{TFR} + 1 \quad \left(\text{simplest measure of fertility} \right)$$

$$\text{CBR} = \text{CFR} \times 0.2.$$

SOCIETAL DEPENDENCY RATIO:

$$\frac{< 15\text{yrs} + > 65\text{yrs}}{15-65\text{yrs}} = \text{SDR}$$

↓ SDR = BETTER

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

HEALTH STATISTICS REPORTING

* SOURCES -

- 1) CENSUS -
- 1st - 1881
 - Last - 2011

Census stop 00:00 HRS 1st March.
(Reference date + Time)

MID YEAR POPULATION - 1st July

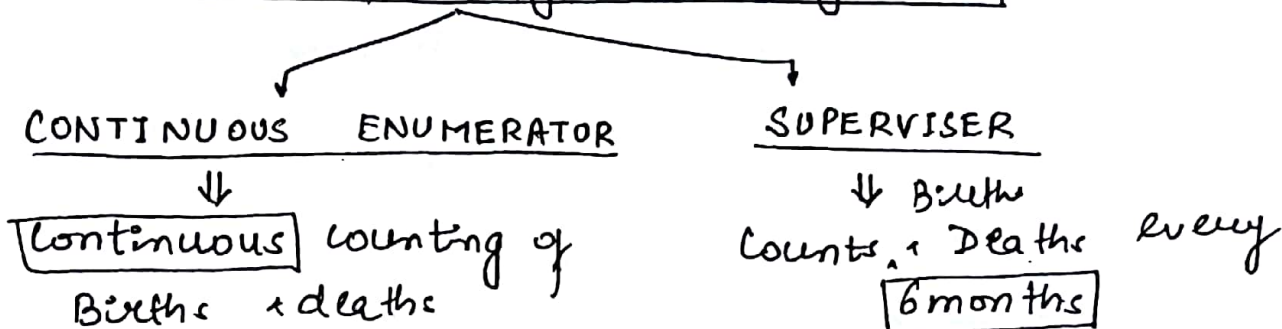
2> CIVIL REGISTRATION SYSTEM

Births + deaths to be registered within ⁸¹ 21 days

Marriage in 30 days

Born outside in 60 days of return to India

3> SRS (Sample Registration System)



* ~~IND~~ INDICATORS

Mortality Indicator + CBR.

↓
CBR / IMR / NMR / SBR /
still

USMR / MMR

4> NFHS

National Family Health Survey

DLHS

District Level Health Survey

← completed 4 rounds →

← Immunization →

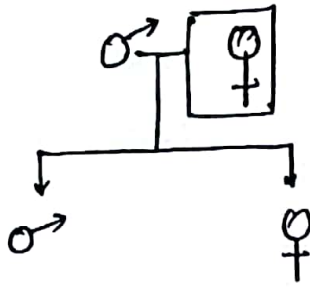
⊕

⊕

NFHS - Fertility Rate (TFR, GRR)

⊗

+ Mortality Rate



$$TFR = 2$$

$$GRR = 1$$

TFR / TOTAL FERTILITY RATE = No. of children

GRR / GROSS REPRODUCTION RATE = No. of kids.

NRR / NET REPRODUCTION RATE = Real time fertility of
♀ child

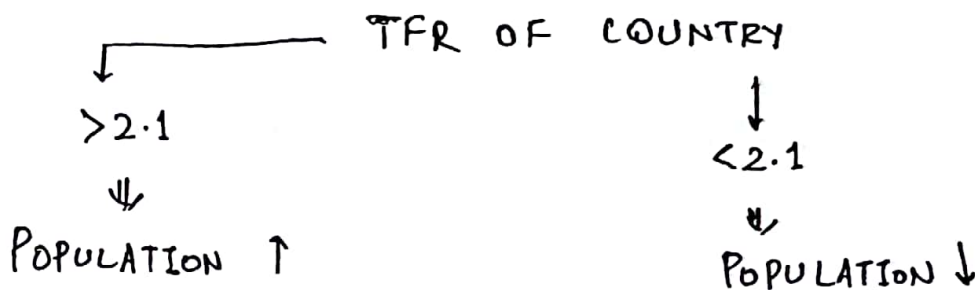
ie. GRR + Mortality Pattern,
Life expectancy

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)



NRR

- ① Best Indicator of Fertility
- ② To achieve $NRR=1$, $CPR=60\%$
- ③ $TFR = \frac{2 \times GRR}{NRR}$ or

$$\text{Haryana} = TFR > 2 \times GRR$$

$$\text{Kerala} = \text{~~TFR~~ } TFR < 2 \times GRR$$

GFR [GENERAL FERTILITY RATE]:

$$\frac{\text{No. of Live Birth in Given year} \times 1000}{\text{No. of } \text{♀} \text{ in 15-44 yr age group}}$$

ASFR [AGE SPECIFIC FERTILITY RATE]:

$$\frac{\text{No. of Live Birth in Specific Age Group} \times 1000}{\text{Mid year Population of } \text{♀} \text{ of same age}}$$

$$TFR = \frac{\sum ASFR}{1000} \times \text{INTERVAL IN AGE GROUP.}$$

CONTRACEPTIVE EFFICACY

85

PEARL INDEX (P.I.)
(M/c)

LIFE TABLE
(Best But complex)

$$P.I. = \frac{\text{Total Accidental } \textcircled{0}}{\text{Total Months of exposure}} \times 1200$$

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 Injⁿ → ANTARA
CENTROCHROMAN = CHHAYA. ~~SAMELI~~
- 5) M/c CONTRACEPTIVE USED IN INDIA
= $\textcircled{0}$ STERILISATION
+
- 6) MISSION PARIVAR VIKAS = ↑ inj
Contraceptive Awareness in Areas where
TFR > 3.

NON-COMMUNICABLE DISEASE ⁸⁶

	INCIDENCE	PREVALENCE
♂		
♀		
TOTAL		

TOBACCO -

Nicotine + CO are non-carcinogenic

CARCINOGENIC SUBSTANCES

P - Polynuclear aromatic Hydrocarbons.

A - Aromatic Amines

N - Nitrosamines

T - TAR

PREVENTIVE STRATEGIES -

1) WHO MPOWER^(R) STRATEGY -

↓
Raising Taxes (most effective)

75% of the ~~to~~ Pack Price should be Tax

In India - 7.5%

2) PICTORIAL WARNING

87

WHO

INDIA

Plain Packaging of Tobacco Product

85% on Both Sides

PREVENTION OF BREAST CANCER

- 1) Any female >25 yrs of age \rightarrow
 - a) monthly self Breast examⁿ
 - b) 3 yearly clinical Breast examⁿ

- 2) Any ♀ >40 yrs of age \rightarrow annual mammography

PREVENTION OF CERVICAL CARCINOMA

1^o PREVENⁿ

$9-13$ yrs old ♀
(class VI) are given
2 doses of cervical
Ca vaccine

2^o PREVENⁿ

any ♀ >29 yrs of age

PHC \rightarrow Visual Inspecⁿ of c
acetic acid (VIA)

\downarrow If ab(N)

District Hosp. - Pap smear

\downarrow If (N)

Repeat Pap
Smear

BEST - <3 yrs

Max - <5 yrs

\downarrow If Ab(N)

Rx as per clinical
guideline

OBESITY

88

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

$$\text{BMI} = \frac{\text{Wt (in kg)}}{\text{Ht (m}^2\text{)}}$$

2) PONDERAL INDEX

NOT used in India

3) CORPULENCE INDEX

$$= \frac{\text{Actual wt}}{\text{Ideal wt}}$$

$$\textcircled{N} \leq 1.2$$

4) BROCA'S INDEX

$$\text{Ideal wt} = \text{Ht (cm)} - 100$$

5) LORENTZ FORMULA

$$\text{Ideal wt} = \text{Ht (cm)} - 100 - \left[\frac{\text{HT (cm)} - 150}{2(\text{♀}) / 4(\text{♂})} \right]$$

SKIN FOLD THICKNESS-

89

1) Rapid non-Invasive method of fat assessment

2) Harpenden Skin Calliper

3) Measured at 4 sites -

↓
⇒ Med Triceps (single Best)
Med Biceps
Subscapular
Suprailiac

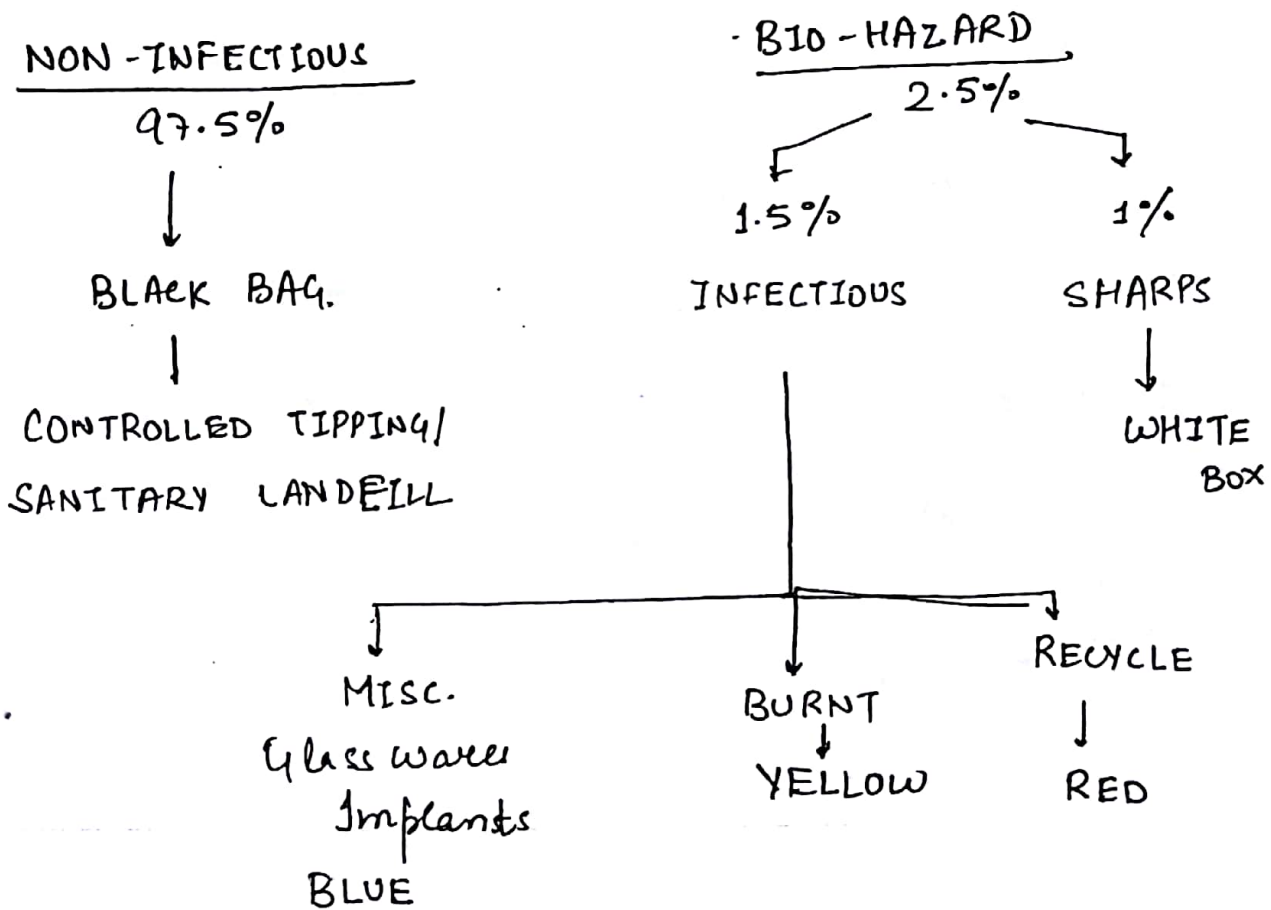
CUT OFFS

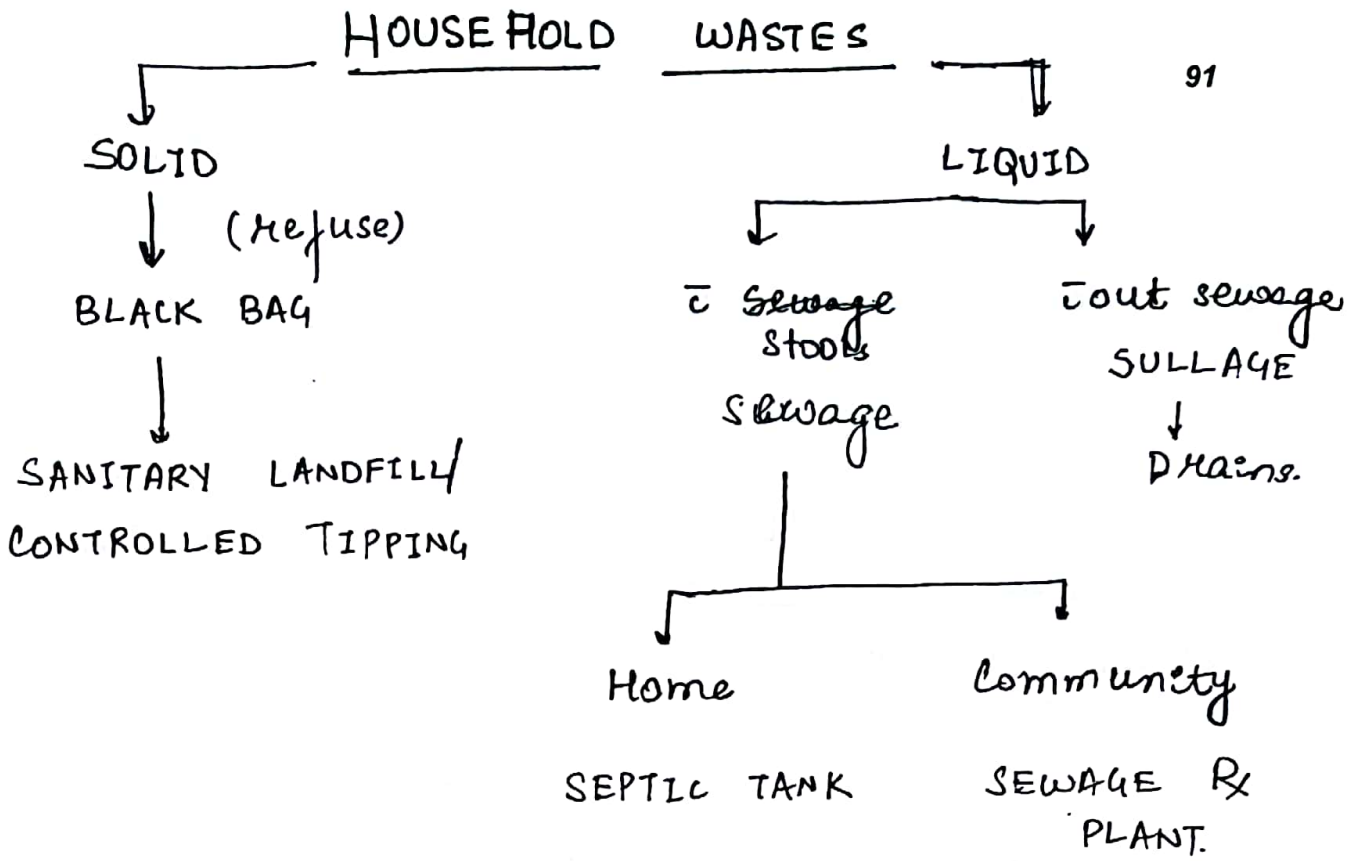
	♂	♀
Skin Fold Thickness	≥ 40mm	≥ 50mm
Waist Hip Ratio	> 1	> 0.85
Waist circumference	102cm	88cm
Waist Height Ratio	← 0.5 →	
(Best) { age } { sex }	Independent	

MISCELLANEOUS

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

HOSPITAL WASTE M_x





HEALTH PLANNING

TARGETS :- ① Discrete Activity & helps to measure extent of objective attainment

② concerned w/ 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.

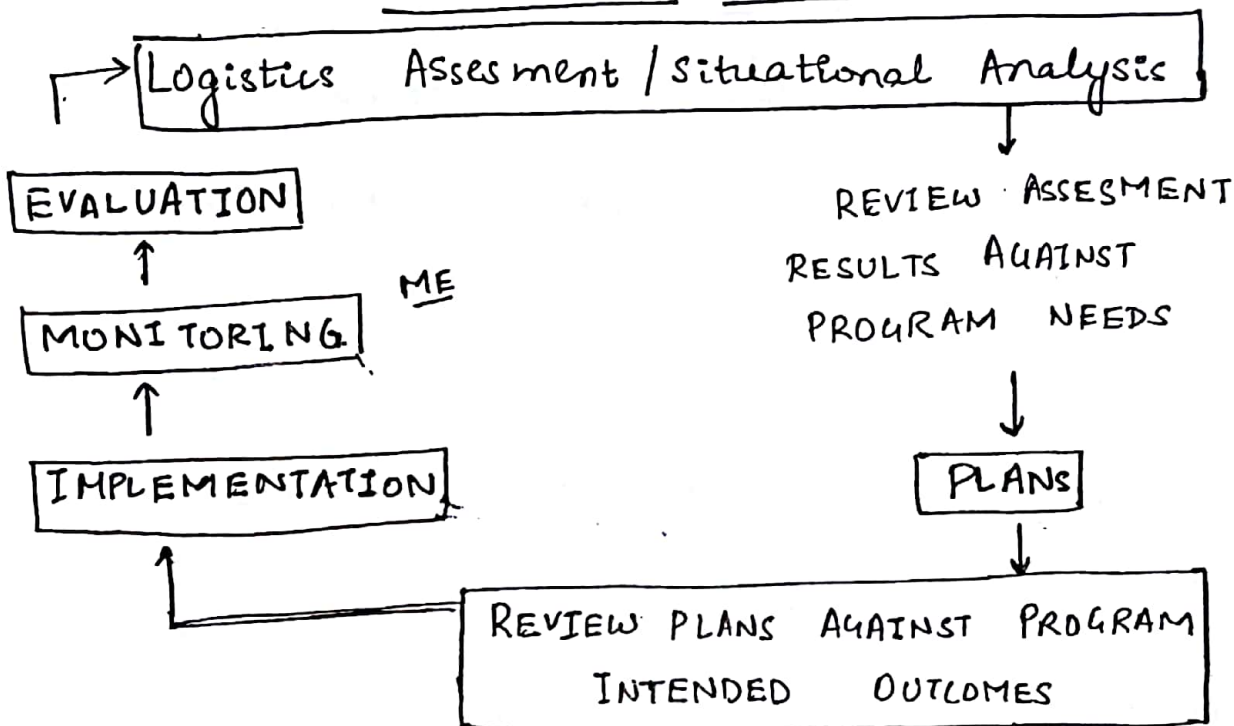
ex. Quality next PG 2019

GOAL:

92

- 1) ultimate Desired state to be achieved
 - 2) may or may not be achieved
 - 3) not constrained in time
- ex. Go stay Happy

PLANNING CYCLE



MONITORING

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

eg. class monitor

EVALUATION

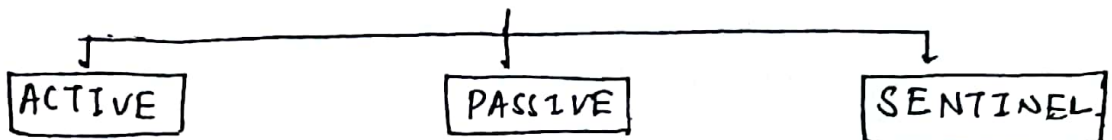
- ① Int. / Ext. Person
- ② Intermittent
- ③ How well it happened?
- ④ Past Tense

Principal

SURVEILLANCE

93

Ongoing systematic **Collection**, **Analyses**, **Interpretation** of Data **Use** of this information to take Action for Prevention & Disease control.



Health worker visits home of people

- MAX. RESOURCES
- BEST QUALITY OF DATA

Eg. Polio
TB
Leprosy

Pt. visits the hospital.

MIN. RESOURCES

POOREST QUALITY OF DATA

majority of health programme

Methodology varies from Disease to Disease

OBJ - 1) 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 three types of surveillance

SURVEILLANCE IN MALARIA

94

ACTIVE

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

TARGET- No. of ~~the~~ slides per year = 10% of entire population surveyed

PASSIVE

Pt visits the hospital. Any pt. \bar{c} fever has to go for malaria Parasite slide.

TARGET- Expected 10% of entire OPD cases have fever

SENTINEL

In Hard to reach areas & difficult areas Sentinel surveillance is performed

Deaths due to PVO are Investigated in Detail.

QUANTITATIVE METHODS OF MANAGEMENT

1) NETWORK ANALYSIS -

Graphic Plan of all events & Activities.

PERT
Program Evaluation & Review
Technique

updated Progress
Report card.

CPM
Critical Path Method

Longest Path

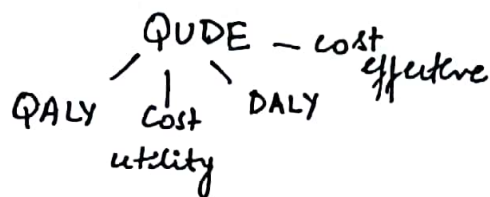
If any activity along critical path is delayed entire project will be delayed.

ECONOMIC EVALUATION

95

INPUT

Money



OUTPUT

Money = Cost Benefit A.

QALY = Cost Utility A.

Best for health system → **DALY** = Cost Effective A.

Systems Analysis → Best M₂ technique to find out cost effectiveness

WORK ANALYSIS

a) DEFⁿ -> systematic **Observation** + **Recording** of individual's activity

b) Provides **Quantitative** Assessment of various activities

c) 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) Proceeds 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) Proceeds from Target to Resource
(REVERSE DIRECTION)

3) Time is more

4) Most efficient manner of Financial management

ENTOMOLOGY

97

METHODS OF TRANSMISSION OF DISEASE BY VECTORS -

- 1) BITING - only ♀ Bite - Mosquito
Sandfly
Both sexes Bite - Tse Tse Fly
- 2) REGURGITATION - Housefly
- 3) SCRATCHING / RUBBING OF INFECTIVE SURFACE
Scabies
- 4) CONTAMINATION OF HOST \bar{c} 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

98

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 - PYRETHROM.

PREDATOR [TOXORHYNCHITIS] → Biological method
MOSQUITO [SPLENDENS] for Bednet
egyptio control

II> ANTI - LARVAL

1) LARVICIDAL

- OILS
- PARZS GREEN
- TEMEPHOL

2) FISHES

- GAMBUSIA
- BARBADOS MILLIONS → Labister

3) INTERMITTENT IRRIGATION.

III > INSECTICIDES

CLASSIFICATION

ORGANO P. ↓ Thions Diazinon Chlorpyrifos	ORGANO CHL. ↓ DDT Dieldrin BHC Lindane	CARBAMATES ↓ Carbaryl Propoxon
--	---	---

RESIDUAL SPRAYS-

TOXICANT	DOSAGE (gm/m ²)	DURATION OF EFFECTIVENESS	
		(month) <u>Avg</u>	<u>Max</u>
DDT	1-2	6-12	18
LINDANE	0.5	3	6
MALATHION	2	3	6

	<u>COLOUR</u>	<u>CODING</u>	EXAMPLE
COLOUR		TOXICITY	
RED		Extremely	Zn Phosphorus
YELLOW		Highly	Endosulphan
BLUE		Moderately	Malathion
GREEN		Slightly	Mosquito Repellents

DDT

100

- ① Sandfly → Insecticide of choice
- ② Pyrethrum → Synergistic effect
- ③ Zeller → Discovered it
- ④ Paul Miller → Discovered insecticide property
∴ Given Nobel Prize
- ⑤ %age 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 Toluamide (ODOMOS)

- 1) All Purpose Repellents
- 2) Anti fly / Flea / Haemophage / Mosquito

WATER

101

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

2) Safe Yield of water = Adequate for $\textcircled{95\%}$ of year

3) PROBLEM VILLAGE.

a) Drinking water source pt.

> 1.6 km in plains

> 100 m $\frac{6}{km}$ Hilly areas.

b) Depth > 15m

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	NITRITE
mg/dL	<50	<3
Contamination	remote	recent
Disease	Methemoglobin- emia	Blue Baby Syndrome

6) WATER PURIFICATION

102

URBAN

Sand Filters

RURAL

Chlorination

A) SLOW SAND FILTER.

Element responsible for yielding Bacteria free
~~Be~~ water → VITAL / ZOOLOGICAL / SCHUMUTZDECKE
LAYER.

Present on Sand Bed surface

Made of algae / Planktonic / Diatoms

Heart of slow sand filter.

Formation ⇒ Ripening of filter

* When never water is stored for 1st
5-7 days

↓
Bacterial count drops by 90% due to
Sunlight

* VENTURIMETER - Device used to measure Bed
Resistance in ~~the~~ slow sand filter.

CHLORINATION OF WATER V.V.I

103

- 1) ACTIVE MOLECULE \Rightarrow Hypochlorous acid.
- 2) has residual Germicidal effect
[O_3 , UV have no such property]
- 3) Recommended contact Period for free residual chlorine in water > 1 hr.
- 4) Acts Best at pH (7)
- 5) Fresh Bleaching powder has 33% chlorine
- 6) 1 CHLORINE TABLET = sufficient to chlorinate '20 L of H_2O '
- 7) Orthotolidene Arsenite = measures level of both free + residual chlorine
- 8) chlorine - kills Bacteria only
- 9) chlorine doesn't kill Bacterial spores, Protozoal cysts, Helminths or viral agents. (Hep A, Polio) Cyclops.

10) Amount of Bleaching Powder Required
[CHLORINE DEMAND].

$n \times 2$ gm \rightarrow Disinfect 455 L of ' H_2O '

↓
NO. of 1st cup \equiv shows distinct Blue colour.

\hookrightarrow Indicator = Starch Iodide

Q. 3rd cup is the 1st cup & can become ^{ble}₁₀₄
 How much bleaching powder required for
 1820L. of water.

Ans. $3 \times 2 = 455$

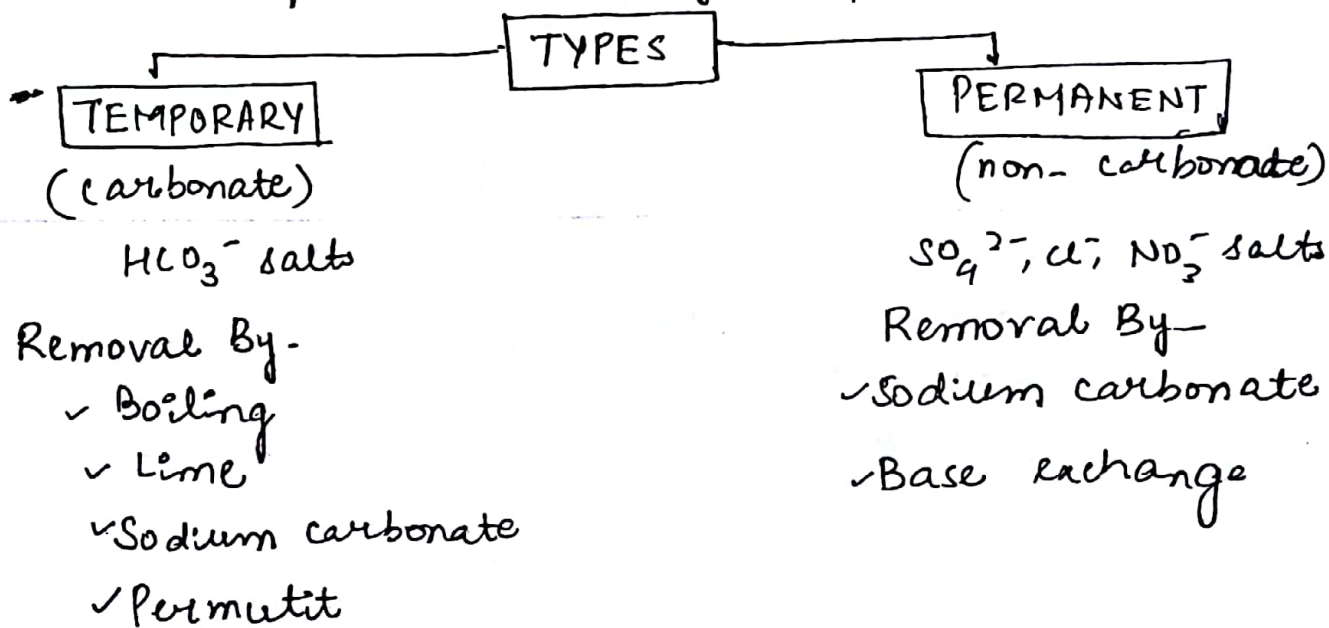
455L $\approx 3 \times 2$

$$1820L = \frac{3 \times 2}{455} \times 1820^4$$

$$= 24gm.$$

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 $> 3 \text{ meq/L}$ or $> 150 \text{ mg/L}$ of CaCO_3 .



VVI BACTERIOLOGICAL INDICATORS OF WATER QUALITY

1) COLIFORMS -

1° * most Reliable Indicator of faecal Pollution.

E. coli → Most Imp.

Faecal streptococci → Recent contamination

Clostridium → Remote contamination

2) TESTS

Presumptive → MPN

(most probable No)

INDICATOR → BROMOCRESOL PURPLE

Confirmatory - EIKJMANN.

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.

CET / CORRECTED EFFECTIVE TEMP-

1) Imp :- Index of Thermal Comfort

2) COMBINES - Temperature

M mean radiant heat
movement / velocity of air

Humidity

3) 'Mc ARDLE' MAX Allowable sweat Rate = $\frac{4.5L}{4hours}$
From CRS

Water Quality

Sound level

Housing Std.

Type of Transmission.

Vector (Disease Transmitted

• Mosquito.

Disease by Ticks.

Insecticides

ENVIRONMENT

107

VENTILATION :

- 1) SPACE = fresh air supply of 3000 ft³/HR/Person.
- 2) Air change = $\begin{cases} \rightarrow 2-3 \text{ changes/HR. (living room)} \\ \rightarrow 4-6 \text{ changes/HR (work place)} \end{cases}$

GLOBAL WARMING :

Due to Green House Gases

- 1) Water vapour \rightarrow Highest
- 2) CO₂ \rightarrow 2nd Highest - Measured by KIFFER'S TEST
- 3) O₃ \rightarrow Protector, CFC \rightarrow Depletor

AIR POLLUTION

- 1) Max in winters (Due to Temp Inversion)
- 2) Best indicators of air pollution.
 - a) Chemical \rightarrow SO₂
 - b) Biological \rightarrow Lichens
- 3) AQI - (air quality Index).

810 & INDICATORS

DARK GREEN - GOOD

MAROON - severe

- 4) Air Quality is monitored by CPCB (Central Pollution Control Board)

5) WHO Annual $PM_{2.5}$ Guideline = $40 \mu g/m^3 \cdot 108$
particulate (2.5 μm)
matter
 (most dangerous)

OVERCROWDING

⇒ AGE = 0-1yr = 0
 1-10yr = 1/2
 >10yr = 1.

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

ROOMS	MAX NO. OF PERSONS
1	2
2	3
3	5
4	7
4 5	10

NUTRITION

OBSOLETE :-

- ① NPU / BV / PER
- ② Food Pyramid
- ③ PFA, A4MARK, ISI
- ④ BALWADI Nutrition / special Nutrition Programme
- ⑤ ~~B~~ Balanced / Prudent Diet

HEALTHY DIET -

WHO Definition of 2015.

ADULTS

CVS DISEASE

Total fats	< 30%	
		< 20%
Saturated fat	< 10%	< 7%
Sugar	< 50 gm/day	< 30 gm/d
		Dietary cholesterol < 200 mg/d
		Chl./HDL Ratio < 3.5

← salt intake < 5 gm/day →
 ← 400 gm (5 portion) of fruit - veg - a day →

DISTRIBUTION OF CALORIES IN (N) DIET -

Carbohydrate → 55-65%

Protein → 15-20%

FATS → 20-25%

Elderly



Fiber, Iron,
Calcium



carbohydrate
energy

same

fats oil

↓ by 5% after 9th
decade + 10% after
6th decade

110

DIETARY FIBRE

RDA Normal = 40mg/dL

RDA Diabetic = 48mg/dL

RDA

97.5% population

EAR (Estimated Avg
Requirements)

5% population

Never estimate calorie
intake as per RDA

PROTEIN ASSESSMENT

Best Indicator - DIAAS [Digestibility Indispensable Amino
acid score]

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

INDIVIDUAL FOOD STUFFS

1) SOYABEAN

⇒ Richest Pulse

43% Protein (Quantity ↑) But utilization (55%)

⇒ Poor Quality

⇒ Limiting AA = methionine

⇒ Richest source of $\left\{ \begin{array}{l} \text{Calcium} \\ \text{Iron} \\ \text{Vit B} \end{array} \right.$

111

II Eggs

- 1) Utilization $\approx 96\% \approx 100\%$ (Reference Protein)
- 2) 6 gm of protein
6 gm of fats
30 mg calcium
1.5 mg Iron
250 mg Cholesterol
- 3) wt. = 60 gm. Energy = 70 kcal
- 4) Richest source of cholesterol
- 5) Poor source of Vit C + Carbohydrates.

III FISH

- 1) Richest source of Vit A, D
- 2) Rich source of proteins, calcium, phosphorus, fluoride, iodine
- 3) Poor source of Carbohydrate + Iodine.

IV 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

112

- 1) RDA NORMAL = 150 Mg/d
RDA ♀ = 250 Mg/d.
RDA Lactation = 290 Mg/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) Endemic Cretinism = when Iodine uptake is < 20 µg/d
- 9) KI ⇒ used for Iodisation.

FOOD STANDARDS

113

GLOBAL

↓

Global Codex alimentarius
(Int Govt Body of FAO + WHO)

INDIAN

↓

FSSAI (Food safety - std
authority of India)

FORTIFICATION

- ① Small amount
- ② Daily consumption
- ③ salt iodination
Vit A + D in Vanaspate
2500 IU \ 175 IU / 100
gm of vanaspate

SUPPLEMENTATION

- ① Large amounts
- ② Intermediate consumption
- ③ vit A supplementation.

MID-DAY MEAL PROGRAMME

- 1) PRINCIPLE - $\frac{1}{3}$ rd of carbohydrate + $\frac{1}{2}$ Protein.
- 2) MINISTRY - Human Resource + Development
- 3) Minimum - 250 days/year
- 4) 1° SCHOOL
 - 450 kcal
 - 12gm Protein
- 5) Upper 1°
 - 700 kcal
 - 20gm Protein
- 6) Age Group - 4-12 years
- 7) upto class 8

Images + Mug-up.

PART-3

VACCINES

116

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.

BENEFIT:- Provide max chance of survival

INDIA has largest no. of unvaccinated children

Drop out = Total - not fully immunised

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 betⁿ

Rate of colour change \wedge Temp.

\Rightarrow Lower Temp \rightarrow 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

eg. 6wk → DPT 1, OPV 1, Hep B-1

10wk → missed

Came at

12wk → DPT 2, OPV 2, Hep-B2

Next dose of 14wk given at 16wk

2) If not a single Dose is taken.

< 1yr → Give as per NIS

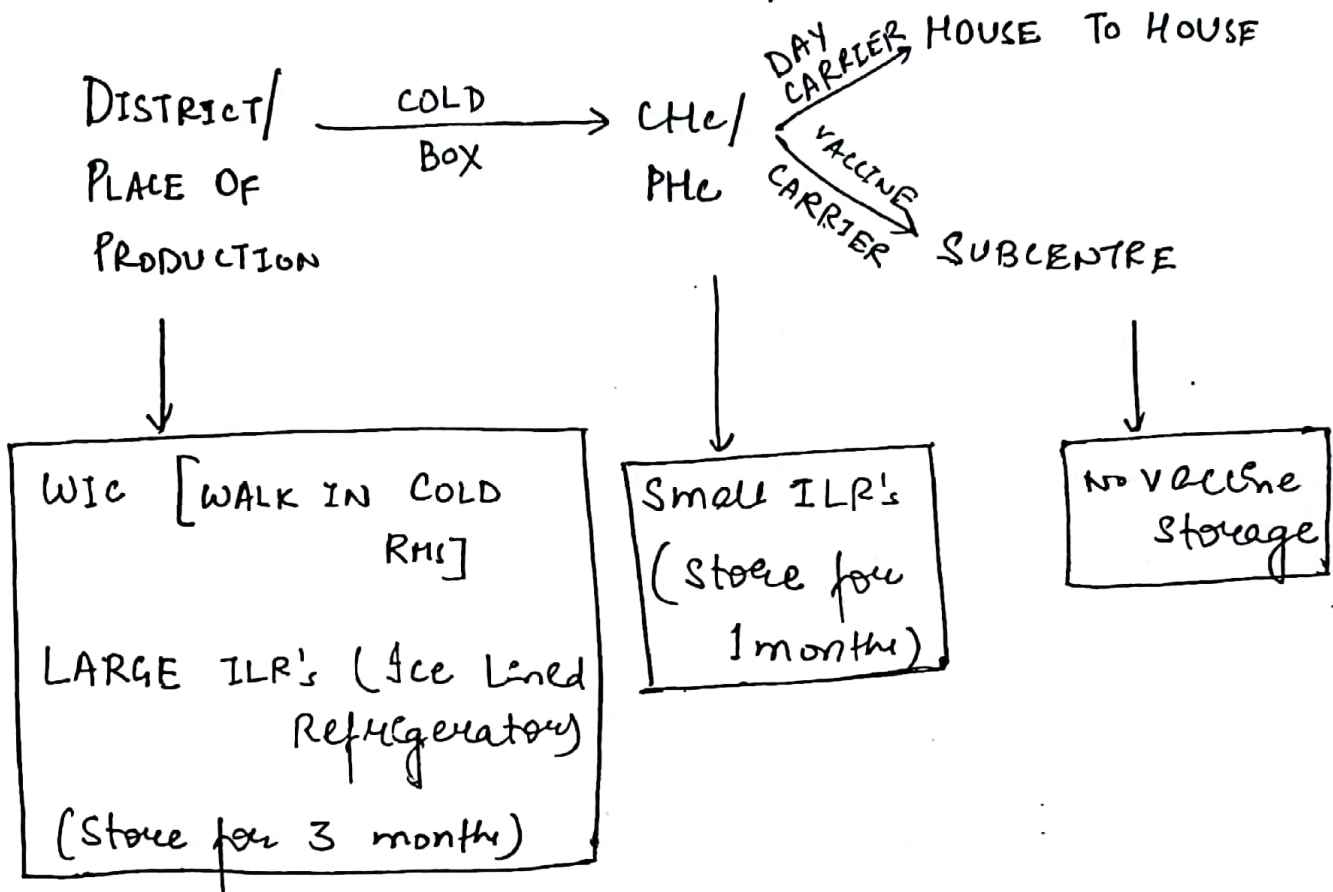
NEW GUIDELINE

	1-5yr	5yr ^[DPT causes serological Ab(N) in >5yr]
1st visit	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

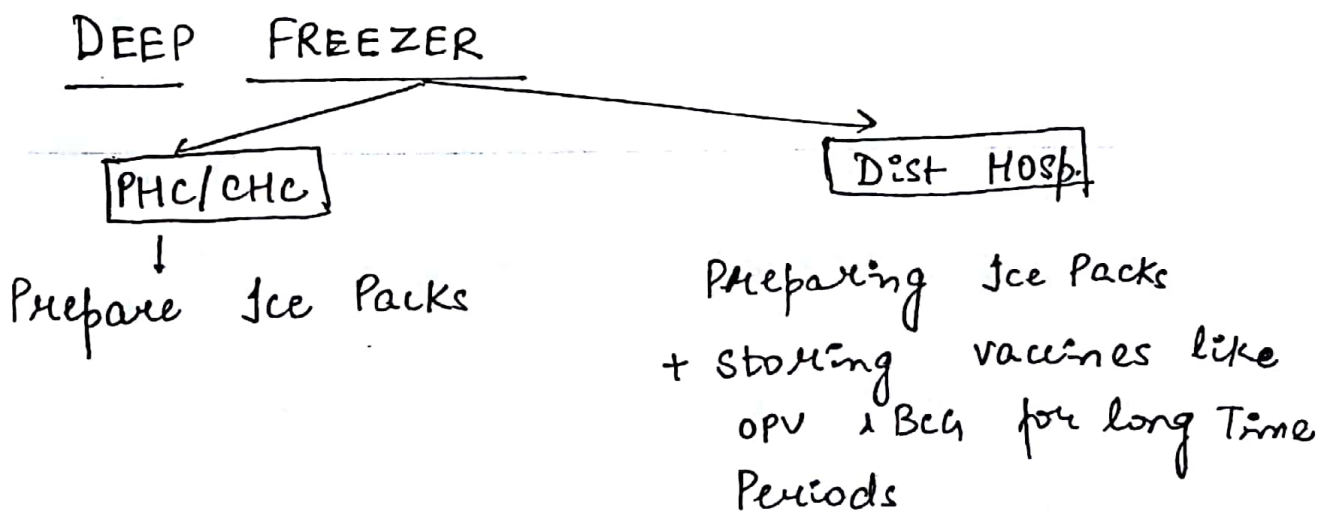
1yr Later	1-5yr OPV, PPT, Hep B	> 5yr Hep B
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COLD CHAIN (Storage of vaccines)



MAX. Damage to vaccine occurs in SUBCENTRE
or
VILLAGE LEVEL



ICE PACK-

119

- 1) Prepared in deep freezer
- 2) 320 mL In capacity, Horizontal Mark,
Water is filled, nothing else to be added.
- 3) 2 Holes on surface for



- 4) Day carrier → 2 Ice Packs
Vaccine carrier → 4 Ice Packs

ILR (ICE LINED REFRIGERATOR)

- 1) With an uninterrupted Power Supply of 8hrs,
ILRs can maintain Temp for 24hrs
- 2) Instrument & we use it like DIAL THERMOMETER
- 3) Measured twice a day, even on Holidays. ↓
- 4) Temp +2 to +8°C
- 5) SEQUENCE

PRINCIPLE
Thermo-couple

SEQUENCE OF STORAGE -

(Top)

Diluents	De
Hep B	Hurnein
IPV	Itnc
Penta	Permanent
DPT	Daya
TT	Teer
BCG	Bhagwan
Measles	Mere
OPV	OH

Temp. ~~see~~ sensitive
Reconst BCG > Yellow fever

(Bottom)

OPEN VIAL POLICY

Reconstituted vaccine

+ ROTA

BCG, Measles, JE

(Yellow fever, Rabies)

NEVER REUSED after
4hrs of Reconstitution.

Other vaccines

If vvm is intact
then can be used
till 28 days

AIIMS

EVIN. (Electronic Vaccine Intelligence Network¹²¹)

'SMS' Based Temp. Monitoring Sens^s System where ILR is connected to a computer & sends messages in case of Temp. Fluctuation to Medical officer in charge + District Immunization officer Number.

"Lowest Level It is Being Used for PHC"

NATIONAL VACCINE REMINDER

AIIMS

- 1) Free SMS Service
- 2) Where child's name + DOB 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)

Bcg → 2

ROTA
Measles } → 1.33

JE

Others → 1.11 ~~1.15~~

AIIMS

VER (VACCINE EFFECTIVENESS RATIO)₁₂₂

$$VER = 1 - RR$$

(Relative Risk)

IPV

India started \bar{c} 0.5ml I.M. Dose of IPV single
Dose at 14wk



Now we give fIPV (fractionated IPV)

0.1ml I.D. 2 doses of IPV at 6 + 14wk

VIT A supplementation

<1yr = 1 Lakh IU/1ml

>1yr = 2 Lakh IU/2ml

9 months \rightarrow 1ml given

after every 6 months till 5 yrs we give
vit A 2ml / 2 lakh I.U.

Total = 9 Doses

$$1 \times 1 + 8 \times 2 = \boxed{17 \text{ Lakh IU}}$$

BCG

123

- 1) DANISH 1331 strain
Mycobacterium Bovis
- 2) DOSE = 0.1 mL
< 1 month = 0.05 mL
- 3) Route - I.D. (Tuberculin Test)
- 4) Site = (L) upper arm
- 5) Diluent = NS
- 6) ADVERSE Rxn -
Ulceration
Suppurative lymphadenitis
osteomyelitis
Disseminated T.B.

DPT/DT

- 1) DT - Toxoids P → killed acellular
- 2) $AlPO_4 / AlOH$ (Adjuvant - ↑ ses Immunogenicity)
- 3) THIO MERSAL (Preservative)
- 4) Route - I.M. 0.5 mL middle part of Anterolateral thigh
- 5) ADVERSE Rxn - neurological shock

C/I → Severe Rxn in previous doses 124
Screening upto 48 hrs. after vaccinaⁿ.

a) Sore throat

b) Fever $> 40^{\circ}\text{C}$

c) Neurological

MEASLES

1) EDMONSTRON ZAYREB

2) Diluent - Sterile/ Distilled water

3) Stabilizer - Sorbitol.

Neomycin,

Hydrolyzed gelatin.

4) Route - 0.5 mL S.C (R) arm

5) C/I - High Fever

Anaphylactic Rxn

⊕
+

7) Complication - TSS
ITP.

VACCINATION IN ELDERLY

125

NO GUIDELINES IN INDIA

- 1) Influenza I.M. (live attenuated - C/I)
- 2) Pneumococcal (single Dose)
- 3) dT Booster (every 10 yrs)
- 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
 - CholeraTravel / outbreak + Rabies
- 2) Any vaccine (except OPV + Yellow fever) if accidentally 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

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5) Minor fever, Diarrhoea & are not ~~OK~~ for
acute resp. ~~HIV~~ vaccination
Infectⁿ

~~HIV~~ HIV

PPTCT

Prevention of Parent to child Transmission of HIV

MOTHER

CHILD

If a ♀ is on 'TEL'
Therapy from 1st
Trimester no need to go
for Prophylactic LSCs.
(unless obstetrically
Indicated)

1) Nevirapine Prophylaxis
start at Birth.

Min - 6 weeks

Max - 18 months

2) Cotrimoxazole Prophylactic
Therapy

start → 6 weeks

Continue → Till clinical
discretion.

3) Exclusive Breast Feeding
for 6 months.

↓
Abrupt stop

↓
Switch to artificial feed

No mixed feeding is allowed

* In India, there is no C/I for Breast Feeding

4) Early Infant Diagnosis

Done using HIV DNA PCR +

Confirmⁿ of HIV -ve status of child is done only @ 18 months

POST- EXPOSURE PROPHYLAXIS

- Any Person who has come in parenteral or mucosal contact w/ 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 72hrs)
- Given till 28 days
- Confirmⁿ of HIV status can only be done at 3 months.

REGIMEN

>10 yrs - Adults

↓
TEL

<10 yrs

↓
ZIDUVODINE/TENOFOVIR + LAMIVUDINE

↓
+ RITONAVIR/
LOPINAVIR.

Ziduvodine Based

Regimen is Preferred

HIV Rx IN INDIA

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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 pt → CD₄ Every 6 month

HIV + TB pt → CD₄ done every 3 months

≥ 3 yrs → Adults

↓
TEL

< 3 yrs

↓
LOPINAVIR/
RITONAVIR.

HIV Rx SERVICES UNDER PROGRAMME-

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

ART All medical colleges 1st Line ART + CD₄ count
 + Dist' Hospital

LAC
Link ART All Subdistrict 1st Line ART
CENTRE Hosp + CHC
 PHC

NATIONAL STRATEGIC PLAN FOR HIV/AIDS & STI.

2017-24

VISION - Paving way for AIDS free India

GOAL

- '0' new Infection
- '0' ~~AIDS~~ AIDS Related Deaths.
- '0' Discrimination.

TARGETS

By 2020

By 2024

① **75% Reduction** in new HIV Infection

80% Reduction in new HIV Infection

② **90-90-90**

95-95-95

90% of people who are

HIV +ve know their **Status**

90% of people who know the Status are on **HIV Rx**.

90% of People who are on HIV Rx should have viral

Load suppression

③ Elimination of **Stigma** + Discrimination

④ Elimination of **PTCT** of HIV + Syphilis

HIV SENTINAL SERVICES (2016-17) 130

PREVALENCE OF HIV INFⁿ

100 → 6.26%

ANC CLINIC ATTENDEES → 0.28%

3 GROUP OF POPULATION

HIGH RISK GROUP

BRIDGE POPULATION

GENERAL POPULATION

↓
Injectⁿ Drug users
Trans-gender
Hijakas
Men having sex
with men
Commercial sex
workers.

↓
Long Distance
Truck Driver
Single migrant
MEN

↓
ANC

(n) 250

250

400

Sampling Random

Consecutive

Consecutive

TESTING STRATEGY

Linked Anonymous 2 TEST STRATEGY

POLIO

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POLIO ELIMINATION

STRATEGY-

HISTORICAL

- ① Routine Immunisation (RI) → under NIC
- ② Supplementary Immunization Activity (SIA) → Pulse 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 & in gut vaccine virus converts to wild variety

NEW/END GAME

- ① SWITCH [2016]
tOPV → bOPV
Type 2
- ② SHIFT (2018)
OPV → IPV
- ③ Continue AFP surveillance

VDPV

[Vaccine derived Polio Virus]

Rarer

More Dangerous

Causes outbreak

(cVDPV)

↳ circulating

Due to Type 2 strain

Unknown But commonly seen in areas of low

vaccine & causes
Paralysis

vaccine coverage 132

SOLUTION - ~~st~~ shaft
(2018)

Switch
(2016)

ACUTE

FLACID

PARALYSIS

DEFⁿ - 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 neuritis
- 4) Guillain Barre Syndrome

TIMELINE -

- 1) in 2 days of notification AFP Surveillance has to be done
- 2) 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 COLLECⁿ

- 2 samples 24 hrs ~~after~~ apart are collected ¹³³
each sample being 8g in amount
(size of distal 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 $\pm 8^{\circ}\text{C}$) [Reverse cold chain]

INFECTIVE EPIDEMIOLOGY

EPIDEMIC



$> \text{Mean} + \text{SD}$

even a single new case of new/eliminated/eradicated Disease

Point source



Rapid Rise

Rapid fall

1 incubation period

clustering of cases

Propagated



slow rise

slow fall.

multiple I.P.

ENDEMIC



$< \text{Mean} \pm 2\text{SD}$

HYPERENDEMIC

Only in paediatric population.

PANDEMIC



> 1 country involved at a time

HOLENDEMIC
All age groups are equally affected

PART-4

DISASTER

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1) DEF^N :- Extra-ordinary Response from outside

2) M/c DISASTER / MAX FATALITY -

Hydrological (Cyclones + Floods)

3) Dis. c Max Morbidity / M/c DIST. POST DISASTER
Acute Gastro enteritis.

4) M/c Vit. Deficiency Post Disaster
Vitamin A

5) Most Preventive Strategy for AGE -

a) clean drinking ~~Post~~ water

b) SAFE Disposal of stores.

6) Clean Drinking water
is ensured by Chlorination

* Amount of Residual Chlorine

(N) Drinking water
0.5 ppm

Post Disaster water
0.7 ppm

7) Potassium Iodide → Drug to be consumed prophylactically Post Natural ~~Disa~~ Disaster

↓
Replaces radioactive 'Iodine' from Thyroid Gland

8) TRIAGE CLASSIFICATION OF DISASTER

BLACK - Dead - Least Priority

RED - Max. ~~Priority~~ Priority → Rx In 4-6 hrs

YELLOW - Intermediate → Rx In 24 hrs

GREEN - Ambulatory Pts

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

9) VACCINES TO BE GIVEN

DISASTER VICTIMS

(After Disaster)



Measles

+ VCA

Chicken pox

ROTA

* Typhoid & cholera
useless

DISASTER RELIEF TEAM

(Before Disaster)



Hep B

Tetanus

Typhoid

Cholera

NODAL

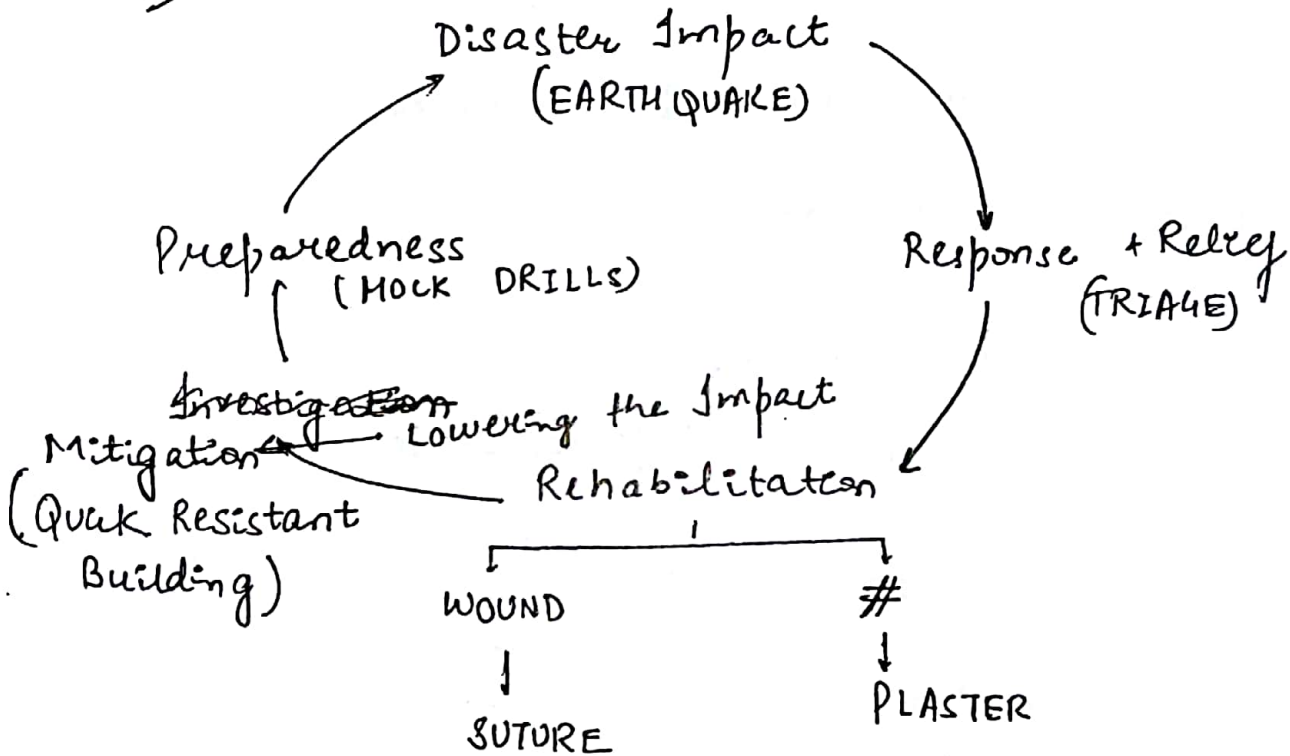
HEAD → PM

Ministry → Home

Agency → National Disaster M_x agency/
authority

Health Unit → District

PGI DISASTER CYCLE



UNICEF

GOBI FFF

G - ~~Growth~~ Growth Monitoring

O - Oral Regulation

B - Breast Feeding

I - Immunisation

F = Female Educⁿ

F = Family Planning

F = Food Supplementation

HQ

GENEVA

ORGANISATION

WHO,

International Red. cross

International Labour Organisation

NEW YORK

UNICEF, UNPP

ROME

FAO (food + Agriculture Orgⁿ)

ERGONOMICS → Right Man In Right Job 140

NDSOLOGY → Classification of Disease

EMPIRIATRICS → Study of International Disease of Travellers

UNDP → Development

UNFPA → Family Planning, Reproductive Health.

WORLD BANK → Economic Loan.

WHO

07/04/1948 → constitution of WHO adopted

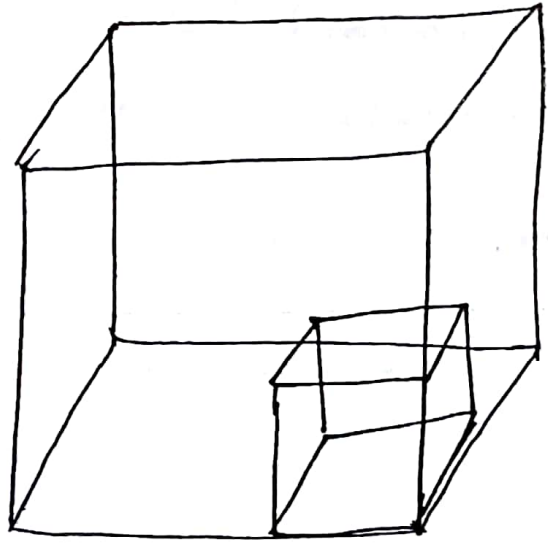
∴ celebrated as WORLD HEALTH DAY



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 + neighbours (NO PAKISTAN)

COMMUNICATION

Most Imp. Component = FEEDBACK / EFFECT

TYPES

ONE WAY	TWO WAY	FACE TO FACE
DIDATIC ↓ T.V., Internet News Paper Min. Resources Max. Audience Min Behaviour change	SOCRATIC Focused Group Disc. (FGD), workshop, Panel Discussion, Symposium INTERMEDIATE	1 to many ↙ 1 to 1 ↘ Advice Counseling Max. Resources Min. audience Max. Behaviour change

ADVICE → ONE TO MANY

COUNSELING → ONE TO ONE

↳ ~~Gather Approach~~ G.A.T.H.E.R. APPROACH
↓
Emergency contraceptive pill

TWO-WAY

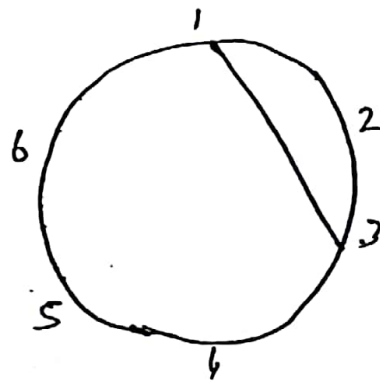
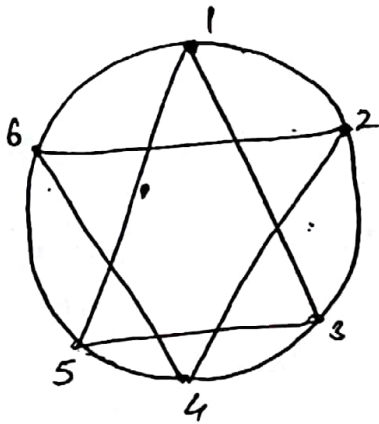
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I) FGD

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

e) SOCIOGRAM

*) Provides details of Participations of Participants



II) WORKSHOP

- a) Practical skill Development Demonstratory Place
- b) 30-40 participants.
- c) Cataract
- d) Laproscopic workshops.

③ PANEL DISCUSSION

④ SYMPOSIUM

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is sequential

←————→
[3-4 Participants who discuss in front of a large audience]

AIIMS, PGU

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

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1) ACCULTURATION -

Mixing of 2 cultures

2) OPINION - Temp. Subjective view

BELIEF - Permanent subjective view

ATTITUDE - Permanent objective Acquired

HABIT - Acustomed Acquired automatic way of doing a thing

3) LEVELS OF LEARNING -

COGNITIVE - knowledge → H/C Q. (lowest level)

AFFECTIVE - Attitude

PSYCHOMOTOR → skills → HIGHEST (USMLE step III)

4) TYPES OF FAMILY - CENSUS DEFⁿ.

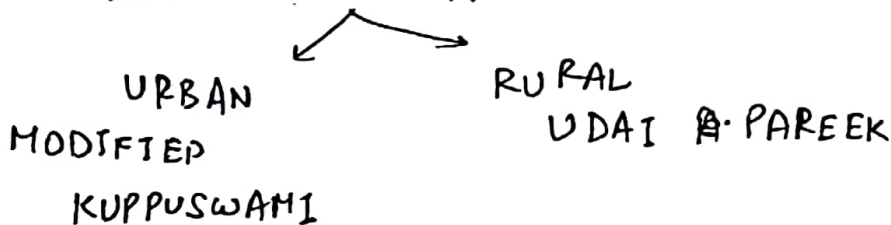
a) NUCLEAR - MA + PA + Bacha

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



Income of Family

+ Education + occupation of head of household

BEFO

6) BELOW POVERTY LINE

Amount of Money required to buy 2400 kcal/day
In RURAL. → 32 Rs/day.

or
2100 kcal/day In Urban → 47 Rs/day.

I) SOCIAL PATHOLOGY

→ It is the study of Relationship Between Disease + Social Factors

II) SOCIAL SECURITY- BISMACK (Germany)

Social Assistance

Social Insurance

Non-Contributory Benefit

Contributory Benefit

Extended to vulnerable Population

Extended to Individuals

Ex- Old age / widow / Disability Pension scheme

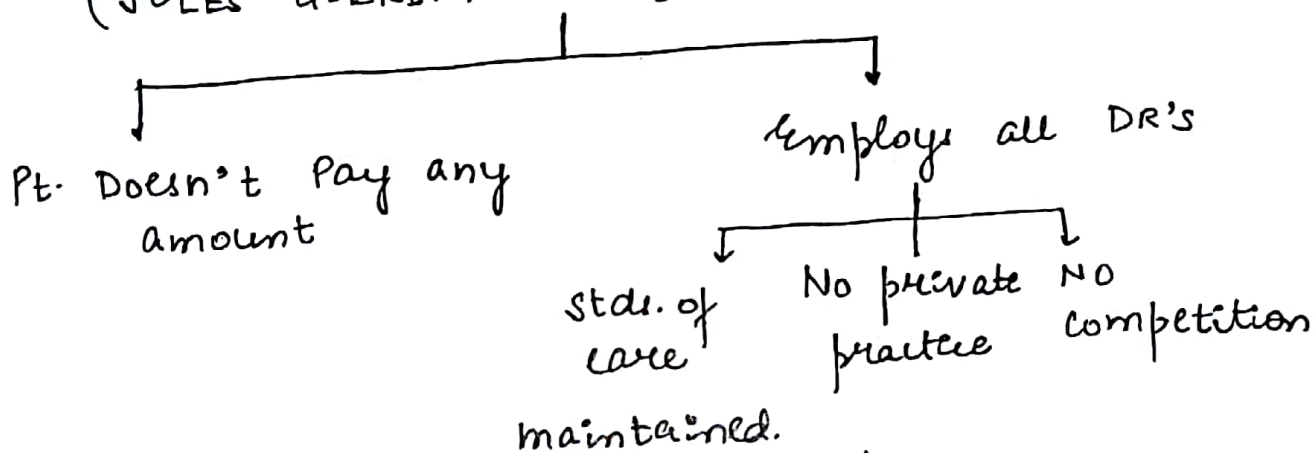
Ex- LIC, ESI

III > SOCIAL SAFETY NET -
collection of services provided by Govt. ¹⁴⁶ ϵ
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)



UNIVERSAL HEALTH CARE

OCCUPATIONAL HEALTH

147

M/c Occupational D/s In India \Rightarrow

LUNG DISEASE

Q. Lung Disease
↓
Pneumoconiosis } Occupational Cancer
↓
Silicosis. } Skin cancer \rightarrow 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 ~~low~~ fit 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 ceeche > 50 ♀ workers

ESI (EMPLOYEES STATE INSURANCE) 1948

1) INCLUDES

↓

- a) all factories
- b) all educational institutions
(Both govt + private.)
- c) Restaurants + Hotels
- d) Cinemas + theatres
- e) Newspaper agency
- f) Road motor Transport

EXCLUDES

- Mines
- 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

150

Ministry change:- 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 Δ to District TB officer (DTO)
- 3) In 2018, 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 ↓ of T.B. Burden, morbidity & mortality By 2025.
DTPB approach [Detect Treat Prevent Build]
- 3) Expected outcome- By ~~2025~~ 2025,
 - a) 60% reduction in TB Incidence
 - b) 90% ↓ in TB mortality
 - c) 0% pt having catastrophic expenditure due to TB

FINANCIAL INCENTIVES

- Every TB pt will receive 500 Rs/month for ¹⁵¹ purpose of meeting TB related expenses
- 1000 Rs/pt one time is provided for notification.

RT-MERM

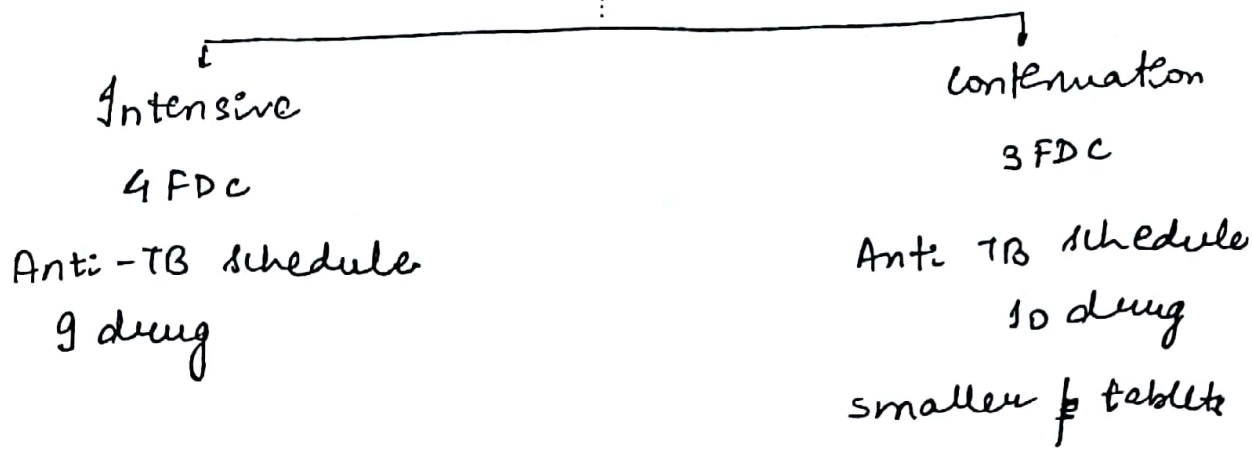
- Real Time Medication Event Monitor Device
- This records date & time of Mx intake by patient & provides details about adherence to TB Rx

HIV-TB Rx

5 Interventions-

- 1) Δ using CB NAAT only
- 2) Daily fixed Dose combination
- 3) 99 DOTS
- 4) Pharmacovigilance
- 5) Isoniazid Preventive Therapy →
 - every HIV pt is given 10 mg/kg of Isoniazid (In India, ~~IAH~~ TB is M/c opportunistic infecⁿ in case of HIV pts)

* In case of HIV TB co-infecⁿ we always start \bar{c} TB therapy 1st for 1st 15 days & to avoid Immune Re-constitution syndrome



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

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

DOSSN4

H - 75mg

R - 150mg

Z - 400mg

E - 275mg

DRUG SENSITIVE NEW

2 (HRZE)₇ +
4 (HER)₇

DRUG SENSITIVE
Previously R_x ¹⁵³

2 (HRZE)₇ +
1 (HRZE)₇ +
5 (HER)₇

GOALS OF RNTCP

Cure

Prevent
Resistance

Break chain of
Transmission

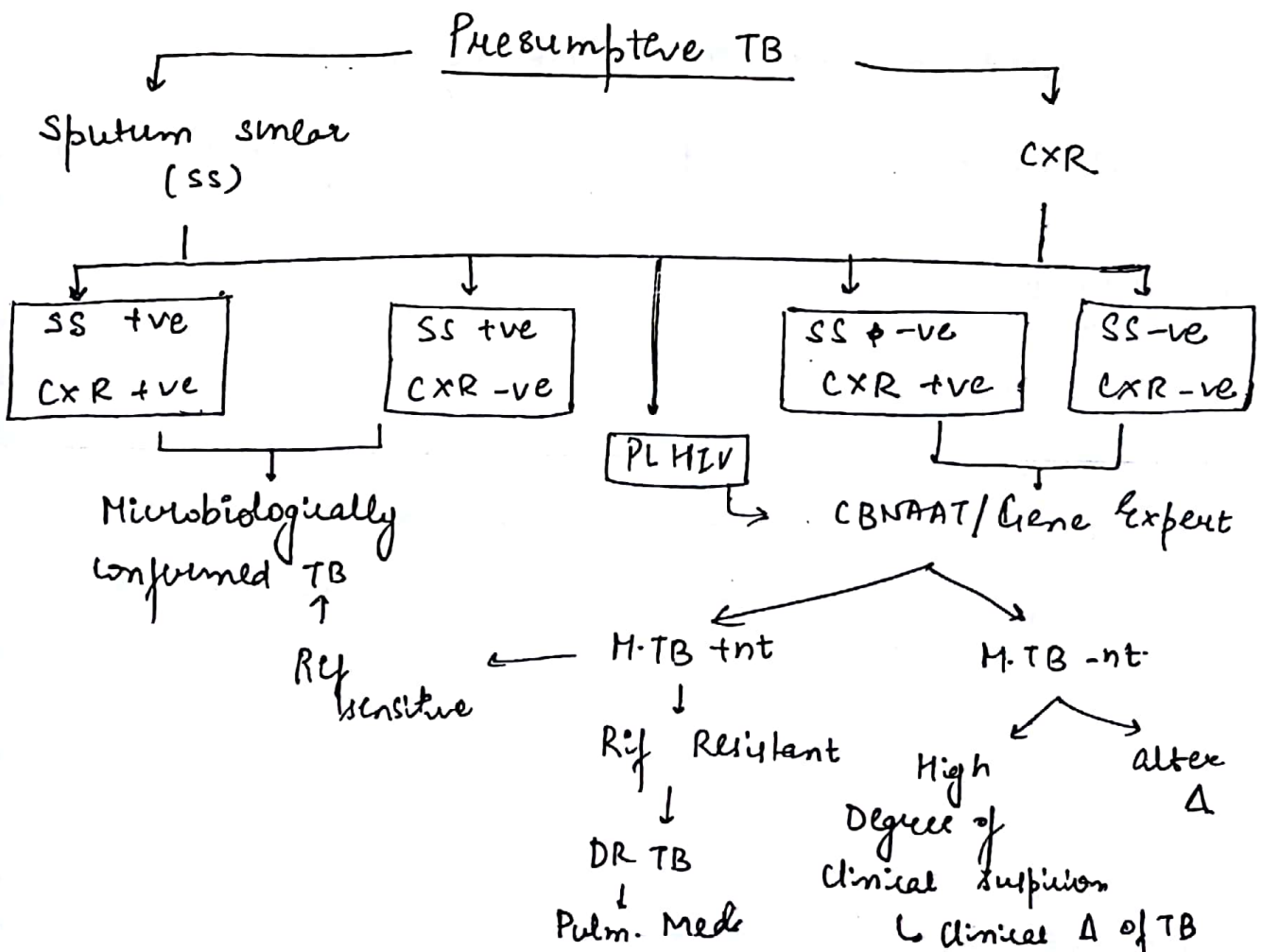
TARGETS

Detection - 90%

Cure Rate →

Drug sensitive New = 90%

Drug sensitive Previously R_x = 85%



CASE DEFINITIONS :-

154

Microbiologically

Presumptive TB pt. AFB/
Culture +ve / CBNAAT +ve

Clinically Used

Presumptive TB pt. not
microbiologically confirmed
But Used 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 s.s. at end of Intensive Phase
 - a) no need to extend I.P. at by 1 month
 - b) sputum ~~sent~~ sent for DST (Drug sensitive TB)

⊙ Monthly wt

u) CXR. (if required)

DRUG RESISTANT

Sputum smears 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-

155

Defⁿ - 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~~ free call to hidden phone no.

NVBDCP

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

HALARIA -

National Framework for malaria elimination in India
(2016 - 2030)

(Aggressive Target 2016 - 2022)

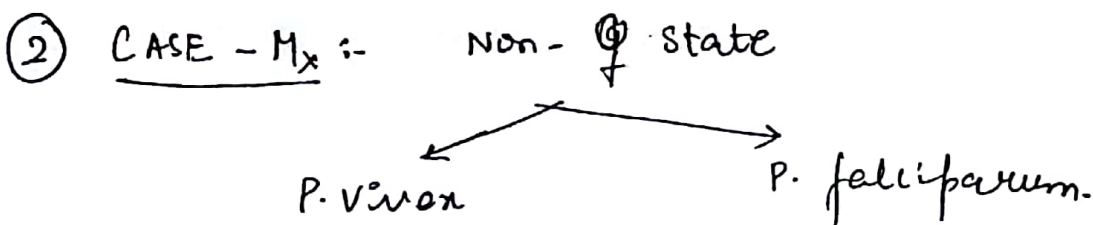
GOAL - Eliminate malaria [0] Indigenous cases throughout entire country by 2030

CAT	PHASE	STATES/ UTs
0	Preven ⁿ of Re-establishment	'0' Indigenous cases of Malaria ¹⁵⁶
1	Elimination	state API < 1/1000
2	Pre-elimination	state API < 1/1000 \bar{c} some district having API > 1/1000
3	Intensified control	state API \geq 1/1000

MALARIA CONTROL STRATEGIES : JUNE (malaria control month)

National Dengue Day = 16th May.

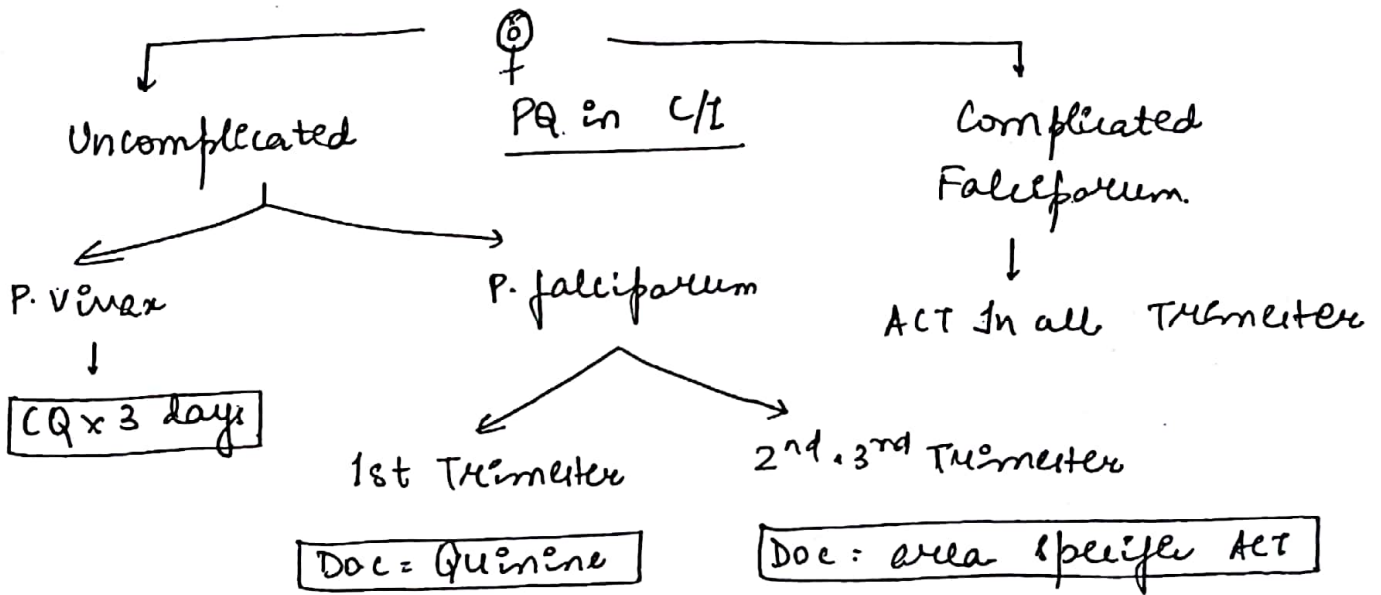
- 1) Surveillance $\rightarrow M_x$
- 2) Case management
- 3) IVM (Integrated Vector Management)
 - a) IRS (Indoor Residual Spray)
 - \hookrightarrow DDT, Malathion
 - Mainstay in Rural areas
 - b) ITN/LLIN \rightarrow Urban area
 - c) Anti-Larval (Both the areas)



P. vivax
 ↓
 CQ x 3 days
 +
 PQ x 14 days

P. Falciparum 157
 ↙ ↘
 North-eastern other states
 ↓ ↓
 ACT - AL. ACT + Sp
 [Arthemether + Lumefantrine] [Atebunate + sulfadoxine + Pyrimethamine]

Single dose of PQ on Day 2



MALARIOMETRIC INDICATORS -

- 1) SPLEEN RATE :- Best Indicator of malaria prevalence in community
- 2) INFANT PARASITE RATE :- Most sensitive Index of Recurrent Transmission in locality
- 3) API (Annual Parasite Index) ⇒
 API ≥ 2/1000 population → High Risk area

$$API = \frac{\text{Confirmed cases During 1 year}}{\text{Population under surveillance}} \times 100^{158}$$

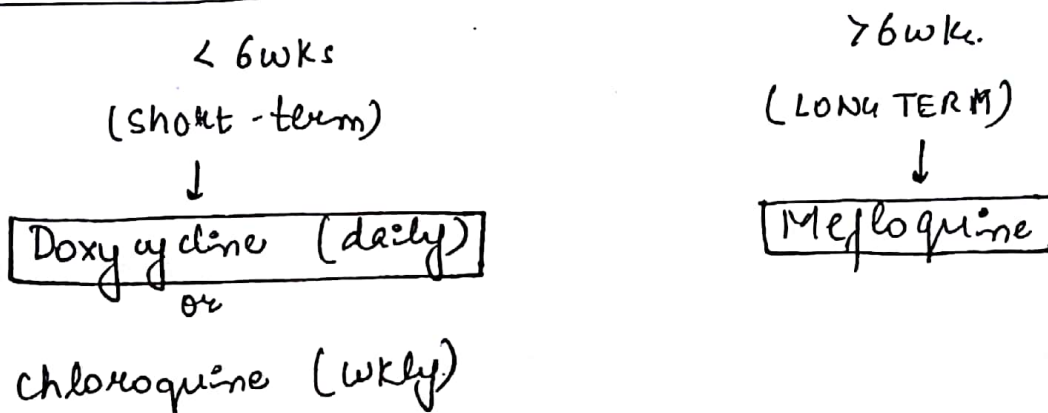
47 ABER [Annual Blood Examⁿ Rate]

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

Imp:- Index of operational efficiency

AIM:- To screen 10% of entire population

CHEMOPROPHYLAXIS



JE CONTROL

1) Human Vaccination → Most effective [SA-14-14-2]
 0.5 mL / s.c. (Upper arm)
 Diluent:- Phosphate Buffer

2) VECTOR CONTROL → JE Vectors are outdoor vectors,
 ∴ IRS is of no benefit

- a) outdoor spraying
- b) Pigs to kept away from human dwelling

1) Chemoprophylaxis -
DEC + Albendazole single dose annually
for 4-6 yrs
Given to all except ♀ & children < 2 yrs

2) Chemotherapy -
DEC - 6mg/kg x 12 days
DEC medicated salt → mass Rx of filariasis.
Consumed for 6-9 months @ 1gm DEC/kg of
salt

LEISHMANIASIS

1) LAB Δ :- RDK PK 3g

2) Doc :- Liposomal Amphotericin B (I.V.)

3) alternative → miltefosin

4) obsolete → Na stibogluconate

5) Financial Compensation →

500/mnth → cases

2000/mnth → PKDL

300/mnth → % 1^o worker of pt families &

200/ ~~month~~ → Generating awareness in
community

67 CONTROL → A) Sandfly Control
(Done By Residual Insecticide)

a) DDT / 1st choice

2 metre, 2 Rounds / yr.,

@ 2 gm / m²

alternative → BHC

B) Personal Prophylaxis

avoid ~~to~~ sleeping on floor

Fine mesh nets < 0.2 mm

CRS → Health care of community