DEMOGRAPHY

4 topics – Demographic stages, Fertility rates, Survey indicators, Family planning

Topic 1.1: Demographic Stages

	Name	Birth rate	Death rate	Remarks
Phase 1	High stationary	High	High	-
Phase 2	Early expanding	High	Starts declining	• Explosive growth • DG starts increasing • Maximum DG toward late part of stage 2 • High fertility rate
Phase 3	Late expanding	Starts declining	Slow decline	• Increasing population, but growth rate is lower than stage 2 • DG starts decreasing • Demographic Gift, bonus • Dependency ratio is lower
Phase 4	Low stationary	Slow decline	Slow decline	Ideal stage, low liabilities, Developing countries
Phase 5	Declining	Slow decline	Very low/ stable	• Declining, dying population • Minimum (negative) DG, demographic liability

Topic 1.2: Fertility Rates

GFR	Total number of **children** a female will bear during her reproductive years
TFR	Total number of **children** a female will bear during her reproductive years assuming the current **Age specific Fertility rates**
GRR	Total number of **daughters a female** will bear during her reproductive years assuming the current **Age specific Fertility rates**
NRR	Total number of **daughters a newborn girl child** will bear during her **entire life** assuming the fixed **age specific fertility rates** and **age specific death rates**

Demographic Gift-
- higher number of reproductive age group population
- lower dependancy ratio
- because of higher birth rates in the previous demogrpahic phase
- seen from stage III onwards

Demographic liability-
- higher number of older age group population
- higher dependancy ratio
- because of declining death rates
- seen typically in Stage 5

Village level
- ASHA, LHV's, Trained Dai

Subcenter
- 2 MPW – (Male and female)
- Upgraded to HWC – with post of CHO

PHC
- Medical officer – incharge, AYUSH, Dental + ANM + HA (supervisory functions)
- Best level of integrated health services – preventive, curative, rehabilitative)

CHC
- Specialist – medical, surgical, ob/gy, pediatrics, opthal, anesthesia, X-ray technician, OT-Assistants
- Functional - X-ray, lab, OT
- Upgraded to FRU with 24 x 7 Blood bank facility

District Hospital
- All Clinical specialities, nurses, specialized labs
- Program officers for national health programs

Population norms, beds

HWC (2-4 staff) – maintained by center govt.	**PHC** (Staff - 13-14 basic, 20 desirable)	**CHC** (Staff - 45 basic, 50 desirable)
Health and wellness center • Rural hilly – 3000 • Rural plain – 5000 • Urban HWC – 15–20,000 population	• Rural hilly – 20,000 • Rural plain – 30,000 • Urban PHC – 50,000 Urban polyclinic – 2.5–3 Lac	Rural hilly – 80,000 Rural plain – 1,20,000 Non-metro city – 2,50,000 Metropolitan city – 5,00,000 population
BEDS • Type A SC: 1–2 beds • Type B SC: 2–3 beds	**BEDS** • Type A – 4-6 beds • Type B – 6-10 beds	**BEDS** • CHC - 30–50 (FRU) beds • UCHC 50–100 (FRU) beds
Drug Kit A, B, C	**Drug Kit** D	**Drug Kit** E, F, G, H

District Hospital: One bed per 1000 population is an 'Essential' norm for every district while two beds per 1000 is a target they should aspire toward 'Desirable level'.

Functions:

ASHA worker	MPW (male)	MPW (female)
• Home visits • Health care of community • Depot holder for essential drugs • Care for mother and child • Integrated functions with Anganwadi, ANM, Village health sanitation and nutrition committee	• Malaria slides, diagnosis, treatment • Insecticide spray, vector control • Chlorination, water quality • Records and registers • Subcenter maintenance • OPD and family survey	• ANC, PNC, Mother and child care • Conduct normal deliveries, emergency mother and child care • Immunization • Family planning, contraception • OPD and family survey

MOTHER AND CHILD HEALTH

Target:

MMR < 70 per lac live births

NNMR < 12 per 1000 live births

U5MR < 25 per 1000 live births

(refer to demographic data for current values, Table 1, pg 41)

Classical definitions:

1. Neonate – from birth till 28 days of life
2. Early neonate – birth till seven days of life
3. Late neonate - from 8th day till 28 days of life
4. Infant - from birth till one year of life
5. Perinatal period - From 28 weeks of gestation till first 7 days of life
6. Still birth - classified as a fetal death which is:
   a. more than 28 weeks of gestation
   b. more than 1000 g
   c. more than 35 cm in crown rump length

NOTE: As per WHO, the perinatal period is from 22 weeks till 7 days, but in India, we take it from 28 weeks onwards under the RCH program

Most common cause of death in:

- Neonatal mortality (and infant mortality) is – low birth rate, prematurity (single best answer)
- Infant mortality (as per Medical certificate cause of death – survey report 2020) – perinatal conditions as hypoxia, birth asphyxia and other respiratory conditions
- U5MR – septicemia > Pneumonia > diarrhea
- Maternal mortality – postpartum hemorrhage due to uterine atony due to multiple risk factors as traumatic delivery, prolonged delivery, anemia

Points to remember:

- Child mortality rate (under five mortality rate) – death of children age under five years
- Child death rate (1-4 years death rate) – death of children age 1 year to 4 years of age
- Perinatal mortality includes still births and early neonatal deaths
- Still birth rate is number of still births out of total births (still + Live births)

See formulas on page 70.

Best indicator:

- Overall development of country and population health – IMR
- United Nations (UN) indicator for country development – U5MR
- Quality of delivery services – MMR
- Health facilities availability and service utilization indicator – Perinatal mortality rate

ANC Visits –

As per National health mission, India – 4 visits -> < 12 weeks, 14-26 weeks, 28–32 weeks, 36 weeks till term

As per WHO – Total 8 visits

1st trimester – 1 visit, 2nd trimester – 2 visits and in 3rd trimester – 5 visits

ANC screening:

Rural areas – Hb, Urine (protein, sugar), malaria test

Urban area – Hb, urine, Malaria test + HIV + HepB + VDRL + GDM testing

GDM screening guidelines:

- two times - < 12 weeks and 20-24 weeks
- criteria is one step testing > 140 mg/dL is positive for GDM
- fasting is not required
- testing at 2 hours, post glucose load - 75 g anhydrous glucose
- trial with medical nutrition therapy (MNT) for 2 weeks to all positive GDM cases

ANC Care

- Two doses of Td vaccine with gap of 4 weeks.
- In case of complete immunization within last three years, then only ONE booster to be given
- Early pregnancy (<12 weeks or 1st Trimester) – only folic acid supplements @ 400 mcg/day
- From 4th month onwards – Iron folic acid supplement (60mg elemental iron + 500 mcg folic acid), daily tablets to be given till delivery and also up till 180 days after delivery

IMPORTANT TABLES

Table 1: Country data, survey report

• Birth rate – 19.5 per 1000 population • Death rate – 6.0 per 1000 population • Infant mortality rate – 28 per 1000 live births • Neonatal mortality rate – 20 per 1000 live births • Maternal mortality ratio – 97 per lac live births • Maternal mortality rate – 6 per lac females in 15-49 yrs • Lifetime maternal risk – 0.21% in WRA 15-49 yrs	Dependency ratio – 48.27%
• Sex ratio – 1020 • Sex ratio birth – 929 • Total fertility rate – 2% • Couple protection rate – 67% • Annual growth rate – 0.9% • %age children with Exclusive breastfeed – 64% • Institutional deliveries – 89%	• TB incidence – 188 per lac • Leprosy prevalence – 0.5 per 10,000 • ANCDR – 8.13 per lac • Grade 2 disability – 1.96 per million population • HIV prevalence – 0.2%

Table 2: Health indicators for country comparisons

INDEX	PQLI	HDI	HIHD	MPI	GHI
	Physical Quality of Life Index	Human development index	Historical Index of Human development	Multidimensional Poverty Index	Global Hunger Index
Sub-indicators	• LE at 1 year • Literacy rate • IMR	• LE at birth • Mean school years • Expected school years • Gross national income	• LE at birth • Adult literacy rate • School Enrolment rate • Gross domestic product	• Death <18 years • <6 years of school • No education till 8th class • Low standard of living (6)	• U5 MR • Undernutrition • Inadequate food supply
Current level	Old indicator, not used	0.64, Rank 132	–	• National 0.118 • Urban 0.04 • R = Rural 0.155 • highest Bihar, lowest Kerala	29.1 (serious Hunger). Rank 107 (out of 122 countries)

PQLI—Physical quality of life index
HDI—Human development index
HIHD—Historical index of human development
MPI—Multidimensional poverty index
GHI—Global hunger index

IMPORTANT IMAGES AND LOGOS

1. Demography

Fig. 1.1: Birth and Death Registrar of India

Fig. 1.2: Digital India Campaign

Fig. 1.3: National Vector Borne Disease Control Program

Fig. 1.4: IDSP—Integrated Disease Surveillance Project

Fig. 1.5: NLEP—National Leprosy Eradication Program

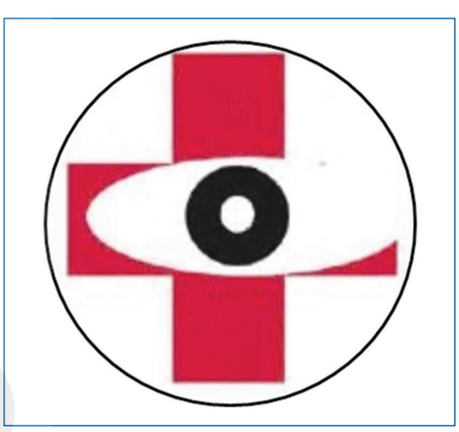

Fig. 1.6: NPCBVI—National Program for Control of Blindness and Visual Impairment

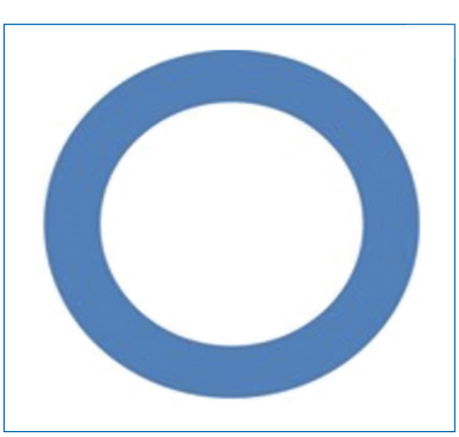

Fig. 1.7: Unite for Diabetes—Logo

Fig. 1.8: MBI kits for iodine testing in household salt

Fig. 1.9: National Program for Control and Prevention of Cancer, Diabetes, Cardiovascular Disease and Stroke

4. Graphs and Charts

Fig. 4.1: Venn diagram

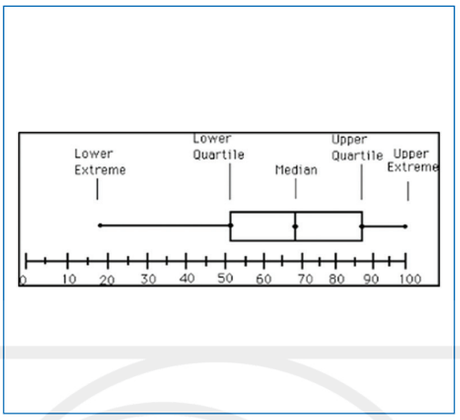

Fig. 4.2: Box and whisker plot with Quartile distribution

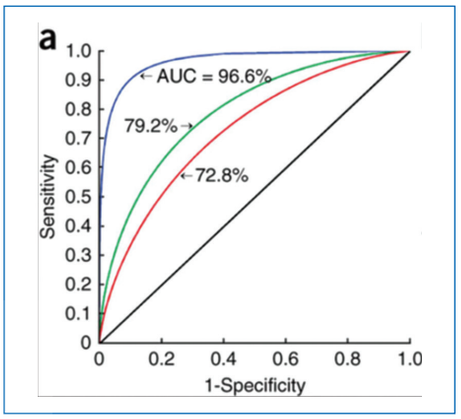

Fig. 4.3: ROC – Receiver operator characteristic curve

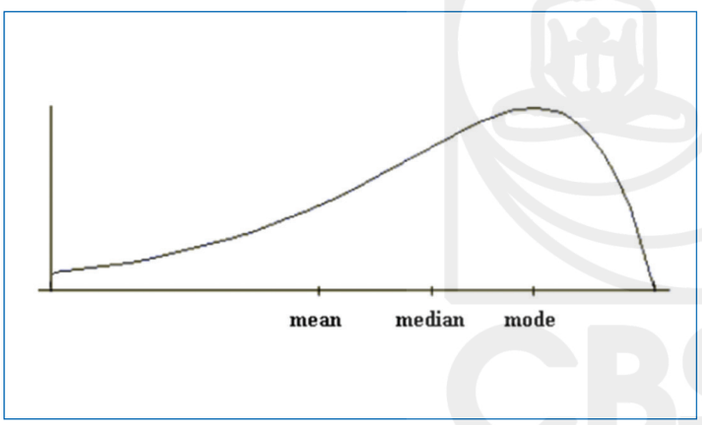

Fig. 4.4: Left Skew

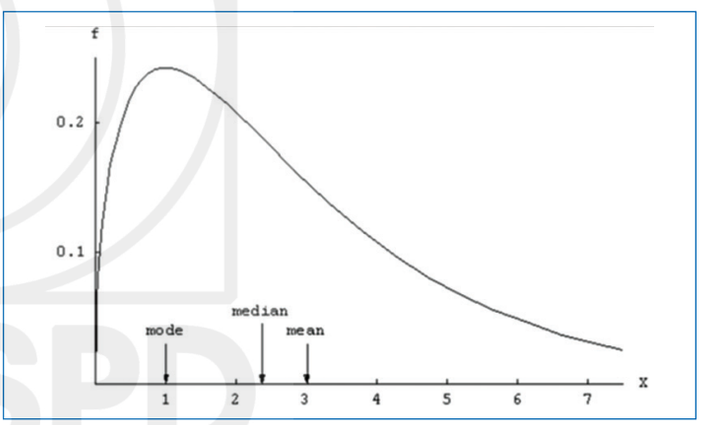

Fig. 4.5: Right Skew

Infant Mortality Rates in Western Africa

Stem	Leaf
5	1
6	
7	
8	4 6 8
9	2 9
10	
11	3 4
12	1 2 4
13	8
14	4 7 8
15	1

Fig. 4.6: Stem and leaf plot

DEMOGRAPHY

FMGE DECEMBER 2021

1. **In a population of 10,000; what does it mean that sex ratio is more than 1000.**
   a. Male population less than 500
   b. Male population less than 5000
   c. Female population less than 500
   d. Female population less than 5000

Ans. b

CRPSM/3rd ed/Page 392
Sex ratio is number of females per 1000 males. So, if the sex ratio is more than 1000, means more females compared to males.

2. **Couple has given birth to their first child, the family is entering in which phase:**
   a. Formation
   b. Expansion/Extension
   c. Contraction
   d. Dissolution

Ans. b

CRPSM/3rd ed/Page 378
Family cycle:
Formation—marriage of couple
Extension—birth of first child
Complete extension—birth of second child
Contraction—first child is adult, and lives away from family
Complete contraction: second child is adult, and lives away from family
Dissolution—death of a spouse
Extinction—death of remaining partner

3. **Registration of birth and death rate in National level by:**
   a. Civil registration
   b. SRS
   c. NFHS
   d. Census

Ans. a

CRPSM/3rd ed/Page 396
Birth and death registration is done as vital survey or the civil registration survey

4. **All are true for vasectomy; except:**
   a. Immediate sterilization
   b. Permanent method
   c. Contraceptive result after 3 months
   d. No sutures are required

Ans. a

CRPSM/3rd ed/Page 408
The male need to use alternate method (condoms) for 8–9 weeks or 30 ejaculations after vasectomy. Hence, does not offer immediate sterilization.

INI-CET/NEET 2022

1. **In a European country continuous deaths are happening but no new births is reported, the country is in which phase?**
   a. High stationary
   b. Low stationary
   c. Decline
   d. Late expansion

Ans. c

CRPSM/3rd ed/Page 389
If the births are not there, but there are more deaths, means the population size is decreasing and hence, option c.

2. **Comparison of development and quality of health and life between two countries is done by?**
   a. Human development index
   b. Human poverty Index
   c. Disability adjusted life years
   d. Quality adjusted life years

Ans. a

CRPSM/3rd ed/Page 152
Human development index measures the standard of living, and healthy life (life expectancy at birth).
- Human poverty Index – measures the poverty rate in country.
- Disability adjusted life years – measures the burden of a disease.
- Quality adjusted life years – measures the effectiveness of an intervention.

3. **Correct statement about population pyramid.**
   a. The base denotes fertility
   b. Higher height, if age pyramid means low life expectancy
   c. If the middle part is bulging means more males compared to females
   d. A broad apex of age pyramid means more working population.

$$\text{Pearls Index} = \frac{\text{Number of accidental pregnancies}}{\text{Total number of women months of exposure}} \times 1200$$

b. Sullivan index – marker for disability free life years
c. Abortion rates – for number of MTPs
d. Total fertility rate (TFR) – indicator or complete family size, it is also an epidemiological indicator for evaluation of the national family planning program.

3. Long acting reversible contraception (LARC) is:
a. OC pills
b. Implants
c. Sterilization
d. IUCD
e. Chhaya

Ans. b and d

The intrauterine device (IUD) and the birth control implant are long-acting reversible contraception (LARC) methods. Both are highly effective in preventing pregnancy and have good return to fertility.

HEALTH SYSTEMS IN INDIA

FMGE DECEMBER 2021

1. A worker is posted in the same village, who is 8th pass and age is 25–45 years. She is a widow and has good communication skills. Identify the worker:
a. MPW
b. Accredited social health activist
c. Anganwadi worker
d. Dai or trained birth assistant

Ans. b

CRPSM/3rd ed/Page 459

This is ASHA worker. She is a resident of the same village; age 25-45 years and 8th pass (recent update: minimum education 10th pass). She should be preferably a mother.

FMGE JUNE 2022

1. All of the following health workers are available at the village level; except:
a. Trained birth assistant
b. Accredited social health activist
c. Anganwadi worker
d. Auxiliary nurse midwife

Ans. d

CRPSM/3rd ed/Page 458

ANMs are available at PHC level or above. ANM courses are accredited courses, regulated under the Indian nursing council.

2. First contact of people to health care is done at:
a. Subcenter
b. Primary health center
c. Polyclinic
d. District hospital

Ans. a

CRPSM/3rd ed/Page 457

The first contact of community toward health care is done at a health center. Subcenters are located for a population of 3000 (hilly areas) to 5000 (plain area) and serve as first point of contact.

Primary health center is the best level of health care for integrated services – involve preventive, promotive and curative health care to community

3. Which of the following is true for PHC; except?
a. Caters to population of up to 30,000
b. Provides 24 x 7 Delivery services
c. Provides specialized health care for referral
d. Integrated health care services

Ans. c

CRPSM/3rd ed/Page 455

PHC provides an integral and important health care functionary system. It provides all levels of health care (preventive, promotive, curative, rehabilitative) to community along with delivery services.

Specialized health care (option c) is provided at a community health center, CHC (and not at PHC), which may also be upgraded to a FRU (first referral unit) for emergency and specialized OBGY care.

4. The following health staff/services is available at a CHC; except:
a. Surgical facility
b. First referral units
c. Congenital malformations/genetic care interventions
d. Blood storage facility