

Community Medicine

Edition 8.5

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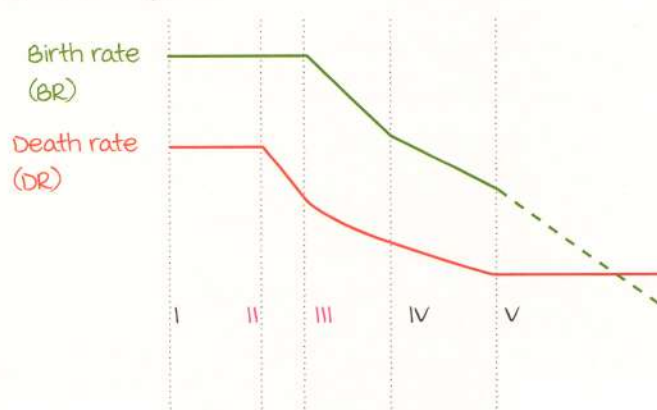
DEMOGRAPHIC CYCLE

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Phases Of Demographic Cycle

00:00:27

Phases of Demographic Cycle :



Demographic gap in different phases

Stages	Phase	Birth rate	Death rate	Demographic gap (BR-DR)	Population	Examples
I	High stationary	High	High	Stable	Stable	Rural Bangladesh, West Africa (Niger)
II	Early expanding	High	Start declining	max, (d/t ↓ in DR) starts ↑	Explosive growth	Developing countries
III	Late expanding	Start declining	Slow declining	starts ↓ (d/t ↓ in BR)	Increasing (But < stage 2)	Developing countries (India)
IV	Low stationary	Slow declining	Slow declining	Stable	Stable	Developed countries (US, Canada, UK)
V	Declining	Slow declining	very low declining/stable	minimum, negative value, BR can be < DR.	Declining	Italy, Japan, Norway

DEMOGRAPHIC TRENDS

Demographic process/variables :

- Fertility/birth rates.
- mortality/death rates
- marriage rates.
- migration rates (Immigration & emigration).
- Social migration (based on socioeconomic classes).

Annual Growth Rate

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Annual growth rate (AGR) = $\frac{\text{Birth rate} - \text{Death rate}}{10}$

Annual growth rates of different population

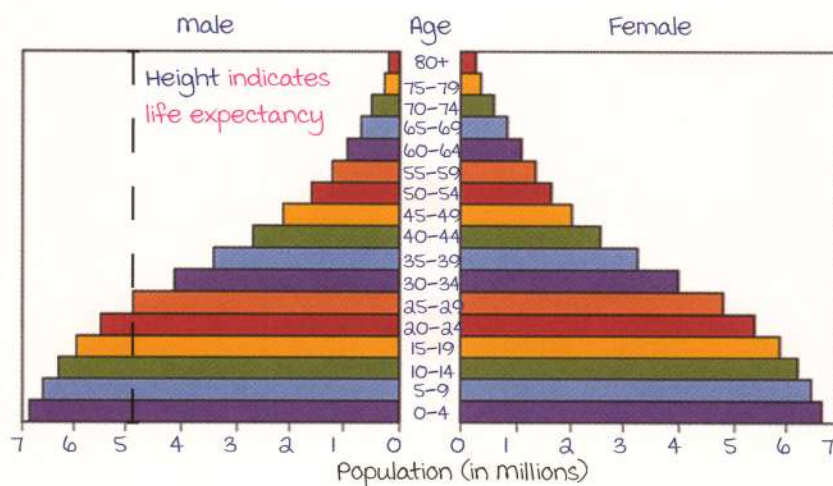
Population	Annual growth rate
Slow growing	<0.5%
moderate growing	0.5 - 1%
Rapid growing	1 - 1.5%
very rapid growing	1.5 - 2%
Explosive growing	>2%

malthusian growth model

Annual growth rate	Population doubles in
1%	70 years
2%	35 years
0.5%	140 years
1.5%	47 years

Age Pyramids

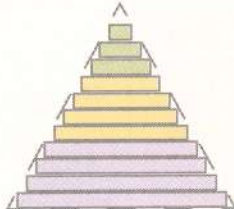
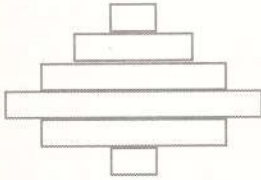
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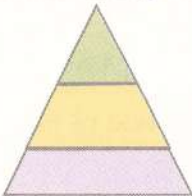
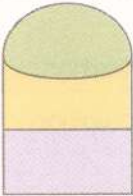
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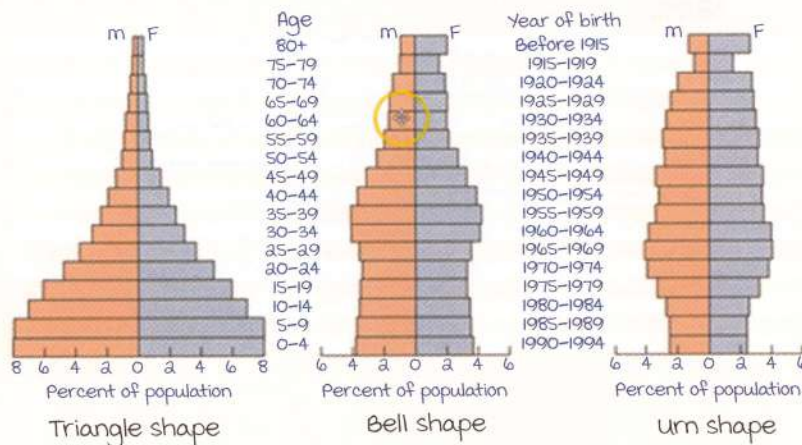
Based on developing vs developed country :

	Developing country	Developed country
Fertility rate	Higher	Lower
Type of age pyramid	Broad base	Broad belly
Image		

 Pre-reproductive
 Reproductive
 Post-reproductive

Based on shape of age pyramid :

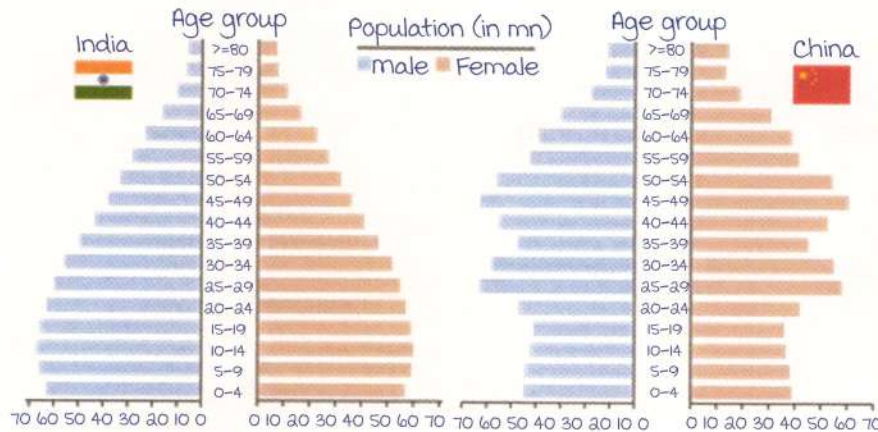
	Triangular shaped	Bell shaped	Urn shaped
Birth & Death rate	↑ Birth rate	↑ Birth rate & ↓ Death rate	Birth rate ≤ Death rate
Population	↑/Growing	Stable	Declining
Image			



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Demographic Gift, Liability & Dependency Ratio

00:18:29

Demographic Gift vs Liability :

	Demographic gift	Demographic liability
Population	Economically productive	Elderly
Occurs d/t	↓ Birth rate	↓ Birth rate & ↓ Death rate
Stage of demographic cycle	✓	✓

Demographic gift :

- AKA Demographic bonus/dividend.
- Leads to ↓ in dependency ratio.

Dependency Ratio :

Formula :

$$\frac{\text{Total no. of dependent population}}{\text{Total no. of independent population}} = \frac{\text{Age } <14y \text{ \& age } >65y \times 100}{\text{Age of } 15-64y}$$

Dependency ratio in India :

- Younger age : 38.9%.
- Old age : 9.7%.
- Total : 48.6%.

FERTILITY RATES

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Fertility and Reproduction Indicators

00:00:15

Women of Reproductive Age (WRA) group : 15 - 49 years.

Fertility Indicators :

1. General Fertility Rate (GFR) : $\frac{\text{Total number of live births in the area}}{\text{WRA in that area}} \times 1000$

If GFR is same in population A and B → Categorise WRA according to age groups (eg; 15-25, 25-35, 35-49) → Group with higher population of younger women chosen for area development.

2. Total Fertility Rate (TFR) : GFR calculated for Age specific fertility rates (ASFR).

If both group A & B has same TFR → Look for no. of daughters born.

Reproduction Indicators :

1. Gross Reproduction Rate (GRR) : $\frac{\text{Total number of daughters born in the area}}{\text{WRA in the area}}$ (With ASFR)

In two groups with similar GRR → Look for NRR.

2. Net Reproduction Rate (NRR) :

- Total no. of daughters a newborn girl child will bear in her lifetime assuming ASFR & Age Specific Death Rates (ASDR).

Targets

00:13:37

Net reproduction rate :

- Target NRR = 1 (Replacement level)
- Best indicator to evaluate National Family Planning Program (NFPP).
- Aka final impact indicator.

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Total fertility rate :

- Target TFR < 2.1 (0.1 is adjustment for gender bias).
- **most important** indicator
- **Epidemiological** indicator.
- TFR of India is 2.0 (NFHS-5 data).
- Proxy indicator for **complete family size**.

Couple protection rate :

- Target CPR > 60%.
 - If CPR is > 60% $\rightarrow$ TFR < 2.1 $\rightarrow$ NRR=1 (**Target of NFPP**).
- **Functional & operational** indicator.
- Implementation of NFPP at grass root levels (ASHA) : Contraceptize 60% of population.
- CPR of India : 66% (NFHS-5 data).

SURVEY TECHNIQUES

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Types

1. CRS : Civil Registration System.
2. SRS : Sample Registration System.
3. NFHS : National Family Health Survey.
4. DLHS : District Level Household Survey.
5. Census.

Defacto Vs De Jure Survey :

Defacto Survey (Obsolete)	De jure Survey
"As and where" basis.	uses legal proof of permanent residency.

Types : CRS & SRS

00:02:30

Civil Registration System:

- Aka **vital registration system**, Not a survey technique.
- Birth & death registration in India.
 - Birth registered within 21 days.
 - Death registered within 21 days.
 - NRI : Birth & death within 90 days.
- Under the ministry of Home Affairs : **Office of Registrar General of India.**

Sample Registration System :

- Aka Dual/Biannual system.
- Conducted every 6 months at two levels.

National level

State level

(PHC → District → State)

→ Data matching/
Triangulation →

Presented to the citizens of country.

Use :

Assessment of Indicators :

- Crude death rate (CDR) : 6.0
 - Natural growth rate.
 - Neonatal mortality rate : 23/1000 live births.
- } Based on 2019 survey
-
- Crude birth rate (CBR) : 19.5
 - Infant mortality rate (IMR) : 28/1000 live birth.
 - Maternal mortality ratio (MMR) : 97/100000 live births.
 - Under 5 mortality rates : 32/1000 live births.
- } Recent updates

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Types : NFHS, DLHS & Census

00:09:44

National Family Health Survey - 5 :

Conducted :

- Between 2019-21.
- Every 5 years by MOHFW.
- By International Institute for Population Sciences (IIPS) in Mumbai.

Recent update :

HIV testing has been dropped (Done by NACO), BP & Blood glucose has been included.

Questionnaires/Schedules assessed on :

1. Biomarkers.
2. Household.
3. men.
4. Women.

Indicators assessed :

- Literacy rate.
- Sex ratio.
- Prevalence of anemia.
- Anemia rates in 15-49 y females : 57%.
- Contraceptive use : 66.7% of women of reproductive age, m/c contraception is tubectomy (India).
- Immunisation rates.

1. Sex Ratio

- No. of females per 1000 males.
- NFHS-5 $\rightarrow$ 1020 females per 1000 males
 $\rightarrow$ At birth : 929 daughters born per 1000 male children.

2. Literacy rate (LR)

- Effective LR = $\frac{\text{No. of people who can read \& write in any language}}{\text{Population with age } > 7 \text{ years}} \times 100$
- Adult LR = $\frac{\text{No. of people who can read \& write in any language}}{\text{Population with age } > 15 \text{ years}} \times 100$

Other rates and ratios :

- Diabetes prevalence : 13-15%.
- Tobacco use in males : 38%.
- Alcohol use in males : 18.8%.
- Total dependency ratio : 48.7.

District Level Household Survey :

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- **Ad hoc survey** at district level.
- use : To assess MCH, growth & social parameters which affect health.

Census :

- Conducted under **ministry of Home Affairs** every 10 years.
- use : Determines demographic structure of the population.
- method : De jure method.
- First official census : **1881**.
- First census with disability accounted : **1981**
- **Year of big divide** (Peaks in annual growth rate) : 1921.

2021 Census :

- Digital census.
- Differentiated population based on **industrial & occupational** categories.

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FAMILY PLANNING AND CONTRACEPTION : PART 1

Terms :

Eligible couples	Couples in whom female is in reproductive age group (15-49 years) Contraception given
Target couples	Couple who has completed family & has at least one live child Sterilization done
Planned family	1st child born after 2 years of marriage 2nd child born 3 years after 1st child (Or 5 yrs after marriage) - Couple adopts permanent method of family planning after 2 children
Failure of contraception	- Lifetable analysis (Best method) - Pearl's index (m/c) $\frac{\text{Number of accidental pregnancy}}{\text{Total woman years of exposure}} \times 100$ } methods of assessment (multiply by 1200 for exposure in months) - Unit : HWY (Hundred woman years) - Pearl's index of contraceptive methods - Condoms : 2-20% - Intrauterine device : 0.7-1.5% - OCP : <0.1% (most effective contraception under 60) - Implants : <0.05% (Nexplanon : Least failure rate in implants)

Methods Of Contraception : Natural & Barrier

00:08:53

Natural methods :

1. Abstinence.
2. Withdrawal method/coitus interruptus.
3. Calendar/Rhythm method.
 - Based on normal menstrual physiology.
 - Safe period : First & last seven days of cycle.
 - Type : **Tirumala method/Cycle beads.**

Types of contraception

Temporary	Permanent methods
- Natural methods - Barrier methods - Intrauterine devices - Oral contraceptive pills - Other methods	- Tubectomy - Vasectomy - Other

