PSM

RR-8.0

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DEMOGRAPHY

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Demographic Stages/Phases

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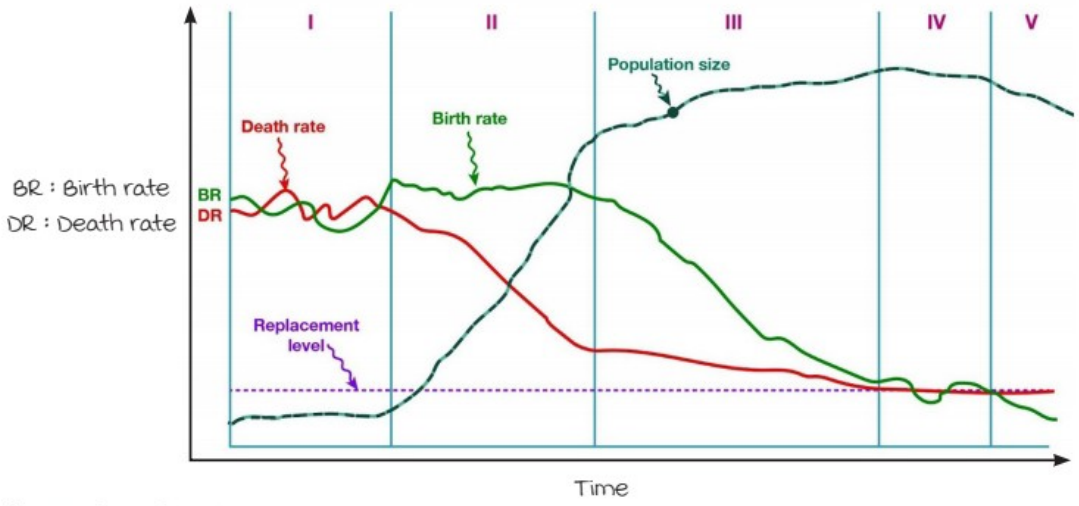
AKA Demographic transition model.



Characteristics :

Stages	Phase	Birth rate (BR)	Death rate (DR)	Demographic gap (BR-DR)	Other features
I	High stationary	High	High	Narrow	-
II	Early expanding	High	Start declining	Starts ↑ (D/t ↓ in DR) Max in late II	Underdeveloped, developing countries
III	Late expanding	Start declining	Slow declining	Starts ↓ (D/t ↓ in BR)	• India • Demographic gift ⊕
IV	Low stationary	Slow declining	Slow declining	Stable	Developed countries
V	Declining	Slow declining	Very low declining/stable	Minimum, negative value, BR < DR	Demographic liability ⊕

Demographic Gift/Dividend/Bonus :

- Higher no. of economically productive population → ↓Dependency ratio.
- D/t ↓BR (Higher BR in previous demographic stage).
- Seen in developed country.
- Max : Stage 3, 4 of demographic cycle.

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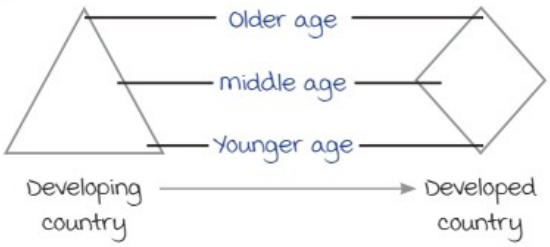
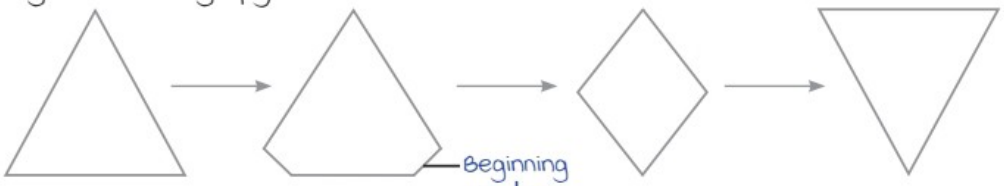
Age Pyramids :

- ↑BR
- ↑DR
- ↑Fertility



- Economically productive.
- ↑middle age group.
- Max demographic gift.

Progression of age pyramids :



Demographic Liability :

- Higher no of older population.
- Very low DR.
- Stage V of demographic cycle.
- Dependency ratio : ↑↑.

Annual Growth Rate :

$$\frac{BR-DR}{10}$$

Malthusian growth rate :

Annual growth rate	Population doubles in
1%	70 years
2%	35 years
0.5%	140 years
1.5%	~50 years

AGR and population :

Population	Annual growth rate
Slow growing	<0.5%
moderate growing	0.5% – 1% (India)
Rapid growing	1–2%
Very rapid growing	>2%

Fertility Indicators

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	Description
General Fertility Rate (GFR)	• No. of children a female bears during her reproductive years. • $\frac{\text{Total no. of live births}}{\text{WRA}} \times 1000$
Total Fertility Rate (TFR)	• No. of children a female bears during her reproductive years taking ASFR into consideration. • $\frac{\text{Total no of live births}}{\text{WRA with ASFR}} \times 1000$ • Best indicator for fertility & complete family size. • Epidemiological, planning, operational indicator. • Target : <2.1

	Description
Gross Reproduction Rate (GRR)	• No. of daughters a female will bear during her reproductive years in ASFR. • Total no of daughters born to a woman x 1000 / No. of WRA females with ASFR
Net Reproduction Rate (NRR) : Best indicator	• No. of daughters a newborn child will bear during her reproductive years in ASFR and ASMR. • Total no. of daughters born to a women in her lifetime / Total females with ASFR & ASMR • Best indicator for impact of national family planning programme. • Target : 1 (Replacement level) ⟶ Stable population.

WRA : Women in Reproductive Age group (15 to 49 years).

ASFR : Age Specific Fertility Rate.

ASMR : Age Specific Mortality Rate.

Couple Protection Rate (CPR) : >60%

- Contraceptive methods to be provided for eligible couples.
  (Eligible couples : Couples with women in reproductive age.)
- If CPR >60% ⟶ TFR <2.1 ⟶ NRR = 1 ⟶ Stable population.
- Field, operational indicator.

Survey Systems

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Civil/Vital Registration System :

Birth & death : Register within 21 days.

Sample/Dual Registration System :

- Evaluated every 6 months at national & state/district level.
- Published annually.

Components evaluated :

- Fertility : Crude birth rate (CBR).
- Mortality :
  - Crude death rate (CDR).
  - Infant mortality rate.
  - Maternal mortality ratio.
- Latest NFHS : NFHS-5, 2019-2020.

Census :

- Evaluates population distribution.
- Evaluated every 10 yrs.

National Family Health Survey (NFHS) :

- Conducted by MoHFW (Ministry of Health & Family Welfare).
- Evaluated every 5 years.
- Latest NFHS : NFHS-5, 2019-2020.

Uses :

- Prevalence of diseases :
  - Anemia
  - DM
  - HTN
  - Malnutrition
- Sex ratios.
- Utilization rates.
  - ANC coverage.
  - Immunisation coverage.
  - Contraceptive coverage : Unmet needs of contraception.
- Literacy rates.

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Demographic Variables & Statistics

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Demographic Variables :

- Births & deaths.
- Migrations : Immigration & emigration.
- Age at marriage.
- Female literacy.
- Social mobility : Movement across socio-economic classes.

Demographic Statistics Of India :

	Statistics
CBR (SRS 2022)	19.5/1000 population
CDR (SRS 2022)	6/1000 population
DGR	12.5%
Annual growth rate	0.9% (UN, MoHFW)
Total dependency ratio	48.7%
Sex ratio	1020 : Total no. of females for every 1000 males. 929 : Child (0-6 yrs) sex ratio
Eligible couple rate	15-18%
Literacy rate	72-85%
Couple protection rate	67%
TPR	2.0
Youth dependency ratio	38.5
Elderly dependency ratio	10.2
Potential support ratio	9.9

DGR : Decadal Growth Rate

Dependency Ratio :

$$\frac{\text{Total dependent}}{\text{Total independent}} = \frac{\text{No. of persons aged <14 \& >65 years}}{\text{No. of persons aged 15-64 years}} \times 100$$

Potential Support Ratio :

- Absolute no. of persons aged 15-64 years per one older person aged >65 yrs.
- Japan : 2-2.5.
- France : 2.5-3.
- India : 9-10.

Population Statistics :

- Population size.
- Sex ratio.
- Dependency ratio.
- Density

Vital Statistics :

- Birth, death rate.
- Natural/population growth rate.
- Life expectancy at birth.
- Mortality.
- Fertility rates.

FAMILY PLANNING

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Replacement level for total fertility rate : <2.1

Family Planning Methods (FPM) 00:01:03

Target Couple vs. Eligible Couple :

	Eligible couple	Target couple
Definition	Couples with reproductive age female (15–49 yrs)	Completed family + at least 1 live child.
Ideal FPM	Contraceptives	Permanent sterilization

Failure Rate :

Life table analysis : Best method.

Pearl's index :

$$\frac{\text{Total no. of accidental pregnancies}}{\text{Total women years of exposure}} \times 100 \quad (OR) \quad \frac{\text{Total no. of accidental pregnancies}}{\text{Total women months of exposure}} \times 100 \times 12$$

Contraception	Pearl Index (Per 100 women years)
Condoms	2 – 20
IUD	0.5 – 1.5
OCP	<0.1 : most effective oral contraception
Implants	<0.05 : most effective overall

Types of Contraception :

Reversible/Temporary methods		Permanent methods
• Natural methods • Barriers • IUD • Emergency contraception	• OCP • Implants • Gossypol • Centchroman	• Male sterilization (Vasectomy) • Female sterilization (Tubectomy)

Temporary Contraceptives 00:05:42

Natural Methods :

Methods	Descriptions
Lactational amenorrhoea	• Amenorrhoea post childbirth • High failure rate • Ideal contraceptive of choice during lactation : Progesterone only pills
Rhythm method	Based on calendar method

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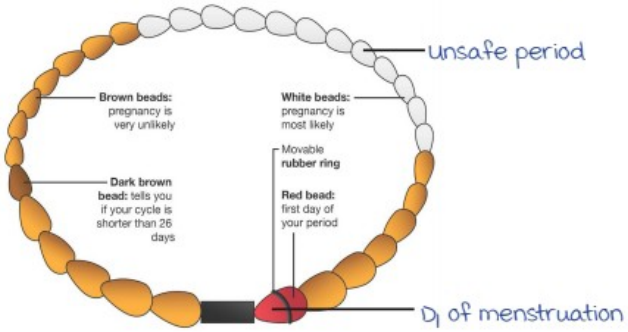
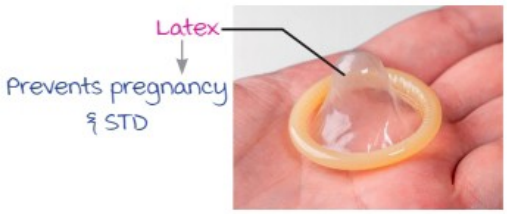
methods	Descriptions
Basal body temperature	↑Body temperature by 0.3 – 0.5°C d/t ovulation : Unsafe period.
Billing's method	Thinning of cervical mucus d/t ovulation
String of beads/Tirumala methods	• Adv : Used by illiterate women • Disadv : Not used in irregular, short (<26 days) or long (>32 days) cycle



Tirumala beads

Barriers :



male condom

Female condom

Intrauterine Devices :

- 1st generation : Inert IUD → Lippe's loop, Grafenberg ring.
- 2nd generation :
  Copper containing : CuT200, CuT380A, CuT375 (Multiload devices).
- 3rd generation : Hormonal IUD → Mirena, Progestasert.

Hormonal IUD :

	Progestasert	Mirena
Contains	Natural progestin	Levonorgestrel/LNG-20 (Synthetic)
Life span	1 year	5 years
Total hormone load	38 mg	52 mg
Rate of secretion	65 mcg/day	20 mcg/day
Characteristic	• Lowest expulsion rate • A/w ectopic pregnancy if contraception fails	• Lowest failure rate (<0.3/100 women years) • Lowest side effect

Mirena IUD

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Copper containing IUD :

	CuT-380A	Cu 375 device
Shape of device	T shaped	Inverted U shaped
Life span	10 years	5 years (5 > 3)
Copper present	On the arms as well (A)	Only on the stem
Thread	Polyethylene (White)	Monofilament nylon (Blue green)
Image		

380 : Surface area of Cu on the IUD.

Mode of action : Prevents fertilization > implantation.

IUD insertion :

	Description
Intra caesarean	During C/S
Post placental	Within 10 min of delivery
Post partum	10 mins to 48 hrs after delivery
Interval	After 6 weeks of delivery
Post surgical abortion	After 12-15 days (12 days : Sx abortion, 13-15 days : Medical abortion)
Non pregnant female	Within 1st 10 days of start of menses

Absolute Contraindications :

- Suspected pregnancy.
- Ongoing pelvic inflammatory disease.
- Undiagnosed vaginal bleeding.
- Cancer cervix, uterus or adnexa or other pelvic tumors.

Note :

- Previous ectopic pregnancy is not a C/I.
- Bleeding up to 3 days post IUD insertion : Reassurance + Iron folic acid tablets.

Side Effects :

- Spotting/bleeding (m/c).
- Pain.
- PID.
- Perforation.

Oral Contraceptive Pills (OCPs) :

Mala N, Mala D : Ethinylestradiol 0.03 mg + Levonorgestrel 0.15 mg.

- 21 hormonal pills + 7 ferrous fumarate (Iron) tablets.
- Mala N : Free of cost, by GOI.
- Mala D : Home delivery contraceptive by ASHA worker.