

DEMOGRAPHIC TRANSITION

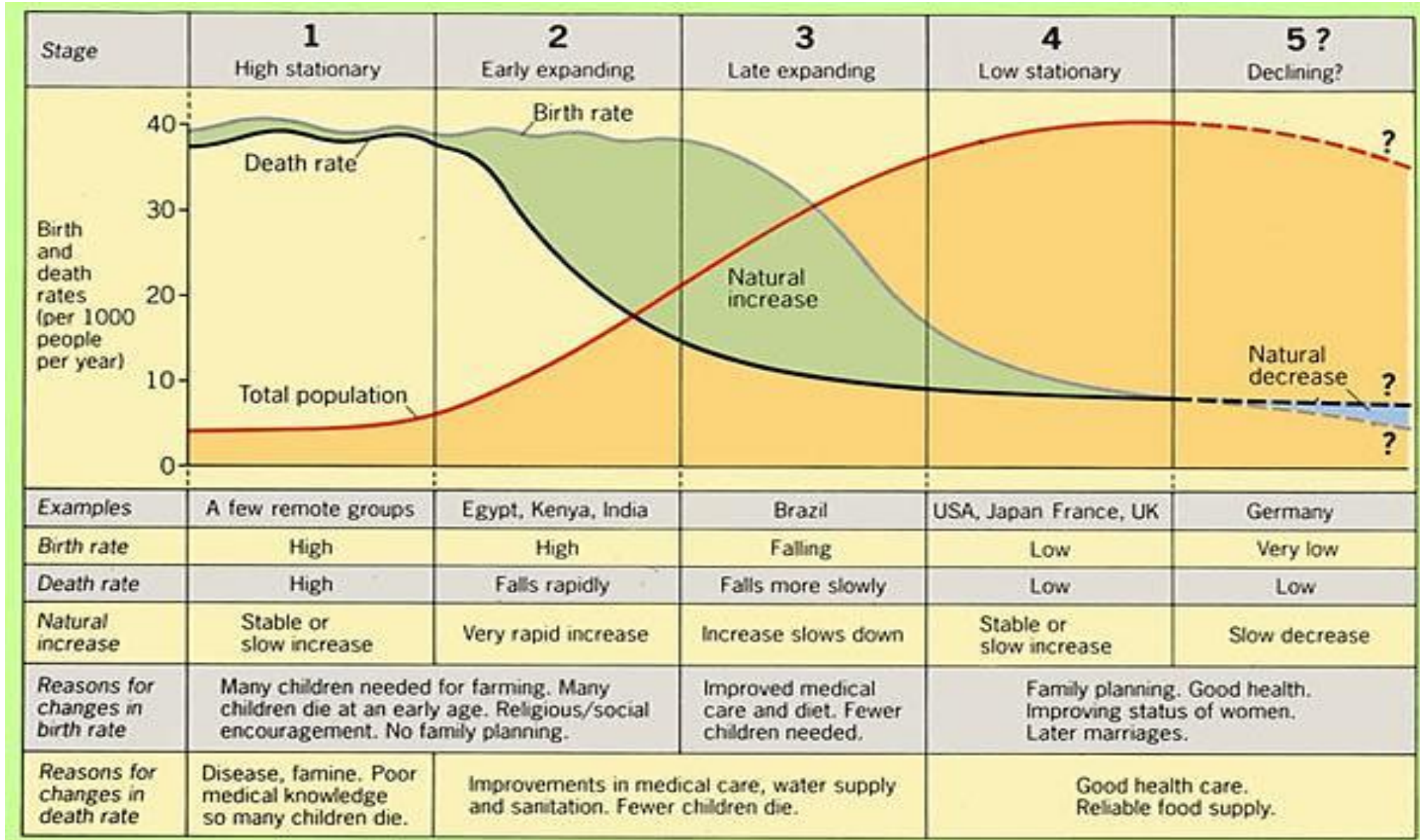
Learning objectives

- Describe the stages of Demographic Transition Model
- Link the type of population pyramid to the stage of Demographic Transition Model
- Define, compute and interpret mortality indicators
- Define, compute and interpret fertility indicators
- Explain the phenomenon of migration and its effect on population size
- Define, compute and interpret the rates of population increase and population doubling time

Demographic Transition Model

Description of the changes in the population that occurred in western countries in the past two centuries

- Changes in fertility trend
- Changes in mortality trend
- Reason for this changes



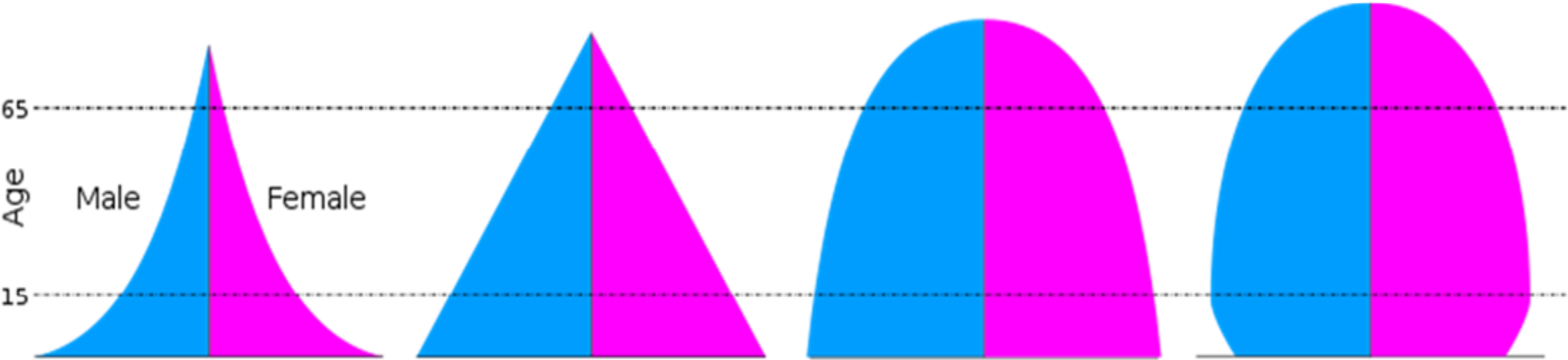
Phases of Demographic Transition Model

Early expanding

Late expanding

Low stationary

Declining



Population Pyramid Corresponding To Phases of demographic transition

Demographic forces

- Mortality
- Natality/ Fertility
- Migration

Mortality indicators

- Crude death rate
- Age specific mortality rate
 - Infant mortality rate
 - Perinatal mortality rate
 - Neonatal mortality rate
 - Post-neonatal mortality rate
- Mortality rate of children below 5 years of age
- Maternal mortality rate and ratio
- Cause specific mortality rate
- Proportionate mortality rate
- Life expectancy

Review “Health Indicators” lecture for these indicators

Fertility indicators

- Crude Birth Rate (CBR)
- General fertility rate (GFR)
- Age specific fertility rate
- Total Fertility Rate (TFR)
- Gross Reproduction Rate (GRR)

Crude Birth Rate (CBR) is the number of live births per 1 000 population in a specific year and locality

$$\text{CBR} = \frac{\text{Total number of live births in a year and locality}}{\text{Estimated mid year population in the same year and locality}} \times 1000$$

- Crude index of fertility as it relates births to total population (males and females outside the reproductive age period, as well as unmarried females)
- It is useful for
 - Making annual comparison
 - Illustrating fertility trend

General Fertility Rate (GFR) is the number of live births per 1000 women in the reproductive age (15 to 49 years) in a specific year and locality

$$\text{GFR} = \frac{\textit{Total number of live births in a year and locality}}{\textit{women in the age of 15 to 49 years in the same year and locality}} \times 1000$$

- GFR eliminates the effect of male and women outside the reproduction age
- It doesn't consider
 - The marital status of women
 - The variation in reproductive pattern at different age group of reproduction

Age-Specific Fertility Rate (ASFR) is the number of live births per 1000 women in a specific reproductive age group in a specific year and locality. The reproductive age groups are organized into 7 groups of 5 years interval

ASFR=

$$\frac{\text{Total number of live births born to women in a specific age group in a year and locality}}{\text{women in the same age group in the same year and locality}} \times 1000$$

Example

ASFR (15 – <20)=

$$\frac{\text{Total number of live births born to women in age group 15 – < 20 years in a year and locality}}{\text{women in the age group 15 – < 20 years in the same year and locality}} \times 1000$$

Total Fertility Rate (TFR) represents the average number of children a woman will have during her reproductive span

$TFR = \sum (ASFR \times 5)$ expressed as children per woman

Refined fertility rate which illustrate the variation in the rate of births at different age group

Gross Reproduction Rate (GRR) is the average number of female births that would be born to a woman throughout her reproductive period expressed as daughters per woman.

$GRR = TFR \times 48.0\%$ (the percentage of females to the total birth)

It predicts fertility of the next generation

But it doesn't take into consideration the deaths among females

Factors affecting live births

- Number of female population in the reproductive age group
- The rate and age of marriage
- Level of infant and preschool mortality rates
- The rates of using and continuation of contraceptive methods
- Economic value of the child

Migration

It is the movement of the population across a geographic borders for the purpose of residence. The purpose is usually for better life and higher standard of living.

- The term “immigration” and “emigration” are used to refer to international migration; movement between countries
- The terms “in-migration” and “out-migration” are used to refer to internal migration; movement between different areas within a country
- “Immigration” and “in-migration” is moving to an area while “emigration” and “out-migration” is moving out of the area

Internal migration

It is the movement within the boundary of a given country which may be

- Rural-urban migration; movement from rural to urban area and the reverse
- Urban-urban migration; movement from one urban area to another
- Movement of nomadic population governed by rain and climate
- Movement of temporary and seasonal nature; temporary worker

International migration is the movement from one country to another. It may be

- Permanent migration

The movement across borders with no eventual return as the movement of the population from less developing to developed countries of Europe, USA, Canada and Australia.

- Temporary migration

The movement across borders with the aim of working for a number of years, with the intent of an eventual return to the motherland as the migration of professionals and laborers to countries requiring their contribution

The effect of migration on population size compared to fertility and mortality.

Rate of Natural Increase (RNI) is the increase of the population size through the addition by births and the loss by deaths expressed in percentage

$$\text{RNI} = \frac{\text{Births} - \text{deaths in a year and locality}}{\text{Estimated mid year population of the same year and locality}} \times 100$$

$$\text{RNI} = \frac{\text{CBR (per 1000)} - \text{CDR (per 1000)}}{10}$$

Annual Growth Rate is the increase of the population size considering the births and deaths and the migration

$$\text{Annual Growth Rate} = RNI + \text{Net migration}$$

Net migration is the difference between emigration and immigration

Population Doubling Time

- With an annual growth rate of 1%, the population will double in 69.3 years (nearly 70 years)
- Population doubling time = $\frac{70}{\text{Annual Growth Rate}}$
- With an annual growth rate of 2% then the expected doubling time is 35 years