

# DEMOGRAPHY

**part 1+2**

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Original Content | [Titles](#) | Additional Notes | **Important**

# Learning objectives

- Define demography
- Describe the process of counting of the population
- State methods of estimation of the population size in inter-census years
- List and explain demographic elements
- List demographic forces and explain how it affects demographic elements
- Describe a given population using the population pyramid
- Define and distinguish between young and old dependency ratio

# DEMOGRAPHY

**Definition** of Demography: Demo means **population** and graphy means **measurement**.

Demography is the science concerned with the study of and the changes taking place in population size, distribution and composition as well as the changes that are taking place

## **Demographic elements**

- Size (how many)
- Composition (characteristics)
- Distribution(place of residence)

## **Demographic forces**

- Mortality
- Natality
- Migration

# Population census

Population census is

- **enumeration** of all persons of a country in a specified time
- collection of **demographic & socioeconomic** data
- analysis and **publication** of the data

Usual timing of population census

Census is carried every **ten years** at a time of minimal movement of the population (international and national travel)

# Types of census

## De Facto Census

Counting individuals **wherever they are** on the census day.

It is easier

More economic

### Main disadvantages:

- *Persons in transit may be missed*
- *False information of the population size of areas with high migration or high seasonal mobility*

## De Jure Census

Counting individuals at **their legal permanent residence** regardless of their physical presence.

Gives a factual figure

### Main disadvantages :

*Expensive and time consuming*

*People may be missed or counted twice in view of the definition of "permanent residence" for population of high mobility*

# Inter-census estimate

Population in inter-census years is estimated relying on “actual population”

- Use the preceding census population as starting point
- Adding the births and the immigrants
- Subtracting the deaths and the emigrants

Population census is done every 10 years !!! so instead of waiting 10 years we do an estimation called inter-census population which use census population as a reference

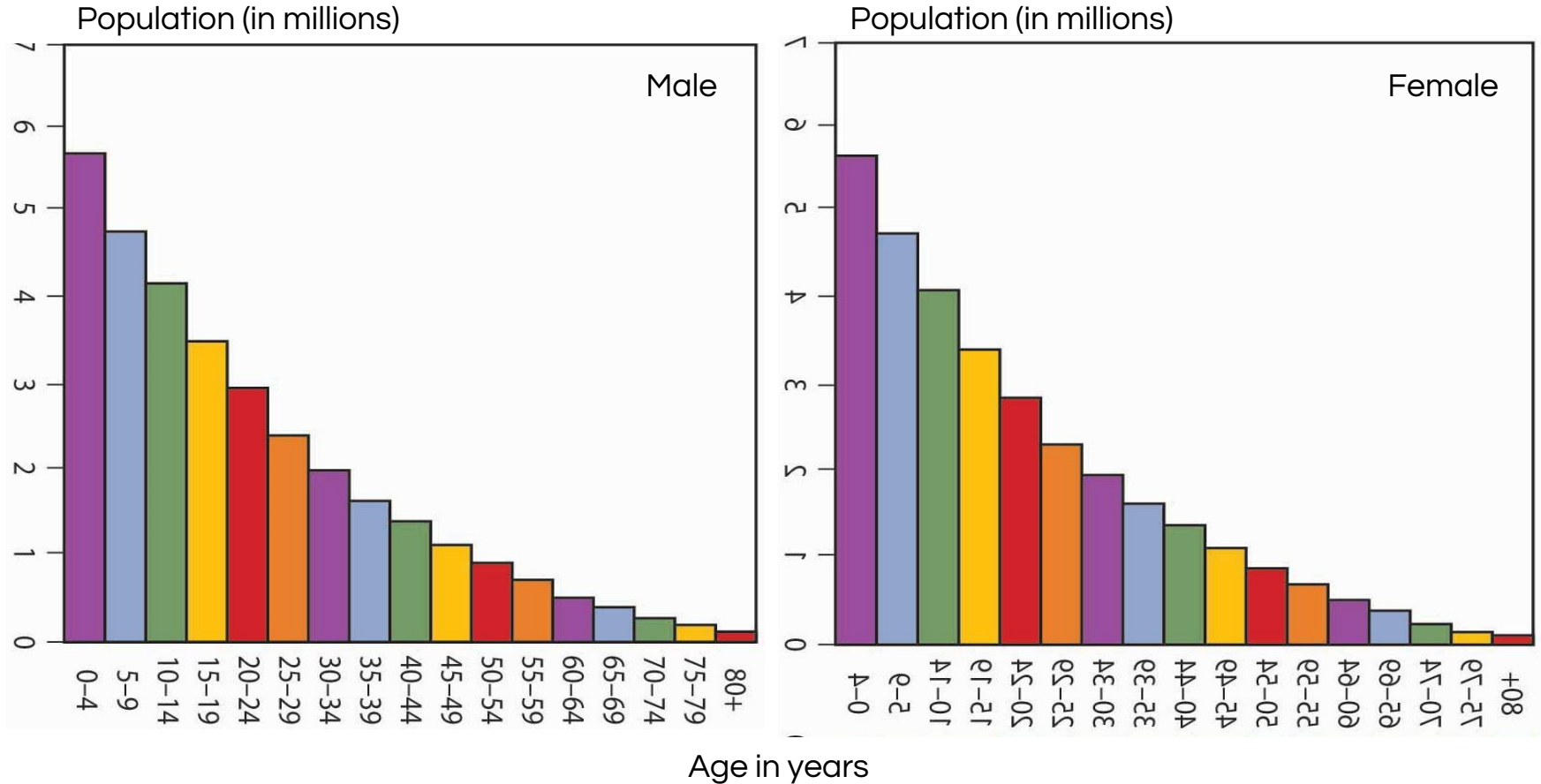
## Mid Year Population

- The population count is adjusted to represent the population as of July the 1<sup>st</sup> of the year
- The mid year population is used to compute indicators related to population

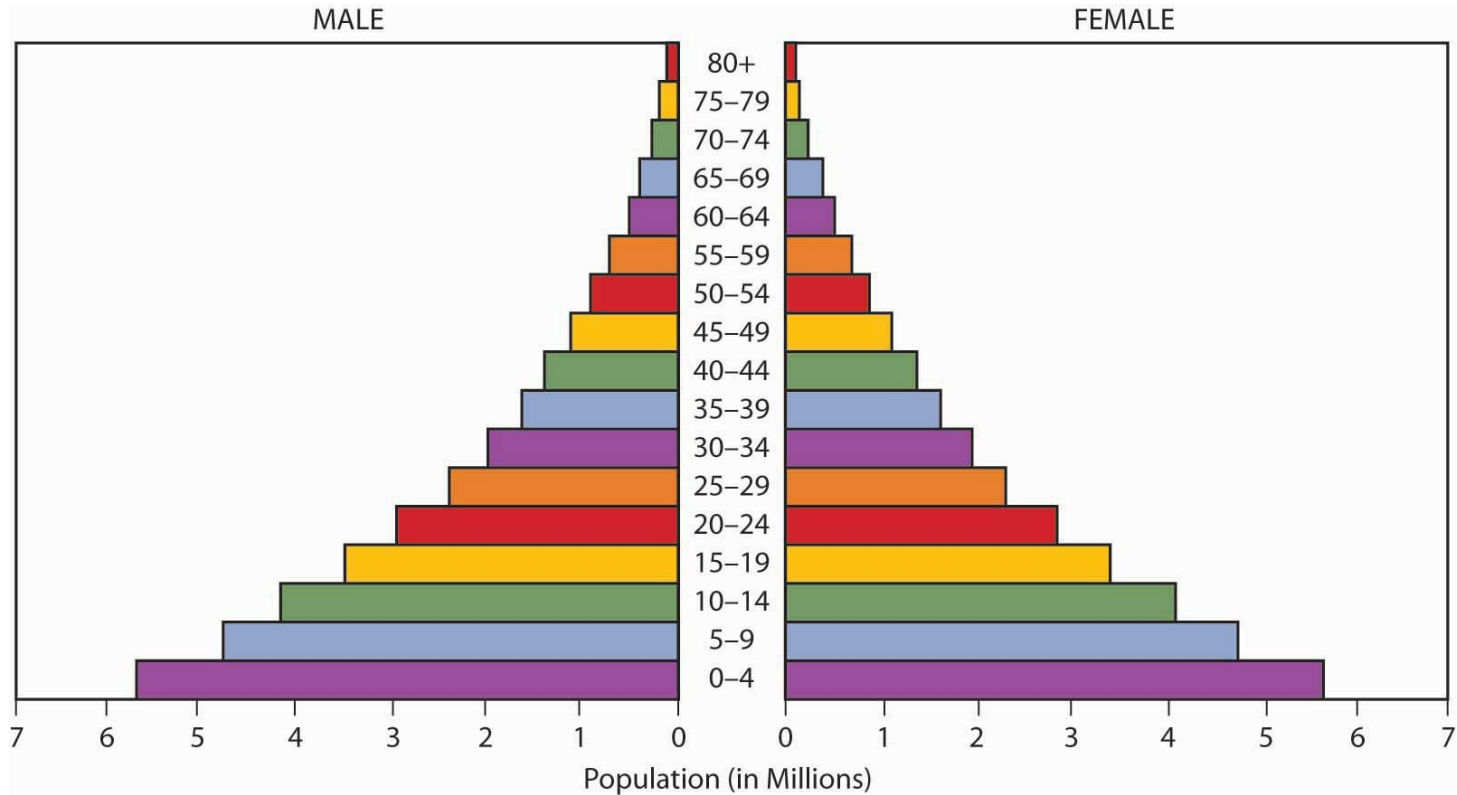
## Uses of population census

- Provides information on the **changes of population size**
- Population size is needed to **compute** morbidity, mortality and fertility rate
- Related to “**health status**” of the population as it depends on the dynamic relationship between number of people, their characteristics and the space they occupy
- **Planning of health services** is guided by demographic variables as number of health units required, their distribution and the number of healthcare workers required for service delivery

# POPULATION PYRAMID







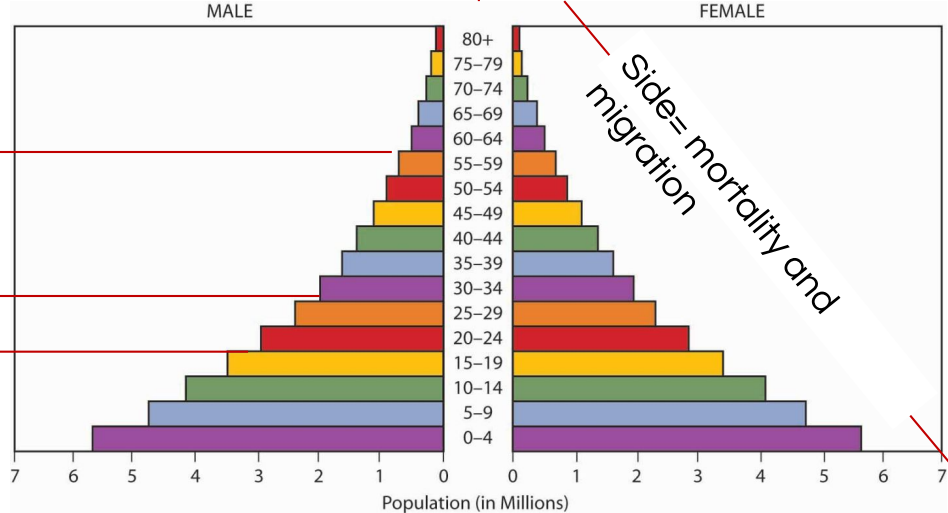
Population pyramid is a graphical presentation of the age and sex composition of the population represented by two histograms (one for male and the second for female) of the age distribution of the population set at 5-year interval and placed back to back

Apex= People living to old age

People  $\geq 60$  years=  
Old dependency

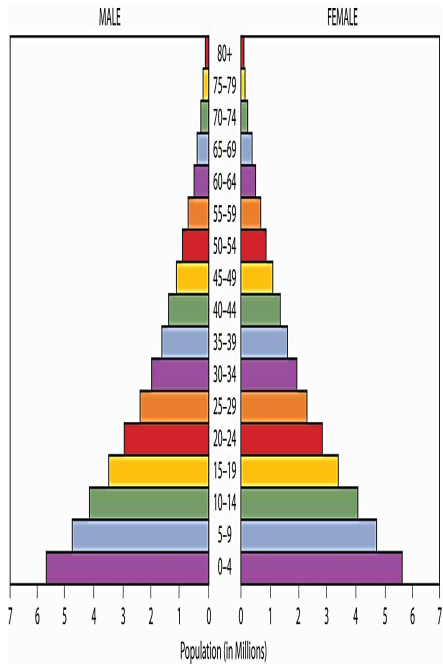
Median age

People  $< 15$  years=  
Young dependency

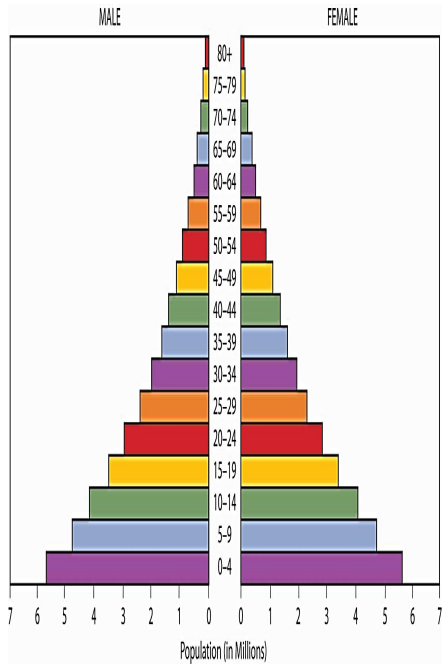


Height= life span

Base= births



- Halves-Proportion of males and females
- Base
  - Births; population adding to itself
  - Wide base reflects high births
  - Narrow base reflects low births
- Apex
  - Oldest people; reflects those living old age
  - Tapering apex reflects few living to old age
  - Broad apex reflects many living to old age
- Height-Life span; increase height reflects increase life span
- Side
  - Change in population size due to death or migration
  - Steep slope reflects rapid decrease**(high mortality)
  - Almost straight side reflects slow decrease



- Less than 15
  - Represents the size of people below 15 years
  - Represents the size of dependent youth
  - Large size in rapidly growing population
  - Small size in slowly growing population
- 60 + years
  - Represents the size of people  $\geq 60$  years
  - Represents the size of dependent old
  - Large size in population with longer life span
  - Small size in population with short life span
- Median age
  - Age that divide the population into two halves
  - Small in population with high births
  - Large in population with low births

Dependency ratio reflects the proportion of those who depends on the working group (15 to less than 60 years)

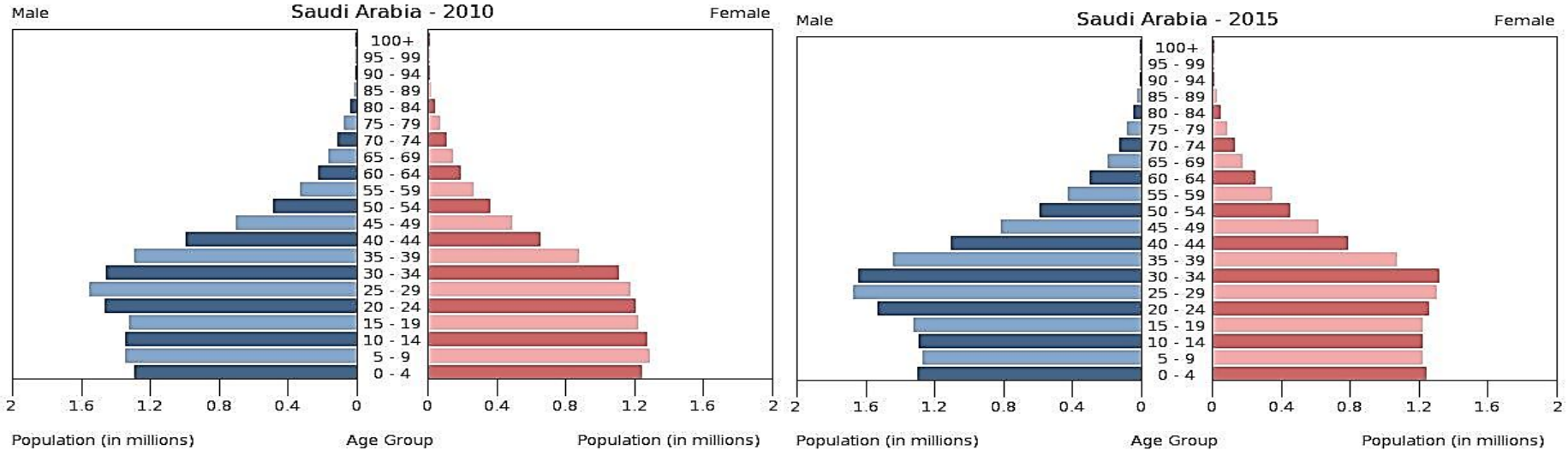
$$\text{Young dependency ratio} = \frac{\text{Population } <15 \text{ years}}{\text{Population } 15 \text{ to } <60 \text{ years}} \times 100$$

$$\text{Old dependency ratio} = \frac{\text{Population } \geq 60 \text{ years}}{\text{Population } 15 \text{ to } <60 \text{ years}} \times 100$$

$$\text{Total dependency ratio} = \frac{\text{Population } <15 \text{ years } \& \geq 60 \text{ years}}{\text{Population } 15 \text{ to } <60 \text{ years}} \times 100$$

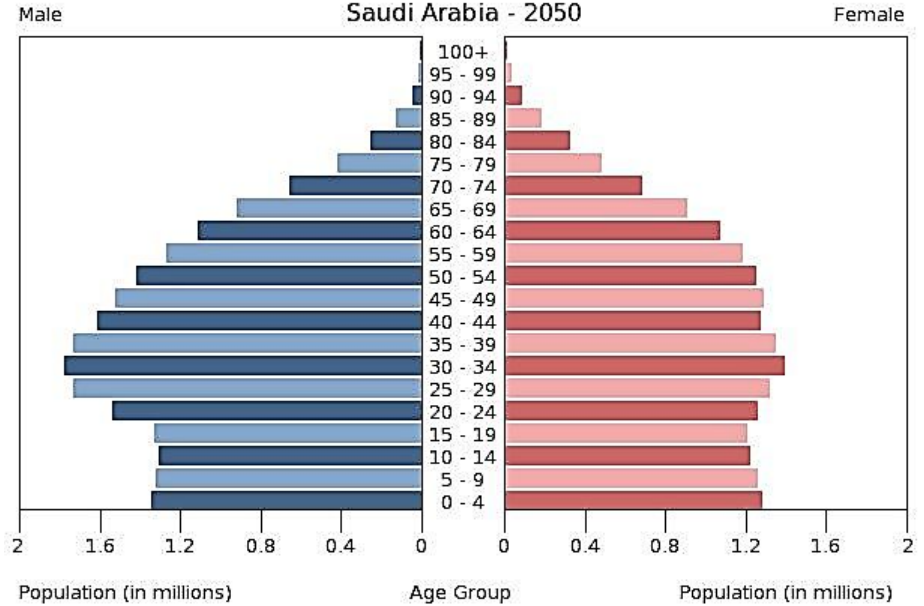
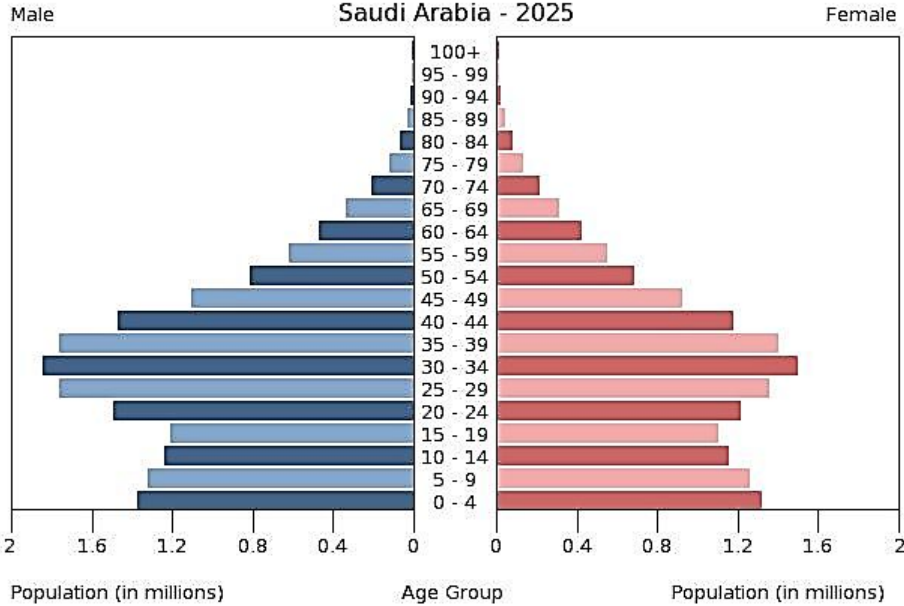
Having a high dependency ratio is not a good sign and preventive measures should be done in response

# SAUDI POPULATION



Population 25 732 000  
 CBR 19 per 1000 population  
 TFR 2.4 per woman  
 Growth rate 1.5%  
 CDR 3 per 1000 population  
 Life expectancy 74 years

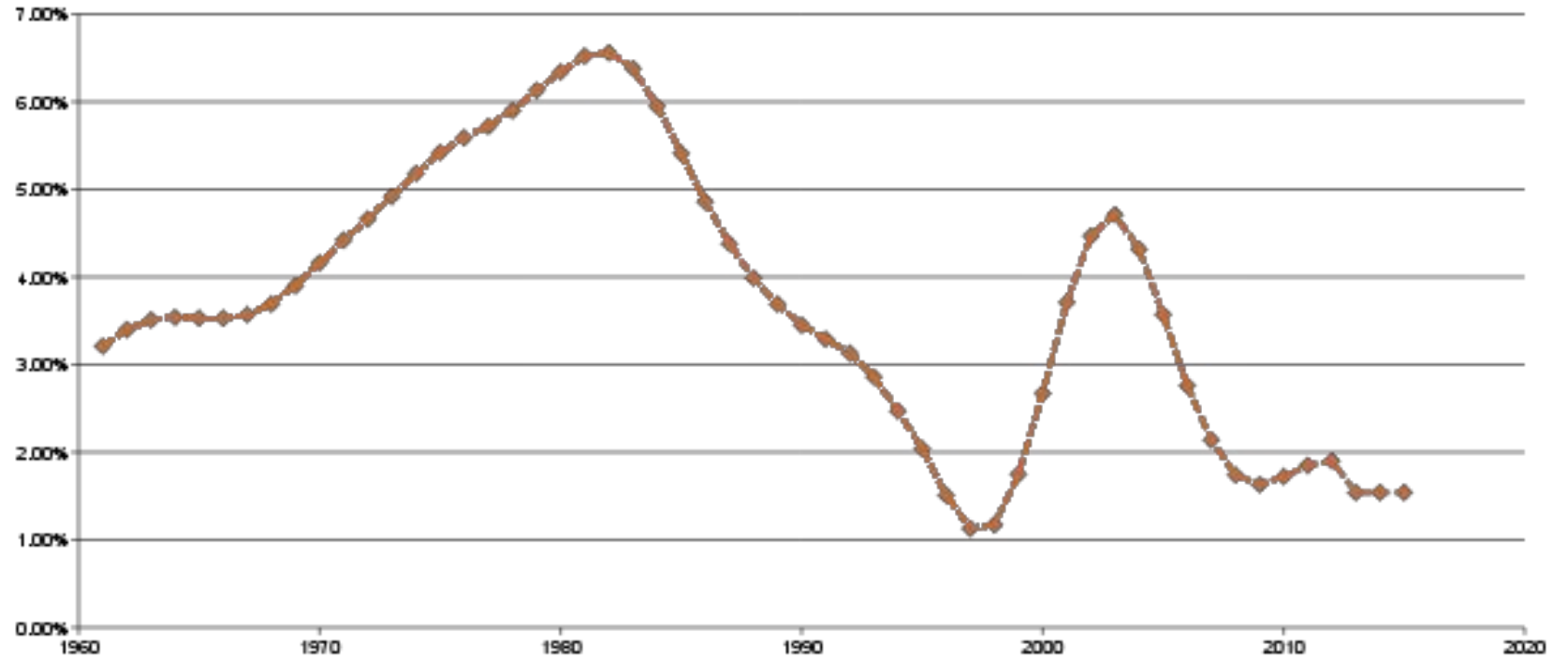
Population 27 752 000  
 CBR 19 per 1000 population  
 TFR 2.1 per woman  
 Growth rate 1.5%  
 CDR 3 per 1000 population  
 Life expectancy 75 years



Population 31 877 000  
 CBR 17 per 1000 population  
 TFR 2 per woman  
 Growth rate 1.3%  
 CDR 4 per 1000 population  
 Life expectancy 77 years

Population 40 251 000  
 CBR 13 per 1000 population  
 TFR 2 per woman  
 Growth rate 0.7%  
 CDR 6 per 1000 population  
 Life expectancy 81 years

Growth  
%



Population growth in KSA 1960 -  
2015

Year  
s



Total population	27 752 316	
Male population	15 105 575	
Female population	12 646 741	
Sex ratio (M/F)	119.4/100	
Below 15 years	7 512 186	
15 to < 60 years	18 802 626	
≥ 60 years	1 437 504	EACH 100 PEOPLE TAKES CARE OF 40 (ABOVE AGE OF 60)
Young dependency ratio	39.95%	
Old dependency ratio	7.64%	
Total dependency	47.59%	

# DEMOGRAPHIC TRANSITION

part 2

# Learning objectives

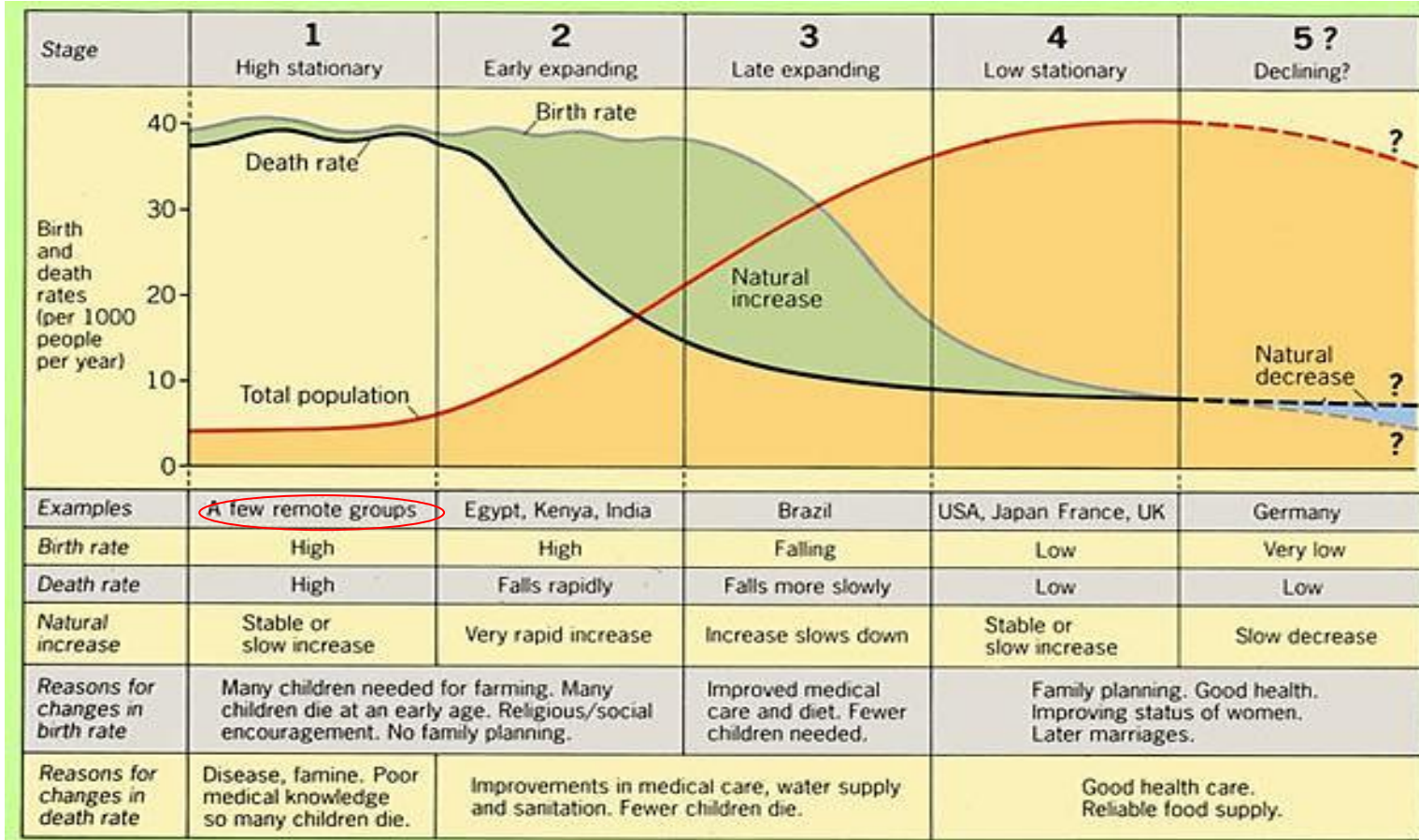
- Describe the stages of Demographic Transition Model
- Link the type of population pyramid to the stage of Demographic Transition Model
- Define, compute and interpret mortality indicators
- Define, compute and interpret fertility indicators
- Explain the phenomenon of migration and its effect on population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

# DEMOGRAPHIC TRANSITION

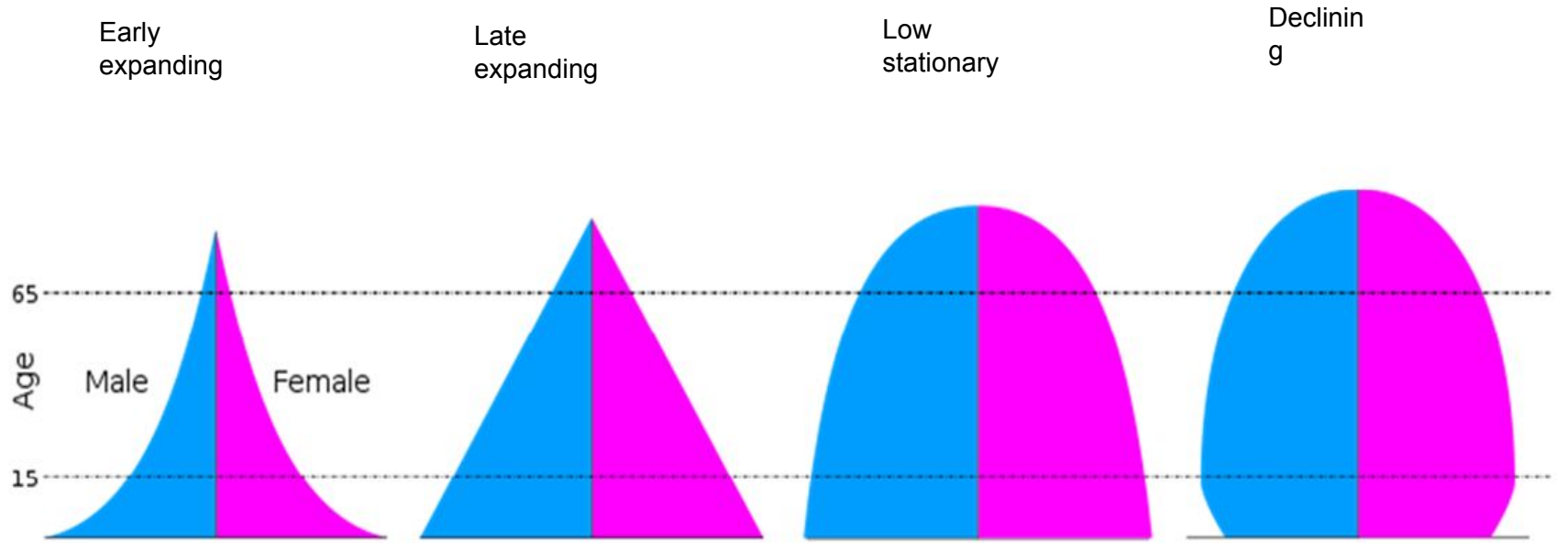
## Demographic Transition Model

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



Population Pyramid Corresponding To Phases of demographic transition

# Demographic forces

1. Mortality
2. Natality
3. MIGRATION

## Fertility indicators

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

# 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



Crude Birth Rate (CBR) is the number of live births per 1000 population in a specific year and locality

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

- 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

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

- 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.

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

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 in countries with high death rate
- The rates of using and continuation of contraceptive methods
- Economic value of the child like in poor families or in the west (

# 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 external 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

Immigration is living permanently in a foreign country

# Internal migration

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

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

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

We divide it by ten because its per thousand

So to make it percent ( out of 100) we divide it by 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