Demography

Demography is Concerned with Study of :the Population

- Size, Distribution, Structure , Change over time and Characteristics (social & economic activities, religion, race, language, education, employment status, health status (Morbidity & Mortality) and marital status)

Demography:

- **Population Size** is the number of units (persons) in the population.
- **Population Distribution** is the population arrangement in space at a given time: **geographically** (Upper and Lower Egypt) or among various **types** (urban and rural).

Demography

- **Population Structure** is the distribution of the population by age and sex.
- **Population Change** is the growth or decline of the total population or one of its structural units.
- The components of change of the total population are **births, deaths and migration).**

Demography Tools

1-Count:

- The absolute number of a population or any demographic events occurring in a specified time period (e.g. births in Egypt were 2.6 million live births year 2017).

Demographic tools

2-Rate:

- The rate is the frequency of demographic events in a population in a specified time period (e.g. The Birth Rate was 28 live births per 1000 population in Egypt year, 2017).
- Crude Rates: are computed for an entire population.
- Specific Rates: are computed for a specific subgroup, usually the population at risk for having the event (e.g. General Fertility Rate: is the number of live births per 1000 women aged 15-49).

Demographic tools

3- Ratio:

- It is the relation between one population **subgroup** and another subgroup in the same population.
- One subgroup is divided by another subgroup (e.g. Sex ratio at birth were 106 males per 100 males in Egypt 2017).
- Ratios are usually used to assess resources as number of health units per 100,000 population.

Demographic tools

4- Proportion:

- It is the relation between population subgroup and the entire population. It is used to *describe* a group of population according to specific variables.
- ***Example:* According to CAPMAS 2017, Rural Population in Egypt constituted 58% of the entire population.**

Demography tools

5- Constant:

- The constant is an unchanging arbitrary number (e.g. 100 or 1000 or 100,000) by which rates, ratios or proportions can be multiplied to express those measures in more understandable fashion.
- ***Example: There were 0.028 live births per person in Egypt year 2017. By multiplying this rate by constant (1000), it could be expressed as "there were 28 live births per 1000 population in Egypt year 2017".***

Demography tools

6- Cohort Measures:

- Cohort measures are statistics that measure events occurring to a cohort (a **group of people sharing a common demographic experience who are observed through time.** Examples: Birth cohort, marriage cohort and school class cohorts.

A- Population Size

Population Census

(1) **Enumeration of the persons in different parts of the country at specific time.**

Population Census

(2) Collection of demographic and socioeconomic data of the population:(age, sex, religious, education, occupation, income, marital status, family composition and other data.) The data are filled in a special census questionnaire form by the trained enumerator during interviewing the head of the family.

Population Census

(3) Census taking is repeated at intervals, usually every 10 years.

Value of the census

1- Provides information **about Characteristics of the population**

2- Provides basic data for calculation of the statistical indicators

3- Census + fertility + Mortality data calculation of population projection (*Expected Population Change)*

(*Population projection is essential for planning the future needs for education, jobs and health care etc.,)*

Differences between Census and Survey

Census	Survey
All Population	**Subgroup**
Every ten years	**Any time**
All demographic data	**Specific objectives**
No clinical examination	Could **include clinical examination**

Population Size

Mid Year Population (July 1st)

Census population
Every ten years

Estimated Population
Any time

1- Natural Increase Method
2- Arithmetic Method
3- Graphic Method
4- Geometric Method

Why is population forecasting important?

- Fundamental to planning
- Environmental impact
- Needs assessment
- Demand Assessment
- Evaluation of health and population programs

Methods of Estimation of the Population:

(1) Natural Increase Method:

- The differences between live births and deaths (natural increase of the population) in the years following the census are added to the census population to get the estimated population of a given year.

Estimated population 2018= Census 2017 + (Births 2017 –Deaths 2017)

Population Change

Population change has three components:

Births

Deaths

Migration.

Population Change

- **Rate of Natural Increase (RNI) =**

$$\frac{\text{Birth rate} - \text{Death Rate}}{10}$$

Birth rate= 28/1000 population

Death Rate= 6/1000 population

RNI= ??? %

The Population increases by ??? /100 population per year

Population Change

2- **The growth rate:**

The rate at which a population is increasing (or decreasing) in a given year due to natural increase and net migration, expressed as a percentage of the base population.

Population Change

3- Doubling Time

How long, at its current growth rate, a population would take to double in size?

- A country with a constant growth rate of 1% would double its population in 70 years.
- A country with a constant growth rate of 2% would double its population in 35 years.
- A country with a constant growth rate of 3% would double its population in 23 years.

Population Change

- To estimate the doubling time: divide 70 by the growth rate expressed as a percent.

$$\text{Doubling Time (in Years)} = \frac{70}{\text{Growth rate (\%)}}$$

In a country with

- no migration phenomena and
- the rate of natural increase is 2% and
- the total population is 60 million,

How many estimated years for the population size to be 120 million???

The Theory of Demographic Transition

- This theory explains the population change over time
- The theory states that: the population's fertility and mortality will both decline from high to low levels as a result of economic and social development
- The decline in mortality usually precedes the decline in fertility resulting in high population growth in the transition period

The Theory of Demographic Transition:
Stages of demographic transition:

- Stage 1: ▲ BR + ▲ DR = Little increase in the population size = High potential population
- Stage 2: ▲ BR + ▼ DR = High rate of natural increase = Transitional population
- Stage 3: ▼ BR + ▼ DR = Low rate of natural increase= Balanced Population
- Stage 4= ▼ ▼BR+ ▼ DR = very low population increase or declining population

C- Population Structure

The Population Structure

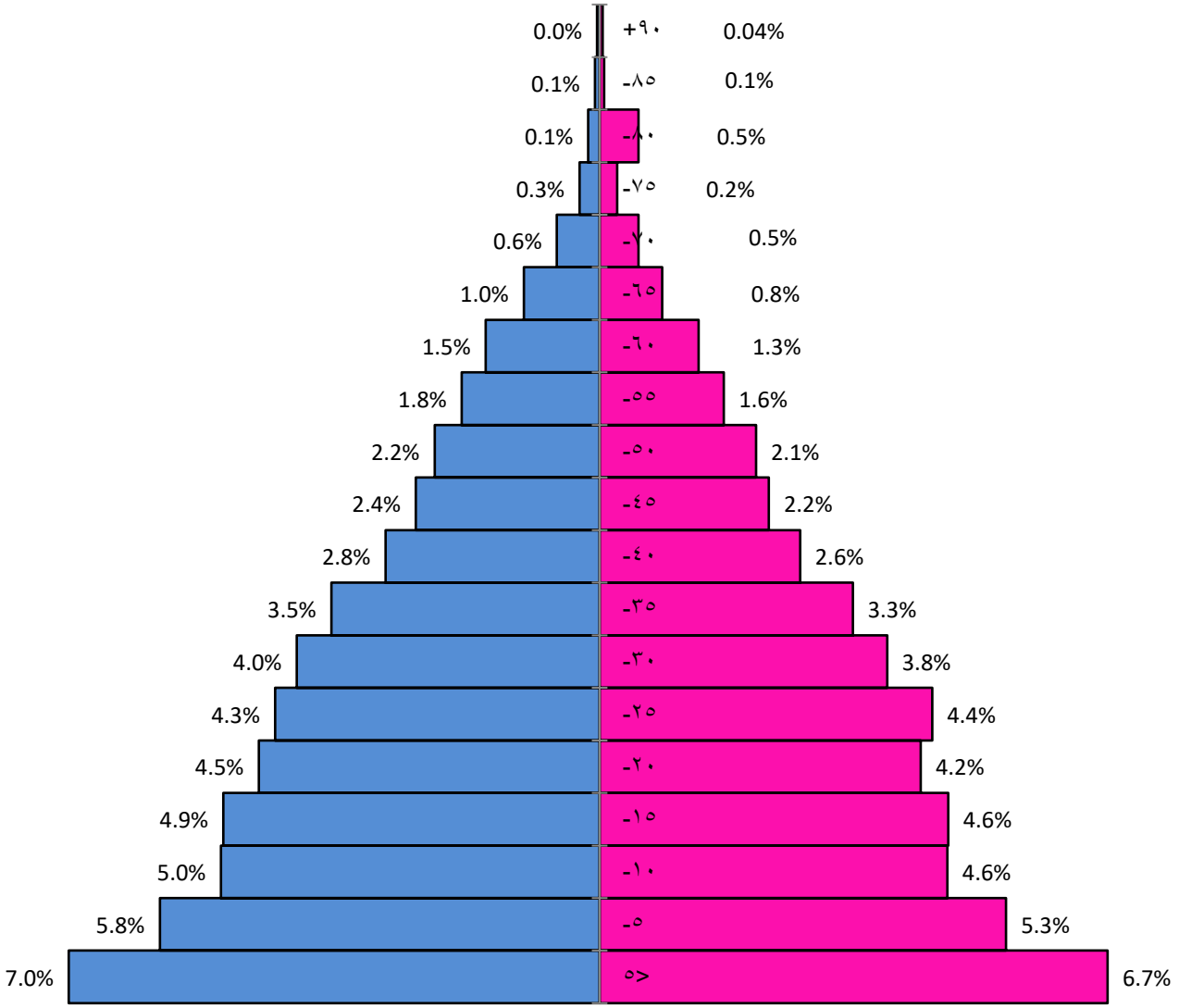
- Age composition
- Median Age of the Population
- Age Dependency Ratio
- Sex composition
- Age and Sex composition (Population Pyramid)

Sex Composition

The sex ratio at birth in any population is 106 males to 100 females !!!!!

Population Structure

- **Age and Sex Composition of the Population:**
- The age and sex composition of the population could be presented as a **population pyramid.**



Egypt Population Pyramid 2017 (n= 94,798,827

The Population Pyramid

- The population pyramid graphically displays the population's age and sex composition
- It shows the proportion of males and females in each age group.
- The sum of all age-sex groups in the entire population pyramid equals 100 percent of the population.
- Each horizontal bar represents the size of an age-sex group.

The Population Pyramid

- The **bottom** bar shows the percentage of males and females who were under 5 years of age in a specific year.
- At the **top** is the very brief bars that show the few surviving members of the birth cohort born since 75 years, *for example.* Each year a **newborn cohort** will appear at the bottom of the pyramid, while the cohort above it (older one) moves up.

The Population Pyramid

- The Population Pyramid shape can give significant clues to the population past and future
- Generally Females form the majority in the oldest age group. Females have higher average life expectancy than males☺ ☺ ☺

The Population Pyramid

- The Shape of the population pyramid is influences by Fertility more than the **mortality**

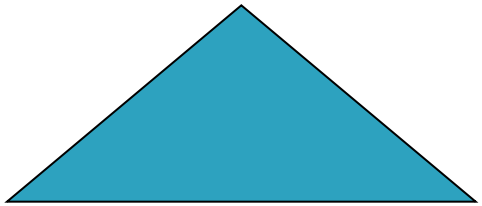
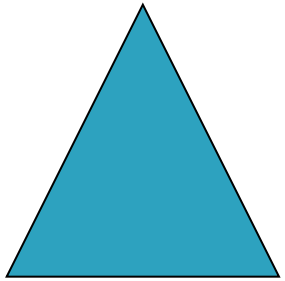
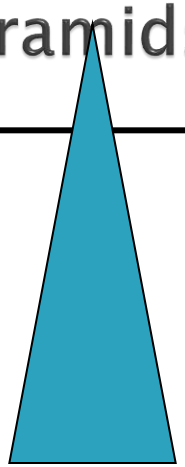
????????

The Population Pyramid

Comments on the Population Pyramid include:

- ▲Base Width — the proportion of the young age groups
- ▲ Top width — the proportion of the elderly
- ▲ Height — Average duration of life expectancy
- ▲Symmetry — the similarity/differences in the proportion of males and females in the different age groups ☹ ☹ ☹
- ▲Sides: smooth , Depression (death, emigration), Bulging (immigration, baby boom)

Profile of the different population pyramids

		
Expansive Population	**Constrictive Population**	**Stationary Population**
Young age population	**Young age population**	*Roughly equal number of people in all age ranges and tapering off at older age*

Life Expectancy

- Life Expectancy at birth is the average number of years the newborn is expected to live

- Life Expectancy at any age is the average number of years an individual of that age is expected to live

Life Expectancy

- Life expectancy is one of the indicators that assess the improving health status and health services in the community
- Life expectancy at birth is higher in the developed countries than the developing countries
- Life expectancy is higher for females than males
- Life expectancy is used for calculation Disease Burden (DALYs and QALYs)

Life Expectancy

- The measurement of the average life expectancy is depending on using a cross-sectional data about how long people of different age groups are expected to live through construction of a current life table. This is in contrast to medical studies of survival which use cohort life tables, in which the same group of subjects is followed for a given period of time.

(1) The growth rate don't take into account

A. Births
B. Deaths
C. Migration
D. Diseases

(2) Most accurate method for estimating population size is:

A. Graphic method
B. Geometric method
C. Arithmetic method
D. Rate of natural increase

(3) As population growth rate increases, the doubling time

A) Cannot be predicted from this information

B) Remains constant

C) Decreases

D) Increases

(4) The higher the age dependency ratio, the:

A) higher burden on working group

B) less burden on working group

C) No change of burden on working group

D) higher the burden of diseases

(5) A country with a crude birth rate of 44 and crude death rate of 11 would have a rate of natural increase of:

A) 33

B) 33%

C) 3.3%

D) 3.3/1000

(6) The second stage of demographic Transition:

A) Declining birth rate; low death rate

B) High birth rate; declining death rate

C) High birth rate; high death rate

D) Low birth rate; low death rate

(7) Sum of all age-sex groups of the entire population pyramid equals

A) 200%

B) 100%

C) 50%

D) 50% in each side

(8) Developing countries have Population Pyramid with:

A)Expansive population

B)Constrictive population

C)Stationary population

D)None of the above

(9) In a standard population pyramid the age range of each bar is:

A) 5 years

B) 10 years

C) 15 years

D) 20 years

(10) Population Projections Depend on:

A) Fertility, morbidity, motility

B) Births, deaths and migration

C) Life expectancy

D) Fertility, mortality, census

Model Answer

(1)	(2)	(3)	(4)	(5)
D	B	C	A	C
(6)	(7)	(8)	(9)	(10)
B	B	A	A	D

Demography

Thank You my Professor

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