

# Migration, Urbanization and Population Density

MODULE 4 Forth Year MBBS  
REPRODUCTION AND POPULATION  
MEDICINE

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## Vision & Mission of RMU

### Vision

Highly recognized and accredited center of excellence in Medical Education, using evidence-based training techniques for development of highly competent health professionals, who are lifelong experiential learner and are socially accountable.

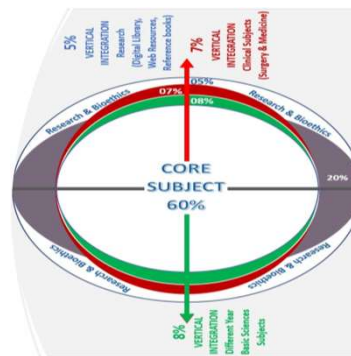
### Mission Statement

To impart evidence-based research-oriented health professional education in order to provide best possible patient care and inculcate the values of mutual respect, ethical practice of healthcare and social accountability.



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• Prof Umar's Model



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## Sequence of the Session

- Learning outcomes (1 slide)
  - Core Subject (32 slides)
  - EOLA (End of lecture assessment) (1 slide)
  - Further reading/Digital Library References (1 slide)
- (Research, Bioethics, Artificial Intelligence)

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## Learning Objectives

1. Discuss concept of demographic equation
2. Calculate population at a particular time from the given data
3. Calculate population in future from given data
4. Discuss push and pull factors associated with migration.
5. Describe various measures of migration.
6. Discuss implications of urbanization
7. Explain types of migration and associated measures
8. Define population density
9. Explain family size and factors associated with it
10. Explain replacement level fertility
11. State what is meant by life expectancy and how it is calculated

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## POPULATION DYNAMICS

- Population Equation
  - $P_n = P_o + (B - D) + (I - E)$
- $P_n$  = Population at time n  
 $P_o$  = Population at previous time  
 $B$  = No. of live births to mothers living in the area  
 $D$  = No. of residents died  
 $I$  = No. of persons moving into the area for permanent residence  
 $E$  = No. of persons moving out of the area to live elsewhere

Core content

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## Population Growth



**Natural Increase (NI)**  
Rate at which Pop. of Country is growing (Expressed in %)

Core content

**NI(B-D)+Net Migration (IM-OM)**

**Natural Increase:**  
Surplus or deficit of births over death

**Net Migration:**  
Net effect of immigration & emigration (↑ or ↓)

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## CALCULATION OF FUTURE POPULATION FROM GIVEN DATA

- $Pt_1 = Pt_0(1+r)^t$
- $Pt_0$  = present population
- $Pt_1$  = future population
- $r$  = growth rate divided by 100
- $t$  = number of years between  $t_0$  and  $t_1$

Core content

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## POPULATION DOUBLING TIME

Core content

Time that would take a population to double

$T = \log(2) / \log(1+r/100)$   
 $= 70/r$  ( $r$  = annual growth rate)

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## URBANIZATION

Core content

refers to mass migration of rural population into urban centers resulting in increasing the urban population & growth of cities

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## DEMOGRAPHIC INDICATORS

- **Population statistics**
  - Population size
  - Sex ratio
  - Dependency ratio
  - Density
- **Vital statistics**
  - Birth rate
  - Death rate
  - Natural growth rate
  - Life expectancy at birth
  - Mortality and fertility rates

Core content

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## REPLACEMENT LEVEL FERTILITY

- or Zero population growth
- is activated when a couple has two births during their reproductive life, just enough to replace themselves.
- At a community scale, the replacement level is considered when there are, on the average, 2.1 births per woman, to compensate for child deaths

Core content

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## LIFE EXPECTANCY

Core content

Average number of years which a person of that age may be expected to live

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## LIFE EXPECTANCY AT BIRTH

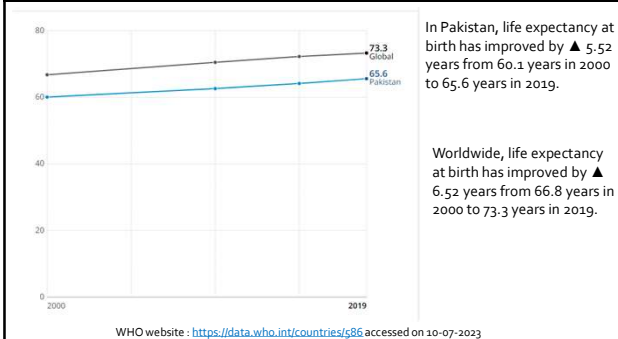
Core content

- It indicates the average number of years that person can expect to live from the time of birth if they experience throughout their life the age specific death rates currently prevailing.
- Indicator to measure mortality changes.

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## LIFE EXPECTANCY AT BIRTH PAKISTAN

Core content



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## HEALTHY LIFE EXPECTANCY (HALE) AT BIRTH

Core content

- average number of years that a person could expect to live in "full health" from birth. This measurement takes into account years lived in less than full health due to disease and/or injury.

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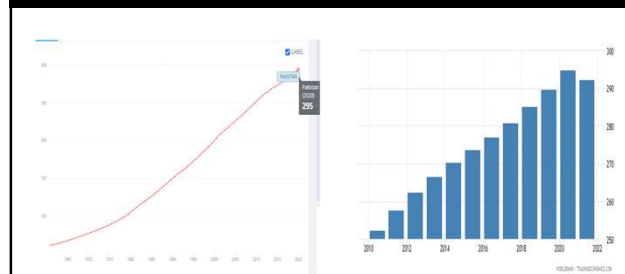
## POPULATION DENSITY

Core content

Refers to the number of persons living per square kilometre .

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## PAKISTAN POPULATION DENSITY



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## FAMILY SIZE

Core content

- Total no. of persons in a family (commonly)
- Total no. of children a woman has borne at a point in time (demographers)
- Total fertility rate.....approx magnitude of the completed family size
- Factors
- Household Size
- 6.4 people per household

<https://hub.arcgis.com/maps/esri::average-household-size-in-pakistan/about>

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## REPLACEMENT LEVEL FERTILITY

Core content

(or Zero population growth)

- is activated when a couple has two births during their reproductive life, just enough to replace themselves.
- At a community scale, the replacement level is considered when there are, on the average, 2.1 births per woman, to compensate for child deaths

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## Contd..

Core content

- Replacement Level Fertility is said to have been reached when  $NRR=1.0$
- Surviving women in the hypothetical cohort have exactly enough daughters (on average) to replace themselves in the population

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## MIGRATION

Core content

- Mobility of people conditioned by change of residence
  - Migrant
  - Place of origin
  - Destination

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## Push-pull Theory

Core content

### Push factors

Which force a person to migrate out of the area

### Pull factors

Which encourage a person to migrate in that area

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## PUSH FACTORS

Core content

### Valid under normal condition

- Head of the family moves
- Transfer of job
- Marriage in case of females
- Business and economic deprivations
- Absence of or poor educational facilities
- Retirement and no re – employment
- No housing shelter
- Divorce
- Fragmentation of agricultural land
- Poor relationship with other members of community

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## PUSH FACTORS contd....

- Valid under abnormal conditions

Core content

War and fear or threat of war  
Civil war or insecurity  
Racial discrimination  
Oppression  
Cultural/religious  
Overcrowding

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## PUSH FACTORS contd....

- Natural calamities

Core content

Earthquakes  
Excessive rainfall and floods  
Long persistent drought  
Weather severity  
Eruption of volcano  
Severe and repeated cyclones  
epidemics

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## PULL FACTORS

### Economic

- High job availability and higher wages.
- More exciting lifestyle.
- Better living conditions
- Industry
- Education

### Cultural

- Political freedom/ racial harmony
- greater safety and security
- More exciting lifestyle.
- Better medical care
- Security
- Family links
- Better chances of marriage

Core content

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## PULL FACTORS contd....

### Environmental

- Political freedom, greater safety and security
- Attractive climates
- Land fertility
- Better sanitary conditions

Core content

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## MIGRATION

Core content

- International /external migration  
Immigration  
Emigration
- Internal migration  
In migration  
Out migration

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## TYPES of MIGRATION

Core content

Type	Characteristics
International	Crossing a boundary; easier to control; regulated; difference in income; 2-3 million per year.
National	Between states or provinces; little control; employment opportunities; education; retirement.
Local	Within a city/region; change of income or lifestyle.
Voluntary	The outcome of a choice.
Involuntary	The outcome of a constraint.

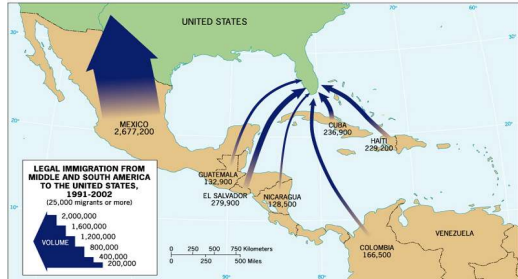
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## INTERNATIONAL MIGRATION/EXTERNAL MIGRATION

Core  
content

- Migration across the international boundaries of a country



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## TYPES of MIGRATION

Core  
content

Emigrant



Immigrant

Problems or  
benefits?

- Emigration or Expatriation:** migration out of the country
- Immigration or Repatriation:** Migration from outside towards the country

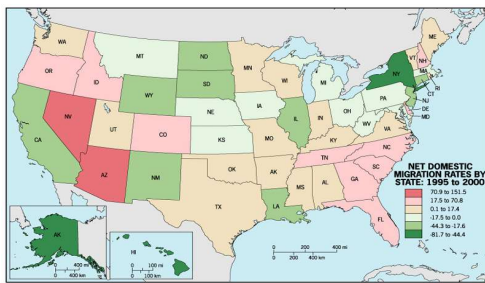
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## INTERNAL MIGRATION/ NATIONAL MIGRATION

Core  
content

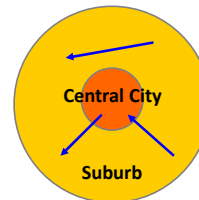
- Migration from one unit to another within the country



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## LOCAL MIGRATION

Core  
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## TERMS RELATED TO MIGRATION

Core  
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- In migration:** migration towards a geographical unit from within the country
- Out migration:** migration out from that unit to other units within the country
- Gross international migration:** combined effect of emigration and immigration
- Gross internal migration:** combined effect of in-migration and out-migration

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## TYPES OF INTERNAL MIGRATION

Core  
content

- Urban to urban
- Urban to rural
- Rural to urban
- Rural to rural

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## DATA IS OBTAINED FROM

- Censuses
- Sample surveys
- Immigration records
- Vital registration record

Core content

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## INTERNATIONAL MIGRATION MEASURES

- Crude immigration rate
- Crude emigration rate
- Crude Gross International Migration
- Crude Net International Migration

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## INTERNAL MIGRATION MEASURES

- Crude in migration rate
- Crude out migration rate
- Crude gross migration rate
- Crude net migration rate

Core content

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## Research/Further reading/Digital Library References

- [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2442569/#:~:text=Population%20dynamics%20is%20the%20portion,more%20species%20\(Begon%20et%20al.](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2442569/#:~:text=Population%20dynamics%20is%20the%20portion,more%20species%20(Begon%20et%20al.)

Population dynamics

Go to: »

Population dynamics is the portion of ecology that deals with the variation in time and space of population size and density for one or more species (Begon et al., 1990). In practice investigations and theory on population dynamics can be viewed as having two broad components: first, quantitative descriptions of the changes in population number and form of population growth or decline for a particular organism, and second, investigations of the forces and biological and physical processes causing those changes. The first of these components involves descriptive data that are useful for quantifying trends, and with appropriate statistical treatment, for forecasting future trends. In the context of biological control of mosquitoes, or more generally, any effort to control mosquitoes, this aspect of population dynamics is important because it provides the data that can answer important questions about control efforts (e.g. Are control efforts justified at this time? What is the expected population of a mosquito species some time in the future and is some intervention desirable to alter that expectation?). The second component, dealing with causal processes, is important because it can provide a general framework for strategies to control mosquitoes. Knowledge of causal processes affecting population dynamics also may improve the forecasts of population trends (e.g. Does early spring precipitation affect expected populations later in the year?). Consideration of principles of population dynamics may help to answer questions about the choice of biological control agents (e.g. What population characteristics of a predator, pathogen, or parasite are associated with biological control success?) or the life cycle stages of the target species that should be the focus of biological control efforts (e.g. Would introduced predators or pathogens attacking larval stages affect population dynamics sufficiently to reduce the population of a mosquito?). Other sources of guidance in decision making about biological control

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## End of Lecture Assessment

- If population of an area in 2005 is 20,000 and annual growth rate is 3%, how much would be the population in 2010.

- a. 21,185
- b. 22,185
- c. 23,185
- d. 24,185
- e. 25,185

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### Primary (recommended textbooks)

Reading sources:

- J Parks textbook of Preventive & social Medicine.
- Textbook of Community Medicine & Public Health. By Muhammad Illyas, Dr Irfanullah Siddiqui

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