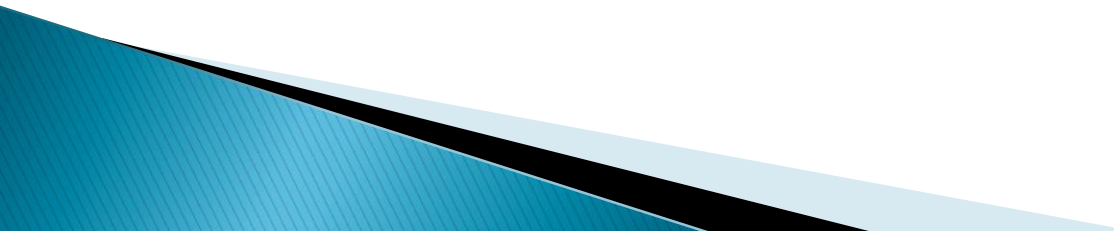


# **GENERAL CONCEPTS OF EPIDEMIOLOGY.**

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# Discussion topics

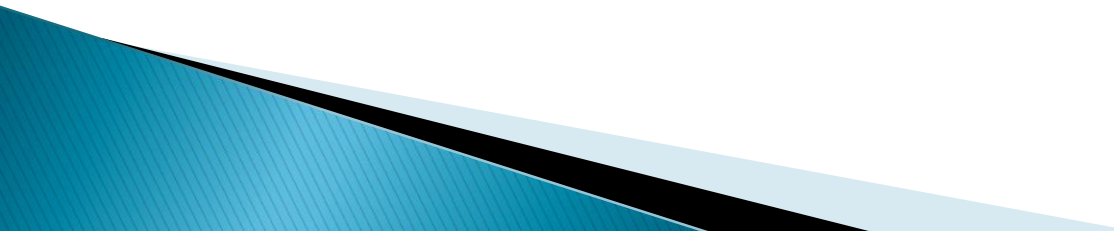
- 1. Epidemiology as a science and subject of study.**
  - 2. The task and the objectives of epidemiology.**
  - 3. Measures of population health.**
  - 4. Clinical epidemiology, the aim and concerns .**
  - 5. Determinants of health and their impact on chronic diseases.**
  - 6. The factors that play a role in the causation of disease.**
  - 7. The ethics of biomedical research.**
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# 1. Definition of epidemiology

- The word “epidemiology” is derived from the Greek words: epi “upon”, demos “people” and logos “study”.
- Epidemiology is defined as “the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the prevention and control of health problems”

**Epidemiologists are concerned not only with death, illness and disability, but also with more positive health states and, most importantly, with the means to improve health.**

# **Epidemiology - definition**

- ▶ Is the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the prevention and control of health problems**
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# Epidemiology description

<b>Study</b>	<b>includes: surveillance, observation, hypothesis testing, analytic research and experiments.</b>
<b>Distribution</b>	<b>refers to analysis of: times, persons, places and classes of people affected.</b>
<b>Determinants</b>	<b>include factors that influence health: biological, chemical, physical, social, cultural, economic, genetic and behavioral.</b>
<b>Health-related states and events</b>	<b>refer to: diseases, causes of death, behaviors such as use of tobacco, positive health states, reactions to preventive regimes and provision and use of health services.</b>
<b>Specified populations</b>	<b>include those with identifiable characteristics, such as occupational groups.</b>
<b>Application to prevention and control</b>	<b>the aims of public health—to promote, protect and restore health.</b>


## **2. The aim of epidemiology**

**Public health refers to collective actions to improve population health.**

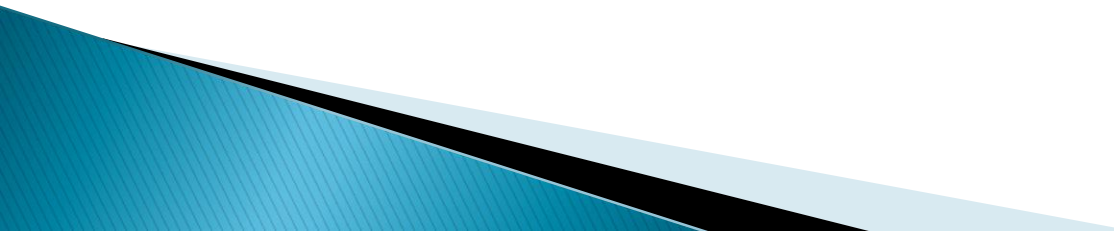
**Epidemiology, one of the tools for improving public health, is used in several ways:**

- ✓ etiology of communicable diseases can lead to the identification of preventive methods.**
  - ✓ epidemiology is a basic medical science with the goal of improving the health of populations, and especially the health of the disadvantaged.**
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## **2. The objectives of epidemiology**

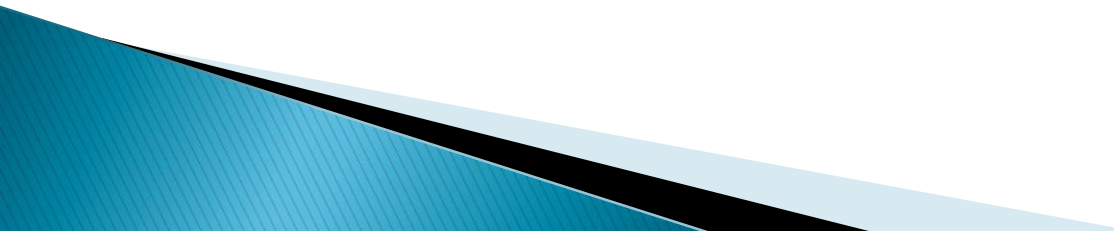
- 1. To identify the etiology or the cause of a disease and the risk factors – factors that increase a person's risk for a disease.**
  - 2. To determine the extent of disease found in the community**
  - 3. To study the natural history and prognosis of disease.**
  - 4. To evaluate both existing and new preventive and therapeutic measures and models of health care delivery**
  - 5. To provide the foundation for developing public policy and making regulatory decisions relating to environmental problems**
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### **3. MEASURES OF POPULATION HEALTH**


- **Health determinants**
  - **Health indicators**
  - **Risk factors**
  - **Other measures**
- 




### ***3. Health determinants***

- ***Health determinants*** are generally defined as the underlying social, economic, cultural and environmental factors that are responsible for health and disease.
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### ***3. Health indicators***

- **A health indicator is a variable – that can be measured directly to reflect the state of health of people within a community.**
  - **It can be used as components in the calculation of a broader social development index to a combination of the level of economic development, literacy, education, and life expectancy.**
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### ***3. Risk factors***

- **A risk factor refers to an aspect of personal habits or an environmental exposure, that is associated with an increased probability of occurrence of a disease. The impact of these interventions can be determined by repeated measures using the same methods and definitions.**
  - **Risk factors can include tobacco and alcohol use, diet, physical inactivity, blood pressure and obesity.**
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### ***3. Other measures of population health***

- **years of potential life lost (PLL) based on the years of life lost through premature death (before an arbitrarily determined age);**
- **healthy life expectancy (HALE);**
- **disability-free life expectancy (DFLE);**
- **quality-adjusted life years (QALYs);**
- **disability-adjusted life years (DALYs).**

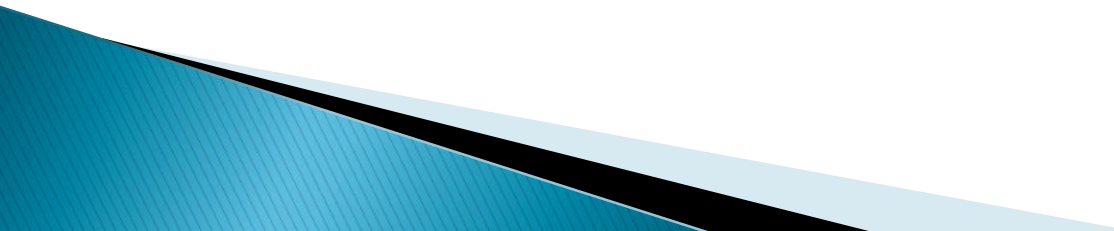
# 4. Clinical epidemiology

*is the application of epidemiological principles and methods to the practice of clinical medicine.*

- The aim of clinical epidemiology is to aid decision-making about identified causes of disease.

The central concerns of clinical epidemiology are:

- definitions of normality and abnormality
- accuracy of diagnostic tests
- natural history and prognosis of disease
- effectiveness of treatment
- prevention in clinical practice.

- **The decline in death rates that occurred during the nineteenth century in high-income countries was principally due to a decrease in deaths from infectious disease.**
  - **Most of the decline in mortality took place before these interventions and has been attributed to improvements in nutrition, housing, sanitation and other environmental health measures.**
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## 5. DETERMINANTS OF HEALTH AND THEIR IMPACT ON CHRONIC DISEASES

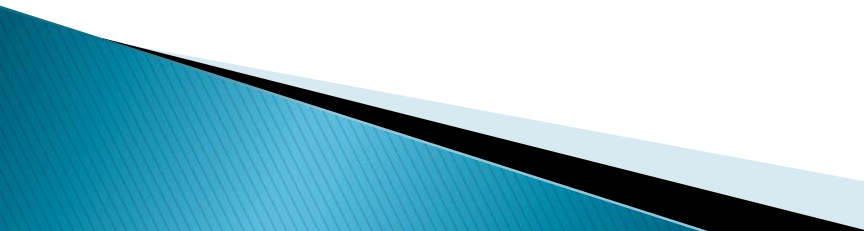
<b>Socioeconomic, cultural, political &amp; environmental factors</b>	<b>Common modifiable risk factors</b>	<b>Intermediate risk factors</b>	<b>Main chronic diseases</b>
<b>Including:</b> - Globalization - Urbanization - Population ageing	<b>Tobacco use</b> <b>Alcohol abuse</b> - Unhealthy diet - Physical inactivity	- Raised blood pressure - Raised blood glucose - Abnormal blood lipids -overweight/obesity	- Heart disease - Stroke - Cancer - Diabetes - Chronic respiratory diseases
	<b>Non-modifiable risk factors</b>		
	- Age - Sex - Heredity		

## 5. RISK FACTORS COMMON TO MAJOR NONCOMMUNICABLE DISEASES

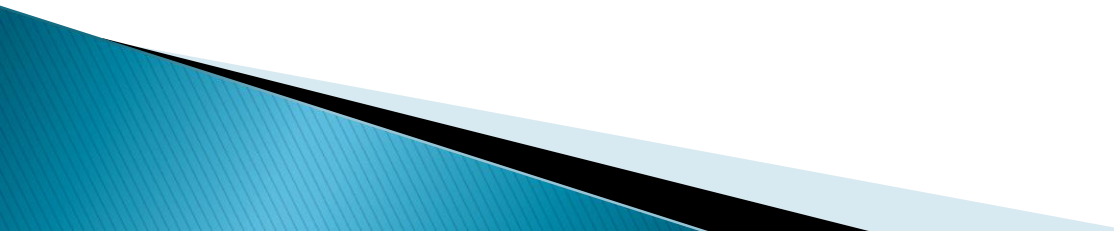
<b>Social structure (social position)</b>	<b>Social class</b> <b>Age</b> <b>Sex</b> <b>Ethnicity</b>	<b>Healthy public policy</b>
<b>Environmental influences (places)</b>	<b>Geographic location</b> <b>Housing conditions</b> <b>Occupational risks</b> <b>Access to services</b>	<b>Organizational and community intervention</b>
<b>Lifestyle influences (individual behaviours)</b>	<b>Smoking</b> <b>Nutrition</b> <b>Physical activity</b> <b>Psychosocial factors</b>	<b>Primary and secondary prevention</b>
<b>Physiological influences (the body)</b>	<b>Blood pressure</b> <b>Cholesterol</b> <b>Obesity</b> <b>Blood glucose</b>	<b>Primary and secondary prevention</b>
	<b>Non-communicable diseases</b>	



## 6. Four types of factors play a part in the causation of disease

- Predisposing factors, such as age, sex or specific genetic traits
  - Enabling (or disabling) factors such as low income, poor nutrition, bad housing and inadequate medical care
  - Precipitating factors such as exposure to a specific disease agent
  - Reinforcing factors such as repeated exposure, environmental conditions and unduly hard work
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# 7. The ethics of biomedical research

- ▶ Research ethics involves the application of fundamental ethical principles to a variety of topics involving research, including scientific research.
  - ▶ These include the design and implementation of research involving human experimentation, animal experimentation and various aspects of scientific misconduct
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# 7. Animal Research

- ▶ It includes the three r's (3Rs) described by W. M. S. Russell and R.L. Burch as:
  1. Replacement – prefer to use of non–animal methods (ex. Computer modelling)
  2. Reduction – methods that enables researches to obtain the same information from fewer animals
  3. Refinement – methods that alleviate or minimize potential pain, suffering or distress of animals.

# 7. Human Experiments

- ▶ In 2010, the National Institute of Justice in the USA publish recommended rights of human subjects that include obtaining voluntary/informed consent from the subjects.
- ▶ Participants should have full access to information regarding research.
- ▶ Participants should be treated as autonomous agents and they should be given the privilege to end participation at any time.
- ▶ Protection from physical, mental and emotional harm and safeguarding the integrity is a mandatory requirement in human experiments, thus the benefits should outweigh the cost

# 7. Scientific misconduct

- ▶ Represent the violation of the standard codes of scholarly conduct and ethical behavior in professional research.

Forms of scientific misconducts includes:

- ▶ Plagiarism, including citation plagiarism.
- ▶ Fabrication – inventing data by inflating respondent numbers.
- ▶ Falsification – changing or wrongly reporting data.
- ▶ Ghost – writing when someone other than the named author makes the major contribution.
- ▶ Suppression – suppressing of publish because of some interest.
- ▶ Salami slicing– reporting of the result of one research in several papers.
- ▶ Fraudulent designs – when research is deliberately designed to provide misleading results (data manipulation, data concoction, deliberate selection of subjects etc.