When mediating over a disease, I never think of finding a remedy for it, but, instead, a means of preventing it.

- Louis Pasteur

“The failure to use available knowledge about chronic disease prevention and control endangers future generations.”
-W.H.O. report Preventing Chronic Diseases
Learning Objectives

• To describe the public health burden of non-communicable diseases.

• To illustrate the disproportionate burden on these diseases in low and middle income countries.

• To identify behavioral risk factors for non-communicable diseases.

• To understand the role of tobacco use and harmful use of alcohol as risk factors for non-communicable diseases.
Non-Communicable Diseases

- 35 million deaths in 2005
- 60% of all deaths are due to chronic diseases
- Higher burden in low-, middle-income countries than communicable diseases.

Diseases of importance:
- Cardiovascular disease
- Diabetes
- Cancers
- Mental disorders
Projected main causes of death, worldwide, all ages, 2005

Percentage of Total Deaths 2005

- Cardiovascular diseases: 30%
- Other chronic diseases: 9%
- Injuries: 9%
- Chronic respiratory diseases: 7%
- Diabetes: 2%
- Cancer: 13%

Total Deaths 2005: 58 million
Projected deaths by major cause and World Bank income group, all ages, 2005

Communicable diseases, maternal and perinatal conditions, and nutritional deficiencies
Chronic diseases*
Injuries

* Chronic diseases include cardiovascular diseases, cancers, chronic respiratory disorders, diabetes, neuropsychiatric and sense organ disorders, musculoskeletal and oral disorders, digestive diseases, genito-urinary diseases, congenital abnormalities and skin diseases.
Projected foregone national income
due to heart disease, stroke and diabetes
in selected countries, 2005–2015
Non-communicable Disease and Developing Countries

Projected global distribution of chronic disease deaths
by World Bank income group, all ages, 2005

- High income countries: 20%
- Low income countries: 35%
- Upper middle income countries: 8%
- Lower middle income countries: 37%
Cardiovascular Disease

• #1 cause of death globally.
• 17.1 million deaths (2004) or 29%
  – 7.2 million deaths due coronary artery disease
  – 5.7 million deaths due to stroke
• Disproporionately affects low and middle income countries.
  – 82% of deaths
Cardiovascular Disease Definitions

• CVDs
  – Group of disorders of the heart and blood vessels.

• Cerebrovascular disease
  – Disease of the blood vessels supplying the brain.

• Peripheral artery disease
  – Disease of the blood vessels supplying the arms & legs.

• Rheumatic heart disease
  – Damage to the heart muscle & valves from rheumatic fever (caused by streptococcal bacteria).
Cardiovascular Disease Definitions

• Congenital heart disease
  – Malformations of the heart structure existing at birth.

• Deep vein thrombosis & pulmonary embolism
  – Blood clots in the legs veins which can dislodge and move to the heart and lungs.
CVD Risk Factors

- Unhealthy diet
- Physical inactivity
- Tobacco use

- Behavioral risk factors responsible for 85% of coronary heart disease & cerebrovascular disease.
CVD Underlying Risk Factors

- Globalization
- Urbanization
- Population ageing
- Poverty
- Stress
CVD in Developing Countries

• More exposure to risk factors.
• Less exposure to prevention efforts.
• Less access to healthcare services.
• The poorest are affected the most.
CVD Impact

• Economic impact
  – Household level
  – Macro-economic level
Diabetes

• Affects more than 220 million people worldwide
• 3.4 million deaths (2004)
• 80% of cases in low- and middle-income countries.

• Prevented or delayed by:
  - Health diet
  - Regular physical activity
  - Normal body weight
  - Avoiding tobacco use
Diabetes

• What is it?
  – Chronic disease
  – Type 1: Pancreas does not produce enough insulin.
  – Type 2: Body can not effectively use the insulin it does produce.
  – Hyperglycemia (high blood sugar) due to untreated/uncontrolled diabetes can cause serious damage to body systems, including nerves and blood vessels.
Diabetes Symptoms

• Excessive urination (polyuria)
• Excessive thirst (polydipsia)
• Constant hunger
• Weight loss
• Vision changes
• Fatigue
Diabetes Long Term Effects

• Increases the risk of heart disease & stroke.
  – 50% die of cardiovascular disease.
• Neuropathy in feet.
  – Can result in foot ulcers & limb amputation.
• Blindness due to diabetic retinopathy.
• Kidney failure
  – 10-20% die from kidney failure.
• Increased risk of death
  – At least double that of healthy peers.
Diabetes Impact

- Financial impact on:
  - Individuals
  - Families
  - Health systems
  - Countries
Cancer

• 7.6 million deaths worldwide (2008).
• 13% of all deaths.
• Main types
  – Lung (1.4 million deaths)
  – Stomach (740,000 deaths)
  – Liver (700,000 deaths)
  – Colorectal (610,000 deaths)
  – Breast (460,000 deaths)
Cancer Risk Factors

• Tobacco use
• Harmful alcohol use
• Poor diet
• Physical inactivity
• History of certain infections

• More than 30% of deaths are preventable.
Cancer Causes

• One single cell mutates from a normal cell to a cancerous cell in a multistage transformation.

• Result of interaction between genetic factors and external agents:
  – 1. Physical carcinogens
  – 2. Chemical carcinogens
  – 3. Biological carcinogens
Cancer and Developing Countries

• More than 70% of all cancer deaths occur in low- and middle-income countries.
Mental Disorders

- More than 450 million people worldwide.
- One in every four individuals
- “There is no health without mental health.”
- Determined by socio-economic, biological, environmental factors.
- Stigma & discrimination
Mental Disorders Risk Factors

• Poverty
• Low levels of education
• Rapid social change
• Stressful work conditions
• Gender discrimination
• Social exclusion
• Unhealthy lifestyle
• Risks of violence
• Physical ill-health
• Human rights violations
Mental Disorders Response

- More than 40% of countries have no mental health policy.
- 33% of countries allocate less than 1% of their total health budgets to mental health.
- Only 1 psychiatrist: 100,000 persons in over half the countries in the world.
- 40% of countries have less than 1 hospital bed: 10,000 people for mental disorders.
Mental Disorders & the Poor

• The poor bear the brunt of mental disorders
• More likely to suffer from them
• Less likely to get care
• More vulnerable due to constant exposure to:
  – Stressful events
  – Dangerous living conditions
  – Exploitation
  – Poor health in general
Shared Risk Factors

- Shared risk factors among many of the non-communicable diseases:
  - Tobacco Use
  - Unhealthy Diets
  - Physical Inactivity
  - Harmful Use of Alcohol
Risk Factors: Tobacco Use

- Kills 1 person every 6 seconds.
- 1 in 10 deaths worldwide in adults.
- Second hand smoke
  - 3400 lung cancer deaths in US/yr.
  - 46,000 heart disease deaths in US/yr.
  - 430 cases of SIDs in US/yr.
  - 24,500 low birth weight infants in US/yr.
  - 71,900 pre-term deliveries in US/yr.
  - 200,000 cases of childhood asthma in US/yr.

“Tobacco is the only legally available consumer product which kills people when it is used entirely as intended.”
- The Oxford Medical Companion (1994)
Risk Factors: Tobacco Use

• Rates increasing fastest in low-income countries.
  – Steady population growth
  – Tobacco industry targeting
  – Shifts in gender norms

• By 2030, over 80% of tobacco-related deaths will be in low- and middle-income countries.

“Reversing this entirely preventable epidemic must now rank as a top priority for public health and for political leaders in every country of the world.” – Dr. Margaret Chan.
Cumulative tobacco-related deaths, 2005–2030
TOBACCO USE IS A RISK FACTOR FOR SIX OF THE EIGHT LEADING CAUSES OF DEATH IN THE WORLD

- Ischaemic heart disease: 6,704 million deaths
- Cerebrovascular disease: 5,280 million deaths
- Lower respiratory infections: 1,532 million deaths
- Chronic obstructive pulmonary disease: 1,253 million deaths
- HIV/AIDS: 1,270 million deaths
- Diarrhoeal diseases: 338 million deaths
- Tuberculosis: 338 million deaths
- Trachea, bronchus, lung cancers: 338 million deaths

Total deaths: 5,395 million
Risk Factors: Tobacco Impact

• In U.S.
  – $92 billion/yr.
  – $81 billion/yr. in healthcare costs

• Half of all tobacco-related deaths occur during the prime productive years.

• Developing world
  – 4 out 5 tobacco deaths will occur by 2030.
  – Resources diverted from essential needs.
NEARLY TWO THIRDS OF THE WORLD’S SMOKERS LIVE IN 10 COUNTRIES

- China: 30.0%
- India: 11.2%
- Indonesia: 4.8%
- Russian Federation: 4.8%
- United States of America: 4.5%
- Japan: 2.8%
- Brazil: 1.9%
- Bangladesh: 1.9%
- Germany: 1.8%
- Turkey: 1.7%
Risk Factors: Alcohol Abuse

• Causal factor in more than 60 major types of diseases & injuries.
• 2.5 million deaths/yr.
• 3rd highest risk factor for disease & disability.
• Affects:
  – Men
  – Lower socio-economic status
  – Lower education levels
Figure 13. Global distribution of all alcohol-attributable deaths by disease or injury, 2004a

- 14.0% Cardiovascular diseases and diabetes mellitus
- 21.6% Cancer
- 16.6% Liver cirrhosis
- 29.6% Unintentional injuries
- 12.0% Intentional injuries
- 0.1% Prematurity and low birth weight
- 6.0% Neuropsychiatric disorders

Note: Percentages may not add up to 100% due to rounding.
Figure 14. Alcohol-attributable deaths as a percentage of total deaths by WHO subregion, 2004

WHO divides the world into six general regions: Africa, the Americas, the Eastern Mediterranean, Europe, South-East Asia and the Western Pacific. Countries within each of these regions are then divided into subregions based on levels of child and adult mortality (mortality strata). Detailed definitions of mortality strata and list of Member States by WHO region and mortality stratum are given at the end of the World Health Report 2004 and can be accessed at www.who.int/whr/2004/annextopic/en/annex_member_en.pdf.
Practice Questions

• Explain the impact of each non-communicable disease on the poor (or low and middle income countries).

• Explain the role of tobacco use and harmful alcohol use as risk factors.

• Other than direct mortality, what are some ways in which each type of non-communicable disease affects public health and society as a whole?
In Summary...

- Non-communicable diseases have a significant impact on public health.
- Many of these diseases affect low and middle income countries disproportionately.
- The risk factors for non-communicable diseases tend to be behavioral and, thus, preventable.