



Risk Factors for NCDs

Objectives:

- Define selected risk factors such as; tobacco use, diet, nutrition, physical activity, obesity, and overweight
- Present the epidemiology and significance of the risk factors globally and in KSA
- Discuss high risk populations and consequences of the NCD risk factors
- Enlist screening methods for these risk factors
- Discuss examples of evidence based interventions to prevent and control these risk factors

Done by:

Team leaders: Khalid Aleisa & Ghada Alhadlaq

Team members: Khalid Aleisa, Reem Alsergani & Faisal Alabbad

Revised by:

Important | Extra | Notes

[Editing file](#)

Types of NCDs:

- Cardiovascular disease (e.g., Coronary heart disease, Stroke)
- Cancer
- Chronic respiratory disease
- Diabetes
- Chronic neurologic disorders (e.g., Alzheimer's, dementias)
- Arthritis/Musculoskeletal diseases
- Unintentional injuries (e.g., from traffic crashes)

Risk Factor Definition:

“An aspect of personal behavior or lifestyle, an environmental exposure, or a hereditary characteristic that is associated with an increase in the occurrence of a particular disease, injury, or other health condition.” (not necessarily an increase)

Modifiable Risk Factor:

- A behavioral risk factor that **can** be reduced or controlled by intervention, thereby reducing the probability of disease.
- WHO has prioritized the following four: If we target one, we target a lot of diseases
 - Physical activity
 - Tobacco use
 - Alcohol use
 - Unhealthy diets (increased fat & sodium, with low fruit & vegetable intake)

Non-Modifiable Risk Factor:

A risk factor that **cannot** be reduced or controlled by intervention; for example:

- Age
- Gender
- Race
- Family history (Genetics)

Common Risk Factors:

Noncommunicable Diseases 4 Diseases, 4 Modifiable Shared Risk Factors

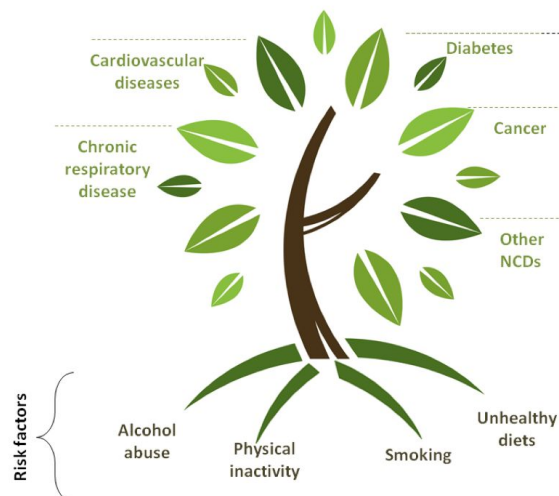
	Tobacco Use	Unhealthy diets	Physical Inactivity	Harmful Use of Alcohol
Cardio-vascular				
Diabetes				
Cancer				
Chronic Respiratory				

Intervention at any one of these can target a lot of diseases

Metabolic Risk Factors:

- “Metabolic” refers to the biochemical processes involved in the body's normal functioning
- Behaviors (modifiable risk factors) can lead to metabolic/physiologic changes.
- WHO has prioritized the following four metabolic risk factors:
 - Raised blood pressure
 - Raised total cholesterol
 - Elevated glucose
 - Overweight and obesity

Four Leading NCDs:



WHO Website:

- Global Health Observatory (GHO): <http://www.who.int/gho/en/>
 - Provides data & analyses on global health priorities
 - Noncommunicable diseases
 - Mortality/morbidity
 - Risk Factors
 - Country statistics: health data & statistics for countries
- Media centre fact sheets:

We should get this data from:
MOH, surveillance, updated data

<http://www.who.int/mediacentre/factsheets/en/>

- Keyfacts
- Symptoms
- Risk factors
- Burden of disease

In saudi , we have scattered data
But no integration or national figures, we just have estimated

Cardiovascular Disease

Definition:

Cardiovascular disease (CVD) is a group of disorders of the heart and blood vessels, and may include:

- **Coronary heart disease:** Disease of the blood vessels supplying the heart muscle
- **Cerebrovascular disease (stroke):** Disease of the blood vessels supplying the brain
- **Peripheral arterial disease:** Disease of blood vessels supplying the arms and legs
- **Congenital heart disease:** Malformations of heart structure existing at birth

Cardiovascular Disease

Global Burden:

CVDs are the #1 cause of death globally.

- An estimated 17.3 million people died from CVDs in 2008. (30% of all global deaths)
 - 7.3 million were due to coronary heart disease
 - 6.2 million were due to stroke
- Over 80% CVD deaths occur in **low- and middle- income** countries.
- By 2030, almost 25 million people will die from CVDs.

Risk Factors:

Major modifiable risk factors	Other modifiable risk factors	Non-modifiable risk factors	“Novel” risk factors
↓	↓	↓	↓
<ul style="list-style-type: none"> ● High blood pressure ● Abnormal blood lipids ● Tobacco use ● Physical inactivity ● Obesity ● Unhealthy diet (salt) ● Diabetes 	<ul style="list-style-type: none"> ● Low socioeconomic status ● Mental ill health (depression) ● Psychosocial stress ● Heavy alcohol use ● Use of certain medication Hormone replacement therapy ● Lipoprotein(a) 	<ul style="list-style-type: none"> ● Age ● Heredity or family history ● Gender ● Ethnicity or race 	<ul style="list-style-type: none"> ● Excess homocysteine in blood ● Inflammatory markers (C-reactive protein) ● Abnormal blood coagulation (elevated blood levels of fibrinogen)

Low socioeconomic : They don't know that they have the disease
 They don't have access
 They dont screen

Diabetes

Definition: Its becoming epidemic

- Diabetes is a disorder of metabolism— the way the body uses digested food for growth and energy.
- There are 4 types: Type 1, Type 2, Gestational, and Pre-Diabetes (Impaired Glucose Tolerance).
- Type 2 is caused by modifiable risk factors and is the most common worldwide.
 - >90% of all adult diabetes cases are Type 2

Burden of Disease:

- 347 million people worldwide have diabetes.
- In 2004, an estimated 3.4 million people died from consequences of high blood sugar.
- More than 80% of diabetes deaths occur in low- and middle-income countries.
- WHO projects that diabetes deaths will increase by two thirds between 2008 and 2030.
- Healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco use can prevent or delay the onset of type 2 diabetes.

Risk Factors:

Major modifiable risk factors	Other modifiable risk factors	Non-modifiable risk factors	“Novel” risk factors
<ul style="list-style-type: none"> ● Unhealthy diets ● Physical Inactivity ● Obesity or Overweight ● High Blood Pressure ● High Cholesterol 	<ul style="list-style-type: none"> ● Low socioeconomic status ● Heavy alcohol use ● Psychological stress ● High consumption of sugar- sweetened beverages ● Low consumption of fiber 	<ul style="list-style-type: none"> ● Increased age ● Family history/genetics ● Race ● Distribution of fat <p><small>Distribution of fat in african americans Just like how the distribution of visceral fat in males is worse than females</small></p>	<ul style="list-style-type: none"> ● Low birth weight <small>Type 2</small> ● Presence of autoantibodies

Cancer

Definition:

- Generic term for a large group of diseases that can affect any part of the body.
- “Rapid creation of abnormal cells that grow beyond their usual boundaries, and which can then invade adjoining parts of the body and spread to other organs”
- Benign tumors
- Malignant tumors

Global Burden:

7.6 million people died from cancer in 2008.

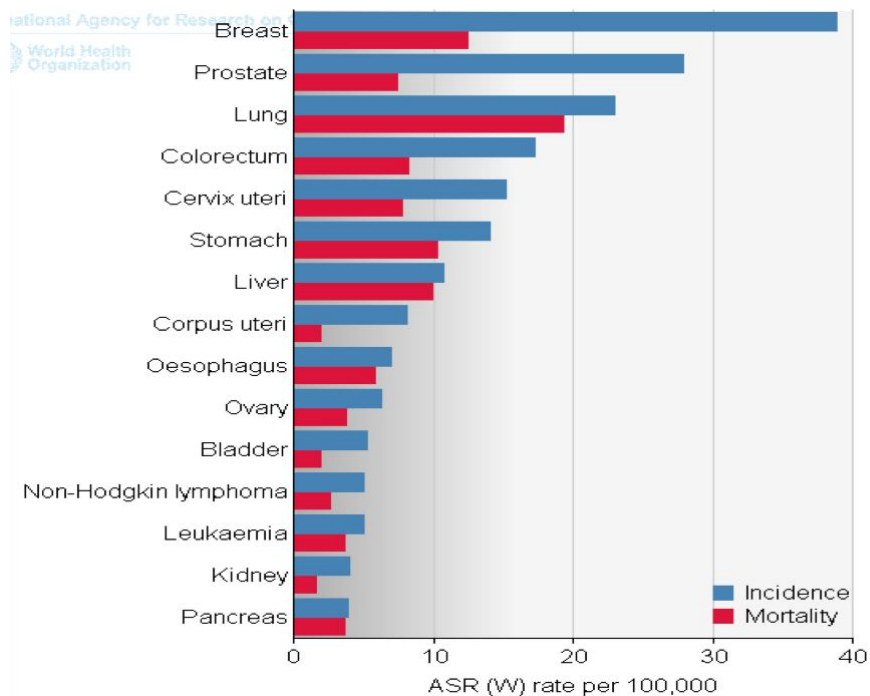
70% of all cancer deaths occur in low- and middle- income countries.

Deaths from cancer are estimated to reach 13.1 million by 2030.

About 30% of cancers are attributable to behavior risk factors.

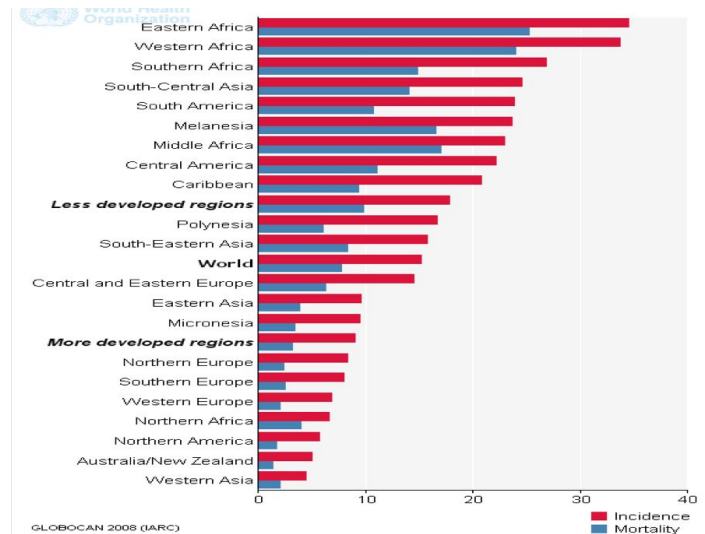
Epidemiology:

**Estimated
age-standardised
incidence and
mortality rates:
total population**



Cervical Cancer:

**Estimated
age-standardised
rates (World) per
100,000**



Risk Factors:

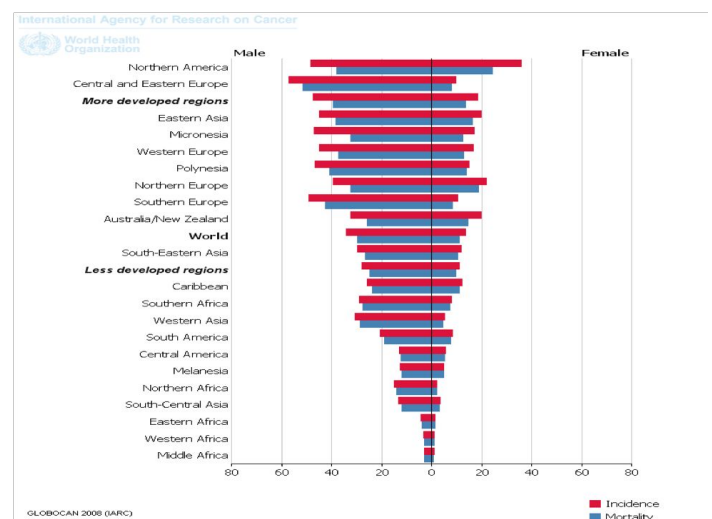
- Human papilloma virus infection (HPV)
- Smoking
- Immune Deficiencies
- Poverty
- No access to PAP screening
- Family history of cervical cancer

Lung Cancer:

- Cancer that forms in tissues of the lung, usually in the cells lining air passages
- Leading cause of cancer death globally, 1.37 million deaths in 2008
- Affects more men than women
- Two main types:
 - Small cell lung cancer
 - Non-small cell lung cancer

Risk Factors:

- Smoking cigarettes, pipes, or cigars - now or in the past
- Being exposed to second-hand smoke
- Being treated with radiation therapy to the breast or chest
- Being exposed to asbestos, radon, chromium, nickel, arsenic, soot, or tar
- Living where there is air pollution



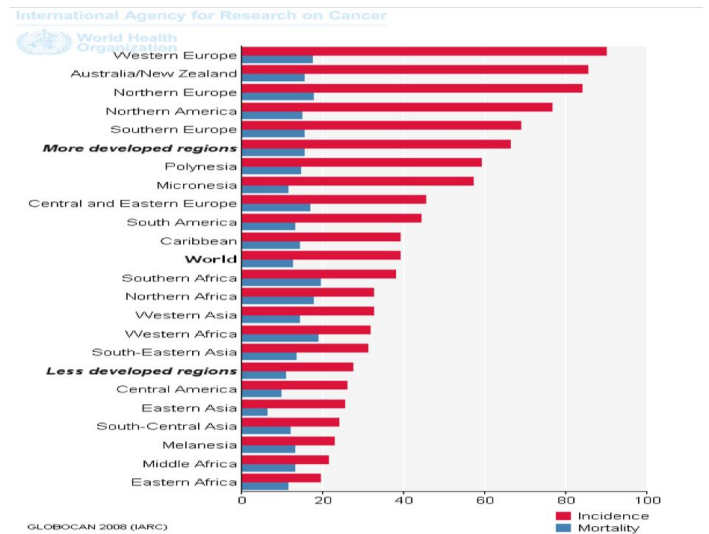
Incidence and Mortality in 2008: Both Sexes

Breast Cancer:

- Cancer that forms in the tissues of the breast, usually in the ducts or in the lobules
- Occurs commonly in women, rarely occurs in men
- 1 of 8 women will be diagnosed with breast cancer in her lifetime.

Risk factors:

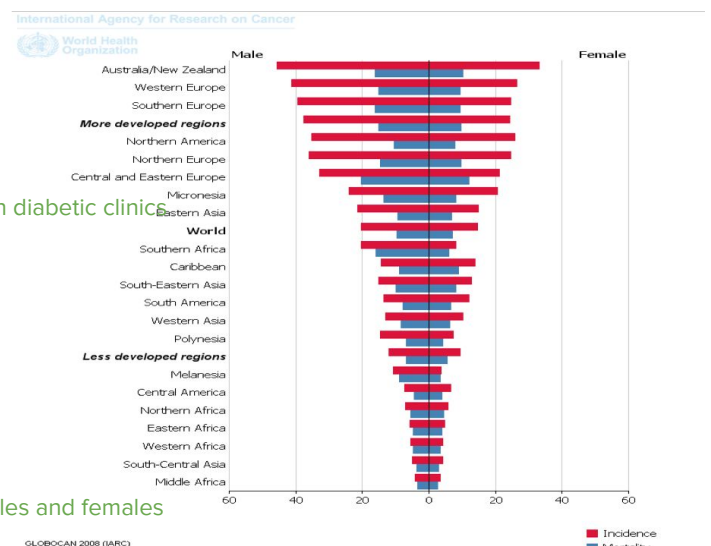
- Hormone therapies
- Weight & physical activity
- Race
- Genetics or family history
 - BRCA1 & BRCA2 genes
- Age is the most reliable risk factor!
 - Risk increases with age



Incidence and Mortality in 2008: Both Sexes

Colorectal Cancer:

- 3rd most common type of cancer
- Forms in the lower part of the digestive system (large intestine)
- Risk Factors include:
 - Aging
 - Black race
 - Unhealthy diet and low exercise
 - Diabetes *We should screen for colorectal cancer in diabetic clinics*
 - Family history of colorectal cancer



No difference between males and females

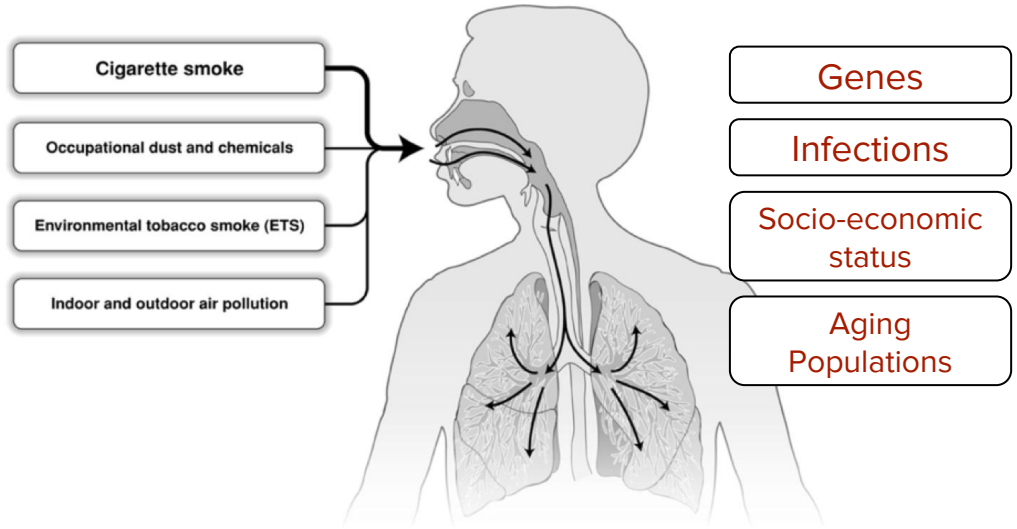
Incidence and Mortality in 2008: Both Sexes

Chronic Respiratory Diseases

Global burden:

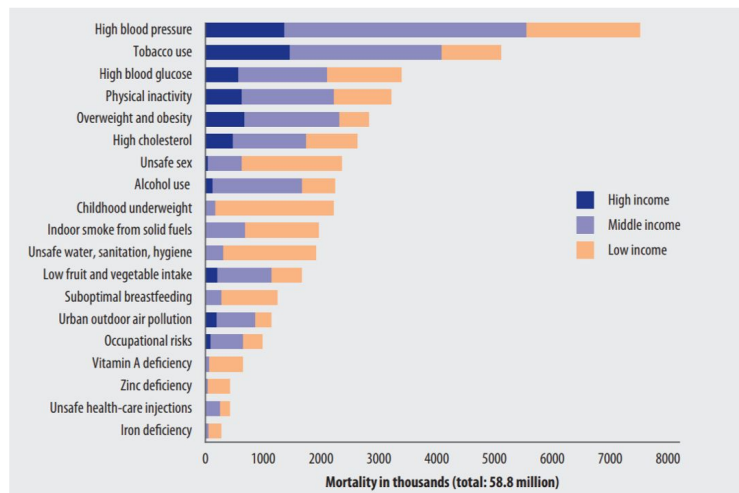
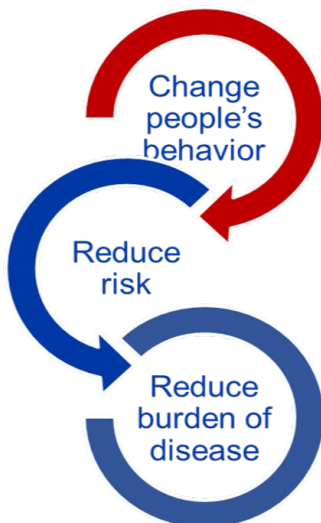
- A leading cause of death
- High under-diagnoses rates
- 90% of deaths occur in low-income countries

Shared Risk Factors:



Why Risk Factors?

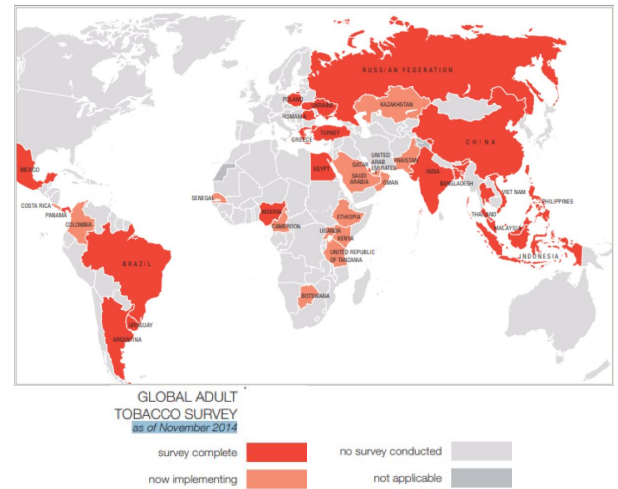
- Surveillance for non-communicable disease can be difficult because of:
 - Lag time between exposure and health condition,
 - More than one exposure for a health condition, and
 - Exposure linked to more than one health condition.
- Interventions that target risk factors are needed to prevent disease.



Deaths attributed to 19 leading risk factors, by country income level, 2004

Tobacco Use:

- Tobacco kills up to half of its users.
- Tobacco kills nearly 6 million people each year.
- Annual death toll could rise to more than 8 million by 2030.
- Nearly 80% of the world's 1 billion smokers live & middle-income countries.



Diet:

Global changes in diet:

- Most countries have increased overall daily consumption of:
 - Daily calories,
 - Fat and meats, and
 - Energy dense and nutrient-poor foods such as:
 - Starches
 - Refined sugars
 - Trans-fats

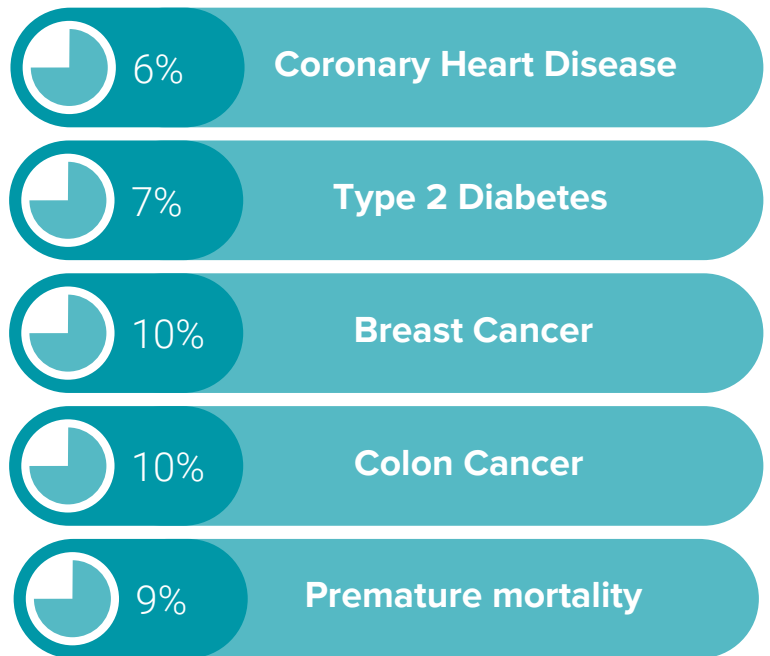
Unhealthy diet: Health Effects:

- Coronary heart disease
- Stroke
- Cancer
- Type 2 diabetes
- Hypertension
- Diseases of the liver and gallbladder
- Obesity

Physical Inactivity: At least 5 times a week and 30 mins a day

Global changes in physical activity:

- 31% of the world's population does not get enough physical activity.
- Many social and economic changes contribute to this trend:
 - Aging populations
 - Transportation
 - Communication technology
- ~ 6-10% of major NCDs worldwide is attributable to physical inactivity



Health effects:

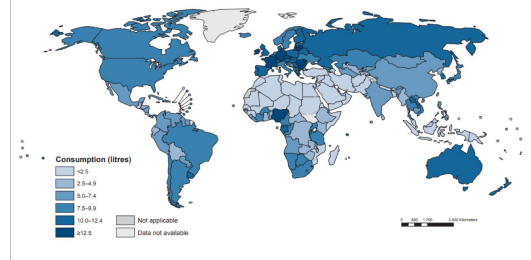
Reduces:

- High blood pressure
- Adverse lipid profile
- Arthritis pain
- Psychiatric issues

Reduces risk of:

- Type 2 diabetes
- Certain cancers
- Heart attacks
- Stroke
- Falls
- Early death

Figure 3.3 Total alcohol per capita consumption (APC) (15+ years; in litres of pure alcohol), 2016



Metabolic Risk Factors

1. Raised Blood Pressure (Hypertension)
2. Raised Cholesterol
3. Raised Blood Glucose
4. Overweight and Obesity

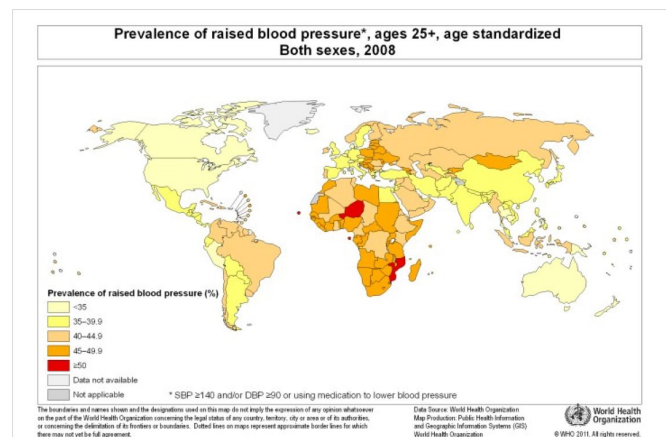
Raised Blood Pressure:

- Hypertension
- (Systolic)/(Diastolic) in mm of Hg (mercury)
- Systolic = amount of force your arteries use when the heart pumps
- Diastolic = amount of force your arteries use when the heart relaxes

Measurement	Normal	Pre-Hypertensive	Hypertensive
Systolic mmHg	<120	120-139	140+
Diastolic mmHg	<80	80-89	90+

Raised Blood pressure: Health Effects

- Leading risk factor for stroke
- Major risk factor for coronary heart disease
- In some age groups, the risk of CVD doubles for each increment of 20/10 mmHg of blood pressure
- Other complications of blood pressure:
 - Heart failure
 - Peripheral vascular disease
 - Renal impairment
 - Retinal hemorrhage
 - Visual impairment



Hypertension and Excessive Sodium Intake:

- Sodium, through hypertension, is a major cause of cardiovascular disease deaths and disability.
- About 10% of cardiovascular disease is caused by excess sodium intake.
- 8.5 million deaths could be prevented over 10 years if sodium intake were reduced by 15%.

Sources of Sodium:

- People are unaware of how much dietary sodium they are eating.
- In the U.S. 75% of sodium consumed comes from processed and restaurant foods.
- In China and Japan, 75% of sodium consumed comes from cooking with high sodium products.

Recommendations & Actual Intakes:



Recommendations:

- A population salt intake of less than 5 grams or approximately 2,000 milligrams of sodium, per person per day is recommended to reach national targets or in their absence. This level was recommended for the prevention of cardiovascular diseases.

Actual Intake:

- Latest global estimates show that average sodium intake varies from 2,000 to 7,200 milligrams of sodium per person per day.

Raised Total Cholesterol:

Global Burden:

- In 2008, global prevalence of raised total cholesterol among adults (≥ 5.0 mmol/l) was 39% (37% for males and 40% for females).
- Estimated to cause 2.6 million deaths.
- What is the prevalence of raised total cholesterol in your country?
 - Search the WHO Global Health Observatory website:
http://www.who.int/gho/ncd/risk_factors/en/index.html

			Raised total cholesterol (≥ 5.0 mmol/L) (age-standardized estimate) ⁱ			Raised total cholesterol (≥ 5.0 mmol/L) (crude estimate) ⁱ		
Country	Year	Age Group	Both sexes	Male	Female	Both sexes	Male	Female
Saudi Arabia	2008	25+ years	39.0 [27.8-50.2]	36.4 [23.1-51.2]	42.1 [24.2-60.3]	36.6 [26.3-47.0]	35.4 [22.7-49.7]	38.2 [22.5-51.2]

Health Effects:

- Increases risks of heart disease and stroke
 - Globally, 1/3 of ischemic heart disease is attributable to high cholesterol
 - A 10% reduction in serum cholesterol in men aged 40 has been reported to result in a 50% reduction in heart disease within 5 years
 - A 10% reduction in serum cholesterol in men aged 70 years can result in an average 20% reduction in heart disease occurrence in the next 5 years

Overweight & Obesity:

Overweight and obesity are defined as "abnormal or excessive fat accumulation that presents a risk to health."

- BMI - the Body Mass Index
 - $BMI = (weight\ in\ kg) / (height\ in\ meters, squared)$
 - Between 25 and 29.9 indicates overweight
 - 30 or higher indicates obesity
- Skinfold Thickness Test
- Waist-to-Hip Circumference Ratio
 - Men > 102 cm are considered high risk
 - Women > 88 cm are considered high risk

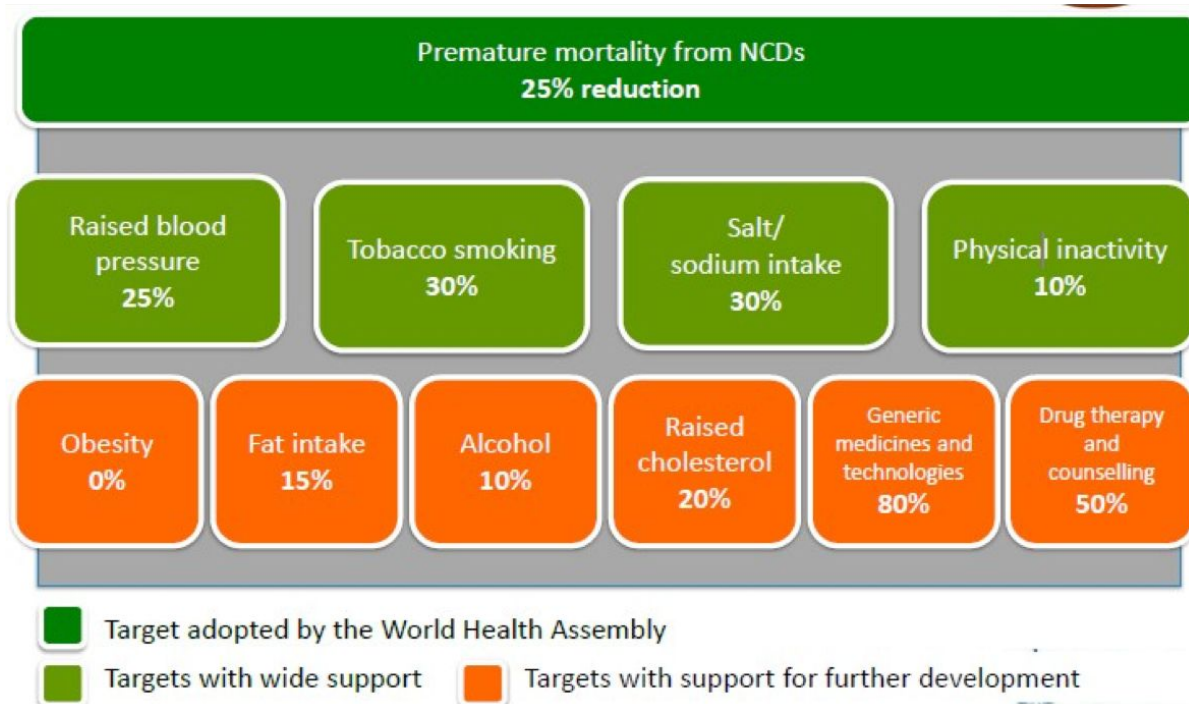
Global Burden:

- Worldwide, obesity has more than doubled since 1980.
- In 2008, more than 1.4 billion adults, 20 and older, were overweight.
 - Of these, 200 million men and nearly 300 million women were obese.
- 65% of the world's population live in countries where the mortality associated with overweight and obesity is higher than the mortality associated with underweight.
- Globally, in 2010 the number of overweight children under the age of five was estimated to be over 42 million.
 - Close to 35 million of these are living in developing countries.

Health Effects:

- Environment, lifestyle, genetics, and other factors contribute to each individual's risk for being overweight or obese.
- Increases risk of coronary heart disease, type 2 diabetes, and hypertension
- Large economic consequences for many countries
- Resource: <http://www.thelancet.com/series/obesity>

WHO Global Targets: Reducing Risk Factors



Evidence based global interventions:

Table 1 Interventions used in this review

Risk factor/ disease	WHO 'best buy'	Specific interventions
Tobacco	Raise taxes on tobacco	Introduce or increase excise taxes
	Protect people from tobacco smoke	Ban smoking in public places
Unhealthy diet and physical inactivity	Enforce bans on tobacco advertising	Advertising/promotion/sponsorship bans
	Warn about the dangers of tobacco	Information and warnings on tobacco packaging
	Mass media campaigns—physical activity	Mass media campaigns
	Mass media campaigns—diet	Group smoking reduction programmes
Harmful alcohol use	Replace trans fat with polyunsaturated fat	Individual programmes
	Reduce salt intake	Evidence-informed campaigns on activity
	Raise taxes on alcohol	Evidence-informed campaigns on diet
Cardiovascular disease	Restrict access to retail alcohol	Reformulation
	Enforce bans on alcohol advertising	Labelling
Cancers	Counselling and polydrug therapy for high-risk groups†	Mass media campaigns
	Treat heart attacks with aspirin	Mass media campaigns
	Hepatitis B immunisation to prevent liver cancer	Reformulation
	Screening and treatment to prevent cervical cancer	Diabetes (HbA1c >9%): ≥1 antidiabetic; polydrug Rx if BP >165/95

*We have included legislative age restrictions on alcohol use as a means of restricting access to retail alcohol.
 †Studies on medical treatment were included even if they did not include a counselling component.
 BP, blood pressure; CVD, cardiovascular disease; HbA1c, haemoglobin A1c; IHD, ischaemic heart disease; Rx, therapy; VIA, visual inspection with acetic acid.

Summary

Name:	Definition:	Global Burden:	Risk Factors:
Cardiovascular Disease	Coronary heart disease, Cerebrovascular disease (stroke), Peripheral arterial disease, Congenital heart disease.	CVDs are the #1 cause of death globally.	<ul style="list-style-type: none"> •Modifiable: High blood pressure •Other modifiable: Low socioeconomic status •Non-modifiable: Age •“Novel” : Excess homocysteine in blood
Diabetes	Type 1, Type 2, Gestational, and Pre-Diabetes (Impaired Glucose Tolerance).	347 million people worldwide have diabetes.	<ul style="list-style-type: none"> •Modifiable: Unhealthy diets •Other modifiable: Low socioeconomic status •Non-modifiable: Age •“Novel”: Low birth weight
Cervical Cancer:	Cancer is Rapid creation of abnormal cells that grow beyond their usual boundaries, and which can then invade adjoining parts of the body and spread to other organs	7.6 million people died from cancer in 2008.	<ul style="list-style-type: none"> •Human papilloma virus infection (HPV) •Smoking •Immune Deficiencies •Poverty
Lung Cancer:			<ul style="list-style-type: none"> •Smoking •Being exposed to second-hand smoke •Being treated with radiation therapy •Living where there is air pollution
Breast Cancer:			<ul style="list-style-type: none"> •Hormone therapies •Weight & physical activity •Genetics or family history •Age is the most reliable risk factor!
Colorectal Cancer:			<ul style="list-style-type: none"> •Aging •Black race •Diabetes •Family history of colorectal cancer
Chronic Respiratory Diseases			<ul style="list-style-type: none"> •Genes •Infections •Socio-economic status •Aging Populations

Common Risk Factors:

Unhealthy diet:

Health Effects: Coronary heart disease, Stroke,,Cancer, Type 2 diabetes, Hypertension, Diseases of the liver and gallbladder, Obesity.

Physical activity:

Health Effects: Reduces:, High blood pressure, Adverse lipid profile, Arthritis pain, Psychiatric issues.

Alcohol Use:

Health Effects: Immediate effects: Diminished brain function, Loss of body heat.

Long-term effects: Liver diseases, Cancers.

Metabolic Risk Factors:

Raised Blood pressure:

Health Effects: Leading risk factor for stroke, Major risk factor for coronary heart disease.

Raised Total Cholesterol:

Health Effects: Increases risks of heart disease and stroke.

Overweight & Obesity:

Health Effects: Increases risk of coronary heart disease, type 2 diabetes, and hypertension.

Good luck!

