

Final Summary

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L1 - Health of People With Disabilities

Definitions

Health

- “**State of complete physical, mental, and social well-being, not merely the absence of disease or infirmity**”(WHO, 1948).
- In recent years, this statement has been amplified to include the ability to lead a "socially¹ and economically productive life”

Quality of Life²

- “Individual's **perception of their position in life** in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.” (WHO)
- Can be measured, WHOQOL: Measuring quality of life

Disability

- A long-term physical, mental, intellectual, or sensory impairment, which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others. Always we focus on Barriers.

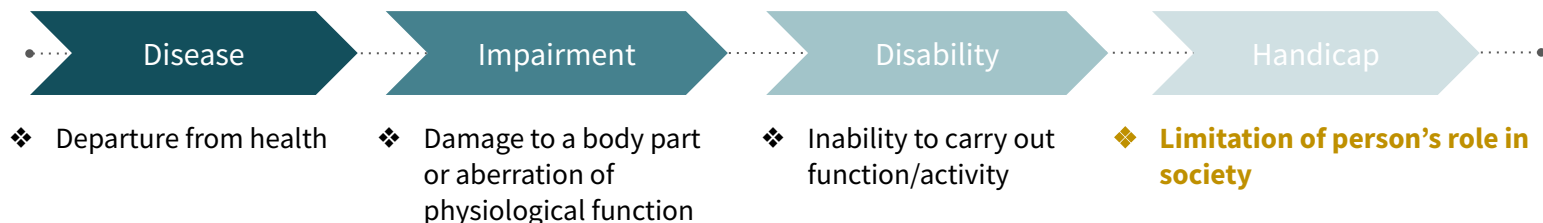
Dimensions of Disability:

- **Impairment** is a problem in body function or structure. Example: loss of limb, loss of vision.
- **Activity limitation** such as difficulty seeing, hearing, walking, or problem solving.
- **Participation restriction** in normal daily activities, such as working, engaging in social and recreational activities, and obtaining healthcare preventative services.

Development of Disability¹

Medical Model:

The impairment is the barrier, medical intervention is needed



- The medical model of disability says people are disabled by their impairments or differences.
- Under the medical model, these impairments or differences should be 'fixed' or changed by medical and other treatments.
- The medical model looks at what is 'wrong' with the person and not what the person needs. It creates low expectations and leads to people losing independence, choice and control in their own lives.

Social Model:

The society is the barrier, can be solved by help of the environment

- **The social model of disability says that disability is caused by the way society is organised, rather than by a person's impairment or difference.** It looks at ways of removing barriers that restrict life choices for disabled people. When barriers are removed, disabled people can be independent and equal in society, with choice and control over their own lives.
- It can be subdivided into: community attitudes, environmental barriers and institutional barriers

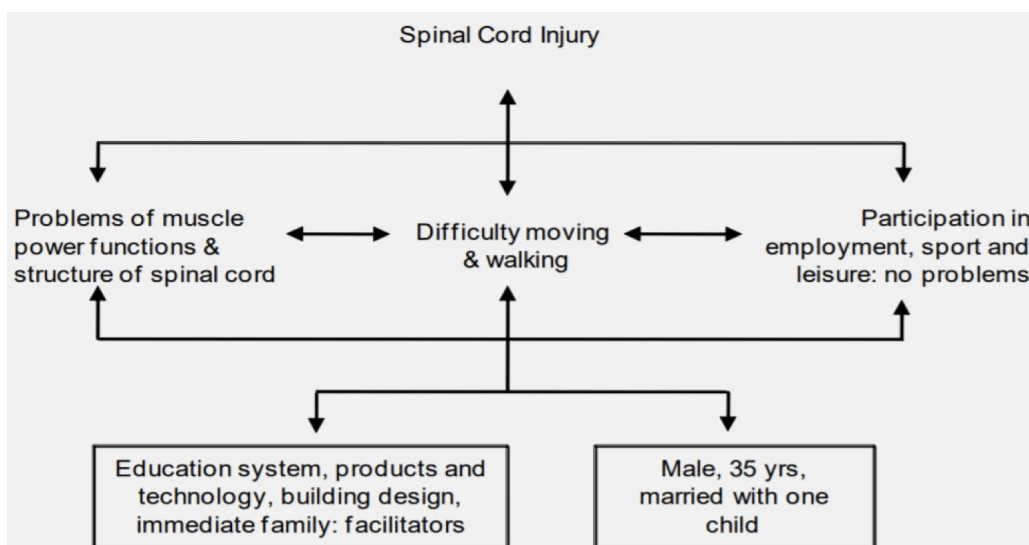
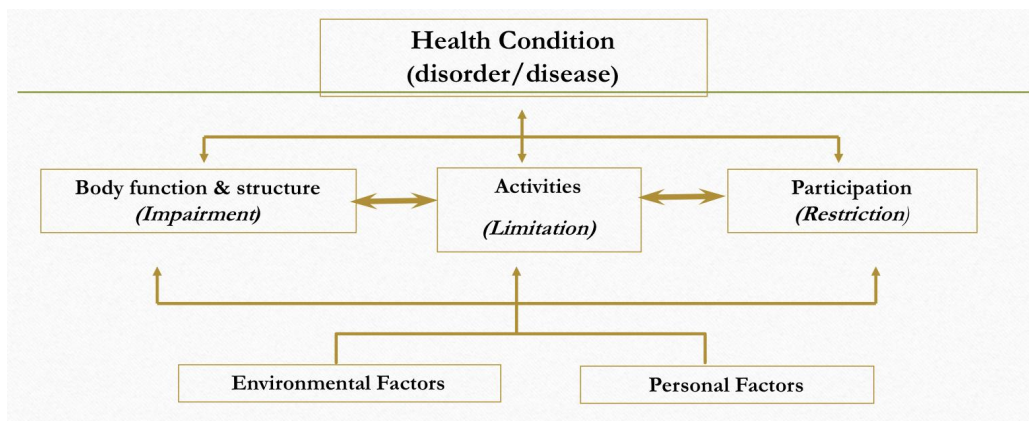
Medical Model	Social Model
<ul style="list-style-type: none"> ● You cannot make decisions about your life ● You are the problem ● You are the sufferer ● You can never be equal to a non-disabled person 	<ul style="list-style-type: none"> ● Everyone is equal ● Society put the barriers in place ● Society prevents and restricts equal opportunities

1- The term quality of life is much broader than the term health and it can be measured through tools and questionnaires to estimate a person's quality of life

2- An example here is blindness. Looking at it through the medical model. Blind people are the problem and we cannot make them equal to normal people. However, if we look at it through the social model. The society is to be blamed for putting the barriers to those people. For example, instead of putting a sign we should put a voice recording.

International Classification Of Functioning, Disability & Health (ICF)

- **A framework for describing and organising information on functioning and disability. It aims to:**
 - Provide a scientific basis for understanding and studying health and health-related states, outcomes, determinants, and changes in health status and functioning
 - **Establish a common language** for describing health and health-related states in order to improve communication between different users, such as health care workers, researchers, policy-makers and the public, including people with disabilities
 - **Permit comparison of data** across countries, health care disciplines, services and time
 - Provide a systematic coding scheme for health information systems
- **ICF components:**
 - Body function
 - Body structure
 - Activities and participation
 - Environmental factors



Environmental factors: Capacity vs. Performance

Capacity	Performance
<ul style="list-style-type: none"> Indicates what a person can do in a standardized environment, often a clinical setting, without the barriers or facilitators of the person's usual environment The highest probable level of functioning of a person in a given domain at a given moment. 	<ul style="list-style-type: none"> Indicates what a person does in the current or usual environment, with all barriers and facilitators in place. Not always capacity will be better than performance and not always performance is better than capacity.

Health Conditions associated with Disability

Children	<ul style="list-style-type: none"> Hearing problems Vision disorders Speech problems 	<ul style="list-style-type: none"> Dyslexia Cerebral palsy Learning disabilities (associated with autism, attention deficit)
Non-communicable Diseases	<ul style="list-style-type: none"> Diabetes ¹ Cardiovascular disease Mental disorders 	<ul style="list-style-type: none"> Cancer Respiratory illnesses
Infectious Diseases	<ul style="list-style-type: none"> HIV Malaria Poliomyelitis 	<ul style="list-style-type: none"> Leprosy Trachoma

Injuries: RTA (Road Traffic Injuries)

Arthritis and Back Pain

Types of Disabling Barriers

Barrier	Description
Attitudinal	Negative attitudes leading to rejection and marginalization.
Communication	Are experienced by people who have disabilities that affect hearing, speaking, reading, writing, and or understanding. Examples: <ul style="list-style-type: none"> Lack of accessibility to transport and information system (sign language) Specialized services: availability, accessibility and quality
Physical	Structural obstacles in natural or manmade environments that prevent or block mobility or access Examples: <ul style="list-style-type: none"> Steps and curbs that block a person with mobility impairment from entering a building or using a sidewalk
Policy	Inadequate policies and standards which does not consider the needs of people with disabilities, or existing policies and standards are not enforced. Examples: <ul style="list-style-type: none"> Insufficient funding for implementation of policies and plans.
Social	Lack of consultation and involvement of persons with disability.
Transportation	Lack of adequate transportation that interferes with a person's ability to be independent and to function in society.

Prevention of Disabilities and Rehabilitation

Type	Description		
Primary Prevention	<ul style="list-style-type: none"> • Premarital genetic counseling • Maternal and neonatal care • Screening of neonates for hypothyroidism • Expanded program on immunization • School services 		
Secondary Prevention	<p>In 2ry prevention we try to prevent complications from happening, while in 3ry prevention we try to limit the disability that resulted from the complication by the means of rehabilitation.</p>		
		Intervention	Prevention
	Health condition	Medical treatment or care	Health promotion, Nutrition, Immunization
	Impairment	- Medical treatment or care - Surgery	Prevention of the development of further activity limitations
	Activity limitation	- Assistive devices - Personal assistance - Rehabilitation therapy	Preventive rehabilitation, Prevention of the development of participation restrictions
&	Participation restriction	- Accomodations - Public education - Anti-discrimination law - Universal design	Environmental change, Employment strategies, Accessible services, Universal design, Lobbying for change
Tertiary Prevention	<ul style="list-style-type: none"> • After the person gets a complication from the disability he has or even before he gets one, we can start rehabilitation. <p>Outcome of Rehabilitation includes:</p> <ul style="list-style-type: none"> • Prevention of the loss of function • Slowing the rate of loss of function • Improvement or restoration of function • Compensation for lost function • Maintenance of current function <p>Rehabilitation: it's the combined coordinated medical, social, vocational, psychological and educational measurements to train disabled individuals to reach the highest level of functional ability</p> <p>Community-based rehabilitation: to provide rehabilitation, reduce poverty, equalize opportunities and promote the inclusion of persons with disabilities in their communities (enhancing the social life & promote engagement with society)</p>		

Community services available for disabled people in KSA

- **Priority card:** The priority card is designed for people with disabilities, and it aims to easily **obtain health services through the electronic registration system to obtain facilitation cards.**
- Financial support for people with disabilities
- Service of assessing the disability
- Service of requesting financial aid for specific medical devices
- Réhabilitation Centers
 - Social réhabilitation centers
 - Professional rehabilitation centers
- Daycare centers
- Home health care

Important and most common causes of disability in KSA?
 Congenital, metabolic, traumatic

L2- Vector-borne Disease

- Vectors: living organisms that can transmit infectious disease between humans or from animals to humans Eg: Mosquito, tick, sand fly,....
- Vector-borne diseases: caused by vectors (transmission). Often found in tropical regions (insects prevail and unsafe access to drinking water and sanitation. Examples: Dengue fever, malaria, yellow fever.

Dengue Fever

Overview	Dengue is a viral disease transmitted by mosquitoes (mainly <i>Aedes aegypti</i>) and is widely distributed throughout the tropics .	
Epidemiological determinants: agent, environment, host		
Agent factors Dr. (MCQ)	Agent/serotype	<ul style="list-style-type: none"> • Causative agent: Dengue virus (Serotype: DENV 1–4), • RNA virus of the genus Flavivirus
	Vector	mosquitoes most commonly from the species <i>Aedes aegypti</i> and to a lesser extent <i>ae. albopictus</i>
Environmental factors	Temperature and humidity	
Host factors	Factors increasing risk of severe disease and complications: <ul style="list-style-type: none"> • Age group: Infants and elderly. • Obesity and Pregnancy • Women who are in menstruation or have abnormal bleeding. • Hemolytic diseases: thalassemia, G6PD, other hemoglobinopathies. • Other: Peptic ulcer disease, Congenital heart disease. • Chronic illnesses: DM, chronic renal failure, liver cirrhosis • Medications: steroids or NSAID treatment. 	
Transmission route through	Vector	Through mosquito bite. <i>Aedes</i> are typically day-time biters. <ul style="list-style-type: none"> • Aedes aegypti (most common): day-time feeder; eggs can remain viable for several months in dry condition, and will hatch when they are in contact with water. • <i>Aedes albopictus</i>, (USA, and Europe) tolerance of colder conditions, as an egg and adult day biter.
	Maternal	babies may suffer from pre-term birth, low birthweight, and fetal distress
	Blood	Rare. Via blood products, organ donation and transfusion

L2- Vector-borne Disease

Clinical features

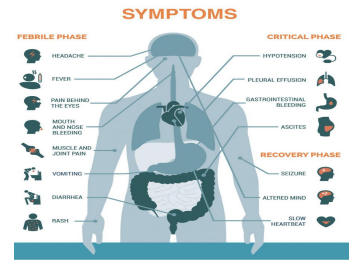
The incubation period is 3–10 days following the mosquito bite. Asymptomatic or mild infections are common. Two clinical forms are recognized:

Classic dengue

(Febrile phase, Lasts for 2 - 7 days)

Characterized by the abrupt onset of:

- **High fever, 39 - 40°C (biphasic)**
- nausea/vomiting
- Headache
- retro-orbital pain
- swollen glands
- muscle and joint pain
- skin rash



The fever subsides after 3–4 days, the temperature returning to normal for a few days, after which the fever returns, together with the features already mentioned, but milder.

Severe dengue

(Critical phase, starts after 2 - 7 days of illness onset)

Severe dengue is potentially deadly. Characterized by:

- Plasma leakage (Capillary leak)
- Fluid accumulation (ex: Ascites)
- Respiratory distress (ex: Pleural effusion)
- Severe bleeding
- Organ impairment
- Hypotension and shock
- Thrombocytopenia

What are the warning signs?

- severe abdominal pain
- persistent vomiting
- rapid breathing
- bleeding gums or nose
- fatigue
- restlessness
- liver enlargement
- blood in vomit or stool.
- **Plasma leakage**
- **Thrombocytopenia**

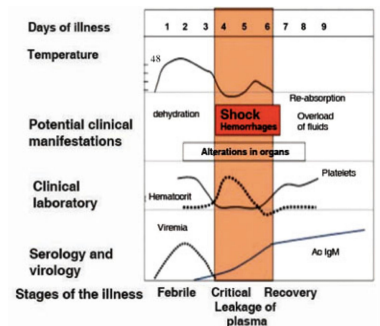
Phase	Incubation	Febrile Phase	Critical Phase	Recovery phase
Time frame	3-14 days	3-7 days	1-2 days	3-5 days
Symptoms	None	Fever is present >Myalgias >Rash >Petechiae >Tourniquet test >Leukopenia >Mild bleeding	Fever resolves >Capillary leak >Shock >Severe hemorrhage >Severe organ involvement	> Fluid Reabsorption >Diuresis
Testing		DENV IGM		
Day of illness	0	1 2 3 4 5 6+	7 8 9	10+

Diagnosis

Diagnosis :

Probable case definition:

Fever with two or more of the following:	At least one of the following:	Laboratory diagnosis:
<ul style="list-style-type: none"> ● Headache ● Retroorbital pain ● Myalgia ● Arthralgia ● Rash ● Hemorrhagic manifestations ● Leukopenia ● Thrombocytopenia ● Rising hematocrit (5-10%) 	<ul style="list-style-type: none"> ● Supportive serology ● Occurrence at the same time and location of confirmed cases 	<ul style="list-style-type: none"> ● Virus isolation methods (RT-PCR) the gold standard. ● testing for a virus-produced protein, called NS1. (rapid does not require specialized laboratory techniques or equipment) ● Serological methods ● Serology (ELISA), recent or past infection (antibodies).



Treatment

- **Supportive**, acetaminophen, monitoring for warning signs
- IV fluids, oxygen, transfusion for severe and shock cases
- Avoid NSAIDs and aspirin to reduce the risk of bleeding and Reye's syndrome

Vaccination

1st dengue vaccine, licensed in Dec. 2015 approved in ~20 countries. Limited use to **prisoners** in endemic areas

L2- Vector-borne Disease

Distribution

Global burden :

- Number of dengue cases increased over 8 fold over the last two decades
- Reported **deaths** (between 2000-2015) also increased affecting mostly younger age group
- 90% of infections affecting children under the age of 5 years, 2.5% of them die.
- The disease is now endemic in more than 100 countries
- The Americas, South-East Asia and Western Pacific regions are the most seriously affected, **with Asia representing ~70% of the global burden of disease**
- The largest number of dengue cases ever reported globally was in **2019**. All regions were affected

Dengue in KSA :

- In 1999 an outbreak was reported for the first time in Jeddah.
- Then two peaks were reported in 200/2006 and another two in 2008.
- **Dengue is now endemic in western and southern regions of KSA.**

Notification,

- In dengue-endemic countries: Probable, suspected and confirmed cases have to be notified to authorities
- In Saudi Arabia: immediate notification **to MOH**

Prevention & control

1. Prevention of mosquito breeding:
 - a. Preventing mosquitoes from accessing egg-laying habitats by environmental management and modification
 - b. Disposing of solid waste properly and removing artificial man-made habitats that can hold water
 - c. Covering, emptying and cleaning of domestic water storage containers on a weekly basis
 - d. Applying appropriate insecticides to water storage outdoor containers
2. Personal protection from mosquito bites:
 - a. Using of personal household protection measures, such as window screens, repellents, coils and vaporizers. (mosquito vectors bites throughout the day)
 - b. Wearing clothing that minimizes skin exposure to mosquitoes is advised
3. Community engagement:
 - a. Educating the community on the risks of mosquito-borne diseases
 - b. Engaging with the community to improve participation and mobilization for sustained vector control
4. Active mosquito and virus surveillance:
 - a. Active monitoring and surveillance of vector abundance and species composition should be carried out to determine effectiveness of control interventions
 - b. Prospectively monitor prevalence of virus in the mosquito population, with active screening of sentinel mosquito collections
 - c. Vector surveillance can be combined with clinical and environment surveillance.

WHO responds to Dengue

- supports countries in the confirmation of outbreaks through its collaborating network of laboratories
- provides technical support and guidance to countries for the effective management of dengue outbreaks
- supports countries to improve their reporting systems and capture the true burden of the disease
- provides training on clinical management, diagnosis and vector control at the country and regional level with some of its collaborating centres
- formulates evidence-based strategies and policies
- support countries in the development of dengue prevention and control strategies and adopting the Global Vector Control Response (2017-2030)
- reviews the development of new tools, including insecticide products and application technologies
- gathers official records of dengue and severe dengue from over 100 Member States
- publishes guidelines and handbooks for surveillance, case management, diagnosis, dengue prevention and control for Member States

L2- Vector-borne Disease

Malaria

Overview	Life threatening febrile illness caused by infection with the protozoan parasite Plasmodium .	
Pathogen	<ul style="list-style-type: none"> • Causative agent- Different species of plasmodium parasite: <ul style="list-style-type: none"> ◦ P. falciparum, P. vivax, P. ovale, P. malariae, P. knowlesi • P.falciparum and P. vivax pose the greatest threat. • The dominant malaria species in Saudi Arabia is P. Falciparum. 	
Transmission route through	Vector	transmitted to humans through the bite of the female Anopheles mosquito (indirect mode of transmission)
	Maternal	From mother to unborn child
	Blood	Injection/transfusion of contaminated blood
Protective factors	<ul style="list-style-type: none"> • Genetic Factors: sickle cell trait, Other <u>hemoglobinopathies</u> (e.g., thalassemia, HbC, G6PD deficiency) • Acquired Immunity: newborns in endemic areas will be protected during the first few months by maternal antibodies. • Repeated attacks of malaria 	
Predisposing factors	General	<ul style="list-style-type: none"> • Non-immune individuals (including Travelers/migrants) in areas with high transmission • Young children (less than 5 years) • Pregnant women • Environmental: rain seasons • People with low immunity such as HIV patients • Poverty • Genetic has the least effect
	In KSA	<ul style="list-style-type: none"> • Jazan and Aseer (southern region) due to heavy rainfall season • Army personnel & employees working at the Southern borders • Travelers to countries with active malaria transmission • Pilgrimage from regions with active malaria transmission
Presentation	Early Sx	Common: Chills, Fever, Headache Less common: Anorexia, Nausea, vomiting, Diarrhoea, Abdominal pain
	Severe Sx	If not treated early might progress to: - Severe anemia - Respiratory distress - Cerebral malaria - Multiorgan failure
	Malaria paroxysm	A typical attack comprises 3 distinct stages: cold stage, hot stage and sweating stage. Cold skin (1/4 -1h) → Hot & dry skin (2-6h) → sweating & fever subsides (2-4h). Between paroxysms temperature is normal and patient feels well and asymptomatic (shown in diagram) Terian (every 48hr) → P.vivax and P.ovale. Quartan (every 72hr) → P.malariae. irregular → P.falciparum.
Diagnosis	Lab	<ol style="list-style-type: none"> 1. Light Microscopy: Giemsa-stained blood smear; Thin film, thick film. 2. Serology: 2 weeks after infection, past infection in epidemiological studies. 3. Rapid diagnostic test (RDT)

L2- Vector-borne Disease

Malaria

Community diagnosis

Pre-eradication “Saudi is in this stage”	<p style="text-align: center;">Areas with advanced malaria control</p> <p>Spleen rate. Parasite rate.</p> <ul style="list-style-type: none"> - Universal access to diagnostic tests/ capabilities. - Surveillance/mapping. - Focused screening (e.g., those who present with danger signs) and treatment (e.g., active case strategy in Oman).
Eradication	<p style="text-align: center;">Areas where malaria has been eliminated</p> <p>Microscopic diagnosis: parasite incidence, blood examination rate.</p> <ul style="list-style-type: none"> - Prevent re-introduction. - Considerable resources are still needed. - Different strategies (e.g., border control, active case management). - Maintain high-quality diagnosis
Vector indices	<p>Human blood index, Sporozoite rate, Mosquito density, Man biting rate, Inoculation rate.</p>

Malaria Treatment

I want you to know that malaria treatment is **never** a single medication, **it's always a combination therapy for at least 3 days.**

Choice of treatment line depends on:

1. **Type of plasmodium species and stages** of malaria parasites.
2. **Clinical status of patient:** Uncomplicated or Severe, or pregnancy.
3. **Drug sensitivity** of the infected parasite (area)
4. **Previous exposure to anti-malarial drugs.**

Treatment - Artemisinin combination therapy (ACT): (3days)

- Monotherapy is not recommended for malaria treatment **to prevent drug resistance**
- A single dose of **Primaquine** is added to the first day as a gametocidal medication

- 6 months baby with symptoms of malaria? **Give Anti-malaria + antibiotics**

For uncomplicated malaria:

First line: (ARTESUNATE + SP); alternative (ARTESUNATE + MEFLUQUINE)

Second Line: (ARTEMETHER + LUMEFANTRINE)

Third Line : (oral QUININE + DOXYCYCLINE)

Primaquine is contraindicated in:

- **G6PG deficiency, pregnancy,** lactating mothers for babies <6m, children < 6m, or hypersensitivity

Treatment failure: Failure to resolve or recurrence of fever or parasitemia:

- Early (1-3 days of treatment) **OR** Late: (4 days – 6 weeks after treatment)
- Causes:
 - Poor adherence to treatment
 - Low or incomplete dose
 - Abnormal individual pharmacokinetics
 - Drug resistance

Antimalarial drug resistance: The ability of the parasite to survive and/or multiply despite the administration and absorption of medication.

- Reason: Exposure of the parasite to **insufficient amount of the drug. How?**
 - Low dose prescribed
 - Lesser amount dispensed
 - Incomplete treatment
 - Vomiting
 - Low absorption

L2- Vector-borne Disease

Malaria

Global Technical Strategy for Malaria 2016–2030:

1. Ensure universal access to malaria prevention, diagnosis and treatment
2. Accelerate efforts towards elimination and attainment of malaria-free status
3. Transform malaria surveillance into a core intervention

Which of the following preventive measures is included in the malaria control program? Which of the following interventions for malaria prevention is implemented at the secondary level?

Case Management

The **main way** to **reduce and interruption of malaria transmission** at a community is **vector control**:

- **Decrease human-mosquito contact**
 - **Insecticide-treated mosquito nets (ITNs)** - primary intervention in malaria
 - For **all at-risk persons**
 - Provision of **free Long lasting insecticide treated nets (LLINs)**
 - **Everyone sleeps under a LLIN every night.**
- **Destruction of adult mosquitoes**
 - Indoor spraying with residual insecticides
 - **At least 80%** of houses in targeted areas are sprayed
 - Protection depends on type of insecticide.
- **Destruction of larvae**
 - Larviciding of water surfaces, intermittent irrigation, biological control
- **Environmental control**
 - Source reduction: Environmental sanitation, water management, drainage
 - Social participation: Health education, community participation
- **Chemoprophylaxis**
 - **To travelers**
 - **Pregnant women**
 - **Infants** in endemic areas
 - Seasonal chemoprevention
- **Vaccination**
 - Since 2021, RTS,S/AS01 malaria vaccine
 - **Recommended for children in endemic regions**
 - Significantly reduce malaria, and deadly severe malaria, among young children.

WHO efforts in Malaria control

Prevention & control of malaria in KSA

The current elimination strategy in Saudi Arabia focuses mainly on:

1. **Targeting high risk areas** for sustained preventative measures such as (Long lasting insecticide treated nets, Indoor residual spraying)
2. **Management of infection** through rapid confirmed diagnosis and treatment.
3. Individual case follow up and **reactive surveillance** with appropriate treatment and vector control.
4. **Active case detection at borders** with screening and treatment.

Malaria & Hajj season

Measures applied before inlet of Pilgrims:

- Spray health care facilities pilgrims camps with residual insecticides.
- Surveillance at Hajj Entry ports (suspected cases/ necessary measures).

Measures applied during Hajj season:

- Epidemiology investigation malaria cases (proper diagnosis/treatment).
- Secure malaria drugs and treatment policy for all healthcare facilities.

L3- Reporting & Surveillance

- The Centres for Disease Control and Prevention (CDC) defined **Public Health Surveillance** as: “**Ongoing systematic collection, analysis, interpretation and dissemination** of data regarding a health related event for use in public health **action** to reduce morbidity and mortality and to improve health”.
- In other words, it means “**information for action**”.
- It is the eyes and ears of public health.
- It a very **important tool** for public health
- It is a network of people and activities to keep this process.
- Functions at local to international levels and is available in regular reports routinely.

Objectives of Public Health Surveillance

Main aim:
Disease control and prevention

- 1 To study the trends of disease
- 2 Early warning of epidemics
- 3 To provide quantitative estimates of magnitude of health problem
- 4 To study the natural history of disease
- 5 Demonstrating the spread of a disease in time and Place
- 6 To develop epidemiologic research questions
- 7 To test epidemiologic hypothesis
- 8 Evaluation of control and preventive measures *Breast cancer screening*
- 9 Monitoring of change in infectious agent *like changes in malaria species*
- 10 Detecting changes in health practices

Types of Surveillance

Types	Item	Description
Passive	Definition	<ul style="list-style-type: none"> • Regular reporting of disease data by all institutions that see patients (or test specimens) and are part of a reporting network. • There is no active search for cases. • Relies on the cooperation of health-care providers — laboratories, hospitals, health facilities and private practitioners. • This is the most common type of surveillance. <p><u>Example:</u> <i>Reported cases of COVID-19 by hospitals.</i></p>
	Uses	<ul style="list-style-type: none"> • In this type of surveillance criteria are established for reporting diseases, risk factors or health-related events then health practitioners are notified of the requirements and they report events as they come to their attention. • The data recipient has to wait for the data providers to report. • In most countries with a passive surveillance system, every health facility is required to send a monthly (sometimes weekly/daily) report of all cases on a standard form.
	Advantage	<ul style="list-style-type: none"> • Simple to conduct • Inexpensive • Covers wide areas (whole countries or provinces)
	Disadvantage	<ul style="list-style-type: none"> • It can be difficult to ensure completeness and timeliness of data. - Because it relies on an extensive network of health workers. • Usually underestimate the true illness burden.

Types	Item	Description
Active	Definition	<ul style="list-style-type: none"> In active surveillance the organization conducting the surveillance actively seeks the relevant information (healthcare providers are contacted and asked to provide details of any cases they have seen). Data must be obtained by searching for cases, and also by periodically contacting those who may know of cases. <p><u>Example:</u></p> <ul style="list-style-type: none"> Health workers go into the community, search for cases of fever and take their blood slide for malarial parasite Screening for people arriving from a certain country. Actively visiting and screening individuals in high risk areas.
	Uses ¹	<p>Active surveillance is used when there is an indication that something unusual is occurring:</p> <ul style="list-style-type: none"> Rare disease Disease on way to eradication e.g. polio During outbreaks (very good indication) <p>Regular outreach to potential reporters, to stimulate the reporting of specific diseases or injuries. <i>This type of surveillance is not effective in all types of diseases.</i></p>
	Advantage	<ul style="list-style-type: none"> Produce complete data of a good quality
	Disadvantage	<ul style="list-style-type: none"> Expensive high use of resources For this reason, when it is used, it is for a limited time period.
Sentinel ²	Definition	<ul style="list-style-type: none"> Collect, analyze, interpret, and use data from a select subset of potential data sources
	Uses	<ul style="list-style-type: none"> There is no adequate existing surveillance system Resources do not allow for a population-based survey Can be established for short term and/or rapid system set-up Data collected from available healthcare providers or other reporters <p><u>Example:</u></p> <ul style="list-style-type: none"> Injury and mental health surveillance after a disaster Assessment of chemical exposures to children of agricultural workers Assessment of workplace-related injuries or diseases
	Advantage	<ul style="list-style-type: none"> Rapid Economical alternative to other surveillance methods. Because it is conducted only in selected locations.
	Disadvantage	<ul style="list-style-type: none"> May not be as effective for detecting rare diseases or diseases that occur outside the catchment areas.

Similar to passive but more detailed and is not considered a main type of surveillance.

Data Source of Surveillance

Death certificates	identifying information & appropriate use of mortality data
Disease registries	Can be based on the hospital records/pathology/lab . Best for rare events such as cancers . <u>Disadvantage:</u> hospital-based registries lack diagnostic data. Pathology registries lack demographic data.
Health surveys	A form of active surveillance used to plan public health programs.
Administrative data	Example: hospital discharge data, governmental/non-governmental insurance claims
Census	Used as the denominator for population-based estimated of the occurrence of disease

Steps in Establishing a Surveillance System

Step 1

Is it Justifiable to Establish a Surveillance System?

Step 2

Spell out the objectives of surveillance system

Step 3

Specify the organization and structure of the surveillance

Step 4

Clearly define the disease(s) being considered for surveillance

Case Definition (438): ★

A set of uniform criteria used to define a disease for public health surveillance (possible, probable, confirmed).

Low specificity	Suspected	Probable	Confirmed	High specificity
Example	Item	Description		
Beginning of COVID-19 (2019-nCoV)	Suspected case	A person with acute respiratory illness (fever with cough and/or shortness of breath) AND and of the following: 1. A history of travel to China in the 14 days prior to the symptom onset. 2. A close physical contact in the past 14 days with a confirmed case of COVID		
	Confirmed case	Suspected case with laboratory confirmation of 2019-nCoV infection		
Smallpox	Probable case	A case that meets the clinical case definition that is not laboratory confirmed but has an epidemiological link to another confirmed or probable case.		
	Confirmed case	case of smallpox that is laboratory confirmed.		

Step 5

Specify the Details of Collection of Information

Step 6

The Organization and procedures of data analysis

Step 7

Making Scientific interpretations out of the results.

Consider whether the apparent statistically significant data **represents true changes**. False increases or decreases can be due: to improvement in diagnostic procedures etc.

Step 8

Ensure proper feedback to all concerned

Step 9

Periodically evaluate / review the surveillance system

Examples of National Surveillance Systems

1) HESN

- Health Electronic Surveillance Network (HESN) is used to control and manage infectious diseases and epidemics online.

2) ISSA

- Influenza Surveillance In Saudi Arabia (ISSA)

L4- Hajj and Health

- The Hajj pilgrimage is one of the greatest **mass gatherings** in the world, and presents unique public health challenges.
- Mass gatherings can present important public health **challenges** related to the **health of attendees** and of the **host country population** and **health services**.

Diseases and Health risks associated with mass gathering (Hajj)

- **Transmission of communicable diseases, including antibiotic-resistant bacterial infections.**
- Non communicable diseases.
- Most common medical problem in hajj is **influenza-like illness**

Communicable diseases

- **Unhygienic practices** and close contacts between pilgrims in **overcrowded situations** during the Hajj rituals, as well as **international travel**, increase the risks of outbreaks and the spread of infectious diseases among pilgrims.

★ Meningococcal disease

- Meningitis most commonly caused by **Neisseria meningitidis** because of its **potential to cause epidemics**.

Epidemiology

- **Crowded conditions** are a risk factor for the carriage and transmission
- **Hajj has been associated with outbreaks of invasive meningococcal disease.** Most cause of epidemics
 - **Outbreaks have high fatality rates.**
 - **Associated with medical costs.**
- During the **2000** and **2001** Hajj pilgrimages, Saudi Arabia experienced 2 large outbreaks of invasive meningococcal disease that led to global spread of N. meningitidis **serogroup W-135**
This happened during hajj before that this strain wasn't known.

Neisseria meningitidis

- Pathogenic meningococci are enveloped by a **polysaccharide capsule** the capsule identifies the valurince
- **Humans are the only reservoir.**
- **Nasopharynx** is the natural habitat and reservoir, in most cases colonization of Nasopharynx is asymptomatic.
- Even with adequate chemotherapy, meningococcal meningitis has a **fatality rate of about 10%** and about 15% of the survivors have residual (CNS) damage **hearing loss, vision loss, and preeminent damage**

Meningococcal disease

Host

- **Maternal antibodies offer protection against invasive disease till the age of six months.**
- Susceptibility **peaks at age 6 - 12 months** and decreases again after colonization of closely related non-pathogenic bacteria.
- **Invasive disease occurs if no protective bactericidal antibodies are mounted against the infecting strain.**

Environment

- **Crowded living conditions** also facilitate disease spread, since individuals from different areas have different strains of meningococci.
- The **risk of invasive disease** is higher in the first **few days after exposure to a new strain.**
- **Smokers**

Mode of Transmission

- **Direct contact.**
- **Respiratory droplets**
- The average **incubation period is 3 - 4 days** with a range of 2 to 10 days, this is also the period of communicability.

Diagnosis

- by the **clinical presentation** and a **lumbar puncture** showing a **purulent spinal fluid.**
- **Typical CSF abnormalities in meningitis include:**
 - **Increased pressure (>180 mm water)**
 - **WBC counts between 10 and 10,000 cells/ μ L, (predominantly neutrophils)**
 - **Decreased glucose concentration (<45 mg/dL)**
 - **Increased protein concentration (>45 mg/dL)**

Clinical Features

Most Common symptoms

- **Acute onset of intense headache**
- **High fever** can reach to 40
- **Sensitivity to light (photophobia)**
- **Stiff neck.**
- **Meningococcal septicaemia:** which is characterized by a **haemorrhagic rash** which usually indicates disease progression and rapid circulatory collapse

In infants and young children

- **Subacute infection that progresses over several days.**
- Irritability and **projectile vomiting** may be the presenting features in this age group.
- **Seizures** occur in 40% of children with meningitis.
- **Neck stiffness can be absent in children so a high fever in children meningitis unless proven otherwise**

Meningococcal disease

Management

- fatal and should always be viewed as **medical emergency**.
- requires **early recognition**, prompt **initial parenteral antibiotic** therapy and close monitoring.
- Several antibiotics can be used for treatment including **penicillin (Drug of choice)**, ampicillin, chloramphenicol and **ceftriaxone**.
- Penicillin-allergic patients, ceftriaxone and other third generation cephalosporins should be substituted.

Preventive measures for Meningococcal diseases

Chemoprophylaxis

Use of vaccination

Health awareness
and educational
campaigns

Efficient disease
surveillance and
response systems

1- Chemoprophylaxis:

- Is the **preferred means of prevention** of disease among close contacts of sporadic

2- Meningococcal Vaccines:

- More than 90% of meningococcal disease, **vaccines are available for group A, C, Y and W - 135**
- At present **two types** of meningococcal vaccines are licensed;
- Meningococcal **polysaccharide vaccines**:
 - Bivalent → protection against serogroups A and C.
 - Quadrivalent → protection against serogroups A, C, Y and W - 135 **commonly used**
- Meningococcal conjugated polysaccharide vaccine.
- **Recommendations for use of meningococcal vaccine:**



Vaccination with a single dose of polysaccharide vaccine is recommended for travelers above 18 months of age going to an area experiencing an epidemic of meningococcal disease or to areas with a high rate of endemic meningococcal disease.

Diarrhoeal diseases

- **Cholera (especially from Yemen)** and **traveller's diarrhoea** are common during the Hajj.

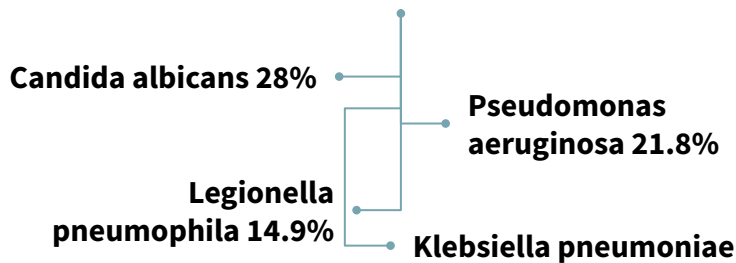
Respiratory tract infections

- Upper respiratory tract infections (URTIs), including **pharyngitis**, **viral URTI**, and **tonsillitis** are the most common cause of outpatient department visits during the Hajj

Pneumonia

- One of the leading causes of **hospitalization** of pilgrims in Mecca, especially among elderly people
- The leading cause of severe **sepsis** and **septic shock** among pilgrims admitted to the ICU.

Pathogens



Tuberculosis

- The annual risk is **3 times higher** in Mecca than the national average in Saudi Arabia.
- TB during the Hajj has the potential to be a source of TB upon return of pilgrims to their home countries

KSA's Efforts for a Healthy Hajj

KSA's Healthcare System during Hajj

- The Saudi government provides **free healthcare services** for all pilgrims.
- The **healthcare system**, which is operated by 26 421 domestic employees in addition to international visiting healthcare practitioners, provides **curative** and **preventive services**.

Travel immunisation recommendations

- They are classified as:
 - **Mandatory** (required)
 - **Voluntary** (recommended) before performing Hajj
- The three **mandatory** vaccines are:
 - quadrivalent meningococcal vaccine for all pilgrims
 - Yellow fever
 - Polio vaccines for pilgrims coming from countries with active polio transmission.
- **Recommended** vaccines include:
 - **influenza vaccine** (in 🇸🇦 they considered it as a **mandatory** vaccine), (MOH consider it as a mandatory vaccine)
 - pneumococcal vaccine

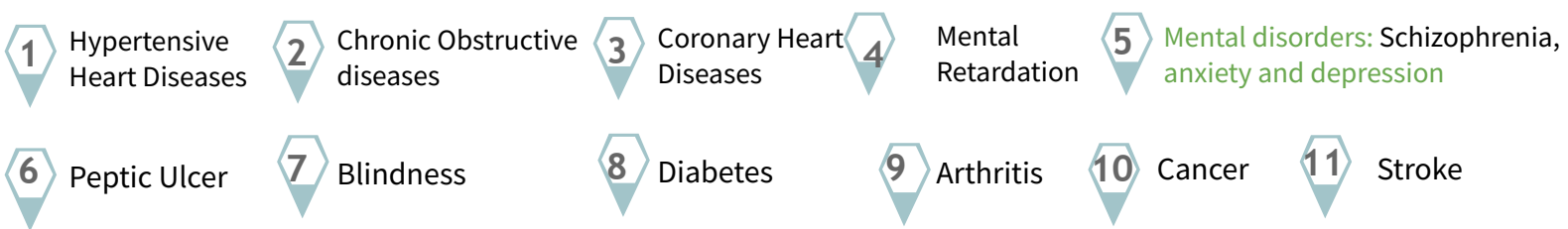
L5-Introduction to Non-Communicable Diseases

Definition of NCDs

- Non-communicable diseases are all impairments or deviations from the normal, which have one or more of the following characteristics;



Non-Communicable Diseases



Causes of non-communicable diseases

- 1 Underlying socioeconomic, cultural, political and environmental determinants:
 - Globalization
 - Urbanization
 - Population ageing
- 2 Common modifiable risk factors:
 - Unhealthy diet
 - Physical inactivity
 - Tobacco use
- 3 Non-modifiable risk factors:
 - Age
 - Heredity
 - Gender
- 4 Intermediate risk factors:
 - Raised blood pressure
 - Raised blood glucose
 - Abnormal blood lipids
 - Overweight/obesity
- 5 Main Chronic Diseases:
 - Heart Disease
 - Stroke
 - Cancer
 - Chronic Respiratory Disease
 - Diabetes

★ Modifiable risk factors

- Cigarette smoking
- High Blood pressure
- Elevated serum Cholesterol
- Diabetes
- Lifestyle changes (dietary patterns, physical activity)
- Stress factors
- Alcohol abuse

VS

Non Modifiable risk factors

- Age
- Sex
- Family Hx
- Genetic factors
- Personality
- Race



Framework for NCD prevention

Primary prevention

- Population Strategy
- High Risk strategy



Secondary prevention

Tertiary prevention

Population Strategy

- Dietary Changes¹
- Blood pressure control
- Physical activity (weight reduction)- specially children
- Behavioral change reduction of stress & **Smoking cessation**
- Self care
- Health education

High risk approach

- Identify Risk: Identify high risk people and families eg those who smoke, and have high serum cholesterol.
- Specific Advice: helping them to **stop smoking** and **exercise** and diet control ect

Secondary approach

Continuation of primary care.

Early case detection and treatment.

- Eg: CHD
 - Cessation of smoking
 - Reduction of serum cholesterol level
 - Compliance

The stepwise framework

Step 1→Data, data will give us how many male and female diabetics we have, how many people died of stroke and how many people need secondary or tertiary prevention due to stroke.

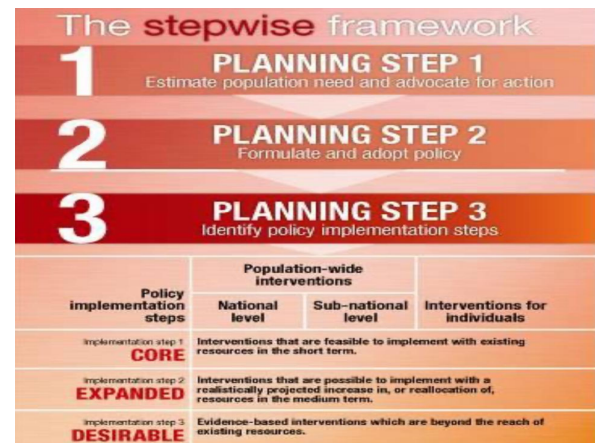
Step 2→Policy, for ex. adaptation of tobacco free areas and taxation of tobacco products.

Step 3→Implementation:

A.National level: not selling tobacco products to anyone under 18.

B.Sub-national level: labeling zones and neighborhoods that are smoke free.

C.Individuals level: fines/penalties for anyone who smokes in a smoke free area.



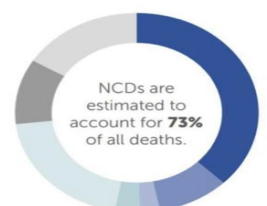
This diagram is very important



NCDs in Saudi Arabia:

PROPORTIONAL MORTALITY*

- ▶ 37% Cardiovascular diseases
- ▶ 10% Cancers
- ▶ 3% Chronic respiratory diseases
- ▶ 3% Diabetes
- ▶ 20% Other NCDs
- ▶ 11% Communicable, maternal, perinatal and nutritional conditions
- ▶ 16% Injuries



1-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

L6- Risk factors for Non-Communicable Diseases

Cardiovascular Disease

Definition:

CVDs are the **#1 cause of death globally**. **Family history is a strong risk factor for IHD**

- You can decrease the risk of CVD by **Decrease trans fatty acid**

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

Disease of the blood vessels supplying the brain. (Stroke)

Peripheral arterial disease

Disease of blood vessels supplying the arms and legs.

Congenital heart disease

Malformations of heart structure existing at birth **not of main focus.**

Diabetes

Definition:

- Diabetes is a **disorder of metabolism** — the way the body uses digested food for growth and energy.
- There are 4 types:
 - 1- Type 1 **an autoimmune attack against insulin secreting cells in the pancreas**
 - 2- Type 2 **insulin resistance combined with decreased insulin secretion**
 - 3- Gestational **diabetes first diagnosed during pregnancy that usually resolves after labor.**
 - 4- Prediabetes **elevated blood sugar but doesn't meet the clinical definition of diabetes.**
- Type 2 is mainly caused by modifiable risk factors and is the **most common** world wide.
- >90% of all adult diabetes cases are type 2.
- Healthy diet, regular physical activity, normal body weight and avoiding tobacco use can prevent or delay the onset of type 2 diabetes.

Risk Factors:

Major Modifiable	Other Modifiable
<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
Non-Modifiable	Other
<ul style="list-style-type: none"> • Increased age • Family history/genetics • Race • Distribution of fat 	<ul style="list-style-type: none"> • Low birth weight • 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.” (WHO, 2012)
- About 30% of cancers are **attributable to behavior risk factors**.

1 Cervical Cancer

Risk Factors:

1. Human Papillomavirus (HPV)⁴
2. Smoking
3. Immunodeficiency Disorders (e.g. HIV)
4. Poverty
5. No access to PAP screening
6. Family history of cervical cancer

2 Breast Cancer

Risk Factors:

1. Hormonal therapy
2. **Weight and physical activity (raised BMI)¹**
3. Race
4. Age is the most reliable risk factor
5. - Screening should start after 45.²
5. Genetics (e.g. BRCA1, BRCA2)

3 Lung Cancer³ **Leading cause of cancer death among males globally**

Risk Factors:

1. **Smoking** cigarettes, pipes, or cigars now or in the past.
2. Being exposed to secondhand smoke
3. Being exposed to asbestos, **radon**, chromium, **nickel**, **arsenic**, soot, or tar.
4. **Being treated with radiation therapy To the breast or chest**
5. Living where there is air pollution.

4 Prostate Cancer (2nd most common cancer among men)

Risk Factors:

1. Age
2. Weight gain
3. Obesity
4. Race

1. Estrogen is formed in the ovaries and in adipose tissue. Obesity can increase the aromatization of androgens and increase the levels of estrogen leading to an increased risk for breast cancer
2. Women with positive family history should start screening prior to this age
3. Two main types: 1- small cell cancer 'more aggressive' 2- non-small cell cancer. It is important to differentiate between the 2 types because the two have different management options; SCC can not be treated by surgery.
4. There's a vaccine for this virus that decreased the incidence of cervical cancer

5

Colorectal Cancer

- 3rd most common type of cancer (most common in men in KSA)
- Forms in the lower part of the digestive system (large intestine)
- Most **preventable** cancer among men in KSA
- Most **common** death cause of cancer among men in KSA

Risk Factors:

1. Age
2. Unhealthy diet and low exercise
3. Black Race
4. Diabetes
5. Family history of colorectal cancer

Chronic Respiratory Disease

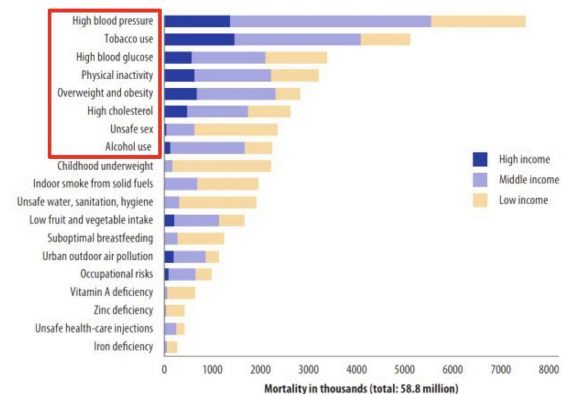
Risk Factors

1. **Cigarette smoke**
2. Occupational dust and chemicals
3. Environmental Tobacco Smoke (ETS)
4. Indoor and outdoor air pollution
5. Genes
6. Infections (frequent respiratory infections)
7. Socio-economic status
8. Aging populations

Why Risk Factors?

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

19 Leading Risk Factors Causing Death:



Blood pressure: Highest mortality & first priority risk factor

Metabolic Risk Factors ★

1 Raised Blood Pressure:

Health Effects:

- Leading risk factor for **stroke** and **coronary heart disease (CHD)**.
- In some age groups, the risk of CVD doubles for each increment of 20/10 mmHg of blood pressure.
- 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 and Actual Intakes WHO/PAHO:

- 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

2

Raised Blood Cholesterol:

Health Effects

- **Increases risks of heart disease and stroke**

- Globally, 1/3 of ischaemic 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

3

Raised Blood Glucose:

Health Effects

- Elevated glucose levels can lead to type 2 diabetes.
- Diabetes is the leading cause of renal failure.
- Lower limb amputations are at least 10 times more common in people with diabetes
- Raised glucose is a major cause of heart disease and renal disease.
- Retinal damage

4

Overweight and Obesity:

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

Body Mass Index	
BMI (Body Mass Index) = Weight (kg) / Height ² (m)	
Underweight	<18.5
Normal	18.5-24.9
Overweight	25-29.9
Obese	>30
Skinfold Thickness Test	
Waist-to-Hip Circumference Ratio	
Men	> 102 cm are considered high risk
Women	> 88 cm are considered high risk

- Accurate estimation of body fat can done by **Dual energy X-ray absorptiometry (DEXA) scan**

L7-Tobacco Use And Cessation

Content of Cigarette

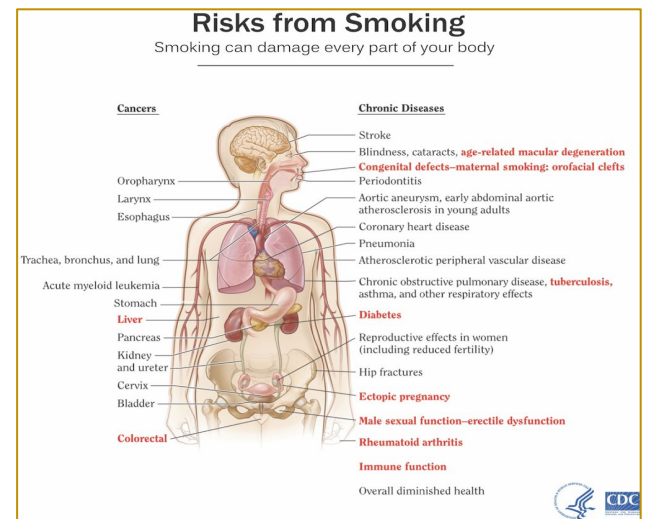
- Tobacco smoke is made up of thousands of chemicals, including at least 70 known to cause cancer.
- These cancer-causing chemicals are referred to as **carcinogens**.
- **Some of the chemicals found in tobacco smoke include:**
 - Nicotine (the addictive drug that produces the effects in the brain that people are looking for).
 - Hydrogen cyanide.
 - Formaldehyde.
 - Lead.
 - Arsenic.
 - Ammonia.
 - Radioactive elements, such as polonium-210.
 - Benzene.
 - Carbon monoxide.
 - Tobacco-specific nitrosamines (TSNAs).
 - **Polycyclic aromatic hydrocarbons (PAHs). It is the most carcinogenic one.**



Risks of Smoking

(Morbidity and Mortality) (pic)

- Cigarette smoking causes more than 480,000 deaths each year in the United States.
- This is about one in five deaths.
- **Smoking causes more deaths each year than all of these combined:**
 - Human immunodeficiency virus (HIV).
 - Illegal drug use.
 - Alcohol use.
 - Motor vehicle injuries.
 - Firearm-related incidents.



Biological :

Withdrawal symptoms

Peak: first to second week where the relapse rate is high

- Dizziness (which may last 1 to 2 days after quitting)
- Feelings of frustration, impatience, and anger
- Depression, Anxiety, Tiredness and Irritability
- Sleep disturbances
- Trouble concentrating
- Restlessness
- Headaches
- Increased appetite and Weight gain
- Constipation and gas
- Cough, dry mouth, sore throat, and nasal drip
- Chest tightness

L7-Tobacco Use And Cessation

Overcome Withdrawal Symptoms

Tips to Overcome Withdrawal Symptoms

- **Avoid temptation.** Stay away from people and places that tempt you to smoke.
- **Change your habits.** Switch to juices instead of coffee. Take a brisk walk instead.
- **Choose other things for your mouth:** sugarless gum or hard candy, raw vegetables such as carrot.
- **Get active with your hands:** Do something to reduce your stress like Exercise or keeps your hands busy.
- **Breathe deeply:** as you inhaled the smoke.
- **Delay:** If you feel that you're about to light up, hold off. Tell yourself you must wait at least 10 min
إذا بيغى يدخن يأخر الموضوع شوي لين تروح الرغبة وهذي حركه ننصح فيها كثير بعيدات الإقلاع ولها تاثير فعال
- **Reward yourself.** Put the money you would have spent on tobacco in a jar every day and then buy yourself a gift.

2 > Social and Cultural Factors



Social and Cultural Factors

- **Social Factors**
 - Social determinants of health include **community, social, environmental** and **political** factors that either exist prior to an individual's choice or that influence that choice.
 - **Socio-demographic factors** are among the strongest predictors of smoking.
 - **Education and Household Income level** are among the most important.
- **Environmental Factors**
 - The likelihood of smoking increases **when those around the smoker also smoke** (e.g. coworkers, friends, family members). Especially in **young population**
 - **Access to cigarettes and smoking** environments at home, work, and social situations also increases the likelihood of smoking.
 - **The social acceptability of smoking** influences prevalence rates.

3 > Psychological Factors



Determinants of Tobacco Use Disorder Psychological Factors

- **Psychological Factors**
 - Stimulation/arousal
 - Relaxation/reduce stress
 - Mood regulation
 - Appetite suppression
 - Weight management
 - Pain management
 - Reduces anxiety/social facilitation
- **Cognitive Effects:**
 - Enhanced memory
 - Enhanced attention
 - Increased speed of processing

People who have depression and other mental disorders they have high susceptibility to smoke

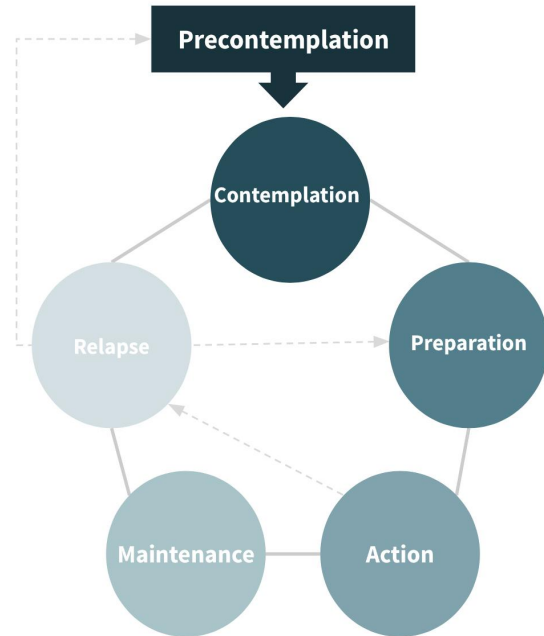
L7-Tobacco Use And Cessation

Assessment and Treatment Plan

Transtheoretical Model Stages of Change (used only as a guide)

- Know what does each stage mean , in the exam it will come as scenario and will ask you in which stage this patient in.
- Its not a continuous process patient may present from any stage of these .

1	Precontemplation: No intention to quit within 6 months. person does not have intention at all to quit smoking within 6 months So the approach will be different from patient who is willing to quit tobacco smoking
2	Contemplation: Intention to quit within 6 months. يقول : أفكر اوقف خلال الست الشهور الجاية بس ما عرف متى ولا أعرف كيف
3	Preparation: Ready to quit within 30 days.
4	Action: Has quit.
5	Maintenance: Abstinent for 6 months or more.
6	Relapse: Return to regular use after a period of abstinence.



Nicotine Replacement Therapy



Batch



Inhaler



Gum



Spray



Lozenge

Precautions NRT

Please note the word precautions. This does not read contraindication!

- Immediate post-heart attack period
- Uncontrolled cardiac arrhythmias
- Severe or worsening angina
- **Pregnancy focus in behavioral changes**
- Children and adolescents

L8- Diabetes Mellitus

Definition	A metabolic disorder of multiple etiology characterized by chronic hyperglycemia with disturbances of carbohydrates, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both.	
Types of DM	<ol style="list-style-type: none"> Type 1 diabetes: Due to autoimmune β-cell destruction, usually leading to absolute insulin deficiency. Type 2 diabetes: Due to a progressive loss of β-cell insulin secretion frequently on the background of insulin resistance. Gestational diabetes mellitus (GDM): Diabetes diagnosed in the second or third trimester of pregnancy that was not clearly overt diabetes prior to gestation. Dipstick will show proteinuria Specific types of diabetes due to other causes: e.g. maturity-onset diabetes of the young [MODY], and drug - chemical induced diabetes (such as with glucocorticoid use), disease of the exocrine pancreas. Impaired glucose tolerance (IGT) and impaired fasting glycaemia (IFG): Intermediate conditions in the transition between normal blood glucose levels and diabetes (especially type2) 	
Symptoms	<ul style="list-style-type: none"> - Polyuria. - Polydipsia. - Polyphagia. - Weight loss. - Blurred vision. - Fatigability. - Tingling of hands & feet. - Slow healing. - Dry skin. 	
Epidemiology	<ul style="list-style-type: none"> - Trends in prevalence of diabetes, 1980–2014, by country income group by WHO region: ● The prevalence of DM in eastren mediterranean region is the highest. 	
Risk factors	<ul style="list-style-type: none"> - Genetic factors: autoimmune disease and viral infections may be risk factors in Type I DM. - Family history: The risk of type 2 diabetes is higher (five to six fold) in those with both a maternal and paternal history of type 2 diabetes . - Obesity: The risk of impaired glucose tolerance (IGT) or type 2 diabetes rises with increasing body weight. - Fat distribution: The distribution of excess adipose tissue is another important determinant of the risk of insulin resistance and type 2 diabetes which is highest in those subjects with central or abdominal obesity, as measured by waist circumference or waist-to-hip circumference ratio. - Physical inactivity: Significantly increased risk of type 2 diabetes. - Diet: Consumption of low vitamin D consumption; early exposure to cow's milk or cow's milk formula; or exposure to cereals before 4 months of age increases risk of type 1 diabetes. - Smoking: cigarette smoking increases the risk of type 2 diabetes. - Infections: Rare infections and illnesses can damage the pancreas and cause type 1 diabetes. - Pregnancy: Pregnancy causes weight gain and increases levels of estrogen and placental hormones, which antagonize insulin. - Medications: Thiazide diuretics, Adrenal corticosteroids, Oral contraceptives. - Physiological or emotional stress: Causes prolonged elevation of stress hormone levels. 	
Diagnosis <small>1- Impaired Glucose Tolerance 2- Impaired Fasting Glucose 3- Gestational Diabetes Mellitus</small> <small>According to new World Health Organization diabetes management guidelines, what is the best diagnostic criterion of diabetes? HbA1C</small>	Normal	<ul style="list-style-type: none"> - Fasting Plasma Glucose: ≤ 5.5 mmol/L (99 mg/dL) - 2-h Plasma Glucose: < 7.8 mmol/L (140 mg/dl)
	IGT¹	<ul style="list-style-type: none"> - Fasting Plasma Glucose: ≥ 7.0 mmol/L (126 mg/dl) AND - 2-h Plasma Glucose: ≥ 7.0 and < 11.1 mmol/L (140 and 200 mg/dl)
	IFG²	<ul style="list-style-type: none"> - Fasting Plasma Glucose: 6.1 to 6.9 mmol/L (110 mg/dl to 125 mg/dl) AND (if measured) - 2-h Plasma Glucose: ≥ 11.1 mmol/L (200 mg/dl)
	Diabetes	<ul style="list-style-type: none"> - Fasting Plasma Glucose: ≥ 7.0 mmol/L (126 mg/dl) OR - 2-h Plasma Glucose: ≥ 11.1 mmol/L (200 mg/dl) OR - HbA1c: $\geq 6.5\%$ <p style="margin: 0;">In the absence of unequivocal hyperglycemia, diagnosis requires two abnormal test results from the same sample or in two separate test samples. (2 FPG / 2 A1C / FPG and A1C/ FPG and 2hpp)</p>
	Prediabetes	<ul style="list-style-type: none"> - Fasting Plasma Glucose: 5.6 – 6.9 mmol/L (100 - 125 mg/dL) - 2-h Plasma Glucose: 140- 199 mg/dl (7.8-11 mmol/L) - HbA1C: 5.7 – 6.4% The person is at risk to develop diabetes mellitus.
	GDM³	<ul style="list-style-type: none"> - Fasting Plasma Glucose: 5.1 - 6.9 mmol/L (92 - 125 mg/dl) - 1-h Plasma Glucose: ≥ 10.0 mmol/L (180 mg/dl) - 2-h Plasma Glucose: 8.5 - 11 mmol/L (153 - 199 mg/dl)

L8- Diabetes Mellitus

<p>Diagnosis in asymptomatic adults (Screening)</p>	<ul style="list-style-type: none"> • Testing should be considered in overweight or obese adults who have one or more of the following risk factors: <ul style="list-style-type: none"> - First-degree relative with diabetes. - History of CVD or Hypertension. - Women with polycystic ovary syndrome. - Physical inactivity. - Conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans) • Patients with prediabetes should be tested yearly. • Women who were diagnosed with GDM • For all other patients, testing should begin at age 45 years. • If results are normal, testing should be repeated at a minimum of 3-year intervals.
<p>Common diabetes complications</p>	<ol style="list-style-type: none"> 1. Cardiovascular events (Cardiovascular disease)(CVD): Adults with diabetes historically have 2-3 times higher rate of cardiovascular disease (CVD) than adults without diabetes. 2. End stage renal disease (CKD): The incidence of ESRD is up to 10 times as high in adults with diabetes as those without. 3. Neuropathy: Screening by the GP no need for referral to neurology: All patients should be assessed for diabetic peripheral neuropathy (Type 1 DM: 5 years after the diagnosis and at least annually thereafter) (Type 2 DM: starting at diagnosis). 4. Loss of vision: Adults with type 1 diabetes should be referred to an ophthalmologist within 5 years after the onset of diabetes. (Type 2 DM: should be referred at the time of diagnosis) 5. Lower extremity amputation
<p>Prevention of Type 2 diabetes</p>	<ul style="list-style-type: none"> - Modifiable factors: Being overweight or obese, Unhealthy diet, Insufficient physical activity and Smoking - Not modifiable factors: Genetics, Ethnicity and Age
<p>Population-based prevention (For more details refer to the lecture)</p>	<ul style="list-style-type: none"> - A life course approach to preventing diabetes: Taking a life-course perspective is essential for type 2 diabetes prevention. - Improving early childhood nutrition: Exclusive breastfeeding up to 6 months of age, Promoting the nutritional well-being of pregnant women ... etc - Supportive environments for physical activity: The physical or built environment plays an important role in facilitating physical activity for many people. - Settings-based interventions: A whole-of-school approach that focuses on improving both diet and physical activity, Healthy eating messages in cafés and restaurants have been shown to stimulate consumption of healthy food – provided that healthy food items are made available. - Fiscal, legislative and regulatory measures for healthy diet - Education, social marketing and mobilization - Preventing diabetes in people at high risk: Intensive behavioral interventions for people with IGT and Pharmacological interventions for people with IGT
<p>Prevention or delay development of diabetes (For more details refer to the lecture)</p>	<ul style="list-style-type: none"> - Diabetes Prevention Program (DPP) - Finnish Diabetes Prevention Study (DPS) - Da Qing Diabetes Prevention Study (Da Qing study) - All demonstrated that lifestyle/ behavioral therapy featuring an individualized reduced calorie meal plan is highly effective in preventing type 2 diabetes and improving other cardiometabolic markers (such as blood pressure, lipids, and inflammation). <p>LIFESTYLE INTERVENTIONS:</p> <ul style="list-style-type: none"> • Refer patients with prediabetes to an intensive behavioral lifestyle intervention program. • Based on the Diabetes Prevention Program (DPP) to achieve PREVENTION OR DELAY OF TYPE 2 DIABETES and maintain 7 - 10% loss of initial body weight and increase moderate-intensity physical activity (such as brisk walking) to at least 150 min/week <p>Health nutrition OSCE:</p> <ul style="list-style-type: none"> • Encourage Minimize; refined and processed foods, like rice, white bread, sugary drinks, ... • A referral to dietitian <p>Physical activity and tobacco cessation OSCE:</p> <ul style="list-style-type: none"> • Just as 150 min/week of moderate intensity physical activity, such as brisk walking, showed beneficial effects in those with prediabetes. <p>Pharmacological interventions:</p> <ul style="list-style-type: none"> • Metformin therapy for prevention of type 2 diabetes should be considered in those with prediabetes, especially for those who are obese and hypertensive. • Metformin and intensive lifestyle modification led to an equivalent 50% reduction in diabetes risk.

L8- Diabetes Mellitus

The National Executive Plan (438)

1. **The primary prevention** from the second type of diabetes, and diminishing incidence rates of the disease through addressing the risk factors causing the disease.
2. **Secondary prevention** from the second type of diabetes through **Treatment, early detection of the disease** and its complications.
3. **Advancing quality** of the health services delivered to the patients suffering from diabetes and its complications.
4. **Detecting and following up**, and assessing patients through Diabetics' Registration Program, extent of adherence to the work quality levels, annual follow-up registers, patients' interviews, and healthcare registers of patients.
5. Improving on the **research tools and studies** related to the disease.
6. Enabling diabetics and their families to **contribute** to controlling diabetes and its complications.
7. **Community participation** in controlling diabetes.

Saudi Efforts in preventing and controlling diabetes

There are multiple sectors serving people with diabetes in Saudi Arabia both in the private and public sectors at primary, secondary, and third level preventions. Examples:

- Saudi Charitable Association of Diabetes.
- The Ministry of Health.
- National Guard Health Affairs.
- The Saudi Society of Endocrinology and Metabolism [under the umbrella of the Saudi Commission for Health Specialties.]

The National Preventive program's goals:

- Suggest research pertaining to diabetes.
- Work on creating a national registry for diabetes in Saudi Arabia.
- Suggest collaborations and coordination efforts on a local level, Gulf region level and international level to achieve set goals.
- Suggesting preventive and curative diabetes programs, as well as overlook their execution and development.
- Create sub-committees to follow up on created programs.
- Study reports form sub-committees, finalize them, and develop recommendations.
- Take decisions and develop recommendation in issues raised to the program.

Global efforts

The WHO had nations sign:

GLOBAL ACTION PLAN FOR THE PREVENTION AND CONTROL OF NONCOMMUNICABLE DISEASES 2013-2020

From the goals

- Halt the rise in diabetes and obesity.
- A 25% relative reduction in the overall mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases.

Sustainable development goals by the UN

- The Sustainable Development Goals (SDGs):
- A collection of 17 global goals set by the United Nations.
- The **third goal** is : Good health and well being, **related to maternal and child care**

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This summary was done by:

Rand Alrefaei

Wish you all

the best!

L9- Cancer

TRUE OR FALSE?

- **True or False:** Large percentage of cancers are preventable.
- **True or False:** Preventing cancer is easier than treating cancer.
- **True or False:** Screening tests are recommended for most cancers.

2nd leading cause of death globally

In Saudi Arabia there is no countrywide policy for colorectal screening despite the increasing incidence of the disease.

Screening for Cancer

Wilson-Jungner Criteria for Screening program:

- 1 The condition being screened for should be an **important health problem**.
- 2 The **natural history** of the condition should be **well understood**.
- 3 There should be a **detectable early stage**.
- 4 **Treatment at an early stage** should be of **more benefit** than at a later stage.
- 5 A **suitable test**² should be devised for **the early stage**.
- 6 The test should be **acceptable**.
- 7 **Intervals for repeating** the test should be determined.
- 8 **Adequate health service** provision should be made for the extra clinical workload resulting from screening.
- 9 The **risks**, both physical and psychological, **should be less than the benefits**.³
- 10 The **costs** should **be balanced** against the **benefits**

Screening for Liver Malignancy

- Patients with **cirrhosis** of any etiology, but especially cirrhosis caused by **hepatitis B or C**, are at high risk for the development of HCC and these patients should be the targets for a screening program.
- The best screening modality is **ultrasound** of the liver. **Every 6 months**

Screening for Uterine Malignancy

- **No evidence that screening reduces mortality** from uterine (endometrial) cancer.
- Most cases of endometrial cancer (85%) are diagnosed at an early stage because of symptoms¹, and survival rates are high.

Screening for Ovarian Cancer

- Example of a high-risk hereditary cancer syndrome, women with **BRCA1 or BRCA2** genetic mutations associated with **hereditary breast and ovarian cancer**.
- **Symptoms:**
 - **Menopause**
 - **Vaginal bleeding after menopause**

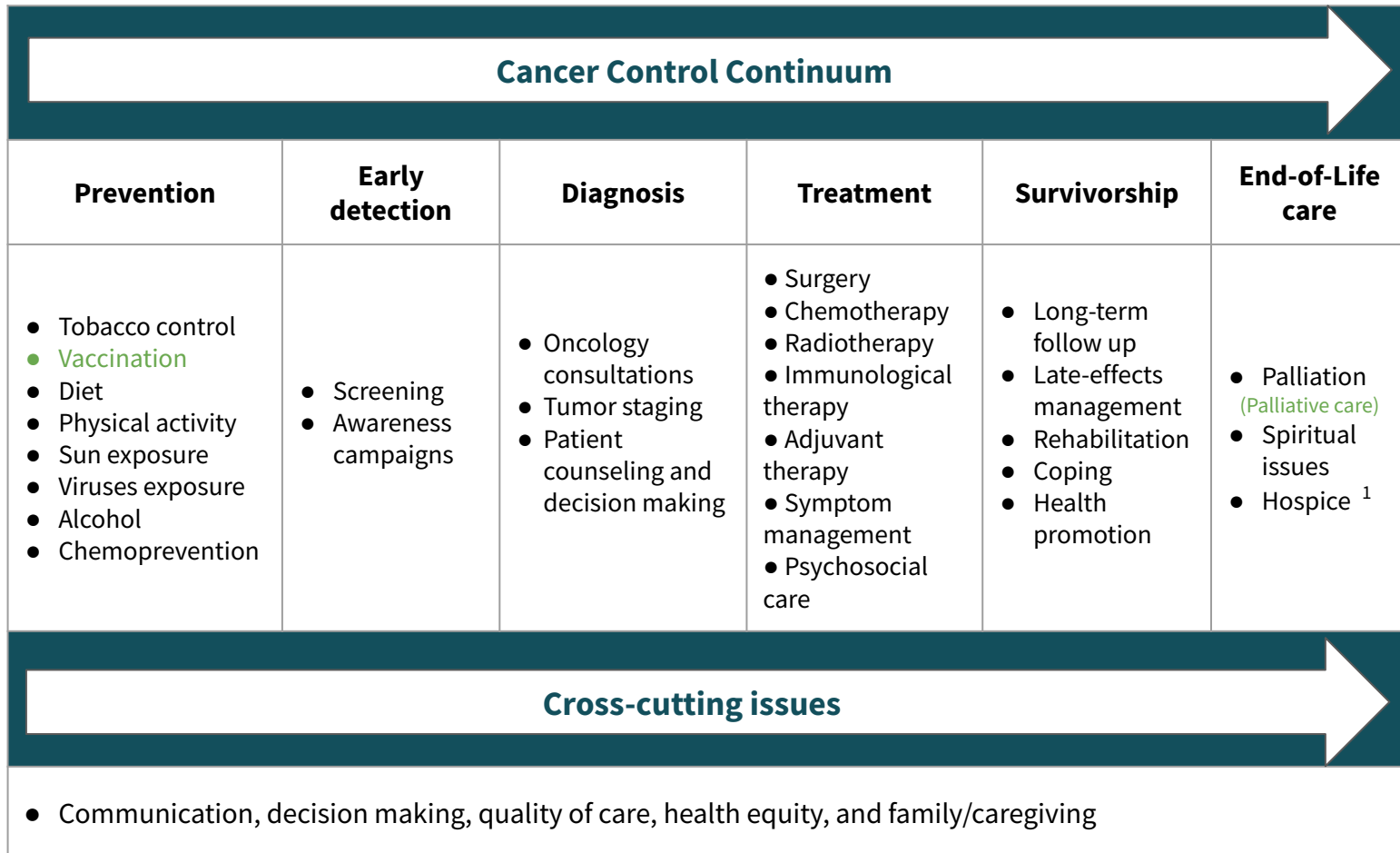
1-Symptoms include: unusual vaginal bleeding, spotting, or discharge. For premenopausal women, this includes menorrhagia, which is an abnormally heavy or prolonged bleeding, and/or abnormal uterine bleeding.

2- An example of suitable test is measurement of PSA levels. An example of an unsuitable test is bone marrow biopsy.

3- For example, mammogram can be painful the women; however, when comparing it to the danger of breast cancer and the benefit of early screening we'll notice that the benefits outweigh the risks

Cancer Control Continuum

- The cancer control continuum **describes the various stages** from cancer etiology, prevention, early detection, diagnosis, treatment, survivorship, and end of life, **it's multi-factorial on multiple levels**
- The cancer control continuum is **a useful framework** to view plans, progress, and priorities.
- It helps us **identify research gaps**, where we must collaborate with others to have an impact, and where more resources may be needed



Screening for Cancer

Wilson-Jungner Criteria for Screening program:

- 1 The condition being screened for should be an **important health problem**.
- 2 The **natural history** of the condition should be **well understood**.
- 3 There should be a **detectable early stage**.
- 4 **Treatment at an early stage** should be of **more benefit** than at a later stage.
- 5 A **suitable test** ² should be devised for **the early stage**.
- 6 The test should be **acceptable & appropriate** for the patient.
- 7 **Intervals** for **repeating** the test should be determined.
- 8 **Adequate health service** provision should be made for the extra clinical workload resulting from screening.
- 9 The **risks**, both physical and psychological, **should be less than the benefits**. ³
- 10 The **costs** should **be balanced** against the **benefits**

1. **(438)** Hospice care is a type of health care that focuses on the palliation of a terminally ill patient's pain and symptoms and attending to their emotional and spiritual needs at the end of life.
2. An example of suitable test is measurement of PSA levels. An example of an unsuitable test is bone marrow biopsy.
3. For example, mammogram can be painful the women; however, when comparing it to the danger of breast cancer and the benefit of early screening we'll notice that the benefits outweigh the risks (e.g. radiation risk)

Screening for Cancer

USPSTF Recommendation grades:

This table is for understanding the grades of recommendations

Grade	Recommend / against	Evidence from literature	Benefit to patients
A	Recommend	high	substantial
B	Recommend	high	moderate
		moderate	Moderate to substantial
C	Recommend selectively based on professional judgment + patient preferences.	moderate	small
D	against	Moderate to high	No benefit or harm>benefit
I	Unknown	Lacking, or poor quality, or conflicting	Benefit? Harm?

Breast Cancer Screening Recommendations ¹

Population	Recommendations	Grade
40 to 49 years	The decision to start screening <u>mammography</u> in women prior to age 50 years should be an individual one. Women with a <u>parent</u> , <u>sibling</u> , or <u>child</u> with breast cancer are at higher risk for breast cancer and thus may benefit more than average-risk women from <u>beginning screening in their 40s</u> .	C
50 to 74 years	<u>Biennial</u> screening <u>mammography</u> for women aged 50 to 74 years.	B
75 years or older	Current evidence is insufficient to assess the balance of benefits and harms of screening <u>mammography</u> in women aged 75 years or older.	I

Colon Cancer Screening Recommendations

Population	Recommendation	Grade (What's This?)
Adults aged 50 to 75 years	The USPSTF recommends screening for colorectal cancer starting at age 50 years and continuing until age 75 years.	A
Adults aged 76 to 85 years ²	The decision to screen for colorectal cancer in adults aged 76 to 85 years should be an individual one, taking into account the patient's overall health and prior screening history. <ul style="list-style-type: none"> Adults in this age group who have never been screened for colorectal cancer are more likely to benefit. Screening would be most appropriate among adults who 1) are healthy enough to undergo treatment if colorectal cancer is detected and 2) do not have comorbid conditions that would significantly limit their life expectancy. 	C

- For the general population it's not preferred before the age of 40
- It's a grey area

Screening for Cancer

Colorectal Cancer Modalities and Frequency

Test	Frequency (years)
Guaiac-based Fecal Occult Blood Test (gFOBT) looks for heme	1
Fecal immunochemical test (FIT) looks for globin , more sensitive than gFOBT	1
FIT-DNA*	1-3
Colonoscopy**	10
CT-colonography	5
Flexible sigmoidoscopy**	5
Flexible sigmoidoscopy +FIT	10

*Can detect altered DNA in the stool.
 **Common side effects of colonoscopy/sigmoidoscopy: perforation, bleeding, and infection.

Cervical Cancer Incidence in KSA

Table 3: Cervical cancer incidence in Saudi Arabia (estimates for 2012)

Indicator	Saudi Arabia	Western Asia	World
Annual number of new cancer cases	241	4,455	527,624
Crude incidence rate ^a	1.9	3.8	15.1
Age-standardized incidence rate ^a	2.7	4.4	14.0
Cumulative risk (%) at 75 years old ^b	0.3	0.5	1.4

Cervical Cancer Screening

Age group	Pap smear (cytology)	HPV testing	Grade
<21 years	Against screening		D
21-30 years		Against	D
	Recommended every 3 years		A
30-65 years	Recommended every 3 years		A
	Or recommend pap + hpv every 5 years		
>65 years	against screening if have had adequate prior screening and are not otherwise at high risk for cervical cancer.		A
Had Hysterectomy + removal of cervix + no prior high-grade precancerous lesion (CIN grade 2 or 3) or cervical cancer.: Against			D

Define "Adequate" cervical cancer screening?

Very Important!!

- ◆ **3 consecutive negative cytology (Pap smear) results.**
- ◆ **2 consecutive negative HPV results within 10 years before cessation of screening, with the most recent test occurring within 5 years.**
- ◆ **Screening may be clinically indicated in > 65 years for whom the adequacy of prior screening cannot be accurately assessed or documented.**
- ◆ **Secondary prevention of cervical cancer → pap smear every 3 years** (the main type of prevention nowadays and usually starts at 21 years old)
- ◆ **Primary prevention of cervical cancer → improve personal hygiene and birth control.** Gardasil 9 is an HPV vaccine approved by the U.S. Food and Drug Administration and can be used for both girls and boys. This vaccine can prevent most cases of cervical cancer if given before a girl or woman is exposed to the virus. **STD prevention, HPV vaccine has been added in our guidelines .**

Screening for Cancer

Screening for Hematological Malignancy

- There are **no routine screening tests** for hematologic malignancies (Lymphoma, Leukemia, .. etc)
- It is typical for a patient to seek medical treatment when **constitutional** symptoms appear.
- Can be discovered incidentally when a blood test (**leukocytosis**) is ordered for another reason
- **Common in Saudi Arabia**

Screening for Lung Malignancy

Most common malignancy in men worldwide

- **Screening patients for smoking:**
 1. Ask all your patients systematically if they smoke or not. Make it part of their **vital signs**.
 2. If a smoker is identified, implement smoking cessation guidelines. (**which is the 5A's**)
- **Screening for Lung Cancer:**
 - Age 55–77 years.
 - Smoking history ≥ 30 Pack Years.
 - **And** Active smoker or quit smoking less than 15 years ago.
 - Did not have chest CT scan the last year.
- **Screening modality: Low dose chest CT scan.**
→ Conventional chest CT radiation dose (7-8 mSv), low dose chest CT (1.4 mSv).

Screening for Prostate Cancer

- Men should have an opportunity to **discuss** the potential **benefits and harms** of screening with their clinician. (**Individualized choice**) but it's more recommended when there is +ve family history.
- Screening offers a **small potential benefit of reducing the chance of death** from prostate cancer in some men.
- Many men will experience **potential harms of screening**, including **false-positive** results that require additional testing and possible prostate biopsy; **overdiagnosis** and overtreatment; and treatment complications, such as **incontinence and erectile dysfunction**.
- It's not an aggressive cancer, usually patients die with it not from it

Population	Recommendation	Grade
Men aged 55 to 69 years	The decision to undergo periodic prostate-specific antigen (PSA)-based screening for prostate cancer should be an individual one.	C
Men 70 years and older	The USPSTF recommends against PSA-based screening for prostate cancer in men 70 years and older.	D

Screening for Thyroid Cancer ¹ **patient tend to be asymptomatic**

Population	Recommendation	Grade
Adults	The USPSTF recommends against screening for thyroid cancer in asymptomatic adults.	D

1. What we mean by screening is screening for asymptomatic people as a mean of secondary prevention. If the patient is symptomatic (has a goiter or hyperthyroidism or nodules) then we need to perform diagnostic tests for him.

Causes of Cancer

Causes of Cancer

Cancer is the result of the interaction between a **person's** factors and **3** categories of **external agents**

Personal Factors



Genetic ¹

Example: Family Hx and oncogenic genes



Age

Through two main mechanisms:
A- Cellular repair mechanisms become less effective as a person grows older.
B- Accumulation of external risk factors. ²

External Factors



Physical Carcinogens

Example: Ultraviolet and ionizing radiation.



Chemical Carcinogens ³

Example:

- Asbestos, components of tobacco smoke,
- aflatoxin (a food contaminant), and arsenic (a drinking water contaminant).
(also in rice so wash carefully)
- Diethylstilbestrol (DES) hormone is associated with vaginal adenocarcinoma**



Biological Carcinogens

Example:

- Bacteria → **H. pylori** causing stomach cancer
- Parasites → **S. haematobium** causing bladder cancer
→ C. sinensis causing biliary, gallbladder and pancreatic cancer
→ O. viverrini causing biliary, gallbladder and pancreatic cancer
- Viruses → EBV causing hodgkin and non-Hodgkin lymphoma, stomach and nasopharyngeal cancer
→ **Hep B/C** causing hepatocellular carcinoma
→ HHV-8 causing kaposi sarcoma and certain form of lymphoma
→ HIV causing Kaposi sarcoma and non-Hodgkin lymphoma
→ **HPV** causing anal, cervical, head, neck, oral, vaginal and vulvar Cancers
→ HTLV-1 causing T-cell leukemia and lymphoma
→ MCV causing Merkel cell carcinoma



جدول التطعيمات الوطني

التطعيم Vaccine	الزيارة Visit
• BCG • Hepatitis B • IPV • DTaP • Hepatitis B • Hib • Pneumococcal Conjugate (PCV) • Rota	الزيارة Visit 1 عند الولادة At Birth
• Hepatitis B (ب) • التثاقب البكتيري • التهاب الكبد (ب) • المستعمية النزلية • البكتيريا العنقودية الرئوية • فيروس الروتا	عمر شهرين 2 months
• DTaP • Hepatitis B • Hib • Pneumococcal Conjugate (PCV) • Rota	عمر 4 شهور 4 months
• IPV • DTaP • Hepatitis B • Hib • Pneumococcal Conjugate (PCV)	عمر 6 شهور 6 months

- Genetic testing has become crucial in some family related cancers such as BRCA1 and BRCA2 gene testing for breast and ovarian cancers
- As the person grows he accumulates more risk factors such as exposure to chemical carcinogens, UV radiation ...etc
- Asbestos can lead to mesothelioma and aflatoxin can increase the risk for liver cancer

Factors Affecting Cancer Control and Future Research

Factors Affecting Cancer Control

The following are important factors and trends affecting cancer control and the directions of future research

1- Tobacco Use

- **Raise tobacco taxes** to at least prevent tobacco products from becoming affordable.
- Tax all tobacco products to prevent consumers switching from highly taxed products to less taxed ones.
- Require by law and Enforce **100% smoke-free environments** in all indoor workplaces and public places.
- Put **health warnings** on all tobacco packaging.
- Establish a **national pilot cessation** program in health-care facilities
 - <https://www.moh.gov.sa/Ministry/Projects/TCP/Pages/default.aspx/> **CALL 937**
- **Build media awareness** of both the addictive nature of tobacco use and treatment options.

2- Unhealthy Diet, Physical Inactivity, Overweight and Obesity

- **Develop and implement national dietary guidelines** and nutrition policies.
 - Example: Restaurants should put calories.
- **Promote educational and information campaigns** about reducing salt, sugar and fat consumption.
- Develop and implement **national guidelines on physical activity**.
- Implement community-wide **campaigns** to promote the benefits of physical activity.
- **Promote physical activity** in workplaces. (give discount for gym subscriptions)

3- Alcohol

- Raise public awareness, especially among young people, about alcohol-related health risks, including cancer.

4- Hepatitis B Virus

- Implement **universal infant immunization** using one of the recommended immunization schedules.

5- Environmental Exposures to Carcinogens

- **Stop using** all forms of **asbestos**.
- Provide safe drinking water.
- **Reduce the use of biomass and coal for heating** and cooking at home, and promote use of clean burning and efficient stoves.
- Implement food safety systems (legislation and monitoring) focusing on key contaminants eg. SFDA.

6- Occupational Exposures to Carcinogens

- Develop regulatory standards and enforce control of the use of known carcinogens in the workplace.
- **Include occupational cancer** in the national list of occupational diseases.
- Identify workers, workplaces and worksites with exposure to carcinogens.

Factors Affecting Cancer Control and Future Research

Factors Affecting Cancer Control

The following are important factors and trends affecting cancer control and the directions of future research

7- Radiation

- **Provide information** about sources and effects of all types of radiation.
- Establish **national radiation protection standards** (using internationally available guidelines).
- Ensure **regular safety training** of radiation workers.
- Promote **UV risk awareness** and UV protection action.
- For example Dose limits for Ionizing radiation are:
 - for the public, 1 mSv/year.
 - for occupationally exposed persons, 20 mSv/year.

How are people exposed to UV radiation?

- **Sunlight:** the main source of UV radiation.
- **Sunlamps and sunbeds** (tanning beds and booths).
- **Phototherapy** (UV therapy):
 - UVA (320 to 400 nm) OR UVB, UVB is divided into:
 - Broadband (280 to 320 nm) **more carcinogenic**
 - Narrowband (311-313 nm)
 - The carcinogenic potential of narrow band UVB is less established.
- **Other:** (Black-light lamps, Mercury-vapor lamps, High-pressure xenon and xenon-mercury arc lamps, plasma torches, and welding arcs).



Display of background radiation in a hotel at Naraha, Japan, showing dose rate in microsieverts per hour, five years after the Fukushima disaster.



Personal radiation badge



Radiation protection clothes

L10- Travel Medicine

• Unintentional and intentional injuries:

- Road traffic injuries
- Injury in recreational water

- Interpersonal violence
- Animal bites (domestic and wild animals)

What is travel medicine?	An interdisciplinary specialty concerned with prevention , early detection, and research of health problems associated with travel. The main focus of travel medicine? Pre-travel preventive care	
What does travel medicine do?	<ul style="list-style-type: none"> • Seeks to prevent illnesses and injuries occurring to travelers going abroad. • Manages problems arising in travelers coming back or coming from abroad. • Impact of tourism on health and to improve health and safety services to tourists • Refugee and migrant health 	
Common diseases associated with international travel	Gastrointestinal Diseases: <ul style="list-style-type: none"> • Traveler's diarrhea • Typhoid fever • Hepatitis A • Cholera • Poliomyelitis Pulmonary Diseases: <ul style="list-style-type: none"> • Influenza • Meningitis • MERS-Cov • COVID19 • Tuberculosis 	Vector-borne Diseases: <ul style="list-style-type: none"> • Yellow fever • Malaria • Dengue fever • Leishmaniasis • Japanese encephalitis Behavior-related diseases: Sexually transmitted diseases Zoonotic Diseases: Rabies Blood-borne Diseases: Hepatitis B Soil Diseases: Tetanus



Responsibilities of **Travellers** to Prevent Ill-Health:

1) To Consult the General Practitioner

Before Departure	Timing: 4 to 6 weeks. Purpose: 1- medical evaluation. 2- receive preventive intervention . 3- travel advice. 4- Risk of assessment
After Arrival	1- have chronic diseases, 2- spent > 3 months in a developing country, 3- received treatment for malaria while traveling, 4- exposed to a serious infectious disease while traveling, 5- experienced illness in the weeks following return (fever, persistent diarrhea, vomiting, jaundice, urinary disorders, skin disease or genital infection).

2) Carry emergency medical kit, 3) Issue travel insurance, 3) Take precautionary measures such as in: food & water, environmental, injury and crime.

4) Check Status of Destination (its imp to know each warning level)

Warning level 1	Warning level 2	Warning level 3
Practice usual precautions Presence of usual risk for infectious diseases as diarrheal diseases and malaria	Practice enhanced precautions Presence of MERS-CoV in Arabian Peninsula	Avoid non-essential travel - Presence of outbreak (Ebola, COVID-19) and adverse security situation if returned from and infectious diseased country then the person should quarantine

L10- Travel Medicine

Preventative Measures for International travellers

1) Immunizations

Immunizations (internationally)

Routine: Childhood immunizations.

Recommended: According to risk of infection.

Required: 1) yellow fever vaccine, 2) meningococcal vaccine, 3) COVID-19 vaccine

Routine Immunizations in KSA



1. Hepatitis A
2. Hepatitis B
3. BCG
4. DPT
5. MMR
6. Polio
7. Pneumococcal
- 8. Meningococcal**
9. Rota virus
10. Varicella
11. Hemophilus influenzae

Routine Immunizations in other countries

1. Human papilloma virus
2. Tick borne encephalitis
3. Influenza

Required Immunizations

1. Yellow fever (international health regulation)
2. **Meningococcal meningitis:** by Saudi Arabia for Hajj and Umrah and seasonal workers.
3. Polio

Preventative Measures for International travellers


2) Chemoprophylaxis

Malaria Chemoprophylaxis

Transmission: Mosquito bite Malaria

Prevention: Awareness, Bite avoidance, **Chemoprophylaxis before, during and after traveling**, Diagnosis of febrile illness, **personal protective equipment**

Fever in returned traveler is a medical emergency considered malaria until proven otherwise

Drug	Area	Instructions of use
Proguanil	all areas	1 – 2 days before departure, <u>daily</u> during journey, & 7 days after return
 Doxycycline 100 mg	all areas	1 – 2 days before departure, <u>daily</u> during journey, & 4 weeks after return
Chloroquine 300 mg	chloroquine sensitive areas	1 – 2 <u>weeks</u> before departure, weekly during journey, & 4 weeks after return
Primaquine 30mg	predominant vivax areas & ovale	1 – 2 days before departure, <u>daily</u> during journey, & 7 days after return
Mefloquine 228mg	Used in chloroquine resistant falciparum mefloquine sensitive areas	2 <u>weeks</u> before departure, weekly during journey, & 4 weeks after return

Disease	Info	Recommended	Vaccination	Notes:
Hepatitis A	<p>Endemic in many developing countries & High mortality in elderly & pregnant women</p> <p>Prevention: Food, water, personal hygiene & immunization</p>	<p>-Travelers to the developing countries</p> <p>-2 years and older</p>	<p>Inactivated vaccines</p> <p>Dose (2 doses) (HAVRIX® or VAQTA®) (can combine immunoglobulins with the vaccine if needed)</p> <p>-Protection:</p> <p>14 – 20 years in children</p> <p>25 years among adults</p>	<p>Medicine Lecture:</p> <p>For healthy patients <40 years old, one dose before travel confers adequate protection.</p> <p>Consider immunoglobulin treatment for patients:</p> <ul style="list-style-type: none"> → Leaving in less than two weeks → Older. → Immunocompromised → Chronic medical conditions. → Under 12 months of age.
Hepatitis B	<p>Transmission: Blood- borne, sexual contact</p> <p>Prevention: Avoid risk factors & immunization</p>	<p>travelers to endemic areas and travelers with special risk</p>	<p>-Type: Recombinant vaccine, IM injection</p> <p>-Monovalent or combined with hepatitis A (for those ≥ 18 years)</p>	-
Cholera	<p>Transmission: Contaminated food or water</p> <p>Prevention: Food, water & personal hygiene</p> <p>Vaccination (oral)</p>	-	<p>Type: Oral vaccine (Live attenuated)</p>	-
Yellow fever	<p>Vector borne disease associated with international travel and addressed by the international health regulation (IHR)</p> <p>Required for travelers to a country under the International health regulations.</p>	<p>travelers to endemic area. Ex: Brazil</p>	<p>Type: Live attenuated virus vaccine</p> <p>Dose: Single subcutaneous injection</p> <p>Immunity: starts after 10 days</p> <p>Protection: Valid for 10 years</p>	<p>Contraindications:</p> <ul style="list-style-type: none"> Infants < 9 months Immunocompromised patients Pregnant women Egg allergies HIV-positive individuals

Disease	Info	Recommended	Vaccination	Not recommended
Meningococcal meningitis	Required: by Saudi government for Hajj or Umrah.	or travelers to endemic area. Risk: Sub-Saharan Africa (seasonal) Saudi Arabia (Hajj) Crowded student dormitory situations	Dose: Single dose (injection) Protection: effective protection for 3–5 years in adults and older children (must retake the vaccine after 3-5 years) Not effective: for children below 2 years	-

Disease	Transmission	Prevention	cause/risk
Typhoid	contaminated food and water	Food, water, personal hygiene & vaccination	By salmonella typhi, causes acute life-threatening illness
Polio	contaminated food and water.	<ol style="list-style-type: none"> Food, water, personal hygiene Vaccination: (injectable, oral). Travel to KSA from pakistan/afghanistan: Must be within the previous 12 months and at least 4 weeks prior to departure. All travelers from these countries will receive 1 dose of OPV at KSA border points upon arrival. 	Increases in travellers from pakistan and afghanistan
Japanese encephalitis	By mosquito bite same as malaria	vector control & vaccination	increases in travelers to <u>rural</u> Asia or long stay travelers
Rabies	Animal bite or scratch (especially dogs)	Immunization: 1) Pre-exposure vaccination, 2) postexposure vaccination plus immunoglobulin In case of animal bite on travel: wash area with soap & water, then consult physician immediately	occupational , travel to rabies risk countries
Tick-borne encephalitis	<ol style="list-style-type: none"> Ixodes sp. Ticks. Ingestion of unpasteurized dairy products. 	<ol style="list-style-type: none"> Tick prevention. Avoidance of unpasteurized dairy products. Vaccination. Self check and removal ASAP (tweezers). 	Rural forested areas of east and Central Europe, Russia and part of Asia.
Zika virus	mosquito bite	preventing mosquito bite	pregnant women → microcephaly and other brain abnormalities.
Traveler's diarrhea	One of the most common traveler's incidence.	<ul style="list-style-type: none"> Wash It, Peel It, Cook It, or Forget It Only Drink Bottled Water Wash hands frequently 	Bacterial (60-80%) Viral (10-20%) Parasitic -usually in devolping country- (5-10%)

L11- Introduction to Environmental Health & Hazards



Environmental Health

Environmental health is the science and practice of preventing human injury and illness and promoting well-being by:

- Identifying and evaluating environmental sources
- implementing policies and programs to reduce chemical and other environmental exposures in air, water, soil and food



Common Terminology in Environmental Health

- **Environment:** The complex of physical, chemical, and biotic factors that act upon an organism or an ecological community and ultimately determine its form and survival.
- **Ecological system (ecosystem):** Dynamic complex of plant, animal, and microorganism communities and the nonliving environment interacting as a functional unit.
- **Ecological model:** Proposes that the determinants of health interact and are interlinked over the life course of individuals.
- **Exposome:** The measure of all the exposures of an individual in a lifetime and how those exposures relate to health. *Similar to the genome. We're exposed to the environment from utero, and this exposure can result in illnesseses, disease. This cumulative exposure is referred to as the exposome.*



Water Pollution Diseases & Prevention

Water Treatment	<ul style="list-style-type: none"> • Processing of water takes place in water treatment plants • There are four stages of water treatment : coagulation, sedimentation, filtration, and disinfection. • Disinfection: Chlorination is the most commonly used method, but it produces a chlorine by-product which is bad for our health so were developing new technologies using UV, OZONE that have less of an effect • In saudi arabia we mainly use desalinated water.
Microbial Water pollution	<ul style="list-style-type: none"> • Human health effects occur due to ingestion or other contact with polluted water • Examples: Cholera, schistosomiasis (bilharzia) very common in egypt, cryptosporidiosis, cercariasis (swimmers itch) just from contact with your skin (penetrate the skin by cercariae), legionellosis (respiratory) from hot tubs or spas
Chemical Water Pollution	<p>Anthropogenic</p> <ul style="list-style-type: none"> • Point source: a stationary location or fixed (one location) facility from which pollutants are discharged. E.g. a pipe, industrial plant, ship • Nonpoint sources are diffuse pollution sources without a single point of origin. E.g. runoff rainwater washes all the dirt (agriculture, factories) and goes somewhere • Other examples: leaching of wastes into groundwater, lead leaching from old drinking-water pipes, and pharmaceuticals and personal care products (PPCPs) that are released into water from human sewage.
Water Sanitation and Hygiene (WASH)	<ul style="list-style-type: none"> • Clean water is water that is free from: disease-causing microbes, High concentrations of anthropogenic chemical contaminants (e.g. pesticides, nitrates, microplastics, other industrial pollutants), High concentrations of naturally occurring contaminants such as arsenic and fluoride • WASH associated health effects: Diarrheal diseases, Schistosomiasis, soil transmitted helminth and trachoma infections Respiratory tract infections. Malnutrition, Vector-borne diseases (e.g. Malaria) • E.coli needs to be quantitatively measured on regular basis to assess the safety of swimming in lakes • Surface waters (Lakes, streams) requires further treatment after disinfection, making it a challenge for humans in using it
Arsenic contamination in water	<ul style="list-style-type: none"> • Arsenic is naturally-occurring contaminant in groundwater • Long term exposure can cause skin lesions (arsenicosis) and cancer, exposure has also been associated with cardiovascular disease and diabetes • In utero and early childhood exposure is linked to negative cognitive development

L11- Introduction to Environmental Health & Hazards



Air Pollution Diseases & Prevention

The US has National Ambient Air Quality Standards, and from it they developed the 7 criteria air pollutants. Basically, they set up clear standards and regulations and see if these specific pollutants are meeting the standards or not.

Air pollutants **included** in the criteria

Carbon Monoxide (CO)

- **Odorless, tasteless, colorless gas.** By product of combustion.
- **Sources:** Primary sources are motor vehicles and anything with a combustion engine. Other sources: gas-powered stoves, space heaters, water heaters, generators, fireplaces, tobacco smoke, volcanoes, and forest fires.
- **Health effects:**
 - **Absorbed in the blood and displaces oxygen from hemoglobin to bind**
 - Fatigue, headaches, nausea, dizziness, disorientation, and visual and coordination impairment, angina, cognitive impairment and death.
- In movies when someone is sitting in a car with the exhaust plugged and they're trying to kill themselves, they're doing it via CO poisoning. The only way to detect it in homes is by using CO detectors since it is colorless and tasteless. Usually CO poisoning happens in the winter because that's when we use (faulty) heaters.

Particulate Matter (PM)

- **Solid or liquid particles suspended in air**
- **Sources:**
 - **Manmade:** Burning of fuels, driving unpaved roads, industrial activity, combustion process
 - **Natural:** **dust** (the primary contributor to PM in riyadh), mold, pollen, salt spray (in saudi, the main one is dust.)
- **Health effects:**
 - Larger particles deposit in mucous membranes
 - Smaller particles can be inhaled and penetrate into the lung and even blood stream (e.g. diesel exhaust)
 - Irritation of mucous membranes (eyes, throat, nose)
 - Respiratory symptoms
 - Exacerbation of chronic pulmonary and cardiac conditions
 - Increased ER visits, hospitalizations, and mortality

Sulfur dioxide (SO₂)

- Water soluble gas. Can be converted to sulfuric acid and contributes to **acid rain formation along with nitric oxide**
- **Sources:**
 - Primarily produced by power plants
 - Produced from burning sulfur containing fuels; e.g. coal
 - Natural sources are volcanoes
- **Health effects:** Respiratory symptoms, hospitalizations from cardiovascular and respiratory causes, eye irritation, adverse pregnancy outcomes, mortality

Nitrogen Dioxide (NO_x)

- Category of gases containing nitrogen and oxygen
- Produced through combustion when nitrogen in air is oxidized
- Precursors of tropospheric ozone and particulate matter
- NO is a greenhouse gas (a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect)
- **Sources:**
 - Motor vehicles, and power plants
 - Indoor kerosene heaters, non-vented gas stoves and heaters, and tobacco smoke.
 - Processes in soil, forest fires, and lightning

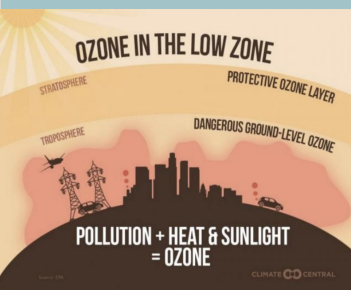
L11- Introduction to Environmental Health & Hazards

Air pollutants **NOT included** in the criteria

Volatile Organic Compounds (VOCS)

- Group of chemicals that readily evaporate at normal temperature and pressure
- Include benzene, chloroform, formaldehyde
- **Precursors of ozone**
- **Source:**
 - Produced from transportation, industrial processes
 - Half of VOCs are from transportation, particularly old poorly maintained vehicles. That's why in some countries, including Saudi Arabia, cars past a certain age on the road have specific regulations.
 - Naturally from vegetation; (an assemblage of plant species and the ground cover they provide)
- **Health effects:** Irritation of respiratory tract, headaches, **cancer**

OZONE



- Most of you know ozone as the ozone layer. That is called stratospheric ozone. The criteria ozone is tropospheric or ground-level ozone. **On particularly hot days, ground ozone increases.** They generally recommend that you check the weather on hot days, and it'll tell you the weather "ozone red day" or "ozone orange day", tell you the the level ozone so that particularly sensitive people do go outside or postpone it.
- **Ground level ozone is harmful, but the ozone layer is protective (GOOD UP HIGH...BAD NEARBY)**
- **Source:** Tropospheric ozone is formed from VOCs and Nox with sunlight, concentrations are seasonal increasing during hotter months
- **Health effects:** Respiratory symptoms, decreased lung function, Increased ER visits and hospitalizations, **children and asthmatics are particularly sensitive**
- **Biological consequences of ozone depletion:** Increase skin cancer, cortical cataracts, reduction of plankton populations (**extra, but in gifts**)

Urban Air Pollution

- Include pollutants such as sulfate, nitrates and black carbon
- **Source:** Residential energy for cooking and heating, vehicles, Power generation, Agriculture/waste incineration, Industry.
- **Health effects:**
 - 91% of premature deaths occurred in low and middle-income countries
 - Contributes to the burden of disease from stroke, heart disease, lung cancer, and **both** chronic and acute respiratory diseases, including asthma.

Indoor Air Pollution

- Disproportionately affects poor in low- and middle-income countries **cooking in unventilated huts**
- **Source:** open fires and simple stoves fueled by kerosene, biomass, or coal for cooking
- How to make fire? **Fuel, ignition, oxygen**
- **Health effects:** pneumonia, stroke, **ischaemic heart disease, COPD, lung cancer**

Dust and Sandstorms

- Common weather events in arid and semi-arid regions
- **Source:** Winds lift large amounts of sand and dust from bare, dry soils. Dust particles can contain various hazardous materials
- **Health effects:** Respiratory conditions, CVD, Increased ER visits, Increased mortality

Air Pollution Prevention

- **Standards and regulations:**
 - National Ambient Air Quality Standards (NAAQS)
 - Removal of lead from gasoline
 - Regulating Co2 emission from vehicles
 - Cap and trade approach
 - Regulations targeting environmental change (e.g. desertification)
- **Education & awareness:** ozone action days, carbon mom]noxide awareness month

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
When the AQI is in this range:	...Air quality conditions are:	...As symbolized by this color:
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for sensitive groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very unhealthy	Purple
301 to 500	Hazardous	Maroon

L12- Introduction to Occupational Health

Occupational Health

- It is the promotion and maintenance of the highest degree of physical, mental, and social Well-being of workers in all occupations by preventing departures from health, controlling risks and the adaptation of work, and people to their jobs.

Industrial Hygiene

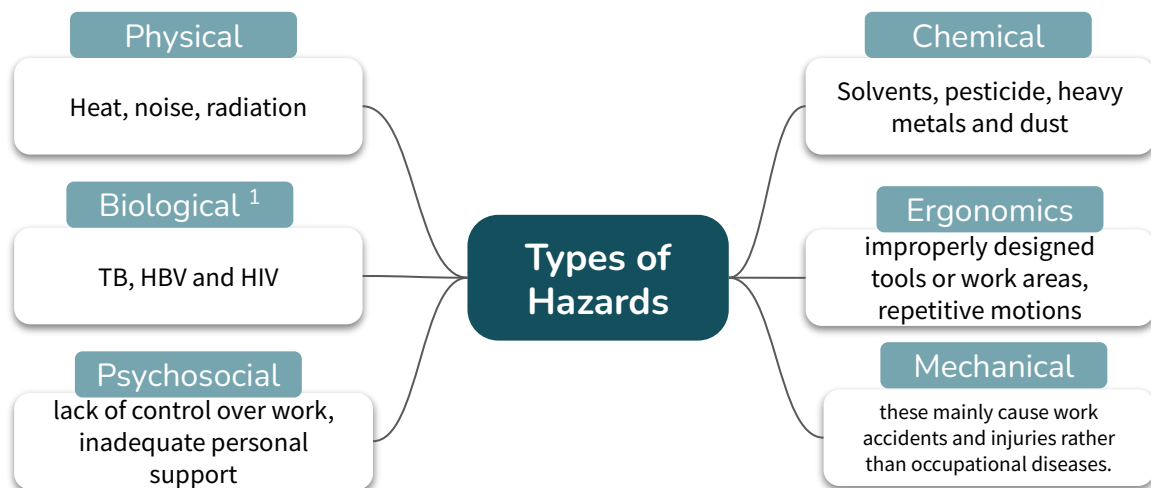
- Activities directed to **identifying, assessing, preventing, and managing hazards** to the worker. In the working environment, falls in the domain of Occupational Safety and Health (OSH).¹
- These activities should be systematic and scientific.

Ergonomics

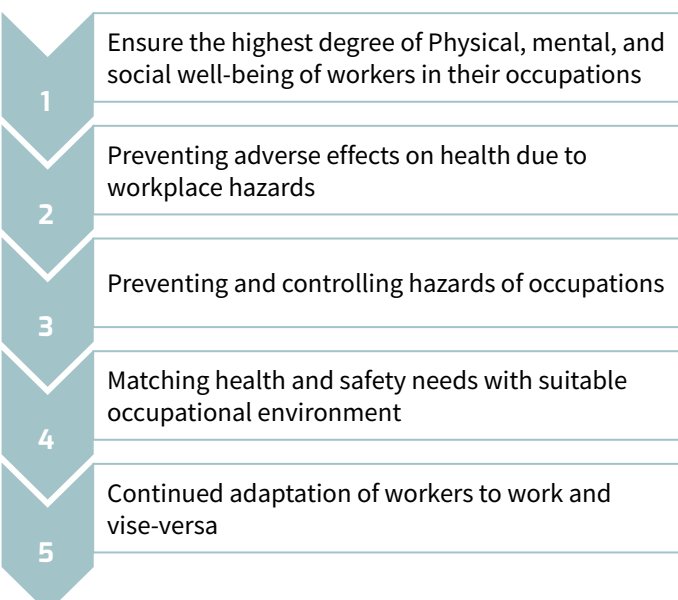
- Stress evaluation occurring in a work environment and the ability of people to cope with these stresses.²
- Designing suitability, the facilities, furniture, equipment, tools, and job demands to make them compatible with the work-force capabilities and limitations.
- Example: having a rest support under the wrist can prevent carpal tunnel syndrome

Occupational Diseases

- Occupational diseases are adverse health conditions in the human being, the occurrence or severity of which is related to exposure to factors on the job or in the work environment.



Aims of Occupational Health and Safety:



Characteristics of Occupational Diseases:

- The **clinical and pathological presentation** are **identical** to that of non-occupational diseases; Example: asthma
- Occupational disease may **occur after the termination of exposure**. Example: asbestos-related mesothelioma (a cancer affecting the lung and abdomen) which can occur 30 or 40 years after the exposure.
- The clinical manifestations of occupational disease are related to the **dose and timing of exposure** ² Example: at very high airborne concentrations, elemental mercury is acutely toxic to the lungs and can cause pulmonary failure, while at lower levels of exposure, elemental mercury has no pathologic effect on the lungs but can have chronic adverse effects on the central and peripheral nervous systems.
- Occupational factors can **act in combination** with non-occupational factors to produce disease Example: exposure to asbestos (five-fold increase in lung cancer); and the long-term smoking of cigarettes (increases the risk by 50 and 70 fold).

Types of Hazards

Physical Agents	
Factor	Description
Heat ¹	Heat hyperpyrexia, exhaustion, syncope, cramps, burns
Cold	Trench foot (gangrene in feet of soldiers who worked in trenches), frostbite
Light	Occupational cataracts, miner's nystagmus
Pressure	Caisson disease ² , air embolism, blast (explosion)
Noise	Occupational deafness maximum permissible noise exposure for 8 hours/day is 90
Radiation	Cancers, leukemias, aplastic anemia, pancytopenia
Mechanical Factors	Injuries, accidents
Electricity	Burns
Chemical Agents	
"reaction delay for exposure is seconds"	
Gases: CO ₂ , CO, HCN, N ₂ , NH ₃ , HCL Chemicals: Acids, alkalis, pesticides	Occupational cancers: Skin, lung, bladder Occupational dermatosis: Dermatitis and eczema
Dusts (pneumoconiosis)	Coal dust (anthracosis), silica (silicosis), asbestos (asbestosis, Ca lung), iron (siderosis) Cane fiber (bagassosis), cotton dust (byssinosis), tobacco (tobacossosis), hay or grain dust (farmer's lung)
Metals and their compounds	Toxicity from Lead, mercury, cadmium, mercury, arsenic
Chemicals	
Other Agents	
Biological agents	Brucellosis, leptospirosis, anthrax, tetanus, encephalitis, fungal infections
Ergonomic hazards	Back pain, joint issues, carpal tunnel disease, chronic muscular pain, pain syndromes, Prolapsed disc
Psychological origin	Industrial neurosis, hypertension, peptic ulcer

Pulmonary Dust Disease

Pneumoconiosis



- Pneumoconiosis is a disabling pulmonary fibrosis that results from the inhalation of various types of inorganic dust, such as silica, asbestos, coal, talc and china clay.

Example: silicosis and asbestosis (the two most important causes of pneumoconiosis)


Types of Pneumoconiosis:

1 Asbestosis

Long time ago, insulators were made of asbestos. Asbestos is an important risk factor for mesothelioma which can present with chest pain (pleuritic) and SOB with unexplained weight loss.

Description	Inhalation of asbestos fibres	
Occupations	<ul style="list-style-type: none"> Mining and extraction Exposure to asbestos (insulation) making of asbestos cloth (soldiers clothes) (fireproof) manufacture of asbestos cement pipes and other products, Such as vinyl floor tiles, in brake and cloth lining 	
Presentation	<ul style="list-style-type: none"> Interstitial fibrosis of the lungs, pleural thickening, calcification. Bronchogenic carcinoma, pleural and peritoneal mesothelioma Progressive dyspnoea on exertion frequently out of proportion to the clinical signs in the lungs, cough, expectoration, chest pain, cyanosis and clubbing of the fingers 	
Diagnosis	<ul style="list-style-type: none"> Asbestos bodies in sputum (asbestos fibres coated with fibrin) X-ray shows ground-glass appearance in the lower 2/3 of the lung → 	
Progression	Progressive disease	
Prevention	Prevention and periodic examinations (gift option: do chest x ray every 6 months for a pt who has been working in fireproof coating industry)	

2 Silicosis

Description	Absorption of high amount of crystalline silica (SiO ₂)	
Occupations	<ul style="list-style-type: none"> Mining , Coal, mica, gold, silver, lead, zinc Stone cutting and shaping, sandblasting , Building and construction areas Glass manufacture Iron and steel industry Ceramic workers and manufacturers 	
Time	7-10 years, sometimes less. Prolonged exposure to higher concentrations of dust	
Presentation	<ul style="list-style-type: none"> Dyspnoea on exertion, irritant cough and chest pain Pulmonary tuberculosis (silicosis can activate latent TB) Cardiac or respiratory failure Impaired TLC (total lung capacity) in advanced disease 	
Diagnosis	<ul style="list-style-type: none"> X-ray shows snow storm appearance (Scattered micro-opacities and might also present with cavitation in upper lobe of the lung because of TB activation) 	
Progression	Progressive (irreversible) disease and converts to TB "silico-tuberculosis"	
Prevention	Prevention and regular physical examinations <ul style="list-style-type: none"> Education about the importance of protection 	

Lead Poisoning (Plumbism)

- Defined as **lead level of 70 µg/ 100 ml** with clinical signs and symptoms
- Occupational usage (Industrial): Storage batteries, glass, ship building, printing and potteries, rubber
- Non-occupational : **Gasoline**, drinking water via **lead pipes, paints** (shine in paints), toys

The Delay exposure to lead occurs in weeks to months

Modes of absorption:

Inhalation of fumes and dust

Ingestion through food or drink

Skin absorption "tetraethyl lead"

Clinical features:

Organic Lead	Insomnia, headache, mental confusion and delirium
Inorganic Lead	Plumbism (lead poisoning), abdominal colic, obstinate constipation (very severe), loss of appetite, blue lines on the gum, anemia and wrist and foot drop

Lab diagnosis:

- Coproporphyrin in urine (screening test)
- Amino levulinic acid in urine
- Lead levels in blood and urine
- Basophilic stippling of RBCs (very sensitive)

Methods of prevention:

- 1 Substitution (with other materials)
- 2 Isolation (segregate procedures with risk)
- 3 Local exhaust ventilation
- 4 Personal protection (should be disposed of after finishing)
- 5 Periodic examinations (through coproporphyrin in urine)
- 6 Health education and personal hygiene (handwashing)

Occupational Cancers

Carcinogenic agent	Organ affected
Arsenic	Skin and lung
Chromium compounds, hexavalents	Lung
Nickel	Lung and nasal sinus
Polycyclic aromatic hydrocarbons	Skin
Coal tars	Skin, scrotum, lung and bladder
Benzol	Blood (leukaemia)
B-naphthylamine	Bladder
Ionizing radiation	Skin, bone, lung and blood (leukaemia)
Asbestos	Lung, pleura, peritoneum

Occupational Dermatitis

Causes:

- Heat, cold and moisture
- Friction and pressure
- X-rays
- Acids, alkalis, solvents, grease, tar and pitch
- Bacteria and fungi
- Leaves, vegetables and fruits

Prevention:

- 1 Pre-selection (pre-employment check)
- 2 Protection (protective equipment)
- 3 Personal hygiene
- 4 Periodic assessment (usually every 6 months)

Classification Primary Irritants and Sensitizing Substances

Radiation Hazards

Industrial Exposures:

- Manufacture of radioactive paints
- Painting of luminous dials for watches
- Mining of radioactive ores and sand workers
- X-rays rooms

Effects of Radiation:

Acute	Acute burns, dermatitis and blood dyscrasias
Chronic	Malignancies (carcinogenic effect) and genetic effects

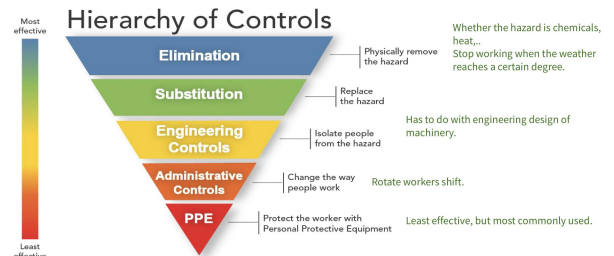
Prevention:

- 1 Shielding in x-ray areas, monitoring 6 monthly, for their film badge or pocket electronic device, adequate workplace ventilation, replacement and periodic exams. (badges are available)
- 2 Pregnant ladies should not be allowed to work in the area.

Control and Prevention of Occupational Hazards



1. **Hierarchy of controls**
2. Regular workplace inspections (Conducted by OSHA)
3. **Medical examinations and screening** (For early detection and management)
4. Establishing effective and consistent reporting and notification system for workplace injury and disease (To collect data)
5. Education of workers and managers
6. Government enforcement of regulations and standard
7. Workplace licensing to operate
8. Supporting continuous research efforts

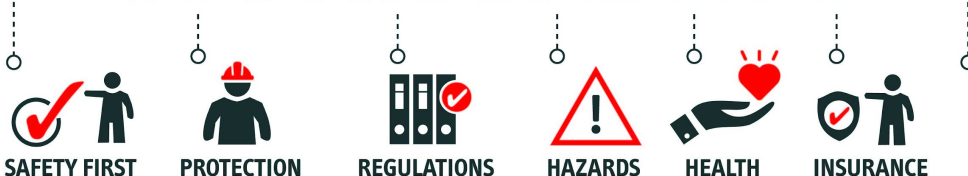


Prevention of Occupational Disease

Prevention of occupational diseases should be addressed by different measures including:

Field	Measurements
Medical	<ul style="list-style-type: none"> • Pre-placement exams • Periodic examinations • Medical and health care services • Notifications, employees should notify the employer with all diseases he has • Supervision of working environment • Maintenance and analysis of records • Health education and counseling
Engineering	<ul style="list-style-type: none"> • Designing of the buildings build good exhaust systems • Good housekeeping • General ventilation ACs, windows, ...etc. • Substitution any harmful substance used should be replaced • Dusts • Enclose • Isolate • Local exhausts ventilations • Protective devices based on the occupation • Environmental monitoring • Research
Legislations	<ul style="list-style-type: none"> • Policies and regulations for factories, work places, health of the workers • <u>Example:</u> insurance, sickness policies and disability benefits

WORK SAFETY



L13- Mass-Gathering & Related Hazards

Definitions



Mass gatherings (MGs)

1. Are events attended by **temporary large numbers of individuals, concentrated in a specific area for a specific purpose** and over a **limited** period of time (define period of time) ¹
2. Are events attended by a sufficient number of people to strain the planning and response resources of the host community, state/province/, nation, or region where it is being held.
3. **The World Health Organization (WHO)** definition also takes a broader view of mass gatherings to include the public health dimensions and **defines mass gatherings as events attended by a sufficient number of people to potentially strain the public health resources of the community, city, or nation hosting the event.**
 - Number of participants: **>1000 persons**, although most literature suggests >25000 persons

Mass gatherings medicine

- is an **area of medicine that deals with health aspects during mass gatherings** including the health effects and risks of mass gatherings and strategies for effective health services delivery during these events.
- The formal discipline of mass gatherings medicine was launched at the World Health Assembly of Ministers of Health in Geneva in May **2014**.

Examples of mass gatherings

Hajj ²



The London Olympics 2012

- 10,250 Olympic athletes \ 4,000 Paralympic athletes \ 20,000 press and media \ 180,000 spectators/day
- 17,000 people living in the Olympic Village
- Estimates of 4.5 million visitors to London
- 26 Olympic sports in 30 venues
- 20 Paralympic sports in 21 venues

Types of Mass-gathering

Fairs, exhibitions
(World Expo
Shanghai)

Concerts, festivals
(Riyadh season,
Glastonbury, UK)

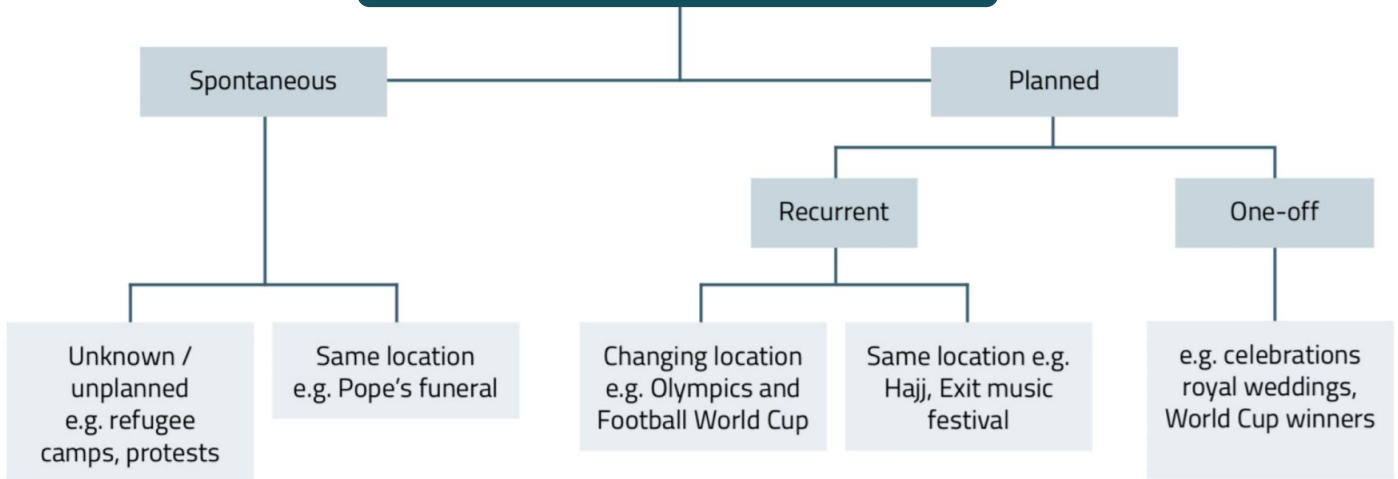
Sports (Olympics)

Religious (Hajj)

Political (G20)

1. In other words, its when a lot of people are in a confined space **for a limited time. Not like every day crowded places example: Mong Kok in Hong Kong**
2. During Hajj, the country hosts millions of people. This confined area creates a risk for hazards that threatens public health to spread and injure those people. Such mass gatherings require huge planning and preparation and identifying potential risks and figuring ways to overcome them.

Categories of Mass-gathering



Where is the risk in MG?

- Mass gatherings can pose several significant public health challenges to the health and security authorities **both within the host country and abroad.**
- They place additional pressures on health systems, which must operate for the duration of the mass gatherings stretched to surge capacity.¹
- Require intersectoral approaches to risk mitigation and coordination and cooperation across multiple disciplines, agencies, sectors, and ministries

MG characteristics that represent public health risk

Higher population concentration

- Diversity of population characteristics²
- Different communities/ parts of the world/ regions
- Imported diseases
- Epidemic prone diseases
- Different health-related behavior

Pressure on infrastructure

- Hotels
- Food sales
- Healthcare system aviors

Environmental conditions

- Heat/ cold
- Vectors of diseases

Political attention

- Terrorism/ bioterrorism

Risk of Outbreak

- The importation of infectious diseases during a mass gathering may result in outbreaks.
- Mass gatherings health deals with the diverse health risks associated with mass gatherings including **transmission of infectious disease**, non-communicable disease, **trauma** and injuries (occupational or otherwise), environmental effects (such as, heat-related illnesses, dehydration, hypothermia), illnesses related to the use of drugs and alcohol and deliberate acts, such as terrorist attacks

Examples of outbreaks

Year	Location	Event	Cause	Deaths	Injuries
1993	Madison, WI, USA	Football game (12 000)	Crowd crush	0	69
1994	Athlone, South Africa	Political rally (20 000)	Crowd surge	3	21
1994	Mecca, Saudi Arabia	Religious festival (2 500 000)	Crowd surge	270	Unknown
1994	Baytown, TX, USA	Sports event	Grandstand collapse	1	17
1994	Saugerties, NY, USA	Rock festival (350 000)		2	7500
1995	Rio de Janeiro, Brazil	Rock concert (3 500 000)		Unknown	Unknown
1996	Cleve, Australia	Circus	Stand collapse	0	48
1997	Mecca, Saudi Arabia	Religious festival	Fire	343	2000
1997	Tel Aviv, Israel	Sports event	Bridge collapse	4	Unknown
1997	Ciudad del Este, Paraguay	Political rally	Structural collapse	38	100+

1. For example Iran facing the coronavirus their healthcare system collapsed
 2. Age, gender, disabilities, comorbidities...etc

Risk assessment ¹

1 Risk identification (depending on event assessment)

2 Risk characterization (impact, likelihood)

3 Risk management (surveillance and response)

The aim of risk assessment is to:

- Know the risk **by** risk assessment, identification
- Know when it happens **by** surveillance
- Know what to do when it happens **to prepare** a response

Risk assessment

1 Risk identification

Dr: You will be asked to **assess the risk of an event**, like this example.

Host country context assessment

- Systems: need for enhancement in surveillance, testing, reporting, response and command, control and communication
- Training: responsibilities
- After we finished assessing the event **we need to identify the risks based on event assessment**
- Population factors: immunity (hosts, visitors)
- Baseline status for CD

Event assessment

Type: Religious event

Season: summer

International

Venue: indoor

Venue: temporary

Catering: informal

Hygiene: hand washing stations

Risk identification

Older population with NCD, in-site medical care

Risk of dehydration, heat stroke

Imported diseases

Poor air circulation

Poor infrastructure

Risk of foodborne illnesses

Decreased risk of infections

2 Risk characterization

- After identifying the risk we need to characterize its impact on the mass gathering and public health (minimal-severe).
- **In other words, what is the risk likelihood?**

	Potential impact on Mass Gathering	Potential impact on public health
Minimal	Little or no consequence or disruption to the MG	Little or no consequences
Minor	Small impact on MG can be managed with little impact on the event	Few illness or injuries which public health and medical services can manage
Moderate	Some controlled impact on the Games and reputation for host	Death and or injuries or illness occur. Public and medical services are strained
Major	Event is disruptive to MG and reputation of host	Many deaths, injuries or illness. Disrupts public health and medical services
Severe	Event causes cancellation of some or all of MG. Significant adverse impact on MGs and host reputation.	Substantial loss of life and serious injuries or illness. Widespread disruption of local services and infrastructure

Why risk characterization?

- If the risk estimate that a particular event will occur is highly uncertain, **risk management decisions might be more conservative** than in the case of an event deemed to be highly likely ²

Then what? (we do surveillance to reduce the risk)

- Once the risks have been mapped on the risk matrix, the objective of public health planning for the MG will be to reduce the likelihood of a threat occurring and to reduce the consequences of each threat: risk management

1. Risk assessment starts with risk identification through assessing the type of event. For example, if the event was religious (ex. Hajj) you need to expect elderly and people with comorbidities to gather. After identifying the risk we need to characterize it whether it's major or minor risk. Depending on the risk characterization, a plan must be developed to manage it.
2. We always need to prioritize the risks we identified after we assessed the mass gathering. Because we can never deal with all risks.
3. **climate change? Respiratory allergies and airway diseases**

- What mitigation measures can be put into place to manage the risk and reduce either the probability or impact?

Management can include:

- Initiating **new surveillance programmes**
- Implementing a range of **special prevention** (risk of food-borne, waterborne, airborne and person-to-person spread of diseases)
- Developing **plans for immediate acquisition** of additional human and material **resources** should a crisis occur

Surveillance in MG

When planning surveillance for the MG, the questions that public health authorities are likely to ask are:

1. What diseases or syndromes should surveillance be conducted for and what is the risk of these?
2. What is the best type of public health surveillance system(s) to use? (timeliness and sensitivity)
3. What are the special considerations for outbreak or public health response?

Preparing a surveillance plan

1. Identify monitoring resources at all levels
2. Define conditions to look for
3. Establish priorities
4. Set threshold / alert levels
5. Identify mechanism for prompt investigation and feedback
6. Link notification and response plan

Diseases with the following characteristics should be considered for surveillance:

1. Have an outbreak potential (modes of transmission enhanced in the MG e.g. **respiratory spread**)
2. Are known to be of particular potential use as bioterrorism agents
3. May cause severe illness and require investigation and / or the application of control measures even for a single case
4. Imported diseases not usually seen in the host country (especially drug-resistant organisms and unusual serotypes)
5. Endemic diseases for which event attendees may have no immunity.
6. Highly infectious diseases (e.g., **norovirus or measles**).
7. Diseases or events that need to be reported under the IHR (2005).

Surveillance Problems posed by MGs

1. Short time – problem for collecting information – systems sensitive and responsive
2. Large, diffuse and highly varied population Include diseases not normally surveyed?
3. People arrive from/return to many locations
4. Multiple opportunities for exposure: air travel – food – water – physical contact
5. Varying health surveillance capabilities of – host nation– originating nation(s)
6. Tracking (time/location) and notification – not just in location, but after returning

MG Planning

A safe and healthy MG requires

- Early multi-sectoral preparation involving:
 - event organizers
 - health emergency managers
 - public health authority representatives
 - local hospital emergency departments
 - first-aid personnel
 - other sectoral partners (e.g. police, emergency services, security services)
- Depends on risk assessment and risk identification
- **Medical care needs to be offered at the mass gathering but local care needs to be maintained as usual**

Legacy and Evaluation

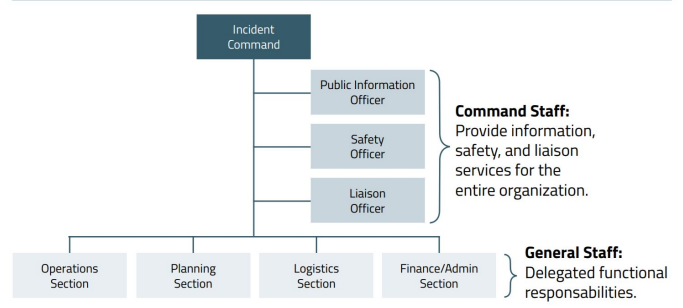
- The wealth of knowledge and expertise generated from mass gatherings can drive best health promotion, education, and risk mitigation strategies and optimize the planning and delivery of effective health services during future mass gathering events.

Response

Establish a major incident response system

- Well rehearsed multi-agency and cross government response systems.
- Effective liaison across health sector.
- Public health engagement with: – Police & other emergency services (threat assessment, incident response) – Central government (threat assessment, preparedness, response) – Intelligence services (threat assessment).

Figure 2: Incident Command System (ICS) structure



WHO's role in mass gatherings

WHO provides advice and technical support to host governments preparing for mass gathering events.

How does WHO provide support to Member States for mass gatherings?

- To provide advice and technical support to Member States that are hosting mass gatherings, **WHO draws on 5 WHO Collaborating Centres for Mass Gatherings and a Virtual Interdisciplinary Advisory Group (VIAG)**. VIAG is an informal network of mass gathering experts. Their role is to **share expertise on public health requirements** and best practices with any organization considering hosting a mass gathering event.

Activities to support host governments of mass gatherings often include:

- Prior to the event: all-hazard risk assessment, travel medicine and activities to encourage increased physical activity, cessation of tobacco use and avoidance of excess alcohol.
- During the event: international monitoring of potential disease spread and risk assessment, emergency medical services and hospitals and plans to manage fan zones.
- After the event: capture lessons learnt and share expertise with future mass gathering hosts

What governs WHO's work on mass gatherings?

- The decision states that the WHO "Director-General should, where appropriate, work closely with Member States that are planning and conducting mass gatherings to support cooperation and communication between the concerned health authorities in each country, and help Member States strengthen capacities to better utilize the International Health Regulations (2005)".

Does WHO have the power to cancel or move mass gatherings?

- WHO may provide advice and technical guidance to host countries on public health risks, **but has no decision power to uphold, cancel or postpone mass gatherings hosted by Member States.**

Q- A planned combination of educational, political, regulatory, and organizational supports for actions and conditions of living conducive to the health of individuals, groups, or communities is the definition of ?

Health promotion

TBL - Outbreak Investigations

★ Key Terms ★

Sporadic	A disease that occurs infrequently and irregularly, separated widely in space and time
Endemic	<ul style="list-style-type: none"> • A disease that affects individuals at a relatively constant rate within a specific population in a given region (ex: brucellosis in KSA) • Unlimited time, limited geographic area
Hyperendemic	Persistent, high levels of disease occurrence.
Epidemic	<ul style="list-style-type: none"> • The occurrence of more cases of disease than expected in a given area or among a specific group of people over a particular period of time. Usually, the cases are presumed to have a common cause or to be related to one another in some way. • Limited time, limited geographic area
Outbreak	<ul style="list-style-type: none"> • Epidemic limited to localized increase in the incidence of disease • Occurrence of more than usual number of cases of a disease
Cluster	Aggregation of cases in a given area over a particular period without regard to whether the number of cases is more than expected.
Pandemic	<ul style="list-style-type: none"> • An epidemic that has spread over several countries or continents, usually affecting a large number of people (e.g. influenza H1N1) • Limited time, unlimited geographic area

Outbreak Settings

Food-borne Outbreaks	<ul style="list-style-type: none"> • The most common outbreak is in a food borne setting • A food-borne outbreak is generally considered to exist if there are <u>more than two reports of a similar illness from the same food source</u>, frequently in a restaurant or at a community dinner. • A food-borne outbreak may have a widely varied number of cases, and has no seasonal distribution. • While the food borne outbreak is the most common, in only about 50% of the outbreaks is the food culprit identified, so a large number of these outbreaks go unsolved.
Water-borne Outbreaks	<ul style="list-style-type: none"> • Infection occurs by either ingesting contaminated water or swimming in contaminated water In disease that occurs from a water-borne outbreak, infection occurs by either ingesting water contaminated by pathogens or by swimming in water contaminated by pathogens. • Most often, these outbreaks are common source types. • The most common agents responsible for water-borne outbreaks are norovirus, Shigella, Giardia, Cryptosporidiosis, and E. coli.
Community/Institution Acquired	<ul style="list-style-type: none"> • The most widely varied of the outbreak settings • Include most all types of infectious diseases; respiratory diseases and gastrointestinal diseases. • Transmitted most often by person-to-person transmission in schools, hospitals, daycare, nursing homes, prisons, and high density living areas such as military barracks, hotels, and even airplanes. • Some common agents that cause the diseases acquired in a community setting include norovirus, varicella, influenza, rhinovirus, parasites, and adenovirus.

TBL - Outbreak Investigations

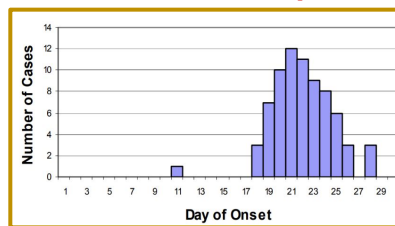
★ Epidemic Patterns ★

Common Source

- All cases of the infectious disease are acquired from the **same source in a limited period of time and in a limited geographical location.**
- It is also characterized by very minimal (or zero) transmission from person to person.
- **Generally, a common source outbreak has a smaller number of cases than a propagated outbreak and is often caused by contaminated food or water.**
- A typical example of a common source epidemic is a foodborne illness caused by exposure to one specific food or restaurant.
- **Common source epidemics are usually characterized by a dramatic single “peak” of cases.**
- Many common source outbreaks go unreported since they are generally small in numbers and often don't come to the attention of public health authorities.

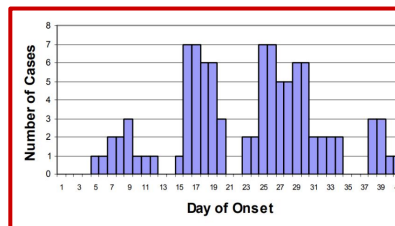
Common Source “Point”

Everyone becomes ill within one incubation period



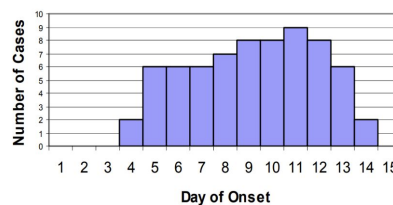
Common Source “Intermittent”

Intermittent nature of the exposure



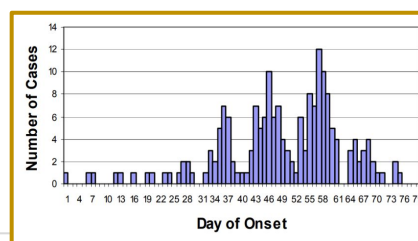
Common Source “Continuous”

Exposed over a period of days, weeks, or longer



Propagated

- **Characterized by an outbreak that continues over an extended period of time.**
- This outbreak has individuals exposed to the original source, but then will also have secondary infections in individuals exposed to those initially ill people via person-to-person spread.
- The propagated epidemic usually lasts for a longer period of time and **has various numbers of “peaks” of cases over time.**
- The initial source often resolves, but the outbreak continues by affected persons infecting other persons.
- Propagated outbreaks often **result in larger numbers of cases than common source outbreaks.**



TBL - Outbreak Investigations

Steps of Outbreak Investigation

Identify that a problem exists

Confirm the Diagnosis

- Symptoms need to be reviewed.
 - Disease must be properly diagnosed
 - Ensure suspected illness is properly diagnosed
 - Confirm laboratory results/rule out errors

Confirm the Existence of an Outbreak/Epidemic

- Very important to establish that the disease being seen in the community is in fact an outbreak Investigations can be costly and time consuming
 - Normal rate of illness in the population must be known

Measure the problem

Define a Case and Count Cases.

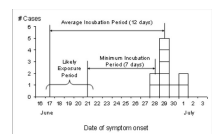
- Case classification (definition) should include:
 - Clinical symptoms (\pm 1 symptom can change accuracy)
 - Laboratory verification
 - Restrictions of person, place, and time
 - Must classify if cases are
 - Confirmed: clinical diagnosis with lab conformation
 - Suspected
 - Probable: clinical diagnosis but there is no lab conformation
 - Count cases: Important to find and count all cases that exist
 - Line list/ line listing: a table that contains key information about each case in an outbreak

Case #	Report Date	Onset	Population	Specimens							Lab	Demographics
				A	B	C	D	E	F	G		
1	10/12/02	10/10/02	Hepatitis A	1	1	1	1	1	1	1	Low 5001	M 37
2	10/12/02	10/14/02	Hepatitis A	1	1	1	1	1	1	1	Low 48	M 62
3	10/13/02	10/14/02	Hepatitis A	1	1	1	1	1	1	1	Low 5001	M 38
4	10/13/02	10/19/02	NA	1	1	1	1	1	1	1	NA	F 64
5	10/15/02		Hepatitis A	1	1	1	1	1	1	1	PH 101	M 17
6	10/16/02	10/16/02	Hepatitis A	1	1	1	1	1	1	1	5001-01	F 63

Source: "Investigating, Analyzing and Controlling Outbreaks of Hepatitis A: A Case Study for the CDC's Excellence in Curriculum Integration through Teaching Epidemiology" program. Address variables that might be helpful to include are age, sex, occupation, race, if resident, A, neighborhood of residence and social interaction.

Orient Data in Terms of Person, Place and Time

- Get to know your data
 - Descriptive Epidemiology
 - Person: age, race, gender, medical status, exposures
 - Place: map cases (GIS)
 - Map attack rates, not numerators
 - Time: Epidemic curve
 - Orienting groups of cases by time provides more information about the outbreak and possible cause
 - It helps to determine the median incubation period
 - Earliest set of cases to appear on graph can identify date of first exposure
 - Can help identify type of outbreak and secondary attack rate
 - Distribution of cases in the curve is plotted against time of onset of symptoms



Determine Who Is at Risk

- Population at risk is important because It will be the population used as controls.
 - Approach subjects for a study to test the hypothesis to find the cause of the outbreak. It defines the population for whom prevention and control measures will be targeted
 - Using definition of cases, identify population with the same criteria:
 - Geographic location.
 - Time period.
 - Population characteristic.
 - Look for any remaining cases in population at risk.
 - This population will also be the target of prevention and control measures

TBL - Outbreak Investigations

Steps of Outbreak Investigation contd..

Find the responsible agent

Develop a Hypothesis and Test It

6

- Develop a hypothesis to confirm the cause of disease.
- Test the hypothesis using a study design:
 - Case-control study if the population is not well defined and speed of investigation is important. (most appropriate measure of association is odds ratio)
 - Odds ratio: AD/CB
 - Cohort study if the **population is small and well defined**. (Retrospective cohort is the most appropriate study design to investigate an outbreak source)
 - Risk ratio: $(A/A+B)/(C+C+D)$, (incidence in expose group)/(incidence in the unexposed group)

Determine Control Measures

7

- Important to control current outbreak and prevent future outbreaks
- Control measures completely dependent on the identified source of the outbreak.

Plan a More Systematic Study

8

- It may be necessary to continue to study the outbreak with a more comprehensive design. Initial study may be inconclusive, Reconsider hypothesis, Revisit patients, Expand exposures, Utilize additional lab specimens, Additional or more refined control group, Utilize a more comprehensive design, Perform research to expand knowledge

Prevent it from occurring further

Execute Disease Control and Prevention Measures

9

- As investigation wraps up, it is important to use all information available to prevent the spread or resurgence of outbreak
- Activities include:
 - Implement the necessary control and prevention measures:
 - Surveillance for future disease occurrence
 - Regular communication with affected population and health care facilities

Prepare a Written Report

10

- A written report should be prepared in a usual scientific format and should include information about:
 - The setting and the methods used
 - Results of any data collection and analysis
 - The identified causative agent and source
 - Recommendations for control and prevention
- Report should be written for members of affected community

The following lectures were taken in our midterm:

1. Emerging Respiratory Infectious Diseases
2. COVID-19

[Click here to access **439's midterm summary**](#)

Other useful sources:

1. Layan's file
2. [Community gifts arranged by lecture \(includes gifts on **seminars** and **TBL**\)](#)

L17- Emerging Respiratory infectious diseases

Influenza Virus

Antigen type	Who does it infect?	What does it cause?
A	Human	Seasonal epidemic, pandemic
B	Human	Seasonal Epidemic
C	Human	Mild respiratory illness
D	Cattle	---

Antigenic drift

- Happens continually over time.
- Results from point mutation of the gene -> changes in surface proteins¹.
- Why do some people get the flu more than 1 time, although they are vaccinated? This is due to antigenic drift.

Antigenic Shift

- Complete sudden change
- Results from genetic recombination of human virus with animal or avian virus Responsible for pandemic strains.

Three different methods for antigenic shift:

- 1- virus from human and avian reassort in the swine.
- 2- virus jumps from avian to human.
- 3- virus jumps from avian to swine to human without Reassortment

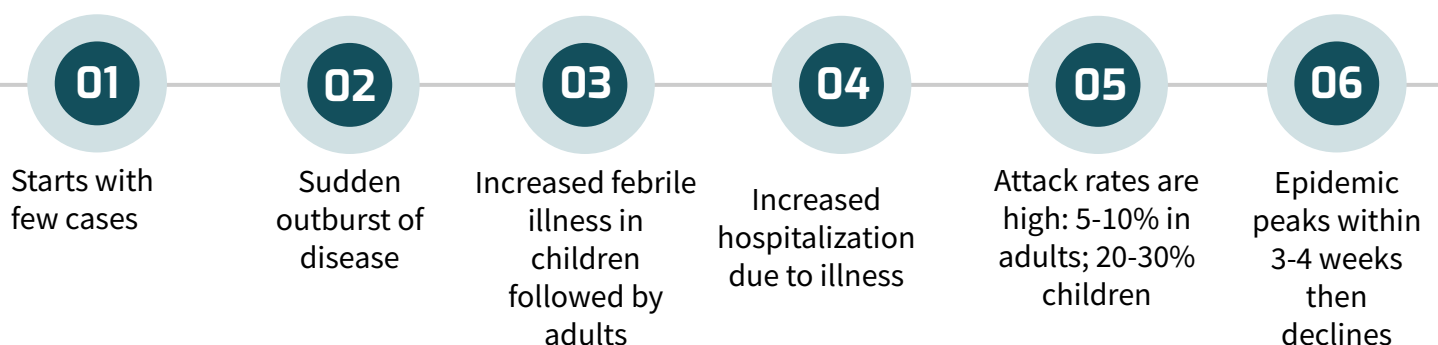
Influenza A subtypes infective to humans:

Currently circulating viruses type A are:

- H1N1 responsible for pandemics (this is the doctor's note and a golden note)
- H3N2

Date of Pandemic	Influenza subtype	Death Toll
1918-1919	Spanish influenza H1N1	50 million
1957-1958	Asian influenza H2N2	2 million
1968-1969	Hong kong influenza H3N2	1 million
2009-2010	H1N1 (swine flu) - novel subtype	18.2 thousand +

Signs of an outbreak :



L17- Emerging Respiratory infectious diseases

Influenza Virus

● Vaccine

- takes **two weeks** to produce immunity
- Immunity against type A (H1N1; H3N2) , and B (trivalent)

Flu vaccines available in KSA:

Injection vaccine:

- Inactivated virus
- **Ages 6 months and above**
- Safe for pregnant women
- Targets H antigen



Nasal spray vaccine:

- Live weakened virus
- **Ages 2y to 49 y**
- **NOT safe for pregnant women**
- Targets both H and A antigens



Contraindications (the Doctor might ask a question)

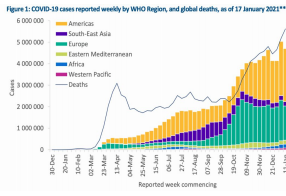
- Those who have severe egg allergy Previous history of severe allergy to influenza vaccine **Yes there are vaccine modifications where egg allergies aren't contradicted but we don't know of KSA has them so we make sure they don't have egg allergies**
- History of Guillain Barre Syndrome after taking the vaccine
- Children under 6 months
- People suffering from very high or moderate temperature



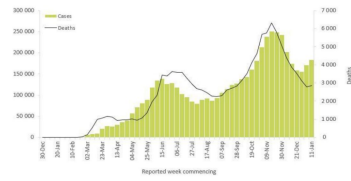
wow, such empty

	Influenza	MERS-CoV	SARS-CoV
Reservoir	<ul style="list-style-type: none"> Animals (swine, horses, dogs, cats) Birds (poultry, wild birds) human 	<ul style="list-style-type: none"> Animals in the Arabian peninsula Dromedary camels May have been in bats and transmitted to camels sometime in the past 	Horseshoe bats
Mode of transmission	<ul style="list-style-type: none"> Secretions of respiratory tract 	<ul style="list-style-type: none"> Person-to-person (patient-to-HCW) Camels-to-humans 	<ul style="list-style-type: none"> Direct: Indirect: Contacting surface contaminated with droplets May be airborne? Aerosol-generating procedures Virus shed in stool – not clear feco-oral transmission
Incubation period	<ul style="list-style-type: none"> 18 – 72 hrs Period of infectivity: 1-2 days prior to symptoms, and 5-7 days after. 	<ul style="list-style-type: none"> 2-14 days high case fatality rate in relation to COVID-19 	2 – 7 days
Risk factors	<ul style="list-style-type: none"> Season: Winter or rainy Age: severe in elderly and < 18 m Overcrowding Contact with infected individual Immunity Chronic diseases; DM; CHD; CLD. Pregnancy 	<ul style="list-style-type: none"> close contact with a confirmed case Healthcare personnel who do not use recommended infection-control precautions contact with camels Consumption of raw animal products Elderly, immunocompromised, chronic disease 	
Prevention & control	<ul style="list-style-type: none"> Cough etiquette Wash hands Vaccine 	<p>secondary prevention : Same as influenza +</p> <ul style="list-style-type: none"> Avoid touching eyes, nose and mouth Avoid personal contact, or sharing items Clean and disinfect frequently touched surfaces Healthcare workers practice infection control precautions 	Same as previous + <ul style="list-style-type: none"> early identification and efficient reporting of cases Isolation of patients Exit screening for international travelers

L18- COVID-19 Pandemic



- It entered a global level on March, 2020. The graph shows **two major peaks (Mar & Nov)** with smaller peaks in between.



Eastern Mediteranean regions

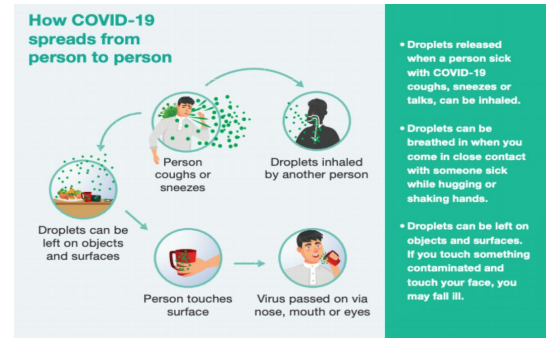
- There are two peaks. First was in May-June and the other peak was in November.
- The graph also predicts

- Americas region is where most of the cases are.

that there might be a rise in the cases if necessary precautions weren't implemented.

Mode of Transmission:

- COVID-19 is mainly transmitted through droplet infection.
- Whenever an infected person speaks or coughs, droplets are released and can be inhaled by a different person within 2 m
- Moreover, droplets can be left on surfaces¹ for sometime before getting inactivated



Signs and Symptoms:

Common symptoms

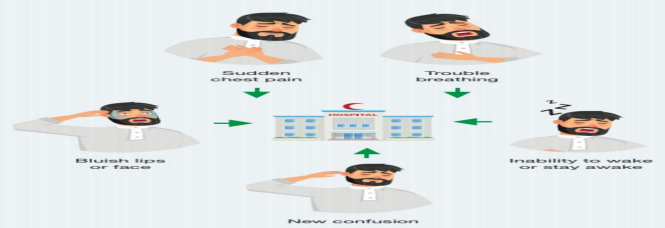
COVID-19: symptoms to look for



- The symptoms differ from the flu in their intensity.
- Loss of taste or smell is particularly pathognomic and should rise high index of suspicion.

Serious/Severe Symptoms

Serious symptoms, seek medical help immediately



- Any patient with any of the symptoms above should immediately seek healthcare and **MUST** be admitted to the hospital.

How to protect yourself and others?^{2,3}

Video is very important!!



- 2 meters = 2 arm's length
- Handwashing should be for **2 minutes**

- Recent research evaluated the survival of the COVID-19 virus on different surfaces and reported that the virus can remain viable for up to 72 hours on plastic and stainless steel, up to four hours on copper, and up to 24 hours on cardboard.
- Does a person, who had the infection, required to wear a mask? YES, all people should wear masks even if they got the infection since they're still susceptible for reinfection.
- Medical masks (surgical) should be worn by healthcare workers, COVID-19 infected people, people who takes care of infected people, people above the age of 60 and people with underlying conditions. Other than that, a fabric mask is enough.

What Should I do if I Feel Sick?



REPORT IMMEDIATELY!

Flu-like symptoms:

- Report to the **flu clinic**
- Opens 24 hrs

Who & Where

Come in Close Contact:

- Report to the **occupational health clinics**
- Fill in the link for contact tracing

Public Health and Social Measurements

Community Transmission

- No (active) cases
- Imported / Sporadic cases
- Clusters of cases
- CT1: Low incidence of locally acquired widely dispersed cases detected in the past 14 days
- CT2: Moderate incidence of locally acquired widely dispersed cases detected in the past 14 days
- CT3: High incidence of locally acquired widely dispersed cases in the past 14 days
- CT4: Very high incidence of locally acquired widely dispersed cases in the past 14 days

Table 1: Situational Level assessment matrix using transmission level and response capacity indicators to guide adjustment of PHSM

Transmission level	Response capacity		
	Adequate	Moderate	Limited
No cases	0	0	1
Imported/Sporadic cases	0	1	1
Clusters of cases	1	1	2
Community - CT1	1	2	2
Community - CT2	2	2	3
Community - CT3	2	3	3
Community - CT4	3	3	4

1 Public health and social measures (PHSM) have proven critical to limiting transmission of COVID19 and reducing deaths.

2 The decision to introduce, adapt or lift PHSM should be based primarily **on a situational assessment of the intensity of transmission and the capacity of the health system to respond**, but must also be considered in light of the effects these measures may have on the general welfare of society and individuals

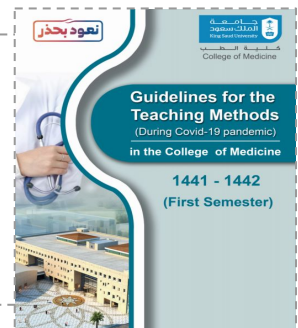
3 **Indicators and suggested thresholds are provided** to gauge both the intensity of transmission and the capacity of the health system to respond; taken together, these provide a basis for guiding the adjustment of PHSM. Measures are indicative and need to be tailored to local contexts.

4 PHSM must be **continuously adjusted to the intensity of transmission** and capacity of the health system in a country and at sub-national levels. When PHSM are adjusted, **communities should be fully consulted and engaged** before changes are made

COVID-19 in University Settings

Risk transmission can be categorized as the following:

- **Lowest risk:** virtual learning, activities, and events.
- **More risk:** small in-person classes, activities, and events. (eg. hybrid virtual and in-person class structures or staggered / rotated scheduling to accommodate smaller class sizes)
 - Individuals are spaced at least 1.5-2 m apart and DO NOT share objects
- **Highest risk:** Full-sized in-person classes, activities, and events.
 - Individuals are not spaced apart and they share objects, materials and supplies



How do you protect yourself in the hospital?

- **REMEMBER:** PPE, surgical masks, face shield & gloves
- **Always follow the guidelines** in the OR, ICU, ER
- **Always report any signs of illness**, any one is deviating from the policies laid down
- **Reduce congestion** in the health clinic
 - Distance inside clinics has to be 1.5 meters
 - Compensate the clinical training by enforcing CBD, or online courses