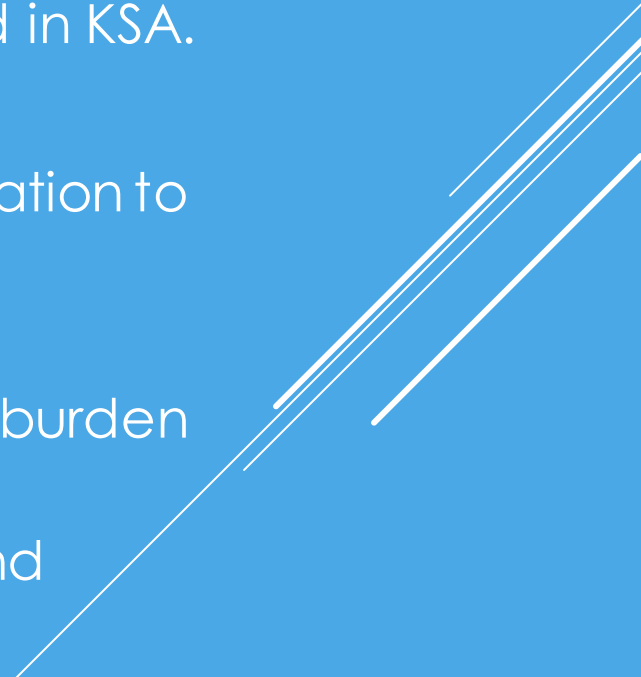


# Cancer (Screening & prevention)

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# OBJECTIVES

1. Appreciate the Global impact of cancer.
  2. Identify the most prevalent cancers worldwide, in the region and in KSA.
  3. Identify the leading causes of cancer deaths.
  4. Understand the cancer control continuum and explain its implication to public health.
  5. Apply common screening recommendations for cancer.
  6. Understand and reflect the Kingdoms efforts to control the rising burden of Cancers in KSA.
  7. Explain important factors and trends affecting cancer control and directions for future research.
- 

BRAIN STORMING QUESTIONS....

The image features a solid blue background. In the bottom right corner, there are several white, parallel diagonal lines of varying lengths and positions, creating a sense of motion or a graphic element.

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

# 1-THE GLOBAL IMPACT OF CANCER

- ▶ 2<sup>nd</sup> leading cause of death globally.
- ▶ In 2018, 18.1 million new cases and 9.6 million deaths\* (26,300 death/days)
- ▶ One in 5 men and one in 6 women develop cancer during their lifetime.
- ▶ one in 8 men and one in 11 women die from the cancer.

\* 2,552,226 died from the COVID-19 pandemic as per 2-March-2021.

# 1-THE GLOBAL IMPACT OF CANCER

- ▶ In 2010 total annual economic cost of cancer was approximately 1.16 trillion US\$.
- ▶ Late-stage presentation and inaccessible diagnosis and treatment are common.
- ▶ In 2017, only 26% of low-income countries reported having pathology services generally available in the public sector.
- ▶ More than 90% of high-income countries reported treatment services are available compared to less than 30% of low-income countries.





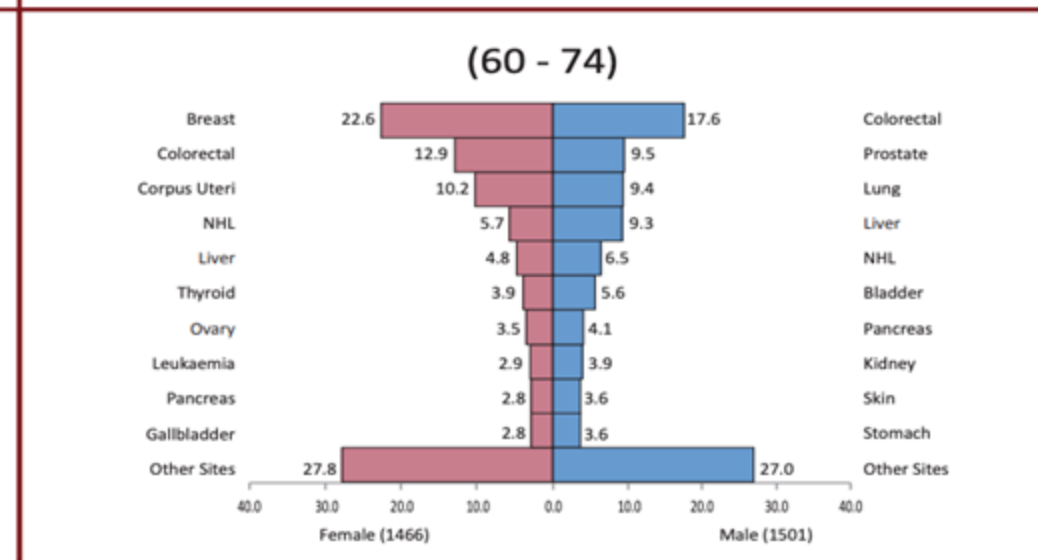
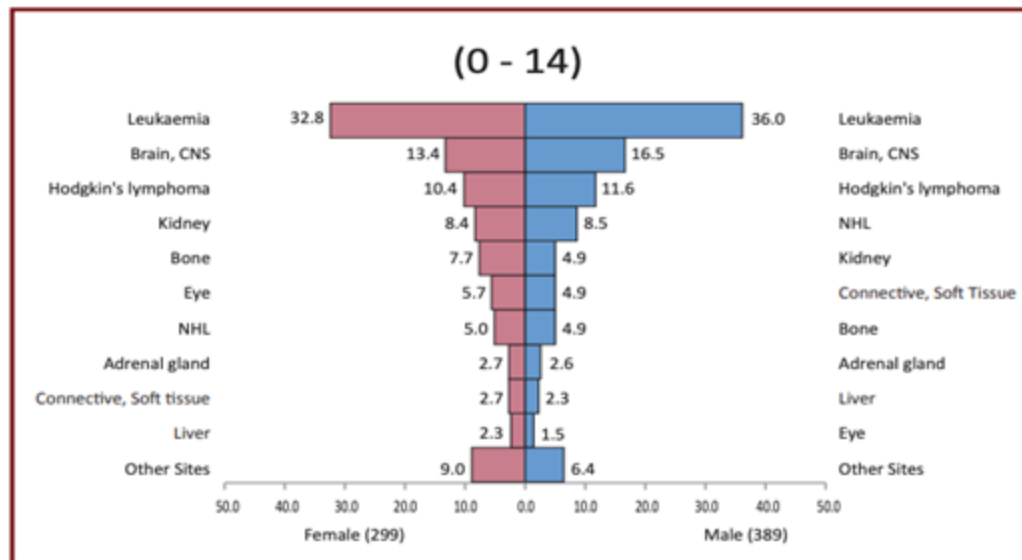
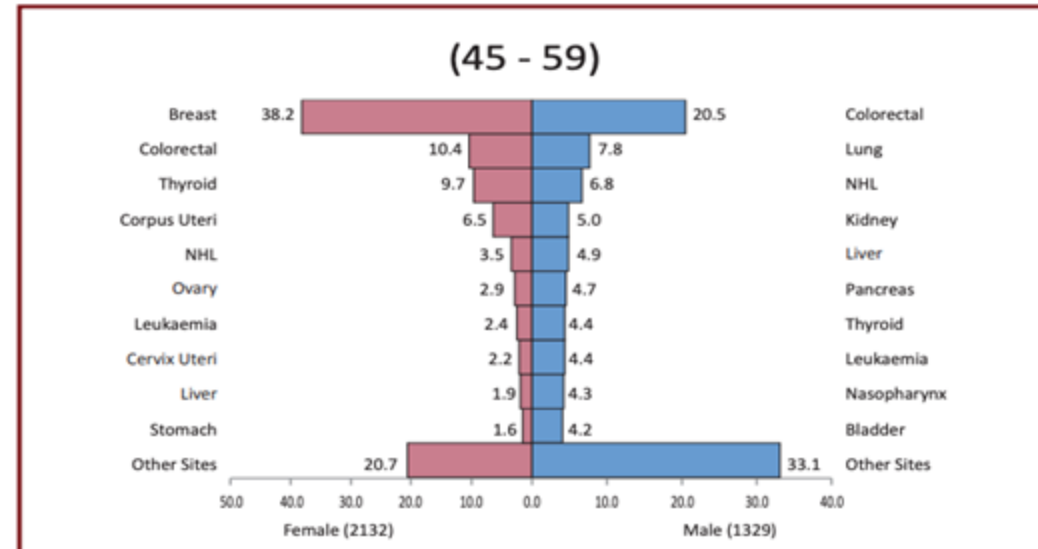
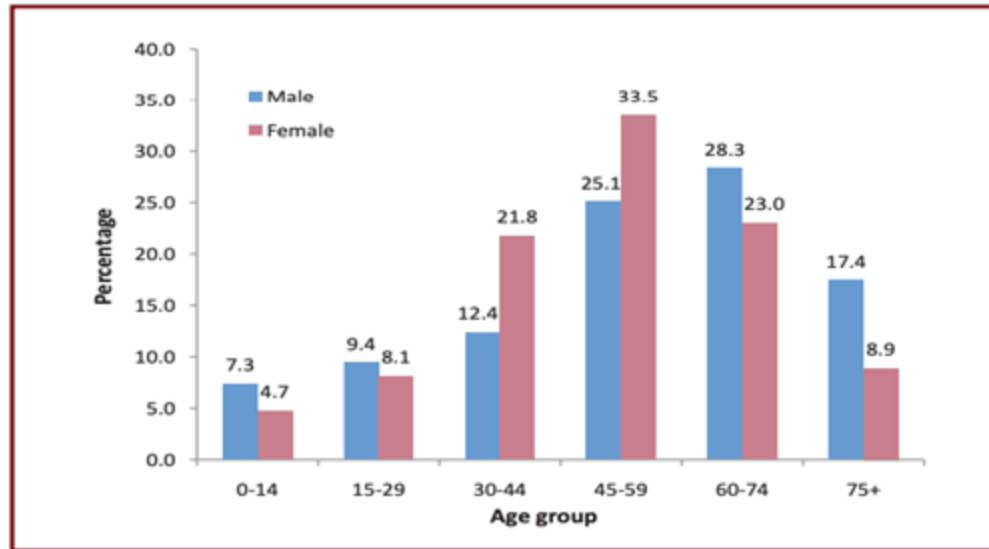
2-IDENTIFY THE MOST PREVALENT CANCERS WORLDWIDE, IN THE REGION AND IN KSA.

3-IDENTIFY THE LEADING CAUSES OF CANCER DEATHS.

## 2-IDENTIFY THE MOST PREVALENT CANCERS WORLDWIDE, IN THE REGION AND IN KSA.

Region	World				Middle East and North Africa				Saudi Arabia			
Cause	Men		Women		Men		Women		Men		Women	
	Incidence	Mortality	Incidence	Mortality	Incidence	Mortality	Incidence	Mortality	Incidence	Mortality	Incidence	Mortality
1st	Lung		Breast		Lung		Breast		Colorectal		Breast	
2nd	Prostate	Liver	Colorectal	lung	Prostate	Liver	Colorectal		Lymphomas, multiple myeloma		Colorectal	
3rd	Colorectal	Stomach	lung	Colorectal	Bladder	Prostate	Thyroid	Lung	Prostate	Lung	Thyroid	Lymphomas, multiple myeloma
4th	Stomach	Colorectal	Cervical		Colorectal		Non-Hodgkins	Stomach	Lung	Liver	Lymphomas, multiple myeloma	Leukemia
5th	Liver	Prostate	Stomach		Liver	Bladder	Ovarian	Liver	Leukemia		Uterine	Liver

**Figure 2.3: Distribution of Cancer Cases Among Saudi Nationals by Gender and Age Groups, 2014**



# CANCER CAUSES

- ▶ Cancer is the result of the interaction between a **person's** factors and 3 categories of **external** agents, including:
  - ▶ **Personal** factors:
    - ▶ 1-Genetic (Family hx & genetic testing).
    - ▶ 2-Age:
      - ▶ A-cellular repair mechanisms become less effective as a person grows older.
      - ▶ B-accumulation of external risk factors.
  - ▶ **External** factors:
    - ▶ **physical** carcinogens, such as ultraviolet and ionizing radiation;
    - ▶ **chemical** carcinogens, such as asbestos, components of tobacco smoke, aflatoxin (a food contaminant), and arsenic (a drinking water contaminant).
    - ▶ **biological** carcinogens, such as infections from certain viruses, bacteria, or parasites.



Table 4

# Cancer-causing Pathogens

## Bacteria

Infectious Agent	Cancer	% of global cancer cases attributable to infection*
<i>Helicobacter pylori</i>	Stomach cancers	32.5

## Parasites

Infectious Agent	Cancer	% of global cancer cases attributable to infection*
<i>Clonorchis sinensis</i>	Biliary, gallbladder, and pancreatic cancers	0.1
<i>Opisthorchis viverrini</i>	Biliary, gallbladder, and pancreatic cancers	
<i>Schistosoma haematobium</i>	Bladder cancer	0.3

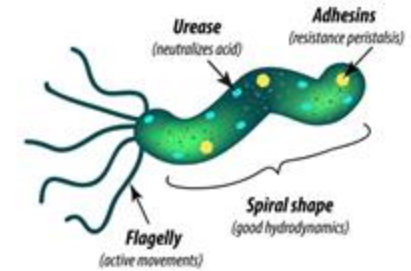
## Viruses

Infectious Agent	Cancer	% of global cancer cases attributable to infection*
Epstein-Barr virus (EBV)	Hodgkin and certain non-Hodgkin lymphomas, and stomach and nasopharyngeal cancers	5.4
Hepatitis B/C viruses (HBV and HCV)	Hepatocellular carcinoma	29.5
Human herpes virus type-8 (HHV-8; also known as Kaposi sarcoma herpes virus)	Kaposi sarcoma and certain form of lymphoma	2.1
Human immunodeficiency virus (HIV)	Kaposi sarcoma and non-Hodgkin lymphoma	
Human papillomavirus (HPV)	Anal, cervical, head and neck, oral, penile, vaginal, and vulvar cancers	30
Human T-cell lymphotropic virus, type-1 (HTLV-1)	T-cell leukemia and lymphoma	0.1
Merkel cell polyomavirus (MCV)	Merkel cell carcinoma	

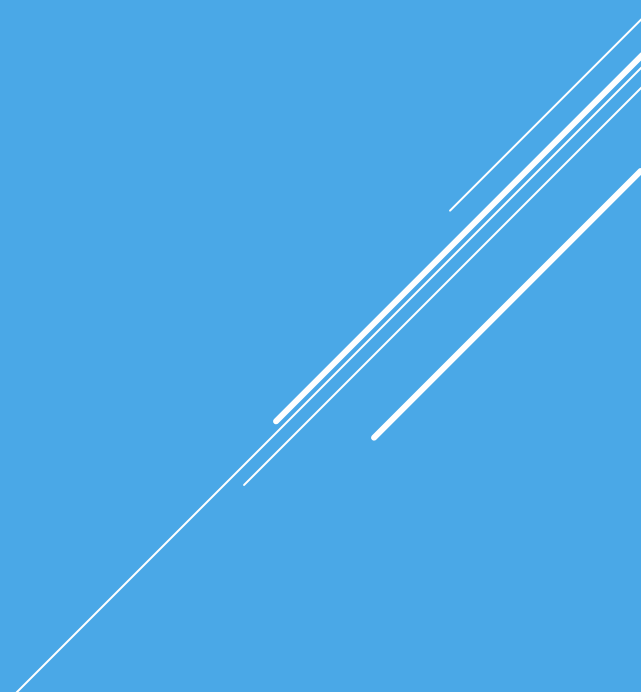
\* where known

data from Ref 76

## The structure of *Helicobacter pylori*



# 4-UNDERSTAND THE CANCER CONTROL CONTINUUM AND EXPLAIN ITS IMPLICATION TO PUBLIC HEALTH.

- ▶ The cancer control continuum describes the various stages from cancer etiology, prevention, early detection, diagnosis, treatment, survivorship, and end of life.
  - ▶ 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.
- 

## Cancer control continuum

### Prevention

Tobacco control  
Diet  
Physical activity  
Sun exposure  
Virus exposure  
Alcohol use  
Chemoprevention

### Early detection

Cancer screening  
Awareness of cancer signs and symptoms

### Diagnosis

Oncology consultations  
Tumor staging  
Patient counseling and decision making

### Treatment

Surgery  
Radiation therapy  
Chemotherapy  
Immunotherapy  
Adjuvant therapy  
Symptom management  
Psychosocial care

### Survivorship

Long-term follow-up/surveillance  
Late-effects management  
Rehabilitation  
Coping  
Health Promotion

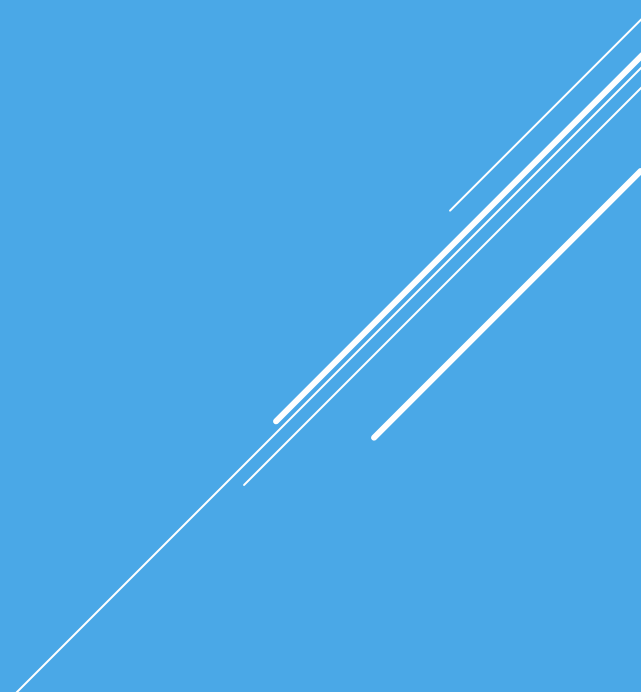
### End-of-Life care

Palliation  
Spiritual issues  
Hospice

## Cross-cutting issues

Communication, decision-making, quality of care, health equity, and family/caregiving

5-SCREENING FOR CANCER.





# THE WILSON-JUNGNER CRITERIA FOR SCREENING PROGRAM

1. The condition should be an important health problem.
2. The natural history should be well understood.
3. There should be a detectable early stage.
4. Treatment at an early stage should be of more benefit.
5. A suitable test 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**.
10. The costs should be balanced against **the benefits**.

*World Health Organization 1968*

## USPSTF Recommendation grades

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

Population	Recommendations	Grade
40 to 49 years	<p>The decision to start screening <u>mammography</u> in women prior to age 50 years should be an individual one.</p> <p>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>.</p>	C
50 to 74 years	<p><u>Biennial screening mammography</u> for women aged 50 to 74 years.</p>	B
75 years or older	<p>Current evidence is insufficient to assess the balance of benefits and harms of screening <u>mammography</u> in women aged 75 years or older.</p>	I

# COLORECTAL CANCER SCREENING

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.	<b>A</b>
Adults aged 76 to 85 years	<p>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.</p> <ul style="list-style-type: none"><li>• Adults in this age group who have never been screened for colorectal cancer are more likely to benefit.</li><li>• 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.</li></ul>	<b>C</b>

# COLORECTAL CANCER MODALITIES AND FREQUENCY

Test	Frequency (years)
Guaiac-based Fecal Occult Blood Test (gFOBT) looks for <b>heme</b>	1
Fecal immunochemical test (FIT) looks for <b>globin</b> , 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.

# INCIDENCE OF CERVICAL CANCER 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 <sup>a</sup>	1.9	3.8	15.1
Age-standardized incidence rate <sup>a</sup>	2.7	4.4	14.0
Cumulative risk (%) at 75 years old <sup>b</sup>	0.3	0.5	1.4

# CERVICAL CANCER SCREENING

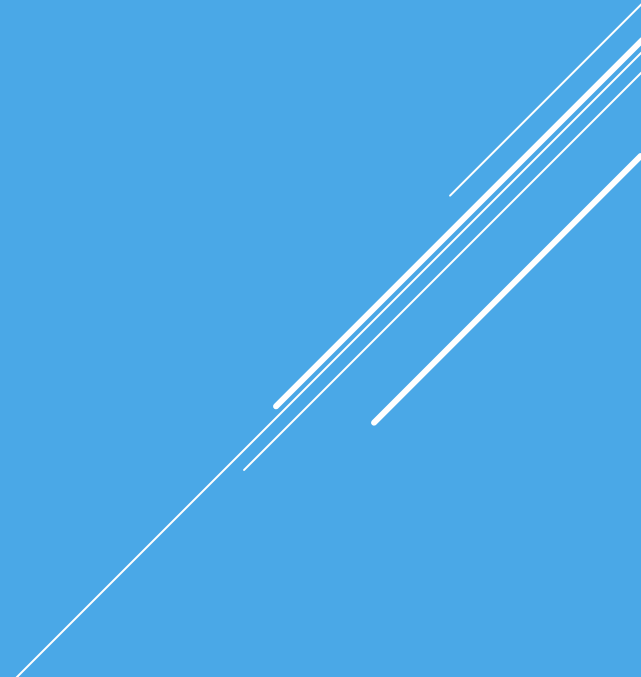
Age group	Pap smear (cytology)	HPV testing	Grade
<21 years	Against screening		D
21-30 years		Against	D
	Recommended every 3 years		A
30-65 years	Recommended every 3 years		A
	Or recommend pap + hpv every 5 years		
>65 years	against screening if have had adequate prior screening and are not otherwise 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?

- ▶ 3 consecutive negative cytology (Pap smear) results.
- ▶ or 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.



# SCREENING FOR HEMATOLOGIC MALIGNANCIES (LYMPHOMA, LEUKEMIA...ETC)?

- ▶ There are no routine screening tests for hematologic malignancies.
  - ▶ It is typical for a patient to seek medical treatment when symptoms appear.
  - ▶ Can be discovered incidentally when a blood test is ordered for another reason.
- 

# SCREENING FOR LUNG CANCER

## ► 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.

# SCREENING FOR LUNG CANCER

- ▶ Age 55-75 years
- ▶ Smoking history  $\geq 30$  Pack Years.
- ▶ And are active smoker or quit smoking less than 15 years ago.
- ▶ Did not have chest CT scan in 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

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.	<b>C</b>
Men 70 years and older	The USPSTF recommends against PSA-based screening for prostate cancer in men 70 years and older.	<b>D</b>

# Prostate Cancer

- Men should have an opportunity to discuss the potential benefits and harms of screening with their clinician.
- 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.

# SCREENING FOR THYROID CANCER

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

# SCREENING FOR LIVER CANCER

-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.

# SCREENING FOR UTERINE CANCER

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



# SCREENING FOR OVARIAN CANCER

Population	Recommendation	Grade
Asymptomatic women	<p>The USPSTF recommends against screening for ovarian cancer in asymptomatic women.</p> <p>This recommendation applies to asymptomatic women who are not known to have a high-risk hereditary cancer syndrome.</p>	<b>D</b>

Example of a high-risk hereditary cancer syndrome, women with *BRCA1* or *BRCA2* genetic mutations associated with hereditary breast and ovarian cancer.

## 6-UNDERSTAND AND REFLECT THE KINGDOMS EFFORTS TO CONTROL THE RISING BURDEN OF CANCERS IN KSA.

- ▶ Cancer Control Program Ministry of Health
- ▶ Saudi Cancer society.
- ▶ <http://saudicancer.org/index.php>
- ▶ National program for early detection of breast cancer.
- ▶ <http://www.bc-moh.com/>
- ▶ King Fahad National Centre for Children's Cancer
- ▶ <https://www.kfshrc.edu.sa/en/home/hospitals/riyadh/kfnccc>
- ▶ Sanad Children's Cancer Support Association
- ▶ <http://www.sanad.org.sa/>

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

7-EXPLAIN IMPORTANT FACTORS AND TRENDS  
AFFECTING CANCER CONTROL AND  
DIRECTIONS FOR FUTURE RESEARCH.



# TOBACCO

- 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.

# TOBACCO

- 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.



تصدير حكومي، التدخين شديداً رئيسي للمتدربين وأمراض العيشة والأمراض القلبية والشرايين



He's one of the busiest men in town. While his door may say *Office Hours 2 to 4*, he's actually on call 24 hours a day.

The doctor is a scientist, a diplomat, and a friendly sympathetic human being all in one, no matter how long and hard his schedule.

*According to a recent Nationwide survey:*  
**MORE DOCTORS SMOKE CAMELS**  
**THAN ANY OTHER CIGARETTE**

**D**OCTORS in every branch of medicine—113,597 in all—were queried in this nationwide study of cigarette preference. Three leading research organizations made the survey. The gist of the query was—What cigarette do you smoke, Doctor?

*The brand named most was Camel!*

The rich, full flavor and cool mildness of Camel's superb blend of costlier tobaccos seem to have the same appeal to the smoking tastes of doctors as to millions of other smokers. If you are a Camel smoker, this preference among doctors will hardly surprise you. If you're not—well, try Camels now.



**CAMELS** *Costlier Tobaccos*



CIGARETTES

Brand



Smoking  
can cause  
a slow  
and painful  
death

GETTY IMAGE

CIGARETTES

Brand



Smoking  
causes fatal lung cancer



# UNHEALTHY DIET, PHYSICAL INACTIVITY, OVERWEIGHT AND OBESITY

- Develop and implement national dietary guidelines and nutrition policies.  
For eg 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.



# تقدر على 8000 خطوة باليوم؟

احسبها مع تطبيق صحتي  
وشاركنا في تحدي المشي

#امش30



# ALCOHOL

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

# HEPATITIS B VIRUS (HBV)

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

جدول التطعيمات الوطني		الزيارة
التطعيم	Vaccine	Visit
• BCG	• درن	عند الولادة
• Hepatitis B	• التهاب كبدي (ب)	At Birth
• IPV	• شلل أطفال معطل	عمر شهرين
• DTaP	• الثلاثي البكتيري	2 months
• Hepatitis B	• الالتهاب الكبدي (ب)	
• Hib	• المستدمية النزلية	
• Pneumococcal Conjugate (PCV)*	• البكتيريا العقدية الرئوية*	
• Rota**	• فيروس الروتا**	عمر 4 شهور
• IPV	• شلل أطفال معطل	
• DTaP	• الثلاثي البكتيري	
• Hepatitis B	• الالتهاب الكبدي (ب)	
• Hib	• المستدمية النزلية	4 months
• Pneumococcal Conjugate (PCV)*	• البكتيريا العقدية الرئوية*	
• Rota**	• فيروس الروتا**	
• OPV	• شلل الأطفال الضموي	
• IPV	• شلل أطفال معطل	عمر 6 شهور
• DTaP	• الثلاثي البكتيري	
• Hepatitis B	• الالتهاب الكبدي (ب)	
• Hib	• المستدمية النزلية	
• Pneumococcal Conjugate (PCV)*	• البكتيريا العقدية الرئوية*	6 months

# ENVIRONMENTAL EXPOSURE 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 (i.e. legislation and monitoring) focusing on key contaminants. For eg. SFDA.

# OCCUPATIONAL EXPOSURE 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.

# 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.



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



防护围领

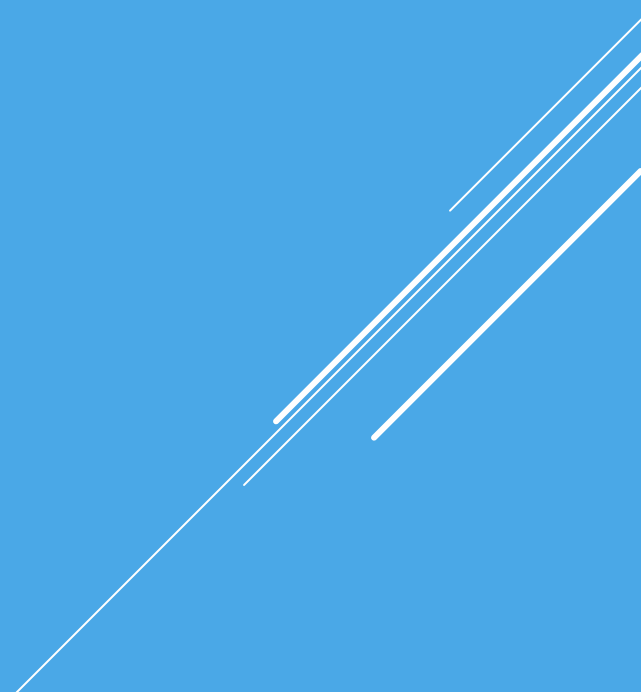


# HOW ARE PEOPLE EXPOSED TO UV RADIATION?

- **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)
    - 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).



THANK YOU



# APPENDIX

**How to use home fecal occult blood screening test:**

<https://youtu.be/WI8zaZiQXDg>

**How to use home Fecal immunochemical (FITs) screening test:**

<https://youtu.be/UWr7IJpm9do>

How to do pap smear and hpv test

<https://www.youtube.com/watch?v=7AWbs-OUV6Y>