Community 432 Medicine

Doctor's notes are in **green**.

Additional information are in **orange**.

Unmentioned information are in **grey**.

Imp info were highlighted in yellow.

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جامعة الملك سعود
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Cancer Epidemiology, Prevention & Control

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Learning Objectives

Students should be able to:

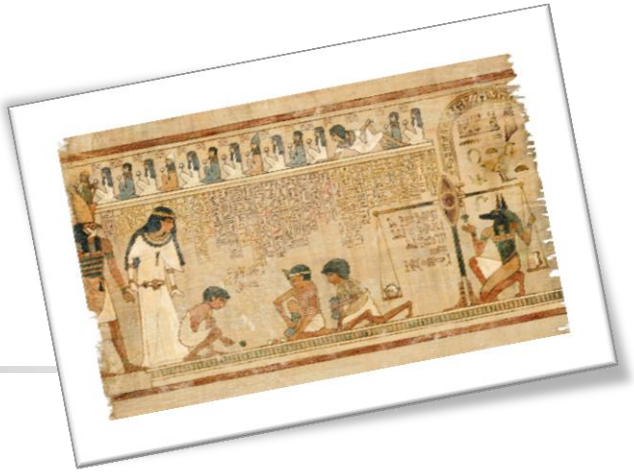
- Appreciate the Global impact of cancer
- Identify the most prevalent cancers world wide
- Identify the leading causes of cancer deaths
- Understand the cancer control continuum and explain its implication to public health
- Explain important factors and trends affecting cancer control and directions for future research

CANCER HISTORY

Human cancer is probably as old as the human race.
It is obvious that cancer did not suddenly start appearing after modernization or industrial revolution.

The oldest known description of human cancer is found in 7 Egyptian papyri written between 3000-1500 BC.

ANCIENT EGYPT (3000 BC-1500 BC) 1



- The oldest known description of human cancer is found in 7 Egyptian papyri written between 3000-1500 BC.
- Two of them, known as the "Edwin Smith" and "George Ebers" papyri, contain details of conditions that are consistent with modern descriptions of cancer.

Magnitude of the problem

Of the cancer

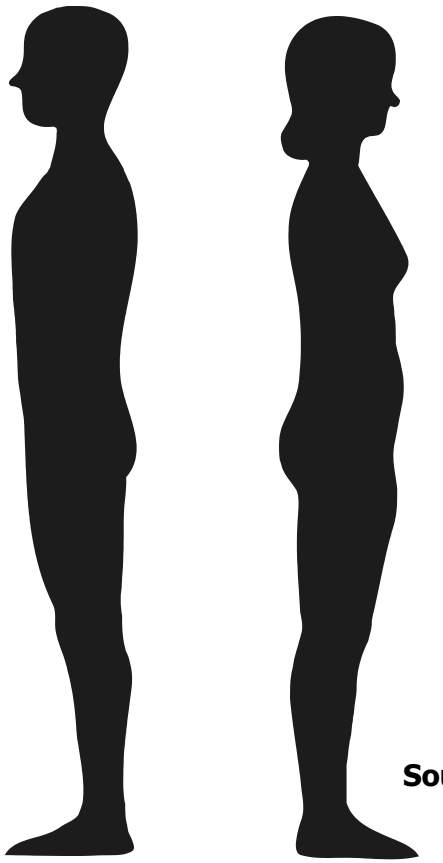
Different than prevalence

Estimated Cancer Deaths

Lung and bronchus	31%
Prostate	10%
Colon and rectum	10%
Pancreas	5%
Leukemia	4%
Esophagus	4%
Liver and intrahepatic bile duct	3%
Non-Hodgkin Lymphoma	3%
Urinary bladder	3%
Kidney	3%
All other sites	24%

Men
295,280

Women
275,000

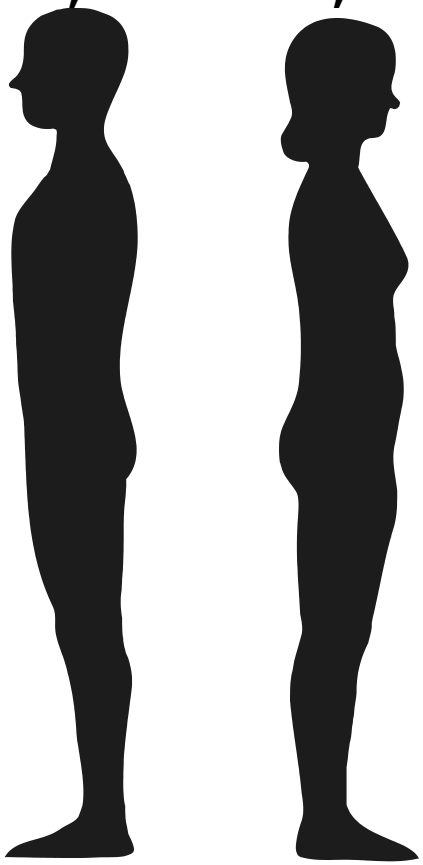


27%	Lung and bronchus
15%	Breast
10%	Colon and rectum
6%	Ovary
6%	Pancreas
4%	Leukemia
3%	Non-Hodgkin lymphoma
3%	Uterine corpus
2%	Multiple myeloma
2%	Brain/ONS
22%	All other sites

Source: American Cancer Society

Estimated New Cancer Cases

Men 710,040		Women 662,870	
Prostate	33%	32%	Breast
Lung and bronchus	13%	12%	Lung and bronchus
Colon and rectum	10%	11%	Colon and rectum
Urinary bladder	7%	6%	Uterine corpus
Melanoma of skin	5%	4%	Non-Hodgkin lymphoma
Non-Hodgkin lymphoma	4%	4%	Melanoma of skin
Kidney	3%	3%	Ovary
Leukemia	3%	3%	Thyroid
Oral Cavity	3%	2%	Urinary bladder
Pancreas	2%	2%	Pancreas
All Other Sites	17%	21%	All Other Sites



Source: American Cancer Society

Regional and Local data

Figure 1.6 ▼
Most common cancers among nationals of the GCC States, 1998-2007.

Non-Hodgkin's lymphoma

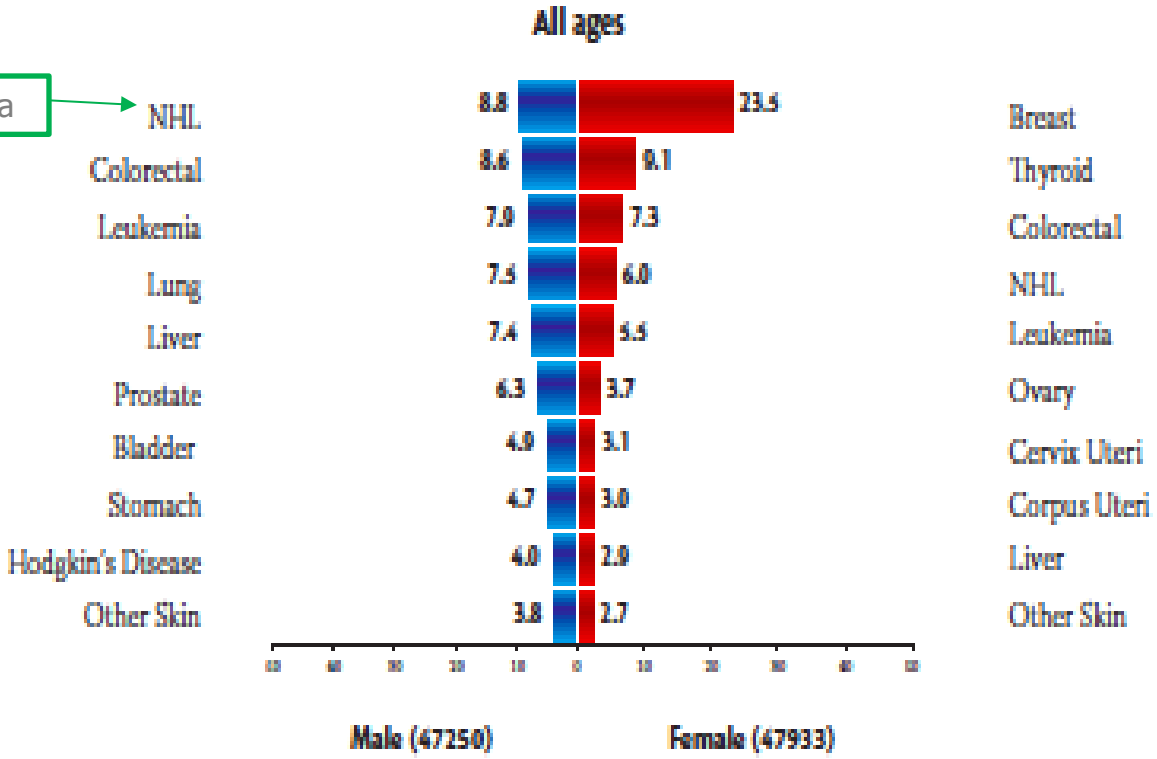
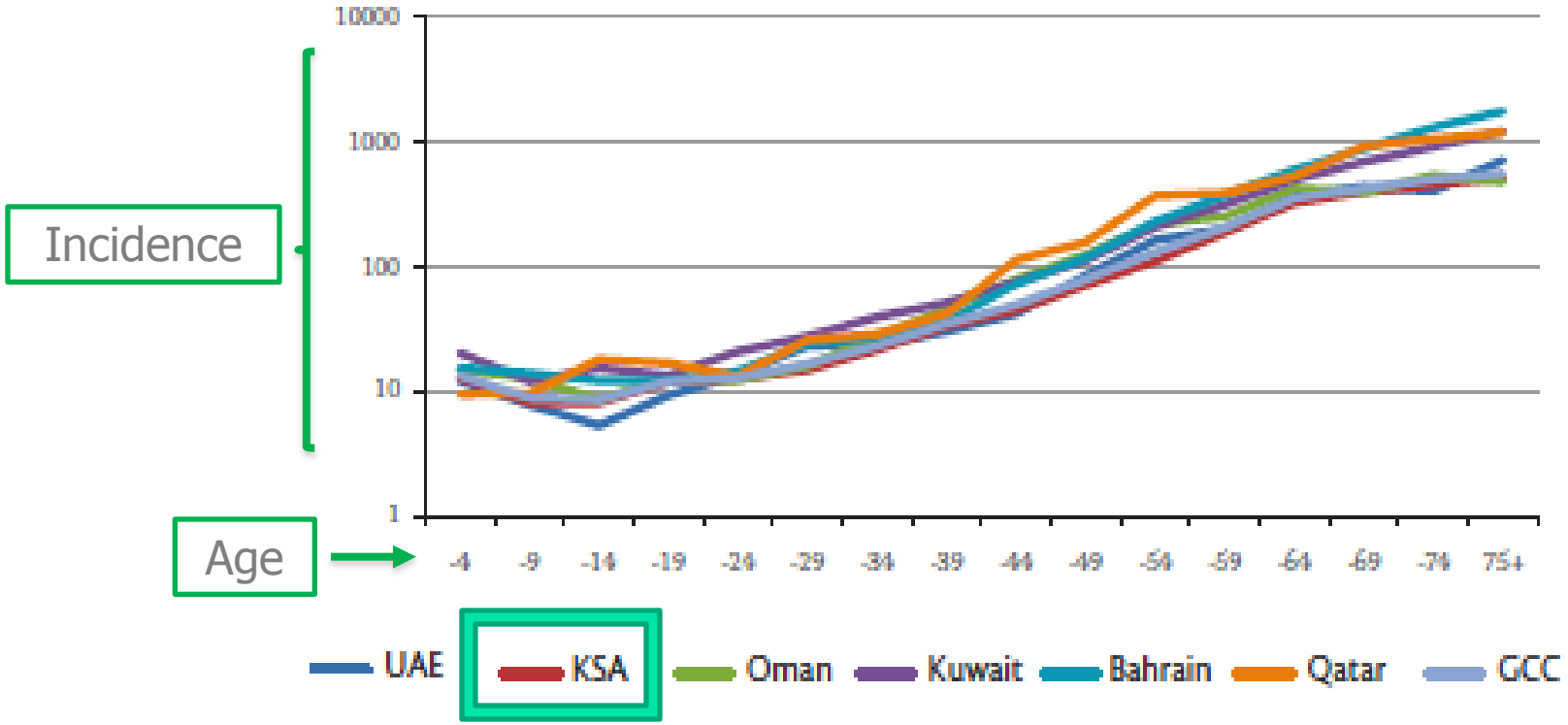


Figure 1.4
Average annual Age Specific Incidence Rates of all Cancers in the GCC States, 1998-2007: Male.



▲ **Figure 1.5**
Average annual Age Specific Incidence Rates of all Cancers in the GCC States, 1998-2007: Female.

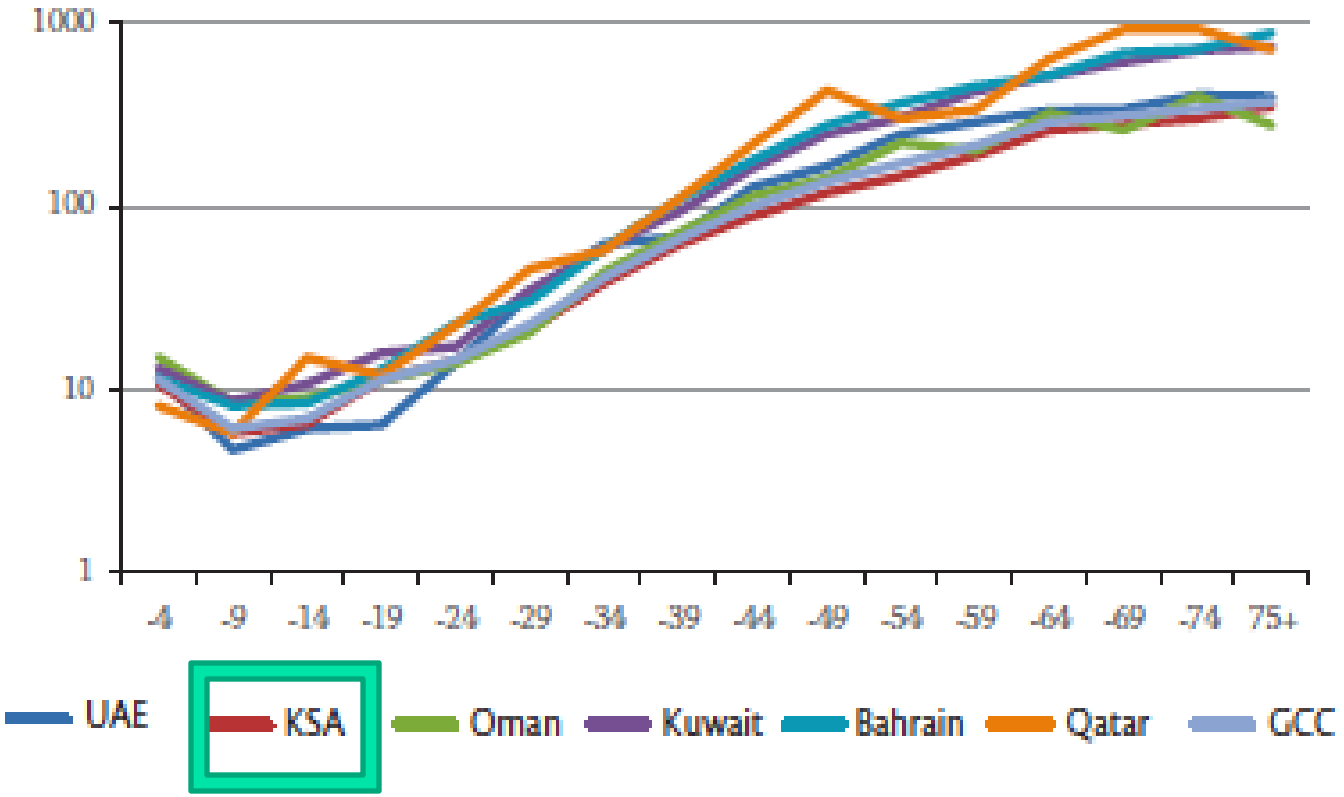
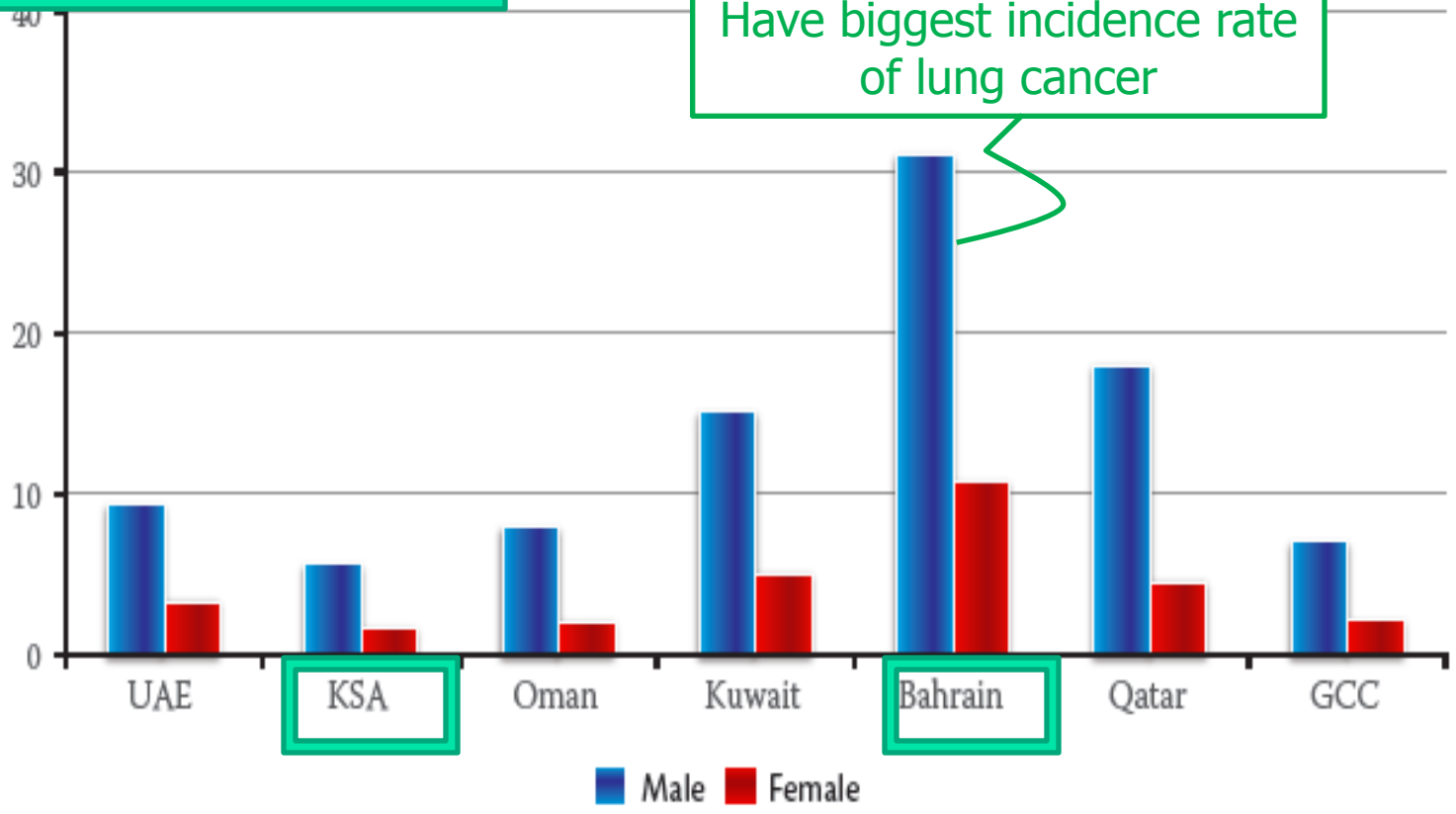
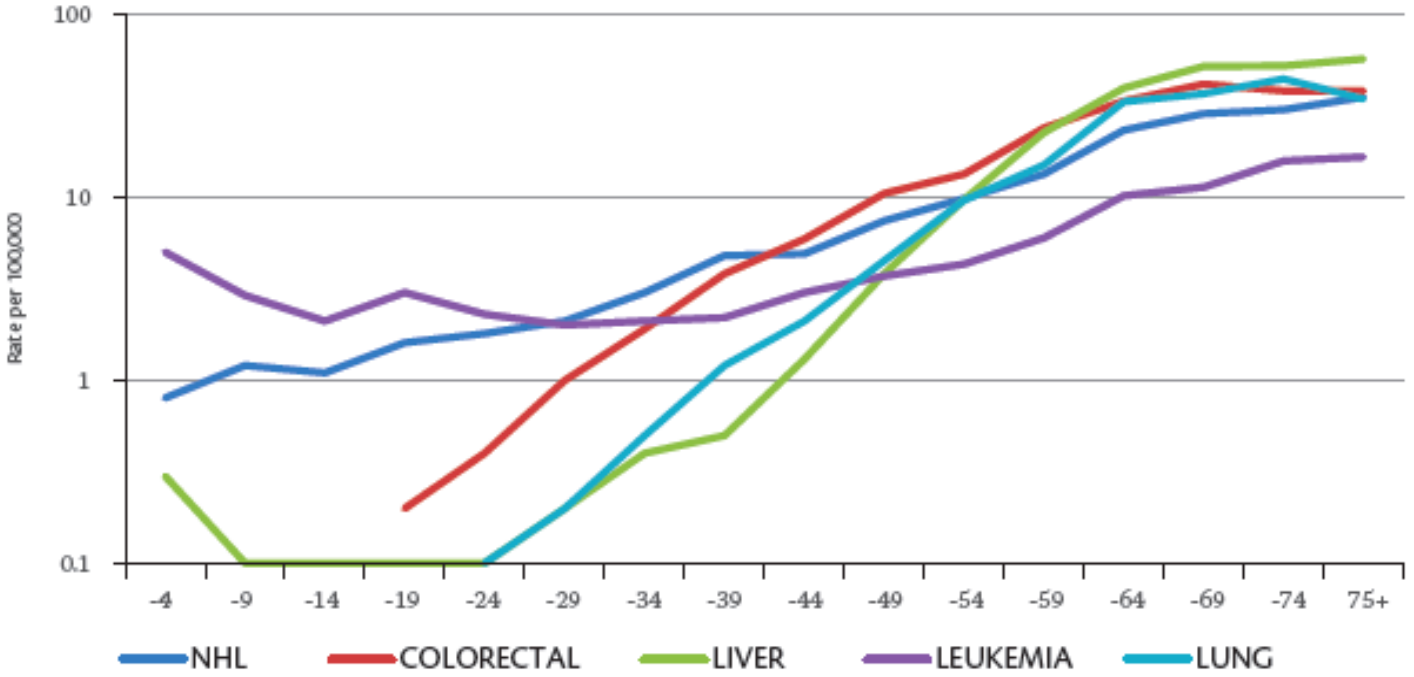


Figure 1.37 ▼
Age Standardized incidence Rate (ASR) of Lung cancer in the GCC States, 1998-2007.

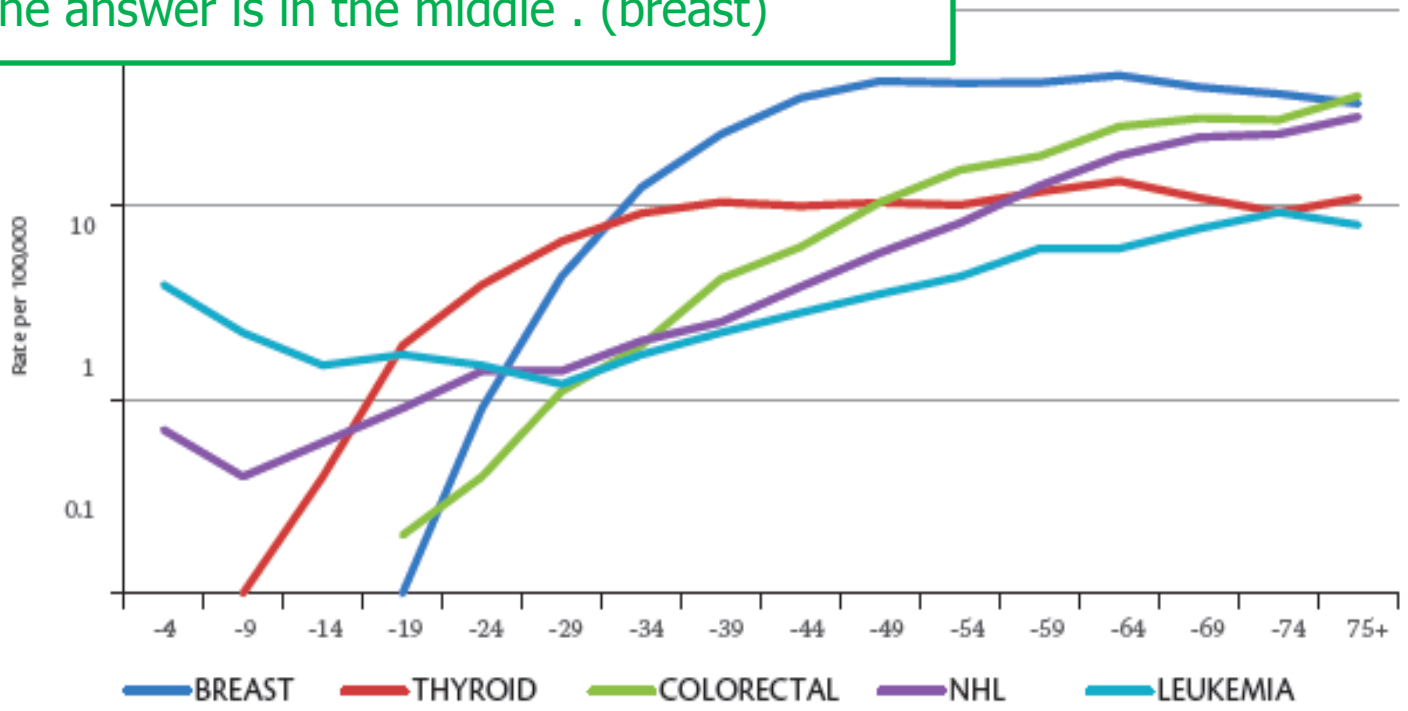


If they asked which type of cancer peaks in specific range of age ex. (45-55).
The answer is in the middle. (colorectal)

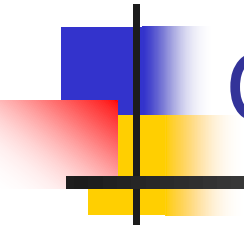


Average annual Age Specific Incidence Rates of Most Common Cancers in Saudi Arabia, 1998-2007: Male.

which type of cancer peaks between (44).
The answer is in the middle . (breast)



Average annual Age Specific Incidence Rates of Most Common Cancers in Saudi Arabia, 1998-2007 Female.



Cancer Epidemiology Concepts

Methods of Cancer Epidemiology

1. Descriptive Studies
   - Incidence, mortality, survival
   - Time Trends
   - Geographic Patterns
   - Patterns by Age, Gender, SES, Ethnicity
2. Analytic Studies
   - Cross-sectional
   - Case-control
   - Cohort

Challenges to Interpretation

- Observational vs. Experimental Design.
- Cancer “clusters”. *
- Study Design and Conduct :
  - Study Size. *
  - Biases: *
    - misclassification, confounding, selection.
- Exposure assessment important.
- “Strong” and “weak” effects .
- Impact on a population level. *

* Mentioned by the dr.

Rates

- Incidence
- Prevalence
- Specific
- Crude
- Adjusted/Standardized
- SMR/SIR

Sources

From where we can calculate data.

- US SEER Registry System (SEER): Surveillance, Epidemiology, and End Results: http://seer.cancer.gov/
- IARC International Registries
- State/Hospital Registries
- Etiologic Clues
  - "Alert" Clinician
  - Experimental Studies

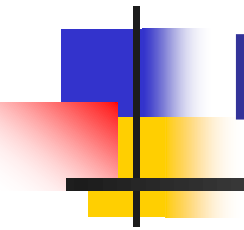
Known Risk Factors for Cancer

- Smoking
- Dietary factors
- Obesity
- Exercise
- Occupation
- Genetic susceptibility
- Infectious agents
- Reproductive factors
- Socioeconomic status
- Environmental pollution
- Ultraviolet light
- Radiation
- Prescription Drugs
- Electromagnetic fields

Identified Associations

- Tobacco →Lung Cancer.
- Asbestos → Lung Cancer.
- Leather Industry → Nasal Cancer.
- Dyes → Bladder Cancer.
- Ionizing Radiation → Many Cancers.
- DES → Vaginal Adenocarcinoma.
- EBV → Burkitt's Lymphoma.
- HPV → Cervical Cancer.

- Asbestos (الحرير الصخري).
- DES (diethylstilbestrol).
- EBV (Epstein–Barr virus).
- HPV (Human papillomavirus).



Prevention & Control

Comprehensive Approach

- Integrated coordinated approach is needed to **reduce** cancer incidence, morbidity, disability and mortality through promotion, prevention, early detection, management, rehabilitation, palliative care.

- This involved combined work of public, private as well as civil society agencies.

Primary Prevention (Risk Factor Control)

- Cancer education & legislation
- Tobacco / alcohol prevention and cessation
- Diet: high fiber, low fat, fruits & vegetables
- Weight control
- STI prevention and control
- Monitoring exposure to sunlight / radiation
- RF control (within/outside workplace)
- Lowest estrogen dose, upon prescription

Secondary Prevention

- Cancer registration (hospital-based, population-based)
- Early detection / screening: best during pre-invasive (in-situ) or pre-malignant stages. Examples: cervical, breast, prostate, colon, oral, skin, testis, etc
- Management: multi-modal: surgical, chemotherapy, radiotherapy, pain therapy

THE CANCER CONTROL CONTINUUM

FOCUS

PREVENTION	DETECTION	DIAGNOSIS	TREATMENT	SURVIVORSHIP
Tobacco control	Pap test	Informed decision-making	Health services and outcomes research	Coping
Diet	Mammography			Health promotion for survivors
Physical activity	FOBT			
Sun exposure	Sigmoidoscopy			
Virus exposure	PSA			
Alcohol use				
Chemoprevention				

CROSSCUTTING ISSUES

- Communications
- Surveillance
- Social Determinants of Health Disparities
- Genetic Testing
- Decision-Making
- Dissemination of Evidence-Based Interventions
- Quality of Cancer Care
- Epidemiology
- Measurement

Adapted from David B. Abrams, Brown University School of Medicine.

Lung Cancer

- Risk factors
  - Cigarette smoking, environmental exposures, tuberculosis
- Detection/Prevention
  - Reduce exposure to tobacco smoke

Breast Cancer

- Risk Factors
  - Age, family history, biopsy, breast density, early menstruation, obesity after menopause, recent use of oral contraceptives, hormone therapy, late or no children, alcohol, breast feeding, exercise
- Early Detection
  - Mammography and clinical breast exam every year after age 40 (ACS)

Prostate Cancer

- Risk factors
  - Age, ethnicity, family history, dietary fat?, weight?
- Early detection/prevention >50yrs old
  - PSA blood test/yr
  - Digital rectal exam/yr

Colorectal Cancer

- Risk factors
  - Age, family history, smoking , alcohol, obesity, exercise, high fat diet/red meat
- Early Detection/Prevention
  - 4 modalities recommended for people age 50 and older
    - Fecal occult blood test (FOBT) every year
    - Flexible sigmoidoscopy every 5 years
    - Colonoscopy every 10 years
    - Double-contrast barium enema every 5 years

MCQ

1. You are working in the Ministry of Health and would like to plan prevention and control program to address the rising prevalence of Cancer in KSA. Out of the list below, which one is an example of modifiable risk factor to establish an appropriate intervention strategy?

A. Age
B. Gender
C. Smoking
D. Family history of cancer

C