

Neoplasia

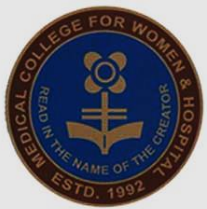
Epidemiology of cancer

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MCWH

References:

- **Robbins & Cotran Pathologic Basis of Disease-9th edition**
- **GLOBOCAN 2018**

(<https://gco.iarc.fr/today/data/factsheets/populations/50-bangladesh-fact-sheets.pdf>)



Epidemiology of cancer

International Agency for Research on Cancer

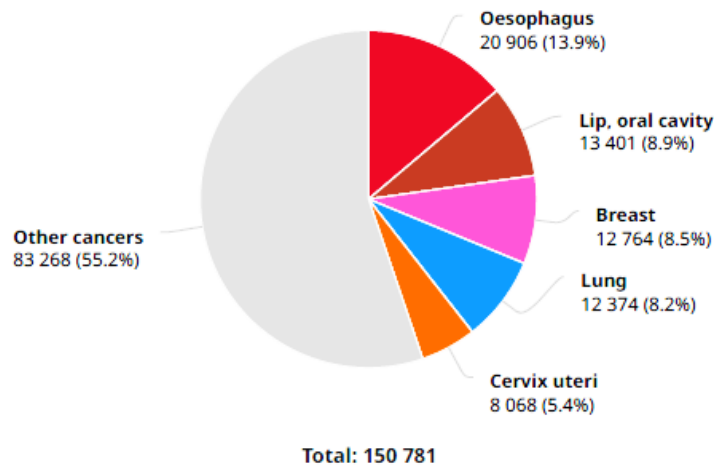


Bangladesh

Source: Globocan 2018



Number of new cases in 2018, both sexes, all ages

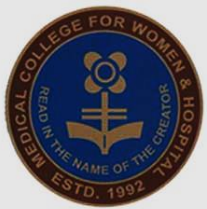


Geography



Number of new cases in 2018, males, all ages

Activate Windows
Numbers at a glance
Go to Settings to activate Win



Epidemiology of cancer

International Agency for Research on Cancer

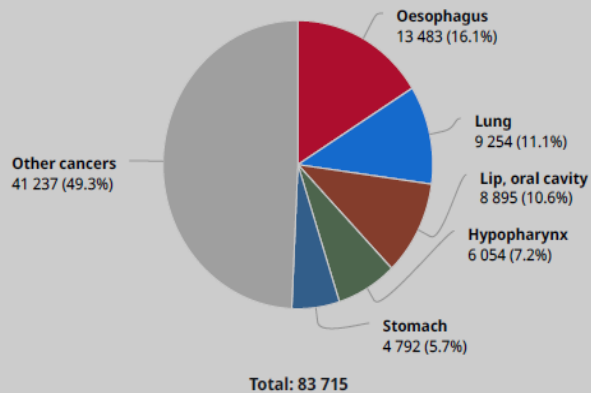


Bangladesh

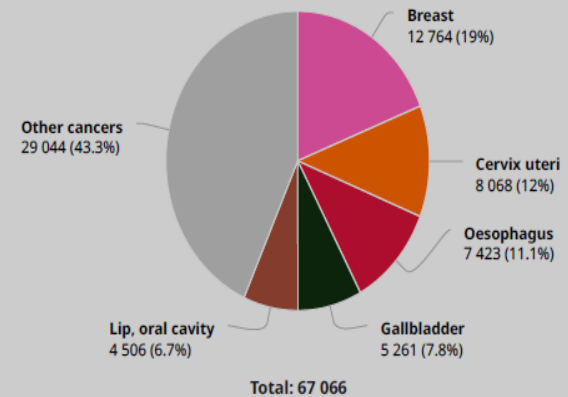
Source: Globocan 2018

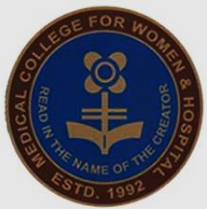


Number of new cases in 2018, males, all ages



Number of new cases in 2018, females, all ages





Cancer incidence

BANGLADESH

IN MALES

- Esophagus, lung and oral cancer

IN FEMALES

- breast cancer and cervical cancer

USA

IN MEN

- Prostate, lung, colon/rectum

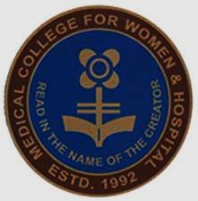
IN WOMEN

- Breast, lung, colon/rectum

Reference:

Hussain SA. Comprehensive update on cancer scenario of Bangladesh. South Asian Journal of Cancer: 2013 Oct-Dec; 2(4): 279–284.

Hussain SA, Sullivan R. Cancer control in Bangladesh. 2013 Dec;43(12):1159-69.



Epidemiology of cancer

The incidence of cancer varies with

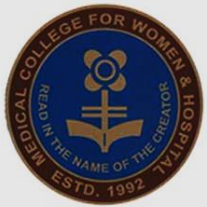
- **Environmental** factors
- **Genetic** background



Epidemiology of cancer

The incidence of cancer varies with

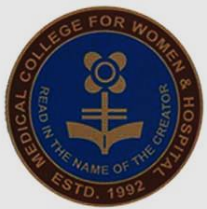
- **Environmental** factors
- **Genetic** background



Epidemiology of cancer

Environmental factors

- **Infectious Agents**
- **Smoking**
- **Alcohol consumption**
- **Diet**
- **Obesity**
- **Reproductive history**
- **Environmental carcinogens**

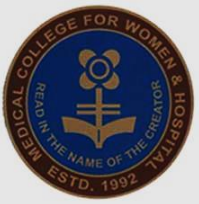


Epidemiology of cancer

Environmental factors

Infectious Agents:

- About 15% of all cancer worldwide are caused (directly/indirectly) by infectious agents
- Developing world -3x more than developed world
- **Human Papilloma Virus** is responsible for a large majority of cases of **cervical carcinoma** and large number of **head and neck carcinoma**

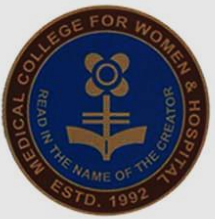


Epidemiology of cancer

Environmental factors

Smoking: SINGLE MOST IMPORTANT FACTOR

- **90% of lung cancer deaths**
- Mouth
- Larynx
- Pharynx
- Oesophagus
- Pancreas
- Urinary bladder

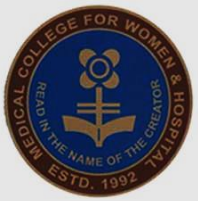


Epidemiology of cancer

Environmental factors

Alcohol consumption:

- Alcohol abuse alone increases the risk of carcinomas of **oropharynx** and **esophagus**
- **Hepatocellular carcinoma** (if alcoholic cirrhosis develops)
- **Alcohol** and **tobacco** synergistically increases the risk of cancers of **upper airway** and **digestive tract**



Epidemiology of cancer

Environmental factors

Diet:

- Precise dietary factors –debatable

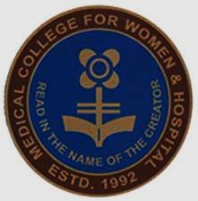


Epidemiology of cancer

Environmental factors

Obesity:

- In US population approximately **14%** of cancer deaths in men and **20%** in women can be attributed to obesity



Epidemiology of cancer

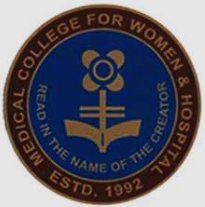
Environmental factors

Reproductive history:

Lifelong cumulative exposure to estrogen unopposed by progesterone



Increased risk of cancers of **breast & endometrium**



Epidemiology of cancer

Environmental factors

Environmental carcinogens:

- Occupational
- UV rays
- **Well water (arsenic)**
- Foods (grilled meat, high fat diet, alcohol)

Occupational cancer

Agents or groups of agents	Human cancers	Typical use
Arsenic and arsenic compounds	Lung carcinoma Skin carcinoma	By product of metal smelting
Asbestos	Lung, oesophageal, gastric, colon carcinoma, Mesothelioma	Used for many applications because of fire, heat, and friction resistance
Benzene	Acute myeloid leukaemia	Light oil
Beryllium and Beryllium compounds	Lung carcinoma	Missile fuel
Cadmium and cadmium compounds	Prostate cancer	Batteries, metal plating
Chromium compounds	Lung carcinoma	Components of paint and preservatives
Nickel compounds	Lung and oropharyngeal carcinoma	Nickel plating, components of ceramics, batteries
Radon and its decay products	Lung carcinoma	From decay of minerals containing uranium
Vinyl chloride	Hepatic angiosarcoma	Refrigerant, adhesive for plastics



Epidemiology of cancer- Age

- Age has an important influence on the likelihood of being afflicted with cancer
- Most carcinomas occur later in life **>55years**
- Main cause of death among women 40-79 years and among men aged 60-79 years

Epidemiology of cancer-Age

CHILDREN ARE NOT SPARED

Common malignancy of infancy and childhood

- **Leukaemia**
- **CNS tumours**
- **Retinoblastoma**
- **Neuroblastoma**
- **Nephroblastoma (Wilms tumour)**
- **Hepatoblastoma**
- **Rhabdomyosarcoma**
- **Ewing sarcoma**



Epidemiology of cancer

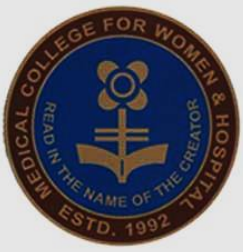
Acquired predisposing conditions

Acquired conditions are:

- Chronic inflammation
- Precursor lesions
- Immunodeficiency states

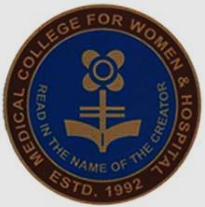
Chronic inflammatory states and cancer

Pathologic condition	Associated neoplasm	Etiologic Agent
Asbestosis, silicosis	Mesothelioma, lung carcinoma	Asbestos fibres, silica
Inflammatory Bowel disease	Colorectal carcinoma	
Lichen sclerosis	Vulvar squamous cell carcinoma	
Pancreatitis	Pancreatic carcinoma	Alcoholism, germline mutation
Chr.cholecystitis	Gallbladder cancer	Bile acid, bacteria, gall stones
Reflux esophagitis , Barrett esophagus	Esophageal carcinoma	Gastric acid
Sjogren syndrome, Hashimoto thyroiditis	MALT lymphoma	
Gastritis/ulcer	Gastric adenocarcinoma, MALT lymphoma	H. pylori
Hepatitis	HCC	Hepatitis B &/or C virus
Osteomyelitis	Carcinoma in draining sinus	Bacterial infection
Chronic cervicitis	Cervical cancer	HPV
Chronic cystitis	Bladder cancer	Schistosomiasis



Precursor lesion

- Several entities that are associated with a increased risk of cancer.



Precursor lesions

Precursor lesions

- Are associated with **increased** cancer risk
- Do not inevitably progress to cancer
- Important to be detected by **screening** procedures and thereby treated
- So **reducing the risk of developing cancer**



Precursor lesions

Chronic inflammation with metaplasia

- a) **Barrett esophagus** (gastric / colonic metaplasia of esophageal mucosa)- due to gastric reflux
- b) Squamous metaplasia of **bronchial mucosa**- due to smoking
- c) Squamous metaplasia of **bladder mucosa**- schistosomiasis infection
- d) Colonic metaplasia of **stomach**- pernicious anaemia & chr. atrophic gastritis



Precursor lesions

Non inflammatory hyperplasias

- a) **Endometrial hyperplasia**- sustained estrogenic stimulation of the endometrium
- b) **Leukoplakia**- thickening of squamous epithelium oral cavity/penis/vulva- SCC



Precursor lesions

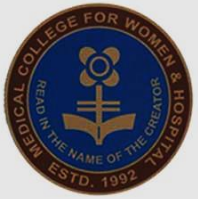
Benign neoplasms:

- **Villous adenoma** of colon- 50% progresses to cancer if left untreated
- **Most benign tumours** transform **rarely** (e.g., uterine leiomyoma, pleomorphic adenoma)
- Others **not at all** (e.g., lipomas)



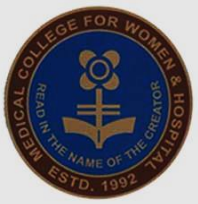
Precancerous /Premalignant conditions

- **Oral cavity:** Leukoplakia
- **Female genital tract:** Cervical dysplasia, endometrial hyperplasia, leukoplakia of vulva
- **Esophagus:** Barrett esophagus
- **Stomach:** Chronic atrophic gastritis of pernicious anaemia
- **Colon:** Villous adenoma
- **Skin:** Solar keratosis, Marjolin ulcer, dysplastic nevi, leukoplakia, radiodermatitis



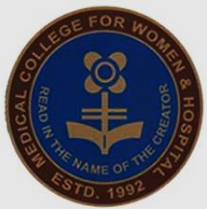
Immunodeficiency states and cancer

- Immunodeficient patients (particularly deficiency in T cell immunity)- increased risk of cancer with oncogenic viruses
- Mainly **lymphomas**
- Certain carcinomas & sarcoma



Genetic predisposition to cancer

- Interactions between **environmental** and **genetic** factors may be important determinants of cancer risk
- A number of inherited cancer syndromes are recognized which account for 5%-10% of all cancers



Inherited cancer predisposition syndromes

Syndrome	Malignancies	Inheritance	Gene
Breast/ovarian	Breast, ovarian, colonic, prostatic, pancreatic	AD	BRCA1, BRCA2
Familial polyposis coli	colonic, upper GIT	AD	APC
Neurofibromatosis 1	Neurofibrosarcoma	AD	NF1
Neurofibromatosis 2	Vestibular schwannoma	AD	NF2
Peutz- Jeghers syndrome	Colonic, ileal, breast, ovarian	AD	STK11



Inherited cancer predisposition syndromes

Syndrome	Malignancies	Inheritance	Gene
Retinoblastoma	Retinoblastoma, osteosarcoma	AD	RB1
Von Hippel-Lindau syndrome	Haemangioblastoma of retina, CNS, renal cell ca.	AD	VHL
Wilms tumour	Nephroblastoma, neuroblastoma, hepatoblastoma, rhabdomyosarcoma	AD	WT1



Thank You