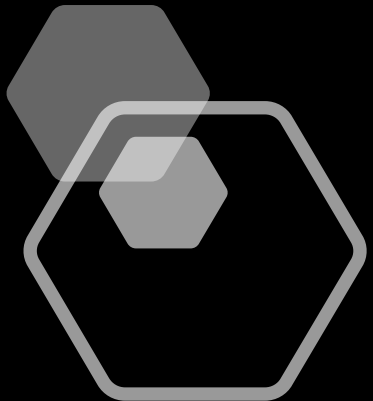# CANCER: ALL YOU NEED TO KNOW ABOUT THE BIG C

CHUMA NDIBE, MD

CANCER CARE CENTER OF TUSCALOOSA ALABAMA

Cancer: What is it?
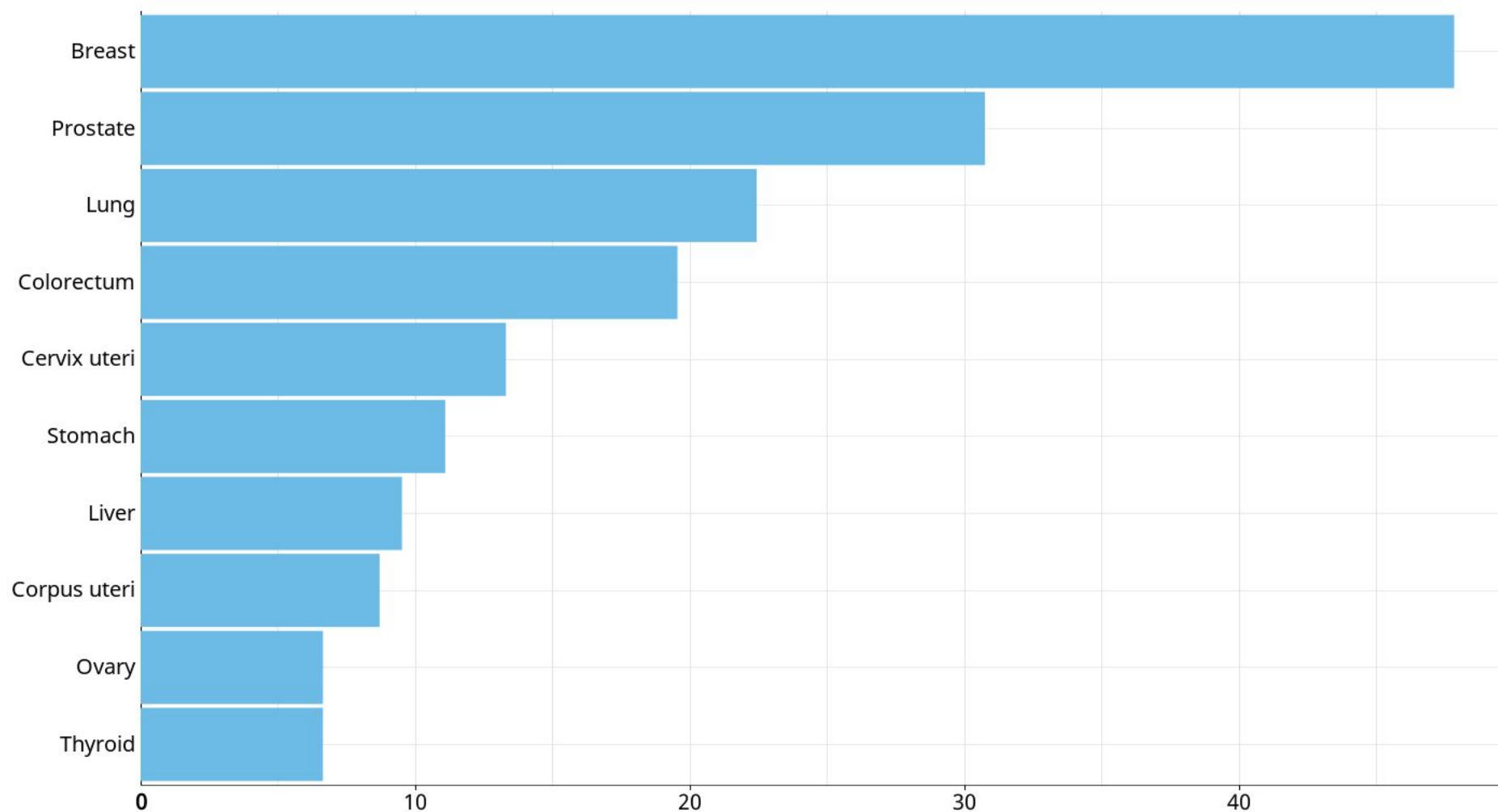
It is a <u>group of diseases</u> that result from <u>uncontrolled growth</u> with potential to <u>invade and spread</u> to other parts of the human body

It arises when the natural building blocks of life (genes/dna) in our cells are either

- Defective since conception or
- Become damaged later in life

It is a <u>chronic disease</u>, usually of aging, that develops after many months to years during which there may be no symptoms

Estimated age-standardized incidence rates (World) in 2020, worldwide, both sexes, all ages
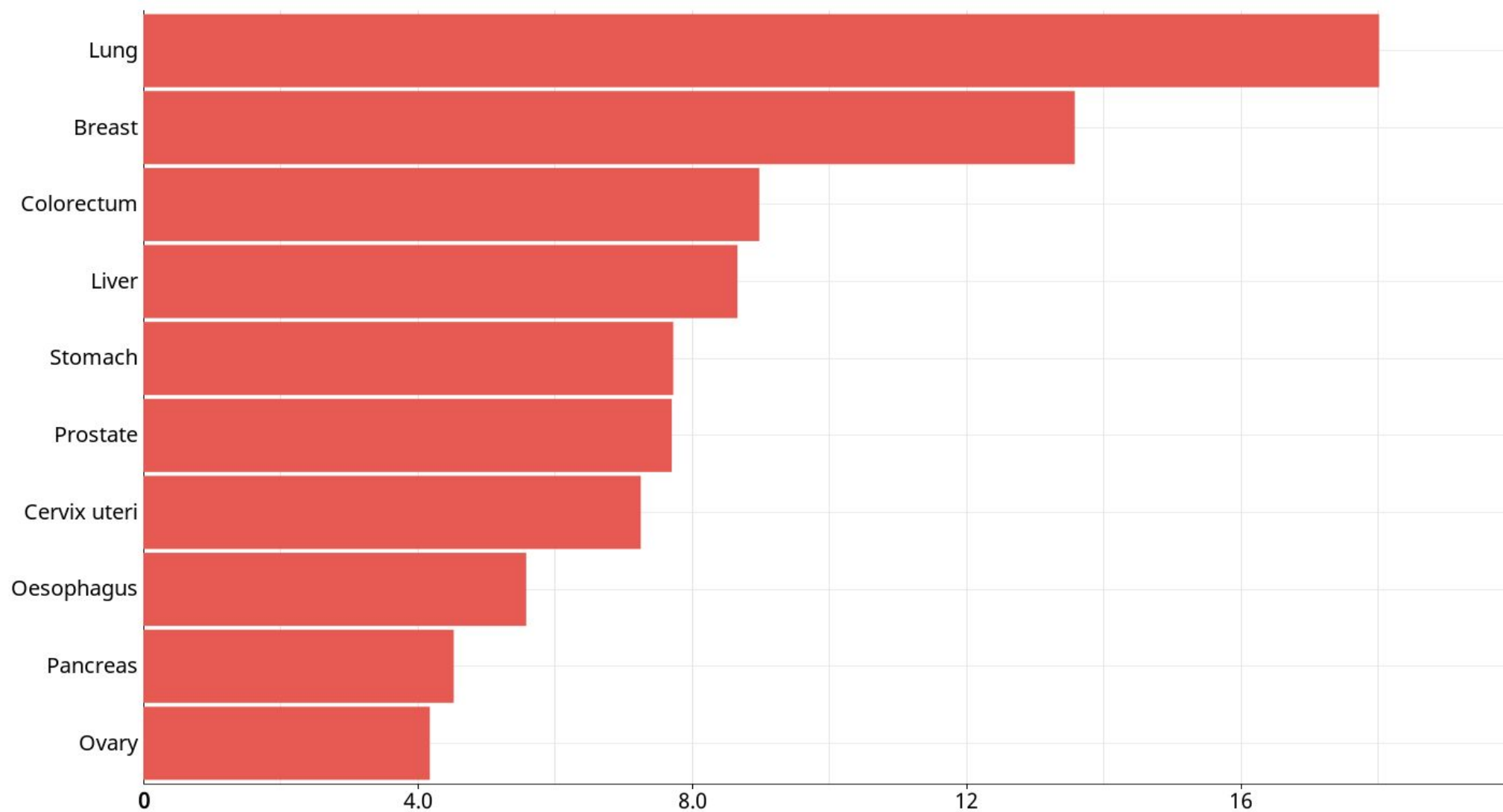
Estimated age-standardized mortality rates (World) in 2020, worldwide, both sexes, all ages

Lung			
Breast			
Colorectum			
Liver			
Stomach			
Prostate			
Cervix uteri			
Oesophagus			
Pancreas			
Ovary			

0   4.0   8.0   12   16

ASR (World) per 100 000

International Agency for Research on Cancer
World Health Organization

Cancer: How Do I Get It?

- In a small minority of patients, it arises from defective genes that were <u>inherited</u> at conception which could manifest in childhood or later in life

- However, most cancers usually develop due to <u>acquired irreparable</u> <u>damage</u> to the body's building blocks from our natural environment

- We are constantly exposed to a wide range of damaging agents from the external environment during our lifetime while the body's ability to repair these damages <u>declines as we grow older</u>

~33% of cancer diagnoses are caused by **tobacco use**.

~20% of cancer diagnoses are related to individuals being **obese or overweight**.

~16% of cancer diagnoses are related to infection with one of several **cancer-causing pathogens**.

~5% of cancer diagnoses are related to individuals getting **insufficient physical activity**.

~5% of cancer diagnoses are related to individuals having **poor dietary habits**.
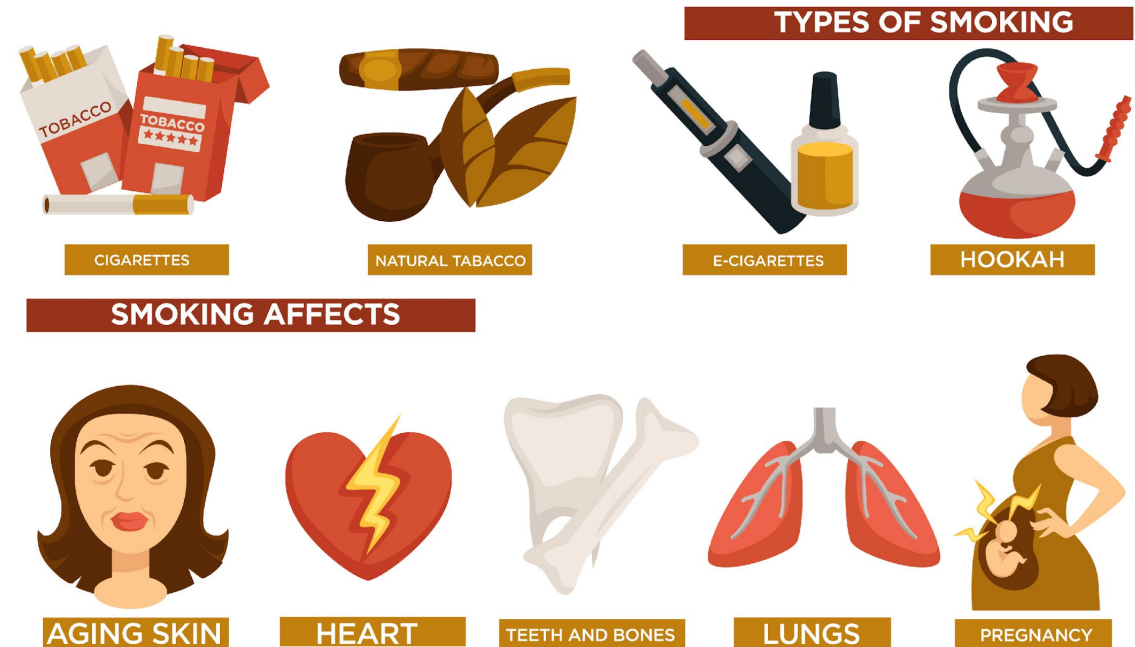
~2% of cancer diagnoses are a result of **exposure to ultraviolet light from the sun or tanning devices**.
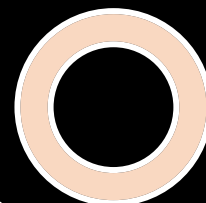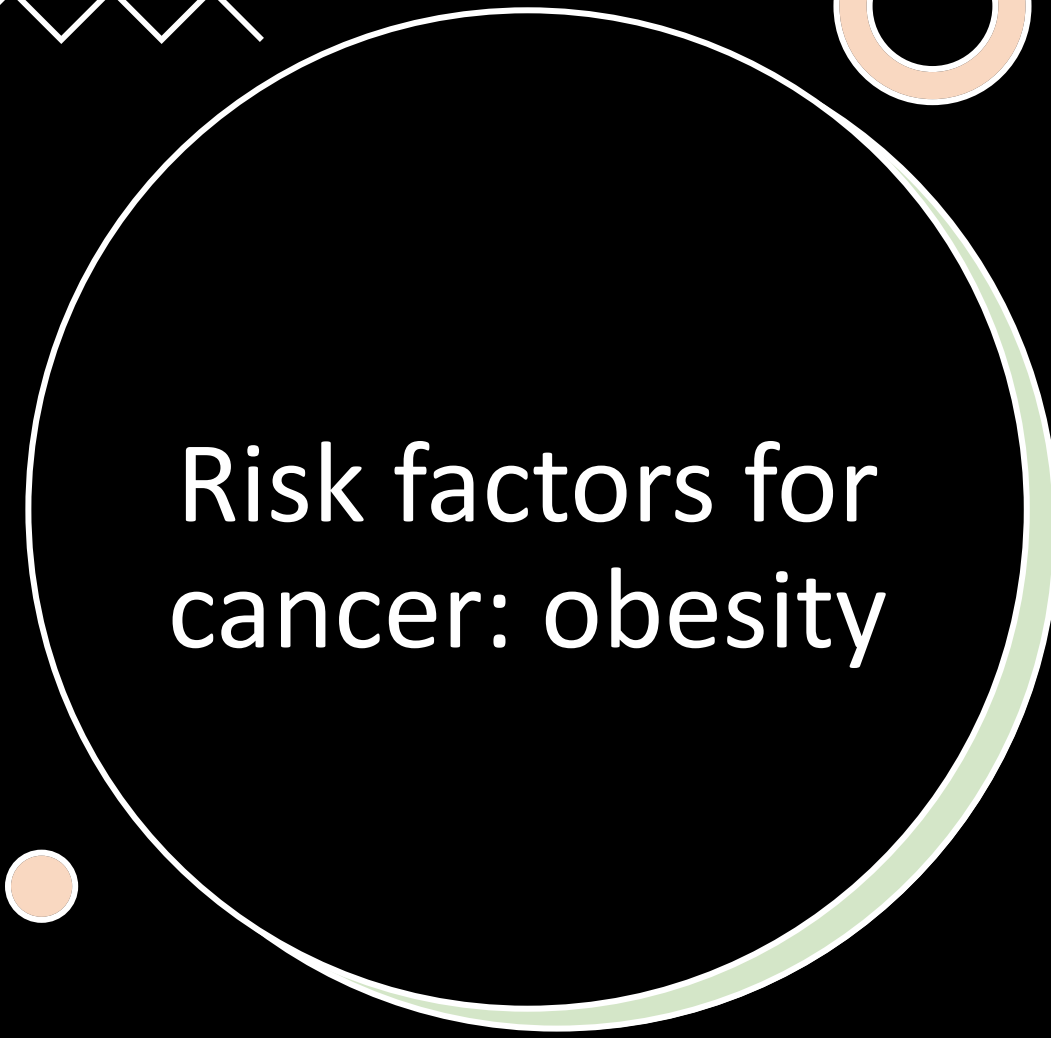
Risk factors for cancer: tobacco

- is the single most important risk factor for cancer and is responsible for approximately 22% of cancer-related deaths globally

- tobacco smoke is a complex mixture of thousands of chemicals of which about 60 have been found to be potent carcinogens

- it is most strongly associated with lung cancer and the cumulative risk increases with duration and quantity of exposure

Tobacco products

- Most common: cigarettes and cigars

- Smokeless tobacco: dipping and chewing

- Second hand smoke/bystander exposure

- Electronic cigarettes/vaping products

TYPES OF SMOKING

CIGARETTES　　　NATURAL TABACCO　　　E-CIGARETTES　　　HOOKAH

SMOKING AFFECTS

AGING SKIN　　　HEART　　　TEETH AND BONES　　　LUNGS　　　PREGNANCY

Risk factors for cancer: obesity

- Obesity is a worldwide pandemic and is associated with

- Chronic inflammation which causes DNA damage that can lead to cancer

- Elevated levels of estrogen which increases risk for breast, uterine and ovarian cancer

- Elevated levels of insulin and hormones that stimulate abnormal cell growth

- Impaired immune responses

Risk factors for cancer: infections

- Most common infections associated with cancer include

  - Helicobacter pylori – gastric cancer

  - Hepatitis B and C – liver cancer

  - Human papillomavirus – cervical cancer and oral cancers

  - HIV – lymphoma, cervical cancer, anal cancer

Human papillomavirus (HPV)

- Common sexually transmitted virus: vaginal, anal or oral sex with someone who has the virus

- Most infections (90%) will go away within 2 yrs but the rest can persist for years

- Associated with:
  - cervical, vaginal and vulva cancer in women
  - penile cancer in men
  - anus, throat, tongue and tonsils in both men and women

- Prevention: vaccination recommended at age 11-12 yrs (can start at age 9 up to age 26)

Risk factors for cancer: poor dietary habits

- a rapidly evolving and potent risk factor for cancer caused by widespread industrialization and urbanization

- associated with high intake of food that is processed, low in fiber and high in added sugars and saturated fat

- associated with low intake of fresh fruits, vegetables, whole grains and low fat dairy

Figure I-1

Adherence of the U.S. Population to the *Dietary Guidelines* Over Time, as Measured by the Average Total Healthy Eating Index-2015 Scores
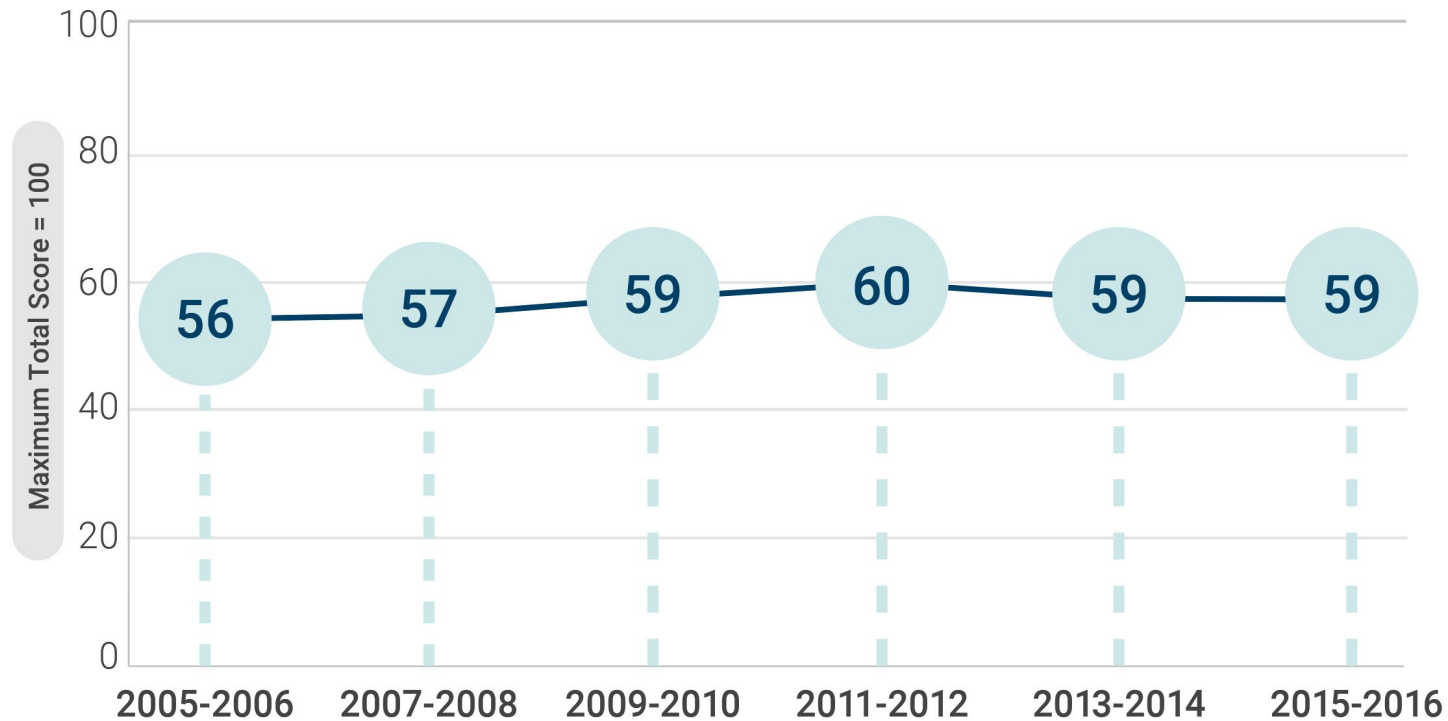
NOTE: HEI-2015 total scores are out of 100 possible points. A score of 100 indicates that recommendations on average were met or exceeded. A higher total score indicates a higher quality diet.

Data Source: Analysis of What We Eat in America, National Health and Nutrition Examination Survey (NHANES) data from 2005-2006 through 2015-2016, ages 2 and older, day 1 dietary intake data, weighted.

DGA
DietaryGuidelines.gov

Figure 1-4

Adherence of the U.S. Population to the *Dietary Guidelines* Across Life Stages, as Measured by Average Total Healthy Eating Index-2015 Scores

Maximum Total Score = 100

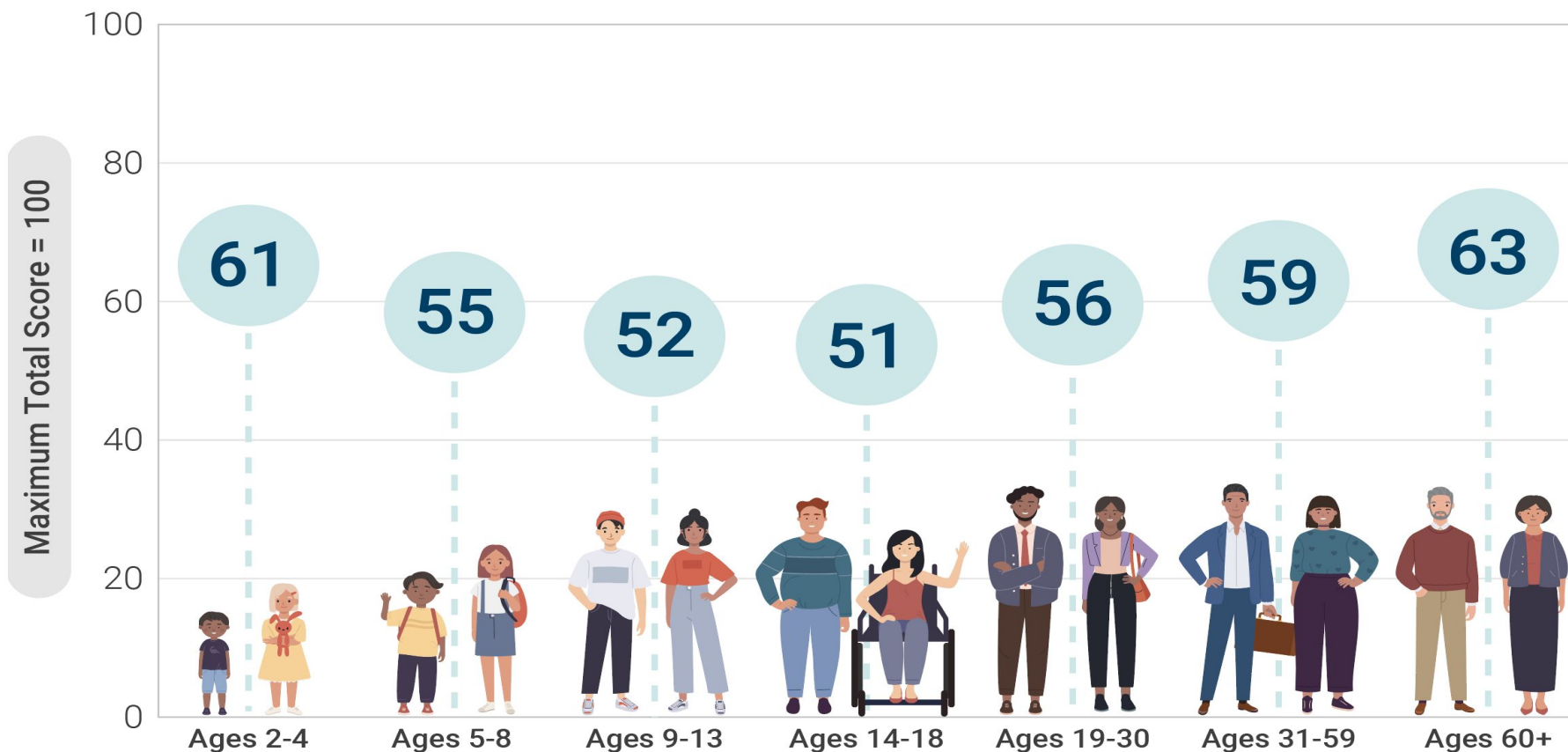| Ages 2-4	Ages 5-8	Ages 9-13	Ages 14-18	Ages 19-30	Ages 31-59	Ages 60+
61	55	52	51	56	59	63

NOTE: HEI-2015 total scores are out of 100 possible points. A score of 100 indicates that recommendations on average were met or exceeded. A higher total score indicates a higher quality diet.

Data Source: Analysis of What We Eat in America, NHANES 2015-2016, ages 2 and older, day 1 dietary intake data, weighted.

DGA
DietaryGuidelines.gov

Risk Factors For Cancer: Ultraviolet Light

- The sun, sunlamps, and tanning booths all give off ultraviolet radiation which can damage the skin and cause skin cancer

- People of all ages and skin tones should limit the amount of time they spend in the sun, especially between 10AM and 4PM

- To protect against the sun: wear wide brim hats, dark long sleeves and pants, use sunglasses and sunscreen with a sun protection factor (SPF) of at least 30

Risk Factors For Cancer

Physical inactivity

Alcohol

Cancer causing substances:

Radiation: x-rays, gamma rays
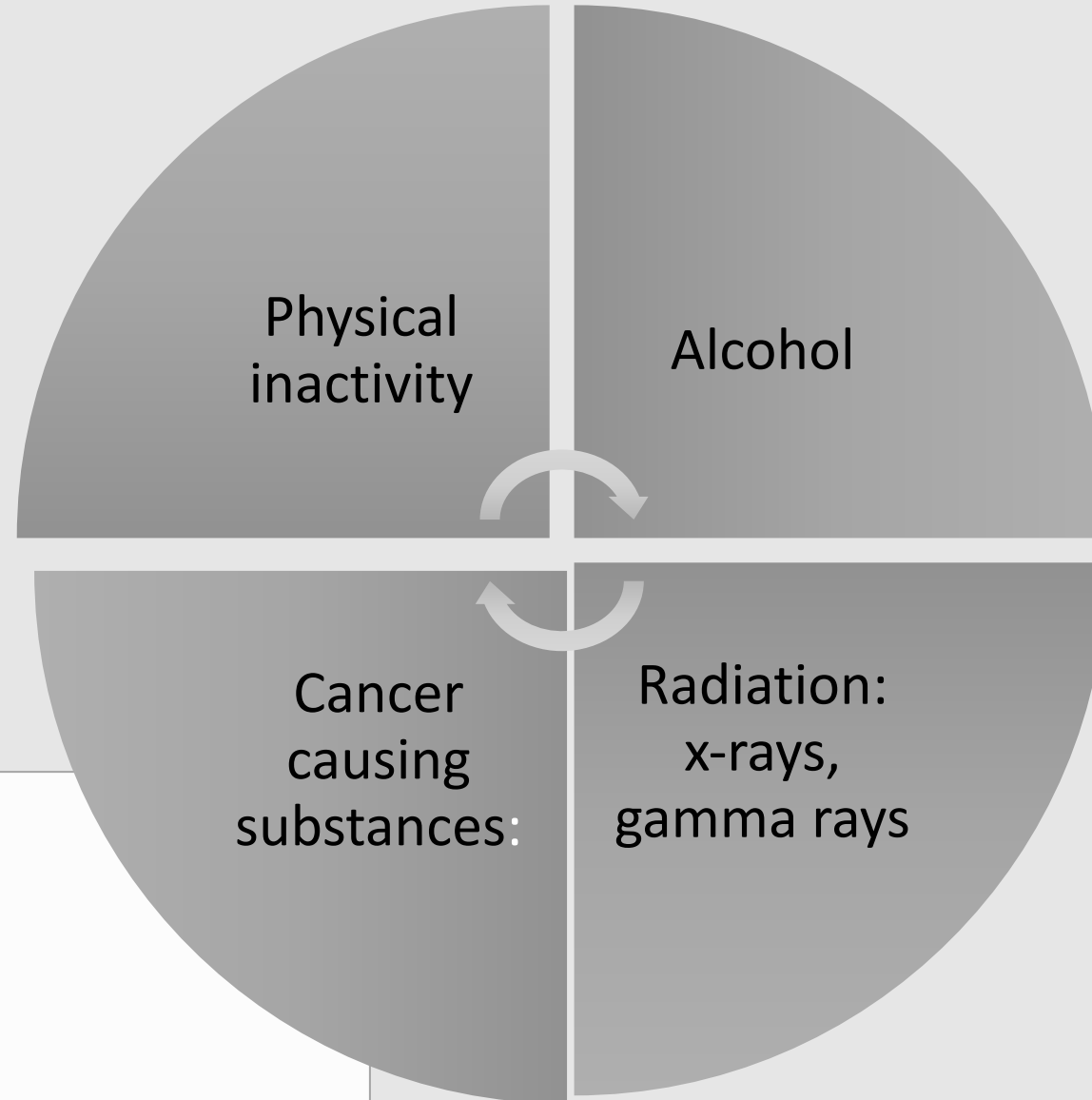
- Radon
- Aflatoxins
- Asbestos
- Arsenic

9 Easy Ways to
Reduce Your Cancer Risk

Eat a
heart-healthy diet.

Limit your
alcohol intake.

Be physically
active.

Don't smoke — or use
any form of tobacco.

Make your home
smoke-free.

Avoid too much sun
and use protection.

Breastfeed to
reduce mother's
cancer risk.

Ensure your children
get hepatitis B and
HPV vaccines.

Take part in
cancer-screening
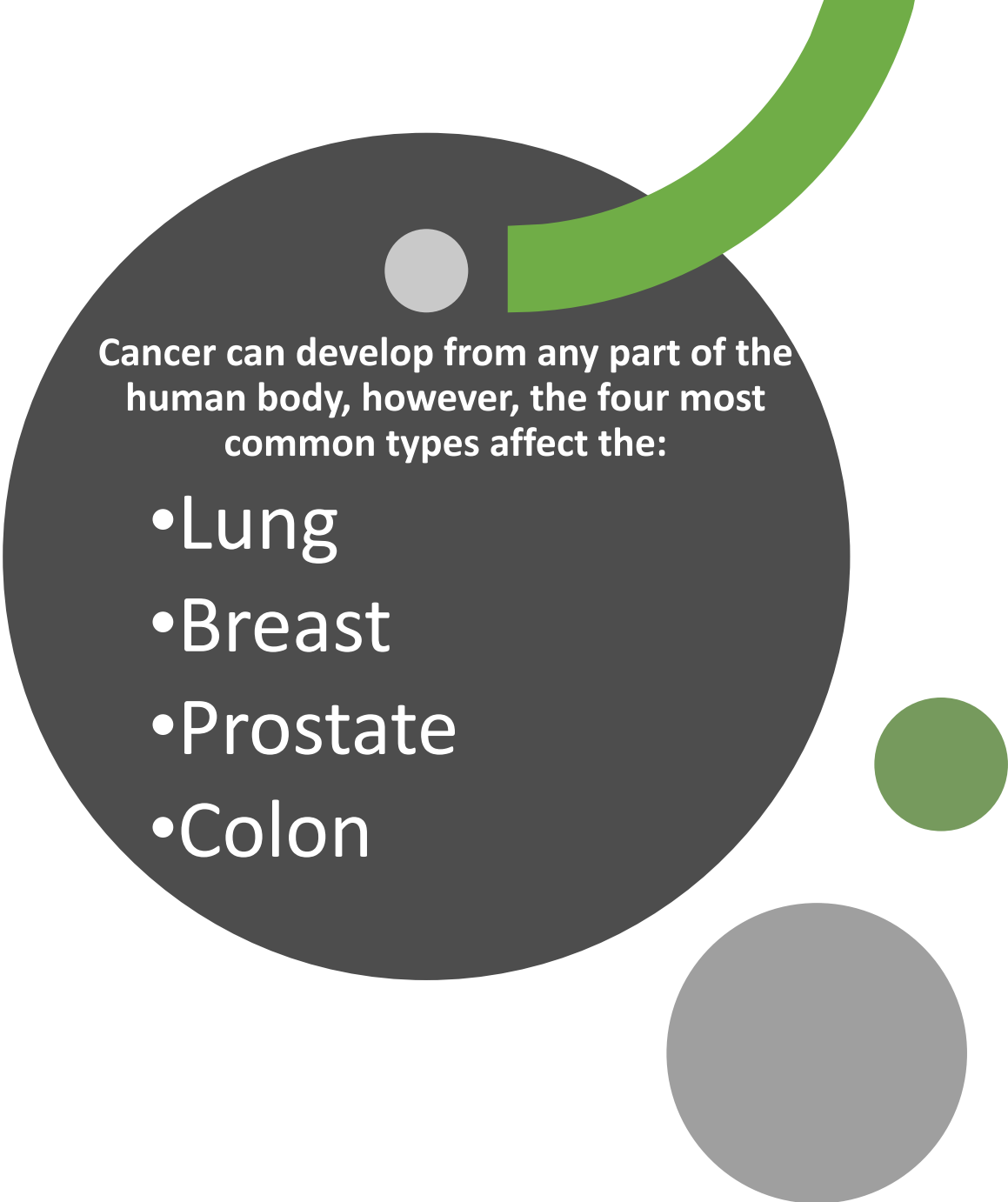programs.

Source: World Health Organization

#worldcancerday

Cancer: what are the most common types?

Cancer can develop from any part of the human body, however, the four most common types affect the:

- Lung
- Breast
- Prostate
- Colon

Lung cancer

- most common cause of cancer death worldwide associated with chronic tobacco use

- however, with continued decline in smoking, there has been a gradual increase in incidence of lung cancer in never smokers

- most cases are diagnosed in advanced stages, however, there has been an increase in incidence of cases diagnosed at earlier stages due to screening

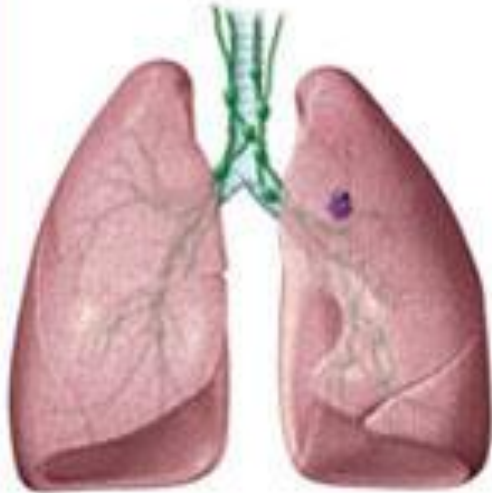# Lung Cancer: <u>Symptoms</u>

- Cough (most common)
- Coughing up blood
- Shortness of breath
- Chest pain
- Hoarseness of voice
- Unintentional weight loss

Lung cancer: screening

- Low-dose computed tomography recommended annually for:

  - Asymptomatic adults aged 55-80 yrs

  - 30 pack-year smoking history and currently smoke or

  - Quit smoking within the past 15 yrs

Lung cancer: stages
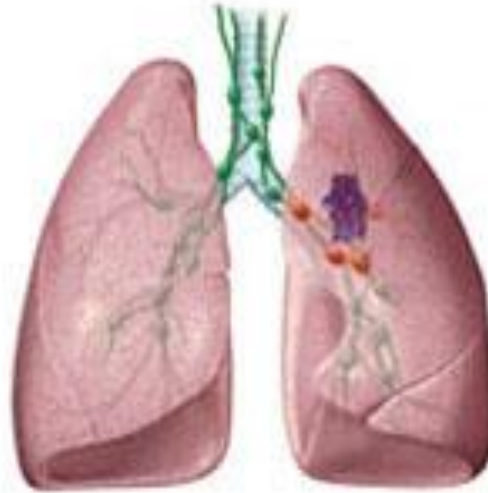
Stage I   Stage II   Stage III   Stage IV

Lung Cancer: Types

Non small cell lung cancer

- Adenocarcinoma
- Squamous cell carcinoma

Small cell lung cancer

- Almost always associated with smoking

Lung Cancer: Treatment

Stage 1 and 2: surgical resection +/- chemotherapy

Stage 3: combination of chemotherapy and radiation

Stage 4:
- chemotherapy
- immunotherapy
- orally administered targeted therapy
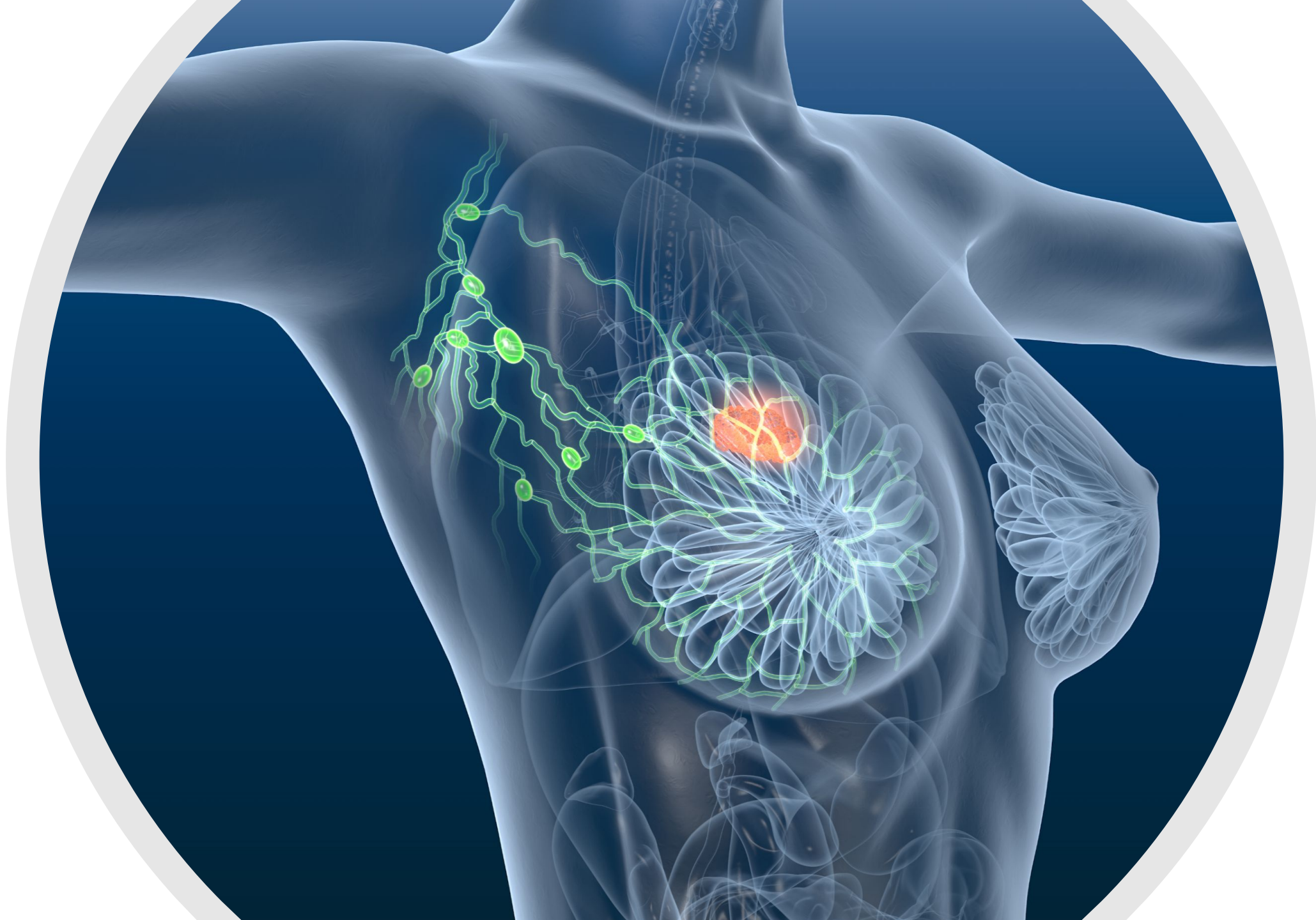
Breast cancer

- Most common cancer diagnosed in women; also diagnosed in men as well

- Gradual increase in breast cancer diagnoses due to increased access to screening

- Continued decline in breast cancer mortality due to improvement in treatment options

Breast Cancer: Risk Factors

Aging

Inherited mutations (BRCA1, BRCA2)

Early onset of menstruation or delayed menopause

Dense breasts

Physical inactivity/post menopausal weight gain

Hormone replacement therapy/certain oral contraceptive pills

Alcohol use

Family history of breast cancer in first degree relative

Breast Cancer: Symptoms

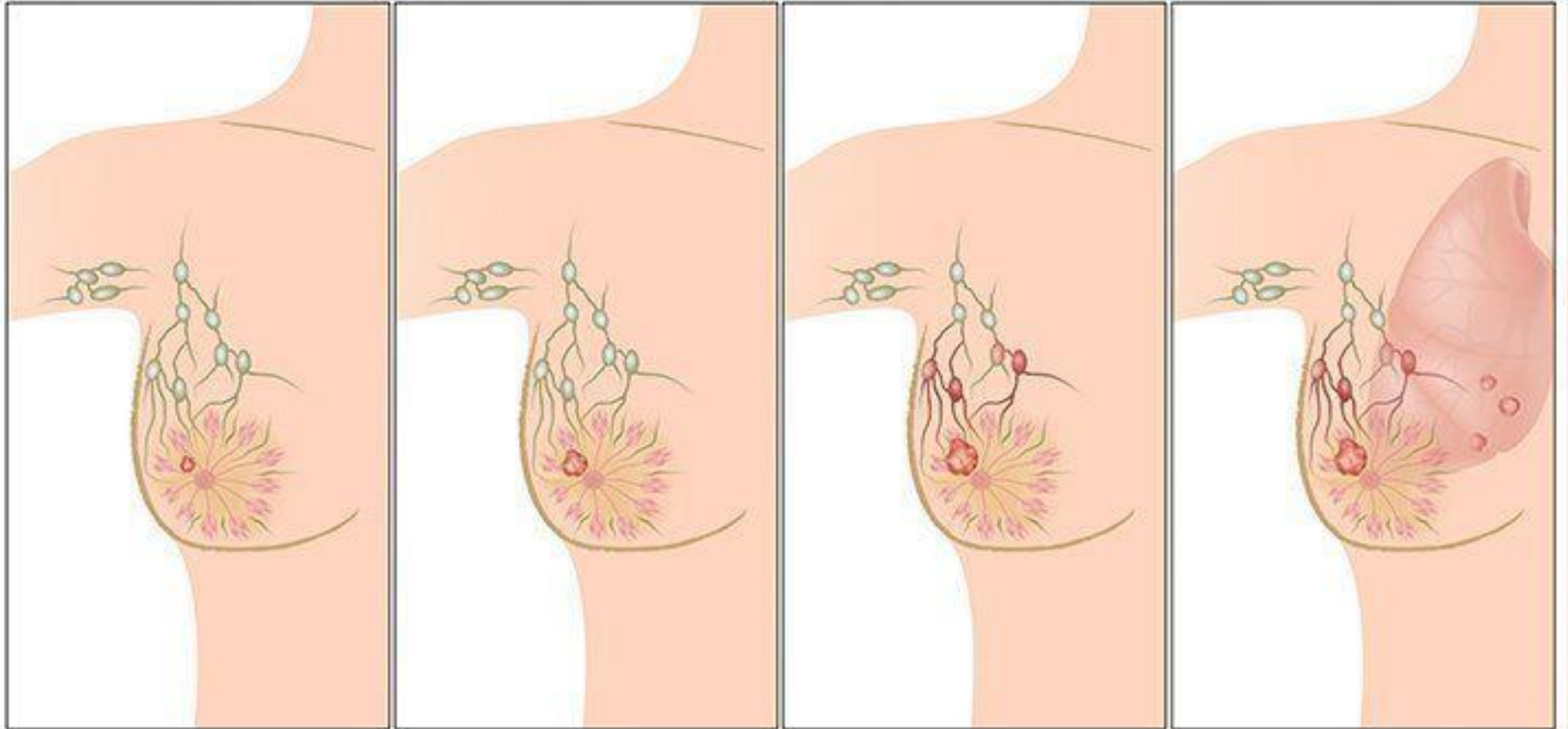|			
New lump in the breast or underarm (armpit).	Thickening or swelling of part of the breast.	Irritation or dimpling of breast skin.	Redness or flaky skin in the nipple area or the breast.
Pulling in of the nipple or pain in the nipple area.	Nipple discharge other than breast milk, including blood.	Change in the size or the shape of the breast.	Pain in any area of the breast

Breast Cancer: Screening

TABLE 1 Screening mammography strategies for average risk women[2-4]

Organization	Starting age, years	Stopping age, years	Frequency
ACOG, ACR, NCCN	40	Life expectancy 5–7 years; life expectancy <10 years (ACOG)	Annual
ACS, ASBS, ASCO	45	Life expectancy <10 years	Annual to age 54, then biennial
AAFP, ACP, USPSTF	50	74	Biennial

Abbreviations: AAFP, American Academy of Family Physicians; ACOG, American College of Obstetricians and Gynecologists; ACP, American College of Physicians; ACR, American College of Radiology; ACS, American Cancer Society; ASBS, American Society of Breast Surgeons; ASCO, American Society of Clinical Oncology; NCCN, National Comprehensive Cancer Network; USPSTF, US Preventive Services Task Force.

Breast cancer: stages

| Stage I | Stage II | Stage III | Stage IV |

CLASSIFICATION

BREAST CARCINOMA

Carcinoma *in situ*

1. Ductal Carcinoma *in situ*
2. Lobular Carcinoma *in situ*

Invasive Carcinoma

1. Invasive ductal carcinoma
2. Invasive lobular carcinoma
3. Medullary carcinoma
4. Mucinous (colloid) carcinoma
5. Papillary carcinoma
6. Tubular carcinoma
7. Paget's disease of the nipple
8. Rare cancers (adenoid cystic, squamous cell, apocrine)
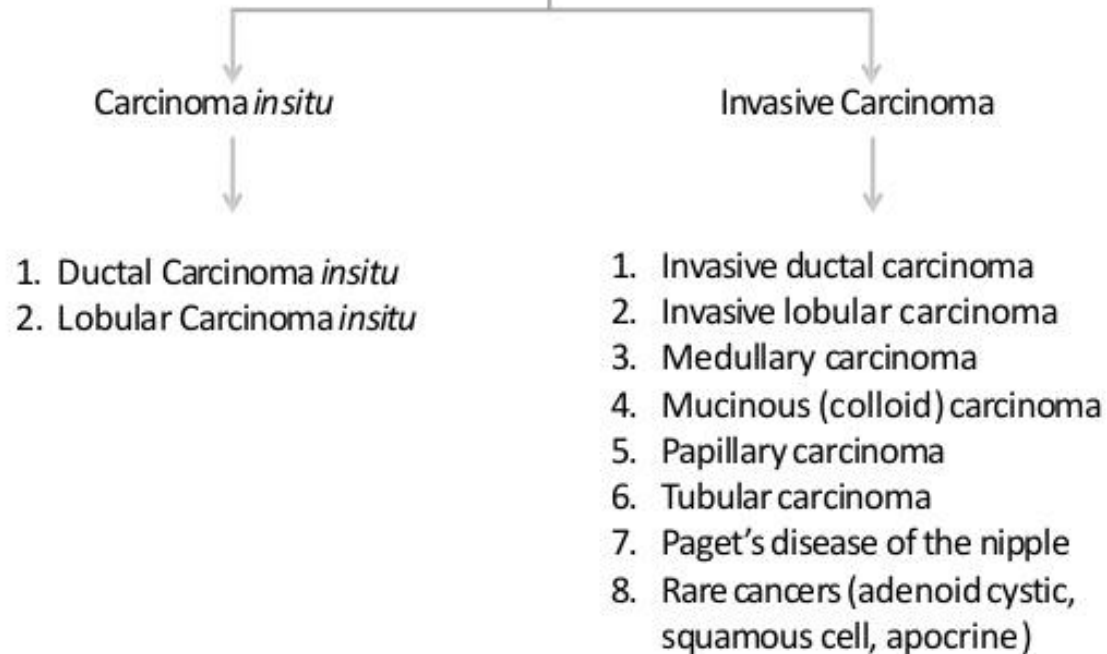
Breast Cancer: Subtypes

- Hormone receptor positive
  - ER (estrogen receptor)
  - PR (progesterone receptor)

- HER2+ (human epidermal growth factor receptor 2)

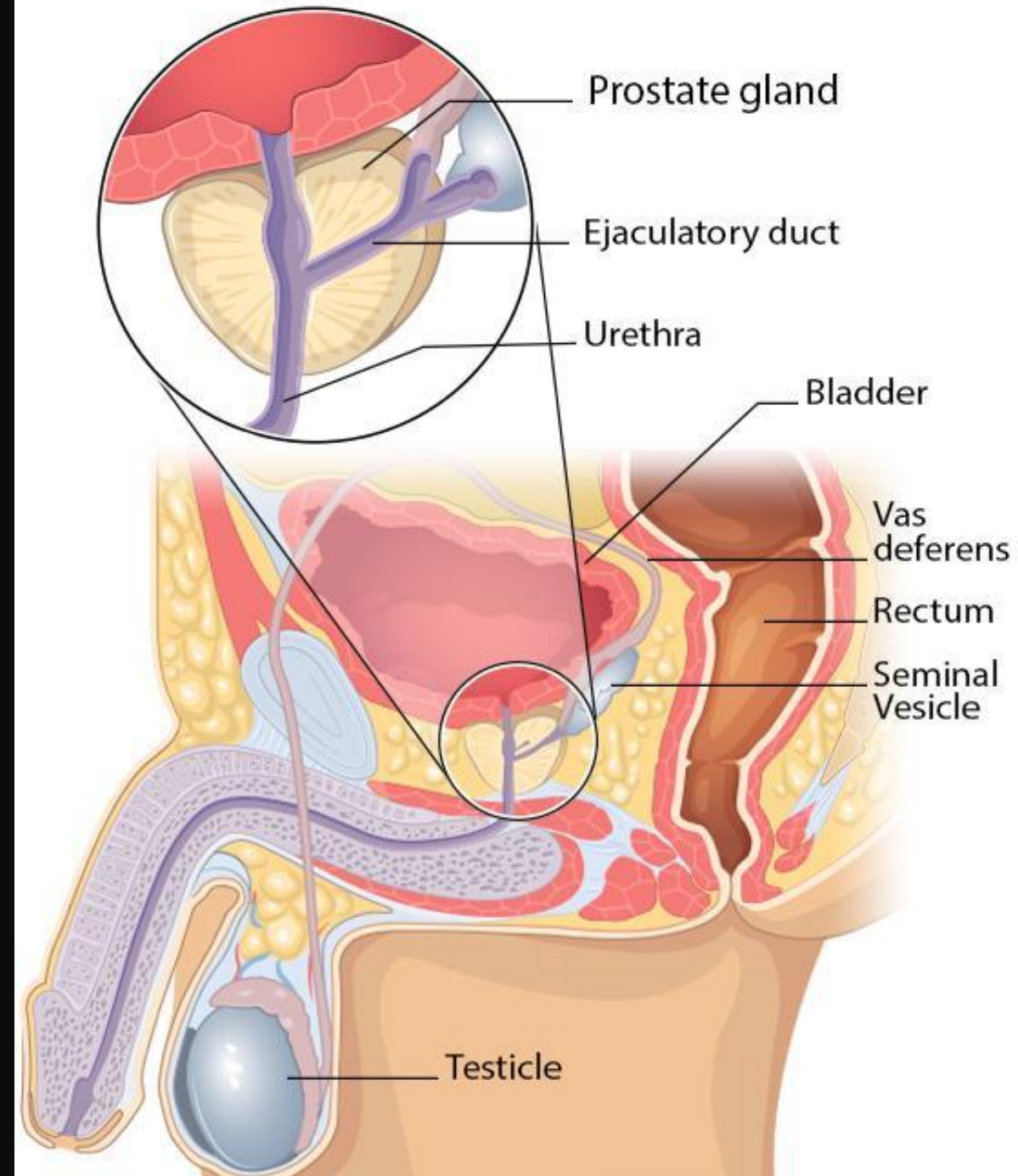- Triple negative (ER/PR/HER2 negative)

Breast cancer: treatment

- Multimodal and dependent on the stage

- Early stage:
  - surgery (lumpectomy with radiation or mastectomy)
  - adjuvant chemotherapy +/- HER2 targeted therapy (in select patients)
  - adjuvant hormonal therapy for at least 5 yrs. (longer in select patients)

- Advanced stage:
  - hormonal therapy
  - chemotherapy
  - HER2 targeted therapy

Prostate Cancer

bladder

prostate

tumor
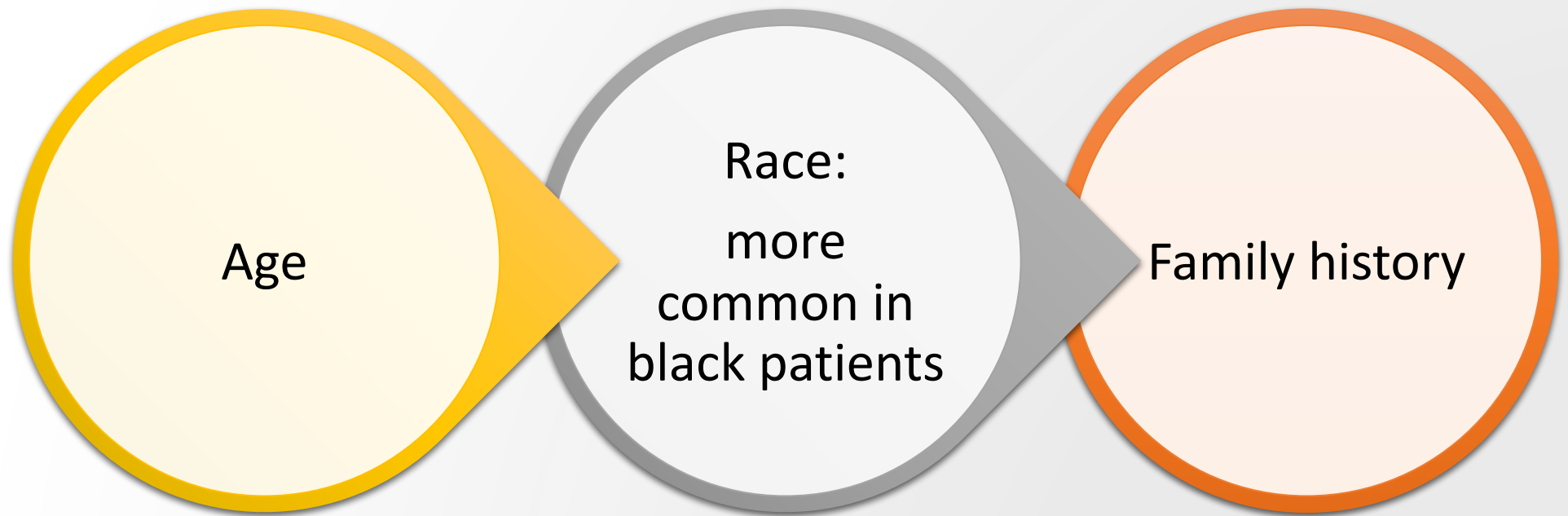
urethra

**enlarged prostate
with malignant tumors**
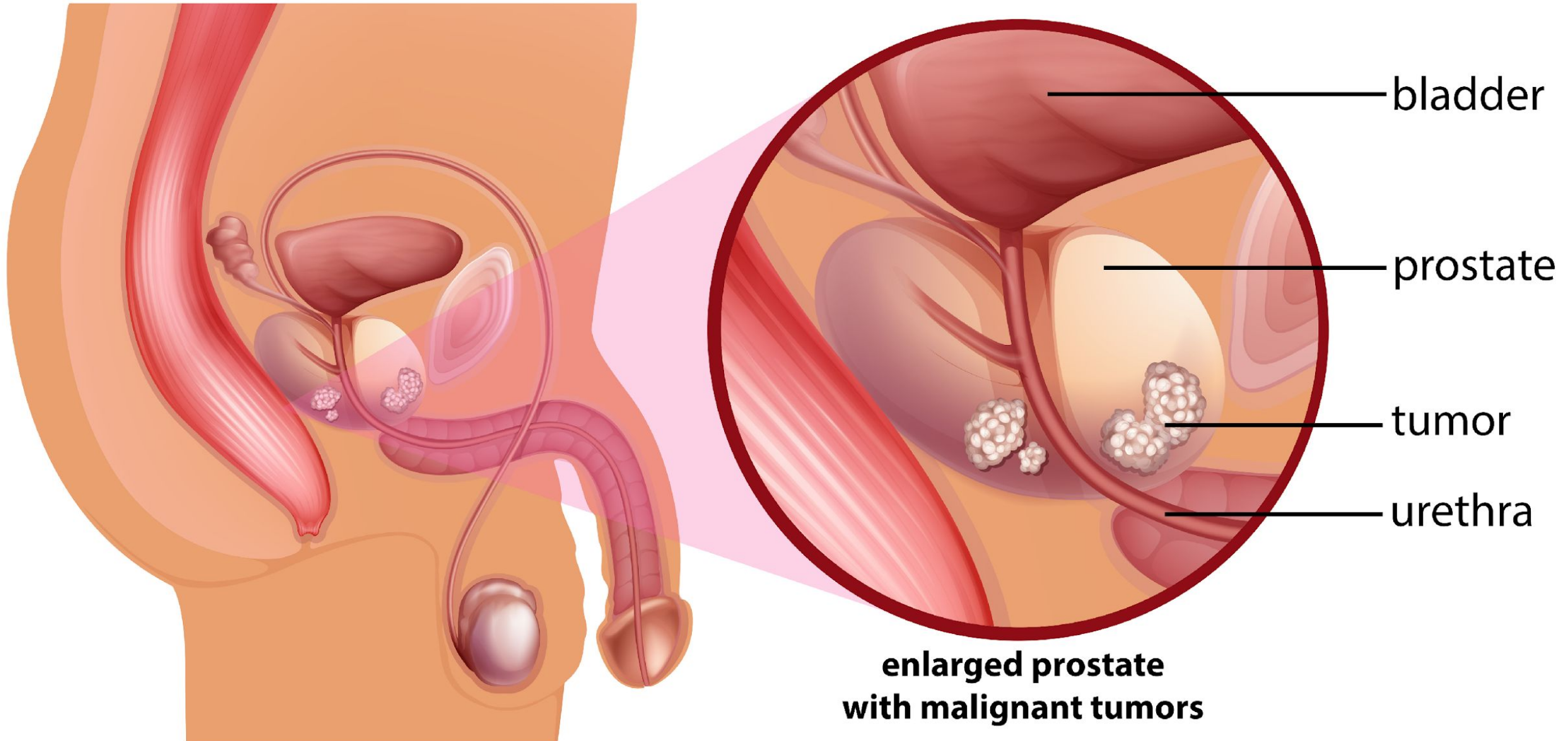
Prostate Cancer

- The most common cancer in men

- The prostate is a walnut sized gland below the bladder that is part of the male reproductive system

- It enlarges with age and can cause urinary obstruction

Prostate gland

Ejaculatory duct

Urethra

Bladder

Vas deferens

Rectum

Seminal Vesicle

Testicle

Prostate Cancer: Risk Factors

Age

Race: more common in black patients

Family history

Prostate cancer: symptoms

- Difficulty starting urination.
- Weak or interrupted flow of urine.
- Frequent urination, especially at night.
- Difficulty emptying the bladder completely.
- Pain or burning during urination.
- Blood in the urine or semen.
- Pain in the back, hips, or pelvis that doesn't go away.
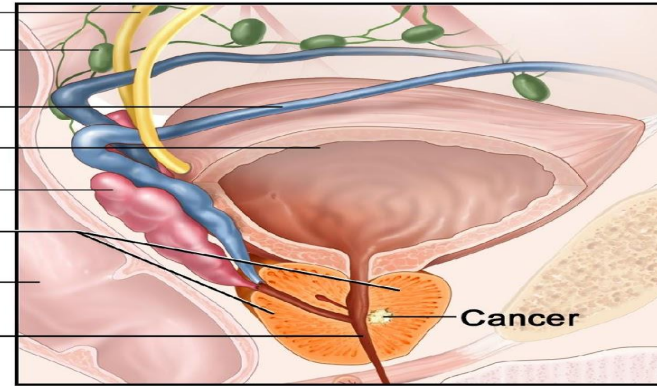- Painful ejaculation

Prostate cancer: screening

- There is no standard screening test, however, the prostate specific antigen (PSA) is a commonly used blood marker that is elevated in prostate cancer and other benign disorders

- Due to the potential harms associated with PSA screening, current guidelines recommend:
    - individualized decision making with a doctor for men ages 55-69 yrs
    - >70 yrs: no routine screening
    - <55 yrs: consider for black patients and positive family history
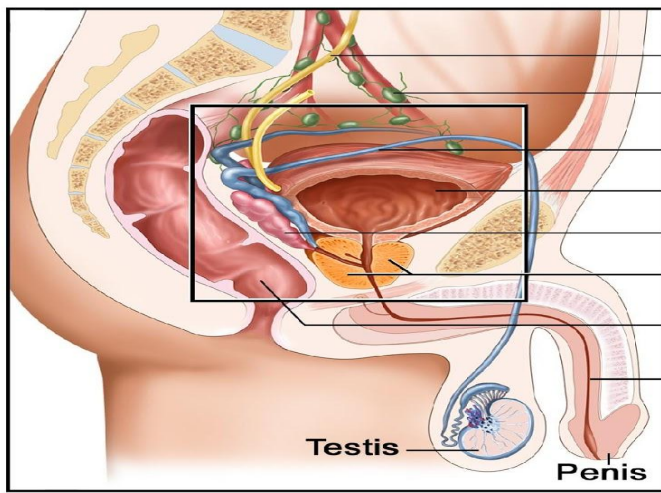
Stage I

Ureter
Lymph node
Vas deferens
Bladder
Seminal vesicle
Prostate gland
Rectum
Urethra
Testis
Penis
Cancer
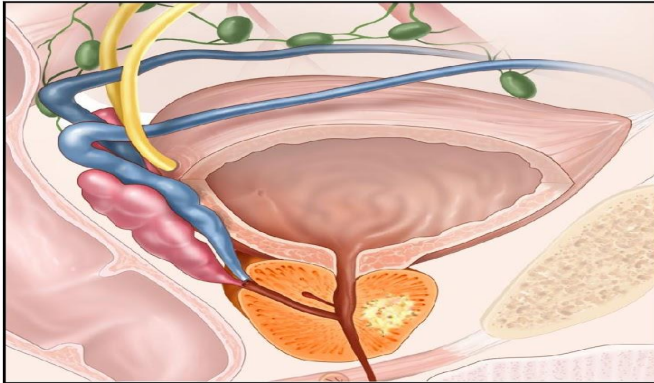
Stage IIA

Stage IIB

Stage III

Stage IV

Cancer may spread to other organs

© 2010 Terese Winslow
U.S. Govt. has certain rights
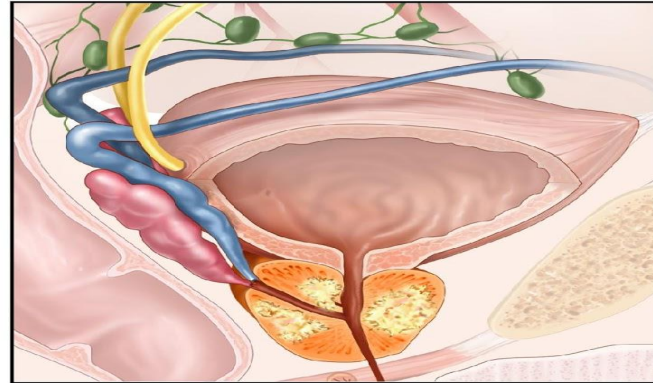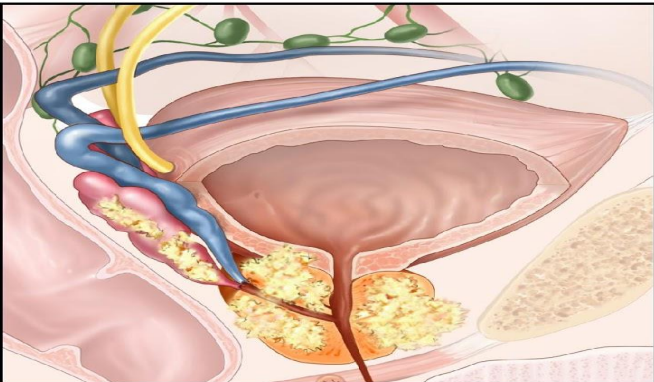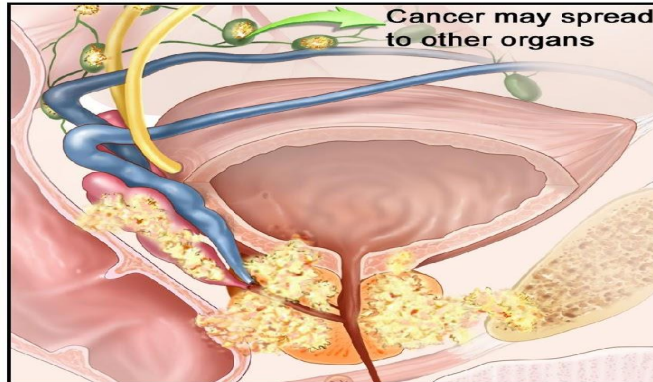
Prostate cancer: treatment

- Localized prostate cancer
  - Active surveillance
  - Surgery (prostatectomy)
  - Radiation

- Advanced prostate cancer
  - Hormonal therapy
  - Palliative radiation

Colon cancer

- Is a cancer that arises from the colon or rectum

- Sometimes abnormal growths called polyps form in the colon or rectum and over time, these growths can turn into cancer

- Recently, there has been a gradual increase in the incidence of colon cancer diagnosed in young people

Colon cancer: risk factors

- **Age**
- **Family history**
- **Inflammatory bowel disease**
- **Lifestyle**
  - Lack of regular physical activity
  - Diet low in fruit and vegetables.
  - Low-fiber and high-fat diet, or a diet high in processed meats.
  - Overweight and obesity
  - Alcohol consumption.
  - Tobacco use

Colon Cancer: Symptoms

Change in bowel habits
- Diarrhea
- Constipation

Blood in stools

Abdominal pain

Weight loss

Screening Recommendations for Average Risk Patients by Age	
Age	**Recommended Screening & Intervals**
45 - 75	Begin with baseline colorectal cancer screening at age 45. Continue with screening at physician recommended intervals.
76 - 85	Continue with physician recommended screenings based on factors such as overall physical health, life expectancy, and prior screening results.
Over 85	Colorectal cancer screenings are not recommended for individuals over the age of 85.

Colon Cancer: Screening Tests

Stool based

- fecal occult blood test
- stool DNA
- FIT

CT Colonography

Colonoscopy: Gold Standard
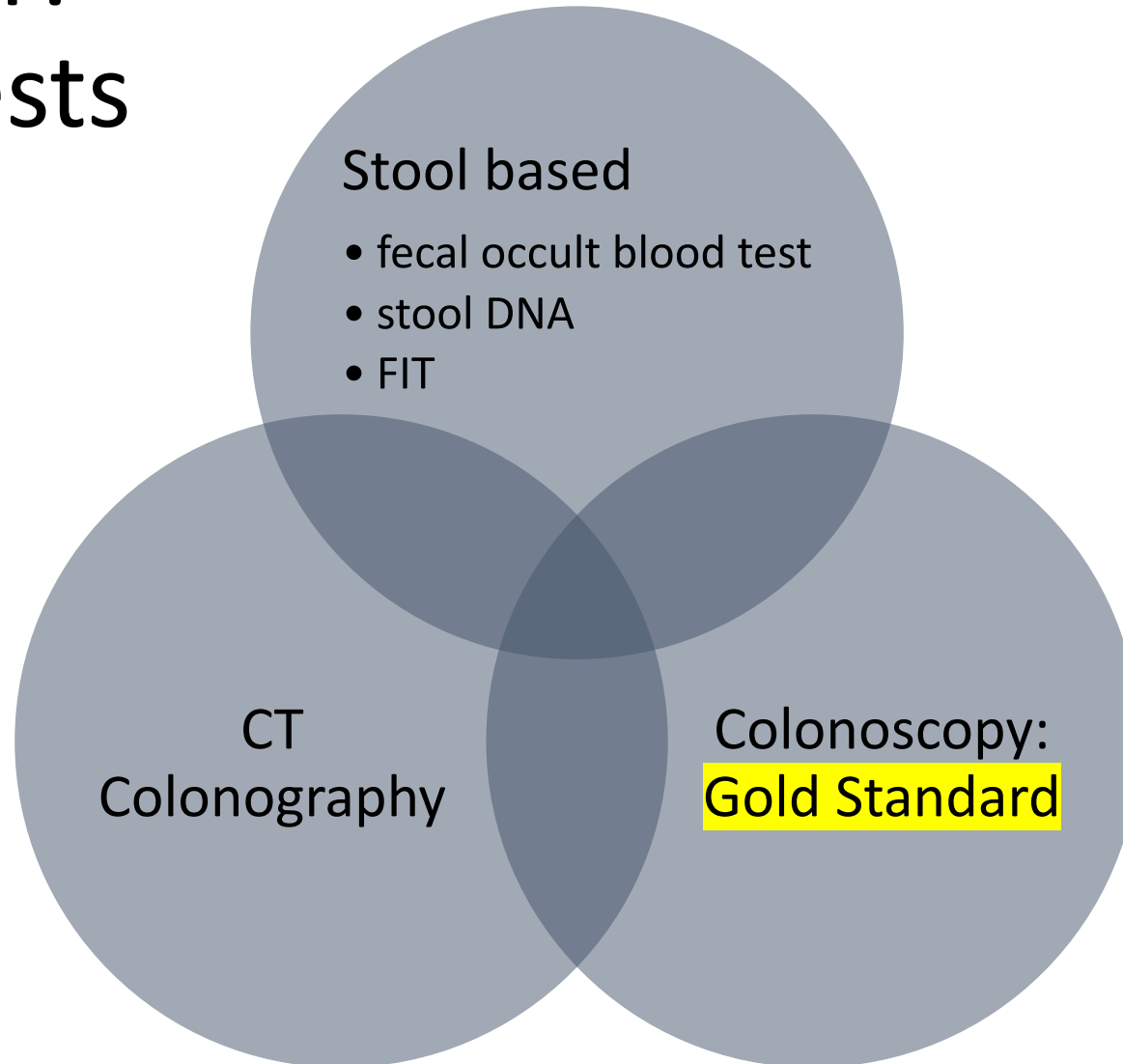
Primary Stages of Colon Cancer

Stage 0

Stage I

Stage II

Stage III

Stage IV
(Spread to lymph nodes or organs)

Created with BioRender.com

Chemo Experts
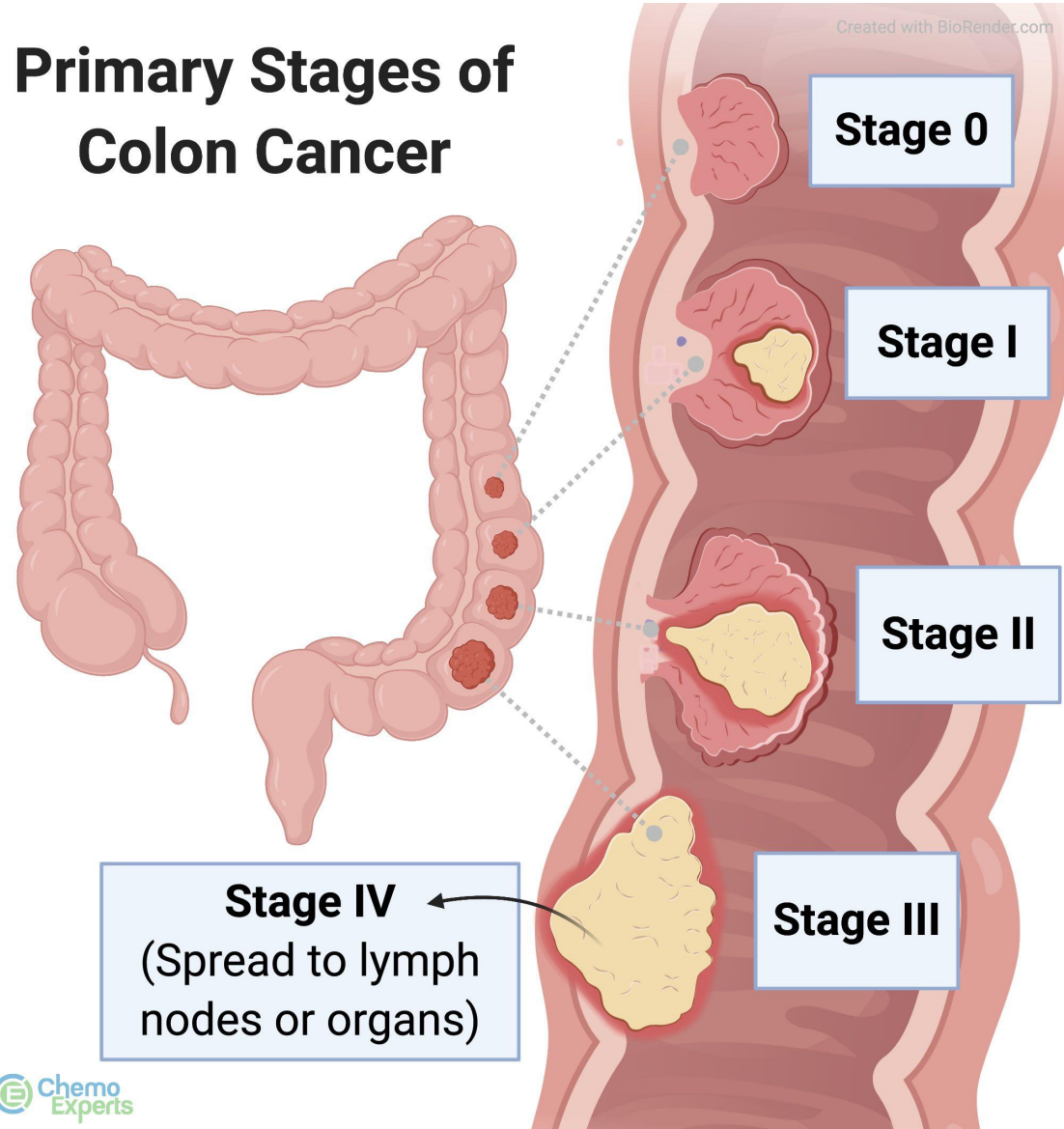
Colon cancer: treatment

- Curative surgery is the standard for early stage disease

- Postoperative chemotherapy is recommended for early stage disease with high risk of recurrence (high risk stage 2, stage 3)

- Palliative chemotherapy is treatment option for advanced disease

FAQs

Can I get cancer from my food container?

Can I get cancer from unprotected sex?

Can I give cancer to my children?

Can sugar make my cancer worse?

Can I get cancer from artificial sweeteners?

Can I get breast cancer from deodorants?

Can I get cancer from cell phone use?

Is cancer contagious?

FAQs

Is breast enlargement (gynecomastia) a risk factor for male breast cancer?

Do fertilizers cause cancer?

Are self breast exams still useful?

When is the best time to give chemotherapy for cancer?

Can we test for radon exposure at home?

When is palliative care recommended in cancer patients?

Are digital rectal exams of the prostate still useful?

What are other cost effective options to available screening?

FAQs

What are other screening options for colon cancer in people under 45 yrs?

Is HPV vaccine still recommended in people diagnosed with HPV?

Are there certain cosmetics that can cause cancer?

Do birth control pills cause cancer?

All
Cancers

Breast
Cancer

Childhood
Cancer

Colon
Cancer

Lung
Cancer

Bladder
Cancer

Carcinoid
Cancer

Appendix
Cancer

Esophageal

Kidney Cancer /
Leukemia

Leiomyosarcoma /
Pancreatic Cancer

Lymphoma

Cervical
Cancer

Uterine
Cancer

Brain
Cancer

Gallbladder / Bile Duct
Cancer

Hodgkin´s
Lymphoma

Liver
Cancer

Melanoma

Head and Neck
Cancer

Stomach
Cancer

Multiple
Myeloma

Ovarian
Cancer

Testicular
Cancer

Sarcoma /
Bone Cancer

Prostate
Cancer

Thyroid
Cancer

Stomach
Cancer

Cancer Awareness Ribbons