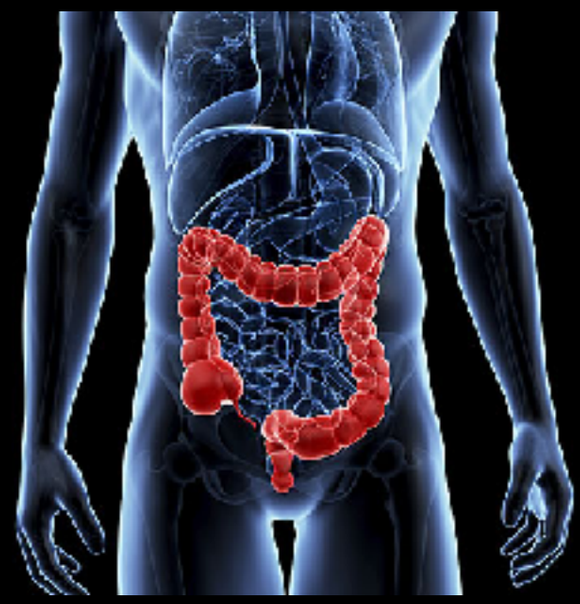
Colon Cancer Screening: An Update



Son T. Do, MD

Digestive Health Associates of Texas

Clinical Assistant Professor
University of Texas Southwestern

Colorectal Cancer Awareness Month

preventable • treatable • beatable

TRUE *or* FALSE?

Colorectal cancer is the 2nd leading cancer killer.

TRUE FALSE

Both men and women get colorectal cancer.

TRUE FALSE

Colorectal cancer often starts with no symptoms.

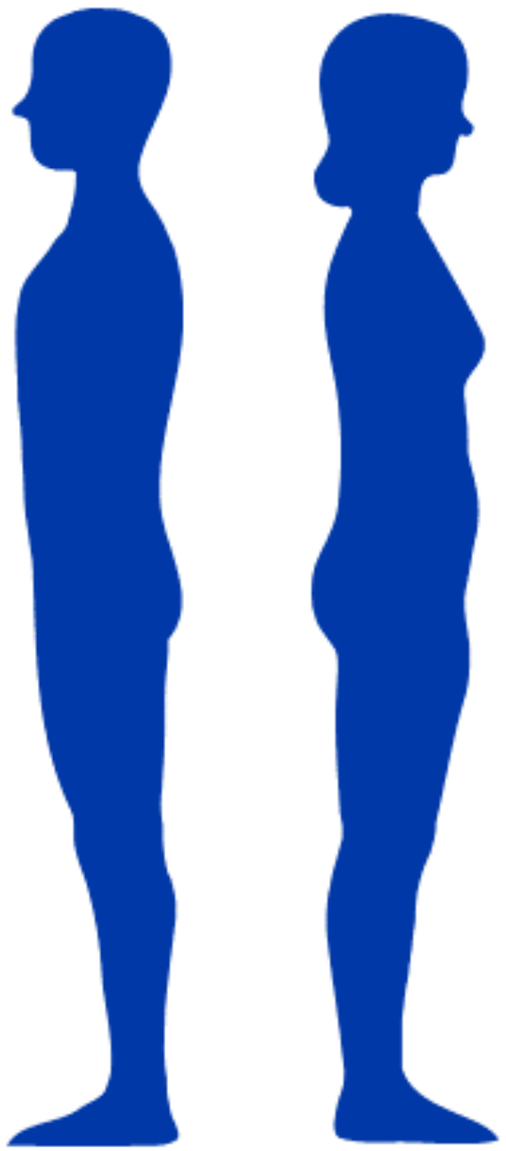
TRUE FALSE

Screening helps prevent colorectal cancer.

TRUE FALSE

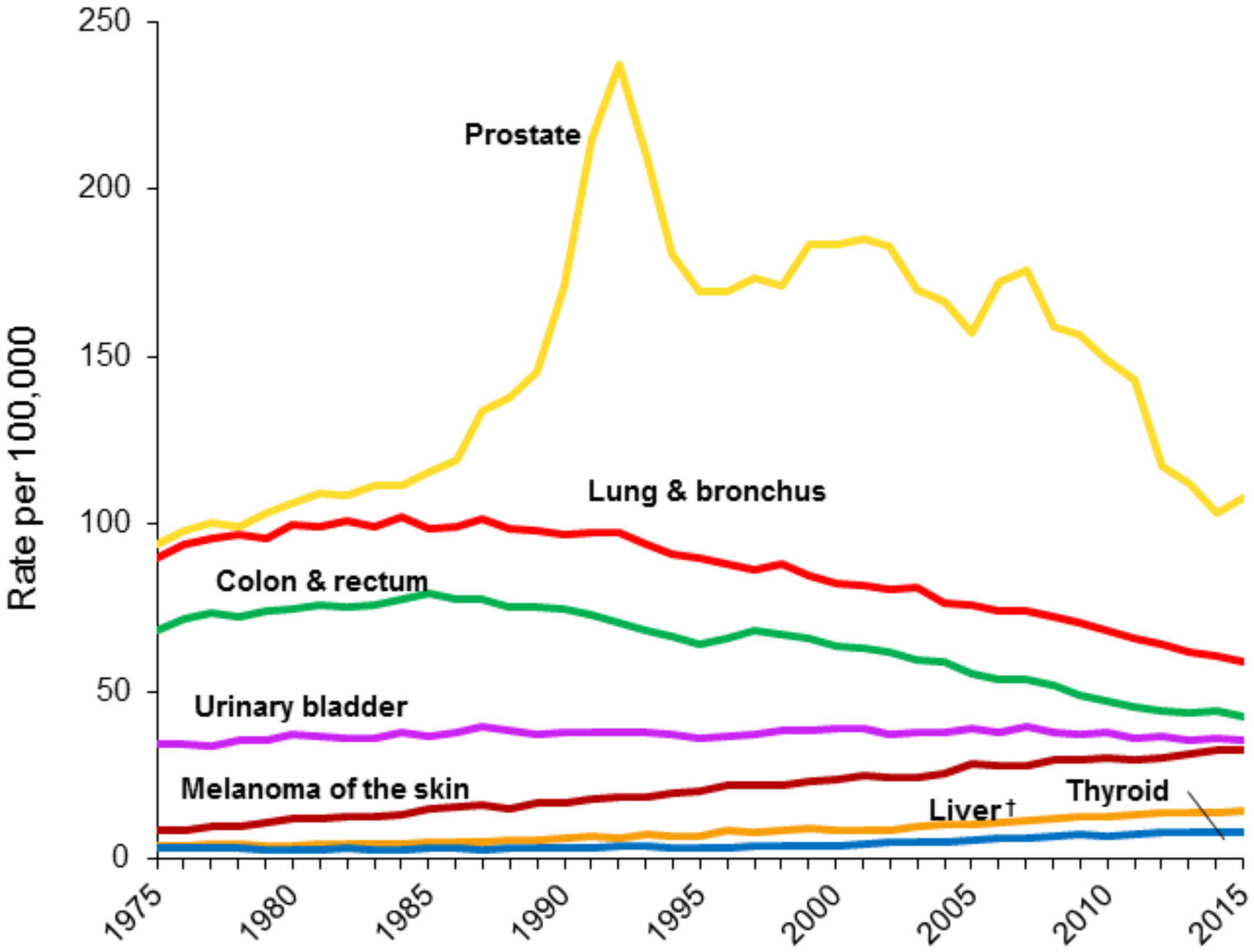
Estimated New Cancer Cases* in the US in 2019

Males 870,970		Females 891,480	
Prostate	20%	30%	Breast
Lung & bronchus	13%	13%	Lung & bronchus
Colon & rectum	9%	7%	Colon & rectum
Urinary bladder	7%	7%	Uterine corpus
Melanoma of skin	7%	5%	Melanoma of skin
Kidney & renal pelvis	5%	4%	Thyroid
Non-Hodgkin lymphoma	5%	4%	Non-Hodgkin lymphoma
Oral cavity & pharynx	4%	3%	Kidney & renal pelvis
Leukemia	4%	3%	Pancreas
Pancreas	3%	3%	Leukemia
All other sites	22%	21%	All other sites



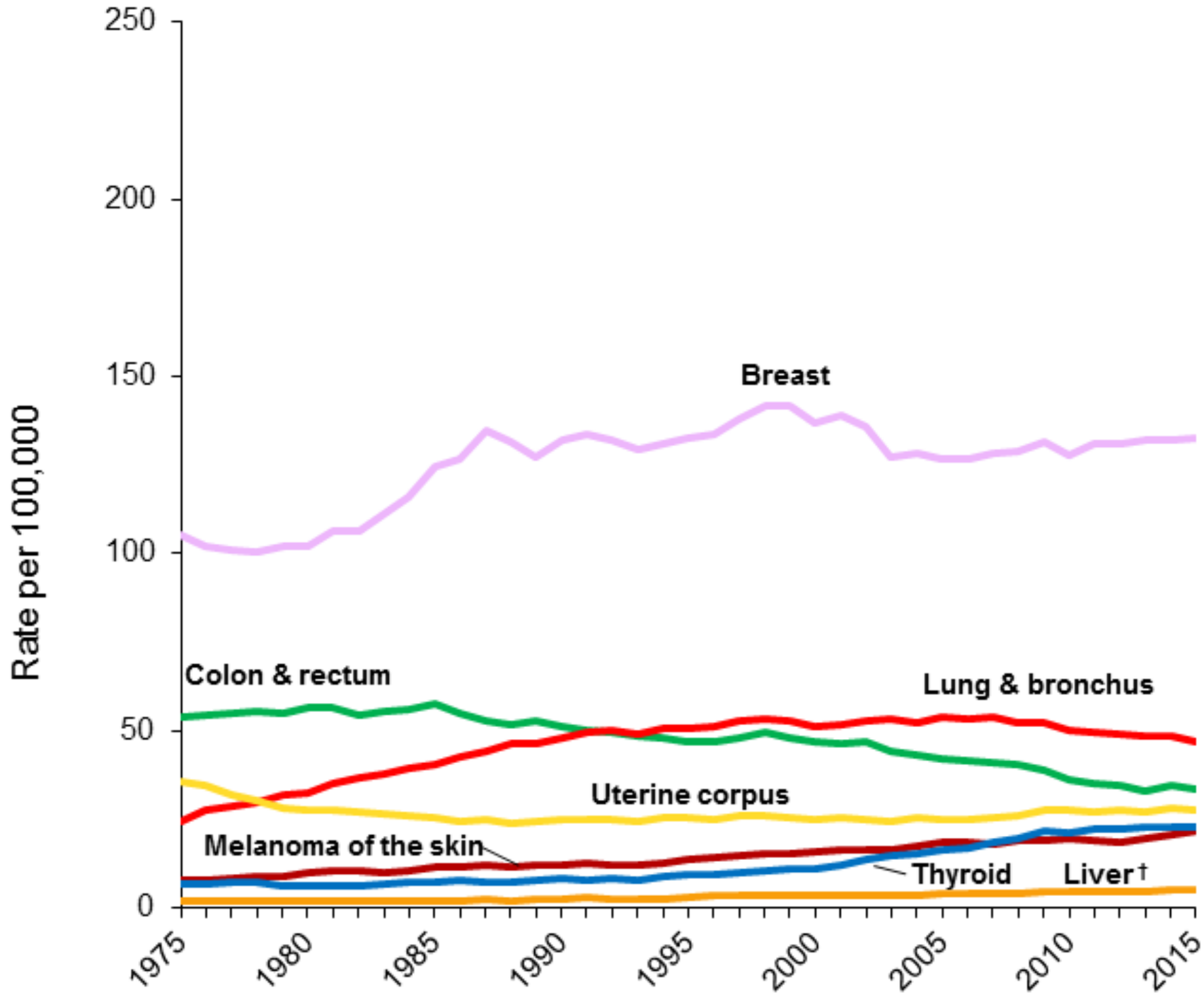
*Excludes basal cell and squamous cell skin cancers and in situ carcinoma except urinary bladder.

Trends in Cancer Incidence Rates* Among Males, US, 1975-2015



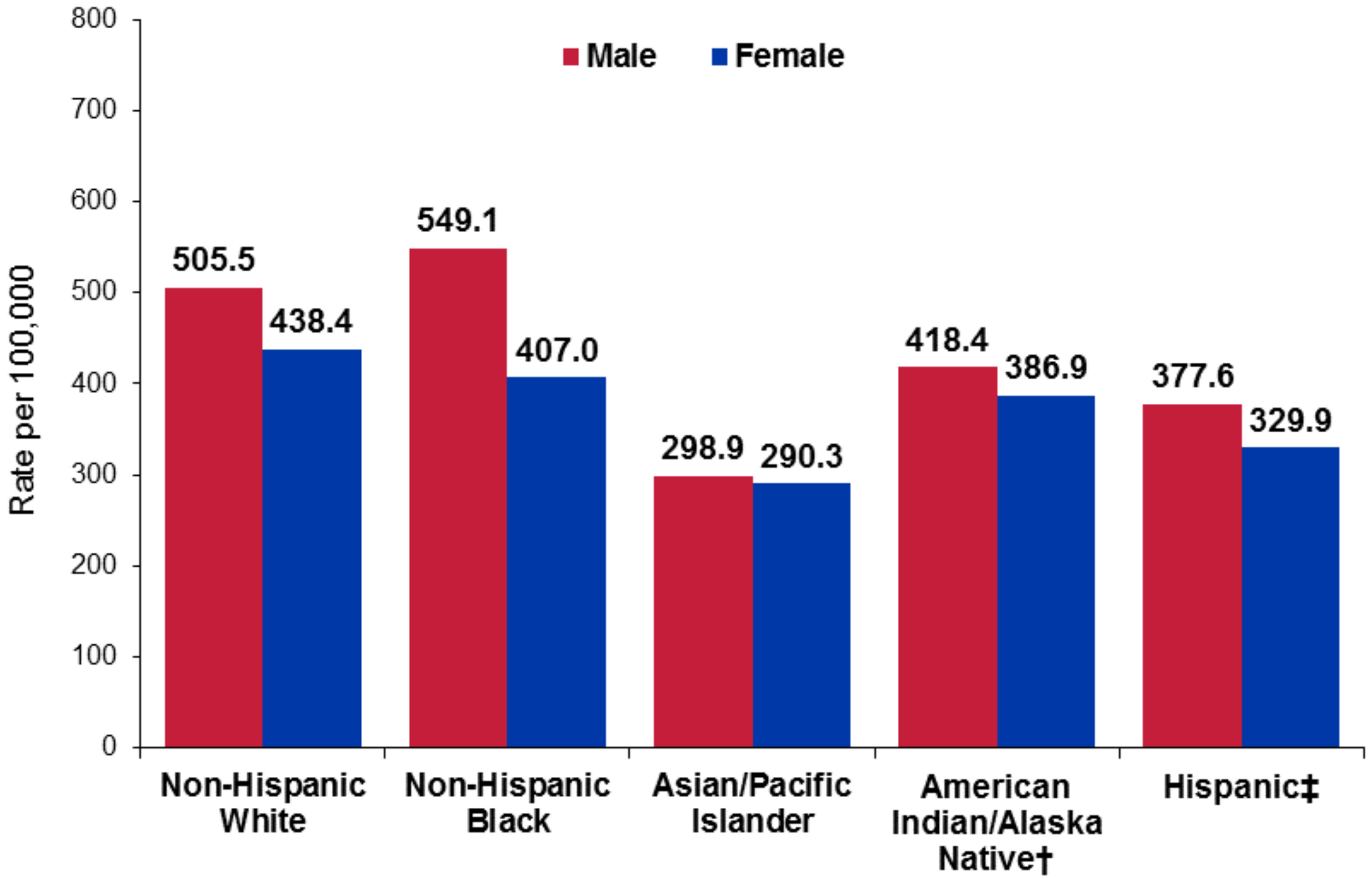
*Age-adjusted to the 2000 US standard population and adjusted for delays in reporting. †Includes the intrahepatic bile duct.
Source: Surveillance, Epidemiology, and End Results (SEER) Program, National Cancer Institute, 2018.

Trends in Cancer Incidence Rates* Among Females, US, 1975-2015



*Age-adjusted to the 2000 US standard population and adjusted for delays in reporting. †Includes the intrahepatic bile duct.
Source: Surveillance, Epidemiology, and End Results (SEER) Program, National Cancer Institute, 2018.

Cancer Incidence Rates* by Race and Ethnicity, 2011-2015



*Age-adjusted to the 2000 US standard population. †Data based on Indian Health Service Contract Health Service Delivery Area counties. ‡Persons of Hispanic origin may be of any race.

Source: North American Association of Central Caner Registries, 2018.

The Lifetime Probability of Developing Cancer for Males, 2013-2015

Site	Risk
All sites*	1 in 3
Prostate	1 in 9
Lung & bronchus	1 in 15
Colon & rectum	1 in 23
Urinary bladder†	1 in 27
Melanoma of the skin‡	1 in 27
Non-Hodgkin lymphoma	1 in 42
Kidney & renal pelvis	1 in 47
Leukemia	1 in 56
Oral cavity & pharynx	1 in 61
Pancreas	1 in 62

*All sites exclude basal cell and squamous cell skin cancers and in situ cancers except urinary bladder. †Includes invasive and in situ cancer cases ‡Statistic for non-Hispanic whites.
Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.7.6 Statistical Research and Applications Branch, National Cancer Institute, 2018.

The Lifetime Probability of Developing Cancer for Females, 2013-2015

Site	Risk
All sites*	1 in 3
Breast	1 in 8
Lung & bronchus	1 in 17
Colon & rectum	1 in 25
Uterine corpus	1 in 35
Melanoma of the skin†	1 in 40
Non-Hodgkin lymphoma	1 in 54
Thyroid	1 in 55
Pancreas	1 in 65
Ovary	1 in 79
Leukemia	1 in 80

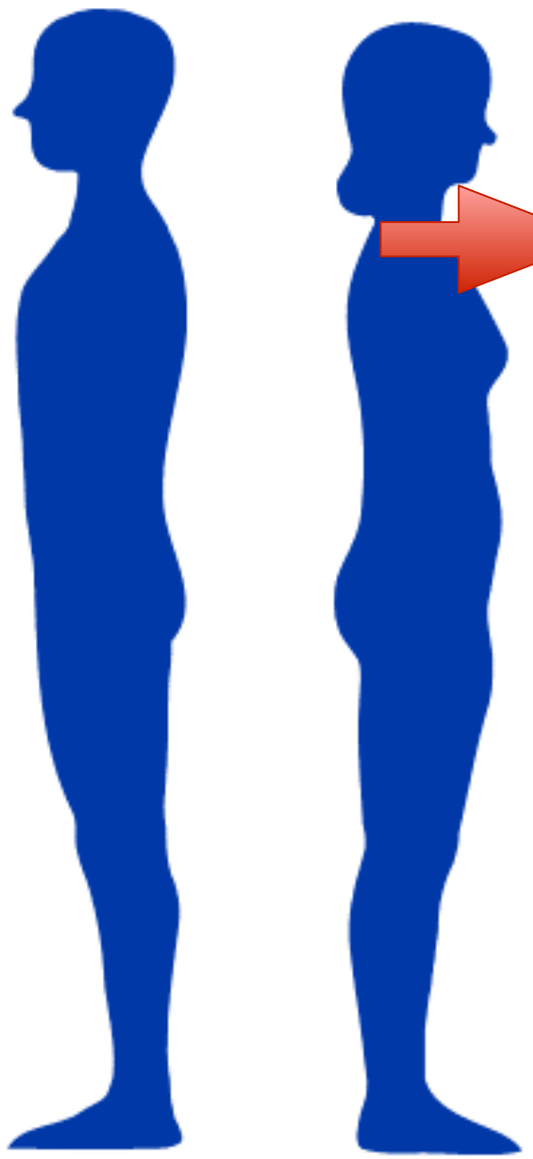
*All sites exclude basal cell and squamous cell skin cancers and in situ cancers except urinary bladder. †Statistic for non-Hispanic whites.
Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.7.6 Statistical Research and Applications Branch, National Cancer Institute, 2018.

Trends in Five-year Relative Survival Rates (%), 1975-2014

Site	1975-1977	1987-1989	2008-2014
All sites	49	55	69
Breast (female)	75	84	91
Colorectum	50	60	66
Leukemia	34	43	65
Lung & bronchus	12	13	20
Melanoma of the skin	82	88	94
Non-Hodgkin lymphoma	47	51	74
Ovary	36	38	48
Pancreas	3	4	9
Prostate	68	83	99
Urinary bladder	72	79	78

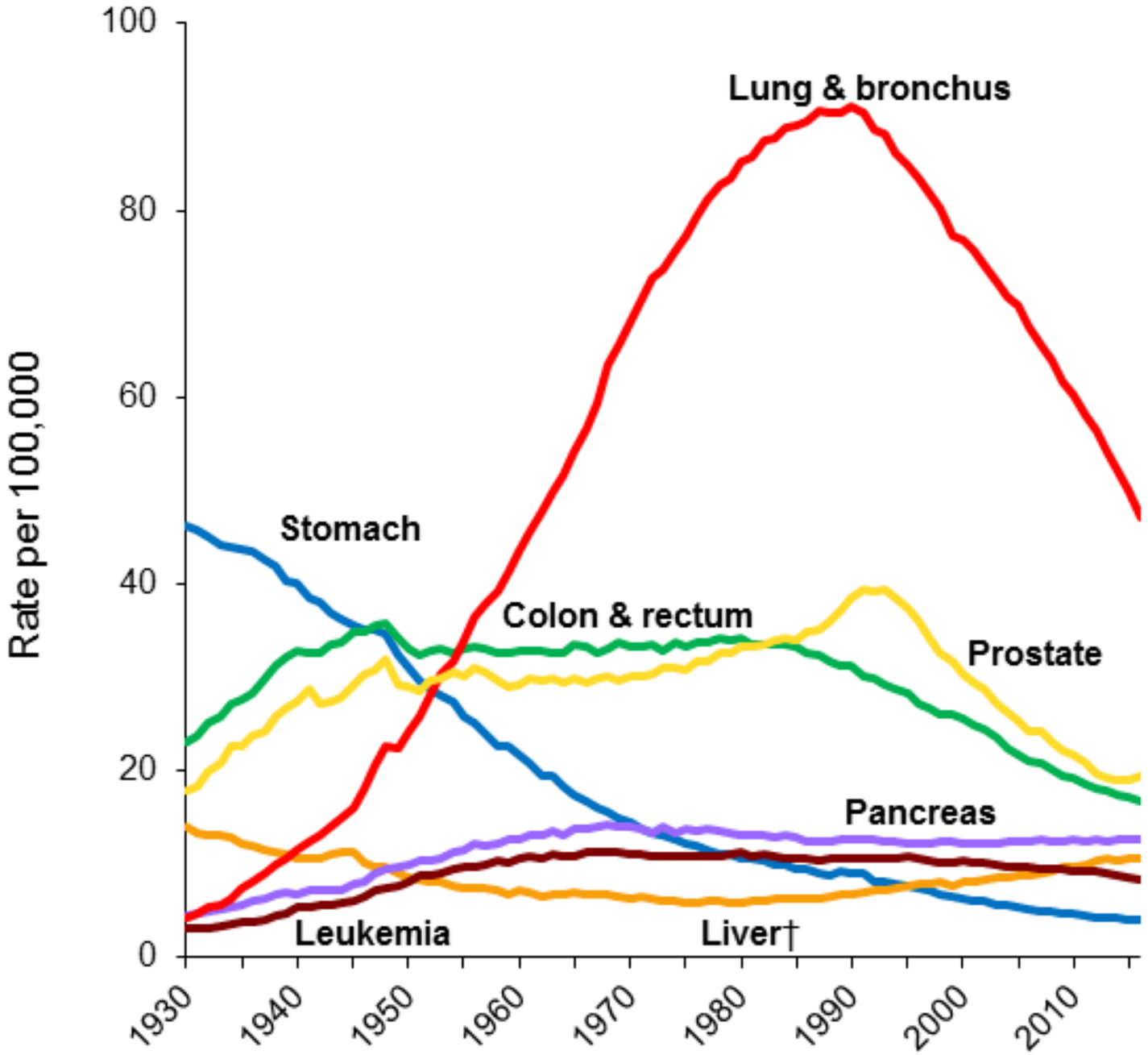
5-year relative survival rates based on patients diagnosed in the 9 oldest SEER registries from 1975-1977, 1987-1989, and 2008-2014, all followed through 2015.
Source: Surveillance, Epidemiology, and End Results (SEER) Program, National Cancer Institute, 2018.

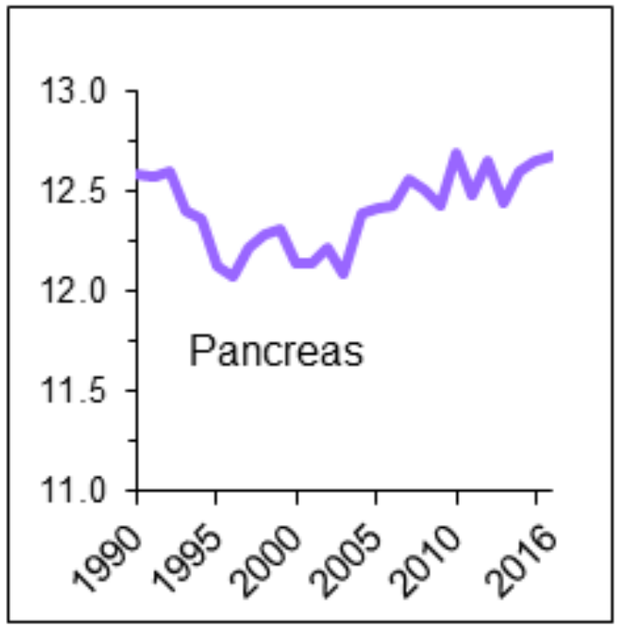
Estimated Cancer Deaths in the US in 2019

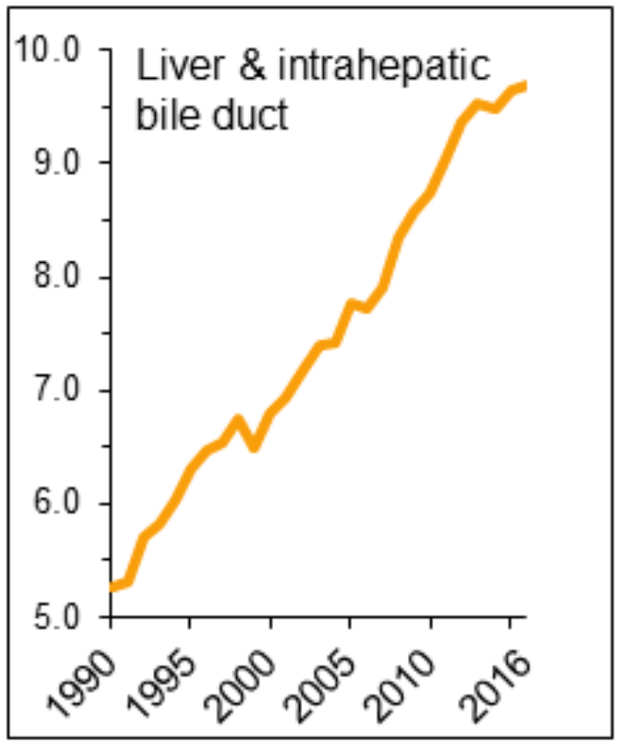


Males 321,670		Females 285,210	
Lung & bronchus	24%	23%	Lung & bronchus
Prostate	10%	15%	Breast
Colon & rectum	9%	8%	Colon & rectum
Pancreas	7%	8%	Pancreas
Liver & intrahepatic bile duct	7%	5%	Ovary
Leukemia	4%	4%	Uterine corpus
Esophagus	4%	4%	Liver & intrahepatic bile duct
Urinary bladder	4%	3%	Leukemia
Non-Hodgkin lymphoma	4%	3%	Non-Hodgkin lymphoma
Brain & other nervous system	3%	3%	Brain & other nervous system
All other sites	25%	24%	All other sites

Trends in Cancer Death Rates* Among Males, US,1930-2016







*Age-adjusted to the 2000 US standard population. †Includes intrahepatic bile duct, gallbladder, and other biliary.
NOTE: Due to International Classification of Diseases coding changes, numerator information for colorectal, liver, and lung cancers has changed over time
Source: National Center for Health Statistics, Centers for Disease Control and Prevention, 2018.

Understanding Cancer of the Colon

Colon Cancer: 3rd most common cancer

The American Cancer Society's estimates for the number of colorectal cancer cases in the United States for 2019 are:

101,420 new cases of colon cancer
44,180 new cases of rectal cancer

51,020 deaths during 2019

Symptoms of CRC

Warning Signs of

COLON CANCER

You Shouldn't Ignore

4 NARROW STOOLS

6 TENDER ABDOMEN OR ABDOMINAL PAIN

5 UNEXPLAINED ANEMIA

3 BLOOD IN STOOLS

2 DIARRHEA

1 CONSTIPATION

7 UNEXPLAINED WEIGHT LOSS

8 WEAKNESS AND FATIGUE

Natural History of Colorectal Neoplasia

Normal Colon

Adenoma

(Pre-cancer)

Early

Intermediate

Late

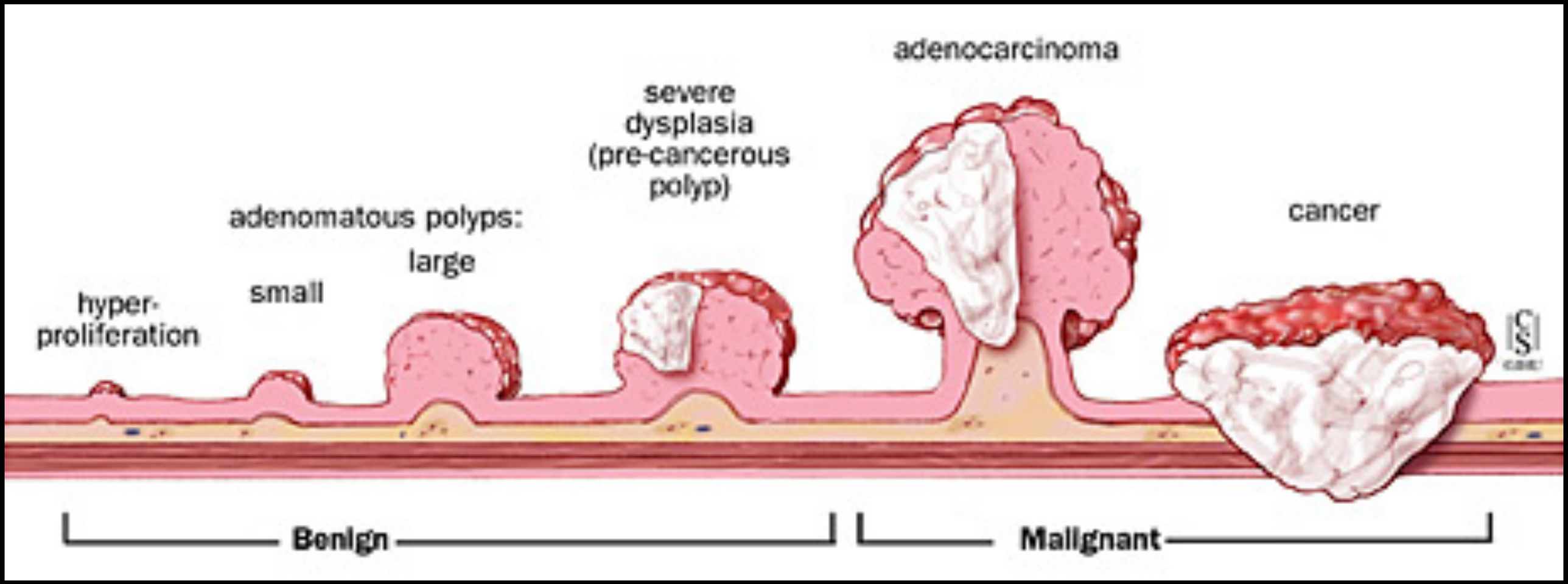
Smaller

Larger

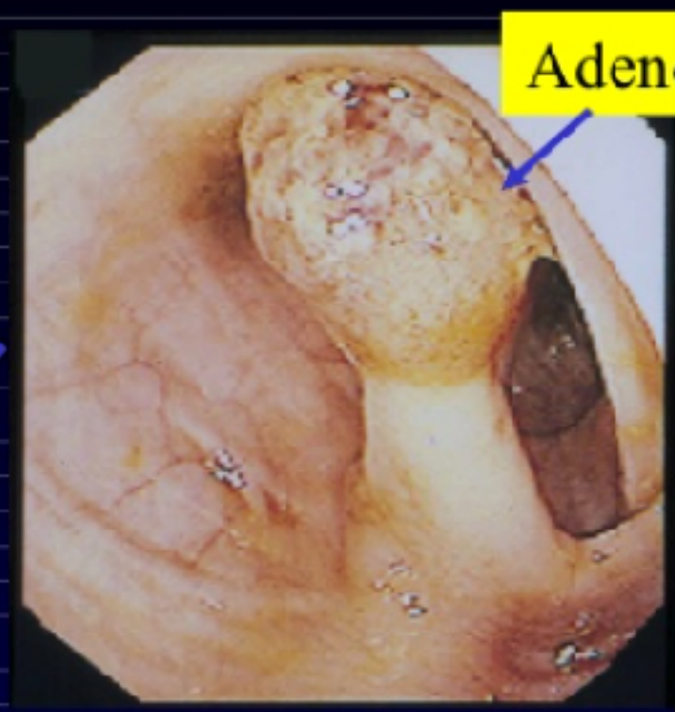
~10-15 years[1,2]

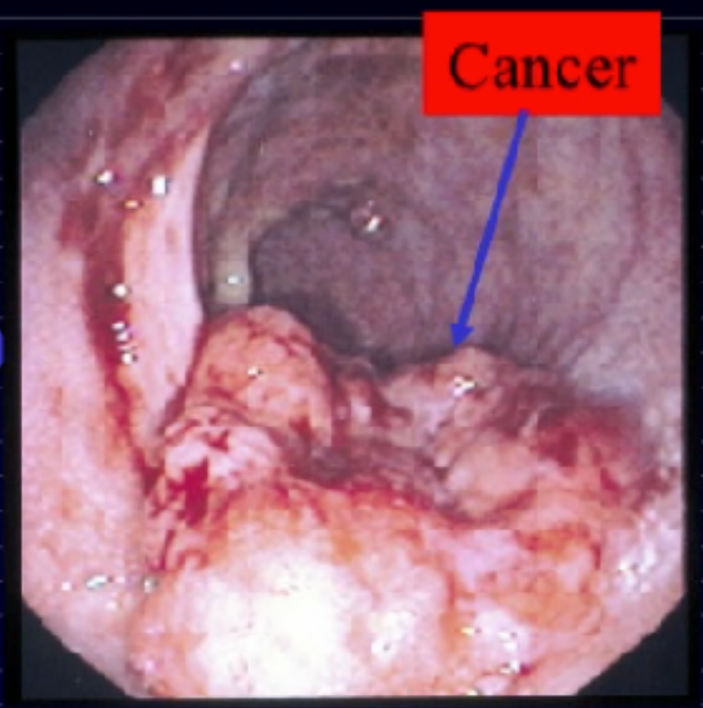
Cancer

Natural history of CRC



Adenoma to Carcinoma Pathway





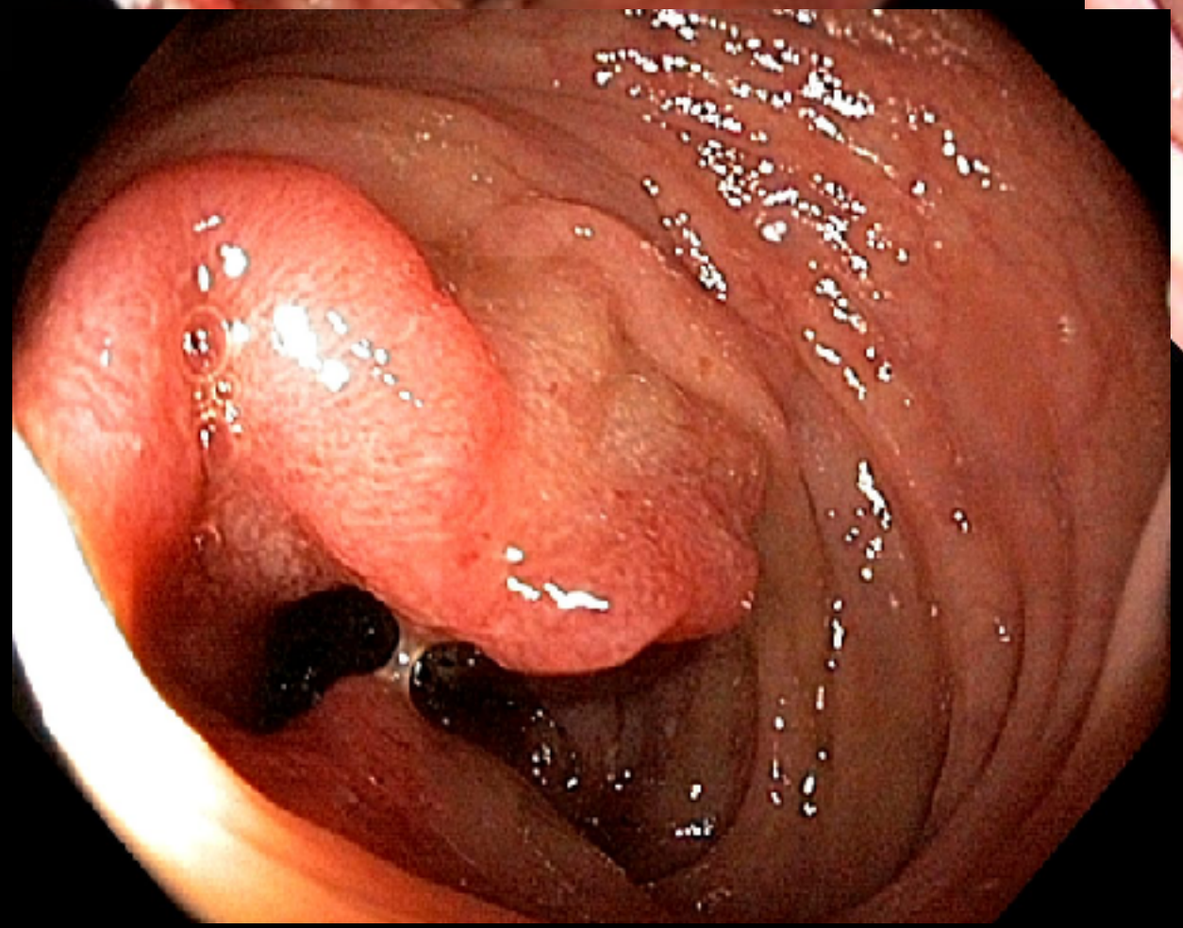
APC loss

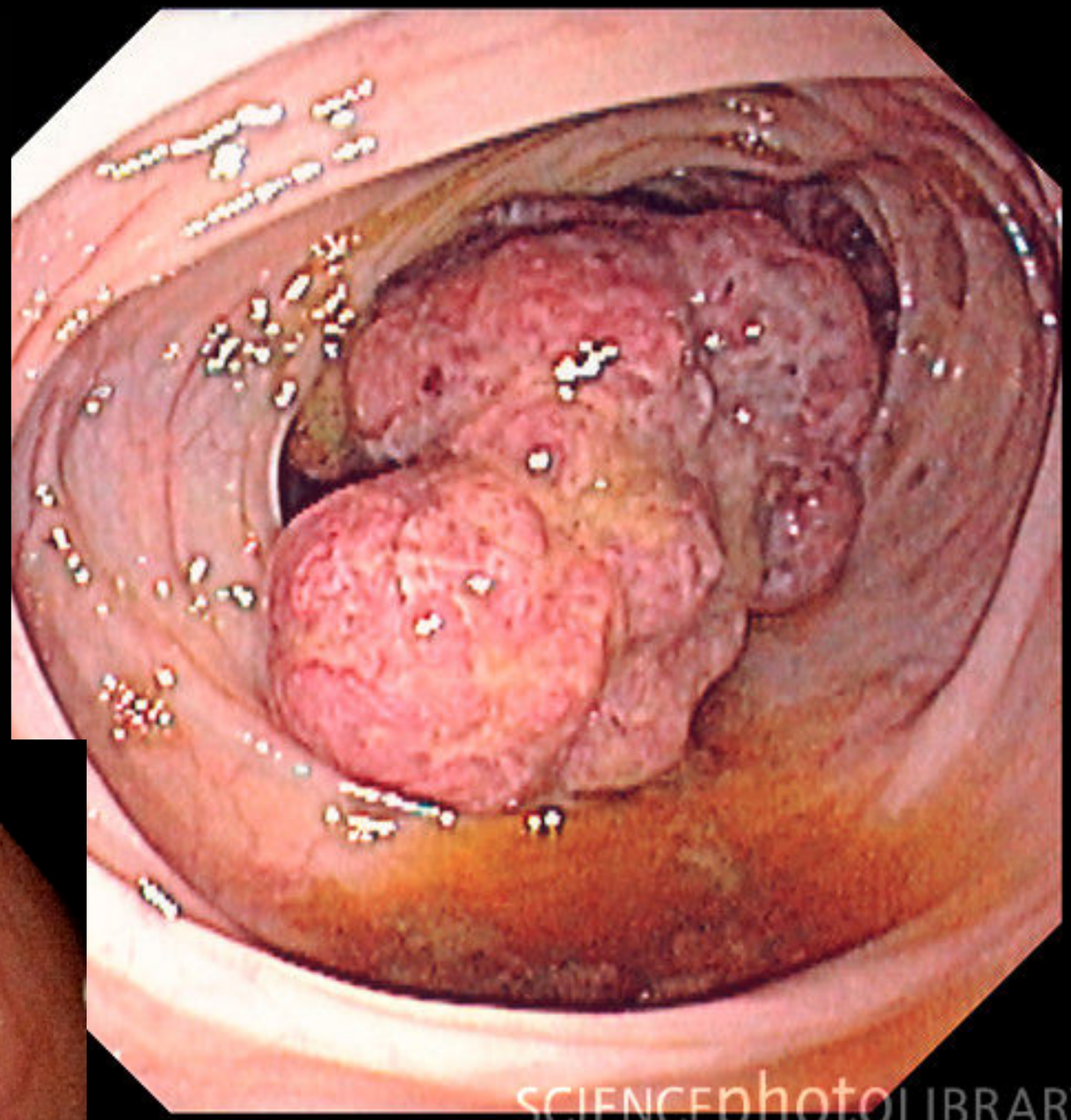
K-ras mutation

Chrom 18 loss

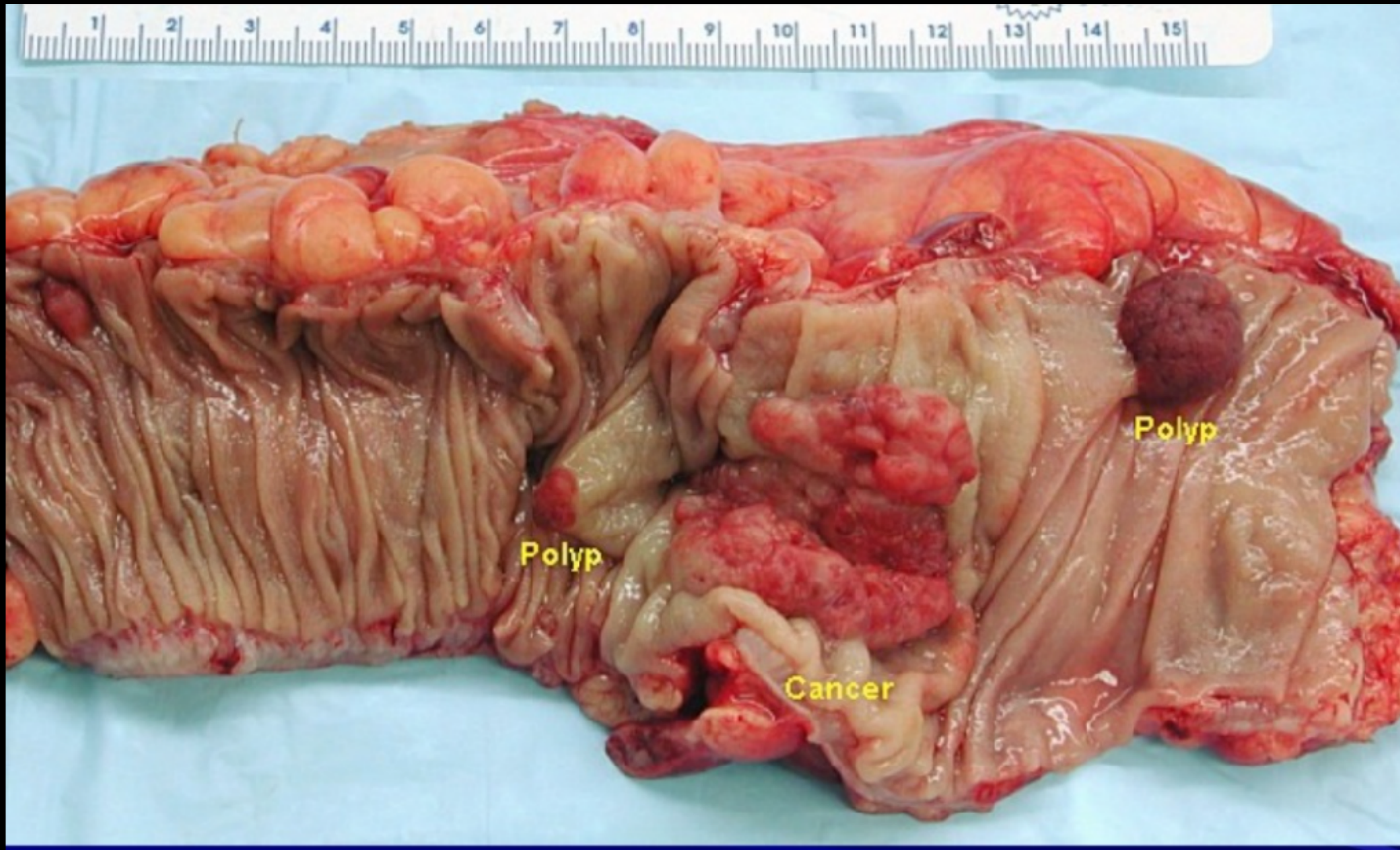
p53 loss

Normal Epithelium → Hyper-proliferation → Early Adenoma → Intermediate Adenoma → Late Adenoma → Cancer



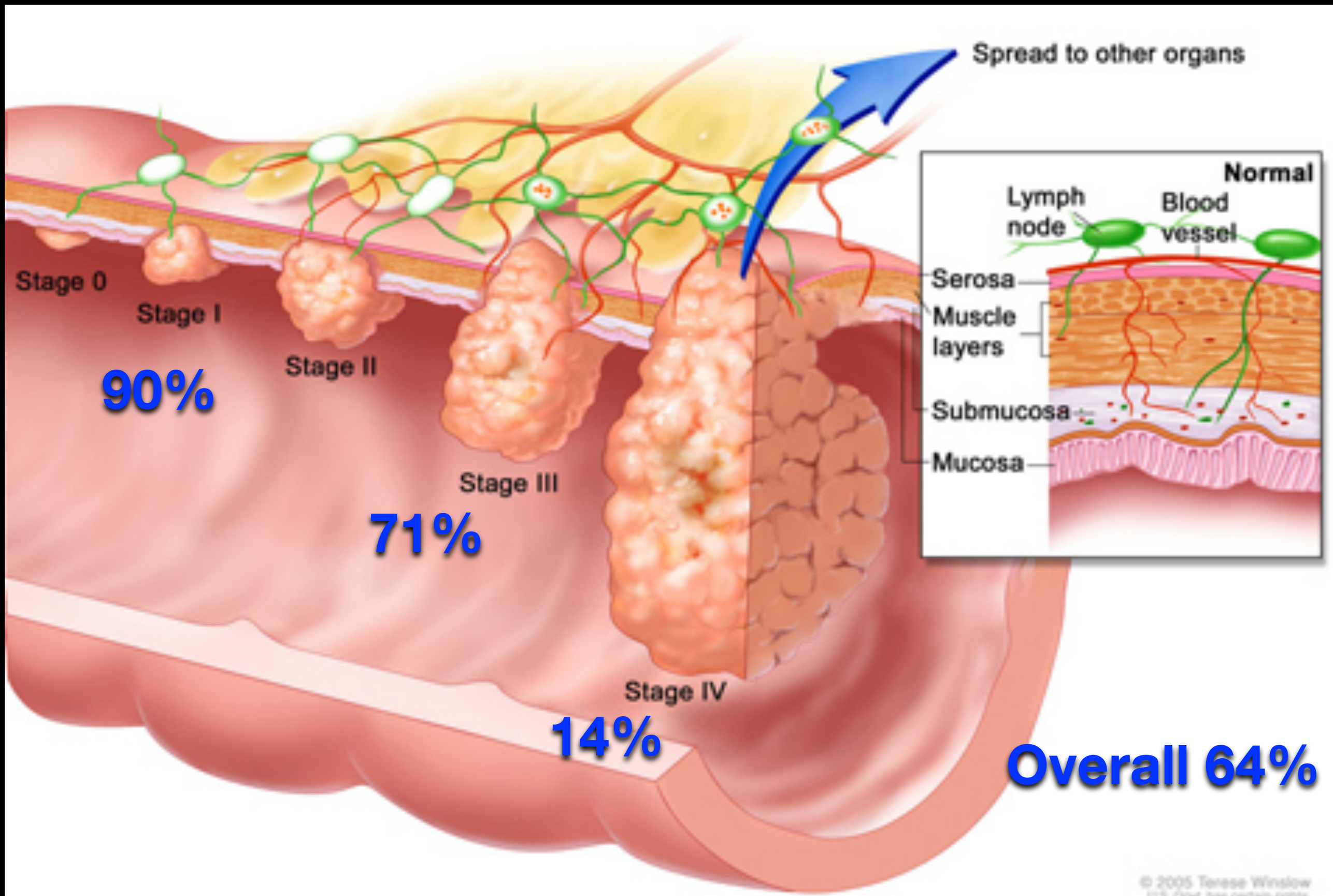


COLON CANCER



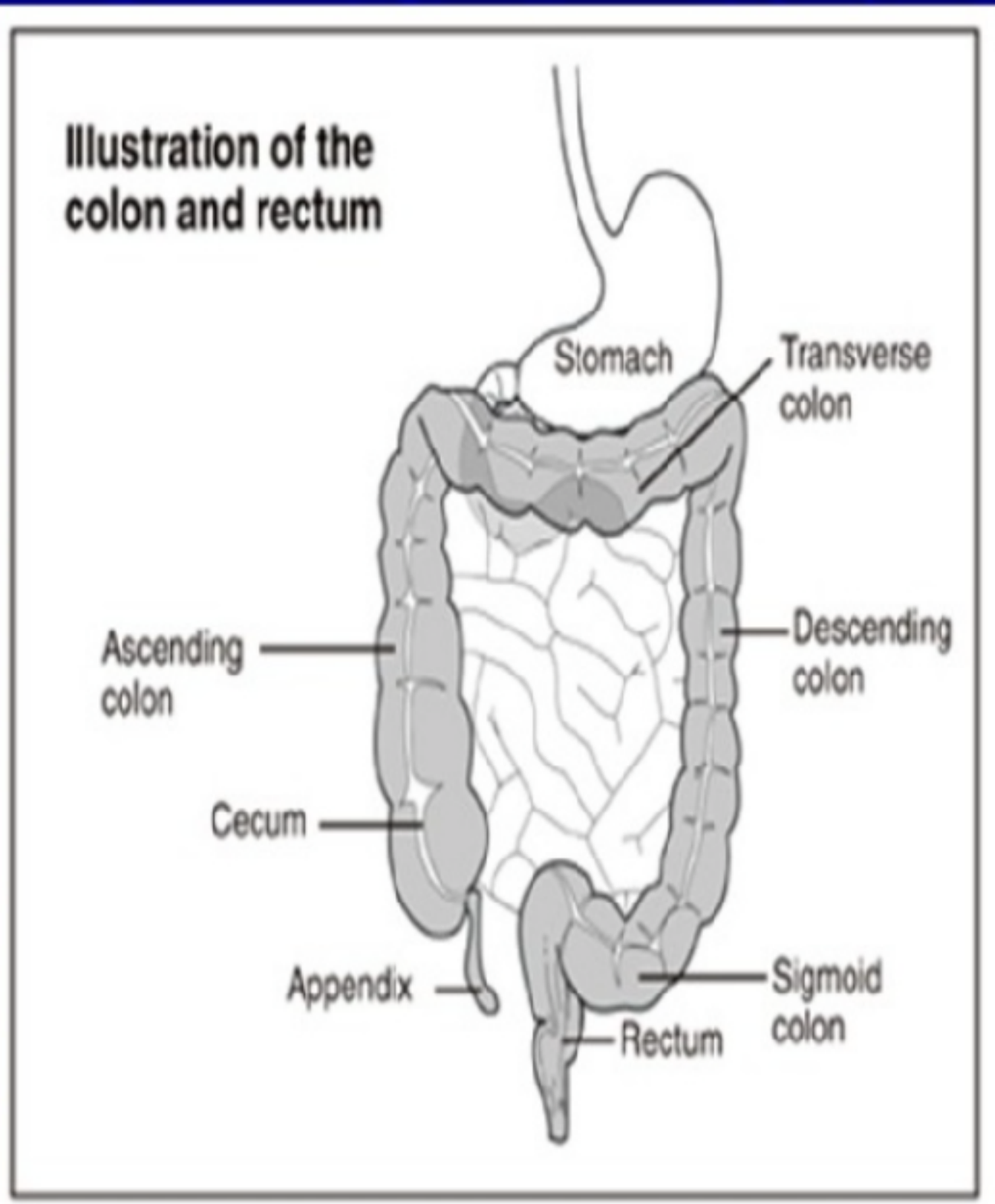
Specimen containing an invasive colorectal carcinoma and two adenomatous polyps.

Colon Cancer Survival 2019



Anatomic Location of CRC

- Cecum 14 %
- Ascending colon 10 %
- Transverse colon 12 %
- Descending colon 7 %
- Sigmoid colon 25 %
- Rectosigmoid junct.9 %
- Rectum 23 %



Guidelines for screening for average risks

New guidelines 3/2018 by American Cancer Society:

- > 45, till 75, as long as life expectancy is > 10 yrs
- 75-85 depending on health,
- none rec > 85

HIGH risks:

- Immediate family members with colon cancer
- More than 2 second degree relatives with colon cancer

If you have symptoms, then test is more diagnostics than screening.

Colon Cancer Screening Tests

Stool-based tests

Highly sensitive fecal immunochemical test (FIT) every year
Highly sensitive guaiac-based fecal occult blood test (gFOBT) every year
Multi-targeted stool DNA test (MT-sDNA or Cologard) every 3 years

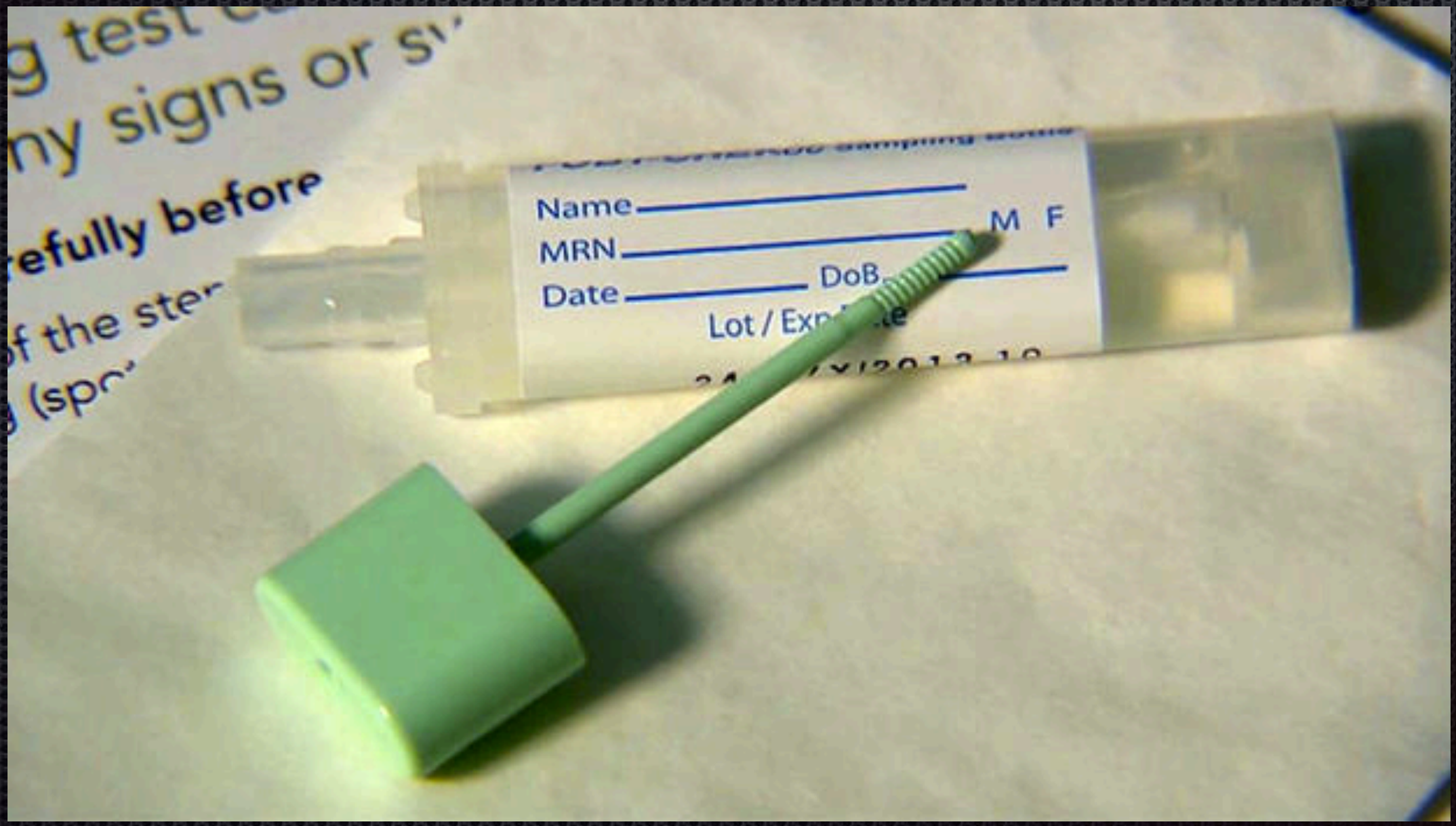
Visual (structural) exams of the colon and rectum

Colonoscopy every 10 years
CT colonography (virtual colonoscopy) every 5 years
Flexible sigmoidoscopy (FSIG) every 5 years

Screening for Blood in the Stool

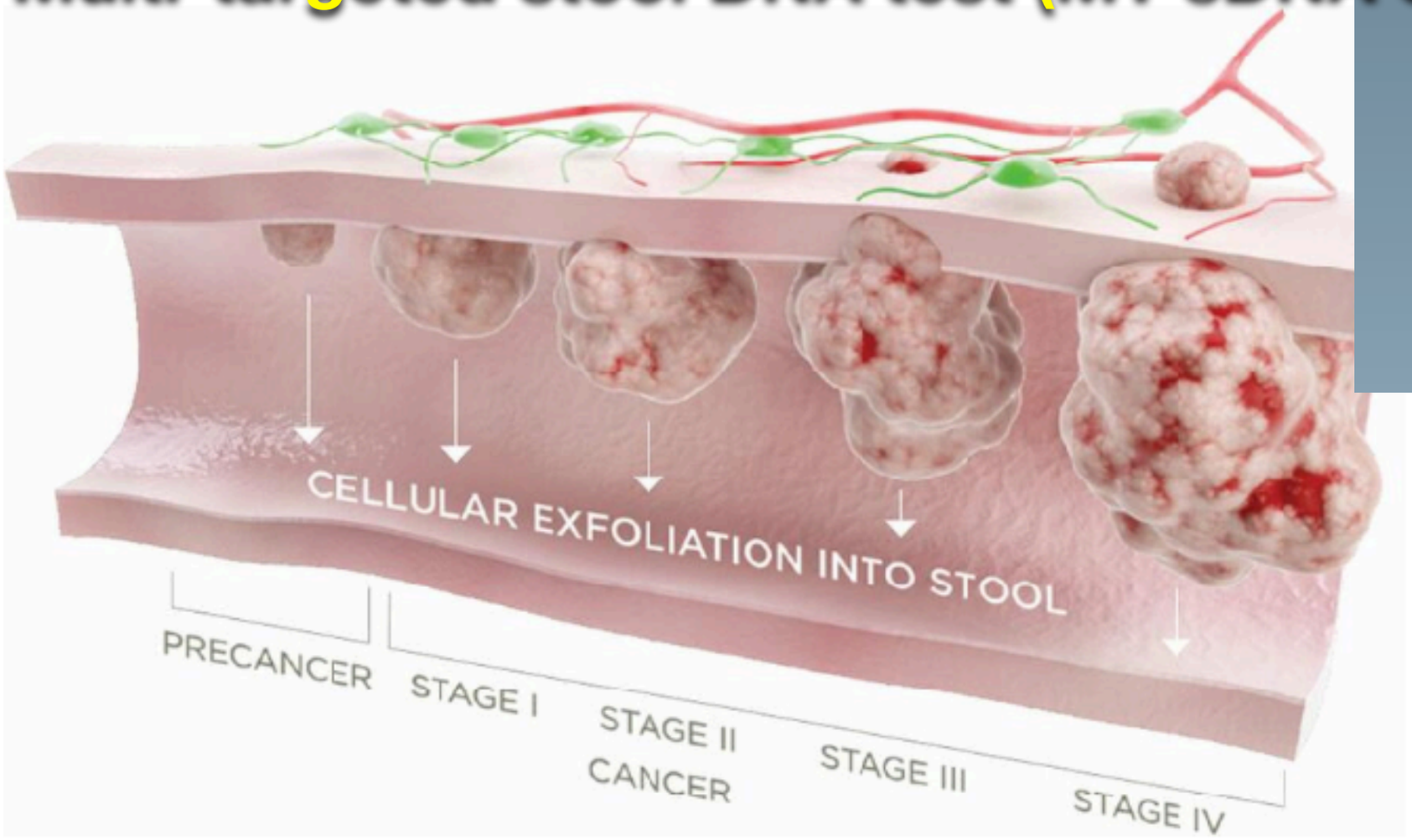
guaiac-based fecal occult blood test (gFOBT)

FIT stool test: detected blood in stool



Cologuard's proprietary stool DNA (sDNA) technology can analyze and detect 11 distinct biomarkers that identify cancer and precancer.

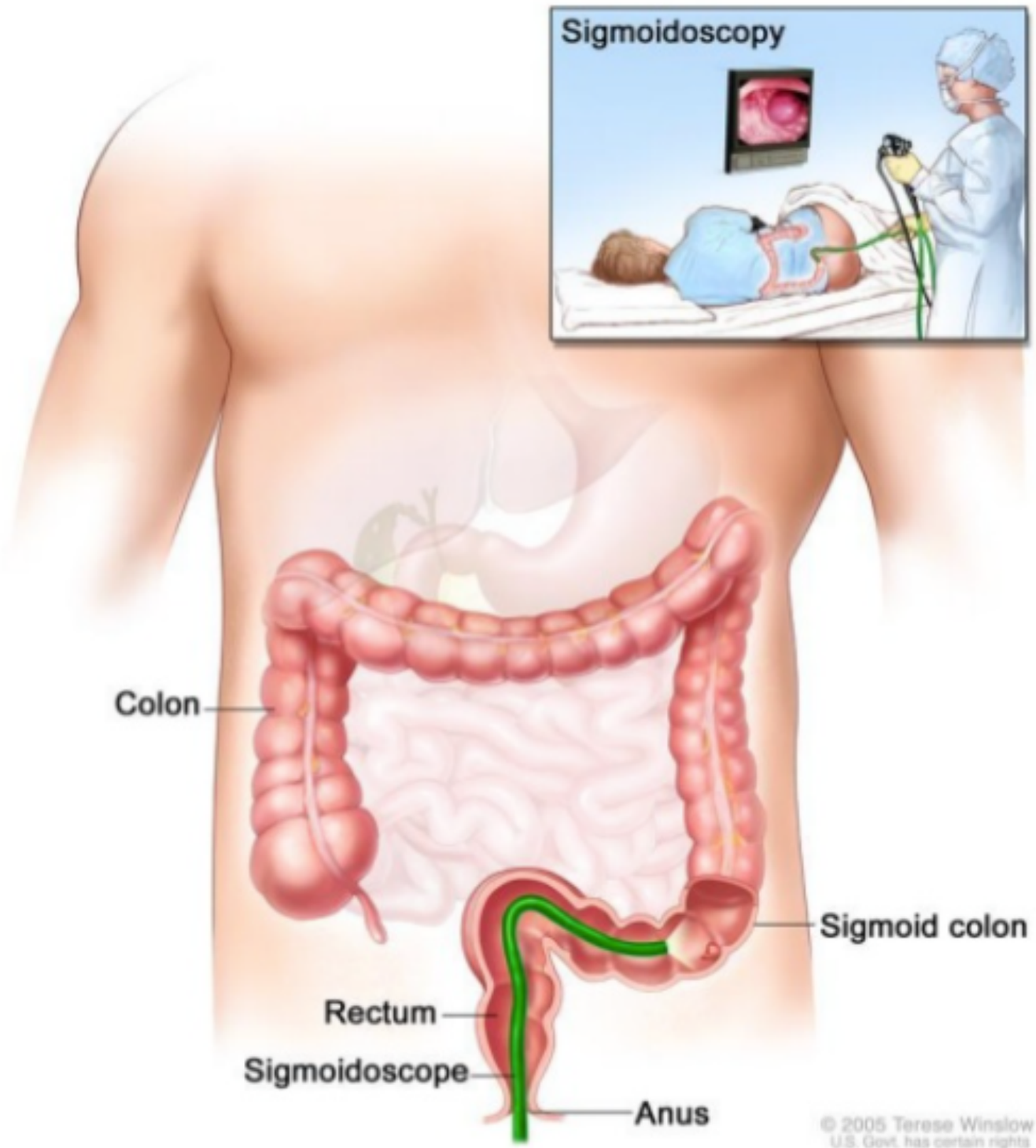
Multi-targeted stool DNA test (MT-sDNA or Cologard)



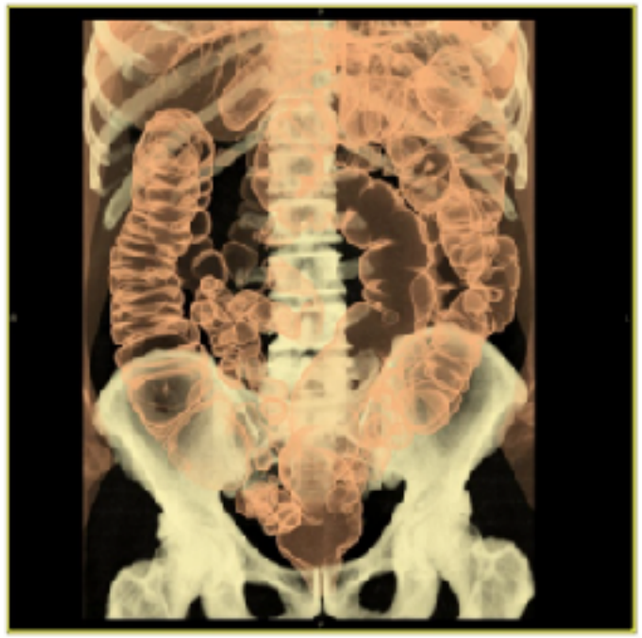
Structural tests

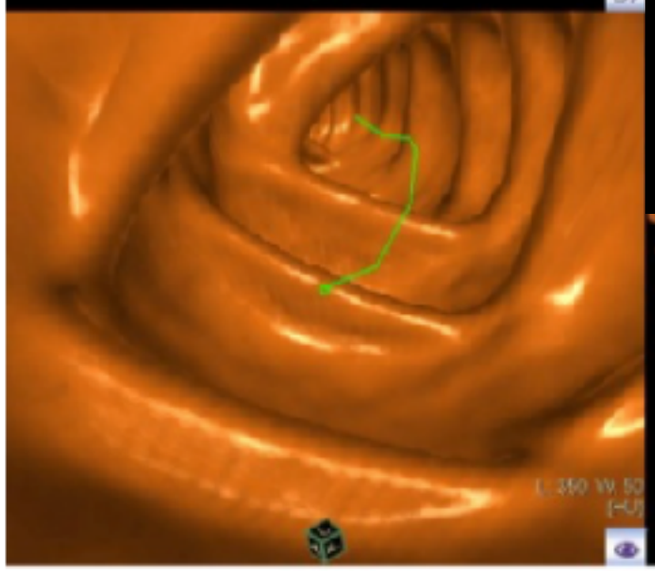
Sigmoidoscopy
Virtual Colonoscopy
Colonoscopy

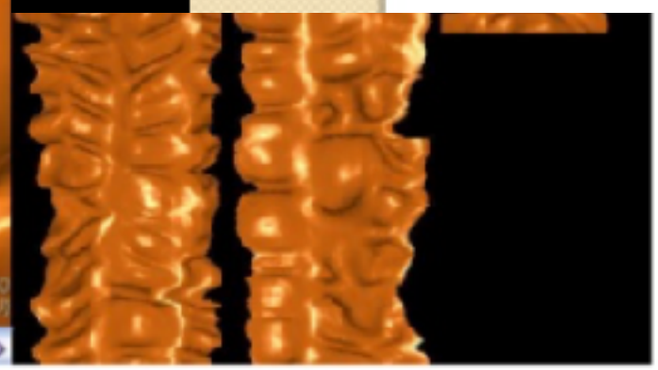
Sigmoidoscopy



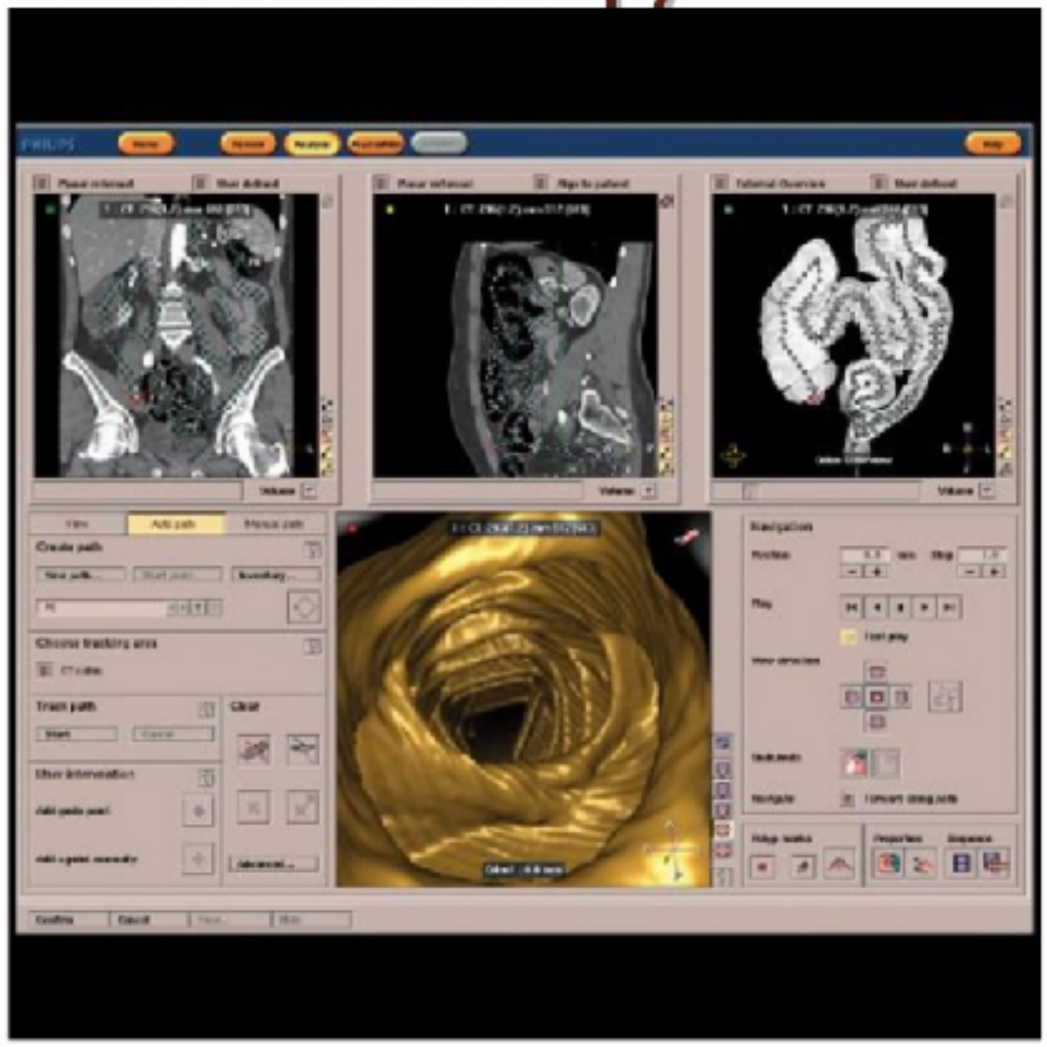
Virtual Colonoscopy







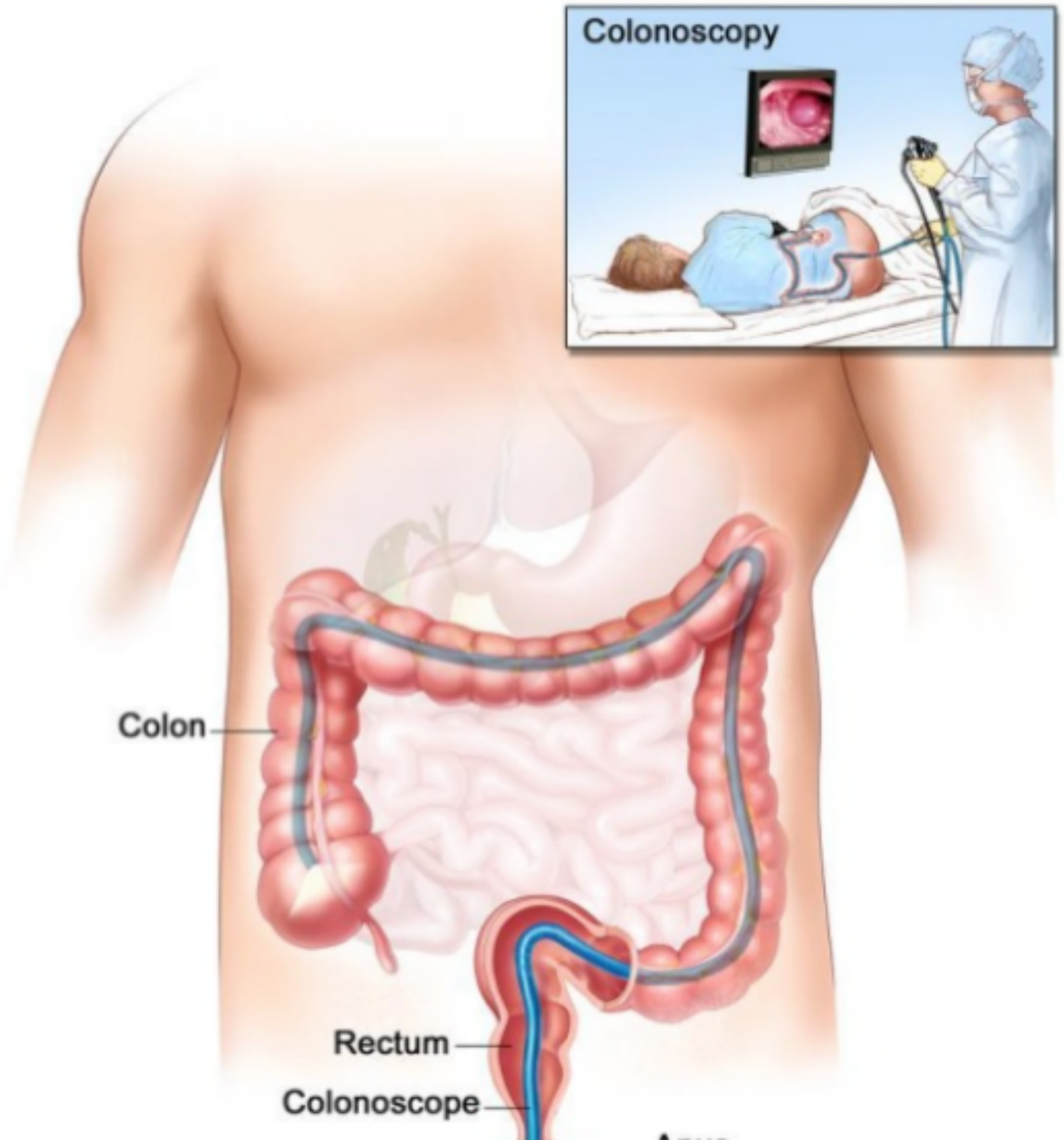
Virtual Endoscopy



CT Colonography (Virtual Colonoscopy)

- Bowel preparation required
- Rectal tube inserted and colon filled with air
- 2 CT scans performed, one lying on back and one on abdomen
- If polyp seen then colonoscopy
- If no polyp seen, repeat in 5 years
- Insurance Reimbursement?

Colonoscopy



Colonoscopy

- 60-90% colon cancer prevention rate
- Rate of completion should be 98-99% (reaching cecum)
- Adequate prep for excellent visualization of colon

Colonoscopy

- Bowel preparation required
- Usually done with sedation
- Best test available for seeing polyps
- Only test that allows detection of polyps and their removal in same procedure
- If adenomas removed repeat test usually done in 3 to 5 years
- If negative then repeat in 10 years

oscopy Preps

- n prep"
- n with different flavors
- solution (no longer OTC): small volume (1.5 oz, twice), very salt tasting

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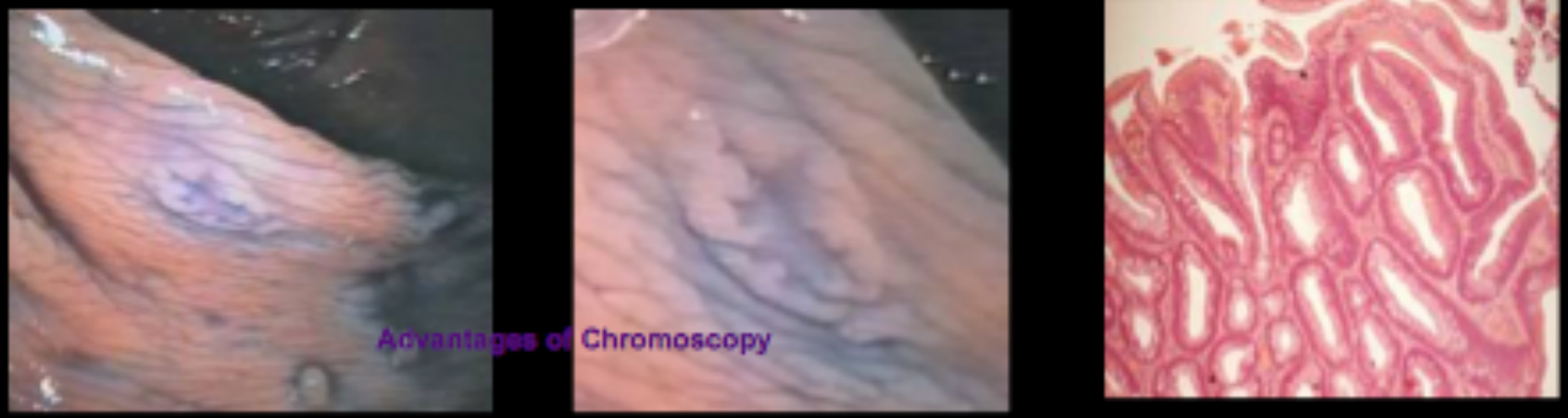
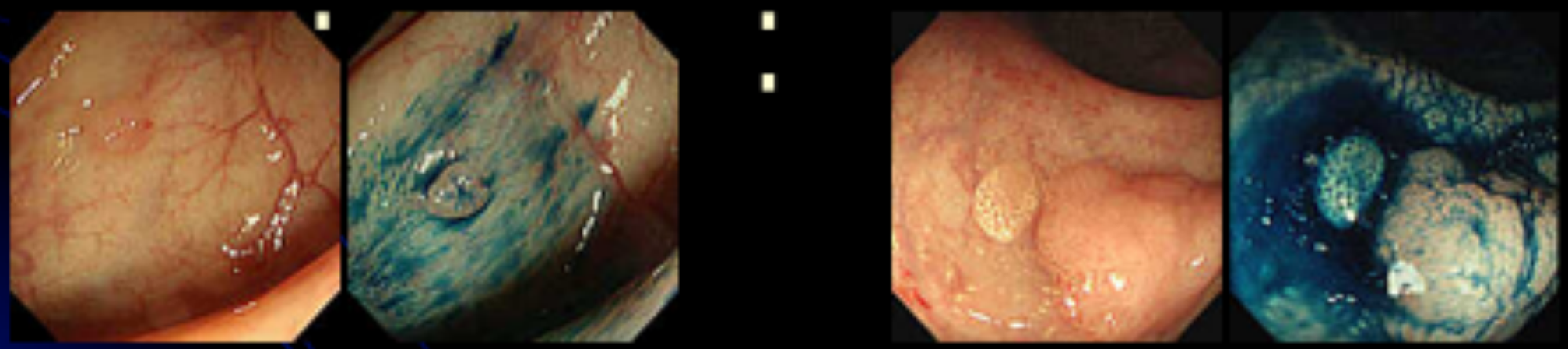
iffer
n so

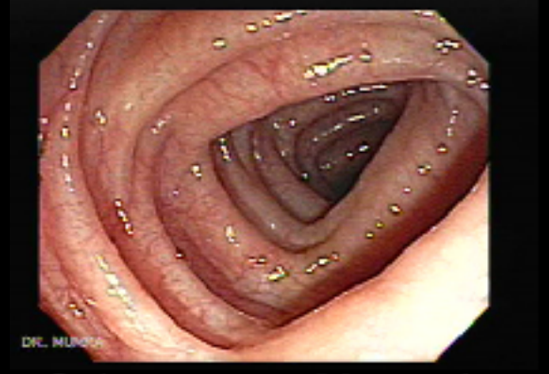
2 bottles of Colonoscopy prep drink

Colon polyps

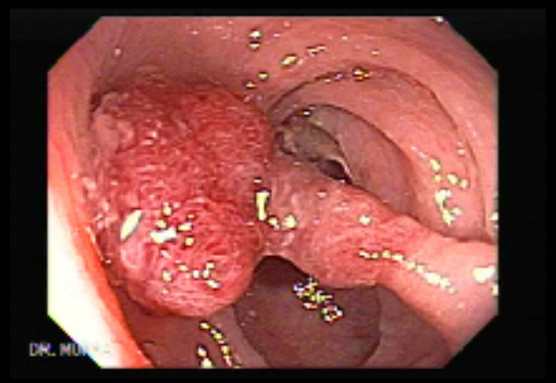


A depressed lesion next to some pseudo polyps: after Indigo-Carmine stain

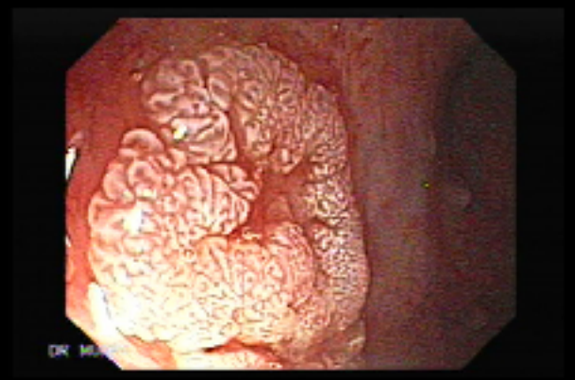




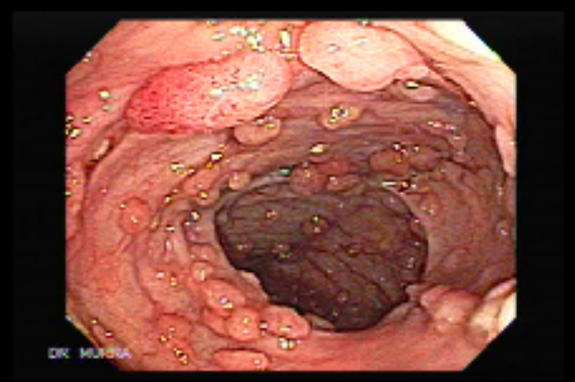
Colonoscopy Normal



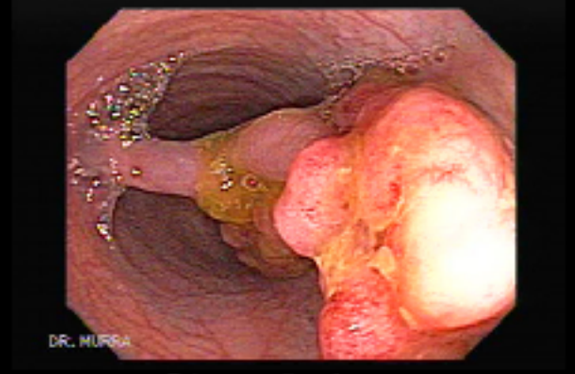
Pedunculated polyp



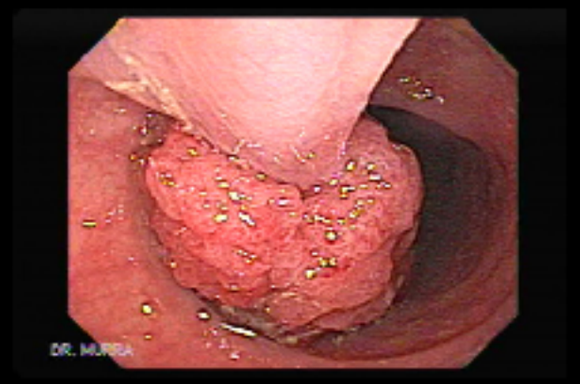
Flat Polyp



Familial adenomatous polyposis



Giant Polyp



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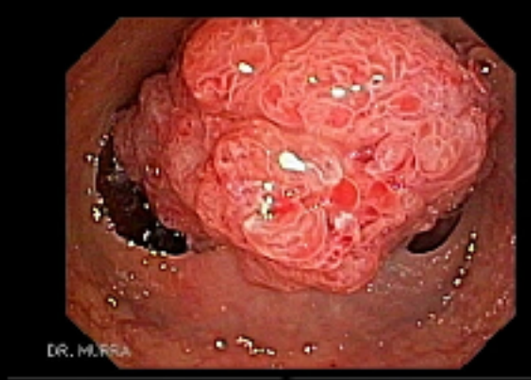
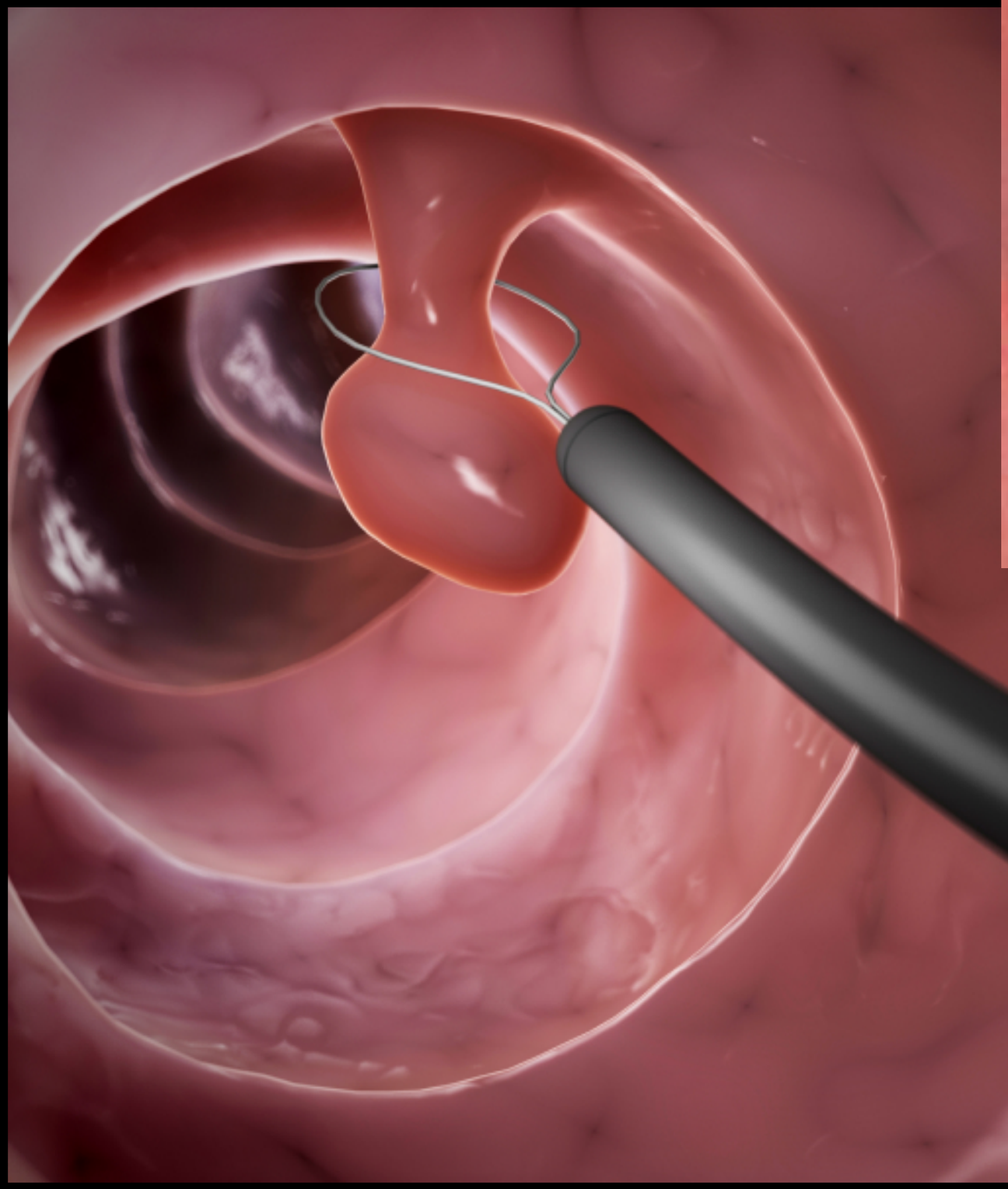
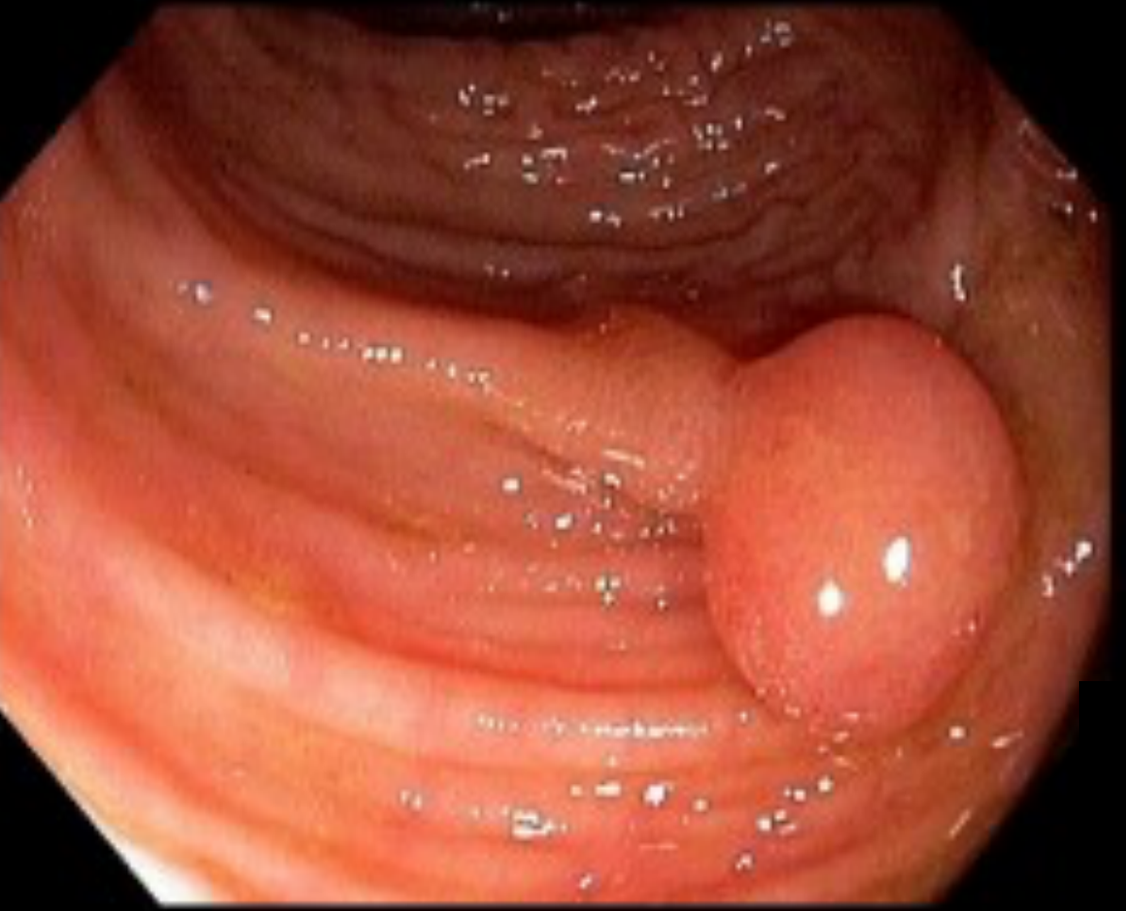


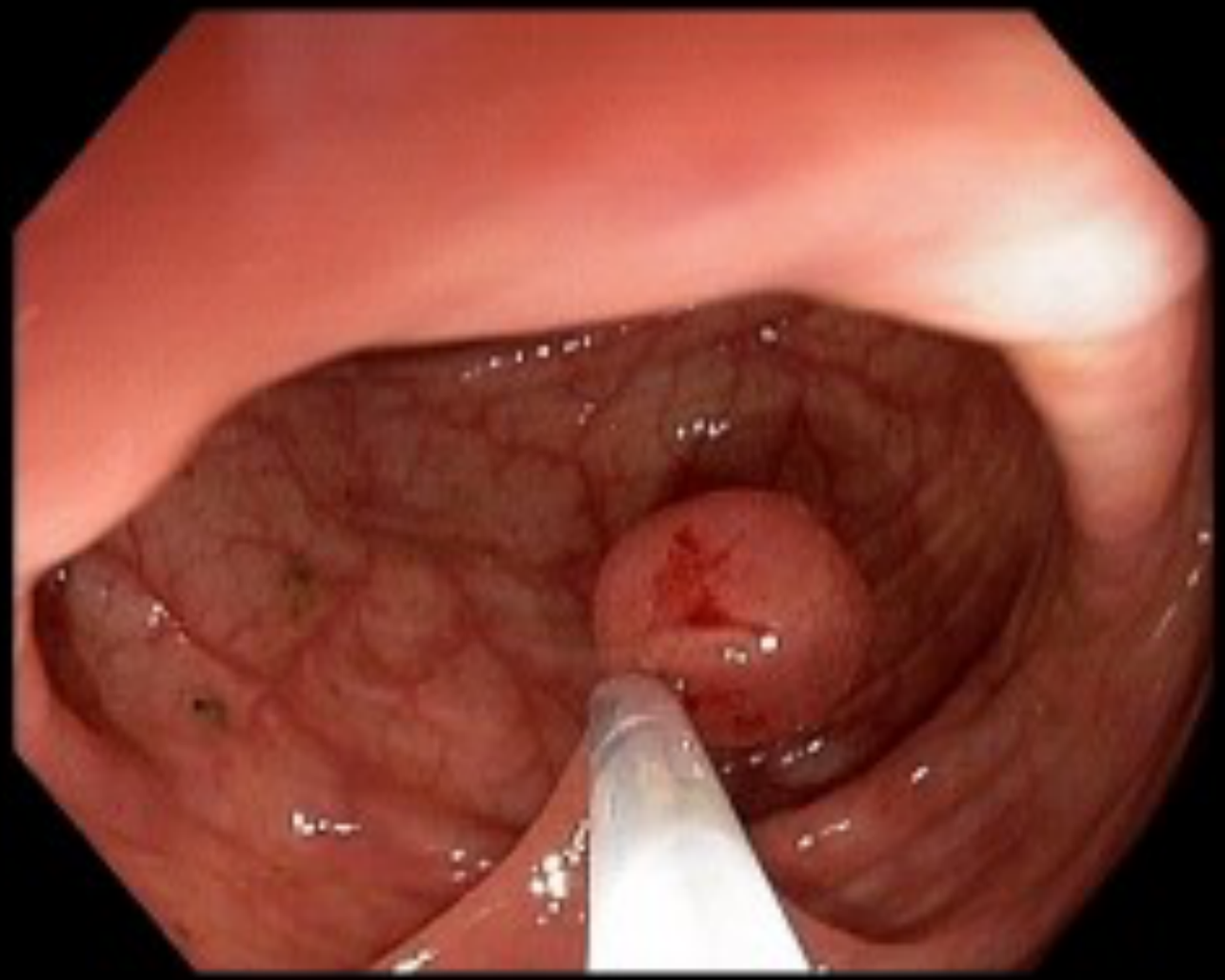
Giant Polyp

Multiple Polyps of the Colon



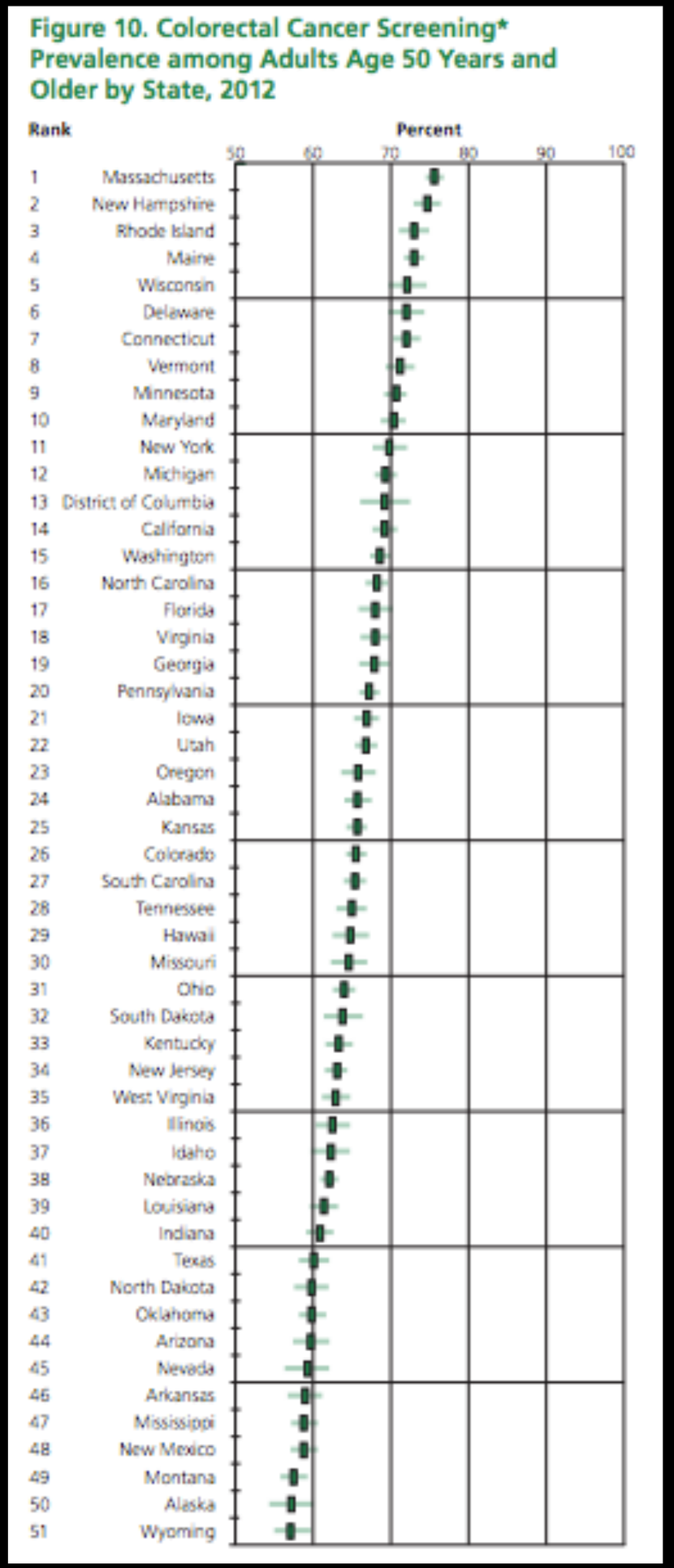
Polyp Removal





CRC Screening

- Texas ranks 41st at 60% in 2012



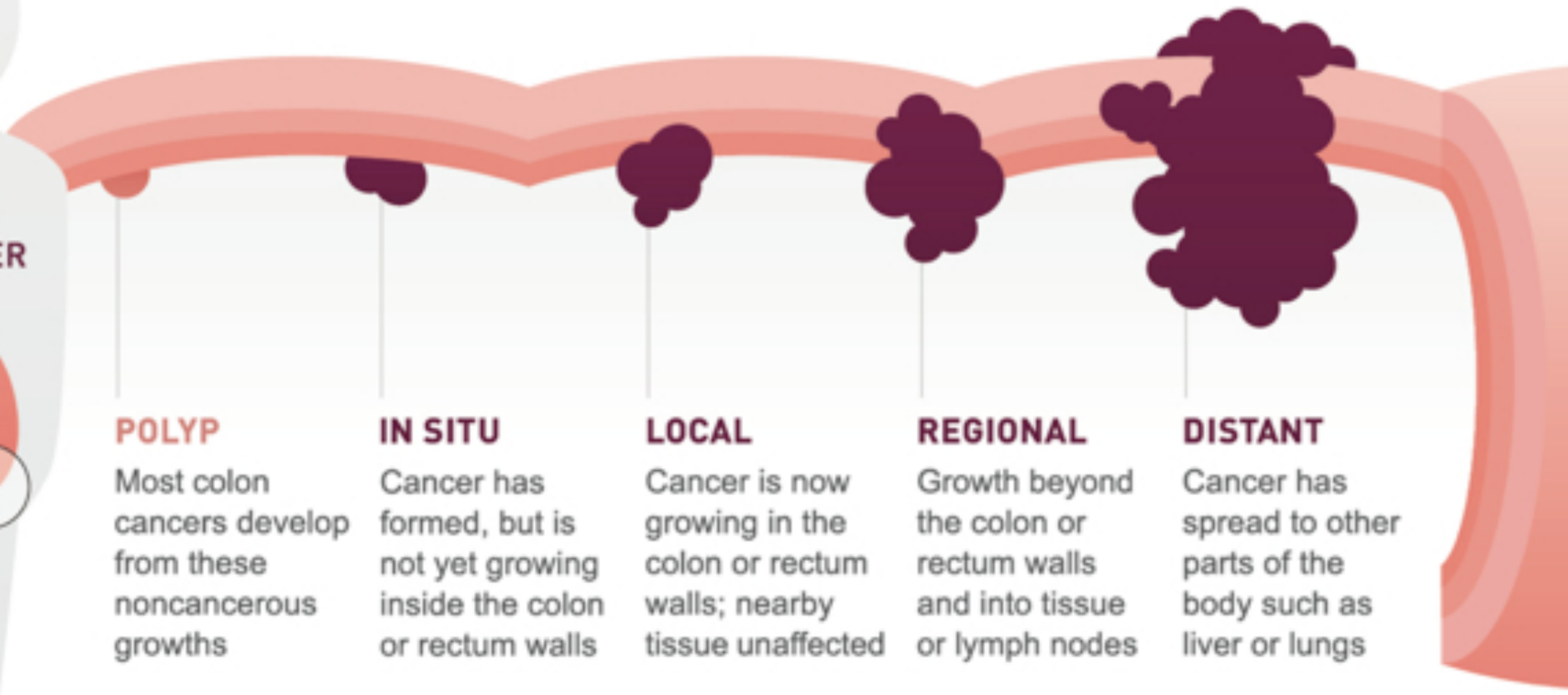
90%

5-YEAR SURVIVAL RATE
IF FOUND AT THE LOCAL STAGE

39%

DIAGNOSED AT AN EARLY STAGE
PARTLY DUE TO LOW SCREENING RATE

STAGES OF COLON CANCER



POLYP
Most colon cancers develop from these noncancerous growths

IN SITU
Cancer has formed, but is not yet growing inside the colon or rectum walls

LOCAL
Cancer is now growing in the colon or rectum walls; nearby tissue unaffected

REGIONAL
Growth beyond the colon or rectum walls and into tissue or lymph nodes

DISTANT
Cancer has spread to other parts of the body such as liver or lungs

What can you do?

- **A LOT !!!**

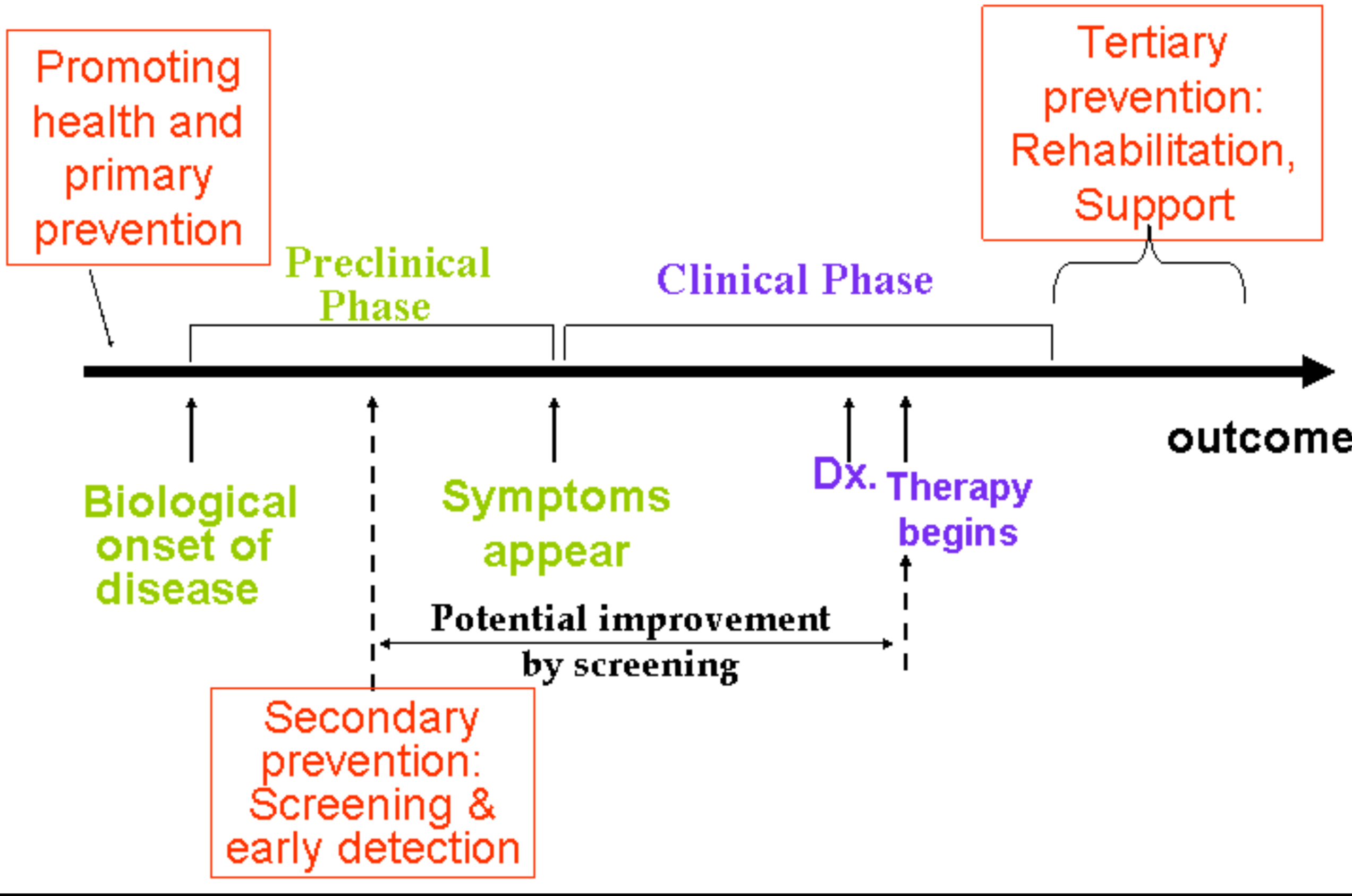
Reduce your risk of colorectal cancer.

1. Get screened regularly.
2. Maintain a healthy weight throughout life.
3. Adopt a physically active lifestyle.
4. Consume a healthy diet with an emphasis on plant sources; specifically:
   - Choose foods and beverages in amounts that help achieve and maintain a healthy weight.
   - Limit consumption of red and processed meat.
   - Eat at least 2½ cups of vegetables and fruits each day.
   - Choose whole grains instead of refined grain products.
5. If you drink alcoholic beverages, limit consumption.
6. Consume the recommended levels of calcium, primarily through food sources
7. Avoid tobacco products.

Prevention

- Increase fibre in diet
- Decrease animal fat and red meat,
- Decrease smoking and EtOH
- Increase exercise and decrease BMI
- Secondary prevention with screening

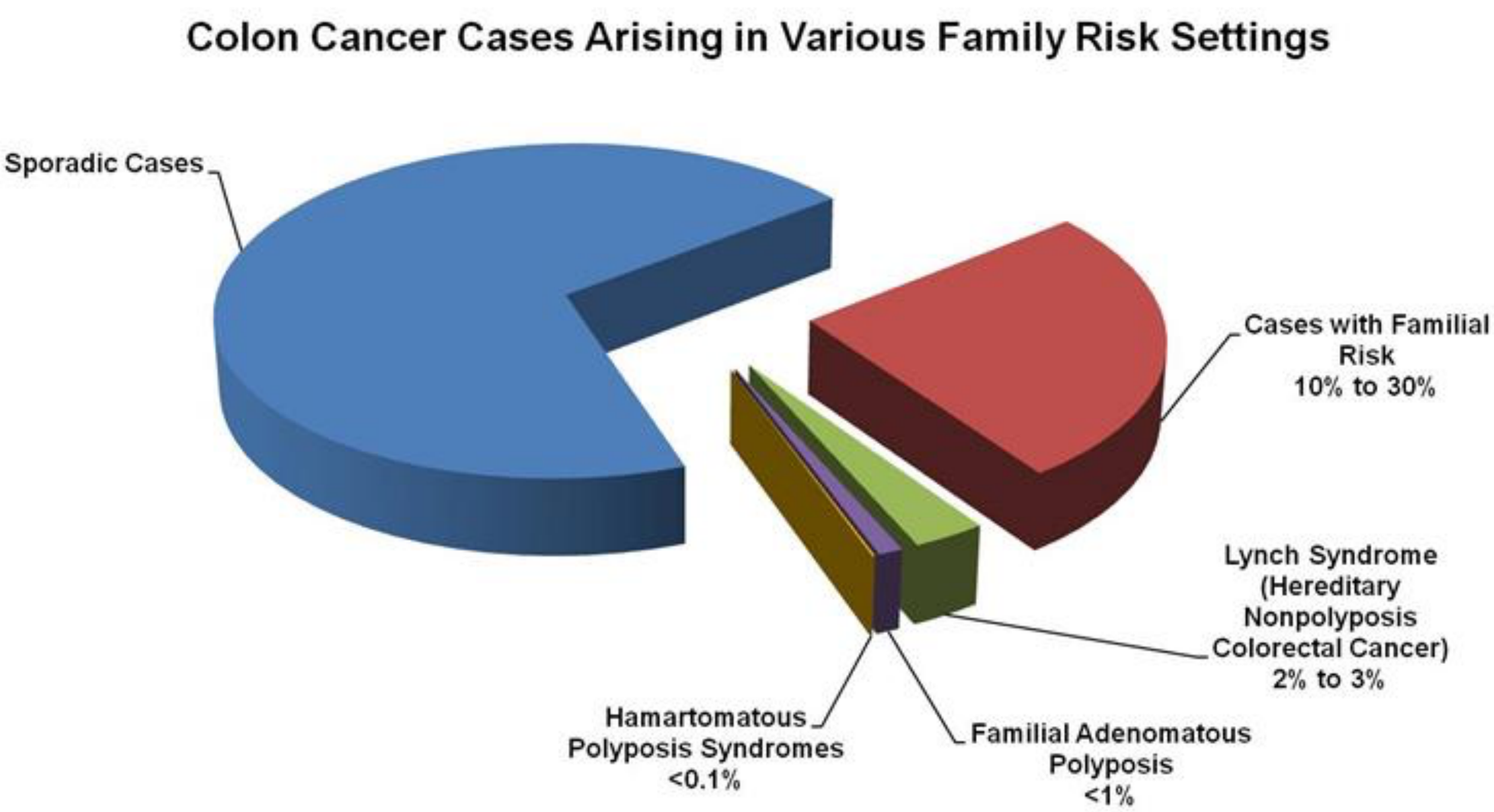
Prevention and the Natural History of Disease



Conclusions

- Colorectal cancer screening is effective and cost-effective
- Recommend screening to all of your eligible patients
- Many choices, simpler, more unified recommendation
- Improving prevention and survival of CRC

Inheritance of CRC

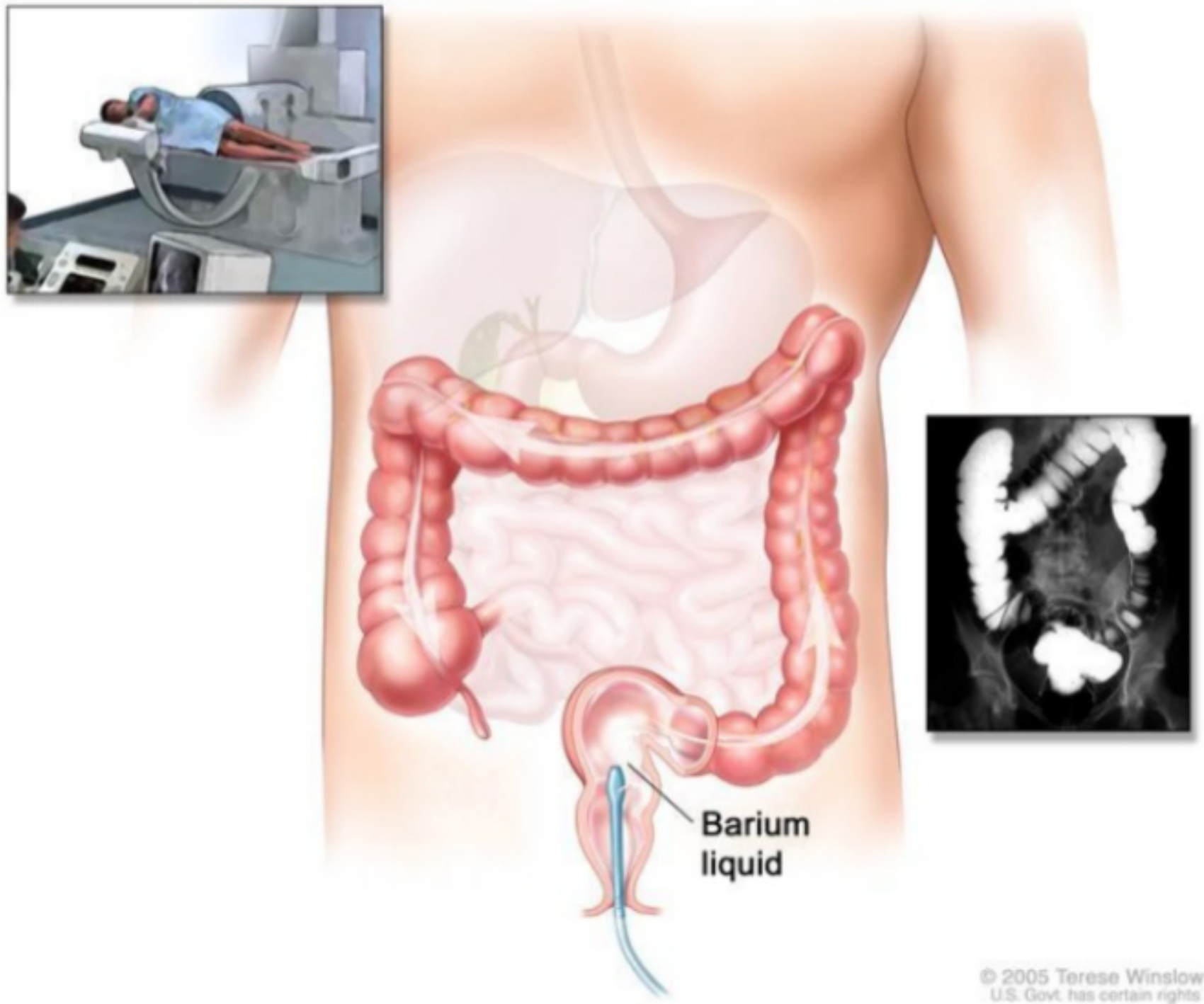


High Risk Factors

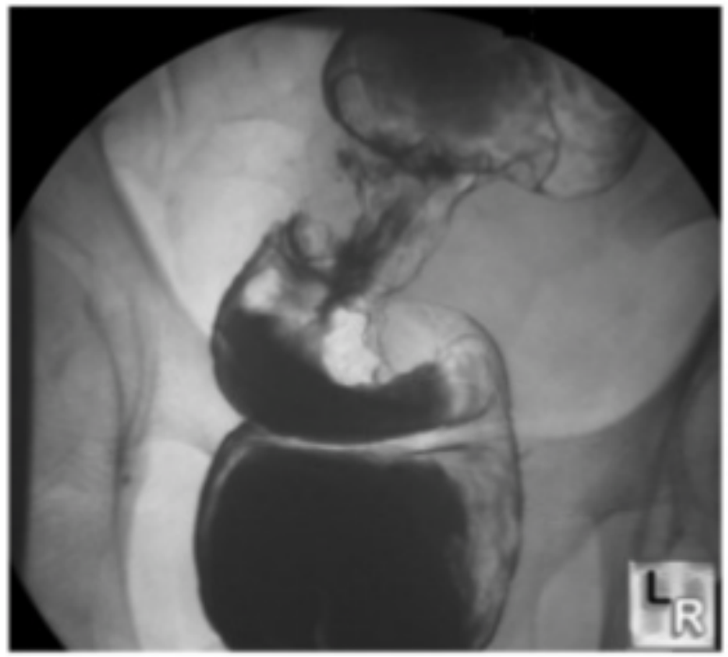
- Familial Adenomatous Polyposis
- Hereditary Non Poliposis Colon Cancer
- Family history of Colo Rectal Carcinoma
- Previous Colorectal CA, Ovarian, Endometrial, Breast CA*
- Age >50
- Inflammatory Bowel Disease (UC > CD)
- Poor Diet (increased fat, red meat, decreased fibre)
- Smoking
- Diabetes mellitus & Acromegaly
- Streptococcus Bovis Bacteremia*
- Ureterosigmoidostomy*

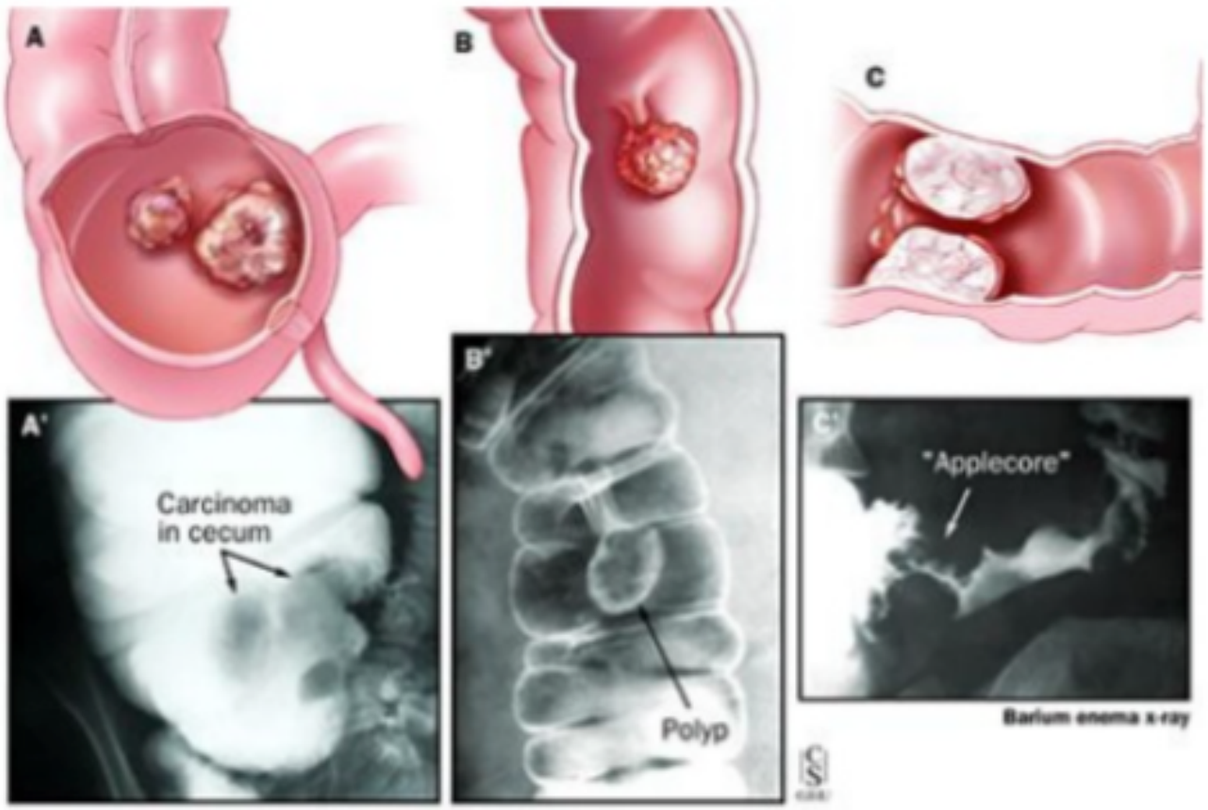
* Harrisons

Barium Enema

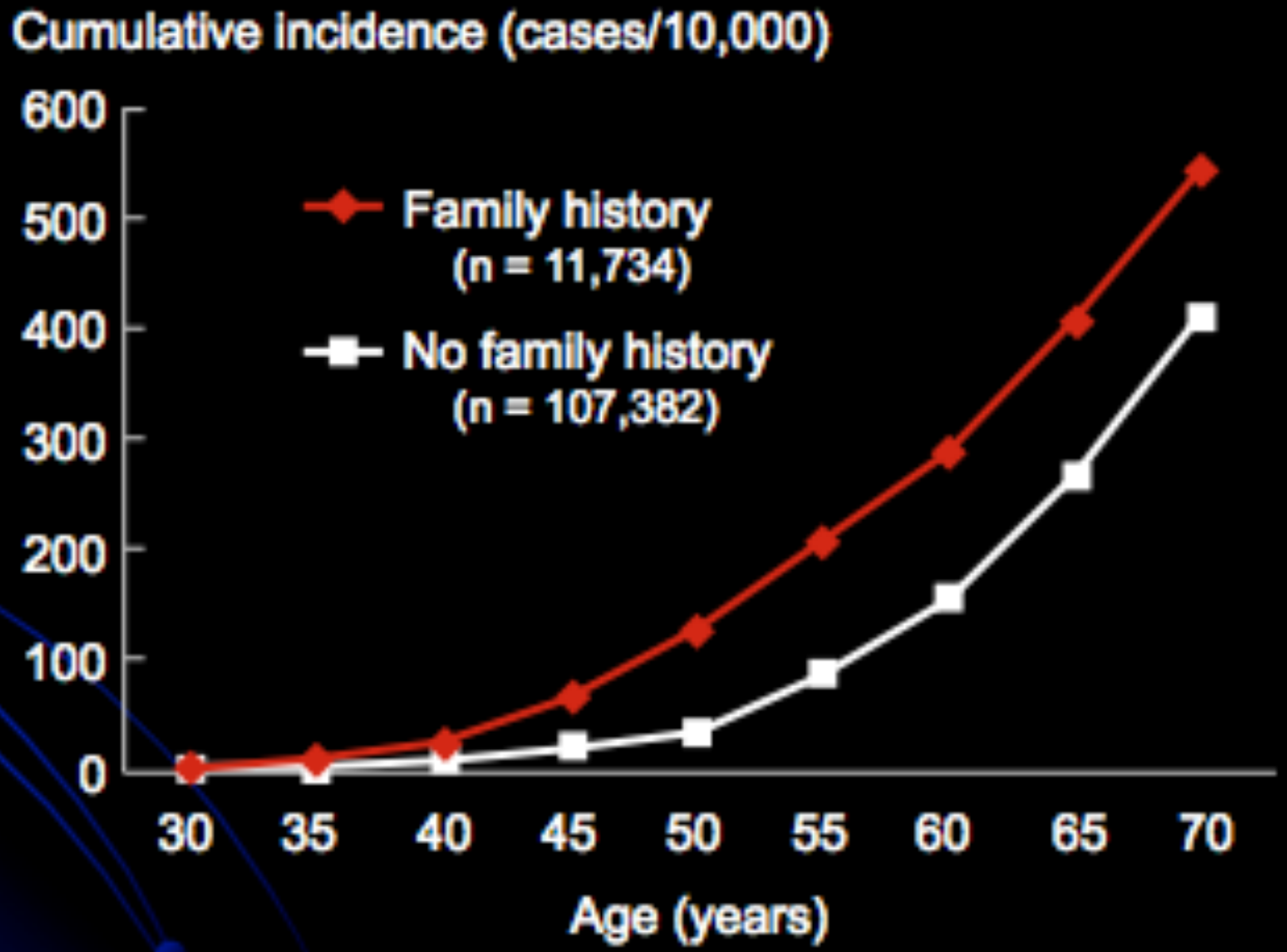


Apple Core Lesion in Colorectal Cancer





Age and Cumulative Incidence of CRC: 10 Year Shift With Positive Family History



Fuchs et al, *N Engl J Med* 1994; 331: 1669