Understanding Colorectal Cancer Screening could save your life!

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LAB FORWARD

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What is Cancer?

Neoplasia Definitions

- Cancer (the generic term for all malignant neoplasms)
- Literally means “new growth” (G. neos, new,+ plasma, thing formed)
- Defined as an abnormal mass or colony of cells produced by a relatively autonomous new growth of tissue
- Arise from the clonal expansion of a single cell that has undergone neoplastic transformation
- Caused by a chemical, physical, or biological agent (or event) that directly and irreversibly alters the cell genome

Neoplasia Definitions

Benign

- lesion is not life-threatening
- slow growing
- are well-differentiated
- will not disseminate through the body (metastasize)
- amenable to removal resulting in a cure

Malignant

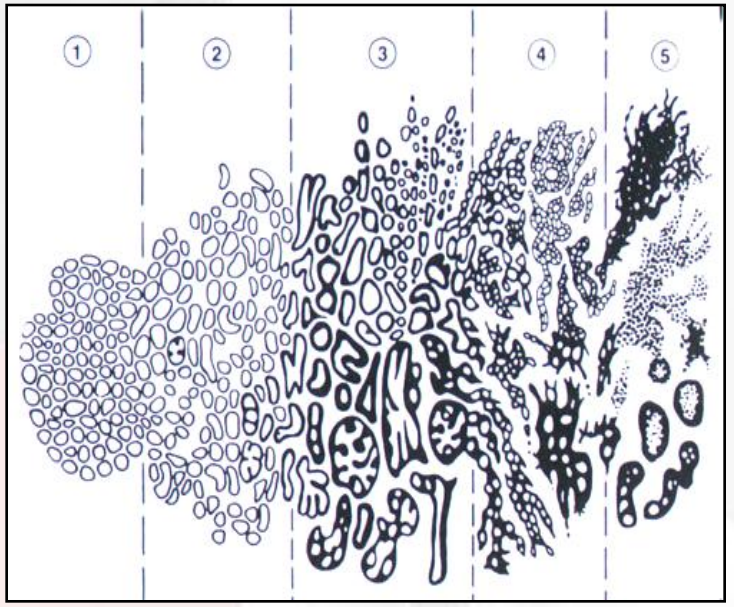
- rapid growth, invasion, and destruction of contiguous structures
- may range from well-differentiated to primitive, anaplastic cells
- disseminates throughout the body leading to death

Battle Against Cancer

- Primary prevention is not feasible (except lung cancer due to smoking)
- Best option is early diagnosis
  - Goal is to diagnose cancer when tumor is still small
  - Most cancers do not produce symptoms until too large or have already metastasized
- Followed by effective (curative) treatment

Grading of Cancer

- An estimate of the cancer's aggressiveness/malignancy
- Based on the cytologic differentiation of tumor cells and the number of mitoses
- Based on increasing anaplasia
- Divided into Grades I to IV (Gleason 2-10)
- Subjective based on the impressions of the evaluator



Best *Worst*

Gleason Grading System

Staging of Cancer

Staging is the process of dividing cancer into groups of early and late cancer

Useful for

- Prognosis
- Therapy selection
- Evaluate clinical outcomes

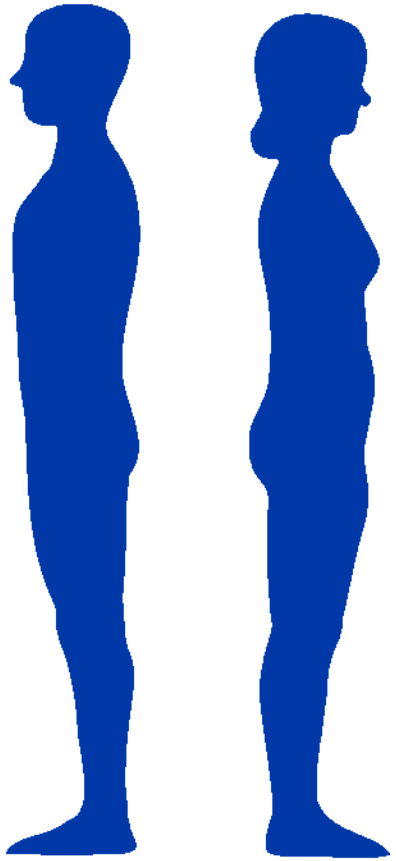
Most widely used system is the **TNM system**

- **T**-the extent of the primary tumor
- **N**-the presence or absence and extent of regional lymph node metastasis
- **M**-the presence or absence of distant metastasis

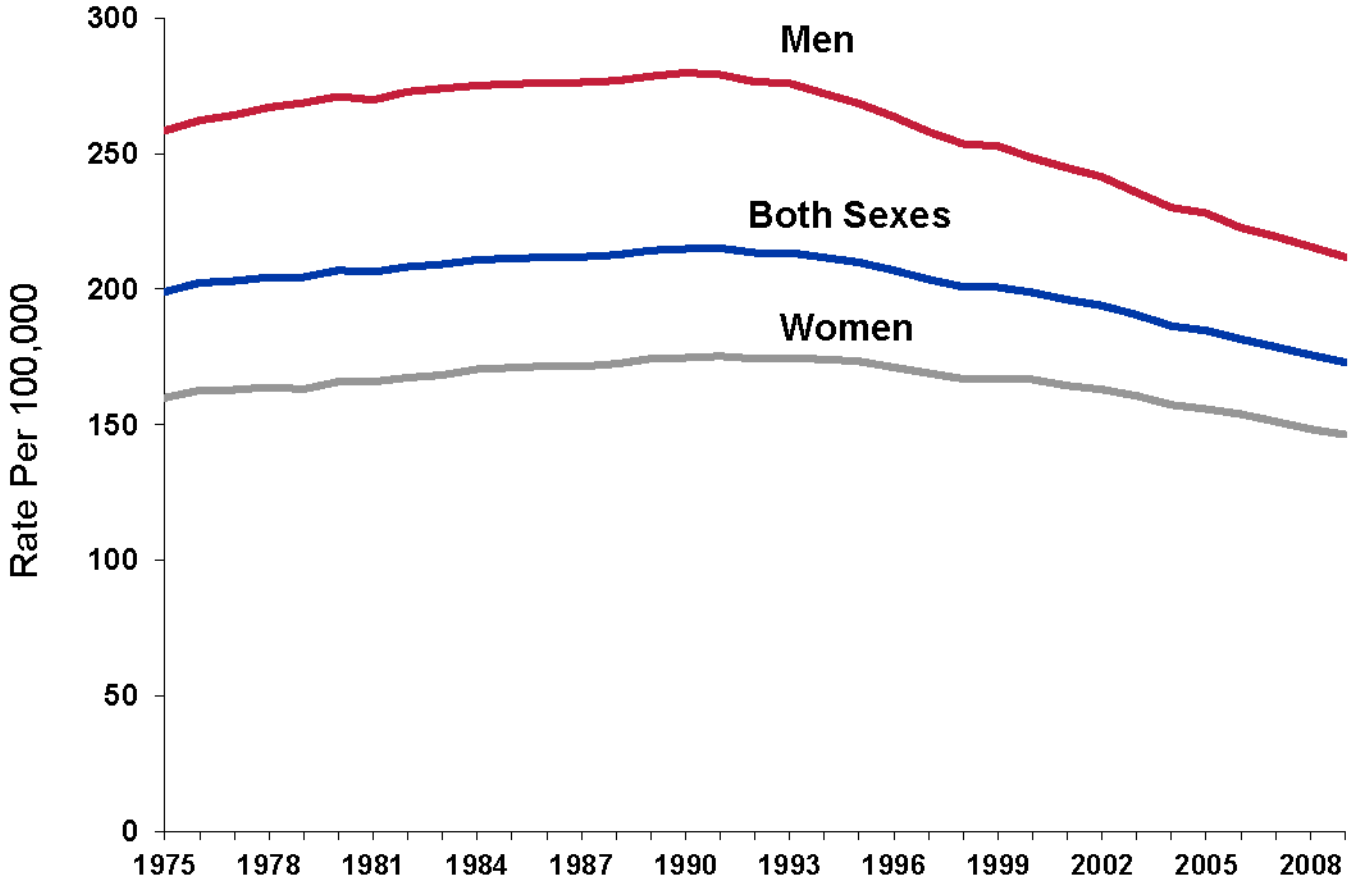
Cancer Statistics 2013*

Estimated Cancer Deaths in the US in 2013

Men 306,920		Women 273,430	
Lung & bronchus	28%	26%	Lung & bronchus
Prostate	10%	14%	Breast
Colon & rectum	9%	9%	Colon & rectum
Pancreas	6%	7%	Pancreas
Liver & intrahepatic bile duct	5%	5%	Ovary
Leukemia	4%	4%	Leukemia
Esophagus	4%	3%	Non-Hodgkin lymphoma
Urinary bladder	4%	3%	Uterine corpus
Non-Hodgkin lymphoma	3%	2%	Liver & intrahepatic bile duct
Kidney & renal pelvis	3%	2%	Brain/other nervous system
All other sites	24%	25%	All other sites

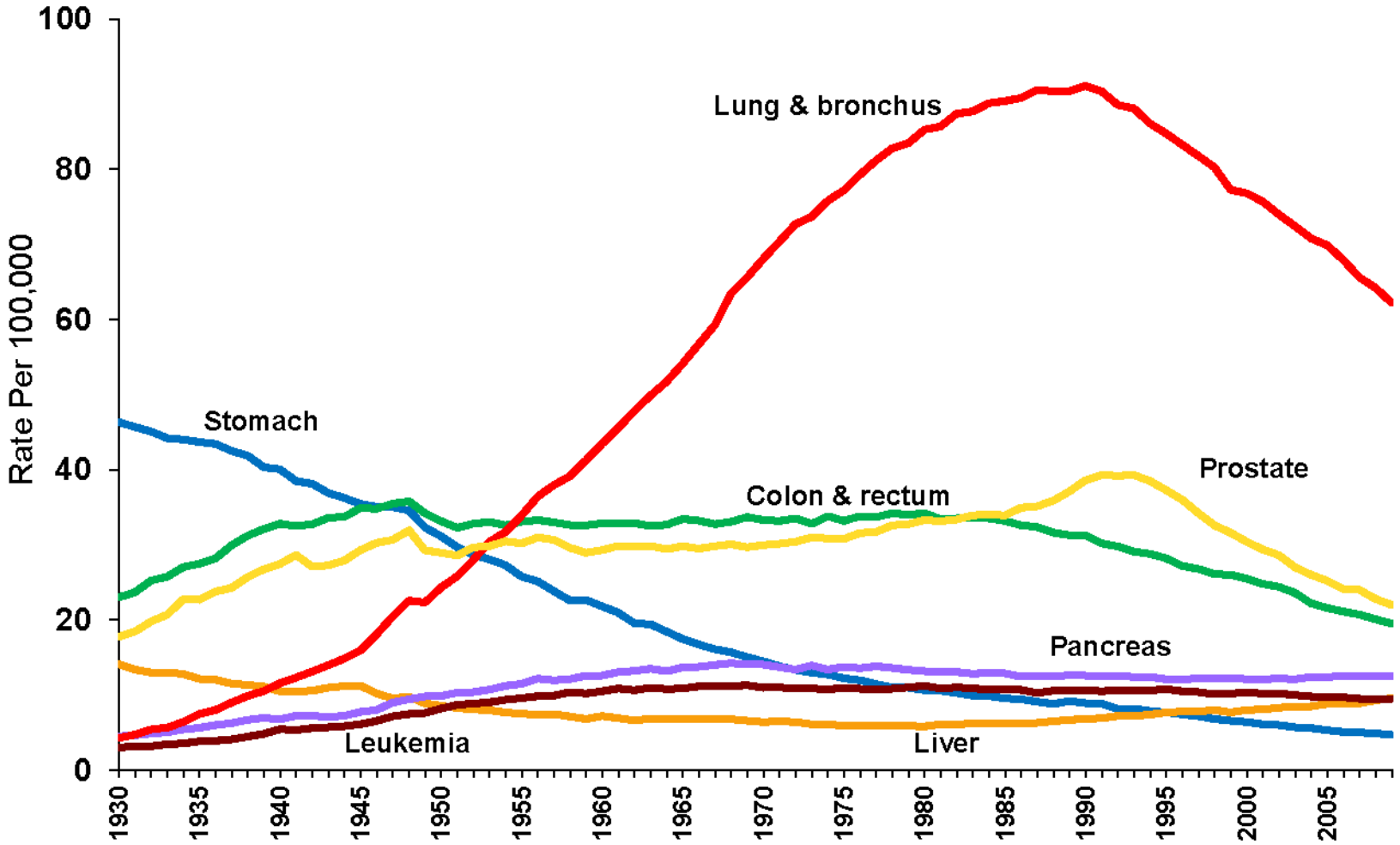


Cancer Death Rates* by Sex, US, 1975-2009



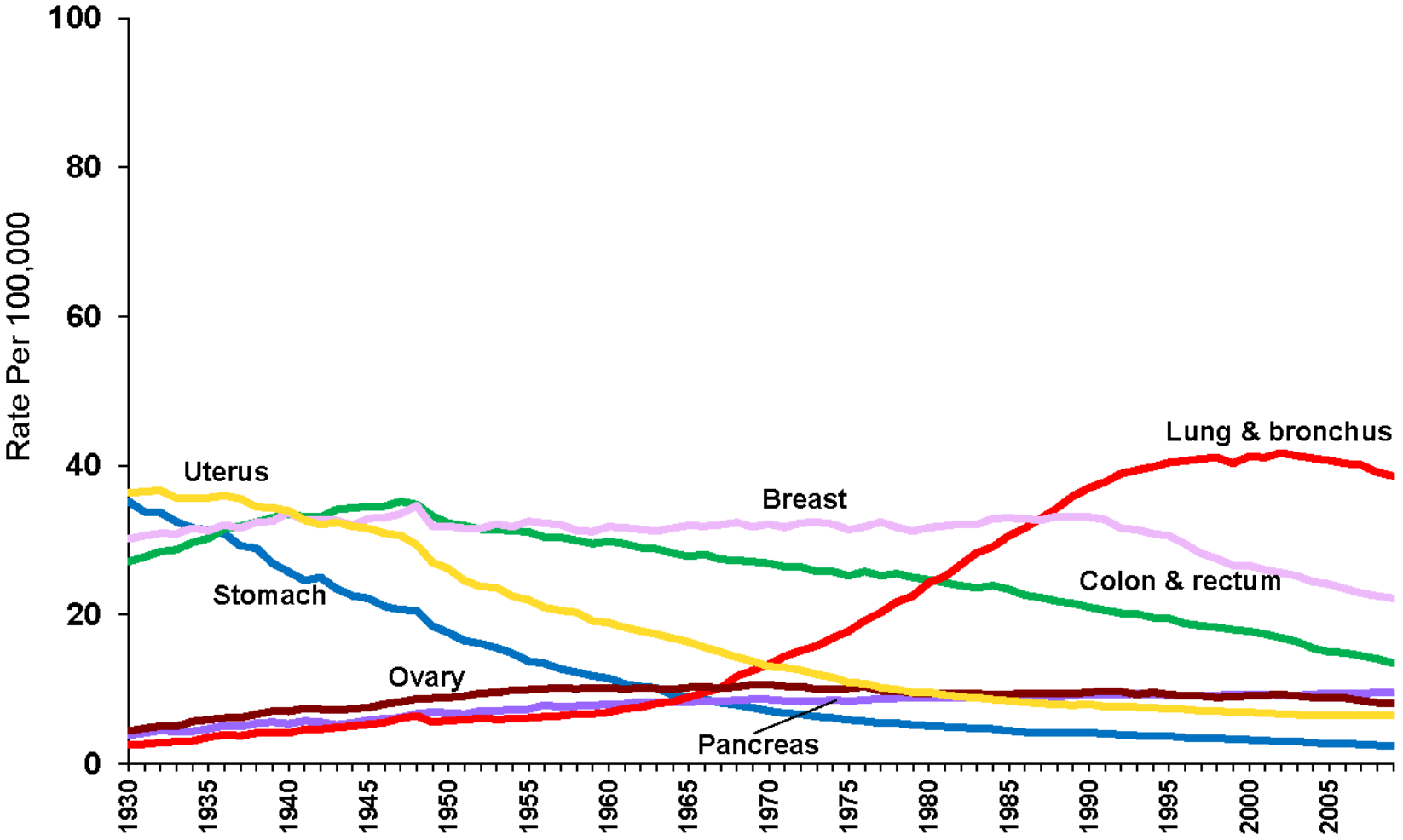
*Age-adjusted to the 2000 US standard population.
Source: US Mortality Data 1975-2009, National Center for Health Statistics, Centers for Disease Control and Prevention.

Cancer Death Rates* Among Men, US,1930-2009



*Age-adjusted to the 2000 US standard population.
Source: US Mortality Data 1960-2009, US Mortality Volumes 1930-1959,
National Center for Health Statistics, Centers for Disease Control and Prevention.

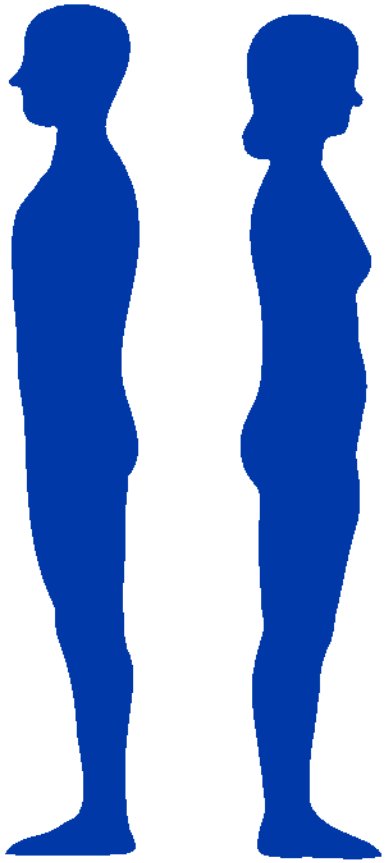
Cancer Death Rates* Among Women, US,1930-2009



*Age-adjusted to the 2000 US standard population.
Source: US Mortality Data 1960-2009, US Mortality Volumes 1930-1959,
National Center for Health Statistics, Centers for Disease Control and Prevention.

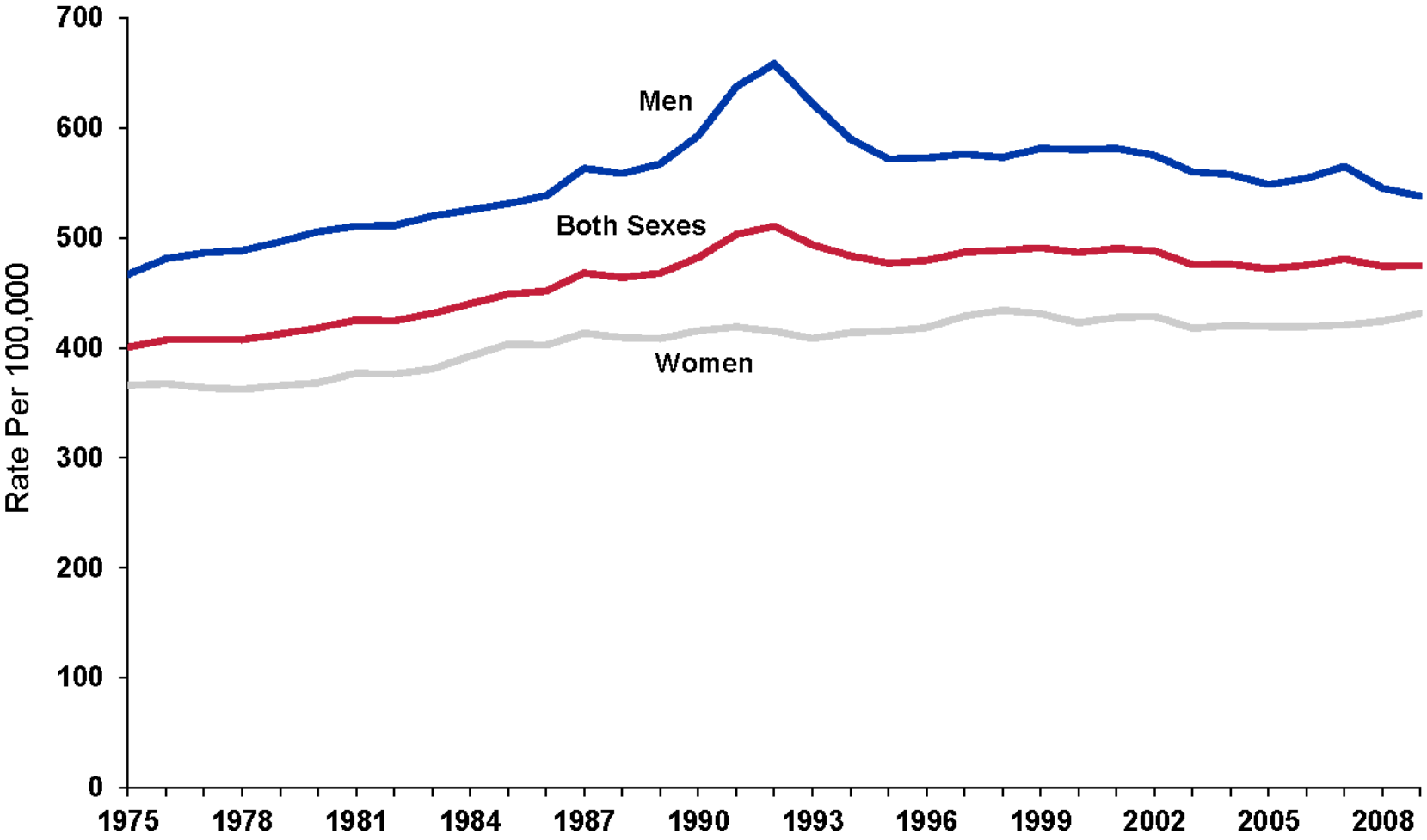
Estimated New Cancer Cases* in the US in 2013

Men 854,790		Women 805,500	
Prostate	28%	29%	Breast
Lung & bronchus	14%	14%	Lung & bronchus
Colon & rectum	9%	9%	Colon & rectum
Urinary bladder	6%	6%	Uterine corpus
Melanoma of skin	5%	6%	Thyroid
Kidney & renal pelvis	5%	4%	Non-Hodgkin lymphoma
Non-Hodgkin lymphoma	4%	4%	Melanoma of skin
Oral cavity	3%	3%	Kidney & renal pelvis
Leukemia	3%	3%	Pancreas
Pancreas	3%	3%	Ovary
All Other Sites	20%	19%	All Other Sites



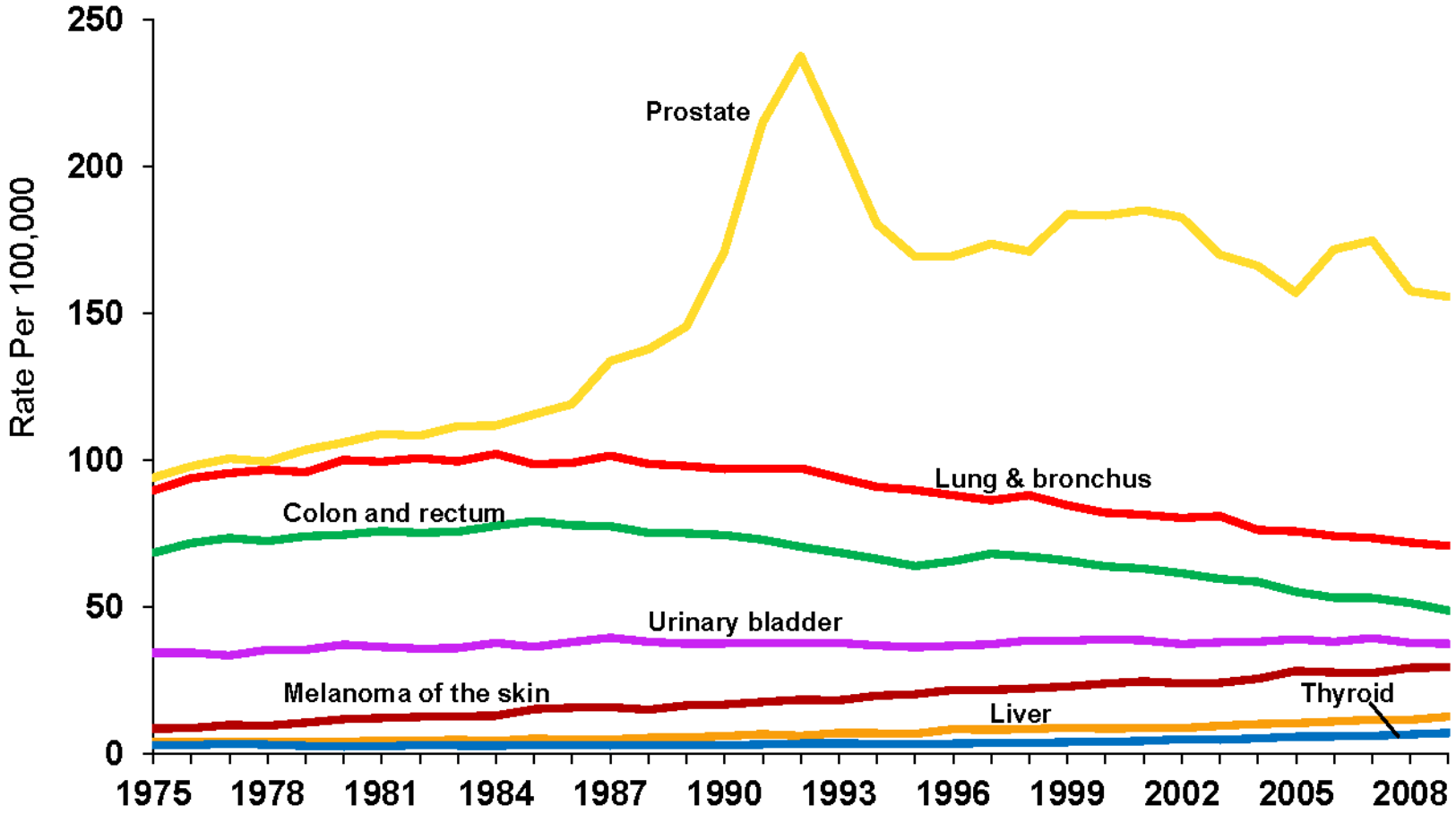
*Excludes basal cell and squamous cell skin cancers and in situ carcinoma except urinary bladder.

Cancer Incidence Rates* by Sex, US, 1975-2009



*Age-adjusted to the 2000 US standard population and adjusted for delays in reporting.
Source: Surveillance, Epidemiology, and End Results Program, Delay-adjusted Incidence database: SEER Incidence Delay-adjusted Rates, 9 Registries, 1975-2009, National Cancer Institute, 2012.

Cancer Incidence Rates* Among Men, US, 1975-2009



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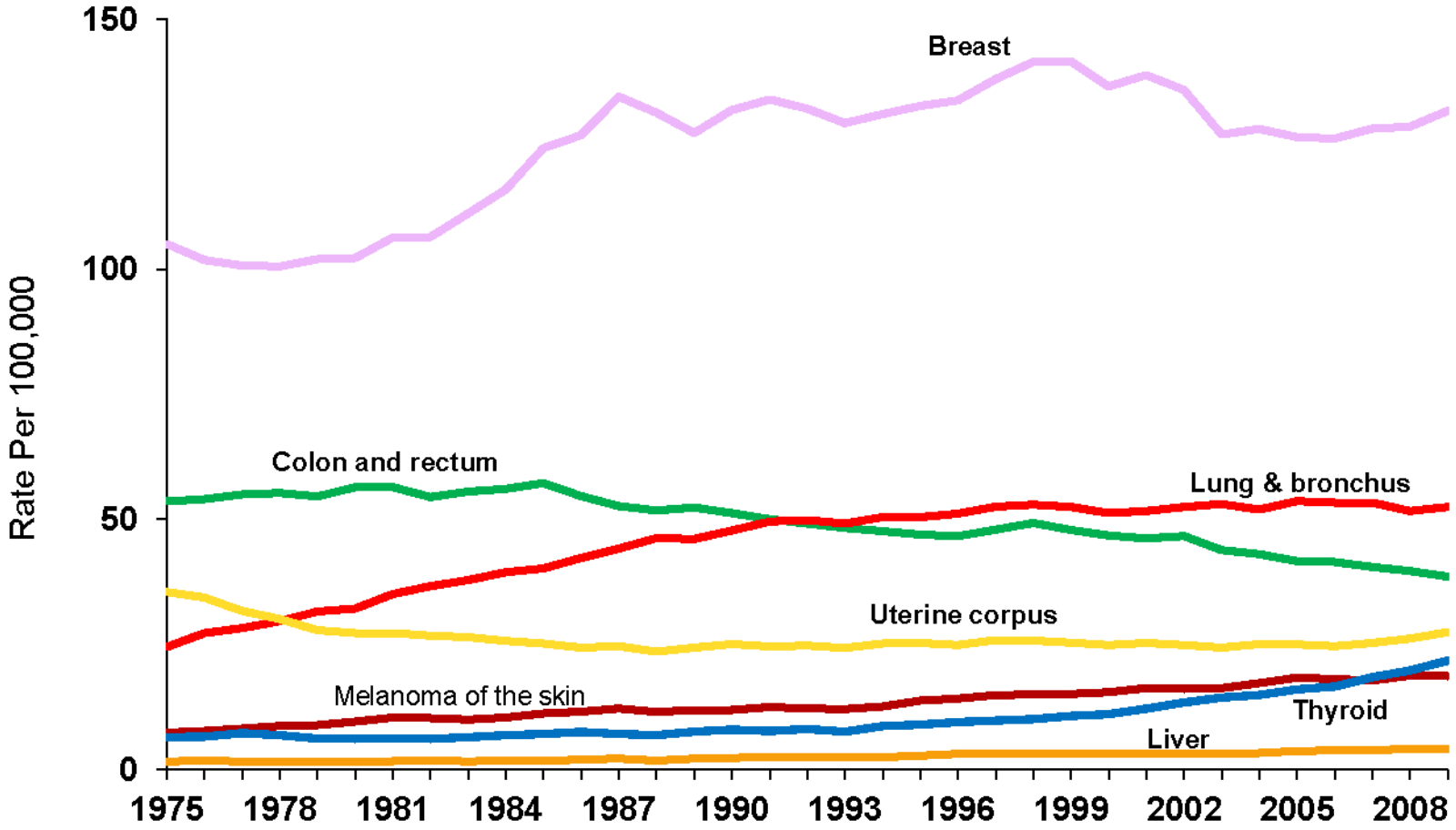
Cancer Incidence Rates* Among Women, US, 1975-2009



*Age-adjusted to the 2000 US standard population and adjusted for delays in reporting.
Source: Surveillance, Epidemiology, and End Results Program, Delay-adjusted Incidence database: SEER Incidence Delay-adjusted Rates, 9 Registries, 1975-2009, National Cancer Institute, 2012.

The Lifetime Probability of Developing Cancer for Men, 2007-2009*

Site	Risk
All sites†	1 in 2
Prostate	1 in 6
Lung and bronchus	1 in 13
Colon and rectum	1 in 19
Urinary bladder‡	1 in 26
Melanoma§	1 in 35
Non-Hodgkin lymphoma	1 in 43
Kidney	1 in 49
Leukemia	1 in 63
Oral Cavity	1 in 66
Stomach	1 in 92

* For those free of cancer at beginning of age interval.

† All sites exclude basal and squamous cell skin cancers and in situ cancers except urinary bladder.

‡ Includes invasive and in situ cancer cases

§ Statistic for white men.

Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.6.1 Statistical Research and Applications Branch, National Cancer Institute, 2012.

The Lifetime Probability of Developing Cancer for Women, 2007-2009*

Site	Risk
All sites†	1 in 3
Breast	1 in 8
Lung & bronchus	1 in 16
Colon & rectum	1 in 21
Uterine corpus	1 in 38
Non-Hodgkin lymphoma	1 in 52
Urinary bladder‡	1 in 87
Melanoma §	1 in 54
Ovary	1 in 72
Pancreas	1 in 69
Uterine cervix	1 in 147

* For those free of cancer at beginning of age interval.
† All sites exclude basal and squamous cell skin cancers and in situ cancers except urinary bladder.
‡ Includes invasive and in situ cancer cases
§ Statistic for white women.
Source: DevCan: Probability of Developing or Dying of Cancer Software, Version 6.6.1 Statistical Research and Applications Branch, National Cancer Institute, 2012.

Trends in Five-year Relative Cancer Survival Rates (%), 1975-2008

Site	1975-1977	1987-1989	2002-2008
All sites	49	56	68
Breast (female)	75	84	90
Colon	51	61	65
Leukemia	34	43	58
Lung & bronchus	12	13	17
Melanoma	82	88	93
Non-Hodgkin lymphoma	47	51	71
Ovary	36	38	43
Pancreas	2	4	6
Prostate	68	83	100
Rectum	48	58	68
Urinary bladder	73	79	80

5-year relative survival rates based on patients diagnosed from 2002 to 2008, all followed through 2009.
Source: *SEER Cancer Statistics Review 1975-2009 (*SEER 9 registries), National Cancer Institute, 2012.

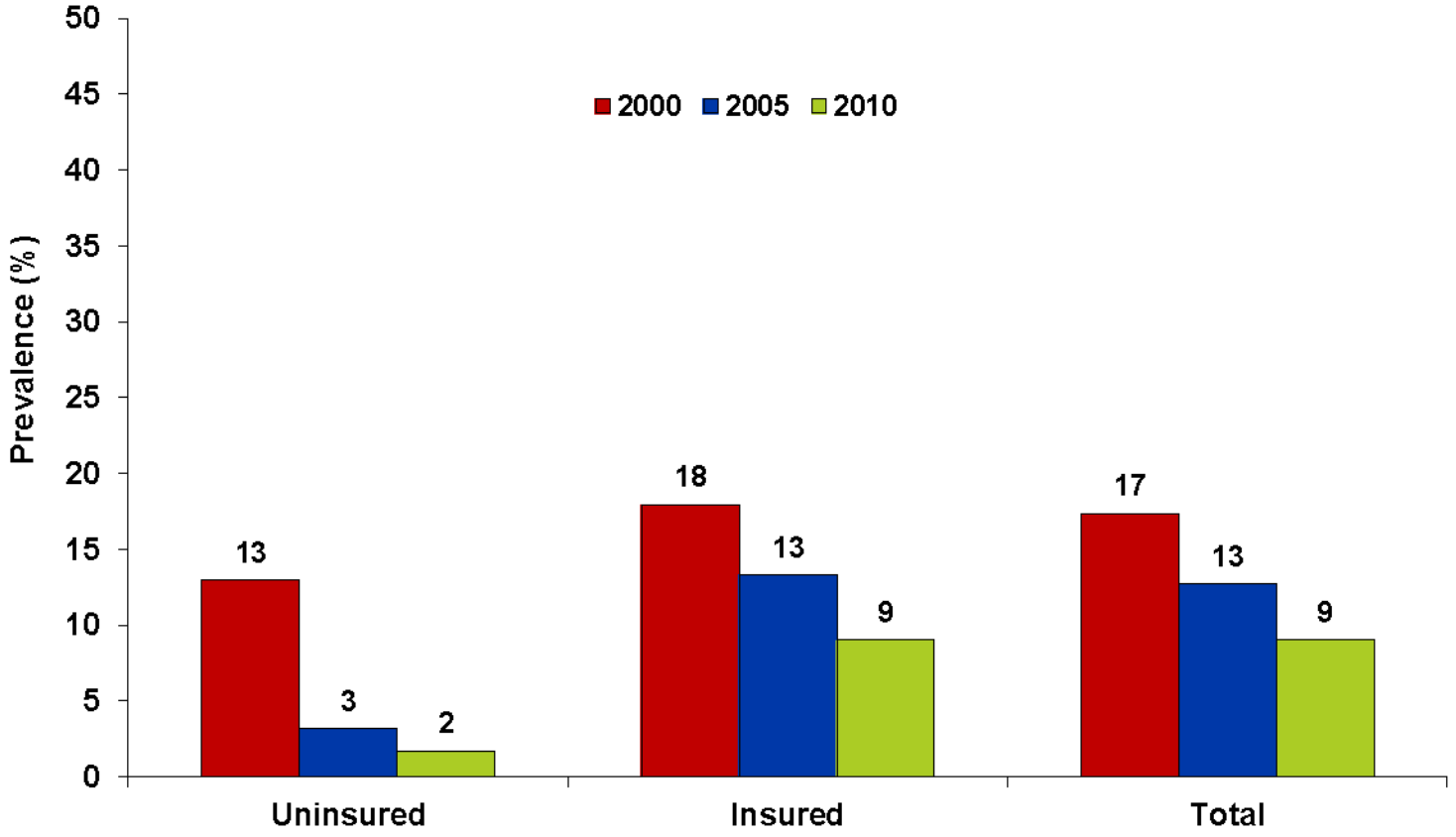
Colorectal Cancer Screening Guidelines*

Beginning at age 50, men and women should follow one of the following examination schedules:

Test	Time interval
Fecal occult blood test	Annual
Flexible sigmoidoscopy	5 yrs
Double contrast barium enema	5 yrs
Colonoscopy	10 yrs
CT Colonography	5 yrs

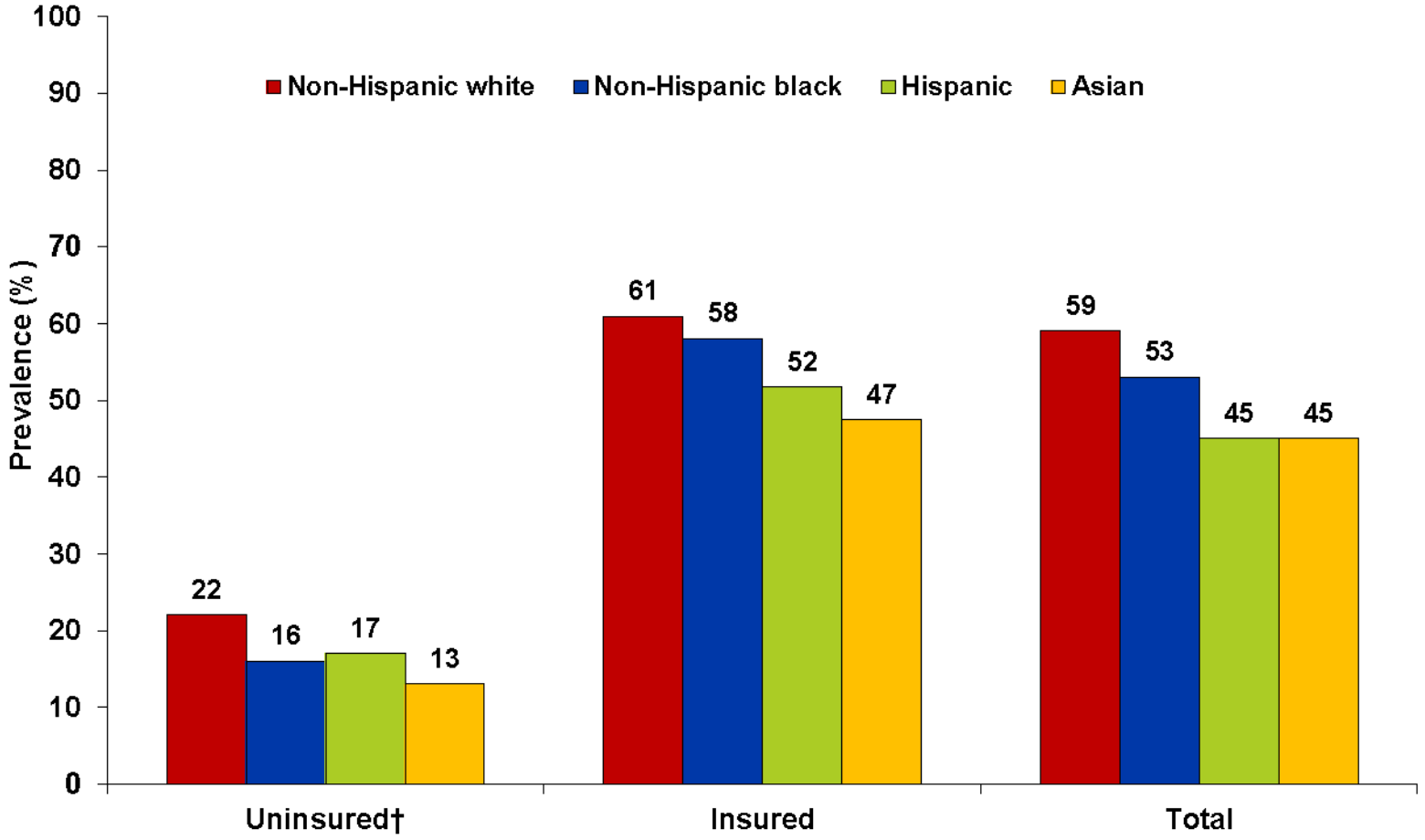
*For people at average risk; individuals at higher risk should talk with a doctor about a different testing schedule.

Trends in the Prevalence of Fecal Occult Blood Test* by Health Insurance Status, US, 2000-2010



*A fecal occult blood test in the past year among adults ≥ 50 years; estimates age-adjusted to the 2000 US standard population.
Source: National Health Interview Survey, National Center for Health Statistics, Centers for Disease Control and Prevention.

Flexible Sigmoidoscopy or Colonoscopy Prevalence* by Race/Ethnicity and Health Insurance Status, US, 2010



* A sigmoidoscopy within five years or a colonoscopy within 10 years among adults ≥ 50; estimates age-adjusted to the 2000 US standard population. Source: National Health Interview Survey, National Center for Health Statistics, Centers for Disease Control and Prevention.

Colorectal Cancer

Colorectal Cancer (CRC) Facts

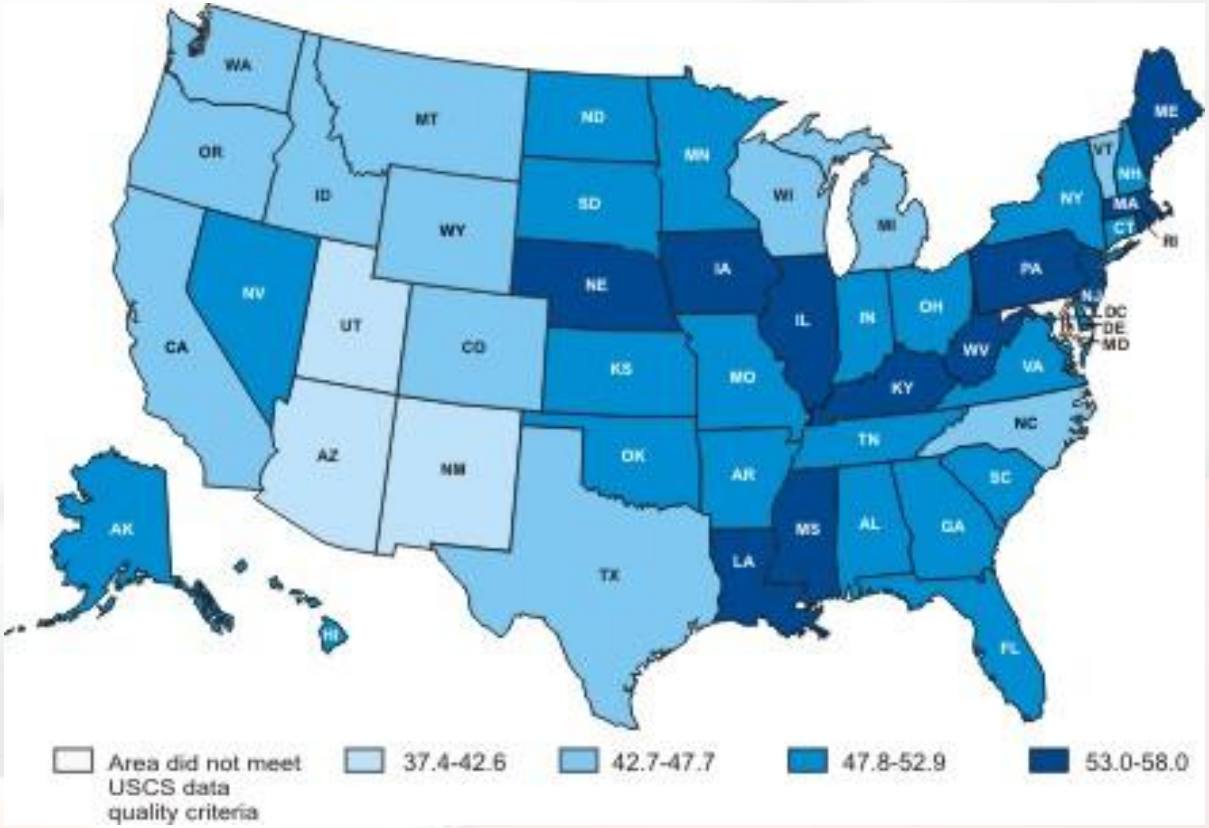
- Third most common cause of cancer
- Second leading cause of cancer-related deaths in men and women in the US
- An estimated 143,000 cases of CRC are expected to occur in 2012

American Cancer Society. Cancer facts and figures 2012. Atlanta: American Cancer Society; 2012

Colorectal Cancer Facts

- 51, 690 deaths from CRC are expected to occur in 2012
- Americans have a 5% lifetime risk for CRC
- Rare before age 40 in both men and women, with 90% of cases occurring after age 50

Colorectal Cancer Incidence- Geographic Location in US



(2004) www.cdc.gov

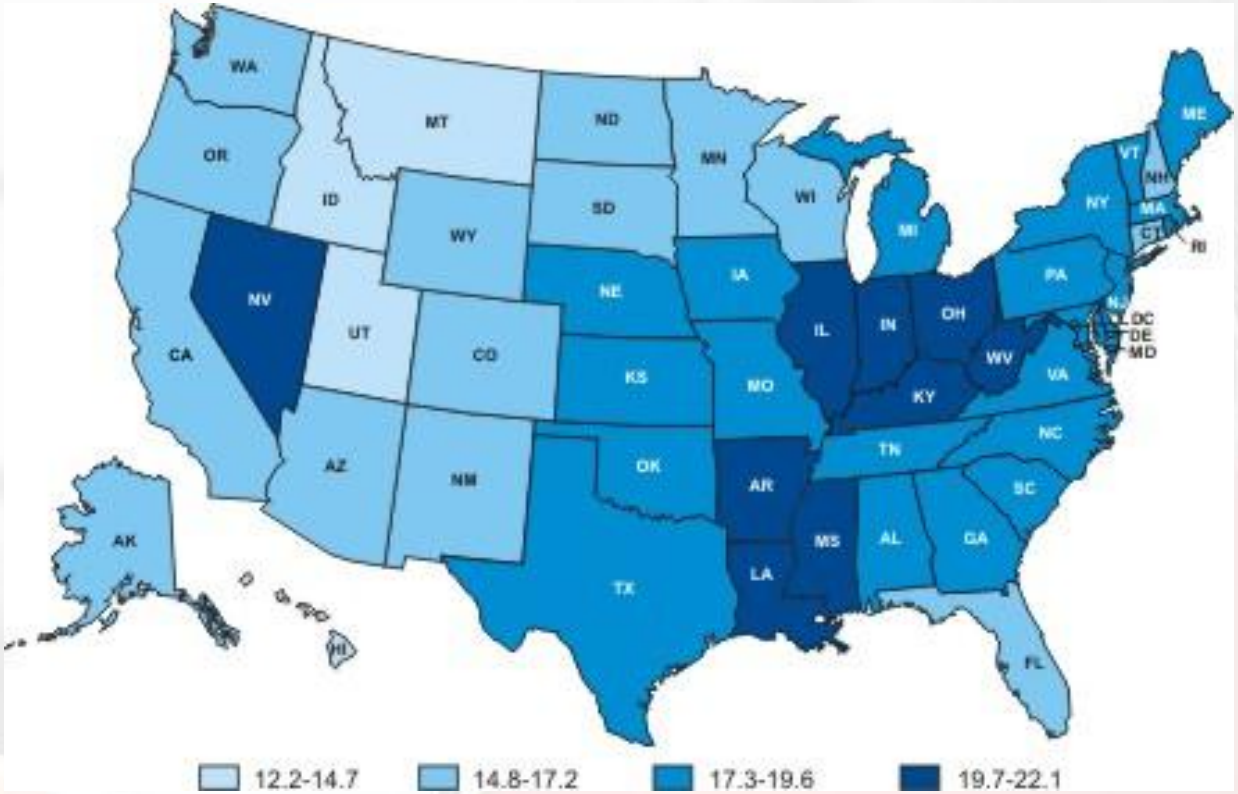
Lowest Incidence rate: AZ, NM, UT

Highest Incidence:

IL, IA, KY, LA, ME, MA, MS, NE, NJ, PA, RI, WV

Colorado is in the 2nd lowest bracket of incidence

Colorectal Cancer Deaths- Geographic Location in US



(2004) www.cdc.gov

Death rate does not correlate exactly with incidence rate

Lowest death rate: HI, ID, MT, UT

Highest death rate: AR, IL, IN, KY, LA, MS, NV, OH, WV

Colorado is in the 2nd lowest bracket of deaths

Colorectal Cancer Facts

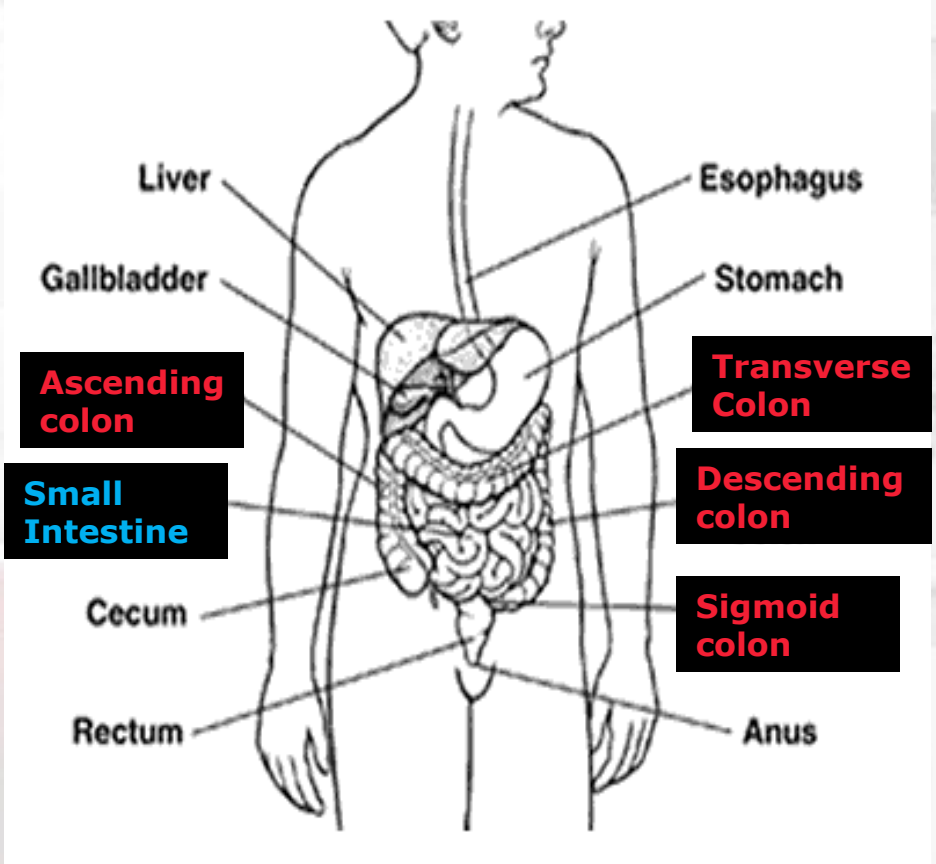
- Incidence of CRC has been declining in the US by 2-3% per year over the last 15 years
- CRC screening probably accounts for this decline by early detection and removal of polyps
- Good evidence shows that screening reduces mortality from CRC

Anatomy of the Gastrointestinal Tract

The colon is a part of the GI (gastrointestinal) tract where food is processed to produce energy and rid the body of waste

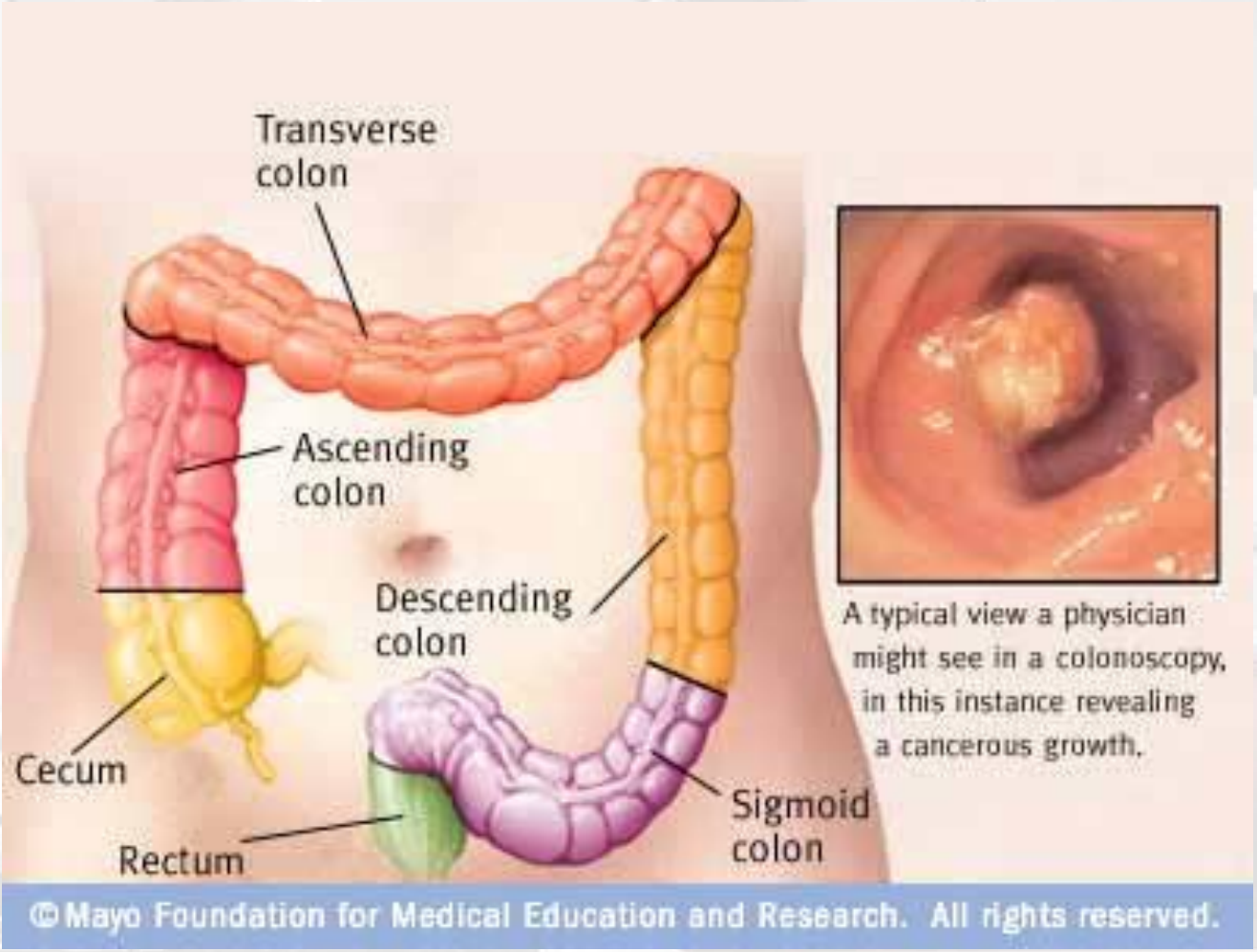
The small intestine is where nutrients are broken down and absorbed

The small intestine joins the colon (large intestine), a muscular tube about 5 feet long



http://www.cancer.org/docroot/CRI/content/CRI_2_2_1X_What_is_colon_and_rectum_cancer_10.asp?sitearea=

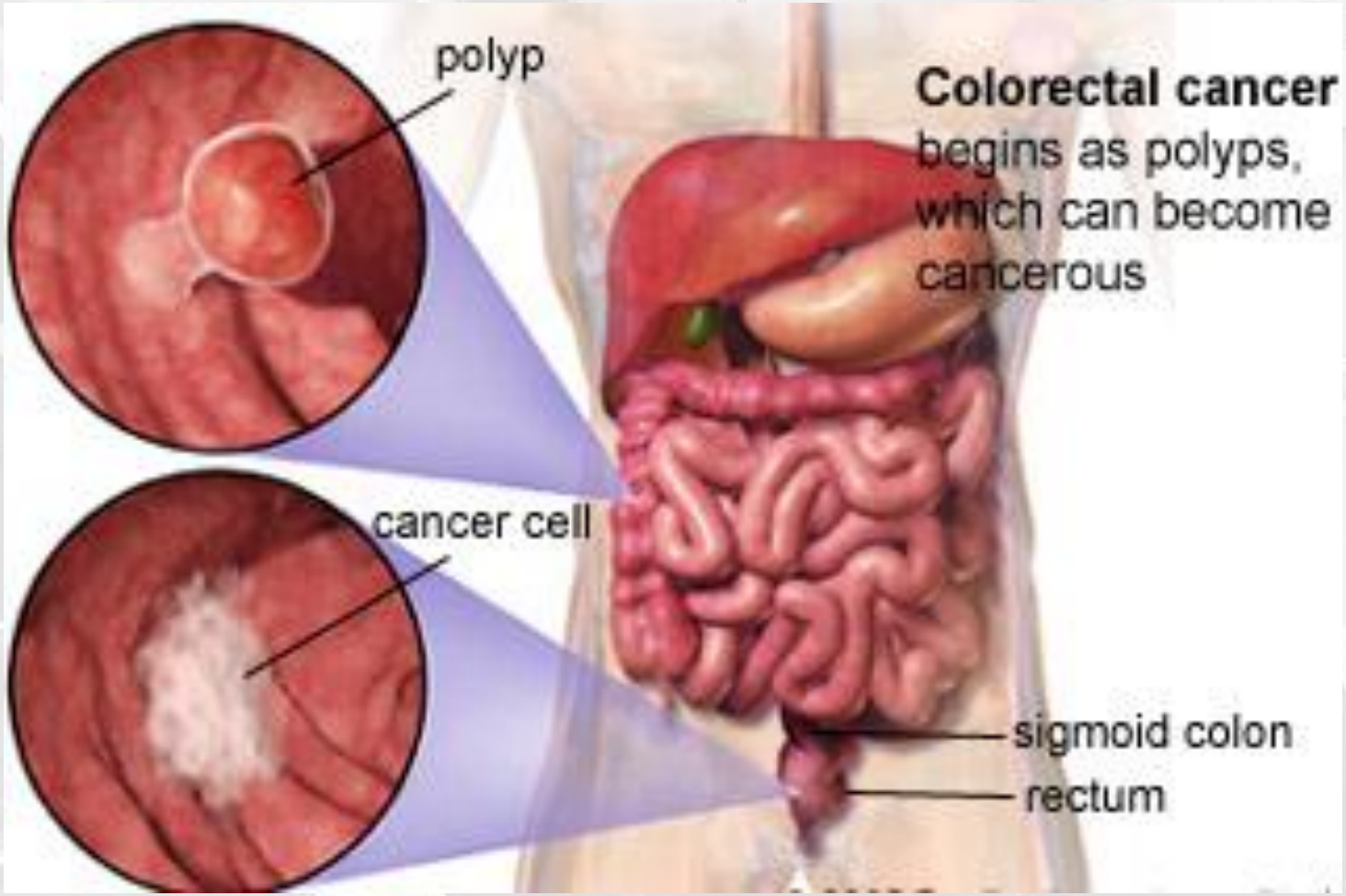
Anatomy of the Colon and Rectum



- The colon has four sections: ascending, transverse, descending, and sigmoid colon
- The first part of the colon absorbs water and nutrients from food and serves as a storage for waste
- Waste then travels through the rectum (the last six inches of the digestive system) and then exits through the anus

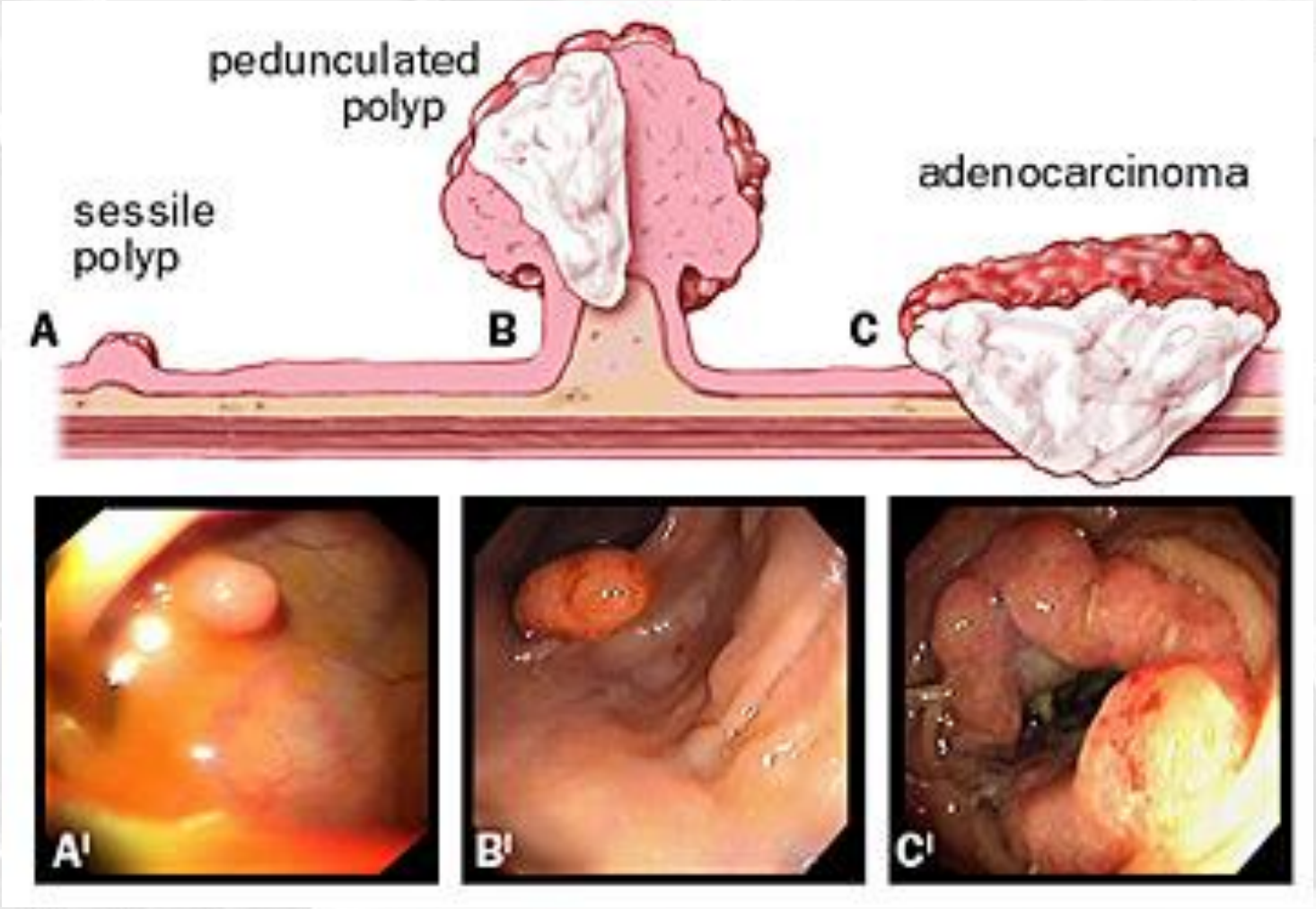
http://www.riversideonline.com/source/images/image_popup/colon.jpg

Colorectal Cancer Origin



http://images.healthcentersonline.com/digestive/images/article/ColorectalCancer.jpg

Polyp to Cancer Progression

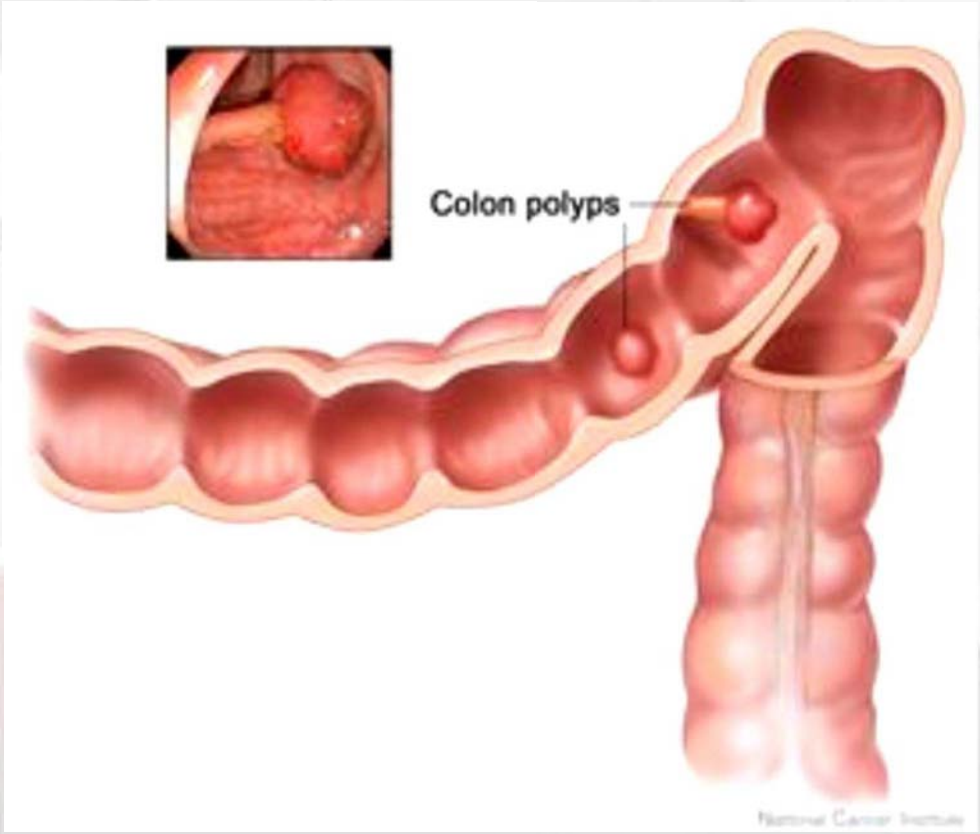


A. Sessile polyp B. Pedunculated polyp C. Colon cancer

Figure available at: http://hopkins-gi.nts.jhu.edu/pages/latin/templates/index.cfm?pg=disease3&organ=6&disease=36&lang_id=1. Accessed March 18, 2009.

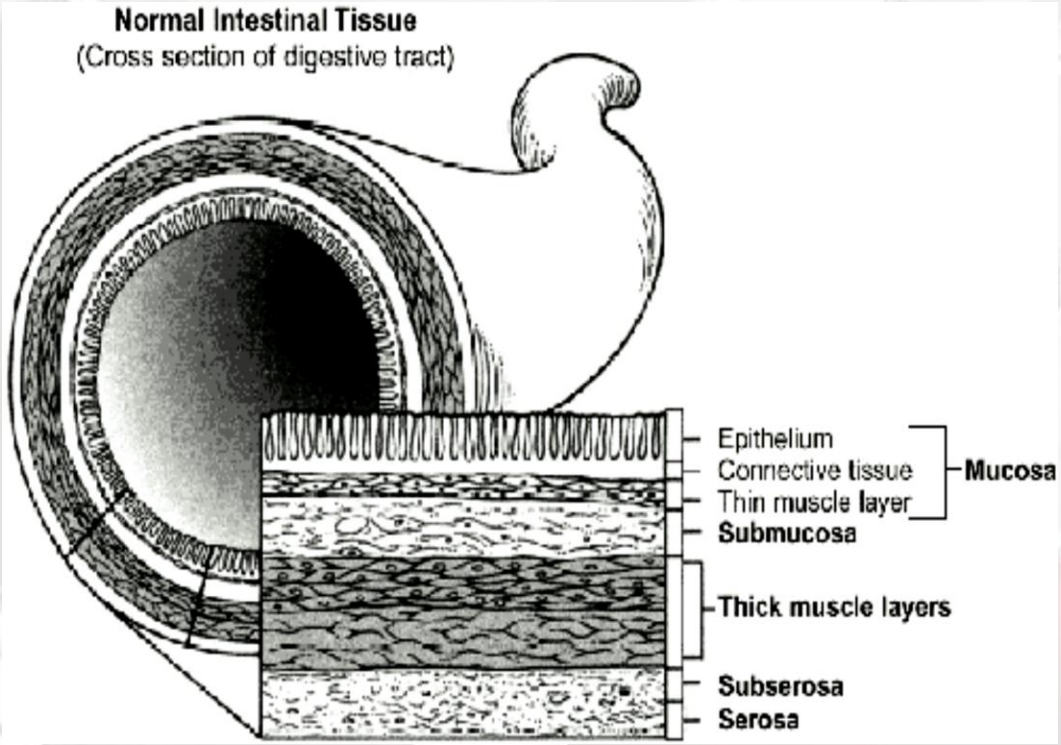
Colorectal Cancer

Over 95% of colon and rectal cancers are adenocarcinomas (cancers that begin in cells that make and release mucous and other fluids). These cells line the inside of the colon and rectum.



http://www.colon-cancer.biz/images/coloncancerr.jpg

Colorectal Cancer



The layers of the colon wall

Each section of the colon has several layers of tissue

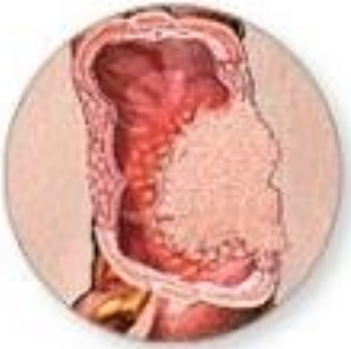
Cancer begins in the inner layer and can grow through some or all of the tissue layers

Cancer that begins in different sections of the colon may cause different symptoms

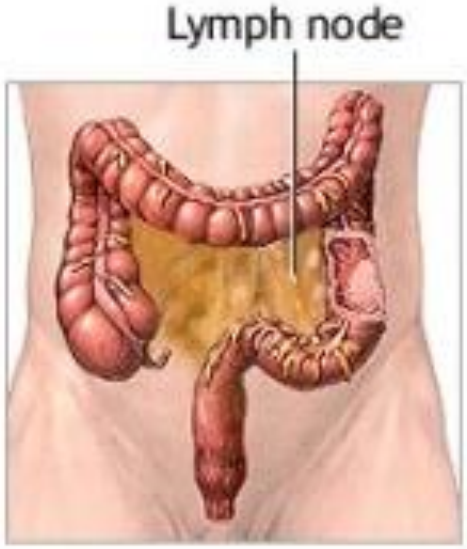
http://www.cancer.org/docroot/CRI/content/CRI_2_4_3X_How_is_colon_and_rectum_cancer_staged.asp?sitearea=

Cancer Progression

Stage I



Stage II



Stage III

ADAM.

Cancer occurs when cells grow and divide without regulation and order *(Stage 0, I, and IIA)*

Metastasis occurs when cancer cells break away from a tumor and spread to other parts of the body via the blood or lymph system *(Stage IIB, III, and IV)*

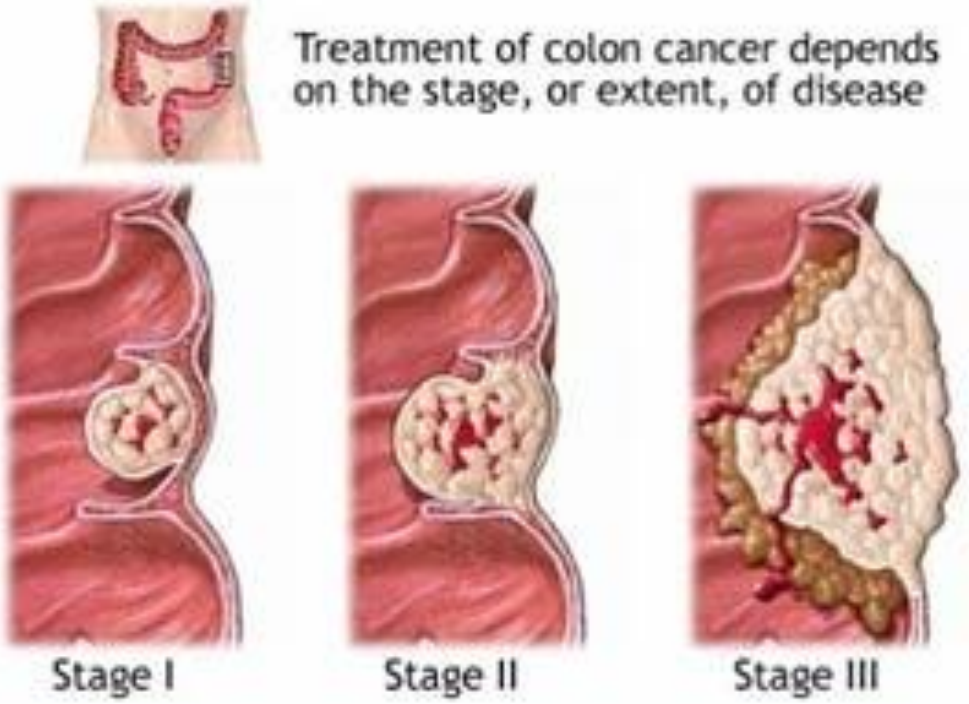
Staging

Staging is a standardized way that describes the spread of cancer in relation to the layers of the wall of the colon or rectum, nearby lymph nodes, and other organs

The stage is dependent on the extent of spread through the different tissue layers affected

The stage is an important factor in determining treatment options and prognosis

- One of the major staging systems in use is the AJCC (American Joint Committee on Cancer) staging scheme, which is defined in terms of **primary tumor (T), regional lymph nodes(N),** and distant **metastasis (M)**



Staging-American Joint Committee on Cancer system (AJCC/TNM)

Staging is an indicator of survival

Stage grouping: From least advanced (stage 0) to most advanced (stage IV) stage of colorectal cancer

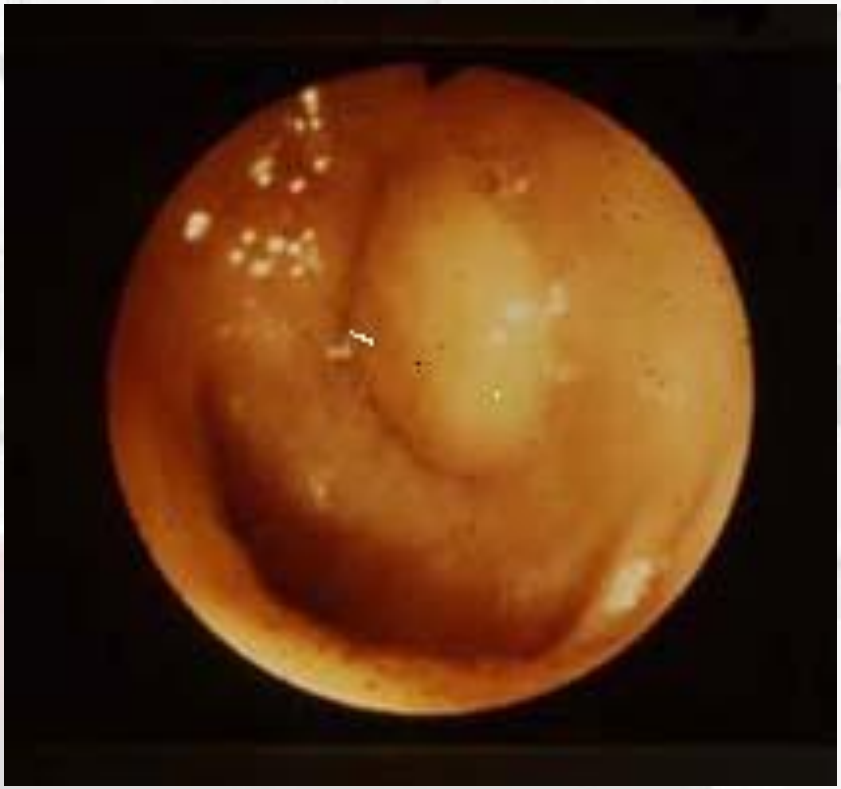
Stage	TNM Category	Survival Rate	
Stage 0:	Tis, N0, M0		The earliest stage. Has not grown beyond inner layer (mucosa) of colon or rectum.
Stage I:	T1, N0, M0 T2, N0, M0	93%	Has grown into submucosa (T1) or muscularis propria (T2)
Stage IIA: Stage IIB:	T3, N0, M0 T4, N0, M0	85% 72%	**IIA:** Has spread into subserosa (T3). **IIB:** Has grown into other nearby tissues or organs (T4).
Stage IIIA: Stage IIIB: Stage IIIC:	T1-T2, N1, M0 T3-T4, N1, M0 Any T, N2, M0	83% 64% 44%	**IIIA:** Has grown into submucosa (T1) or into muscularis propria (T2) and has spread to 1-3 nearby lymph nodes (N1) **IIIB:** Has spread into subserosa (T3) or into nearby tissues or organs (T4), and has spread to 1-3 nearby lymph nodes (N1) **IIIC:** Any stage of T, but has spread to 4 or more nearby lymph nodes (N2).
Stage IV:	Any T, Any N, M1	8%	Any T or N, and has spread to distant sites such as liver, lung, peritoneum (membrane lining abdominal cavity), or ovaries (M1).

Symptoms of Colorectal Cancer

Early colon cancer usually presents with **no symptoms.** Symptoms appear with more advanced disease.

Symptoms include:

- a change in bowel habits (diarrhea, constipation, or narrowing of the stool for more than a few days)
- a constant urgency of needing to have a bowel movement
- bleeding from the rectum or blood in the stool (the stool often looks normal)
- cramping or steady stomach pain
- weakness and fatigue or anemia
- unexplained weight loss



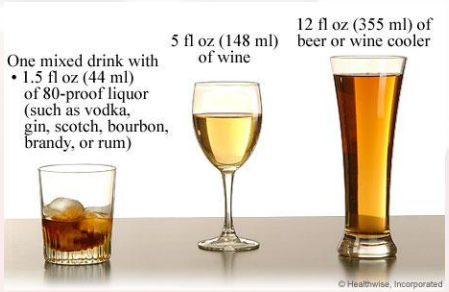
A polyp as seen during colonoscopy

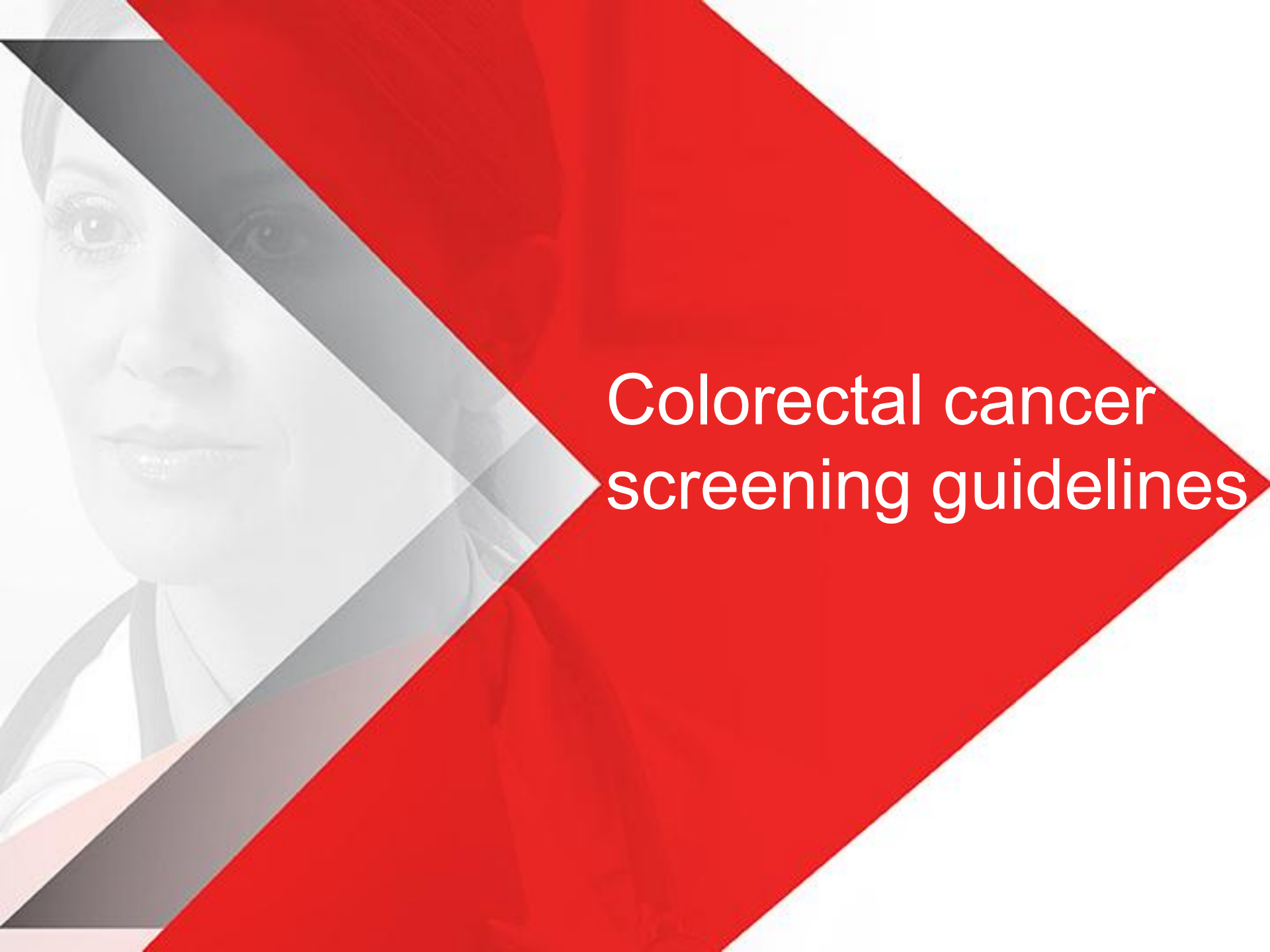
Risk Factors

Risk Factor	Description
Age	9 out of 10 cases are over 50 years old
History of polyps	⇑ risk if large size, high frequency, or specific types
History of bowel disease	Ulcerative colitis and Crohn's disease (IBDs) ⇑ risk
Certain hereditary family syndromes	Having a family history of familial adenomatous polyposis or hereditary nonpolyposis colon cancer (Lynch Syndrome) ⇑ risk
Family history (excluding syndromes)	Close relatives with colon cancer ⇑ risk esp. if before 60 years (degree of relatedness and # of affected relatives is important)
Other cancers and their treatments	Testicular cancer survivors ⇑ risk
Race	African Americans are at ⇑ risk
Ethnic background	Ashkenazi Jew descent ⇑ risk due to specific genetic factors

Risk Factors (cont'd)

Risk Factor	Description
Diet	High in fat, especially animal fat, red meats and processed meats ⇑ risk
Lack of exercise	⇑ risk
Overweight	⇑ risk of incidence and death
Smoking	-⇑ risk of incidence and death -30-40% more likely to die of colorectal cancer
Alcohol	Heavy use of alcohol ⇑ risk
Diabetes	30% ⇑ risk of incidence and ⇑ death rate
Night shift work	More research is needed but over time may ⇑ risk





Colorectal cancer screening guidelines

CRC screening guidelines

US Preventive Services Task Force (USPSTF)

- For average-risk adults, screening should begin at age 50 and continue until age 75
- CRC screening in adults 76 to 85 years should be individualized

Test	Time interval
Fecal occult blood test (FOBT)	Annual
Flexible sigmoidoscopy	5 years
Colonoscopy	10 years

Ann Intern Med 2008;149:627-37

CRC screening guidelines

American Cancer Society (ACS) , US Multi-society Task Force on Colorectal Cancer (USMSTF) and the American College of Radiology (ACR)

- Average-risk adult should start screening at age 50

Test	Time interval
Flexible sigmoidoscopy	5 years
Optical colonoscopy	10 years
Double-contrast barium enema	5 years
CT colonography	5 years
Fecal occult blood test (guaiac or immunochemical based)	Annual
Stool DNA test	Uncertain

Ann Intern Med 2012;156:378-386

CRC Screening Barriers

- Cost and lack of access to health care
- Physician variability regarding screening recommendations
- Poor transmission of the benefits and risks of not getting screened
- Personal barriers
- Fear, embarrassment, distrust of the medical community

Strategies to increase CRC screening

- Prompt one-on-one discussion about the potentially life-saving importance of screening
- Remove financial barriers to screening
- Help patients navigate through the healthcare system
- Use educational prompts to educate the community about Colonoscopy and other forms of screening

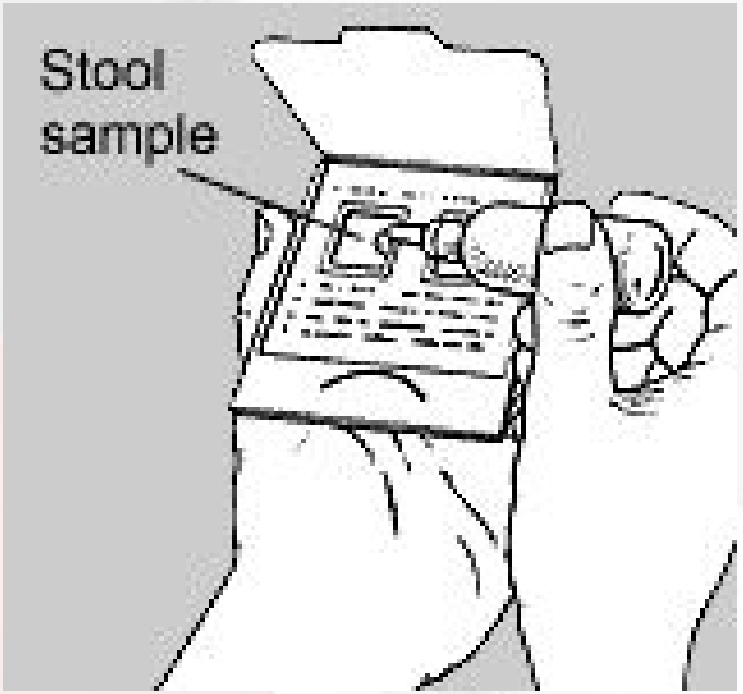
Factors that may reduce risk

Method	Description
Screening	Regular screening can prevent colon cancer completely (it usually takes 10-15 years from the time of the first abnormal cells until cancer develops). Screening can detect polyps and remove before cancerous, or early detection with a better prognosis.
Diet and Exercise	Fruits, vegetables, whole grains, minimal high-fat foods and 30-60 minutes of exercise 5 times per week help ⇓ risk
Vitamins, calcium w/D, magnesium	Aid in ⇓ risk
NSAIDs (Non-steroidal anti-inflammatory drugs)	20-50% ⇓ risk of colorectal cancer and adenomatous polyps; however, NSAIDs can cause serious or life threatening implications on the GI tract and other organs
Female Hormones	HRT (hormone replacement therapy) may ⇓ risk esp. amongst long term users, but if cancer develops, it may be more aggressive. HRT ⇓ risk of osteoporosis, but may ⇑ risk heart disease, blood clots, breast and uterine cancers

Screening Options: Fecal Occult Blood Test

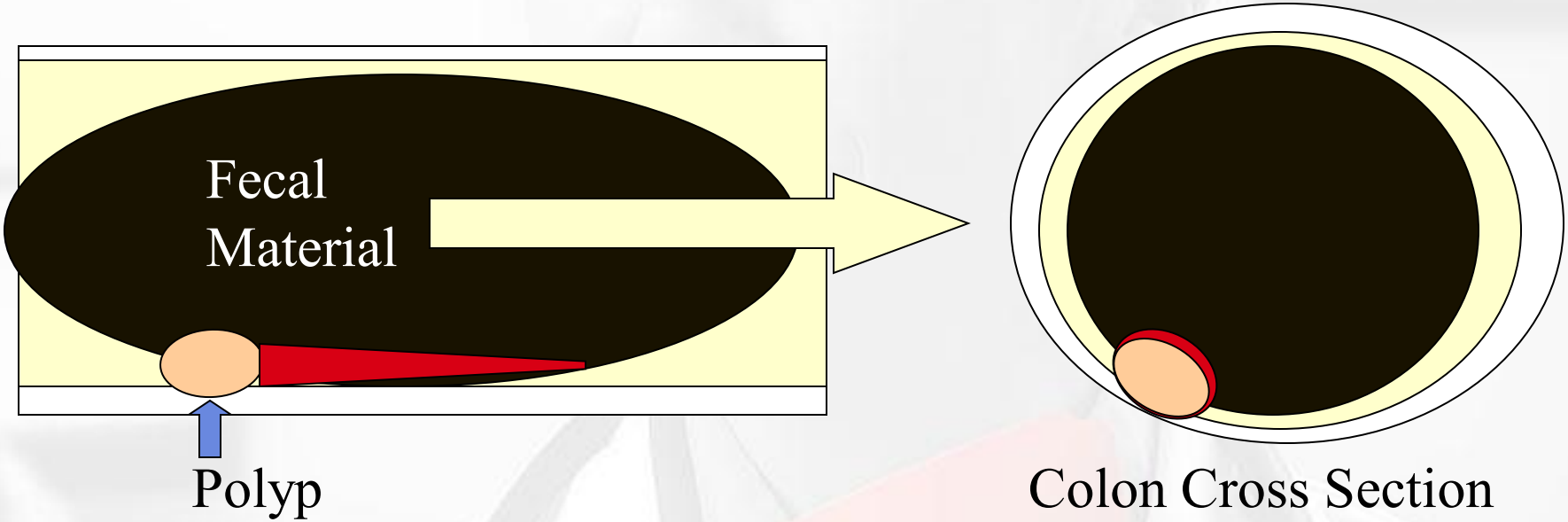
Stool Blood Test (FOBT or FIT): Used to find small amounts of blood in the stool. If found further testing should be done.

http://www.owenmed.com/hemoccult.jpg



http://digestive.niddk.nih.gov/ddiseases/pubs/dictionary/pages/images/fobt.gif

Bleeding Patterns



The fecal material passing through the colon and against the anomaly 'could' result in bleeding

Site and amount of bleeding will affect the location of the blood in the fecal material

Bleeding is Physiological

There is variable quantity of bleeding from day to day in patients…and the blood products present in the faeces are often unequally distributed.

…volume and periodicity of such bleeding is highly variable…

Faecal Occult Blood Tests: Choice, Usage and Clinical Applications; G. Young

American Cancer Society

“For the stool blood tests (FIT), the take-home, multiple-sample should be used”

“The fecal immunochemical test has some of the same drawbacks as conventional FOBT, such as an inability to detect a tumor that is not bleeding.”

American Cancer Society www.cancer.org

Clinical Significance of Multiple Day Testing

Yamamato M, Nakama H, "Cost-effectiveness analysis of immunochemical occult blood screening for colorectal cancer among three fecal sampling methods," Hepatogastroenterology 47: 396-399, Mar/Apr 2000

"The sensitivity and specificity were calculated to be **58%** and 96% for a *single day* method, **89%** and 95% for a *2-day* method, and **100%** and 94% for a *3-day* method, respectively, indicating a significant different in the sensitivity between a single day method and a 2-day as well as a 3-day method ($p < 0.05$), and in the specificity among the 3 testing methods ($p < 0.001$)."

Why FOBT & Colorectal Cancer Screening?

- **Colorectal Cancer (CRC) is very deadly. Hemoccult® saves lives through early detection.**
- Only FOBT that has been proven through clinical studies to reduce incidence by 20% and mortality up to 33%.*
- 41 million Americans (nearly half > 50) need CRC screening.
- **FOBTs are a cost effective and accessible means for CRC screening**

*The effect of fecal occult-blood screening on the incidence of colorectal cancer, J. S. Mandel, 2000

Why the Hemoccult® Brand?

- ☺ Hemoccult® is used by nearly 90% of the United States' best hospitals.
- ☺ Hemoccult® has more than 300 clinical studies to support the Hemoccult® products and the clinical performance.
- ☺ Quality manufacturing provides the highest level of confidence to customers. Over one billion slides produced.
- ☺ Hemoccult® is supported with effective patient education to help increase compliance.

Hemoccult® is supported in many ways.

Why Hemoccult® ICT?

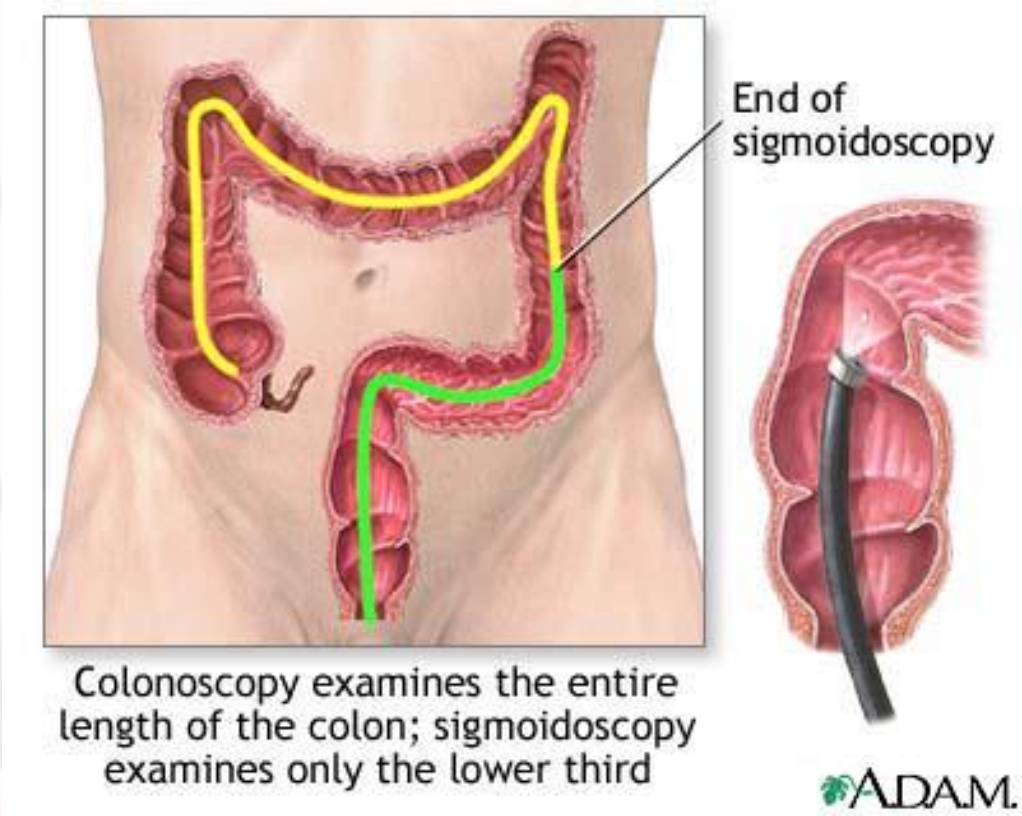
Immunochemical FOBT (Hemoccult® ICT) has major advantages over traditional Guaiac FOBT (Hemoccult II® & Hemoccult II® SENSA®)

Immunochemical Advantage		Result
No diet or medication restrictions	→	Better patient compliance
Increased specificity with high sensitivity	→	Fewer false-positives for CRC
Specific to lower GI bleeding	→	Ideal CRC screening product
New CPT codes = 82274 (QW) and G0328(QW)*	→	Higher reimbursement = $22.22*

*Exemplar CPT and reimbursement provided. Refer to regional CMS fee schedule for relevant/current CPT codes and reimbursements

That's not quite the stool sample we had in mind

Screening: Flexible Sigmoidoscopy



http://www.nlm.nih.gov/medlineplus/ency/images/ency/fullsize/1083.jpg

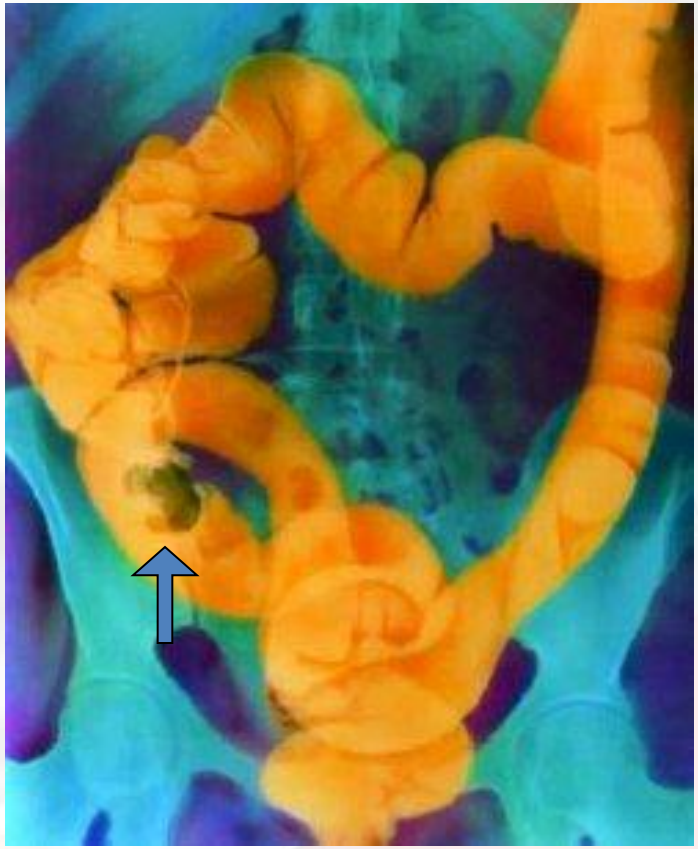
Flexible Sigmoidoscopy: A sigmoidoscope, a slender, lighted tube the thickness of a finger, is placed into lower part of colon through rectum

It allows physician to look at inside of rectum and lower third of colon for cancer or polyps

Is uncomfortable but not painful. Preparation consists of an enema to clean out lower colon

If small polyp found then will be removed. If adenoma polyp or cancer found, then colonoscopy will be done to look at the entire colon

Screening: Barium Enema



http://www.acponline.org/graphics/observer/may2006/special_lg.jpg

Barium enema with air contrast:

A chalky substance is used to partially fill and open up the colon

Air is then pumped in which causes the colon to expand and allows clear x-rays to be taken

If an area looks abnormal then a colonoscopy will be done

A cancer of the ascending colon. Tumor appears as oval shadow at left over right pelvic bone

Screening: Virtual Colonoscopy

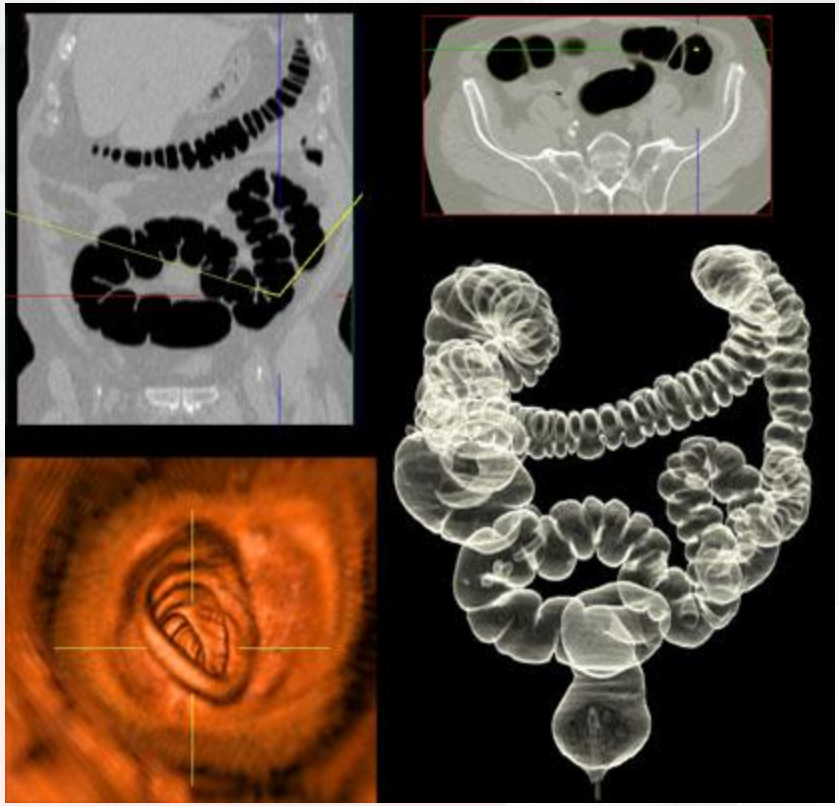
Virtual Colonoscopy: Air is pumped into the colon in order for it to expand followed by a CT scan which takes hundreds of images of the lower abdomen

Bowel prep is needed but procedure is completely non-invasive and no sedation is needed

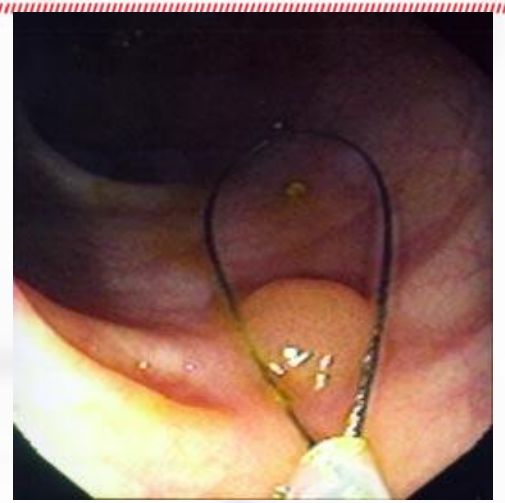
Is not recommended by ACS or other medical organizations for early detection. More studies need to be done to determine its effectiveness in regard to early detection

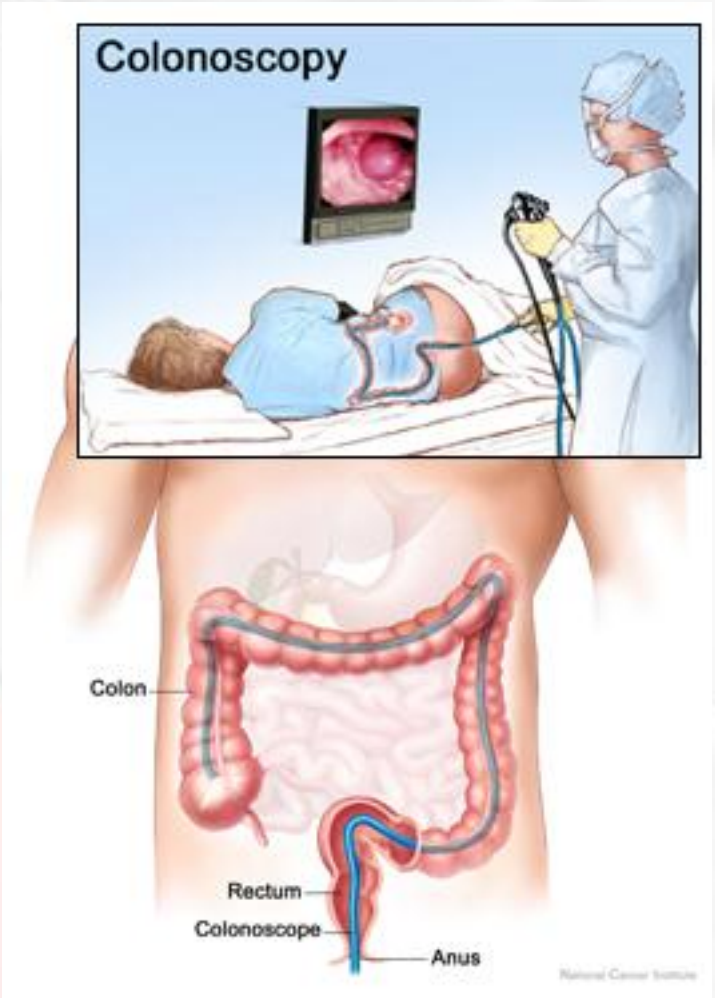
Is not recommended if you have a history of colorectal cancer, Chron's disease, or ulcerative colitis

If abnormalities found then follow-up with colonoscopy



Screening: Colonoscopy





Colonoscopy: A colonoscope, a long, flexible, lighted tube about the thickness of a finger, is inserted through the rectum up into the colon

Allows physician to see the entire colon

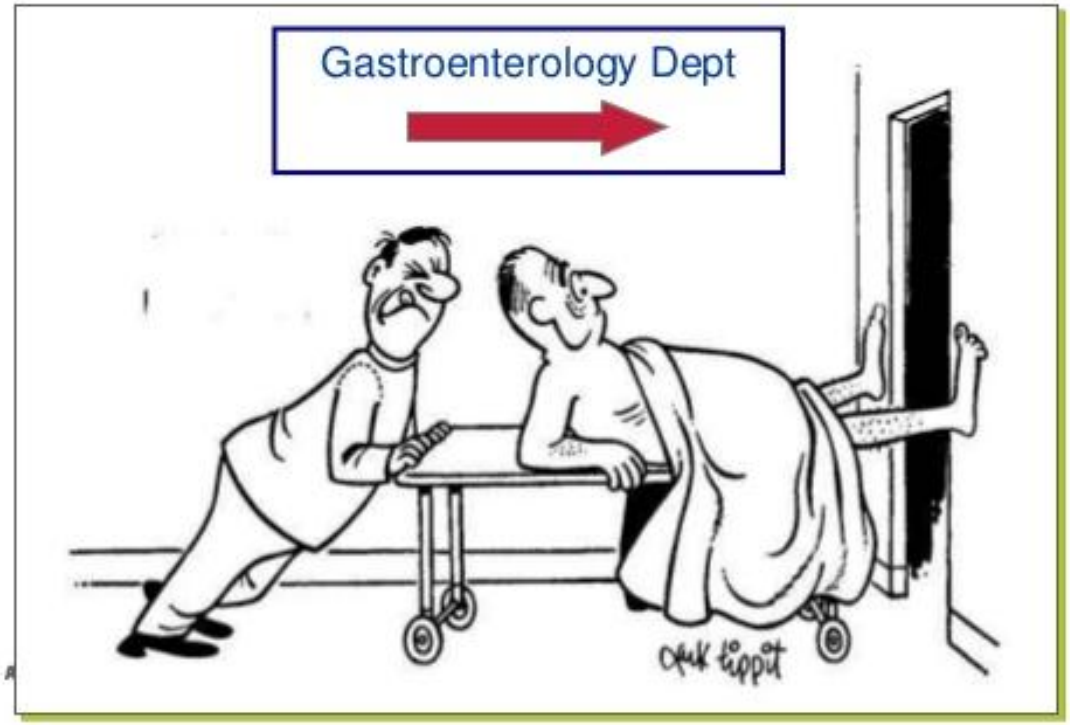
Bowel prep of strong laxatives to clean out colon, and the day of the procedure an enema will be given

Procedure lasts ~15-30 minutes and are under mild sedation

Early cancers can be removed by colonoscope during colonoscopy

http://www.cadth.ca/media/healthupdate/Issue6/hta_update_mr-colonograpy2.jpg

Q: Is a Doctor's Recommendation Really That Useful?



Aren't we bucking human nature with this one?

Screening Guidelines, Advantages, and Disadvantages

Screening	Guidelines	Advantages	Disadvantages
Fecal Occult Blood Test (FOBT)	Annually starting at age 50	-Cost effective -Noninvasive -Can be done at home	-False-positive/false-negative results -Dietary restrictions -Duration of testing period
Flexible Sigmoidoscopy (FS)+FOBT	Every 5 years starting at age 50	-Cost effective -Can be done w/o sedation -Performed in clinic -Any polyps can be biopsied	-Examines only portion of colon (additional screening may be done) -Discomfort for patient -Bowel cleansing
*** Colonoscopy (preferred method b/c polyps can be biopsied and removed)**	Every 10 yrs starting at age 50	-Patient sedated -Outpatient screening -Views entire colon and rectum -Polyps can be removed and biopsied	-Bowel cleansing -Sedation may be a problem for some -Cost if uninsured -Risk of perforation
Virtual Colonoscopy (a.k.a. computed tomography colonography-CT)	Every 10 yrs starting at age 50	-Relatively noninvasive -No sedation needed -Can show 2- or 3-D imagery	-Small polyps may go undetected -Bowel cleansing -Cost -If polyps found, colonoscopy required -Exposure to radiation -Patient discomfort

*American Cancer Society Recommendation

Treatment

Summary: Treatment

Depending on the stage, 2 or 3 different treatment types may be combined.

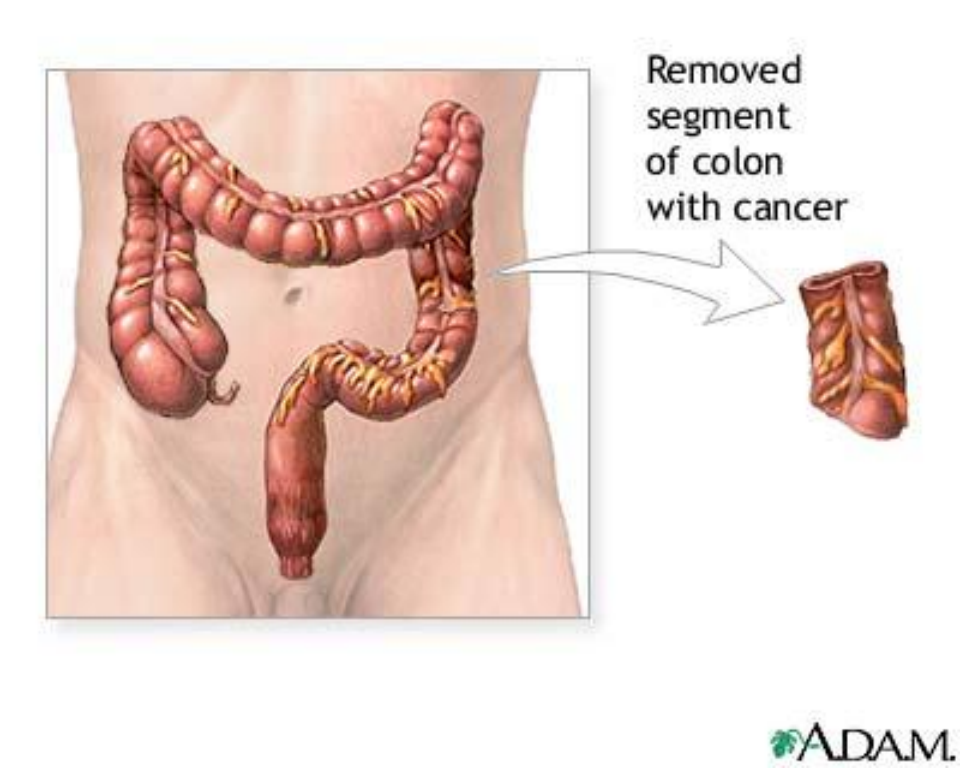
- » Colon surgery
- » Rectal surgery
- » Radiation therapy
- » Chemotherapy
- » Immunotherapy

http://recong2.com/system/files/erbitux_avastin.png

Treatment-Colon Surgery

■Colon Surgery:

- Main treatment for colon cancer
- Patient is given laxatives and enema
- General anesthesia is required
- The cancerous tissue and a length of normal tissue on either side of the cancer, as well as the nearby lymph nodes are removed
- The remaining sections of the colon are then reattached
- A temporary colostomy (colon is attached to the abdominal wall and fecal matter drains into a bag) may be needed. Very rarely is a permanent colostomy needed

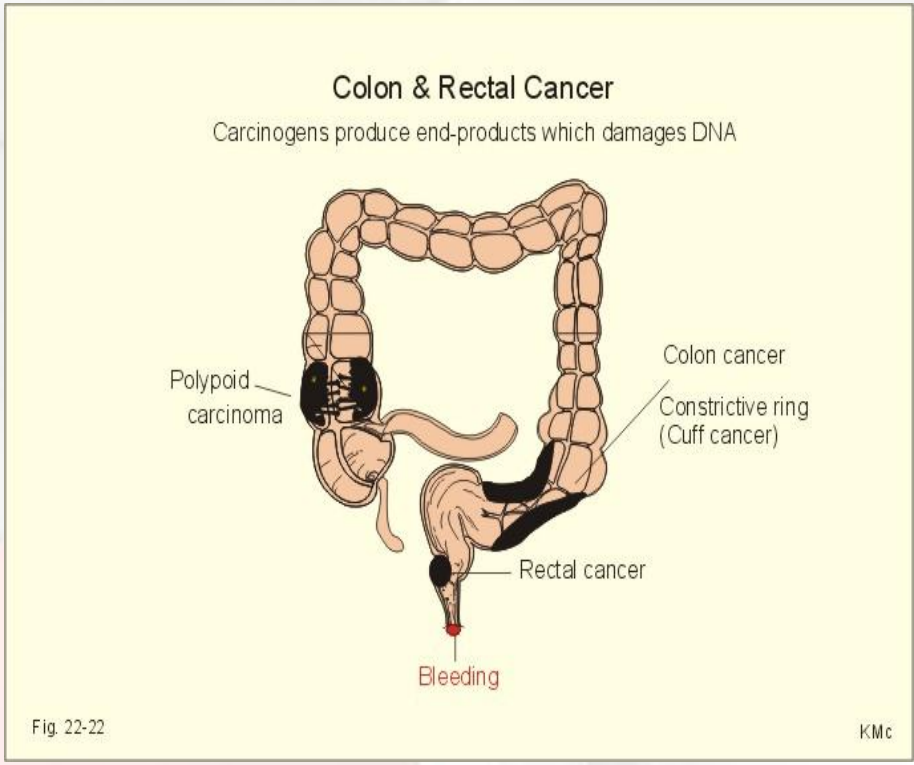


http://ae.medseek.com/adam04/graphics/images/en/15802.jpg

Treatment-Rectal Surgery

Rectal Surgery:

- Several methods for removing or destroying rectal cancers
- Local resection for those with stage I rectal cancer. Cutting through all layers of the rectum to remove invasive cancers and some surrounding normal rectal tissue.
- Many stage I and most stage II and III are removed by either low anterior (LA) resection or abdominoperineal (AP) resection
- LA resection-for cancers near upper part of rectum, colon is reattached to the lower part of the rectum and waste elimination is normal
- AP resection-for cancers in the lower part of rectum, the cancerous tissue as well as the anus is and a permanent colostomy is necessary
- Photocoagulation (heating the rectal tumor with a laser beam aimed through the anus) is an option for relieving or preventing rectal blockage in patients with stage IV cancer



http://www.mfi.ku.dk/ppaulev/chapter22/images/22-22.jpg

Treatment-Radiation Therapy

Radiation Therapy:

-Treatment with high energy rays (such as x-rays) to kill or shrink cancer cells

-May be external radiation (from outside of the body) or radioactive materials placed directly in the tumor (internal or implant radiation)

-Adjuvant treatment (after surgery)-radiation is given to kill small areas of the cancer that are hard to see

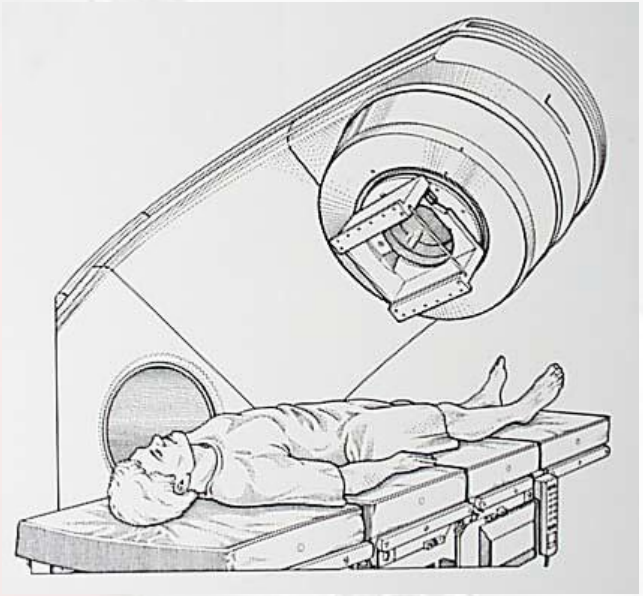
-Neoadjuvant treatment (before surgery)-radiation shrinks the tumor if the size or location of the tumor makes surgery difficult

-Radiation can be used to alleviate symptoms of advanced cancer including: intestinal blockage, bleeding, or pain.

-Main use for colon cancer: when cancer has attached to an internal organ or the lining of the abdomen, radiation is used to insure that all cancer cells left behind from surgery are destroyed

-Main use for rectal cancer: radiation is given to prevent cancer from coming back to the place of origin, and to treat local recurrences causing symptoms of pain

-Radiation is seldom used for metastatic colon cancer



http://www.dkimages.com/discover/previews/839/15012869.JPG

Treatment-Radiation Therapy

External Radiation:

-used for people with colon or rectal cancer

-treatments given 5 days a week for several weeks

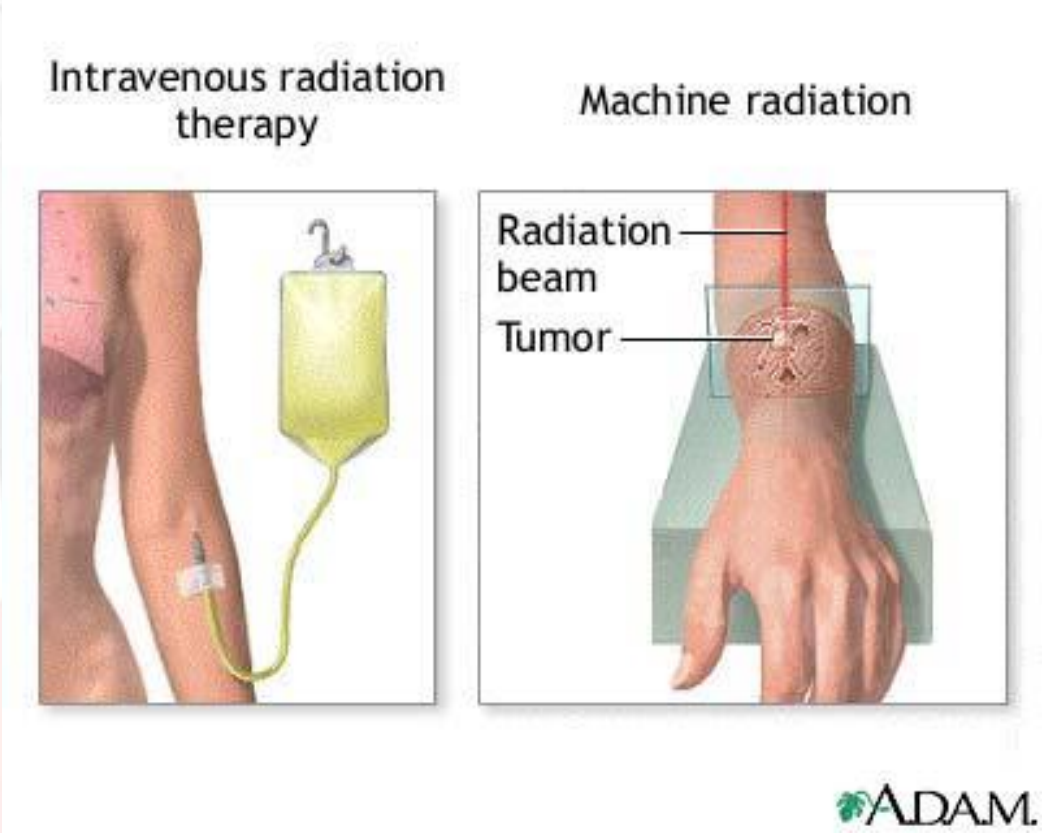
-each treatment last a few minutes and is similar to having an x-ray taken

-a different approach for some cases of rectal cancer involves the radiation aimed through the anus to reach the rectum

Internal Radiation:

-small pellets, or seeds, of radioactive material are placed next to or directly into the cancer

-sometimes used in treatment of people with rectal cancer, especially the sick or elderly that would not be able to withstand surgery



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Treatment-Chemotherapy

Chemotherapy:

-the use of cancer-fighting drugs injected intravenously or orally

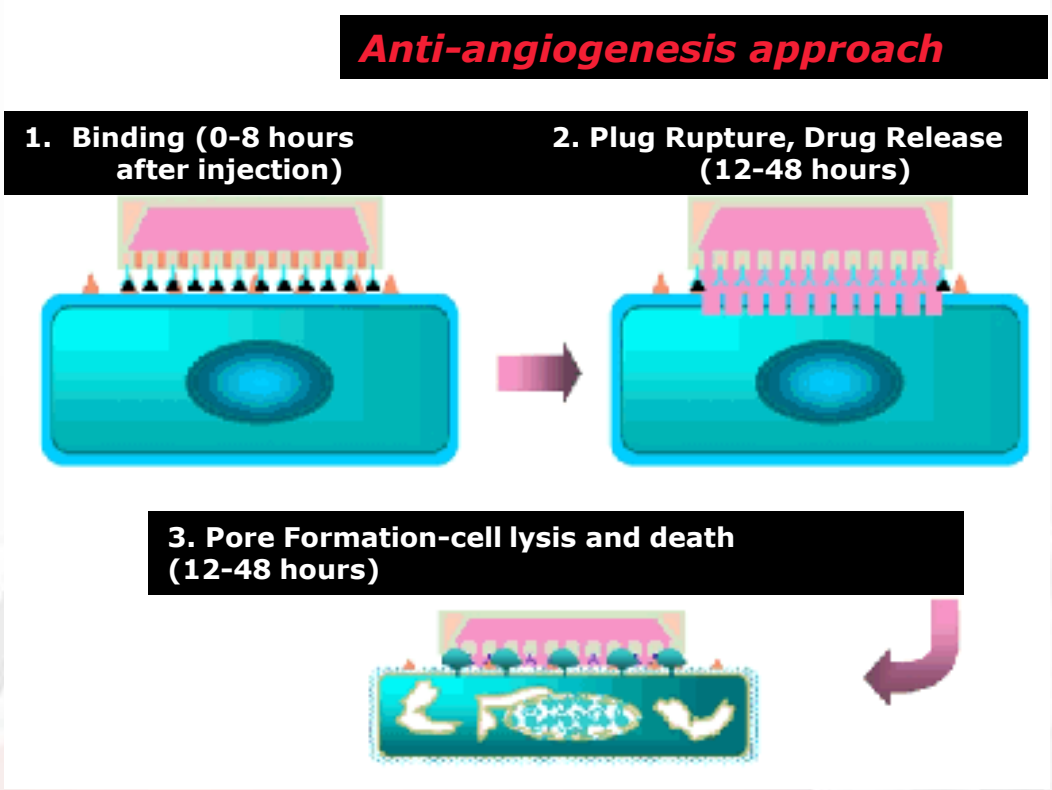
-drugs enter the bloodstream and reach the entire body

-is a useful treatment for metastasized cancers

-chemo following surgery increases the survival rate for some stages

-chemo helps relieve symptoms of advanced cancer

-regional chemo: drugs are injected into the artery which leads to cancerous areas (may be fewer side effects)



http://www.leadershipmedica.com/scientifico/sciesett02/scientificaita/7ferrari/nanopores_7ferrfig2.gif

Treatment-Chemotherapy

Drug	Description
Fluorouracil -(5-FU)	-most common drug, usually given with other drugs, such as leucovorin, to help increase effectiveness -along with radiation therapy, 5-FU is given as a continuous infusion intravenously to increase radiation effectiveness -The de Gramont regimen: -5-FU is given continuously over 2 days with a rapid injection/day -leucovorin given each day over 2 hours -regiment given every other week -With colorectal metastases to liver, a hepatic artery infusion is given involving: 5-FU or floxuridine (FUDR) given directly into the artery which supplies blood to the liver
Ironetican	-treatment is called FOLFIRI: adds irinotecan to de Gramont 5-FU/leucovorin regimen -studies have shown a chance for excessive side effects when all three are combined
Oxaliplatin	-treatment is called FOLFOX: it may be used in place of irinotecan in the de Gramont regimen
Capecitabine	-drug is given orally -is changed to 5-FU once it reaches the tumor site -can be given instead of intravenous 5-FU -acts as if 5-FU being administered continuously

Treatment-Immunotherapy

Immunotherapy:

-use of natural substances produced by the immune system

-substances may kill cancer cells, slow their growth, or activate patient's immune system

-antibodies are produced by the immune system to help fight infections

-monoclonal antibodies (made in lab), attack cancer cells

-2 new monoclonal antibodies approved by the US FDA:

-Bevacizumab: works by preventing growth of new blood vessels that supply tumor cells with blood, oxygen and nutrients needed to grow. Used with chemo as first line of treatment for patients with advanced or metastatic colon or rectal cancer.

-Cetuximab: works by binding to a special site on the cell surface which stops the cell's growth and promotes cell death. Used alone or in combination with chemotherapy agent as a second line of treatment for patients with advanced or metastatic colon or rectal cancer whose disease is no longer responding to irinotecan, or who cannot take it

The Current State of Colorectal Cancer Research

The goal of scientists is to find methods of prevention, as well as the improvement of treatment options

Chemoprevention	-The use of natural or man-made chemicals to lower a person's risk of getting cancer -Researchers are testing the following substances to see whether there is a decrease in risk: fiber, minerals, vitamins, or drugs
Genetics	-Researchers learning more about some of the DNA mutations that cause cancerous cells in the colon and rectum -The understanding of the mechanisms of the genes should lead to new drugs and treatments -The early phases of gene therapy trials are currently taking place
Early detection	-Studies to look at how well current screening methods work and to explore new ways of educating the public about the importance of colorectal screening -<50% Americans over 50 get screened each year, we could prevent ~10,000 deaths/year
Immunotherapy	-Treatments that boost a person's immune system to fight colorectal cancer more effectively are being tested in clinical trials
Tumor Growth Factors	-Have found natural substances in the body that promote cell growth (growth factors) -Some cancer cells grow rapidly because of increased response to growth factors compared to normal cells -New drugs that can spot these types of cells are being tested in clinical trials, which may prevent the cancer from growing so quickly

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Summary

- Colorectal Cancer is a common, yet preventable disease that affects 140,000 individuals annually
- Colorectal Cancer mortality has declined over the past 3 decades largely due to increased screening
- Regular screening can prevent colon cancer completely
- Screening can detect polyps and remove before cancerous, resulting in a better prognosis.

Thank You

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