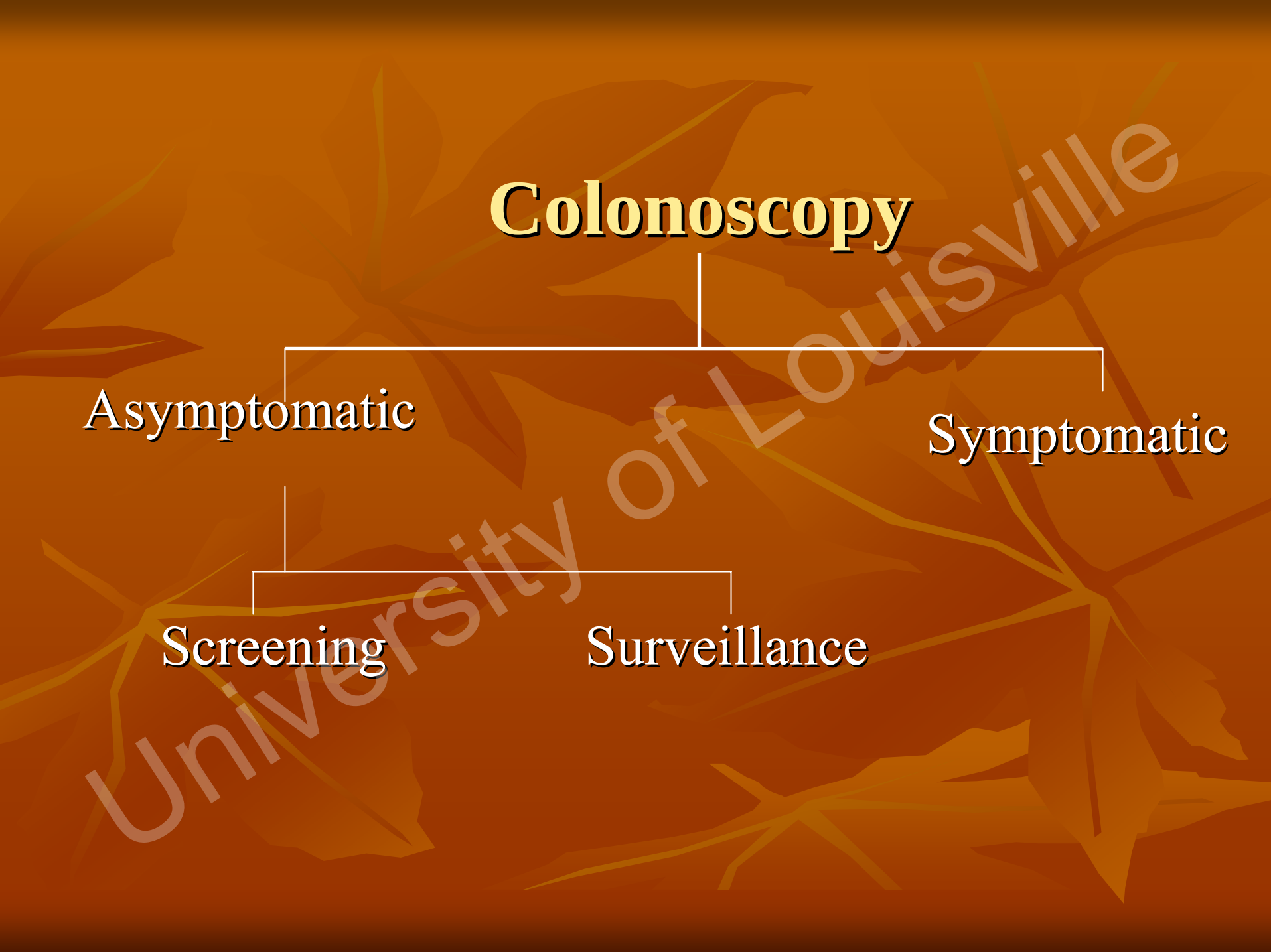
# Surveillance Colonoscopy

# CRC Incidence and Prevalence

- Cancer of the colon and rectum is the 2nd leading cause of cancer death in the US
- 5-7% of CRC occur in persons under 50
- Incidence rises with age



# Screening

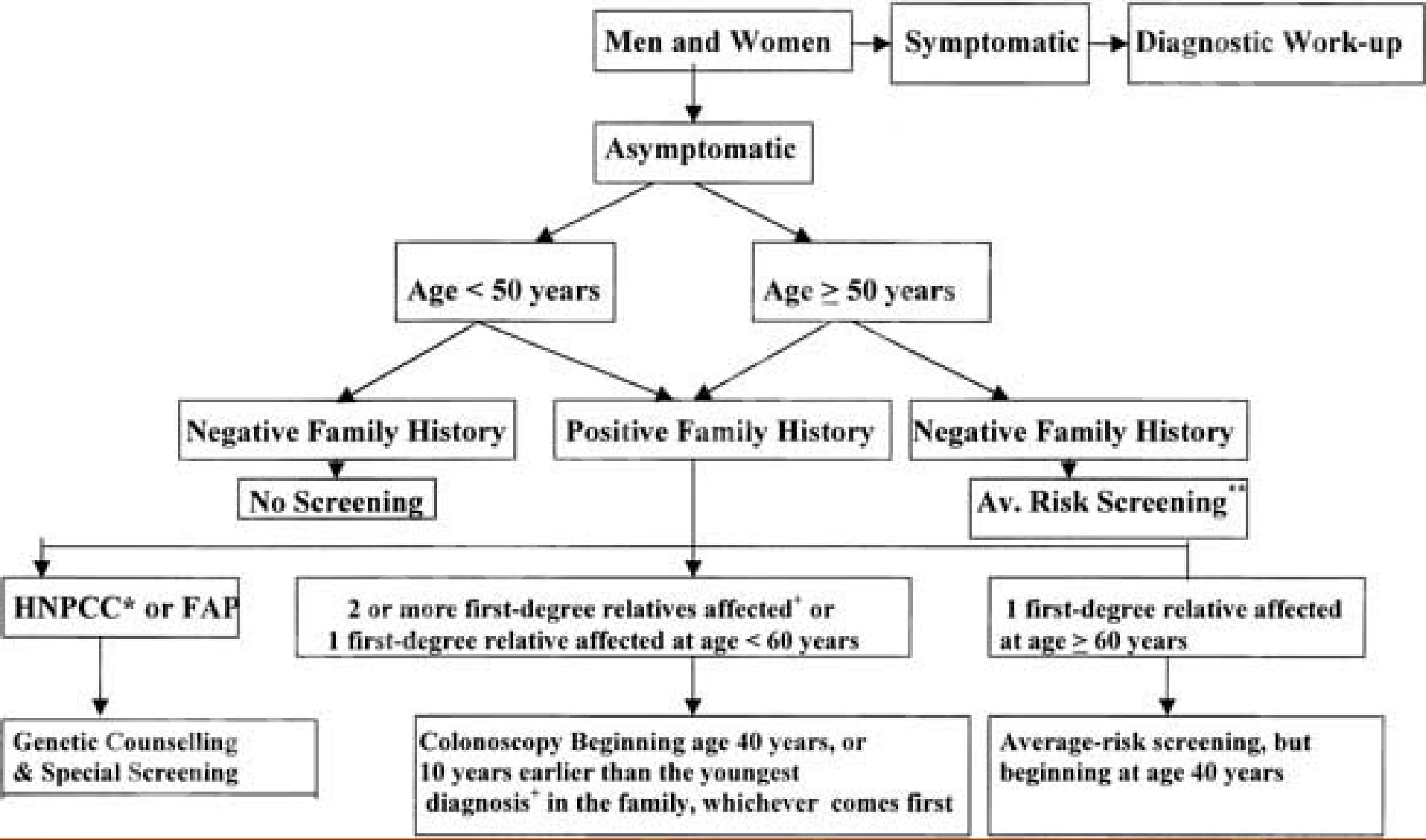
Screening refers to examinations that are performed in an asymptomatic population in an attempt to identify preclinical disease and alter its natural history so as to reduce morbidity and mortality


Gastroenterology- 2003 (Vol. 124, Issue 2: 1865-1871 )

**Colorectal cancer screening and surveillance: Clinical guidelines and rationale—Update based on new evidence**

Sidney Winawer, Robert Fletcher, Douglas Rex, John Bond, Randall Burt, Joseph Ferrucci , Theodore Ganiats, Theodore Levin, Steven Woolf, David Johnson, Lynne Kirk, Scott Litin, Clifford Simmang for the U.S. Multisociety Task Force on Colorectal Cancer

# Screening algorithm



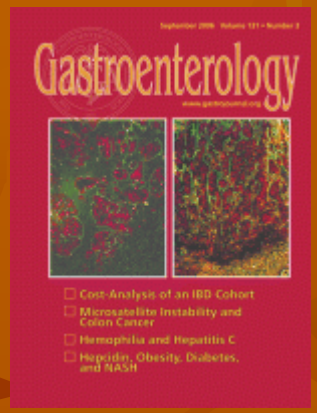

Gastroenterology- 2003 (Vol. 124, Issue 2: 1865-1871)

# Screening Increased Risk People Family History of CRC

- One first degree relative 2-3x RR
- Two first degree relatives 3-6x RR
- One first degree relative <50 3-6x RR
- Two second degree relatives 1-6xRR

# Surveillance

Surveillance is the examinations that are performed in a patient with known previous disease in an attempt to modify and address future risk




Gastroenterology- 2006 (Vol. 130, Issue 6: 1872-1885)

**Guidelines for Colonoscopy Surveillance After Polypectomy: A Consensus Update by the US Multi-Society Task Force on Colorectal Cancer and the American Cancer Society**

Winawer SJ, Zauber AG, Fletcher RH, Stillman JS, O'Brien MJ, Levin B, Smith RA, Lieberman DA, Burt RW, Levin TR, Bond JH, Brooks D, Byers T, Hyman N, Kirk L, Thorson A, Simmang C, Johnson D, Rex DK

# Why new guidelines?

- Large number of patients with adenomas identified
- Surveillance is a huge burden on medical resources
- Need for increased efficiency of surveillance colonoscopy
- Decrease cost, risk and overuse of resources

# Differences From Prior Postpolypectomy Guidelines

1. Goal of these guideline is to identify predictors of subsequent advanced adenomas and cancers to stratify patients into lower- and higher-risk groups

2. Risk stratification is used to encourage a shift from intense surveillance to surveillance based on risk – free up endoscopic resources for screening, diagnosis, and appropriate surveillance



Gastroenterology- 2006 (Vol. 130, Issue 6: 1872-1885)

# Differences From Prior Postpolypectomy Guidelines

3. High-quality baseline colonoscopy is emphasized

4. Completeness of polypectomy at baseline is emphasized – particularly in the setting of piecemeal removal of large sessile polyps



Gastroenterology- 2006 (Vol. 130, Issue 6: 1872-1885)

# Differences From Prior Postpolypectomy Guidelines

5. Follow-up surveillance of hyperplastic polyps is discouraged (except in hyperplastic polyposis)

6. The importance of increasing awareness of hyperplastic polyposis is discussed

7. The use of FOBT during surveillance is discouraged at present, but requires further study (low PPV)

Gastroenterology- 2006 (Vol. 130, Issue 6: 1872-1885)

# Differences From Prior Postpolypectomy Guidelines

8. Follow-up intervals after removal of 1 or 2 small (< 1 cm) adenomas have been lengthened (5–10 years or average-risk screening options)

9. Evolving technologies such as chromoendoscopy, magnification endoscopy, and CT colonography (virtual colonoscopy) are not yet established as surveillance modalities



Gastroenterology- 2006 (Vol. 130, Issue 6: 1872-1885)

# Guideline endorsed by:

- Colorectal Cancer Advisory Committee of the American Cancer Society
- American College of Gastroenterology
- American Gastroenterological Association
- American Society for Gastrointestinal Endoscopy

# Literature reviewed

- Colonoscopy studies addressing relationship between baseline findings and detection of advanced adenoma during follow up
- Sigmoidoscopy studies with large cohorts and follow-up periods longer than 10 yrs addressing the relationship between baseline findings and detection of advanced adenomas at follow up
- 15 studies were identified

# Adenomatous Polyps

- All adenomas contain dysplasia
- Approximately 70% of polyps removed at endoscopy are adenomas
- 70-80% of adenomas removed are tubular
- 10-25% of adenomas removed are tubulovillous
- <5% of adenomas removed are villous

# Incidence of Adenomas

- Approximately 30-40% of US residents over 50 yrs of age have adenomas
- Adenomas were found in >30% of autopsies in people aged >60yrs

Gastroenterology 1979;77:1245-51

Gut 1982;23:835-42

# Advanced Adenoma (AA)

- Sized 1.0 cm or larger OR
- Any villous component (nontubular) OR
- High grade dysplasia OR
- Invasive cancer

# Risk for HGD

- Adenomas <5mm have <1% risk of HGD
- Adenomas 6-9mm have risk of HGD of 6%
- Adenomas >10mm carry a risk of 21% for HGD
- 60-75% of adenomas removed at endoscopy are <1cm
- 5-7% of adenomas have HGD

Gastroenterolgy1990;98:371-79

# Genetics of CRC

- CRC results from the accumulation of multiple mutations in the epithelial cells of the colon
- >95% of CRC arise from initially benign, adenomatous polyps
- Analysis of the age distribution and colonoscopic findings from the NPS suggests the average time for an advanced neoplasm to arise from normal mucosa is 5 years. The time from advanced neoplasm to gross cancer is another 5 yrs

# Adenoma-Carcinoma Sequence

- Adenomas are monoclonal derivatives of a mutated epithelial stem cell
- Results from multi-step accumulation of germline or somatic mutations over years
- This sequence explains why most simple small adenomas remain static and have little or no potential for invasive carcinoma

# Average Risk

- Lifetime 5% chance of developing CRC
- 10 yr interval is based on the estimates of the sensitivity and specificity of colonoscopy
- <6% miss rate for adenomas >1 cm
- Natural history of adenomas from development to transformation to invasive cancer is approximately 10 yrs
- 5 yr incidence of advanced adenomas after negative colonoscopy in asymptomatic average risk person <1%

# High-quality colonoscopy

- Reaches cecum
- Little fecal residue (good prep)
- Minimum time of withdrawal from the cecum of 6-10 minutes
- Meticulous removal of large sessile polyps – particularly if piecemeal polypectomy used (repeat exam if needed)
- Critical for effectively reducing colon cancer risk and planning appropriate surveillance intervals

# Predictors of Subsequent Advanced Adenomas

- Multiplicity
- Size
- Histology
- Location
- Other risk factors – age, sex, history of polyps, family history of CRC

# Multiplicity

- Increased number of adenomas at baseline has been shown to predict subsequent detection of advanced adenoma
- National Polyp Study (RCT)
- European fiber and calcium study (RCT)
- Wheat bran study (Martinez et al) (RCT)
- Atkin et al (observational cohort)
- Noshirwani et al (observational cohort)

Gastroenterology- 2006 (Vol. 130, Issue 6: 1872-1885)

# Size

- Larger adenoma size was related to increased risk for subsequent AA or CRC
- Wheat bran study (RCT) – size larger than 1 cm used
- 4 other RCT did not find size to an independent predictor
- 7 out of 8 observational cohort studies showed size predicted future AA or CRC

Gastroenterology- 2006 (Vol. 130, Issue 6: 1872-1885)

# Histology

- Overall, presence of villous component and/or high grade dysplasia correlated with increased risk of AA or CRC
- None of the RCT showed histologic type of adenoma at baseline to be a significant predictor of advanced neoplasia
- But several of the observational cohort studies showed that advanced histology conferred increased risk of AA

# Location

- Proximal adenoma at baseline was associated with an increased risk for subsequent AA
- Seen in 2 RCT and 1 observational cohort studies

# Other risk factors

- Age – 2 RCT showed increased risk for subsequent neoplasia with increased age
- Sex – 2 RCT reported an increased risk for men for advanced neoplasia
- History of polyps – polyps found before baseline adenoma was associated with increased risk of AA (2RCT)
- Family history of CRC – in patients > 60yrs of age predicted increased risk for AA in the National Polyp Study

# Postpolypectomy Surveillance Recommendations

1. Patients with small rectal hyperplastic polyps should be considered to have normal colonoscopies – subsequent colonoscopy should be 10 years.

   Exception is patients with a hyperplastic polyposis syndrome who need to be identified for more intensive follow-up evaluation (increased CRC/adenoma risk)

2. Patients with only 1 or 2 small (<1 cm) tubular adenomas with only low-grade dysplasia should have their next follow-up colonoscopy in 5–10 years.

   The precise timing within this interval should be based on other clinical factors (such as prior colonoscopy findings, family history, and the preferences of the patient and judgment of the physician)

Gastroenterology- 2006 (Vol. 130, Issue 6: 1872-1885)

# Postpolypectomy Surveillance Recommendations

3. Patients with:
   - 3 to 10 adenomas, or
   - any adenoma ≥1 cm, or
   - any adenoma with villous features, or
   - high-grade dysplasia

   should have their next follow-up colonoscopy in 3 years providing that piecemeal removal has not been performed and the adenoma(s) are removed completely.

   If the follow-up colonoscopy is normal or shows only 1 or 2 small tubular adenomas with low-grade dysplasia, then the interval for the subsequent examination should be 5 years



Gastroenterology- 2006 (Vol. 130, Issue 6: 1872-1885)

# Postpolypectomy Surveillance Recommendations

4. Patients who have more than 10 adenomas at 1 examination should be examined at a shorter (<3 y) interval, established by clinical judgment, and the clinician should consider the possibility of an underlying familial syndrome

# Postpolypectomy Surveillance Recommendations

5. Patients with sessile adenomas that are removed piecemeal should be considered for follow-up evaluation at short intervals (2–6 mo) to verify complete removal.

   Once complete removal has been established, subsequent surveillance needs to be individualized based on the endoscopist's judgment; completeness of removal should be based on both endoscopic and pathologic assessments

6. More intensive surveillance is indicated when the family history may indicate HNPCC

Gastroenterology- 2006 (Vol. 130, Issue 6: 1872-1885)

# Additional Surveillance Considerations

1. Recommendations assume that colonoscopy is complete to the cecum and that bowel preparation is adequate.

   Repeat examination if the bowel preparation is not adequate before planning a long-term surveillance program

2. There is clear evidence that the quality of examinations is highly variable; continuous quality improvement process is critical to the effective application of colonoscopy in colorectal cancer prevention

Gastroenterology- 2006 (Vol. 130, Issue 6: 1872-1885)

# Additional Surveillance Considerations

3. A repeat examination is warranted if there is a concern that the polyp was removed incompletely, particularly if it shows high-grade dysplasia

4. Endoscopists should make clear recommendations to primary care physicians about when the next colonoscopy is indicated

# Additional Surveillance Considerations

5. Given the evolving nature of guidelines, it is important that physicians and patients should remain in contact so that surveillance recommendations reflect changes in guidelines

6. Pending further investigation, performance of FOBT is discouraged in patients undergoing colonoscopic surveillance (low PPV)

7. Discontinuation of surveillance colonoscopy should be considered in patients with serious comorbidities with less than 10 years of life expectancy, according to the clinician's judgment



Gastroenterology- 2006 (Vol. 130, Issue 6: 1872-1885)

# Additional Surveillance Considerations

8. Surveillance guidelines are intended for asymptomatic people; new symptoms may need diagnostic work-up

9. The application of evolving technologies such as chromoendoscopy, magnification endoscopy, narrow band imaging, and computed tomography colonography are not established for postpolypectomy surveillance at this time

# Serrated Adenoma

- Histologic variant of hyperplastic polyp with dysplasia
- Linked to 'sporadic microsatellite instability adenocarcinoma' – acquired mismatch repair deficiency
- Often large and sessile
- Usually located proximally
- Other terms – *sessile serrated adenoma* or *serrated polyp with abnormal proliferation*
- Some investigators suggest complete removal and surveillance as for typical adenoma

# Syndrome of Hyperplastic Polyposis

- At least 5 histologically diagnosed hyperplastic polyps proximal to the sigmoid colon of which 2 are greater than 1 cm OR
- Any number of hyperplastic polyps proximal to the sigmoid in a patient with a 1st degree relative with hyperplastic polyposis OR
- More than 30 hyperplastic polyps of any size distributed throughout the colon

# Syndrome of Hyperplastic Polyposis

- Increased risk for colorectal cancer
- Magnitude of increased risk not yet determined
- Optimal management of hyperplastic polyposis has not yet been defined and requires further study


Gastroenterology- 2006 (Vol. 130, Issue 6: 1865-1871 )

**Guidelines for Colonoscopy Surveillance After Cancer Resection: A Consensus Update by the American Cancer Society and the US Multi-Society Task Force on Colorectal Cancer**

Rex DK, Kahi CJ, Levin B, Smith RA, Bond JH, Brooks D, Burt RW, Byers T, Fletcher RH, Hyman N, Johnson D, Kirk L, Lieberman DA, Levin TR, O'Brien MJ, Simmang C, Thorson AG, Winawer SJ

# Candidates for Surveillance

- After surgical resection of Stage I, II, III colon and rectal cancer
- After curative-intent resection of Stage IV cancers
- After endoscopic resection of Stage I
- Unresectable cancer – generally not candidates for surveillance

# Goals of Postcancer Resection Surveillance

- Detection of metachronous neoplasm – main goal
- Detection of recurrence of primary colon cancer tumor (anastamotic recurrence) by annual or more frequent C-scope does not confer any survival benefit in RCT or meta-analyses
- Due to high rates of local recurrence surveillance to prevent anastamotic recurrence in rectal cancer is indicated

# Differences Between This Guideline and Previous Guidelines on Postcancer Resection Surveillance Colonoscopy

- In addition to careful perioperative clearing of the colorectum for synchronous lesions, a colonoscopy is recommended 1 year after surgical resection because of high yields of detecting early second, apparently metachronous cancers

- Clinicians can consider periodic examination of the rectum for the purpose of identifying local recurrence after low anterior resection of rectal cancer



Gastroenterology- 2006 (Vol. 130, Issue 6: 1865-1871 )

# Postcancer Resection Surveillance Recommendations

1. Patients with colon and rectal cancer should undergo high-quality perioperative clearing.

   - In the case of nonobstructing tumors, this can be done by preoperative colonoscopy.
   - In the case of obstructing colon cancers, CT colonography with intravenous contrast or double-contrast barium enema can be used to detect neoplasms in the proximal colon.
   - In obstructed cases, a colonoscopy to clear the colon of synchronous disease should be considered 3 to 6 months after the resection if no unresectable metastases are found during surgery. Alternatively, colonoscopy can be performed intraoperatively



Gastroenterology- 2006 (Vol. 130, Issue 6: 1865-1871 )

# Postcancer Resection Surveillance Recommendations

2. Patients undergoing curative resection for colon or rectal cancer should undergo a colonoscopy 1 year after the resection (or 1 year following the performance of the colonoscopy that was performed to clear the colon of synchronous disease).

   This colonoscopy at 1 year is in addition to the perioperative colonoscopy for synchronous tumors.

3. If the examination performed at 1 year is normal, then the interval before the next subsequent examination should be 3 years. If that colonoscopy is normal, then the interval before the next subsequent examination should be 5 years.



Gastroenterology- 2006 (Vol. 130, Issue 6: 1865-1871 )

# Postcancer Resection Surveillance Recommendations

4. Following the examination at 1 year, the intervals before subsequent examinations may be shortened if there is evidence of HNPCC or if adenoma findings warrant earlier colonoscopy

5. Periodic examination of the rectum for the purpose of identifying local recurrence, usually performed at 3- to 6-month intervals for the first 2 or 3 years, may be considered after low anterior resection of rectal cancer. (The techniques utilized are typically rigid proctoscopy, flexible proctoscopy, or rectal endoscopic ultrasound. These examinations are independent of the colonoscopic examinations described above for detection of metachronous disease).



Gastroenterology- 2006 (Vol. 130, Issue 6: 1865-1871 )

# Additional Recommendations Regarding Postcancer Resection Surveillance Colonoscopy

1. Recommendations assume that colonoscopy is complete to the cecum and that bowel preparation is adequate

2. Continuous quality improvement process is critical

3. Endoscopists should make clear recommendations to primary care physicians about when the next colonoscopy is indicated

4. Performance of fecal occult blood text is discouraged



Gastroenterology- 2006 (Vol. 130, Issue 6: 1865-1871 )

# Additional Recommendations Regarding Postcancer Resection Surveillance Colonoscopy

5. Discontinuation of surveillance colonoscopy should be considered in persons with advanced age or comorbidities (<10 years life expectancy), according to the clinician's judgment

6. Surveillance guidelines are intended for asymptomatic people

7. Chromoendoscopy (dye-spraying) and magnification endoscopy are not established as essential to screening or surveillance

8. CT colonography (virtual colonoscopy) is not established as a surveillance modality

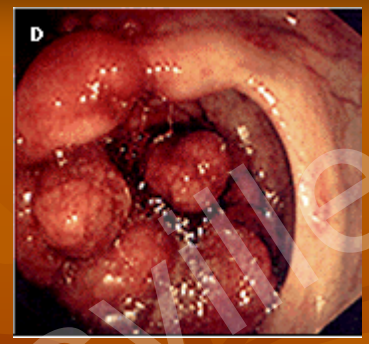


Gastroenterology- 2006 (Vol. 130, Issue 6: 1865-1871 )

# Familial Colon Cancer Syndromes

- Hereditary nonpolyposis colorectal cancer (HNPCC)
- Familial adenomatous polyposis (FAP)
- Attenuated familial adenomatous polyposis (AFAP)
- MYH associated adenomatous polyposis (MAP)
- Peutz-Jeghers syndrome
- Familial Juvenile polyposis coli (FJP)
- Account for <10% of CRC. HNPCC>FAP

# HNPCC




- Autosomal dominant, 80% penetrance
- Accounts for 1% - 5% of all CRC cases
- Caused by germ-line mutation in 1 of 6 mismatch repair genes (hMSH2, hMLH1, hPMS1, hPMS2, hMSH6 and hMLH3)
- Mean age for CRC development is 44 with some patients presenting in their 20s
- Predominantly right colon involvement, 70% proximal to splenic flexure
- Tumors show microsatellite instability (MSI)

# HNPCC
# Lifetime Cancer Risk

- Colorectal cancer – 82%
- Endometrial cancer – 43%-60%
- Ovarian cancer – 9%-12%
- Gastric cancer – 13%-19%
- Urinary tract cancer – 4%-10%
- Renal cell adenoCA – 3.3%
- Biliary tract and gall bladder CA – 2%-18%
- CNS (glioblastoma) – 3.7%
- Small bowel cancer – 1%-4%

# HNPCC

- Muir-Torre syndrome:

  autosomal dominant, sebaceous gland tumors with or without keratoacanthomas, visceral malignancies

- Turcot syndrome:

  HNPCC variant associated with glioblastoma

# HNPCC

**Revised Amsterdam Criteria**
**by the International Collaborative Group on HNPCC[†]**

There should be at least three relatives with an HNPCC-associated cancer (colorectal cancer, cancer of the endometrium, small bowel, ureter, or renal pelvis)

One should be a first degree relative of the other two

At least two successive generations should be affected

At least 1 should be diagnosed before age 50

Familial adenomatous polyposis should be excluded in the colorectal cancer case(s) if any

Tumors should be verified by pathological examination

[†]Adapted from Vasen, HF, Watson, P, Mecklin, JP, et al. Gastroenterology 1999; 116:1453.

# HNPCC - Bethesda Guidelines

(For identification of patients with colorectal tumors who should undergo testing for microsatellite instability)

B1 - Individuals with cancer in families that meet the Amsterdam Criteria

B2 - Individuals with 2 HNPCC-related tumors, including synchronous and metachronous colorectal cancer or associated extracolonic cancer (endometrium, ovarian, gastric, hepatobiliary, or small-bowel cancer or transitional-cell carcinoma of the renal pelvis or ureter)

B3 - Individuals with colorectal cancer and a first-degree relative with colorectal cancer or HNPCC-related extracolonic cancer or a colorectal adenoma; one of the cancers diagnosed at age <50 years, and the adenoma diagnosed <40

B4 - Individuals with colorectal cancer or endometrial cancer diagnosed at age <50 years

B5 - Individuals with right-sided colorectal cancer with an undifferentiated pattern (solid, cribriform) on histopathology diagnosed at age <50 years (solid or cribriform), defined as poorly differentiated for undifferentiated carcinoma composed of irregular, solid sheets of large eosinophilic cells and containing small gland-like spaces

B6 - Individuals with signet-ring-cell type colorectal cancer diagnosed at age <50 years (composed of >50% signet-ring cells)

B7 - Individuals with adenomas diagnosed at age <40 years

# Screening and Surveillance in HNPCC

- Definite or potential gene carriers are screened by colonoscopy every 2 yrs beginning at age 20-25 yrs until age 40 yrs and then annually
- Patients who develop advanced adenoma and proven gene carriers can be offered prophylactic subtotal colectomy followed by annual proctoscopy and polypectomy



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# Other Screening/Surveillance in HNPCC (Published Expert Opinion)

- Annual screening for endometrial and ovarian cancer at age 25-30 yrs
- Annual UA with cytologic exam at 25 for increased risk of renal/urinary tract cancer
- Discussion of prophylactic hysterectomy and BSO at end of child bearing
- Annual skin survey
- Periodic upper endoscopy ( possibly starting age 30?)

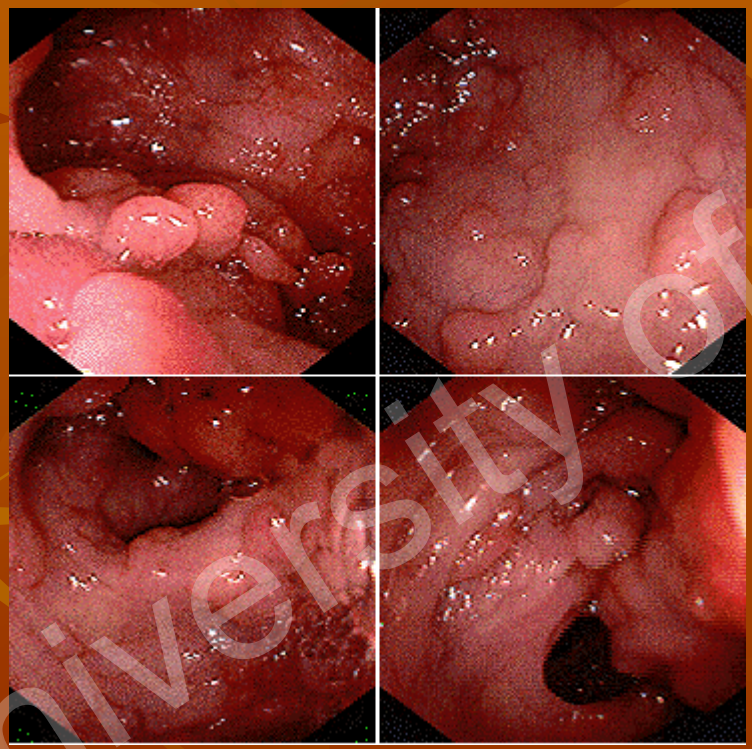
# FAP

- Autosomal dominant
- Mutation in adenomatous polyposis coli (APC) gene on chromosome 5, >300 mutations identified
- APC – tumor suppressor gene
- Accounts of < 1% of colon cancer in the US
- Diagnosis – > 100 adenomatous colorectal polyps
- Almost always involves rectosigmoid
- 95% have CRC by 50 years of age

# FAP

- Lifetime risk of colon cancer is 100%
- Offered colectomy at diagnosis
- Average age of adenoma appearance = 16 yrs
- Average age of colon cancer = 39 yrs

# FAP



# FAP Extracolonic involvement

- Duodenal ampullary carcinoma
- Follicular or papillary thyroid cancer
- Childhood hepatoblastoma
- Gastric carcinoma
- CNS tumors (medulloblastoma)
- Gastric fundic gland polyps (benign)
- Duodenal polyps (4-12% cancer risk)
- Adenomas in distal small bowel and stomach
- Adenomas in gall bladder and bile duct

# FAP

- Gardner's syndrome:

  FAP (same APC gene mutation) with prominent extraintestinal manifestations – desmoid tumors, sebaceous or epidermoid cysts, lipomas, osteomas (especially mandible), supernumerary teeth, gastric polyps and juvenile nasopharyngeal angiofibromas

- Turcot syndrome:

  FAP variant associated with medulloblastoma

# FAP – Screening and Surveillance

- Gene carriers or at-risk family members – flexible sigmoidoscopy every 12 months starting with age 10-12

- Discontinue annual colon examination at age 40 if negative till then

# FAP – ASGE guidelines for screening and surveillance of upper GI tract

- Patients with FAP should undergo upper endoscopy with both end-viewing and side-viewing instruments
- The optimal timing of initial upper endoscopy is unknown – could be performed around the time the patient is considered for colectomy or early in the third decade of life
- If no adenomas are detected, another exam should be performed in five years because adenomatous change may occur later in the course of the disease

# FAP – ASGE guidelines for screening and surveillance of upper GI tract

- For patients with duodenal and periampullary adenomas – surveillance endoscopy and biopsy should be performed at intervals based on stage of disease
- Endoscopic treatment of papillary adenomas may be appropriate in selected patients
- If excision is complete, one approach is for follow-up endoscopy and multiple biopsies every six months for a minimum of two years, with endoscopy thereafter at three-year intervals

# FAP – ASGE guidelines for screening and surveillance of upper GI tract

- Duodenal polyps should be biopsied or sampled at the time of initial discovery and on each subsequent examination to determine the stage of duodenal polyposis

- The frequency of exams and referral for prophylactic surgery are determined on the basis of duodenal polyp stage

# FAP – ASGE guidelines for screening and surveillance of upper GI tract

- Surgical consultation – for advanced (Spigelman stage IV) duodenal polyposis in an effort to prevent periampullary/duodenal carcinoma.

- Management of high-grade dysplasia in the periampullary region is controversial and must be individualized (surgery/ablative therapy versus more frequent surveillance)

# FAP – ASGE guidelines for screening and surveillance of upper GI tract

**Modified Spigelman's Score and Classification†**

| | Score | | |
|---|---|---|---|
| **Factor** | **1 Point** | **2 Points** | **3 Points** |
| Number of polyps | 1-4 | 5-20 | >20 |
| Polyp size, mm | 1-4 | 5-10 | >10 |
| Histology | Tubulous | Tubulovillous | Villous |
| Dysplasia | Low grade | -- | High grade |

Note: Classification: no polyp, stage 0; 1 to 4 points, stage I; 5 to 6 points, stage II; 7 to 8 points, stage III; 9 to 12 points, stage IV.

†Reproduced with permission from: Saurin, J, Gutknecht, C, Napoleon, B, et al. Surveillance of duodenal adenomas in familial adenomatous polyposis reveals high cumulative risk of advanced disease. J Clin Oncol 2004; 22:493. Copyright ©2004 American Society of Clinical Oncology (ASCO).

# FAP – ASGE guidelines for screening and surveillance of upper GI tract

- Gastric polyps – biopsy to confirm that they are fundic gland polyps and to assess for dysplasia.

- Antral polyps - usually adenomas, should be resected.

# Attenuated FAP

- Have fewer colonic adenomas (20-100)
- Average age of adenoma appearance = 44 yrs
- Average age of colon cancer = 56 yrs
- Frequent involvement of proximal colon
- Infrequent involvement of rectum
- Lifetime risk of colon cancer is 69%
- Mutations in APC gene are close to 5-prime end or 3-prime end of the gene

# Attenuated FAP – Screening and Surveillance

- Annual colonoscopy in the late teens or early 20s – depending age of polyp expression in family
- Continue surveillance longer than FAP
- Upper endoscopy screening and surveillance like FAP

# MAP (MYH associated polyposis)

- Autosomal recessive
- Biallelic mutations in MYH gene
- MYH gene is involved in base excision repair
- Phenotype like FAP/AFAP – 15 to >100 colonic polyps

# MAP (MYH associated polyposis) – Extracolonic manifestations

- Gastroduodenal polyps
- Duodenal carcinoma
- Osteomas
- Breast cancer in female carriers
- Congenital hypertrophy of the retinal pigment epithelium (CHERPE)
- Dental cysts
- Sebaceous gland tumors

# MAP (MYH associated polyposis) – Extracolonic manifestations

- No current guidelines for screening/surveillance
- Some experts recommend C-scope starting at 18 yrs
- Other recommend both upper and lower endoscopy starting at 25-30 yrs

# Peutz-Jeghers Syndrome

- Autosomal dominant
- Germ line mutation of a gene on chromosome 19
- Gene encodes a serine threonine kinase
- Pigmented spots on lips and buccal mucosa
- Multiple gastrointestinal hamartomatous polyps (small bowel – 65-95%, colon – 60%, stomach – 50%)
- GI cancer risk is via adenomatous change within hamartoma

# Peutz-Jeghers Syndrome – Lifetime Cancer Risk

- Stomach – 29%
- Small intestine – 13%
- Colon – 39%
- Pancreas – 36%
- Breast – 54%
- Esophagus – 0.5%
- Lung – 15%
- Uterus – 9%
- Ovary -21%

# Peutz-Jeghers Syndrome – Surveillance

- From birth to age 12:

  Male patients:

  H & P with attention to the testicles.

  Routine blood tests annually (optional - ultrasound of the testicles every two years until age 12).

  Female patients:

  H & P with routine blood tests annually

- At age 8:

  Males and females:

  Upper endoscopy and small bowel series; if positive, continue every two to three years



Clinical Gastroenterology and Hepatology 2006; 4:408

# Peutz-Jeghers Syndrome – Surveillance

- From age 18:

  Male patients: colonoscopy, upper endoscopy, and small bowel series every two to three years.

  Female patients: Colonoscopy, upper endoscopy, and small bowel series every two to three years; breast self-exam monthly.

  (Future alternatives to small bowel series: wireless capsule endoscopy; push-enteroscopy or double-balloon enteroscopy - therapeutic intervention, but invasive)

- From age 21:

  Female patients: pelvic examination with a Papanicolaou smear annually

Clinical Gastroenterology and Hepatology 2006; 4:408

# Peutz-Jeghers Syndrome – Surveillance

- From age 25:

  Male patients:

  EUS of the pancreas every one to two years (CT scan and/or CA19-9 offered as options):

  Female patients:

  EUS of the pancreas every one to two years (CT scan and/or CA 19-9 offered as options)

  clinical breast exam semiannually;

  mammography annually (alternative – MRI);

  transvaginal ultrasound and serum CA-125 annually.

  Mammography might begin earlier on the basis of earliest age of onset in the family

Clinical Gastroenterology and Hepatology 2006; 4:408

# Familial Juvenile Polyposis

- Autosomal dominant
- Incidence < 1/100,000
- Germ line mutation in gene on Chr 18
- Gene: SMAD4 or DPC4 or MADH4
- Cytoplasmic mediators in TGF-β signalling
- Diagnosis – > 10 juvenile polyps with history of similar lesions in at least one 1st degree relative
- Risk of colon CA – may be up to 20%

# Familial Juvenile Polyposis – Surveillance and Screening

- At risk individuals – colonoscopy every 1-2 yrs beginning age 15-18
- Upper endoscopy /enteroscopy or UGI with SBFT every 1-2 yrs beginning age 25



Gut 2002; 51 Suppl 5: V21

# Inflammatory Bowel Disease

- No good RCT, based on expert opinion
- Recommendation apply to both UC and CD
- Surveillance colonoscopy every 1-2 yrs beginning with 8-10 yrs of disease – biopsies in 4 quadrants at every 10 cm
- If coexisting diagnoses of UC and PSC – start surveillance immediately
- Patients with HGD or multifocal LGD in flat mucosa – advised colectomy



Gastroenterology- 2003 (Vol. 124, Issue 2: 1865-1871 ) and
American Journal of Gastroenterology - 2004 – Ulcerative Colitis Practice Guidelines