



# IMPACT OF **i**BD ON HEALTHCARE SYSTEMS

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# Overview of Inflammatory Bowel Disease: Epidemiology and Natural History

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# Disclosure of Potential Conflicts of Interest

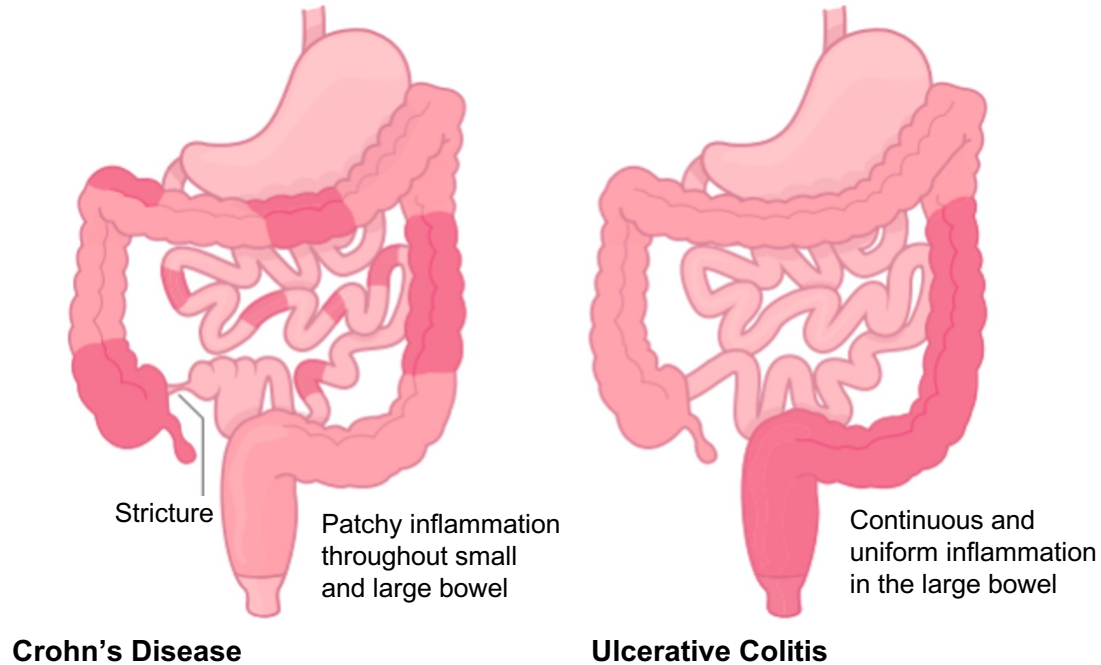
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# Inflammatory Bowel Disease

- Chronic inflammation of the gastrointestinal tract--two most common diseases are **Crohn's disease (CD)** and **ulcerative colitis (UC)**
- IBD affects as many as **3.1 million** Americans, most of whom are diagnosed before age 35
- Currently **no cures** for IBD, but there are treatments to reduce inflammation and control symptoms
- **Idiopathic** but believed to be caused by a combination of factors:
  - Inherited genetic risk
  - Environmental risk factors
  - Imbalance or changes to gut microbiome
  - Inappropriate immunologic response

	Inflammatory Bowel Disease (IBD)	Irritable Bowel Syndrome (IBS)
Symptoms	Diarrhea, abdominal pain, cramping, urgent or frequent bowel movements, blood in the stool, decreased appetite, weight loss, or joint pain.	Diarrhea, constipation, abdominal pain, abdominal bloating, cramping, mucus in stool, bloating, and/or gas
Diagnosis	<ul style="list-style-type: none"> <li>• Anemia may be present</li> <li>• Stool calprotectin is often elevated</li> <li>• Endoscopy: redness, ulceration, bleeding</li> <li>• Imaging: Inflammation of bowel wall is common</li> </ul>	<ul style="list-style-type: none"> <li>• Stool calprotectin is normal</li> <li>• Endoscopy: No inflammation</li> <li>• Imaging: No inflammation of the bowel wall</li> </ul>
Treatment	Aminosalicylates, antibiotics, biologic or biosimilar therapies, corticosteroids, immunomodulators, or JAK inhibitors	Treatments are prescribed to treat specific IBS symptoms (Diarrhea, constipation, gas, bloating, pain)
Complications	<ul style="list-style-type: none"> <li>• Crohn's disease—Stenosis, fistula, abscess, bowel obstruction, and colon cancer</li> <li>• UC—Colon cancer and toxic megacolon</li> <li>• Both—malnutrition, anemia</li> <li>• Psychological Impacts: Impaired quality of life, increased risk for anxiety, depression, and post-traumatic stress, and stigmatization.</li> </ul>	<ul style="list-style-type: none"> <li>• Chronic constipation and diarrhea may cause hemorrhoids</li> <li>• Psychological Impacts: Impaired quality of life, increased risk for anxiety and depression, and stigmatization.</li> </ul>

# Crohn's Disease vs. Ulcerative Colitis



# Diagnosing IBD

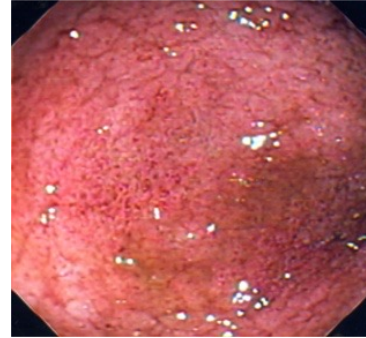
- History and physical examination
- Labs
  - Complete blood count
  - Blood chemistry
  - Inflammation markers: C-reactive protein, erythrocyte sedimentation rate, fecal calprotectin
  - Stool GI PCR or stool culture & sensitivity and stool for oval and parasites; *C. difficile*
  - IBD Serologies (limited role)
  - No role for genetic testing
- Ileocolonoscopy, sometime upper endoscopy
- Cross-sectional imaging (MR enterography or CT enterography)

# Endoscopic Appearance in Ulcerative Colitis

NORMAL



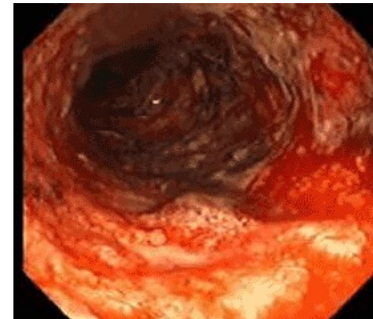
MILD



MODERATE



SEVERE



# Disease Location and Behavior of Crohn's Disease and Ulcerative Colitis

**Table 4.** Anatomic Location of CD and UC and Behavior of CD, Kaiser Permanente IBD Registry, Northern California, 1996–2002

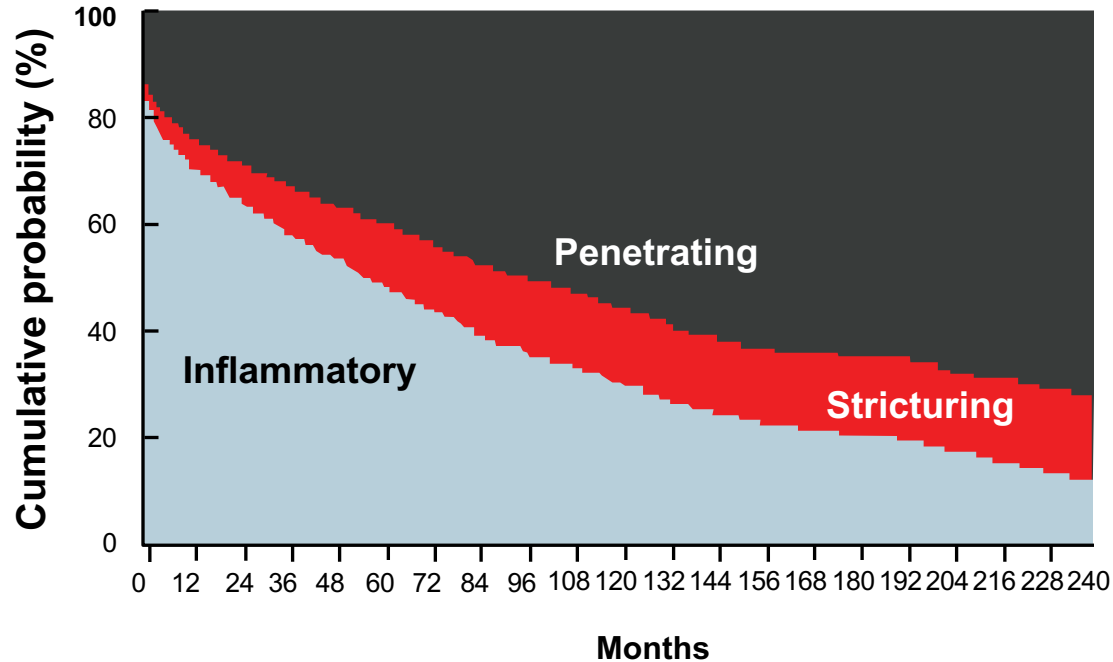
Location and Behavior	%
<b>Location of Crohn's Disease (N = 854)*</b>	
Upper GI	6.5
Ileum	14.2
Ileocolon	39.4
Colon	39.8
<b>Behavior of Crohn's Disease (N = 765)*</b>	
Strictureing and penetrating	13.4
Strictureing only	25.4
Penetrating only	24.8
Neither strictureing nor penetrating	36.4
<b>Location of Ulcerative Colitis (N = 1,317)*</b>	
Ulcerative proctitis	14.8
Distal ulcerative colitis	24.0
Left-sided colitis	26.2
Pancolitis	35.0



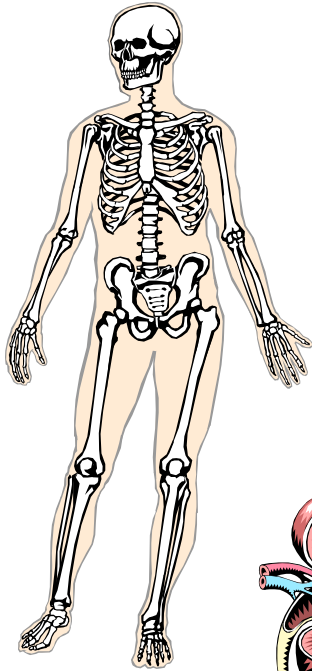
- Colorectal dysplasia and cancer (seen in colonic CD, as well)
- Disease extension

\*Information was missing on location for 94 CD patients, on behavior for 174 CD patients, and on location for 207 UC patients.  
Herrinton L et al. *Amer J Gastroenterol.* 2008;103:1998-2006.

# The Evolution of Crohn's Disease: Inflammation Leads to Structural Damage



# IBD: Extra-intestinal Manifestations



Skin

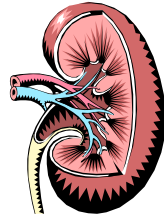
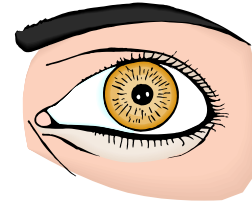
Eye

Bones and Joints

Kidney

Liver/  
Gall Bladder

Thrombosis



# IBD: Worldwide Incidence and Prevalence Ranges Stratified into Quintiles

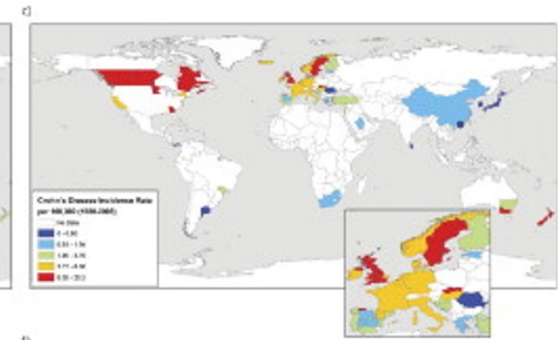
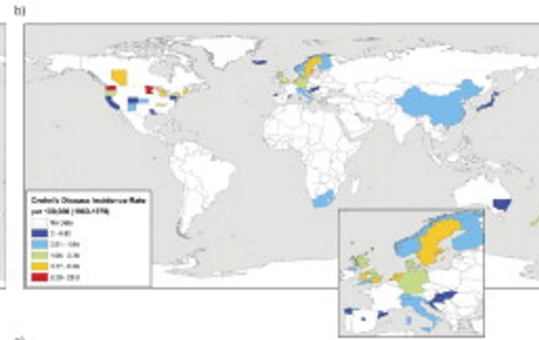
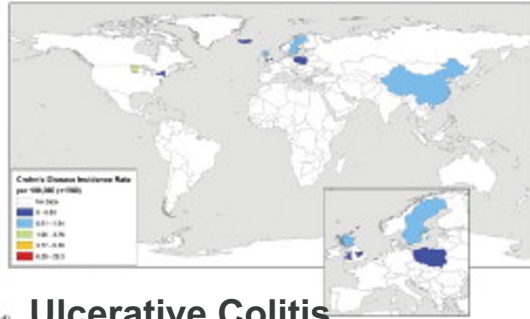
**Table 1.** Incidence and Prevalence Ranges Stratified Into Quintiles for CD and UC

Quintile rank (percentile)	CD		UC	
	Incidence per 100,000	Prevalence per 100,000	Incidence per 100,000	Prevalence per 100,000
0 to 19th (dark blue)	0.0–0.80	0.6–6.75	0.0–1.85	2.42–21.0
20th to 39th (light blue)	0.81–1.94	6.76–25.0	1.86–3.09	21.1–44.3
40th to 59th (green)	1.95–3.76	25.1–48.0	3.10–4.97	44.4–100.9
60th to 80th (yellow)	3.77–6.38	48.1–135.6	4.98–7.71	101.0–198.0
80th to 100th (red)	6.39–29.3	135.7–318.5	7.72–19.2	198.1–298.5

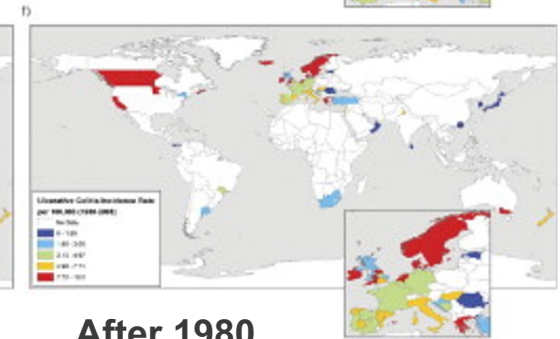
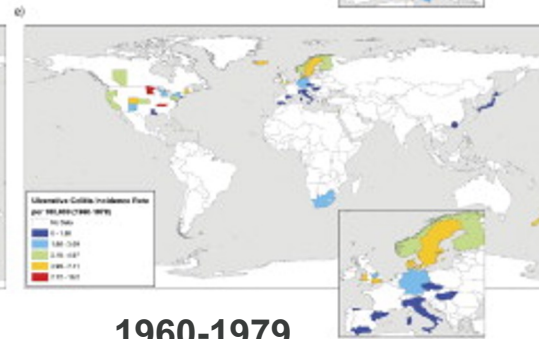
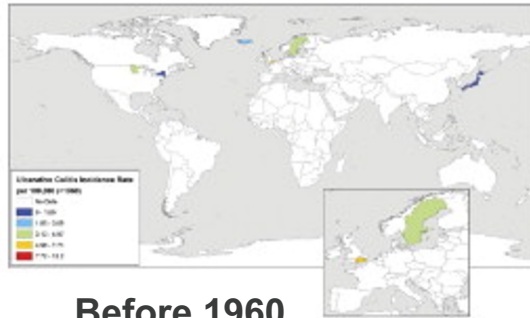
Note. Ranges (as denoted by color) correspond to ranking of incidence and/or prevalence in Figures 2 and 3. Quintile ranges were developed from 260 published studies on incidence and/or prevalence of IBD (references in Appendixes 2 and 3). Molodecky NA et al. *Gastroenterology*. 2012;142:46–54.

# IBD: Worldwide Incidence and Prevalence Ranges Over Time

## a) Crohn's Disease



## d) Ulcerative Colitis

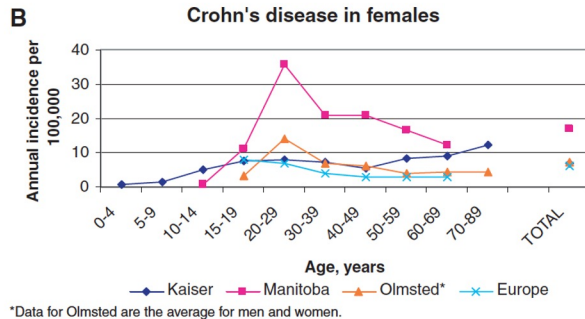
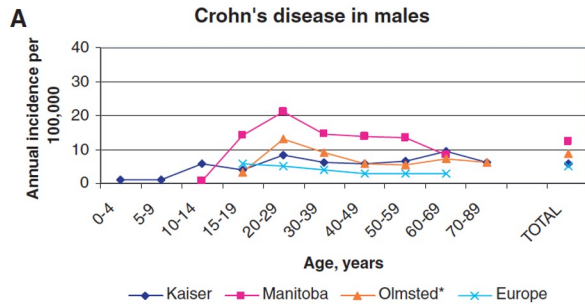


Before 1960

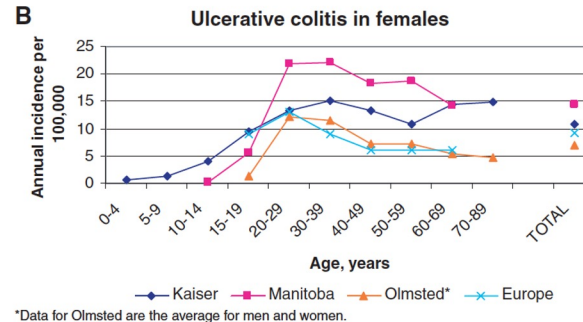
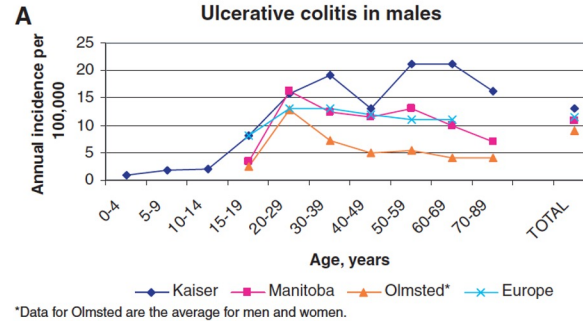
1960-1979

After 1980

# Incidence of IBD by Age in the US, Canada and Europe



**Figure 2.** Incidence of Crohn's disease by sex and age in the present study, the Manitoba study (7), the Olmsted county study (3), and a European study (13).



**Figure 3.** Incidence of ulcerative colitis by sex and age in the present study, the Manitoba study (7), the Olmsted county study (3), and a European study (13).

# Epidemiology of IBD in the US

## Prevalence (U.S.)

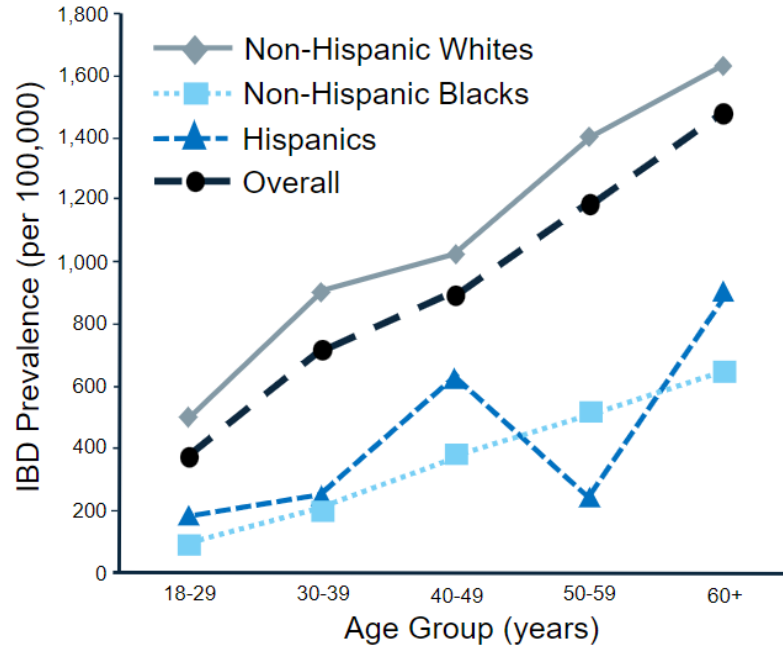
Crohn's disease	Ulcerative colitis
201 per 100,000 adults	238 per 100,000 adults

## Incidence Rate (U.S.)

Crohn's disease	Ulcerative colitis
8.8 cases per 100,000 person-years	7.9 cases per 100,000 person-years

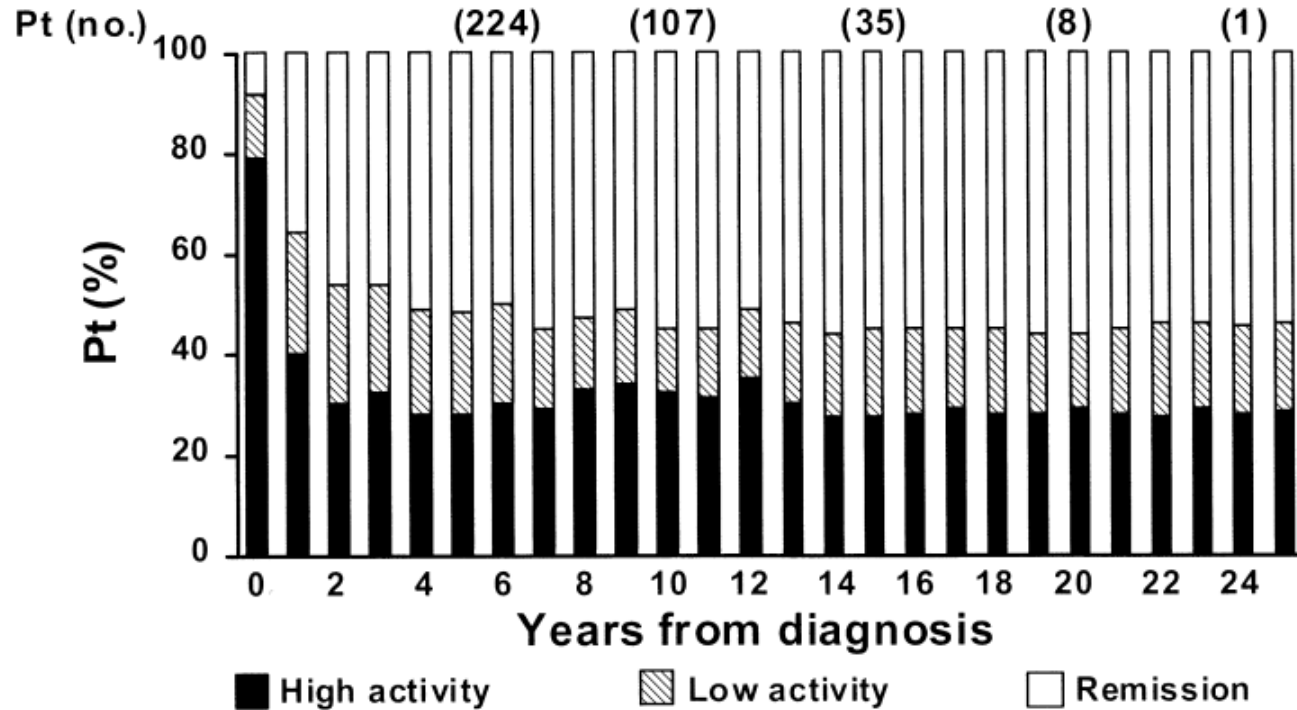
**Prevalence in the US: 0.5% of the population**

# Burden of IBD Among Different Racial and Ethnic Groups



	aOR	95% CI	P Value
Hispanic ethnicity	2.71	1.31, 5.62	.007
Non-Hispanic Black	2.2	1.04, 4.65	.039
Non-Hispanic, non-Black minority race	3.47	1.34, 8.94	.01
Current biologic use	2.42	1.32, 4.42	.004
Annual income < \$50,000	3.02	1.69, 5.4	< .001
Public payer	2.12	1.13, 3.99	.019
Employment	.71	0.38, 1.29	.259
High school educated or less	1.48	0.85, 2.59	.17
Female sex	1.9	1.09, 3.3	.023
Clinical remission	.26	0.15, 0.46	< .001
Current steroid use	1.82	0.84, 3.95	.129
Prior surgery	1.83	1.03, 3.25	.039

# Natural History of CD



# Natural History of UC

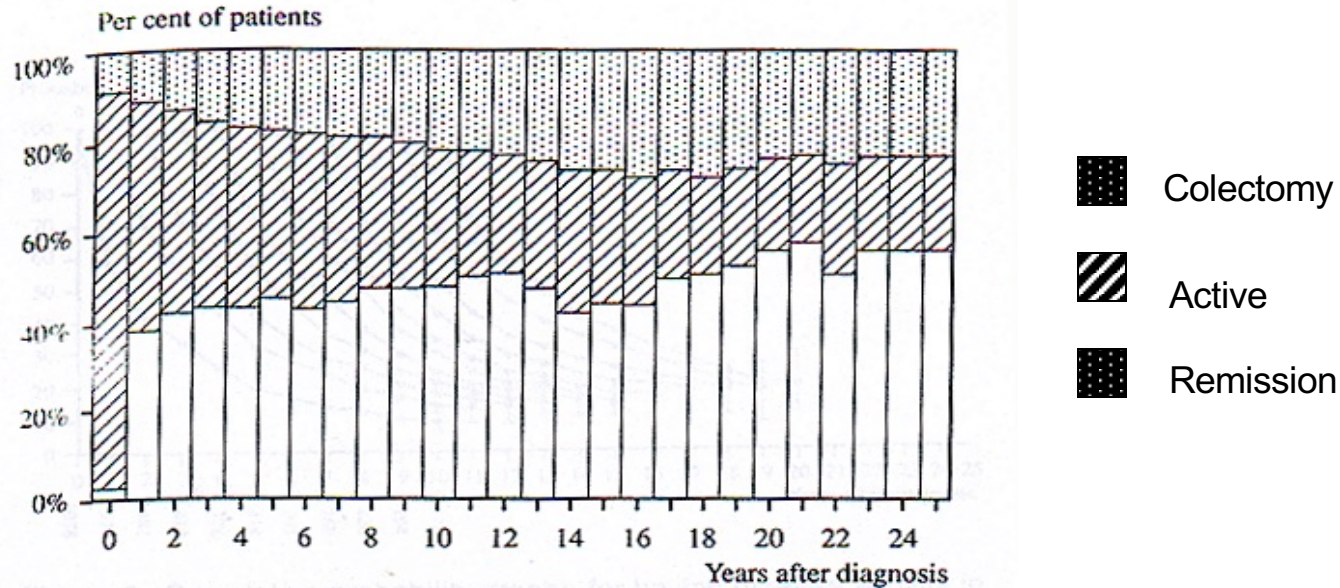
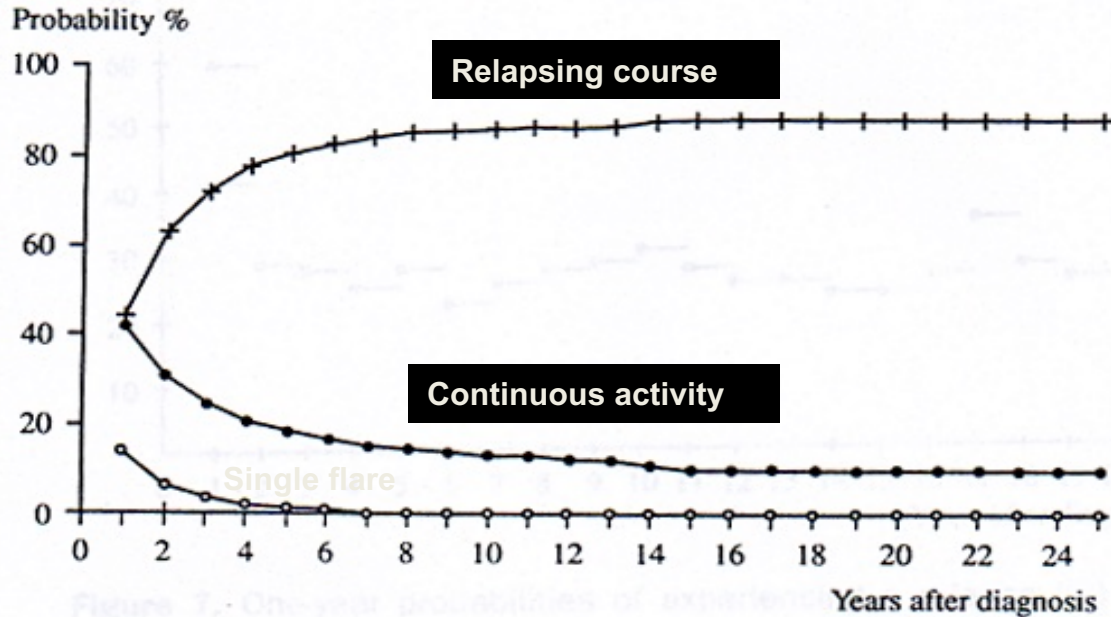


Figure 4. Cumulative probability graphs for having

# Natural History of UC



# Conclusions

- IBD affects ~0.5% of the US population
- Different from irritable bowel syndrome
- Chronic inflammation results in symptoms as well as disease complications
- Highly impactful conditions