Welcome to the IBD Nurse Fellowship Program!

The program consists of 13 modules:

Module 1 – Ulcerative Colitis
Module 2 – Crohn's Disease
Module 3 – Ulcerative Colitis vs. Crohn's Disease
Module 4 – Management of Ulcerative Colitis
Module 5 – Management of Crohn's Disease
Module 6 – IBD and Surgery
Module 7 – Medication Adherence in IBD

Module 8 – Health Promotion and Maintenance in IBD
Module 9 – Nutrition and IBD
Module 10 – Extra-intestinal Manifestations of IBD
Module 11 – Anemia in IBD
Module 12 – Fatigue in IBD
Module 13 – Anxiety and Depression in IBD

Each module is divided into sections, all of which are listed in the Table of Contents. The Table of Contents allows you to click on the page numbers to navigate to each section. Each page has a Home Button on the bottom right-hand corner that will take you back to the Table of Contents.

The learning objectives are at the beginning and end of each module. Before completing the module, you will have the opportunity to take a self-directed quiz, which will test your knowledge on several of the key concepts and takeaways from the module. It is recommended that you take the quiz and accomplish all of the learning objectives before moving on to the next module.

Module 1

Ulcerative colitis

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csgna
Canadian Society of Gastroenterology Nurses & Associates
Société canadienne des infirmières et infirmiers en gastroentérologie et travailleurs associés

CANIBD
Canadian Nurses IBD Group

Table of contents

Learning objectives

After completing Module 1 you will be able to:

- Describe the anatomy of the lower gastrointestinal (GI) tract

- Explain the function of the large intestine

- Define ulcerative colitis (UC)

- Summarize the key epidemiological statistics on UC

- Explain the etiology and pathology of the disease

- Identify the clinical features of UC

- Evaluate disease activity using the Mayo Score

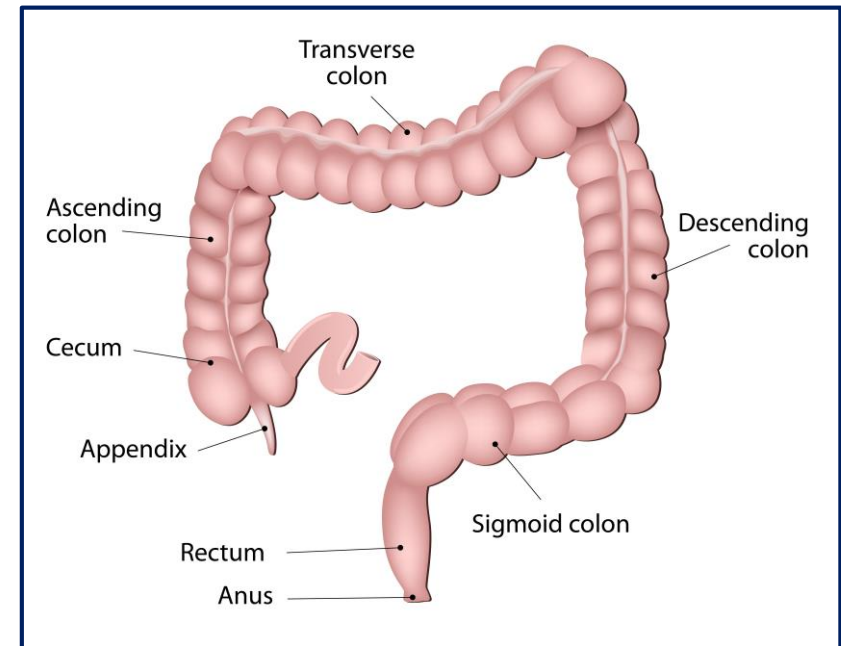- List the complications of UC and describe the prognosis of the disease

Section 1

Anatomy and function of the lower gastrointestinal tract

# Anatomy of the lower gastrointestinal tract

- The lower gastrointestinal (GI) tract can be divided into seven parts:
  1. Cecum – where the large intestine begins
  2. Ascending colon – where bacteria begin to digest the waste material that the body cannot digest and absorb vitamins and water
  3. Transverse colon – where the feces are mixed and bacteria continue to ferment the waste (water and vitamins are also absorbed)
  4. Descending colon – where storage and accumulation of feces begins
  5. Sigmoid colon – primary role is for storage of feces and the propulsion of feces into the rectum
  6. Rectum – where feces are stored until defecation can occur
  7. Anus – primary role is to retain the stools

The lower gastrointestinal tract

Feldman M *et al.,* 2015; gi.jhsps.org; Saibil F, 2011; Taylor T, 2015.

Anatomy of the lower GI tract

- The large intestine (colon) is approximately 1.5 to 1.8 m long and approximately 3.85 cm in diameter

- Ileal contents empty into the cecum through the ileocecal valve

- The appendix extends from the base of the cecum

- The anal canal is approximately 4 cm long and is the terminal part of the colon
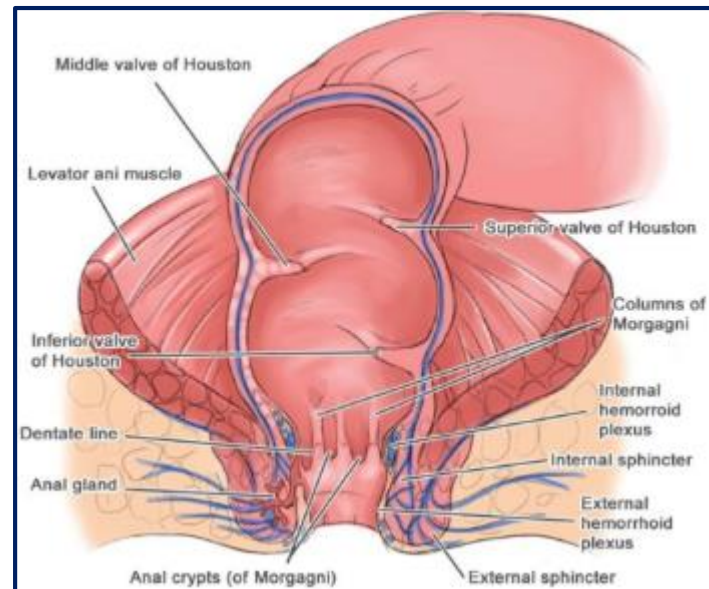
Anatomy of the anal canal

Function of the large intestine

The large intestine performs several important functions:

Absorption and secretion

- The colon is extremely efficient at absorbing water
- Approximately 1.5 L of fluid enters the healthy colon each day, but only about 100 mL to 200 mL is excreted in the stool
- The colon can absorb up to a maximum of 4.5 L per day
- Approximately 150 mEq/L of sodium is absorbed each day
- Sodium and potassium are secreted into the colon to create an osmotic gradient that enables the colon to maintain efficient water absorption
  - Normally, 15 mEq/L of potassium and 5 mEq/L of sodium is secreted
  - The control of electrolyte transport is tightly regulated

Digestion and expulsion

- Large numbers of bacteria are found within the colonic lumen
- These bacteria digest any undigested food products that could not be broken down by the enzymes in the small intestine, such as complex sugars or dietary fiber
- Complex sugars are fermented by the bacteria, forming short-chain fatty acids (SCFAs), such as butyrate, propionate and acetate
  - SCFAs are essential nutrient sources for colonic epithelium and can generate up to 500 cal/day of overall nutritional needs
- Byproducts of sugar fermentation by colonic bacteria include hydrogen, methane and carbon dioxide
- The movement of fecal material from cecum to rectum is a slow process and occurs over a period of days
  - About 100-200 mL of stool is excreted

Section 2

## Introduction
to ulcerative colitis
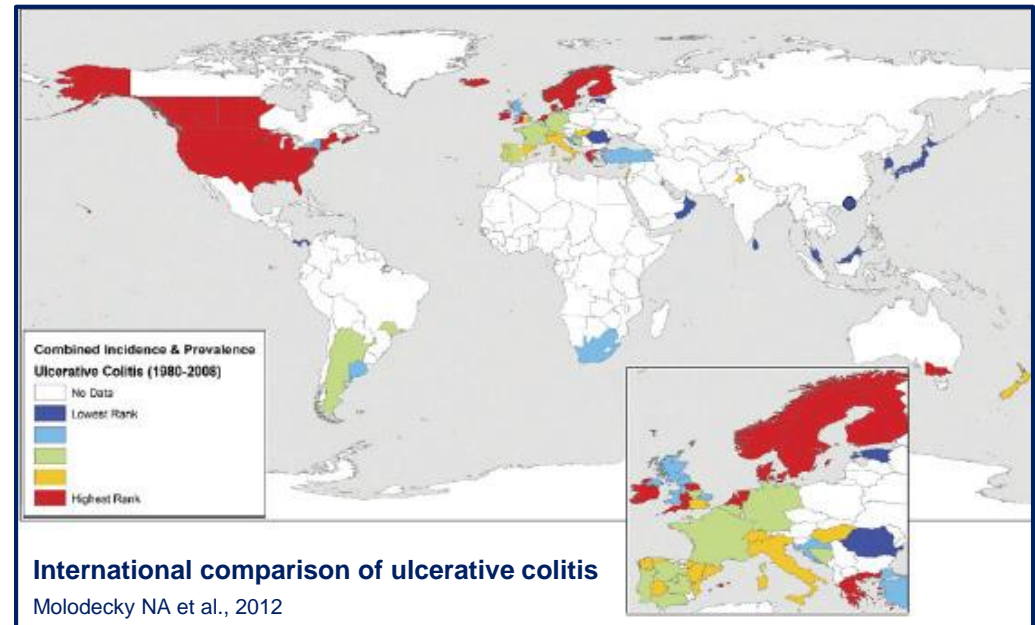
What is ulcerative colitis?

- Inflammatory bowel disease (IBD) is the name of a group of disorders that cause the intestines to become inflamed
- The main forms of IBD are Crohn's disease (CD) and ulcerative colitis (UC)
- UC is a chronic inflammatory disease that only affects portions of the large intestine, including the rectum and anus
- UC typically only inflames the innermost lining of bowel tissue
- UC is characterized by continuous mucosal inflammation from the rectum through a variable length of the large intestine, which manifests as bloody diarrhea with crampy abdominal pain and fecal urgency
- In UC, tiny open sores, or ulcers, form on the surface of the lining, where they bleed and produce pus and mucus
- UC can be controlled with medication and, in severe cases, can be "cured" by surgically removing the entire large intestine
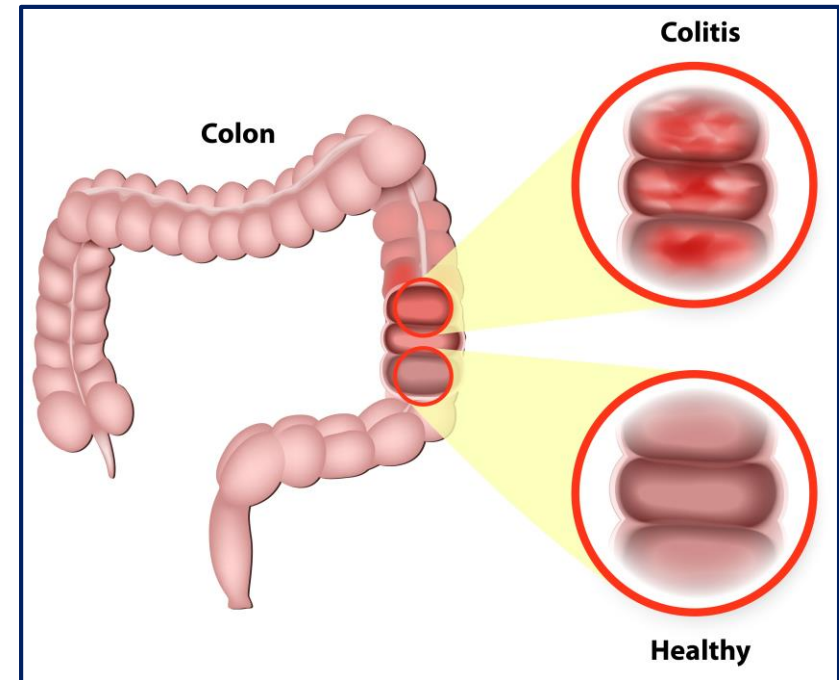
Inflamed mucosa in ulcerative colitis vs. healthy mucosa

CCFC Impact Report, 2012; CCFC Fast Facts, 2012; Macken L et al., 2015.

Epidemiology of ulcerative colitis

- The incidence and prevalence of ulcerative colitis (UC) vary with geographic location and ethnicity
    - Incidence = the rate at which new cases occur in a population during a specified period
    - Prevalence = the proportion of a population that are cases at a point in time
- In Canada:
    - Incidence rates range from 12.9 cases per 100,000 person-years
    - Prevalence rates range from 417.1 cases per 100,000 persons
- As of 2015, there were approximately 104,000 Canadians (0.67% of the Canadian population) living with UC and approximately 4,500 new cases being diagnosed every year in Canada
- The incidence and prevalence of UC are increasing with time around the globe
- UC rates are low in developing countries, but are increasing as they become more industrialized
- UC occurs at any age but is most common among people between the ages of 5 and 70 years
- There is no gender difference in UC

Combined Incidence & Prevalence
Ulcerative Colitis (1980-2008)
- No Data
- Lowest Rank
- Highest Rank

International comparison of ulcerative colitis
Molodecky NA et al., 2012

CCFC Impact Report, 2012; CCFC Fast Facts, 2012; Coggon D et al., 1997; Cosnes J et al., 2011; Feldman M et al., 2015; Molodecky NA et al., 2012.
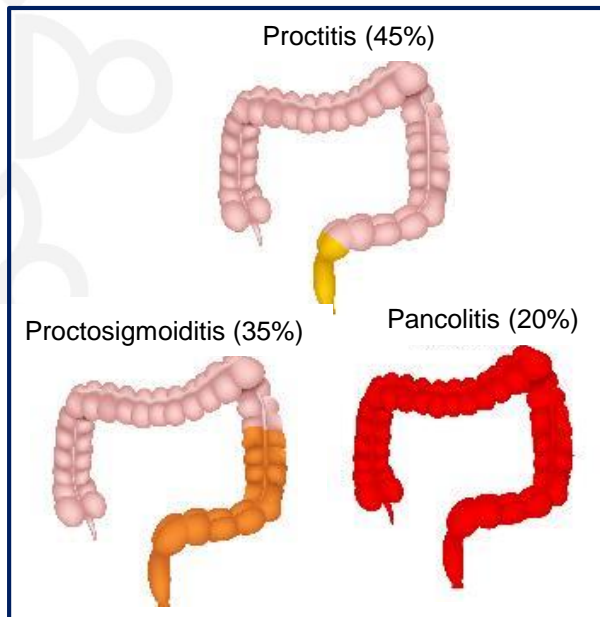
Etiology of ulcerative colitis

- The etiology of ulcerative colitis (UC) is currently unknown but it is clear that it is multifactorial
- Factors may involve the complex interaction of 3 key elements:

  1. Genetic susceptibility
     - IBD clusters in families although in most instances there are no affected relatives
     - Siblings are most likely to be affected
     - In up to 10% of identical twins, both will have UC

  2. "Hygiene hypothesis"
     - A theory to explain why chronic diseases, with inappropriate immune system reactions (like IBD), occur in modern 'cleaner' environments
     - High levels of hygiene may reduce exposure to bacteria and viruses and/or change the type of bacteria found in the gut
     - Children who have taken antibiotics in the first year of life are more likely to develop IBD

  3. Other environmental triggers
     - Diet (high intake of red meat and total fat are associated with increased risk)
     - Infection (bacteria and/or viruses)
     - Lifestyle (smokers have a lower risk of UC)

CCFC Impact Report, 2012; Feldman M *et al.,* 2015.

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Pathology of ulcerative colitis

- 45% of patients have **ulcerative proctitis** (limited to the rectosigmoid colon)
- 35% have **proctosigmoiditis** (extends beyond the sigmoid colon)
- 20% of patients have **pancolitis** (involves the the entire colon)

- Most severe cases typically occur distally
- Less severe cases are commonly found proximally
- Appearance of mucosa:
  - Hyperemic
  - Edematous
  - Hemorrhagic
  - Visible punctate ulcers
- Neutrophilic infiltration of colonic crypts is also apparent on histopathology

Common types of ulcerative colitis
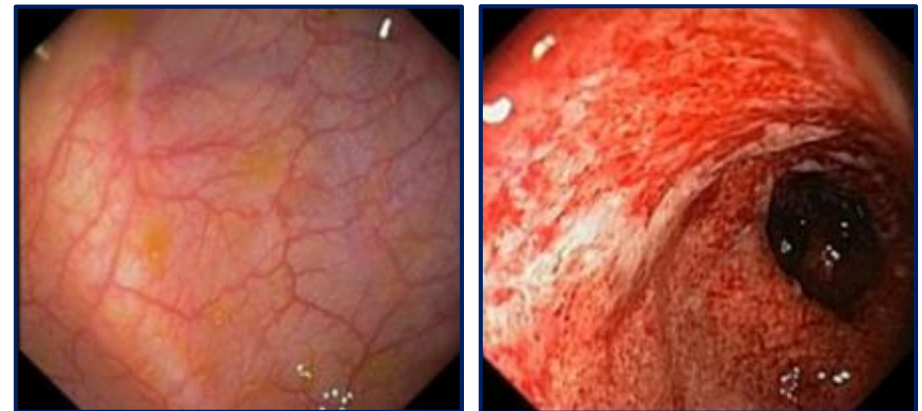
*Appearance of the normal mucosa (left) compared to inflamed mucosa due to ulcerative colitis (right)

Feldman M *et al.,* 2015; Langholz *et al.,* 1997.
*Image source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC434504/.
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Section 3

Symptoms, diagnosis and outcomes of ulcerative colitis

Clinical features of ulcerative colitis

- Patients with ulcerative colitis can present with a variety of symptoms:

Symptom	Description
Bloody diarrhea	• Occurs as a result of ulcerations, perforations of the bowel and malnutrition • Patients with proctitis usually experience passing fresh blood, either separately from the stool or streaked on the surface of a normal or hard stool • When the disease extends proximal to the rectum, blood is usually mixed with stool or there may be significantly bloody diarrhea
Diarrhea	• Typically bloody diarrhea • Often accompanied by passage of large quantities of mucus and pus
Abdominal pain	• "Crampy" abdominal pain which is often experienced in the left lower quadrant of the abdomen • Often accompanied by the severe urgency to have a bowel movement
Anemia	• Mild anemia can occur as a result of blood loss in the stool • Iron deficiency anemia can develop due to chronic blood loss
Hematologic changes and inflammatory markers	• Leukocytosis and thrombocytosis often reflect active disease • Erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) may be elevated and are markers of active disease • Fecal calprotectin (a protein secreted by neutrophils in the feces) is a marker of inflammation
Loss of appetite	• Can lead to weight loss and fatigue
Other symptoms	• Skin lesions • Eye inflammation • Joint pain • Liver disorders

CCFC Impact Report, 2012; Feldman M *et al.,* 2015.

Evaluating disease activity

- The Mayo Score* is a numerical disease activity instrument used to assess the severity of the disease and combines clinical and endoscopic assessments
    - Is the sum of scores from 4 components
- Ranges from 0 to 12, with higher total scores representing more severe disease
    - In general, a patient is considered to be in remission if the Mayo score is 2 or below and to have severe disease if the score is above 10

Variable	0 points	1 point	2 points	3 points
Bowel movement (BM) frequency	Normal (for patient)	1-2 BMs more than normal	3-4 BMs more than normal	≥ 5 BMs more than normal
Rectal bleeding	None	Streaks on stool < 50% BMs	Obvious blood with most BMs	Blood alone passed
Endoscopy	Normal	• Mild disease • Erythema • ↓ vascularity • Mild friability	• Moderate disease • Marked erythema • Lack vascular pattern • Friability	• Severe disease • Spontaneous bleeding ulceration
Physician Global Assessment (PGA)	Normal	Mild disease	Moderate disease	Severe disease

*The Mayo Score system will be discussed in more detail in Module 4.
Feldman M et al., 2015.

Complications of ulcerative colitis

- Complications of ulcerative colitis (UC) include:
    - Profuse bleeding from deep ulcerations
    - Bowel perforation (rupture)
    - Failure to respond to appropriate medical treatments
    - Risk of colorectal cancer (related to longstanding UC)

- Toxic megacolon
    - Abdominal distension is another common complication of UC
    - Severe and sudden distension associated with UC, fever, and constipation may be indicative of toxic megacolon
    - This is a rare development that is produced by severe inflammation of the entire thickness of the colon, with weakening and ballooning of its wall
    - The dilated colon is then at risk of rupturing
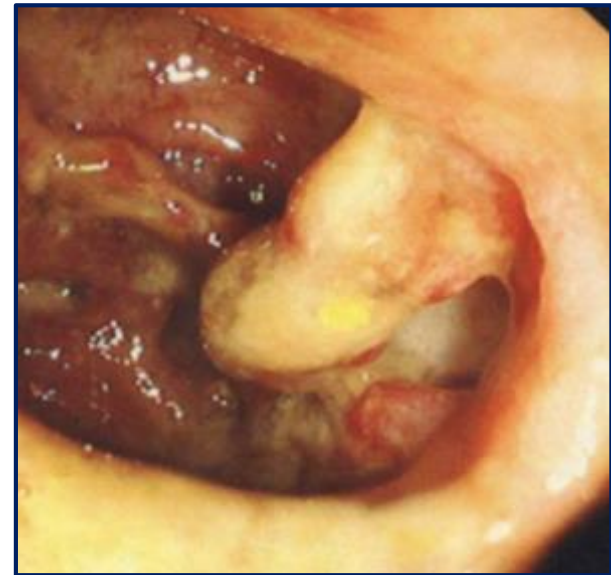

Colonoscopy of toxic megacolon

Prognosis

- 80% of patients with ulcerative colitis (UC) experience a disease course characterized by intermittent flares split between variable periods of remission

- Following the initial flare, 40% to 65% of patients have an intermittent course, and 5% to 10% of patients have a chronic continuous course

- Up to 10% of patients have a severe first flare that requires colectomy

- After 1 year of remission the risk of relapse decreases to 20% for the following year

- The mortality rate due to a severe flare of UC is less than 2%
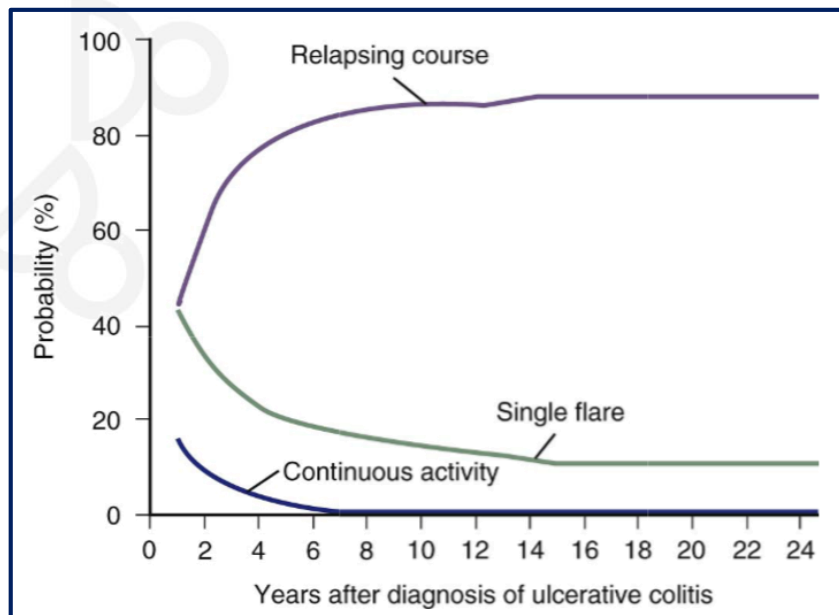
Cumulative probabilities of disease courses
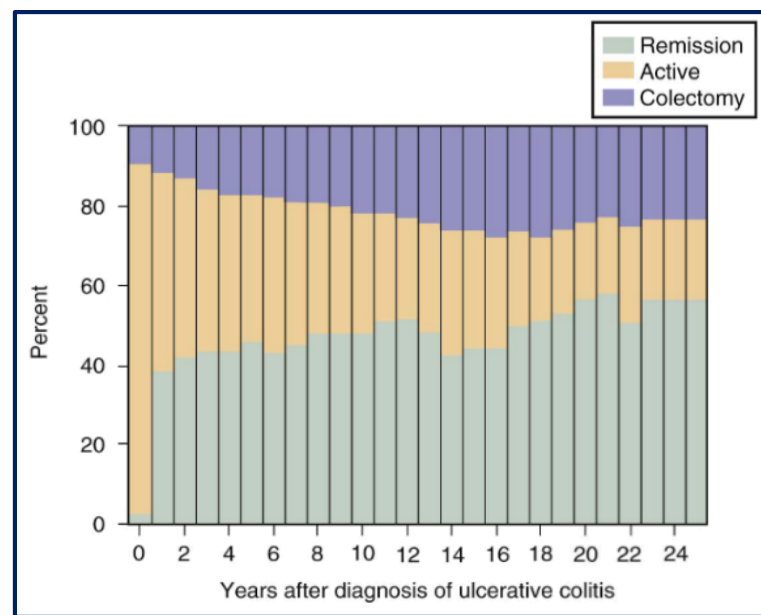
Percent of patients with disease activity

Section 4

Self-assessment quiz

Self-assessment quiz

- Now that you have reviewed the module content, you have the opportunity to test your knowledge and understanding of the material by completing a self-assessment

- The assessment consists of 5 multiple choice questions

- Please attempt each question before looking at the answer key, which is located on page 26

- The answer key provides the rationale for each answer and indicates where the correct answer can be found in the module

Question 1

Which of the following is true about ulcerative colitis?

a) Ulcerative colitis is a chronic inflammatory disease that only affects portions of the large intestine

b) Ulcerative colitis can manifest as bloody diarrhea with crampy abdominal pain and fecal urgency

c) Ulcerative colitis typically only inflames the innermost lining of bowel tissue

d) All of the above

Question 2

Which of the following is/are thought to play a role in the development of ulcerative colitis?

a)   Genetic susceptibility

b)   Hygiene hypothesis

c)   Diet, smoking and infection

d)   All of the above

Question 3

Which of the following is <u>not</u> a clinical feature of ulcerative colitis?

a)   Abdominal pain

b)   Weight gain

c)   Iron deficiency anemia

d)   Joint pain

Question 4

Which of the following variables is assessed on the Mayo Score to evaluate disease activity of ulcerative colitis?

a)   Bowel movement frequency

b)   Endoscopy

c)   Rectal bleeding

d)   All of the above

Question 5

Which complication of ulcerative colitis causes severe inflammation of the entire thickness of the colon, with weakening and ballooning of its wall?

a) Toxic megacolon

b) Bowel perforation

c) Ulcerations

d) Colorectal cancer

Answer key

1. **The correct answer is d.** Ulcerative colitis is a chronic inflammatory disease that only affects portions of the large intestine, and manifests as bloody diarrhea with crampy abdominal pain and fecal urgency. In general, only the innermost lining of bowel tissue becomes inflamed. See page 10 for more information on this topic.

2. **The correct answer is d.** The complex interaction of genetic susceptibility, the Hygiene Hypothesis and environmental triggers is believed to contribute to the development of the disease. See page 12 for more information on this topic.

3. **The correct answer is b.** Weight gain is not a symptom of ulcerative colitis. Weight loss, as a result of reduced appetite, in addition to abdominal pain, iron deficiency anemia and joint pain, is a symptom of ulcerative colitis. See page 15 for more information on this topic.

4. **The correct answer is d.** Bowel movement frequency, rectal bleeding and endoscopy are 3 of the 4 variables measured to assess disease activity on the Mayo Score. See page 16 for more information on this topic.

5. **The correct answer is a.** Toxic megacolon is a rare development that is produced by severe inflammation of the entire thickness of the colon, with weakening and ballooning of its wall. See page 17 for more information on this topic.

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Congratulations!

You have completed the 1st module of the program.

Based on what you learned in Module 1, you should be able to:

- Describe the anatomy of the lower gastrointestinal (GI) tract
- Explain the function of the large intestine
- Define ulcerative colitis (UC)
- Summarize the key epidemiological statistics on UC
- Explain the etiology and pathology of the disease
- Identify the clinical features of UC
- Evaluate disease activity using the Mayo Score
- List the complications of UC and describe the prognosis of the disease

If you have answered the quiz questions correctly and achieved the learning objectives, you are ready to move on to Module 2, which will focus on Crohn's disease.

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