Nutrition and Diseases of the Large Intestine

1. For each of the following foods, rank them as sources of fiber on a weight basis, with most fiber ranked as 1.

	g. Per 100 g.Weight	Rank	g/Per serving	Rank
Banana	1.6	4	2-2.9 g	2 or 3
corn, frozen	3.7	2	2-2.9 g.	2 or 3
bread, white wheat	2.7	3	< 1 g.	4
kidney beans, canned	7.7	1	8.2 g.	1

2. A high-fiber diet has been recommended for Mr. R., who has diverticulosis. A 24-hour recall gives you the following diet, which he states is typical.

Guidelines: (starch, vegetables, & fruit lists)

1. Increase whole grains (6-11 servings)
2. Increase vegetables, legumes, fruits (5-8 servings)
3. High fiber cereals/grains/legumes to bring fiber to > 25 g./d
4. Increase water to > 2 L /d.

How to make changes in the above diet so that it is a high fiber diet by adding food, omitting food or increasing serving size?

Breakfast:

	Current	**Modified**	**F**	**V**	**G**
4 oz. Orange juice			4	6	6
1 egg					
1 slice bread, toasted (whole grain)	0.5	2.0			
1 t margarine					
8 oz. low-fat milk (fresh)					
coffee					
Snack: 1 whole grain bread	1.0	2.0			
1 t. butter					
Lunch:					
3 oz. slice meat					
2 slices white bread (whole grain)		4.0			
1 t mayonnaise					
chopped lettuce salad					
French dressing					
2 canned peach halves (fresh)	2.5	2.5			
8 oz. low-fat milk					
Snack: 1 apple with peel		3.1			
1/2 c. carrot slices (raw)		2.3			
1/2 c. lentil soup		7			
Dinner:					
4 oz. sliced beef					
1/2 c mashed potatoes	3.0	3.0			
1 serving (about 100 g) cooked asparagus	2.0	2.0			

1 white dinner roll (whole grain)	0.5	2.0
1/2 c. broccoli		2.3
1/2 c butterscotch ice cream		
tea		
Snack: 1/4 c. nuts		2.5
1/2 c. fresh strawberries		2.0
	9.5	36.7

What side effects could occur in this patient as a consequence of increasing fiber too quickly in the pt. diet?

Abdominal distress, bloating, flatulence, cramps, & diarrhea.

What advice would you give this patient to avoid these side effects and improve compliance?

Fiber should be increased gradually to minimize potential adverse side effects such as abdominal distress, bloating, flatulence, cramps, and diarrhea. These effects are usually temporary & subside within several days. Follow the FGP. Build a base of grains, fruits, & vegetables. Breakfast foods can be one of the best sources of fiber in your diet. Once you have an idea of how much dietary fiber you already eat, making small dietary changes to get enough fiber will be fun & easy. Remember, experts recommend getting 25-35 g/d. Fiber up with foods you already eat. Mix & match your favorites.

If the patient develops diverticulitis, what diet would be appropriate during this acute phase?

Low fiber. For pts w/an acute flare-up of diverticulitis, a low residue diet, or elemental diet, or, in complicated cases, TPN, may be required , followed by a gradual return to a high fiber diet. A low fat diet helps relieve discomfort.

3. What causes gas in the colon to be excessive?

Intestinal gases include N2, O_2, CO_2, H_2 &, in some individuals, CH_4 (methane). About 200ml of gas is normally present in the GI tract, and hujans excrete on average 700 ml/d. Considerable amounts of gas may be swallowed, exchanged between the GI tract & circulating blood, & produced w/i the GI tract.

- Inactivity
- Decreased GI motility
- Aerophagia
- Diet
- GI disorders

can all contribute to the amount of intestinal gas & the individual's gas-related symptoms. Gas in the upper GI tract results primarily from swallowing air and, to a lesser degree, from chemical reactions that occur during the digestion of foods. High N_2 & O_2 in rectal gas result from aerophagia. Increased amoiunts of H_2 & CO_2 (& sometimes CH_4) in rectal gas indicates excessive bacterial fermentation & suggests malabsorption of a fermentable substrate. When undigested carbohydrates pass into the colon, they are fermented, to varying degrees, to short-chain fatty acids & gases, primarily H_2, CO_2, and, in about 1/3 of individuals, methane.

4. What are several potential actions of fiber in the colon?
    - Forms a soft gel that slows passage of food through the intestinal tract.
    - Delays or inhibits absorption of dietary factors such as glucose & cholesterol.
    - Aids in regularity.
    - Guards against diverticulosis
    - May protect against colon cancer & gallstones
    - May counteract carcinogens in the intestinal tract.

5. Why would a pt. need a low fiber diet?

    The restricted-fiber diet is used when reduced fecal output is necessary, when the GI tract is restricted or obstructed, or when reduced fecal residue is required. Scarring & strictures may form after acute episodes of inflammatory bowel disease (IBD), severe cases of peptic ulcer, or GI surgeries. GI or abdominal tumors may also obstruct segments of the GI tract. Because fiber is not digested to any significant degree, both the amount & size of fibrous material must usually be controlled in these instances.

6. What is the difference between residue and fiber? Are the diets the same or different? How?

    Dietary fiber is that portion of food that comes largely from plant cell walls and that is not readily digested by enzymes in the human digestive tract (includes both water-soluble & water-soluble fractions). Residue refers to the amount of net fecal mass remaining after the processing of food ingestion & GI secretion, absorption & fermentation. Low-residue diet is typically used in pts with maldigestion, malabsorption or diarrhea, & is designed to include foods that are likely to be completely digested & well-absorbed & that will not unduly increase GI secretions. Limit lactose (in those with lactase deficiency), fiber resistant starch, sorbitol, mannitol & xylitol, fructose, sucrose, caffeine, & alcohol.

7. What is the role of diet in the prevalence of diseases of the colon?

    A high-fiber diet can be used in the prevention or treatment of various GI, cardiovascular, & metabolic diseases & conditions including diverticular disease, cancer of the colon, DM, endometrial cancer, constipation, IBS, Crohn's disease, hypercholesterolemia, & obesity. Increased fiber intake should come from a variety of food sources. Adequate water is needed -- 2 L/d.

8. What type of MNT recommendations are for someone with irritable bowel disease?

    The two major forms of Inflammatory Bowel Disease (IBD) are Crohn's disease and ulcerative colitis. In each case, the cause is unknown, but they likely involve viralor bacterial interactions with immune cells lining the mucosal wall of the intestinal tract. Food intolerances of various types occur more than twice as often in persons with IBD than in the rest of the population.In IBD, either the regulatory mechanisms are defective or the factors stimulating the immune and acute-phase response are enhanced, leading to tissue fibrosis and destruction. The clinical course of the disease may be mild and episodic, or severe and unremitting. Persons with IBD are at risk for several forms of malnutrition, and nutrition is a major consideration in each stage of the disease. The goals of treatment in IBD are to induce and maintain remission and to maintain

nutritional status. Medical treatment is with corticosteroids, anti-inflammatory agents, immunosuppresive agents, and antibiotics. MNT: at lease in theory, use of low-residue, low-fiber liquid diets may decrease the antigenic load or reduce microbial populations in the colon. "Bowel rest" with parenteral nutrition is not a major requirement for achieving remission; enteral nutrition is the preferred means of nutritional support. Energy needs are not greatly increased, unless wt. gain is desired, but protein req. may be increased by 50%, especially during active stages of the disease. Supplemental vitamins and minerals may e needed because of avoidance of foods or certain food groups, malabsorption, or to correct drug-nutrient interactions. During acute stages of the disease, the diet is tailored to the pt. A minimal-residue diet may be effective for reducing diarrhea, whereas a diet that limits whole fibrous foods might be used when attempting to prevent obstructive symptoms. Small, frequent feedings may be tolerated better than large meals, and small amounts of isotonic, liquid, oral supplements may be valuable in restoring intake without provoking symptoms. In cases in which fat malabsorption is likely, supplements or foods made with MCTs may be valuable in adding calories and serving as a vehicle for fat-soluble nutrients. Pts can be taught to manage their disease by selecting appropriate foods and beverages. Restrict foods during bouts of diarrhea. Limit fiber if partial obstruction is suspected. Increase omeaga-3 f.a's. to benefit from their anti-inflammatory effect, using supplements appropriately.

IBS, unlike IBD, is not life-threatening & does not result in maldigestion or malabsorption of nutrients. MNT: ensure adequate nutrient intake, guide the pt toward a diet not likely to contribute to symptoms & to explain the role of ordinary dietary practices in producing or avoiding GI symptoms. A normal diet is recommended, with emphasis on high fiber foods that will add bulk to the stool, thus relieving the constricting pressure & promoting normal bowel motility. Additional fiber in the form of bulk laxatives may be needed. Also drink plenty of water and avoid excess fat, caffeine, sugars, & alcohol.