Microbiology/Infectious Diseases I

II. GI Bacterial Infections
Case studies

Case 1

- **History:**

The patient was a 4-year-old male who presented to the emergency room with a 2-hour history of vomiting, diarrhea, fever, and lethargy. His grandmother found him on the floor at 3 a.m. covered with feces. The patient's medical history was significant for his participation in group day care. In the emergency room, he had two episodes of vomiting.

- **Physical Examination:.**

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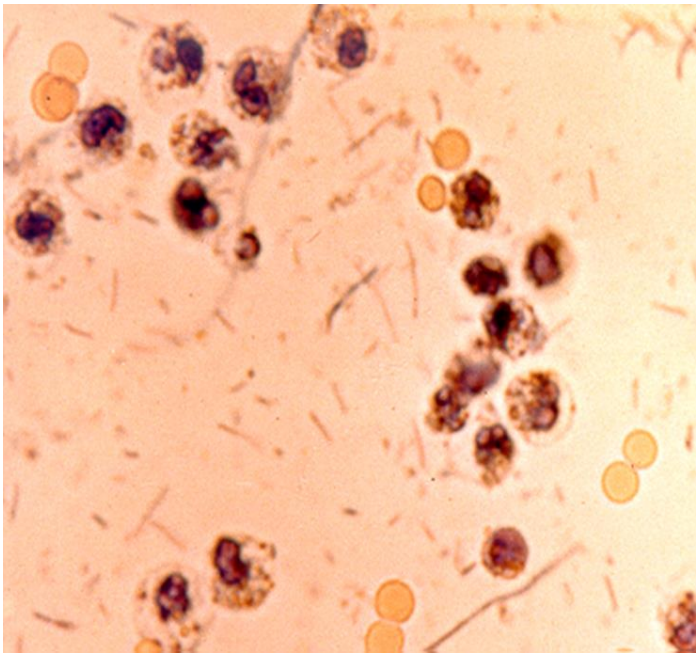
- He had a temperature of 38.9^{o}C, pulse rate of 160 beats/min, and respiratory rate of 36/min, and he was dehydrated.

- **Laboratory:**

- Because his stool contained bloody streaks, a methylene blue stain of his feces was obtained.



- Other laboratory studies included a cerebrospinal fluid examination, which was within normal limits (done because of his lethargy); a peripheral white blood cell count of 16,200/µl with 85% neutrophils (both elevated); a negative blood culture; and a negative stool examination for ova and parasites. His stool was cultured on a MacConkey agar plate (specimen streaked on the right side with E. coli control on the left).
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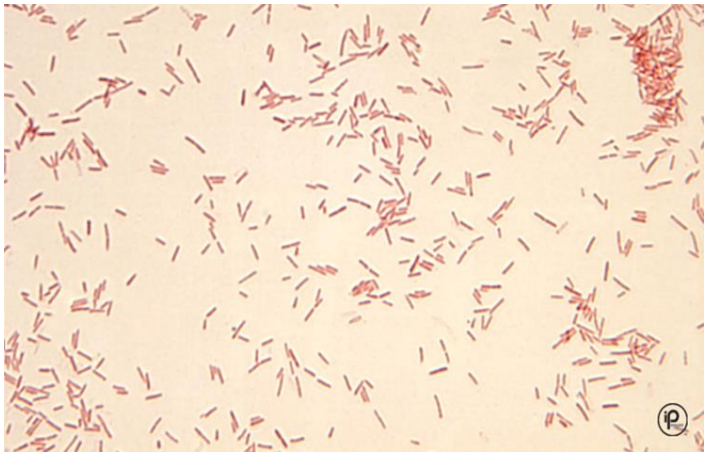
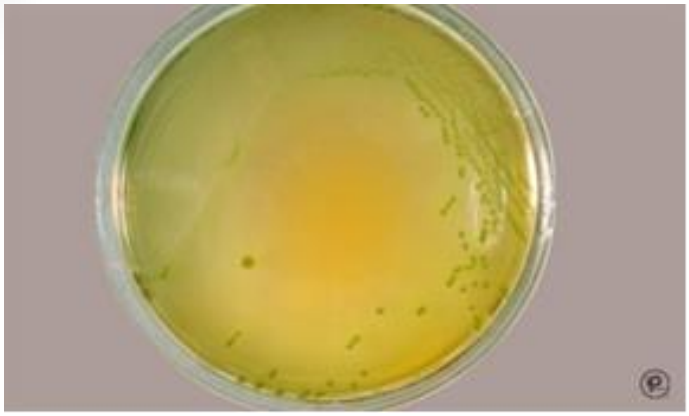
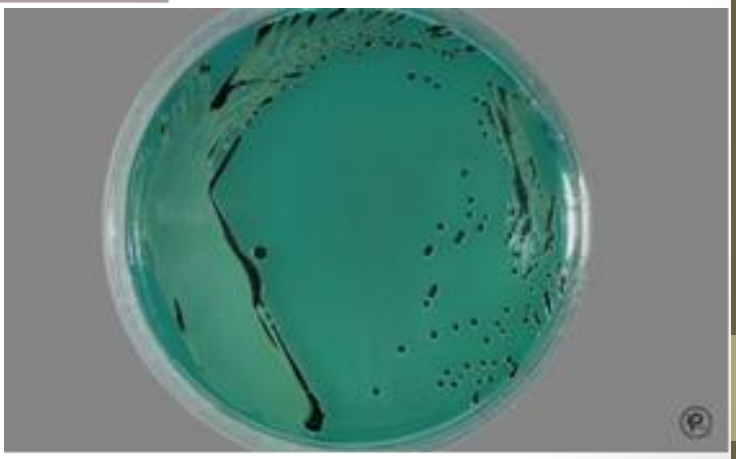
Gram stain of the organism shown above ■

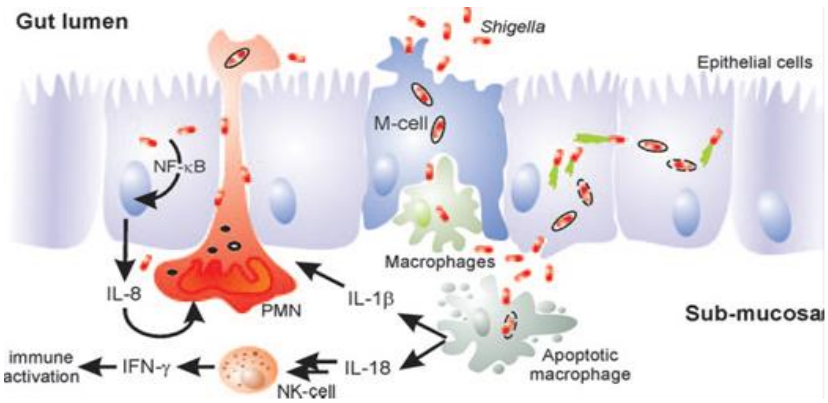


- 1) Given his clinical picture, what bacterial pathogens are likely in this patient?
- 2) Additional characterization of the organism included:
- Hektoen Enteric agar showing white/green colonies. (Fig. 3)





- 3) What organism is likely causing his illness?
- 4) How does the pathogenesis of this organism account for the gastrointestinal symptoms.



- 5) What factors contributed to his lethargy?
- 6) What would be the appropriate treatment strategy for this child?
- 7) Describe the epidemiology of this organism. What was the significance of his being in group day care? What special characteristics of this organism lead to its spread?
- 8) Was it surprising that this patient had a negative blood culture? Explain.

Case 2

- **History**: Mr. P, a 70 year old man with a history of coronary artery disease and leukemia, presents to the Emergency Department with fever, abdominal pain and diarrhea, and you'll meet him later in the course. He was recently diagnosed with bronchitis, for which he is receiving levofloxacin (currently day 4 of 7). He was improving on the antibiotic until he had a sudden onset of watery diarrhea (>6 times in the preceding 24 hours), which is showing bright red blood. He also has significant diffuse abdominal pain, with bloating. He denies vomiting. He reports feeling feverish, but he has not taken his temperature at home.

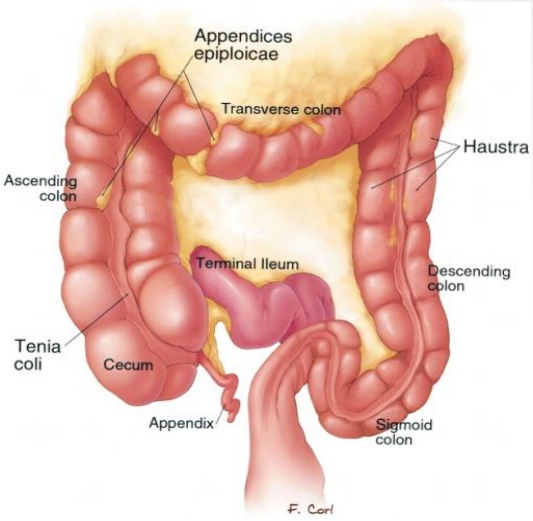
- **Physical Examination:** He has fever to 39.1° C, HR 115 bpm (elevated), RR 17 bpm (normal), BP 110/84. He is ill appearing, with mild distress. He has normal head and neck, cardiac, respiratory examinations. His abdominal examination reveals a mildly distended abdomen. There are diminished bowel sounds, but they are present. There is moderate tenderness to palpation diffusely. There are neither masses nor detectable hepatosplenomegaly. The rest of his examination is grossly normal.

- **Laboratory Studies:** from the ED

WBC: 17.7 k/mm^3 (78% neutrophils), both elevated

Albumin: 2.2 mg/dL (low), otherwise a comprehensive metabolic panel was normal.

Abdominal radiograph



Dilated transverse colon with haustral thickening, suggestive of colitis. Haustra are the small pouches created by the tenia coli (which runs the length of the colon, but is shorter than the overall length of the colon), along with circular muscles. On the radiograph, you can see the thickened walls that make up the pouches, suggesting inflammation in the walls.

1. What is on the differential diagnosis for the cause of the patient's fever and diarrhea?

2. What tests and/or procedures would you order?

- Diagnostic Testing and Procedure:

A toxin test was positive.

The patient was taken for colonoscopy, which revealed 2- to 5-mm, raised, yellowish plagues colonic mucosa and pearly gray pseudomembranes.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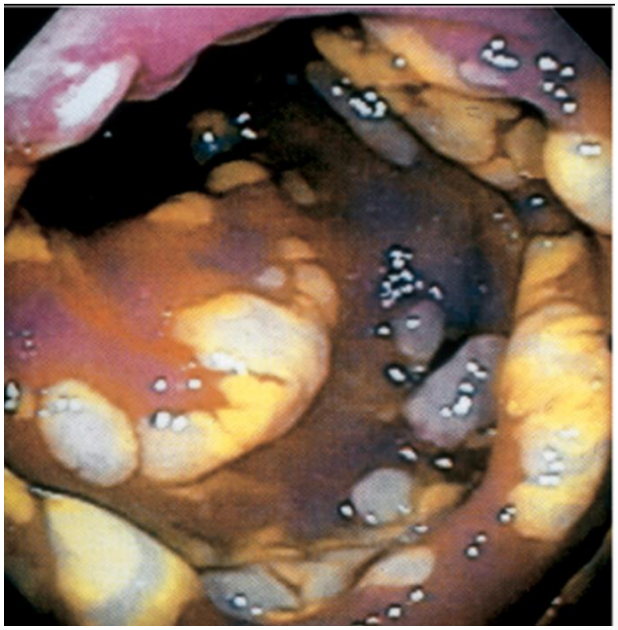

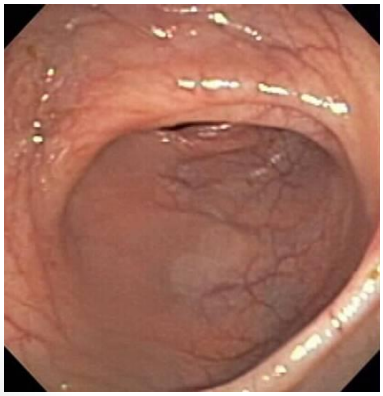

Diagnosis?

3. How would you characterize this patient's disease (mild, moderate or severe)?

4. What is it about the patient that puts him at risk for severe disease, if that is what he has?

5. How would you treat this patient?

Case 3

The following questions relate to the the assigned reading (German outbreak of Escherichia coli O104:H4 associated with sprouts. Buchholz U,et al.*N Engl J Med*. 2011 365:1763-70.PMID: 22029753

http://www.nejm.org/doi/full/10.1056/NEJMoa1106482

- 1. Describe the major clinical features of Hemolytic-Uremic Syndrome (HUS).
- 2. What are the key observations and public health system attributes that contribute to the triggering of an outbreak investigation as occurred here?
- 3. HUS is usually associated with *E. coli* O157:H7 rather than *E. coli* O104:H4. From what you know about the pathogenesis of HUS explain how the disease might have arisen in *E. coli* O104:H4 isolates.
- 4. Discuss the treatment and prevention of enterohemorrhagic *E. coli* infection. Why are certain foods such as sprouts particularly problematic as a source of food contamination from enteric pathogens?