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CENTER FOR DISEASE PREVENTION & EPIDEMIOLOGY • OREGON HEALTH DIVISION

FOODBORNE DISEASE: AN EXTRA SHORT PRIMER FOR PHYSICIANS

Acute enteric disease often results from the consumption of contaminated food or water. Although sometimes mild and usually self-limiting, foodborne diseases often bestir people to medical attention. As front-line soldiers in the war on disease, primary care and emergency room physicians are often the first professionals to hear these tales of woe. And while their focus is understandably on offering succor to their patients qua individuals, clinicians should remain alert to the potential for problems that may affect other household members or members of the larger community. This issue is intended to provide a sketchy overview of foodborne illness, and of how clinicians can work with public health agencies on combatting these larger problems. A comprehensive review of this enormous topic would obviously take more space than we have here; for a more complete review, albeit one 69 pages long, we recommend a recent monograph prepared and published jointly by the CDC, the AMA, the FDA, and the USDA; it was published at least in JAMA and in an MMWR supplement. The complete text of that review—which includes a CME-eligible self-test, is available on-line at *http://www.cdc.gov/mmwr/PDF/rr/rr5002.pdf*.

DIFFERENTIAL DIAGNOSIS

Differentiating foodborne disease from other GI tract illness is difficult when patients have chronic diarrhea, severe abdominal pain or underlying chronic conditions. Foodborne disease should be included in the differential diagnosis, however, when a patient has any combination of the following typical symptoms, especially when they are accompanied by fever: severe abdominal pain, nausea, vomiting, or diarrhea (especially bloody diarrhea, diarrhea leading to dehydration or diarrhea lasting several days).*

Although illnesses caused by foodborne pathogens can be loosely categorized by clinical presentation, the syndromes overlap considerably (Table, *verso*), and a clinician seeing one or two patients from an outbreak can only hazard an unreliable guess as to the offending agent. Patients with these symptoms should be asked about whether (and when) they ate raw or poorly cooked eggs, meats, or shellfish or any unpasteurized milk or juice. It is perhaps most important to ask whether family members or other close contacts are sick with similar symptoms.

REPORTING FOODBORNE DISEASE

The combination of typical symptoms, the consumption of a classic outbreak-associated food usually (but not always) within 72 hours of symptom onset, and similar illness in close contacts suggests a foodborne disease outbreak, and should prompt both an immediate call to public health officials and collection of clinical specimens for laboratory analysis.

It is not necessary to wait for laboratory confirmation before reporting it to the local health department (LHD) in which the patient lives. LHD telephone numbers are in the blue (government) pages of your local telephone directory, on the back of the OHD Disease Reporting poster hanging prominently in your office, and on the Internet at *http: //www.ohd.hr.state.or.us/acd/disrpt. htm*. If you can't reach the LHD, call the OHD epidemiologist on call for the day (503/731-4024) or after-hours (503/731-4030). An investigation will begin promptly.

CLINICAL MICROBIOLOGY TESTING

Stool cultures are indicated if the patient is immunocompromised, febrile, has bloody diarrhea, or has severe abdominal pain, or if the illness is clinically severe or persistent. Stool cultures are also indicated when many fecal leukocytes are present, since they indicate diffuse colonic inflammation and suggest invasion by bacterial pathogens such as *Shigella*, *Salmonella*, *Campylobacter* or *E. coli*. Fifty-six clinical labs licensed to do moderate-to-high-complexity microbiology (of which there are only 122 in Oregon) usually test routinely for *Salmonella*, *Shigella* and *Campylobacter;* 82% screen for *E. coli O157. Yersinia* and *Vibrio* is generally done only upon physician request. The Oregon State Public Health Laboratory will test stool specimens for Norwalk and other enteric viruses during foodborne disease outbreaks. The *Primer* has agent-specific laboratory testing guidelines.

TREATING FOODBORNE DISEASE

Empiric antimicrobial therapy for domestically acquired acute gastrointestinal illness is almost never necessary, and may be a bad idea. Enteric viruses don't respond to antibiotics, of course. *Shigella* have high rates of antimicrobial resistance; treating *E. coli* O157 with antibiotics increases the risk of hemolytic uremic syndrome; and treating salmonellosis can prolong carriage of the microbe.

Most episodes of acute gastrointestinal illness are self-limited and require only fluid replacement and supportive care. Oral rehydration is indicated for patients who are mildly to moderately dehydrated; intravenous therapy may be required for more severe dehydration. Because many *antidiarrheal agents* have potentially serious adverse effects in infants and young children, their routine use is not recommended in this age group. For patients with a confirmed pathogen, the *Primer* has agent-specific therapeutic guidelines.

* Forget not that illnesses that may be foodborne are often spread by other means, e.g., person to person.

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Etiologic agents to consider for various manifestations of food-borne illness

Clinical Presentation	Potential Food-Related Agents to Consider
Gastroenteritis (vomiting as primary symptom; diarrhea also may be present)	Viral gastroenteritis, most commonly rotavirus in an infant or Norwalk-like virus in an older child or adult; or food poisoning due to preformed toxins (e.g. vomitoxin, *Staphylococcus aureus* toxin, *Bacillus cereus* toxin) and heavy metals.
Noninflammatory diarrhea (acute watery diarrhea without fever/dysentery; some cases may present with fever)*	Can be caused by virtually all enteric pathogens (bacterial, viral, parasitic) but is a classic symptom of: Enterotoxigenic *E. coli* *Vibrio cholerae* Enteric viruses (astroviruses, caliciviruses, enteric adenovirus, rotavirus) *Cryptosporidium parvum* *Cyclospora cayetanensis*
Inflammatory diarrhea (invasive gastroenteritis; grossly bloody stool and fever may be present)†	*Shigella* species *Campylobacter* species *Salmonella* species Enteroinvasive *E. coli* Enterohemorrhagic *E. coli* *Vibrio parahemolyticus* *Entamoeba histolytica* *Yersinia enterocolitica*
Persistent diarrhea (lasting ≥14 days)	Prolonged illness should prompt examination for parasites, particularly in travelers to mountainous or other areas where untreated water is consumed. Consider *Cyclospora cayetanensis, Cryptosporidium parvum, Entamoeba histolytica*, and *Giardia lamblia.*
Neurologic manifestations (e.g. paresthesias, respiratory depression, bronchospasm)	Botulism (*Clostridium botulinum* toxin) Organophosphate pesticides Thallium poisoning Scombroid fish poisoning (histamine, saurine) Ciguatera fish poisoning (ciguatoxin) Tetrodon fish poisoning (tetrodotoxin) Neurotoxic shellfish poisoning (brevitoxin) Paralytic shellfish poisoning (saxitoxin) Amnesic shellfish poisoning (domoic acid) Mushroom poisoning Guillain-Barré Syndrome (associated with infectious diarrhea due to *C. jejuni*)
Systemic illness	*Listeria monocytogenes* *Brucella species* *Trichinella spiralis* *Toxoplasma gondii* *Vibrio vulnificus* Hepatitis A virus

* Noninflammatory diarrhea is characterized by mucosal hypersecretion or decreased absorption without mucosal destruction and generally involves the small intestine. Some affected patients may be dehydrated because of severe watery diarrhea and may appear seriously ill. This is more common in the young and the elderly. Most patients experience minimal dehydration and appear mildly ill with scant physical findings. Illness typically occurs with abrupt onset and brief duration. Fever and systemic symptoms usually are absent (except for symptoms related directly to intestinal fluid loss).

† Inflammatory diarrhea is characterized by mucosal invasion with resulting inflammation and is caused by invasive or cytotoxigenic microbial pathogens. The diarrheal illness usually involves the large intestine and may be associated with fever, abdominal pain and tenderness, headache, nausea, vomiting, malaise, and myalgia. Stools may be bloody and may contain many fecal leukocytes.

PREVENTING FOODBORNE DISEASE

Patients with diarrheal illness, especially children, should be told to wash their hands carefully and frequently with soap and water to reduce the risk of spreading the causative agent. Advise patients to prepare and store food properly, and to wash their hands. In outbreaks reported to CDC, the most common food-handling error is storage of food at inadequate temperatures. Most bacterial pathogens proliferate in food at temperatures ranging from 40°F to 140°F; growth may be prevented if cold food is adequately refrigerated and hot food is held at temperatures higher than 140°F before serving. Care in handling and cooking raw poultry, beef, pork, shellfish and eggs is especially important, as is hand washing. Patients should likewise be advised to avoid drinking unpasteurized milk and juice, and to wash their hands. Counseling is especially important for patients with HIV infection and other types of immunosuppression, for pregnant women, for children and the elderly and for those with chronic medical conditions. Before they get sick.

REFERENCE

CDC. Diagnosis and management of foodborne illnesses: a primer for physicians. MMWR 2001;50(RR-2):1–69; *http://www.cdc.gov/mmwr/PDF/rr/rr5002.pdf*.