

OREGON PUBLIC HEALTH DIVISION • DEPARTMENT OF HUMAN SERVICES

FOODBORNE DISEASE: PHYSICIAN PRIMER

The past 12 months have seen several high-profile foodborne disease outbreaks — of infection by *Salmonella* Saintpaul (jalapeño peppers), *Salmonella* Typhimurium (peanut butter), and *Escherichia coli* O157 (cookie dough), to name three. Although sometimes mild and usually self-limiting, foodborne diseases can bestir people to seek medical attention; and as front-line soldiers in the war on disease, physicians are often the first professionals to hear their tales of woe. And while their focus is understandably on offering succor to their patients qua individuals, clinicians should remain alert to illnesses that may affect other members of the household or the larger community. In particular, clinicians should alert public health immediately if they suspect that a patient's gastroenteritis is the result of eating in a restaurant or a commercially distributed product.

This issue provides an overview of foodborne illness, and of how clinicians can work with public health agencies to fight it. A comprehensive review of this enormous topic would take more space than we have here; for a 33-page review, see "Diagnosis and management of foodborne illnesses: A primer for physicians," the 2004 monograph prepared by the CDC, the AMA, the FDA, and the USDA. The complete text of that review includes a CME-eligible self-test and is available at www.cdc.gov/mmwr/PDF/rr/rr5304.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 an acute illness with any combination of the following symptoms, especially when 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 any of the riskier foods classically associated with enteric pathogens: raw or poorly cooked eggs (*Salmonella* Enteritidis), shellfish (*Vibrio parahaemolyticus*, norovirus) or meat (*Salmonella*, *E. coli* O157); or unpasteurized juice (O157, *Salmonella*, *Cryptosporidium*) or milk (TNTC). Also 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 within several days of symptom onset, and similar illness temporally clustered 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 a cluster of illness to the local health department (LHD) for the county in which the patient lives. LHD telephone numbers are in the government pages of your local telephone directory, on the back of the Oregon Public Health Division (OPHD) disease reporting poster hanging prominently in your office, and at www.oregon.gov/DHS/ph/lhd/lhd.shtml. If you can't reach the LHD, call the OPHD epidemiologist on call (971-673-1111). 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 colonic inflammation, which suggests invasion by bacterial pathogens like *Shigella*, *Salmonella*, or *Campylobacter*. Virtually all of the clinical labs that test stools in Oregon will test routinely for *Salmonella*, *Shigella* and *Campylobacter*, and most screen for *E. coli* O157. Special testing for *Yersinia* or *Vibrio* is generally performed only upon physician request. The Oregon State Public Health Laboratory will test stool specimens for norovirus and other enteric pathogens during recognized outbreaks. The Primer has agent-specific laboratory testing guidelines.

TREATING FOODBORNE DISEASE

Empiric antimicrobial therapy for domestically acquired acute gastroenteritis is almost never worthwhile, and may be a bad idea. Enteric viruses don't respond to antibiotics, of course. *Shigellae* have high rates of antimicrobial resistance; treating *E. coli* O157 with antibiotics may increase the risk of hemolytic uremic syndrome; and treating salmonellosis can, paradoxically, 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 anti-diarrheal 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.

PREVENTING FOODBORNE DISEASE

Patients with diarrheal illness, especially children, should be admonished



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to wash their hands carefully and frequently with soap and water to reduce the risk of spreading the causative agent. 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 between 40°F and 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.

REFERENCE

1. CDC. Diagnosis and management of foodborne illnesses: A primer for physicians. *MMWR* 2004;53(RR-4):1–33; www.cdc.gov/mmwr/PDF/rr/rr5002.pdf.

Etiologic agents to consider for various manifestations of foodborne illness

Clinical presentation	Potential food-related agents to consider
Gastroenteritis (vomiting as primary symptom; fever and diarrhea also may be present)	Viral gastroenteritis, most commonly rotavirus in infants, norovirus or other caliciviruses in older children and adults; or food poisoning due to preformed toxins (eg, vomitoxin, <i>Staphylococcus aureus</i> toxin, <i>Bacillus cereus</i> toxin) and heavy metals.
Noninflammatory diarrhea (acute watery diarrhea without fever; some patients may present with fever)*	Virtually any enteric pathogen (bacterial, viral, parasitic); classically, enterotoxigenic <i>Escherichia coli</i> , <i>Giardia</i> , <i>Vibrio cholerae</i> ; enteric viruses (astroviruses, noroviruses and other caliciviruses, enteric adenovirus, rotavirus); <i>Cryptosporidium</i> ; <i>Cyclospora cayetanensis</i> .
Inflammatory diarrhea (invasive gastroenteritis; grossly bloody stool and fever may be present)†	<i>Shigella</i> species, <i>Campylobacter</i> species, <i>Salmonella</i> species, enteroinvasive <i>E. coli</i> , enterohemorrhagic <i>E. coli</i> , including O157:H7, <i>Vibrio parahaemolyticus</i> , <i>Yersinia enterocolitica</i> , <i>Entamoeba histolytica</i> .
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 <i>Cyclospora cayetanensis</i> , <i>Cryptosporidium</i> , and <i>Giardia intestinalis</i> .
Neurologic manifestations (eg, paresthesias, respiratory depression, bronchospasm, cranial nerve palsies)	Botulism (<i>Clostridium botulinum</i> toxin), organophosphate pesticides, thallium poisoning, scombroid fish poisoning (histamine, saurine), ciguatera fish poisoning (ciguatoxin), fugu (tetrodotoxin), neurotoxic shellfish poisoning (brevetoxin), paralytic shellfish poisoning (saxitoxin), amnesic shellfish poisoning (domoic acid), mushroom poisoning, Guillain-Barré syndrome (associated with infectious diarrhea due to <i>Campylobacter jejuni</i>).
Systemic illness (e.g., fever, weakness, arthritis, jaundice)	<i>Listeria monocytogenes</i> , <i>Brucella</i> species, <i>Trichinella spiralis</i> , <i>Toxoplasma gondii</i> , <i>Vibrio vulnificus</i> , hepatitis A and E viruses, <i>Salmonella</i> Typhi and <i>Salmonella</i> Paratyphi, amebic liver abscess.

* 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 cytotoxic 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.