



***E. coli* O157:H7 and the Spinach Scare**

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What is *E. coli* O157:H7?

O157:H7 is a strain of the common bacterium *Escherichia coli*. This strain was first recognized to cause human illness in 1982, when it was ingested via contaminated hamburgers. As illnesses caused by it increase, from the public-health perspective it is considered to be an emerging foodborne pathogen. Each year, *E. coli* O157:H7 causes an estimated 73,000 cases of infection, 2,100 hospitalizations, and 61 deaths in the USA. Although found in the intestines of healthy, live animals, *E. coli* O157:H7 does not cause sickness in animals.

What does it cause?

E. coli O157:H7 causes foodborne illness that is also called hemorrhagic colitis. Symptoms range from none to mild (nonbloody diarrhea, little or no fever) to severe (watery, then bloody diarrhea; severe abdominal cramps). Most people with mild symptoms recover without treatment in 5–10 days.

E. coli O157:H7 produces a toxin that plays a role in hemolytic uremic syndrome (HUS), in which red blood cells are destroyed and the kidneys fail. HUS is the principal cause of acute kidney failure in children in the USA, and most cases of HUS are caused by *E. coli* O157:H7. About 2–7 percent of all *E. coli* O157:H7 cases lead to HUS, and the death rate from HUS is about 3–5 percent.

Who's at risk?

- Everyone is at risk.
- The very young, the elderly, and those with immunocompromised systems appear to have more serious symptoms more frequently.

Which foods have been infected?

- undercooked hamburgers (ground beef should be cooked to at least 160°F in the center to be safe)
- unpasteurized apple and orange juice

- unpasteurized milk and cheese curds
- alfalfa sprouts
- dry-cured salami
- game meat
- lettuce and spinach
- water (swimming in or drinking sewage-contaminated water)

How is *E. coli* O157:H7 spread?

- **Via food:** 85 percent of reported cases are foodborne. This is a veterinary organism that can be spread to the carcass and processing equipment during slaughter. Raw milk may be contaminated from the cow's udders. But since *E. coli* O157:H7 is very easy to kill (cooking at 160°F is enough), meat and milk are safe when properly heat-treated or cooked.
- **Person-to-person transmission:** people can spread it if they don't wash their hands properly after using the toilet—this is especially a risk in day-care centers, nursing homes, and hospitals.
- **Fecal-oral route:** Eating or drinking contaminated food or water; e.g., fruit that has fallen to the ground where animal droppings are present and is then eaten.
- **Animal-to-human transmission:** e.g., touching contaminated animals in petting zoos, then not washing hands thoroughly before touching food.

How is *E. coli* O157:H7 infection diagnosed?

The bacterium is detected in the stool.

How is *E. coli* O157:H7 infection treated?

- Those with only diarrhea usually recover without treatment in 5–10 days.
- Some antibiotics are thought to precipitate kidney complications and should be avoided.
- Antidiarrheal agents should also be avoided.

Intensive care is required if HUS is detected. Blood transfusions and kidney dialysis are often needed. A third of people infected have abnormal kidney functions for many years, and a few require long-term dialysis. Eight percent will have lifelong complications (e.g., high blood pressure, seizures, blindness, paralysis).

How is the risk of infection minimized or prevented?

- Keep raw meat separate from cooked meats from the store to the refrigerator and through all stages of food preparation.
- Wash your hands and food-contact surfaces thoroughly after touching raw meats.
- Cook all ground beef to at least 160°F so that the meat and juices are no longer pink.
- Drink only milk, juice, or cider that has been pasteurized.
- Wash fruits and vegetables thoroughly, especially those that are served uncooked.
- Those with immunocompromised systems (the very young, elderly, sick, with AIDS, undergoing chemotherapy) should avoid eating alfalfa sprouts.
- Drink only water that has been treated with chlorine or other disinfectants.
- Avoid swallowing lake or pool water while swimming.
- Wash your hands thoroughly with hot, soapy water after using the toilet or changing diapers. Teach children how to wash their hands properly.

From what we know today, disease-causing bacteria such as *Salmonella*, *Campylobacter jejuni*, *Vibrio cholerae*, and *E. coli* O157:H7 are more likely found in fresh produce due to contamination through raw or improperly composted manure, irrigation water containing untreated sewage, and contaminated wash water.

Treating produce with chlorinated water reduces the pathogen population but does not eliminate them. Risk from human infection can be further reduced by controlling points of potential contamination in the field, during harvesting, during processing or distribution in retail markets, and in foodservice facilities and the home.

Remember that when we prepare and serve food, we bear the final responsibility for the safety of that food. Therefore, we must be conscious of how contamination can occur and what we must do to avoid it. *Be aware of your hand hygiene!*

What is the latest FDA advice on spinach?

On September 29, 2006, FDA announced that all spinach implicated in this outbreak had been traced to Natural Selection Foods LLC of San Juan Bautista, California. Natural Selection Foods recalled all spinach products, under multiple brand names, with a date code of October 1 or earlier. Spinach processed by manufacturers other than Natural Selection Foods LLC and grown in states other than California has not been implicated in the current outbreak. Frozen, canned, and other processed (cooked) spinach products were also not implicated in the outbreak. No other type of leafy greens has been implicated.

The updated FDA consumer advisory is to not eat raw spinach or spinach blends that were subject to any of the recalls. Consumers are further advised to store fresh fruits and vegetables, including pre-cut or peeled, in a clean refrigerator at a temperature of 40°F or less.

FDA advises retailers and restaurateurs not to sell or serve raw spinach or spinach blends subject to the Natural Selection Foods LLC voluntary recall and other associated recalls.

What does this mean for Hawaii?

As of this date, no foodborne illness due to *E. coli* O157:H7 has been reported in Hawaii. As a precautionary measure, however, bagged fresh spinach and fresh spinach-containing products were pulled off Hawaii supermarket shelves and menus after the FDA nationwide warning during the week of Sept. 18.

FDA continues its investigation. FDA's Dr. Robert Buchanan has advised that elevated levels of microorganisms are found on fresh leafy greens because of their large surface area. Bacteria tend to accumulate in cut surfaces and certain areas of the plant, so that leafy greens can support the growth of disease-causing microorganisms, such as *E. coli* O157:H7. Dr. Buchanan asks consumers to be aware that although washing fresh produce helps in reducing pathogen levels, the effect of washing is limited if the pathogens have infiltrated fresh produce (referred to as internalized contamination) through the root system or during flowering, as some studies suggest can occur during harvesting and processing. FDA continues to work with the research community and the industry to find solutions to this public health concern so that consumers can confidently consume fresh leafy greens as part of a healthy diet.

Results from these studies suggest that it is critical that consumers buy their fresh produce from reliable sources.

Resources

<http://www.foodhaccp.com/online.html> (accessed Nov. 2, 2006)

<http://www.fda.gov/bbs/topics/NEWS/2006/NEW01464.html> (accessed September 24, 2006)

<http://www.cdc.gov/foodborne/ecolispinach>

<http://www.cfsan.fda.gov/~news/whatsnew.html>
(accessed Oct. 4, 2006)

http://www.cdc.gov/NCIDOD/DBMD/diseaseinfo/escherichiacoli_g.htm <http://www.about-ecoli.com>

(Sites accessed Sept. 18, 2006, unless noted.)