

# Foodborne Illnesses

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**Definition:** A foodborne illness is an infection or intoxication caused by a bacterial, viral, parasitic, or chemical agent transmitted by a food. This definition primarily includes outbreaks (two or more cases from a common source), but data on single cases of enteric pathogens (*Salmonella* spp., *Campylobacter* spp., and *E. coli* O157:H7), which are primarily foodborne, are also included. More than 250 different foodborne disease pathogens have been identified.

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## Summary

**Several state and federal agencies—including the Washington State Department of Health and the U.S. Centers for Disease Control and Prevention—monitor foodborne illnesses. The number of identified foodborne illness outbreaks increased in Washington State during 1993 and 1994, largely due to a major *E. coli* O157:H7 outbreak in January 1993 that raised public awareness. Since 1995 the number of reported outbreaks has dropped.**

**In each of the past five years an average of 57 foodborne illness outbreaks has occurred. These outbreaks involved an average of 650 sick people a year in Washington State.**

**Foodborne illness is a significant public health issue. Nationally, thousands of cases of illness occur each year that are unrelated to the reported outbreaks.**

**Improper food handling is the single most important cause of foodborne illnesses.**

## Introduction

Although the U.S. food supply is among the safest in the world, foodborne illnesses and large foodborne illness outbreaks still occur. Based on a widely accepted report on the burden of foodborne illnesses nationally, 65 million Americans are affected by foodborne illness annually, with many causing [hospitalizations](#) and deaths.<sup>1,2</sup> Most foodborne illnesses are single cases or are part of small diffuse outbreaks that never get reported as foodborne illness or as part of an outbreak. A foodborne illness outbreak is defined as two or

more people who became ill because they ate the same food.

Washington State has one of the most aggressive foodborne illness investigation systems in the country. While the surveillance system itself is passive, once outbreaks are reported, they are proactively investigated. Outbreaks of suspected foodborne diseases are a notifiable condition in Washington. Health care providers and hospitals are required to report outbreaks to local health jurisdictions, but affected people can also report their illnesses. Local health jurisdictions typically investigate outbreaks. Laboratory analysis of food and patient samples is the method most often used to confirm the presence of foodborne illness, but not all foodborne illnesses are laboratory-confirmed. The local health jurisdictions report results to the Washington State Department of Health, which reports cases and outbreaks to the U.S. Centers for Disease Control and Prevention (CDC). Washington is one of several states and territories that routinely investigate and report foodborne illnesses.<sup>3</sup> To date, there is no centralized database set up to track foodborne disease outbreak data in Washington State. Lack of a database limits the understanding of which people and regions are at the highest risk from foodborne illnesses.

Ensuring food safety involves monitoring from “farm to table.” In Washington, the state Department of Agriculture works with the U.S. Food and Drug Administration and the U.S. Department of Agriculture to monitor food production safety. The state Board of Health adopts retail food service rules, and the Department of Health Food Safety Program and local health jurisdictions enforce them. The state departments of Health, Social and Health Services, and Early Learning also regulate food service in certain facilities and institutions. Organisms typically causing foodborne outbreaks include: *Campylobacter*, *Salmonella*, *E. coli* O157:H7, and Norwalk and Norwalk-like viruses.<sup>4</sup>

About 75% of reported foodborne outbreaks recorded during 2000–2005 involved restaurant food, and poultry was the most common food implicated. Improper food handling causes most foodborne illnesses. The table below shows the principal causes of foodborne illness in Washington. (Percentages add to more than 100% because most outbreaks have several causes.)

**Factors Contributing  
To Foodborne Illness Outbreaks  
Washington State, 2000–2005**

Contributing Factor	Percent of Outbreaks
Bare hand contact with food	33%
Food handler working when ill	22%
Slow cooling of foods	19%
Inadequate hand-washing	18%
Room temperature storage of foods	16%
Insufficient reheating of foods	14%
Cross contamination of foods	13%

**Description of Potential Indicators**

**Hazard indicators.** It is possible to identify potential hazards in food by sampling for the presence of pathogens. Federal agencies have periodically conducted large-scale sampling studies to assess the presence of *E. coli* and *Salmonella* in our food supply.<sup>5</sup> These agencies have also conducted smaller-scale sampling of other foods to determine the relative risk for other pathogens such as *Listeria monocytogenes*.<sup>6</sup>

Routine sampling studies could be conducted with enough dedicated laboratory support to enhance the ability to detect pathogens in food. Routine, large-scale food sampling on a state or local level, however, is not practical at this time because of the cost.

Food service establishments with poor inspection scores may indicate a greater risk of foodborne disease outbreaks. In fact, a study in Seattle-King County found this to be the case.<sup>7</sup> Local health jurisdictions are beginning to track the percentage of food establishments with 35 or more critical item violation points as one of the new local public health indicators in Washington State.

**Exposure indicators.** Monitoring reports of foodborne-related symptoms is an unreliable method for identifying outbreaks. During suspected outbreaks, stools are often tested for the presence of pathogens. But most people do not seek medical attention for gastrointestinal symptoms, and health care providers seldom request or submit patient cultures for laboratory analysis because of cost.

**Protective indicators.** Many in the food industry and public health agencies make routine efforts to prevent foodborne illness. Protective indicators, such as the frequency of inspections of food establishments, measure these efforts. No statewide data collection occurs at this time; therefore it is not possible to use food inspections as an indicator.

**Health outcome indicators.** The most commonly used health outcome indicator for foodborne illnesses is the number of reported outbreaks or the number of people with illnesses caused by foodborne outbreaks. The number of outbreaks is an indication of the risk posed to the general public. The number of people who become sick is also an indicator of risk, but this number is dependent on both how many outbreaks occur and how many people are sickened in each outbreak. People who have no access to health care are rarely counted in outbreaks even though they may often be at increased risk of suffering the effects of foodborne illness due to untreated health conditions. One outbreak that affects many individuals can greatly increase the number of reported outbreak-related foodborne cases in a year because of heightened disease awareness.

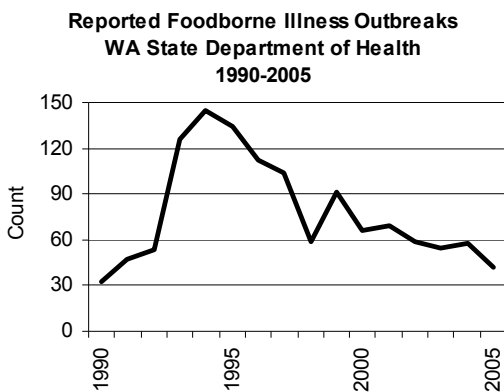
Several factors affect the accuracy of foodborne outbreak reports. Only a fraction of people who experience symptoms from foodborne illness seek medical care. Health care providers do not always report suspected cases to appropriate public health officials. Sometimes it is difficult to establish whether an outbreak is foodborne. Certain enteric pathogens (*Salmonella*, *Campylobacter*, *E. coli* O157:H7) are widely considered to be primarily foodborne. But these pathogens can also be transmitted by other means such as person-to-person contact or drinking contaminated water.

**Time Trends**

**Reported outbreaks and related cases.** Trends in foodborne illness outbreaks and foodborne illnesses in general depend both on the number of illnesses and awareness of foodborne illness. Before 1993,

about 30 to 60 foodborne illness outbreaks were reported each year. The number of identified foodborne illness outbreaks increased during 1990–1994, largely due to a major *E. coli* O157:H7 outbreak in January 1993 and subsequent increased awareness among the public and health care providers of the need to report possible outbreaks to local public health agencies. During 1995–2005, the number of reported outbreaks dropped. Current numbers are consistent with reporting levels prior to 1993.

It is difficult to track trends of individual cases of foodborne illness. The Department of Health tracks the annual confirmed cases of disease related to common foodborne pathogens (e.g., *Salmonella*, *Campylobacter*, *E. coli*, etc.), and the agency will begin tracking trends of these pathogens. But it is hard to be certain these illnesses are foodborne since they can be caused by other exposures. Washington's surveillance of foodborne illnesses, while better than most states, is limited due to a lack of a surveillance database and a decentralized case investigation system. Also, laboratory confirmation and reporting of illnesses from Norovirus, now considered the most common cause of foodborne illness nationally, is a relatively recent development, and trends won't be established for a few more years.



## Population Characteristics

Data are available on the demographic characteristics of most but not all individuals who experience foodborne illnesses. But without a surveillance database it is difficult to access this data. Certain groups of individuals are at a higher risk for developing more severe symptoms of foodborne illness. These include young children, the elderly, pregnant women, and people who are immuno-compromised. Safe

food-handling practices are critically important at facilities and institutions serving these high-risk groups.

## Year 2010 Goals

*Healthy People 2010* calls for a 50% reduction in the number of foodborne illness cases and foodborne illness outbreaks. This objective is difficult to address accurately. Reporting biases, such as an increased awareness of a recent large or serious foodborne illness outbreak, make it more likely that people will seek care and physicians or others will report an illness. Also, changes in outbreak investigation techniques make it difficult to compare numbers of reported outbreaks over time. For example, the number of reported outbreaks may rise, but the actual number of outbreaks may not.

## Intervention Strategies

Preventing foodborne illness is the responsibility of the food service industry, various regulatory agencies, and the general public. The principal methods to prevent and control foodborne illnesses are:

- Educating the public, food handlers, and food managers about the risk factors related to food safety
- Maintaining and improving the capacity at local and state health departments and at the federal level to investigate foodborne disease outbreaks
- Developing food safety regulations based on scientific data
- Conducting inspection and surveillance to enforce regulations
- Supporting communication among food safety agencies to avoid gaps and overlaps and to foster cooperation on food safety issues
- Providing prompt, coordinated response to food safety emergencies caused by floods, power outages, food product recalls, and tampering incidents.

**See Related Chapters:** [Shellfish Safety](#), [Emerging Infectious Diseases](#)

### Data Sources

Washington State Department of Health, Analysis of Foodborne Disease Outbreaks

Surveillance for Foodborne Disease Outbreaks—United States, 1993–1997, March 17, 2000, *Morbidity and Mortality Weekly Report* (MMWR)

## For More Information

Washington State Department of Health, Food Safety Program (360) 236-3385

<http://www.doh.wa.gov/ehp/sf/food/food.htm>

Fight Bac!: <http://www.fightbac.org/>

U.S. Centers for Disease Control and Prevention (CDC), Foodborne Illness, available at:

[http://www.cdc.gov/ncidod/dbmd/diseaseinfo/foodborneinfections\\_g.htm#howtreated](http://www.cdc.gov/ncidod/dbmd/diseaseinfo/foodborneinfections_g.htm#howtreated)

CDC Food Safety Office:

<http://www.cdc.gov/foodsafety>

U.S. Department of Agriculture: <http://www.usda.gov/>

U.S. Food and Drug Administration:

<http://www.fda.gov/>

Washington State Department of Agriculture:

<http://www.wa.gov/agr>

Washington State University Cooperative Extension-Food Safety: <http://www.foodsafety.wsu.edu/>

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<sup>7</sup> Irwin, K., Ballard, J., Grendon, J., & Kobayashi, J. (1989). Results of routine restaurant inspections can predict outbreaks of foodborne illness: the Seattle-King County experience. *American Journal of Public Health, 79*(5), 586-590. Retrieved March 27, 2008 from <http://www.ajph.org/cgi/content/abstract/79/5/586>.

## Endnotes

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<sup>1</sup> Mead, P. S., Slutsker, L., Dietz, V., McCaig, L. F., Bresee, J. S., Shapiro, C., et al. (1999). Food-related illness and death in the United States. *Emerging Infectious Diseases, 5*(5), 607-625. Retrieved March 27, 2008 from <http://www.cdc.gov/ncidod/eid/vol5no5/pdf/mead.pdf>.

<sup>2</sup> U.S. Centers for Disease Control and Prevention. (2008, April 11). Preliminary FoodNet data on the incidence of infection with pathogens transmitted commonly through food—10 states, 2007. *Morbidity and Mortality Weekly Reports, 57*(14), 366-370. Retrieved April 23, 2008 from [http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5714a2.htm?s\\_cid=mm5714a2\\_e](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5714a2.htm?s_cid=mm5714a2_e).

<sup>3</sup> Lynch, M., Painter, J., Woodruff, R., & Braden, C. (2006, November 10). Surveillance for foodborne-disease outbreaks—United States, 1998-2002. *Morbidity and Mortality Weekly Reports, 55*(SS10), 1-34. Retrieved March 27, 2006 from <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5510a1.htm>.

<sup>4</sup> U.S. Centers for Disease Control and Prevention. Foodborne Illness – What are the most common foodborne diseases? Retrieved March 27, 2008 from [http://www.cdc.gov/ncidod/dbmd/diseaseinfo/foodborneinfections\\_g.htm#mostcommon](http://www.cdc.gov/ncidod/dbmd/diseaseinfo/foodborneinfections_g.htm#mostcommon).

<sup>5</sup> U.S. Department of Agriculture, Food Safety and Inspection Service. (1998). *Salmonella enteritidis risk assessment, shell eggs and egg products*. Washington, DC: U.S. Department of Agriculture. Retrieved March 19, 2008 from: <http://www.fsis.usda.gov/OPHS/risk/index.htm>.

<sup>6</sup> U.S. Food and Drug Administration, Center for Food Safety and Applied Nutrition. (2003). Quantitative assessment of relative risk to public health from foodborne listeria monocytogenes among selected categories of ready-to-eat foods. Washington, DC: U.S. Food and Drug Administration. Retrieved March 19, 2008 from: <http://www.cfsan.fda.gov/~dms/lmr2-toc.html>.