

Questions and Answers about the FoodNet MMWR with data from 2010

Questions about the main findings

What are the main findings of the report?

The report shows that in 2010, Salmonella was the pathogen furthest from its national target. At 17.6 cases per 100,000 population, it is far higher than the Healthy People 2010 target of 6.8 or fewer cases per 100,000 population. It also shows that for Salmonella, there was no significant difference in 2010 rates compared with the first three years of surveillance (1996-1998). In fact, there was a recent 10% increase (CI= 4% to 17% decrease) compared with 2006-2008, that erased earlier small gains.

- In comparison, the national 2010 target for STEC O157 infection (≤ 1.0 case per 100,000 population) was reached in 2009, and has improved again in 2010—it. The new Healthy People 2020 target for STEC O157 is 0.6 cases per 100,000 population.
- In comparison with the first three years of FoodNet surveillance (1996–1998), sustained declines in the incidence of infections caused by *Campylobacter*, *Listeria*, Shiga toxin–producing *Escherichia coli* (STEC) O157, *Shigella*, and *Yersinia* were observed. Overall the incidence of six key foodborne pathogens was 23% lower. The measure does not include non-O157 STEC.
- In 2010, we have seen a slight rise in the number of non-O157 *E. coli* infections. Paradoxically, this increase has a positive side because it means more laboratories are testing for them.
- In 2010, compared with 2006-2008, significant decreases in the incidence of *Shigella* (29%) and STEC O157 (29%) infections were observed. Significant increases were observed in the incidence of *Salmonella* (10%) and *Vibrio* (39%).
- The reported incidences of *Salmonella*, *Campylobacter*, *Shigella*, *Cryptosporidium*, STEC O157, STEC non–O157, and *Yersinia* infections were highest among children aged <5 years.
- For infections with most pathogens under FoodNet surveillance, infected persons aged ≥ 60 years are at greater risk than younger persons for hospitalization and death.

Questions about FoodNet

What is FoodNet?

FoodNet is the Foodborne Diseases Active Surveillance Network. Established in 1996, FoodNet conducts detailed and accurate surveillance for *Campylobacter*, *Cryptosporidium*, *Cyclospora*, *Listeria*, *Salmonella*, *Escherichia coli* O157 and non-O157, *Shigella*, *Vibrio*, and *Yersinia* infections diagnosed by laboratory testing of samples from patients. It is a collaborative program among CDC, 10 state health departments, the U.S. Department of Agriculture's Food Safety and Inspection Service (USDA-FSIS), and the Food and Drug Administration (FDA). FoodNet personnel located at state health departments regularly contact the clinical laboratories in Connecticut, Georgia, Maryland, Minnesota, New Mexico, Oregon, Tennessee, and selected counties in California, Colorado, and New York to find out about all infections diagnosed in residents of these areas. The FoodNet surveillance area includes approximately 46 million people or 15% of the United States population. More information about FoodNet is available at www.cdc.gov/foodnet.

How is the “overall incidence” calculated for groups of pathogens?

To calculate the “overall incidence”, data were combined for *Campylobacter*, *Listeria*, *Salmonella*, Shiga toxin-producing *Escherichia coli* O157, *Yersinia*, and *Vibrio*, the six key bacterial pathogens, measured by FoodNet, for which >50% of illnesses are estimated to be transmitted by food, weighting by incidence of infection for each pathogen.

Are the data from FoodNet representative of the entire United States?

FoodNet is a useful tool that provides valid and reliable information about incidence and trends of foodborne illness in the United States; however it does not include the entire country. Since its launch in 1996, FoodNet has increased from five sites to ten sites, which has improved its representativeness. It now covers about 15% of the US population, about 46 million people. The population of the FoodNet surveillance area resembles the entire United States population demographically. The only notable difference is a slightly lower percentage of persons of Hispanic ethnicity in the population of FoodNet sites. Of course, there could be other differences that are not reflected in demographic data between FoodNet sites and the rest of the country, but FoodNet is thought to be generally representative of the nation.

How is the incidence of infections in FoodNet influenced by outbreaks of foodborne diseases?

In 2004, FoodNet began routinely tracking which of the laboratory-confirmed infections reported were associated with outbreaks. The great majority of cases are not related to outbreaks. From 2004-2010, 9-27% of cases of STEC O157 infection and 5-8% of cases of *Salmonella* infection were associated with outbreaks each year. The overall trends described in the *MMWR* report are not substantially different if outbreak-related cases are excluded from the totals.

What are some limitations of the FoodNet data?

- FoodNet relies on diagnoses made in clinical laboratories. Some infectious agents, such as norovirus, that are transmitted commonly through food are not under surveillance in FoodNet, because these pathogens are usually not identified in clinical laboratories. Also, changing laboratory diagnostic practices may affect the reported incidence of infection for some pathogens, even if the true incidence doesn't change. FoodNet is monitoring the impact of these diagnostic changes.
- Some illnesses might have been acquired from non-food sources, so incidence rates do not reflect foodborne transmission exclusively.
- Although the FoodNet population is similar demographically to the U.S. population, the findings might not be representative of the entire U.S. population.
- Hospitalizations and deaths reported to FoodNet may or may not be due to the specific infection reported, since any hospitalization and death is reported if it occurs within 7 days of the diagnosis of infection.

Where can I find past FoodNet reports?

Past reports can be found at www.cdc.gov/FoodNet/Publications.

Questions about national goals

According to FoodNet data, did we reach the Healthy People 2010 national targets for reducing foodborne illness?

Healthy People 2010 set national targets for reducing the rates of infections caused by *Salmonella*, *Campylobacter*, *Listeria*, and Shiga toxin-producing *Escherichia coli* (STEC) O157, which are all transmitted commonly through food. The 1997 incidence rates for each of the pathogens were used as the starting point. The 2010 targets were calculated as a 50% decline from the 1997 incidence rate.

The target for STEC O157 infection was reached in 2009 and also in 2010. The targets for *Campylobacter*, *Listeria*, and *Salmonella* infections were not met. Since FoodNet surveillance began in 1996, there has been no decline in the incidence of *Salmonella* infection. There have been significant declines in the incidence of infection with *Campylobacter*, *Listeria*, and STEC O157, but little progress has been made since 2004.

Why did a 44 % reduction in Shiga toxin-producing *Escherichia coli* (STEC) O157 reach that 2010 goal that was calculated to be a 50% decline?

The target goal was calculated to be 50% of the rate measured in 1997 in 5 FoodNet sites. That rate was 2.0 per 100,000, so the goal was set at ≤ 1 per 100,000. As more FoodNet sites were added, we began tracking progress using a model that incorporated the data from all 10 sites, not just the original 5. We also began using the first 3 years of surveillance (1996-1998) as a baseline, not just the year 1997, to have a more robust comparison period for all the infections. Now using all the data, we reached the 2010 goal with a calculated decrease of only 44%, from that 3 year baseline. The goal remained the same, ≤ 1 case of *E. coli* per 100,000, and reaching it is a major success. For STEC O157, the goal for 2020 has been calculated as a 50% reduction from the three year baseline period 2006-2008. The rate over those three years was 1.2 per 100,000, so the 2020 goal is 0.6 per 100,000.

What are the new targets for reducing Foodborne infections? What are they called?

Healthy People 2020 set new national targets for reducing the rates of infections caused by *Salmonella*, *Campylobacter*, *Listeria*, and Shiga toxin-producing *Escherichia coli* (STEC) O157, as well as by *Yersinia* and *Vibrio*, which are also transmitted commonly through food.

The new targets were set using incidence data from 2006-2008 and will be tracked using data collected through FoodNet. The new targets are listed in the table.

Pathogen	2020 Objective (number of infections per 100,000 persons)
<i>Campylobacter</i> spp.	8.5
Shiga toxin-producing <i>Escherichia coli</i> O157	0.6
<i>Listeria monocytogenes</i>	0.2
<i>Salmonella</i> spp.	11.4
<i>Vibrio</i> spp.	0.2
<i>Yersinia</i> spp. (other than <i>Y. pestis</i>)	0.3

Questions about changes in incidence over time (trends)

The incidence of Shiga toxin-producing *Escherichia coli* (STEC) O157 infections has decreased. Why?

Many factors likely contributed to the decline in incidence of STEC O157 infections. One is improved detection and investigation of STEC O157 outbreaks, resulting not only in contaminated products being removed before more persons became ill but also in enhanced knowledge about preventing contamination that was used to prevent future outbreaks and illnesses. PulseNet, the national molecular subtyping network for foodborne bacterial pathogens, can detect widely dispersed outbreaks and has greatly improved the detection and investigation of multistate outbreaks. Others actions contributing to the decline include cleaner slaughter methods, microbial testing, and better inspections in ground beef processing plants; regulatory agency prohibition of contamination of ground beef with STEC O157; improvements in the FDA model Food Code; and increased awareness in food service establishments and consumers' homes of the risk of consumption of undercooked ground beef.

Why hasn't there been any decrease in the incidence of infections caused by *Salmonella*?

Salmonella infection is a complicated problem that is not likely to be controlled by any one measure. There are many different types of *Salmonella*. They are carried in the intestines of many different kinds of food animals and wild animals, and transmission of *Salmonella* to humans can occur in a number of different ways. Most often,

Salmonella is spread through contaminated food, including foods of animal origin, raw produce, and processed foods. It can also be spread by contact with animals that carry *Salmonella*, as seen in recent outbreaks involving turtles, water frogs, and chicks. It can also occasionally be transmitted through contaminated water. Comparing 2010 with the first three years of FoodNet surveillance (1996-1998), there has been no change in the incidence of *Salmonella* infection. However, *Salmonella* infections can be prevented using approaches similar to those that were successful in reducing STEC O157. These approaches for *Salmonella* include monitoring the safety of ingredients, reducing contamination in factories and slaughterhouses using proven measures, and maintaining refrigeration in transport. They also include preventing food contamination. Regulatory agencies are working to introduce initiatives to reduce food contamination, particularly in poultry and produce. Training restaurant managers in food safety and by educating consumers about preparing foods safely at home can also help. Investigating illnesses and outbreaks is important, so that contaminated products are removed before more persons become ill. Farmers, the food industry, regulatory agencies, food service, consumers, and public health authorities all have a role.

Questions about specific pathogens

***Campylobacter*, *Listeria*, *Shigella*, and *Yersinia* have all decreased over the past 10-15 years, though not as much as STEC O157. How can I learn more about these infections?**

For more information about *Campylobacter*, *Listeria*, *Shigella*, and *Yersinia* please visit:

http://www.cdc.gov/outbreaknet/foodborne_az.html

How do people get *Vibrio* infections, and how can they be prevented? Why haven't they decreased, like the other infections transmitted commonly through food?

Vibrio infections are rare but often serious. *Vibrio* is a naturally occurring organism commonly found in marine and estuarine waters, including the Gulf of Mexico and the Atlantic, and Pacific oceans. Most *Vibrio* infections are due to eating raw oysters. Infections are most common during the warm months, when oysters often contain high numbers of *Vibrio* organisms. Infections can be reduced or prevented by rapidly refrigerating oysters after harvest, treating oysters at processing plants with heat, freezing or high pressure, or by thorough cooking. Continued *Vibrio* illnesses highlight the lack of implementation of available control measures.

Is the decrease in the incidence of *Shigella* infections due to foodborne disease prevention efforts?

Foodborne disease prevention efforts probably played lesser role in the decrease in incidence of *Shigella* infections compared with other infections. *Shigella* infections are most often transmitted directly from one person to another (rather than through contaminated food). *Shigella* infections are known to increase and decrease over multiple-year periods.

Questions about high-risk groups

Why is the incidence of so many of these infections higher in young children, and what are some risk factors for these infections in young children?

The incidences of *Salmonella*, *Campylobacter*, *Shigella*, *Cryptosporidium*, STEC O157, STEC non-O157, and *Yersinia* infection were highest among children aged <5 years. Young children are more likely than persons in other age groups to be brought to medical attention for diarrheal illness, and this is part of the explanation. However, the immune system in young children is immature, which is another reason why they are the age group at highest risk for many infections. Studies in young children have identified various food and non-food exposures—like visiting a farm, riding in a shopping cart near raw meat or poultry, and contact with baby chicks, turtles, and water frogs—that can increase the risk of infection with these pathogens. Breastfeeding provides important protection to young infants and should continue to be encouraged.

Why are the hospitalization and death rates for so many of these infections higher in older adults?

For infections with most pathogens under FoodNet surveillance, persons aged ≥ 60 years are at greater risk than are other persons for hospitalization and death, probably reflecting the fact that many older adults have other health issues that put them at higher risk for severe illness if they get one of these infections. These data highlight the need for prompt diagnosis and treatment in this age group as well as for careful attention to food safety.

Questions about food safety

What is CDC doing to control and prevent foodborne disease?

CDC is part of the U. S. Public Health Service, and has as a mission to use the best scientific methods and information available to monitor, investigate, control and prevent public health problems. Using the tools of epidemiology and laboratory science, CDC provides scientific assessment of public health threats. CDC works closely with state health departments to monitor the frequency of specific diseases and conducts national surveillance for them. CDC provides expert epidemiologic and microbiologic consultation to health departments and other federal agencies on a variety of public health issues, including foodborne diseases. At the invitation of state public health officials, CDC can also send a team into the field to help conduct emergency field investigations of large or unusual outbreaks. CDC researchers develop new methods for identifying and characterizing the microbes that cause disease and translate laboratory research into practical field methods that can be used by public health authorities in States and counties.

CDC is not a regulatory agency. Government regulation related to food safety is the responsibility of the Food and Drug Administration (FDA), the Food Safety and Inspection Service of the U.S. Department of Agriculture (USDA), the National Marine Fisheries Service, and other regulatory agencies. CDC maintains regular contact with the regulatory agencies.

When new food safety threats appear, CDC, in collaboration with its public health partners, conducts epidemiologic and laboratory investigations to determine the causes of these threats and how they can be controlled. Although CDC does not regulate the safety of food, CDC assesses the effectiveness of current prevention efforts. CDC provides independent scientific assessment of what the problems are, how they can be controlled, and where gaps exist in our knowledge.

Much of CDC's effort related to foodborne illness focuses on detecting outbreaks and tracking foodborne illnesses in the US, but CDC also works to make the information it gathers available when, where, and how people need it in order to make decisions that can protect their health. You can find more information on foodborne illness and CDC's prevention activities at <http://www.cdc.gov/foodsafety/>.

What other efforts are underway to reduce foodborne illness?

There are many partners in prevention of foodborne illness, including state and federal public health authorities, the federal food regulatory authorities, the food industry, consumer and patient advocacy groups, and consumers themselves. Enhanced measures are needed to 1) control or eliminate pathogens in domestic and imported food; 2) reduce or prevent contamination of food during growing, harvesting, and processing; and 3) continue the education of all food-handlers, including restaurant workers and consumers about risks and prevention measures. In particular, continued efforts are needed to understand how contamination of fresh produce and processed foods occurs and to develop and implement measures that reduce it. CDC is working with state health departments to develop and implement ways to detect and investigate outbreaks more quickly, so that the foods that cause outbreaks are identified quickly, and illnesses can be prevented.

From a broad public health perspective, what needs to happen to cause a major decrease in the burden of foodborne illness?

- Foodborne illness can be decreased by taking strong and specific actions to prevent contamination of foods from the farm to the table.
- Specifically, Federal, State and local governments need to work with industry and other food safety partners to:
 - Identify and implement prevention policies for the riskiest foods before and after harvesting.
 - Enhance laboratory testing and disease reporting to more quickly identify outbreaks and their causes.
 - Investigate outbreaks quickly and alert consumers and industry of potential food safety concerns.
 - Use prevention-focused safety systems and apply technologies (like pasteurization) to reduce contamination in food.
 - Fully implement existing food safety regulations and policy to prevent food safety problems before they occur.

Who is responsible for “devising” solutions to the “new problems” identified by outbreak investigations?

- Outbreak investigations by public health authorities can identify new pathogens, foods that were not previously thought to be risky, and unsuspected gaps in food safety systems.
- The Government, industry and academia all use outbreak and surveillance data to identify the foods that are the highest risk for contamination and where along the farm-to-table chain foods are most often contaminated.
- This information, in turn, is used to develop potential solutions to food safety problems as they arise and guide the development and implementation of targeted food safety interventions to prevent contamination. Examples include:
 - **Government** can use what is learned from outbreaks, inspections, and monitoring systems to develop, improve and implement prevention strategies and foods safety standards.
 - **Academia** can develop new tools and methods to identify high risk situations and appropriate mitigation steps for food contamination, and **industry** can implement practical processes for reducing these risks.

You say that government needs to fund “state and community efforts to identify and report illnesses and catch outbreaks faster”- why is this needed?

- The cornerstone of CDC’s foodborne disease prevention program is building and enhancing collaborative surveillance networks in states to rapidly detect and respond to outbreaks.
 - Detecting and investigating outbreaks can control them, so the outbreak stops.
 - We can learn from outbreaks what needs to change to prevent similar outbreaks from happening again.
 - Data from these networks are needed to identify the foods that are the highest risk for contamination and where along the farm-to-table chain contamination may occur.
- Early detection of food safety problems results in fewer illnesses, hospitalizations and deaths caused by contaminated food.
- The strength of the overall food safety system and the ability to detect food safety problems early is dependent upon Federal, State and local investment of resources in these surveillance and response networks.
- State and local health departments should be prepared for and capable of responding to a foodborne outbreak of disease.
- Reference laboratories provide critical support to state and local surveillance efforts, and their specialized expertise can help solve unusual outbreaks. Because food safety problems can occur anywhere and vary in scale, resources in these systems must be flexible.
 - Large-scale foodborne outbreaks require redirected resources to address an emerging or breaking public health problem.
 - Surge capacity in states and federal agencies is critical to response .

What can consumers do to reduce the risk for foodborne illness?

Consumers can reduce their risk for foodborne illness by following safe food-handling and preparation recommendations and by not consuming raw or undercooked foods of animal origin such as eggs, ground beef, and poultry; unpasteurized milk; and raw or undercooked oysters. They can avoid bruised or damaged fresh produce, and dented or bulging cans. Risk also can be decreased by choosing pasteurized eggs, high pressure-treated oysters, and irradiated food products. Everyone should also wash hands after handling raw or undercooked foods of animal origin and after contact with animals and their environments.

Food preparers should follow the easy lessons of "Clean, Separate, Cook, and Chill":

- **Clean** - Wash hands, cutting boards, utensils, and countertops.
- **Separate** - Keep raw meat, poultry, and seafood separate from ready-to-eat foods.
- **Cook** - Use a food thermometer to ensure that foods are cooked to a safe internal temperature: 145°F for whole meats (allowing the meat to rest for 3 minutes before carving or consuming), 160°F for ground meats, and 165°F for all poultry.
- **Chill** - Keep your refrigerator below 40°F and refrigerate food that will spoil.

More detailed information on food safety issues and practices, including steps consumers can take to protect themselves, is available at www.foodsafety.gov, and www.foodsafetyworkinggroup.gov