

# CDC Estimates of Foodborne Illness in the United States

## IMPROVEMENTS

### Improvements in Data and Methodology, 2011 and 1999

The 1999 estimates used the best data sources and methods available at the time. The 2011 estimates use better data sources and methods. These improvements explain most of the differences between the two sets of estimates.

### Five key improvements in the 2011 estimates are:

#### Increased (larger) sample size used to estimate acute gastroenteritis

Because of investments in the FoodNet Population Survey, three surveys were available for the 2011 estimates: for 2000–01, 2002–03, and 2006–07. The combined sample size from these surveys was more than 48,000 households—five times that for the 1999 estimates. Larger sample sizes typically result in more accurate data.

#### Focused on illnesses in the United States

Some illnesses reported in the United States are caused by contaminated food or water or other sources encountered in other countries during travel. The 2011 estimates focus on foodborne illnesses that occurred from food consumed in the United States. This is important because efforts to improve food safety in the United States can only affect the burden of illness caused by contaminated food here.

#### Improved data on the fraction of norovirus that is foodborne

In the 2011 estimates, the fraction of norovirus illnesses estimated to be foodborne was 26%, based on data from recently reported outbreaks. In 1999, this fraction was estimated to be 40%, but it was based on data that had substantial limitations.

Because norovirus causes millions of illnesses, the reduction in the proportion considered to be foodborne means a sizeable reduction in the estimated proportion of foodborne illnesses from the 24 known gastroenteritis pathogens—from 36% to 25%.

#### Developed specific multipliers for the 31 known pathogens

For the 1999 estimate, researchers assumed that infections with similar symptoms (such as *Salmonella* and *Yersinia*) had similar levels of under-diagnosis. Therefore, a general multiplier was applied to estimates of similar illnesses, even though there could be differences. For the 2011 estimate, specific multipliers were developed for the 31 known pathogens. These multipliers were based on several factors, including:

- The proportion of severe illnesses for a given pathogen (people with severe symptoms) are more likely to seek medical care, and only those seeking medical care can be captured in surveillance data).
- The frequency with which persons with mild and severe illness seek medical care and submit a stool sample for laboratory testing.
- The frequency with which laboratories test for that pathogen. Not all laboratories test for all the pathogens.
- The sensitivity of laboratory tests for that pathogen (that is, the likelihood that the test correctly identifies the pathogen when it is actually present in a specimen).

Developing specific multipliers for the 31 known pathogens yielded more accurate estimates for each known pathogen and, ultimately, greater accuracy in the overall estimate of foodborne illness.

#### Accounted for uncertainty

CDC used many data sources, with varying degrees of reliability, to determine the estimates of foodborne illnesses, hospitalizations, and deaths. For each estimate, CDC used a formula to account for the cumulative effect of all uncertainties in the data inputs. The results were upper and lower 90% credible limits, or a 90% credible interval. This means there is a 90% confidence level that the actual number fell within the range of that lower and upper limit. In 1999, none of this was calculated.

## Need for improvements and innovations remains

### **Future refinement of estimates of foodborne illness:**

Although investments made over the past decade have resulted in great improvements and innovations and more accurate estimates in 2011, limitations remain that need to be addressed in the future. For example,

- More detailed information on norovirus will better inform future estimates due to the availability of improved surveillance and special studies conducted in the United States. Most of the data underlying the norovirus estimates is from other countries.
- Improved information on the cases of acute gastroenteritis that are reported during FoodNet survey telephone interviews will be needed to help discern whether they might be caused by noninfectious conditions.
- Refining estimates of the degree of underreporting of hospitalizations and deaths.
- Accounting for illnesses caused by some of the unspecified agents that do not result in acute gastrointestinal illness, as such illnesses were not included in the current estimates.

*Future investments and innovations in surveillance and data analysis could help increase the accuracy of estimates. Future efforts can also be directed toward quantifying the illnesses caused by long-term effects of foodborne infections and toxins and to estimate the economic costs associated with foodborne illness.*