

TABLE 9.—SUMMARY OF FIVE FOODBORNE OUTBREAKS

Pathogen	Location and Year	Vehicle	Confirmed or Reported Cases	Estimated Number of Cases	Total Illness Cost
<i>Salmonella enteritidis</i>	Minnesota, 1994	Ice cream	150 cases; 30 hospitalizations	29,100 in MN; 224,000 Nationwide	\$3,187,744,000 to \$5,629,792,000
<i>Shigella sonnei</i>	Michigan, 1988	Tofu salad	3,175 cases	Not available	\$45,183,000 to \$79,795,000
Outbreaks resulting from deliberate contamination					
<i>Salmonella Typhimurium</i>	Dalles, Oregon, 1984	Salad bars	751 cases; 45 hospitalizations	Not available	\$10,687,000 to \$18,875,000
<i>Shigella dysenteriae</i> type 2	Texas, 1996	Muffins and doughnuts	12 cases; 4 hospitalizations	All cases identified	\$83,000
Outbreaks resulting from imported foods					
<i>Cyclospora cayatanensis</i>	United States and Canada, 1996	Raspberries (probably imported from Guatemala)	1465 cases identified, less than 20 hospitalization	Not available	\$3,941,000

Salmonella enteritidis in ice cream

In 1994, approximately 224,000 people were sickened by ice cream contaminated with *Salmonella enteritidis*. The source of the contamination appeared to be pasteurized premix that had been contaminated during transport in tanker trailers that carried nonpasteurized eggs. There were 150 confirmed cases of salmonellosis associated with the outbreak in Minnesota. However, ice cream processed during the contamination period was distributed to 48 states. To calculate the total number of illnesses associated with the outbreak, researchers calculated an attack rate of 6.6 percent. This attack rate was extrapolated to the population that consumed the ice cream, giving a

total number sickened of 224,000 (Ref. 9).

Salmonellosis most commonly causes gastrointestinal symptoms. Almost 91 percent of cases are mild and cause 1 to 3 days of illness with symptoms including diarrhea, abdominal cramps, and fever. Moderate cases, defined as cases that require a trip to a physician, account for 8 percent of the cases. These cases typically have a duration of 2 to 12 days. Severe cases require hospitalization and last 11 to 21 days. In addition to causing gastroenteritis, salmonellosis also can cause reactive arthritis in a small percentage of cases. Reactive arthritis may be short or long term and is characterized by joint pain. Just over 1 percent of cases develop short-term reactive arthritis and 2

percent of cases develop chronic, reactive arthritis.

FDA estimated the costs associated with salmonellosis, including medical treatment costs and pain and suffering. Table 10 of this document provides a summary of these estimates. Pain and suffering is measured by lost quality adjusted life days (QALDs). QALDs measure the loss of utility associated with an illness. A QALD is measured between zero and one, with one being a day in perfect health. FDA presents two estimates of values of pain and suffering associated with arthritis, one based on physician estimates (Ref. 10) and another based on a regression analysis approach (Ref. 11). This gives a range of costs for the average case of salmonellosis between \$14,231 and \$25,133.

TABLE 10.—THE VALUE OF A TYPICAL CASE OF SALMONELLOSIS

Severity	Case Breakdown	Total QALDs Lost per Illness	Health Loss per Case (Discounted)	Medical Costs per Case (Discounted)	Weighted Dollar Loss per Case
Illness					
Mild	90.7%	1.05	\$660	\$0	\$599
Moderate	8.1%	3.68	\$2,310	\$283	\$209
Severe	1.2%	9.99	\$6,266	\$9,250	\$188
Arthritis					
Regression Approach					
Short-Term	1.26%	5.41	\$3,391	\$100	\$44
Long-Term	2.40%	2,613.12	\$452,554	\$7,322	\$11,048
Direct Survey Approach					
Short-Term	1.26%	10.81	\$6,778	\$100 \$87	
Long-Term	2.40%	5,223.15	\$904,573	\$7,322	\$21,906
Death	0.04%		\$5,000,000		\$2,143