

Health Effects and Recalls of Beef E. coli from 2010-2015

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Overview:

E. coli contamination is an ongoing concern in the world today. Every year there are many recalls due to the contamination of E. coli that were discovered after the product was sent out for the population to consume. This report will show the amount of beef products that have been recalled over the past several years, as well as some adverse health effects due to the distribution and consumption of contaminated product. The cost implications for a firm if their product is found to be contaminated can be very severe. These costs go beyond just the loss of revenue from having to dispose of a product. If a product is found to be contaminated after it is in distribution channels, there is a chance that illness and potentially death can result from the contamination. The cost of an outbreak can suddenly begin to mount up once loss of revenue, cost of healthcare, and litigation costs are all factored into the total cost of the E. coli contamination.

A food recall is an action taken by a company to bring their product back in and remove it from all distribution outlets. A company would do this because they became self-aware or it was brought to their attention by an outside source, that their product has misbranding, contamination, or is even harmful to the public. These company recalls are split up into three classes by the Food and Drug Administration. Class III is the least dangerous class and usually has little to no danger to the consumer at all. An example of this would be when labeling or branding for a product is inaccurate or where a product has been contaminated with something non-threatening before it has been packaged. Class II is the middle ground of the classes and it is characterized as not being an immediate danger or health risk for the consumer, but could potentially turn into one if no recall is administered. The last recall possibility is Class I. This is the most dangerous recall that can have immediate health problems for consumers and can even result in death. A Class I recall does not occur very often, but should be dealt with immediately and as swiftly as possible to maintain public safety. It is important to note that all recalls due to E. coli contamination are classified as Class I.

The information that we have accumulated for the completion of this report and for the general findings on the trends of beef E. coli outbreaks and their effect on human health were largely from the Food Safety and Inspection Service and the Center for Disease Control and Prevention Websites. These databases have a wide variety of information, which it is for this reason that our mission became to further break down the data and provide accurate and useful information pertaining to trends and economic health.

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Food Safety Inspection Service (FSIS):

The data we compiled from the Food Safety Inspection Service can be found below. We used the data from 2010-2015. There are no real trends in the data showing that recalls of beef products due to E. coli contamination is either growing or decreasing. This shows that it has continuously been a problem, and is a real concern to companies who process and produce beef products. One item of interest is that several cases had more pounds recovered than were originally recalled. We came up with several reasons behind this. One is that more product was contaminated than originally thought and the numbers from the FSIS were not updated. Another reason, that could potentially have broader impact to a firm, is that when the recall announced all product under the brand name was associated with the recall and therefore disposed of. If the latter is the case, this could have large implications for the firm in terms of costs associated with loss of branding power.

Time Series of Beef Recalls for Past Six Years										
Year	# Beef Recalls	# Beef Recalls due to E. coli	% Beef Recalls due to E. coli	Total Lbs Beef Recalled	Total Lbs Food Recalled due to E. coli	Lbs Beef Recalled Due to E. coli	% Total E. coli Food Recalls Due to Beef	% Beef Lbs Recalled due to E. coli	Lbs E. coli Recovered	% E. coli Lbs Recovered
2010	28	11	39.29%	22,941,326	2,313,423	2,246,647	97.11%	9.79%	499,775	22.25%
2011	35	12	34.29%	1,343,054	1,002,971	980,331	97.74%	72.99%	432,038	44.07%
2012	19	5	26.32%	311,232	63,467	63,467	100.00%	20.39%	339,062	534.23%
2013	20	7	35.00%	396,213	10,771,539	89,919	0.83%	22.69%	57,382	63.82%
2014	22	2	9.09%	13,232,176	1,840,533	1,801,200	97.86%	13.61%	35,538	1.97%
2015	41	8	19.51%	1,345,842	215,593	215,593	100.00%	16.02%	45,643	21.17%
Total	165	45	27.27%	39,569,843	16,207,526	5,397,157	33.30%	13.64%	1,409,438	26.11%

Table 1: Time Series of Beef Recalls for Past Six Years

Financial Implications of Adverse Health Effects:

The United States Department of Agriculture Economic Research Service provides detailed specific disease outcome for 15 major pathogens in the United States. The 15 major pathogens account for 95% of illnesses and deaths from foodborne illnesses. The cost calculator accounts for outpatient and inpatient expenditures, associated lost wages, and estimates of individuals’ willingness to pay to reduce mortality resulting from these foodborne illnesses. The costs are estimates from the complex social matrix. The estimates used in the calculator build on Center for Disease Control (explained below). The

calculator has been used in the past to aid food-safety policy discussions. The mean cases, hospitalizations, and costs can be found in Table 2. The data in the table illustrates that there has been a general upward trend in the number of E. coli cases since 2010.

Cost of E. coli Outbreaks			
Year	Cases	Hospitalizations	Cost
2010	49,742	1,887	\$ 238,102,474.44
2011	58,026	2,243	\$ 282,889,870.40
2012	61,642	1,977	\$ 250,850,793.81
2013	63,153	2,138	\$ 271,418,689.72
2014	76,864	2,389	\$ 303,475,125.92
2015	89,583	3,071	\$ 388,701,188.64

Table 2: Cost of E. coli Outbreaks

Figure 1 illustrates the strong upward correlation between the number of cases and hospitalizations and the cost.

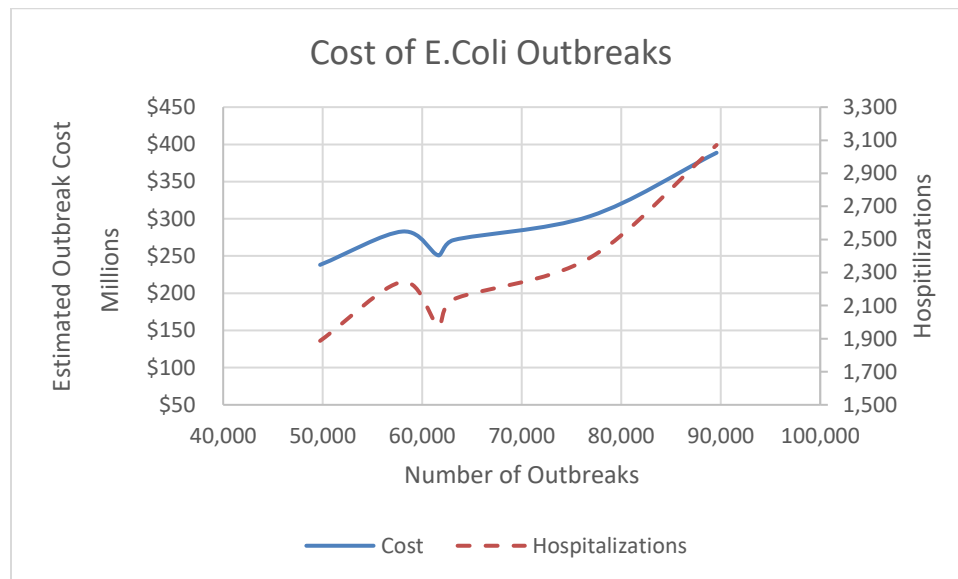


Figure 1: Cost of E. coli Outbreaks

Another point of interest for this project was to highlight the financial burden brought on through E. coli both within the industry as well as from personal hospitalization bills for those affected. Data is compiled to show the volume of beef recalled in ratio relation to the amounts of beef recalled due to E. coli (both O157 and non-O157). Shown below is a chart that exhibits the potential savings if E. coli outbreaks nationwide were to be reduced by 10% and up to half the incident rate. Figure 2 illustrates the potential costs of improving.

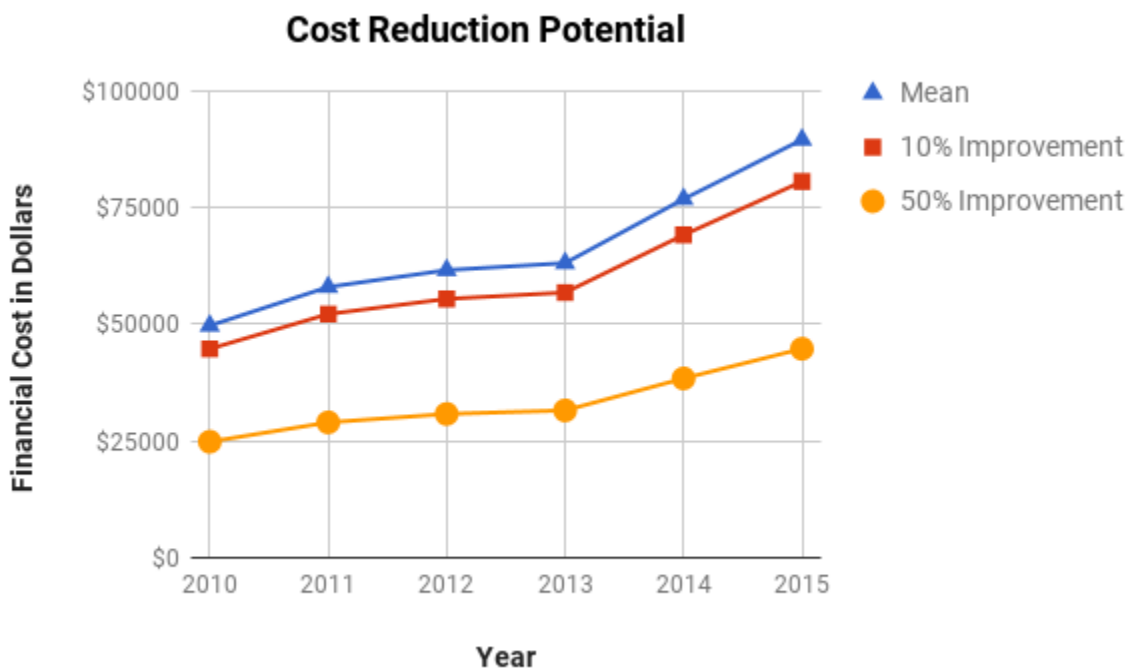


Figure 2: Cost Reduction Potential

Multiplier Explanation:

In the original CDC report, much of the cost multiplier was based on assumptions such as under-reporting, travel and food related incidences, among others. We did not have access to this data so we had to adjust our multiplier accordingly. To do this we took the base year, 2013, that was in the original cost calculator, and then adjusted the totals based on the percentages that had been factored into the original report with the incorporation of overall population growth. We thought this would best give us the average of the assumptions made originally.

Conclusion:

The number of E. coli cases has increased significantly since 2010. The cost of an E. coli outbreak is much more than beef lost by the processor. E. coli outbreaks have a lasting impact on those affected through hospitalization, medical costs, and death in rare cases. This study attempts to quantify these social costs felt by victims of the E. coli Outbreak. Reducing the number of E. coli outbreaks by 10%, or even greater 50%, can have a definitive economic cost to victims, firms involved, and society.

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