



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*



The Individual and Annual Health Costs of Foodborne Illness in the United States

Presented by Travis Minor, FDA

Food Safety: Costs in the United States and Global Consequences

USDA Economists Group Seminar

August 25, 2014

Overview

- Economic welfare-based method to estimate the health costs associated with foodborne illness (FBI)
 - Consists of known viruses, bacteria, parasites, allergens, two marine biotoxins, and unspecified illnesses
 - Present both lost QALYs and dollars
- Accounts for reductions in well-being from both functional disability and physical symptoms
 - Primary illness, secondary effects, and premature mortality; as well as the direct medical costs

Main Findings

- Other studies have estimated the annual burden of FBI in the US totals between \$9-\$152 Billion
- We estimate an annual burden of \$29.6 billion
 - Average identified illness reduce QALDs by 0.96
 - Monetizing and adding in direct medical costs corresponds to a loss of \$2,981

Methodology

- Cost of foodborne illness (CFI_i) is represented by:

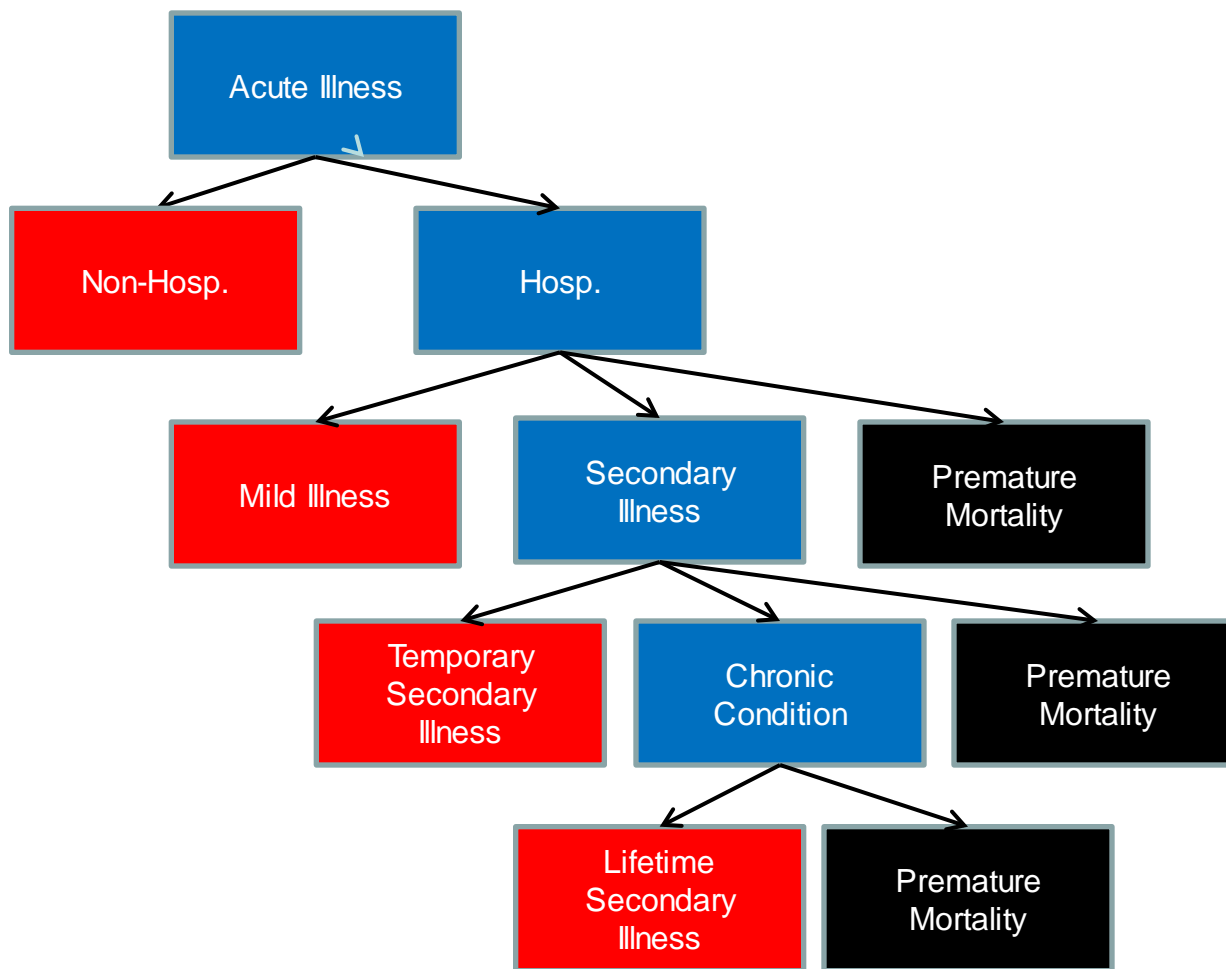
$$CFI_i = (AHL_i + SHL_i + PM_i)VSLY + AMC_i + SMC_i$$

- Where acute health (ahl_i) loss:

$$ahl_i = [(q_n - q_i)/q_n]t_i$$

$$AHL_i = \alpha_{m,i}ahl_{m,i} + (1 - \alpha_{m,i})ahl_{h,i}$$

Foodborne Illness Modeling



Data

- Foodborne Illness Acquired in the United States-Major Pathogens & Unspecified Agents (Scallan et al., 2011)
- Publicly available data on the pathogens not covered by Scallan, et al., as well as duration and incidence estimates from a variety of peer-reviewed, public sources



SELECTED LOSS PER FOODBORNE ILLNESS

	Average Per Case Loss		
Bacteria	QALD		Monetary
Campylobacter spp.	2.41		\$2,780
Clostridium botulinum	33.87		\$1,472,147
E. coli O157:H7	5.27		\$8,510
Listeria monocytogenes	26.79		\$1,410,385
Salmonella spp. (non-typhoidal)	1.88		\$4,717
Vibrio vulnificus	30.44		\$3,786,336
Parasites			
Toxoplasma gondii	6.15		\$38,915
Viruses			
Hepatitis A virus	3.64		\$40,714
Norovirus	0.32		\$270
Marine toxins			
Ciguatoxin	12.72		\$22,547
Scombrototoxin	0.14		\$1,252
Food Allergic Reaction	0.23		\$2,373
unspecified agent	0.31		\$248
WEIGHTED AVERAGE	0.45		\$613
W.A. Excluding unidentified	0.96		\$2,981



SELECTED ANNUAL LOSS PER FOODBORNE ILLNESS

	Average Annual Loss		
Bacteria	QALD		Monetary (in \$1,000s)
Campylobacter spp.	2,036,017		\$2,349,053
Clostridium botulinum	1,863		\$80,968
E. coli O157:H7	332,877		\$537,444
Listeria monocytogenes	42,628		\$2,243,923
Salmonella spp. (non-typhoidal)	1,927,518		\$4,846,653
Vibrio vulnificus	2,922		\$363,488
Parasites			
Toxoplasma gondii	532,968		\$3,373,378
Viruses			
Hepatitis A virus	5,700		\$63,758
Norovirus	1,751,158		\$1,476,079
Marine toxins			
Ciguatoxin	1,157,146		\$2,051,471
Scombrototoxin	3,333		\$30,190
Food Allergic Reaction	96,378		\$978,611
unspecified agent	12,030,782		\$9,506,865
TOTAL Annual Loss of all Foodborne Pathogens	21,584,720		\$29,555,540

Conclusions

- In addition to the 31 identified pathogens from Scallan et al., we also present costs for one additional pathogen (*Cronobacter* spp.), two marine biotoxins (Ciguatoxin and Scombrototoxin), foodborne allergic reactions, and unspecified agent illnesses.
- Costs include both WTP to avoid illness and complications, as well as the direct medical costs that are likely to occur as a results of contracting a particular FBI
- The inclusion of all these factors makes this analysis the most comprehensive look at the economic consequences of FBI to date.

Conclusions (cont.)

- Can be used to analyze an incredibly broad spectrum of food safety policies
 - Including those that address a wide variety of FBIs, such as the Food Safety Modernization Act's Preventive Controls and Produce rules
 - As well as more broad regulations where a specific pathogen may not be readily implicated
- Can be updated easily as new info on the individual pathogens becomes available, and changes to the methodology can be incorporated as future studies emerge