

Sequelae of Foodborne Illness Caused by 5 Pathogens, Australia, Circa 2010

Technical Appendix 5

Model Inputs for 4 Sequelae Illnesses Due to Contaminated Food

Incidence

Technical Appendix 5 Table 1. Guillain-Barré Syndrome

Model input, source, and comments	Distribution	Data for model input
Antecedent bacterial gastroenteritis cases: estimated number of foodborne <i>Campylobacter</i> spp. cases (1)	Outcome	5%, median, 95% values: 108500, 179000, 290000 (circa 2010) 82500, 139000, 227000 (circa 2000)
Sequelae multiplier: this proportion was a midpoint between estimates from the literature reported in Tam et al. (2), McCarthy and Gieseke (3), and Allos et al. (4)	PERT	Minimum, modal, maximum values: 0.000192, 0.000304, 0.000945
Total foodborne illness: foodborne <i>Campylobacter</i> spp. cases × Sequelae multiplier	Outcome	5%, median, 95% values: 30, 75, 150 (circa 2010) 25, 50, 100 (circa 2000)
Rate of foodborne illness from <i>Campylobacter</i> spp. per million population	Outcome	5%, median, 95% values: 2, 3.1, 6 (circa 2010) 1, 2.8, 6 (circa 2000)

Technical Appendix 5 Table 2. Hemolytic uremic syndrome

Model input, source, and comments	Distribution	Data for model input
Antecedent bacterial gastroenteritis cases: estimated number of foodborne STEC cases (1)	Outcome	5%, median, 95% values: 950, 2350, 5850 (circa 2010) 550, 1900, 5000 (circa 2000)
Sequelae multiplier: this proportion is from Vally et al. (5)	Alternate PERT	2.5%, Median, 97.5% values: 0.017, 0.03, 0.051
Total foodborne illness: foodborne STEC cases × Sequelae multiplier	Outcome	5%, median, 95% values: 25, 70, 200 (circa 2010) 15, 55, 175 (circa 2000)
Rate of foodborne illness from STEC per million	Outcome	5%, median, 95% values: 1, 3.3, 9 (circa 2010) 1, 3.0, 9 (circa 2000)

*STEC, Shiga toxin-producing *Escherichia coli*.

Technical Appendix 5 Table 3. Irritable bowel syndrome

Model input, source, and comments	Distribution	Data for model input
Antecedent bacterial gastroenteritis cases: Estimated number of foodborne <i>Campylobacter</i> spp. cases (1)	Outcome	5%, median, 95% values: 108500, 179000, 290000 (circa 2010) 82500, 139000, 227000 (circa 2000)
Estimated number of foodborne nontyphoidal <i>Salmonella</i> spp. cases (1)	Outcome	5%, median, 95% values: 21200, 39600, 73400 (circa 2010) 15000, 28000, 50000 (circa 2000)
Estimated number of foodborne <i>Shigella</i> spp. cases (1)	Outcome	5%, median, 95% values: 150, 350, 850 (circa 2010) 175, 515, 1300 (circa 2000)
Sequelae multiplier: This proportion was from Haagsmsa et al. (6)	Alternate PERT	2.5%, Median, 97.5% values: 0.072, 0.088, 0.104
Total foodborne illness Foodborne <i>Campylobacter</i> spp. cases × Sequelae multiplier +	Outcome	5%, median, 95% values: 12500, 19500, 30700 (circa 2010)

Model input, source, and comments	Distribution	Data for model input
Foodborne nontyphoidal <i>Salmonella</i> spp. cases × Sequelae multiplier + Foodborne <i>Shigella</i> spp. cases × Sequelae multiplier		9500, 14800, 23500 (circa 2000)
Rate of foodborne illness per million	Outcome	5%, median, 95% values: 570, 915, 1440 (circa 2010) 550, 850, 1350 (circa 2000)

Technical Appendix 5 Table 4. Reactive arthritis

Model input, source, and comments	Distribution	Data for model input
Antecedent bacterial gastroenteritis cases:		
Estimated number of foodborne <i>Campylobacter</i> spp. cases (1)	Outcome	5%, median, 95% values: 108500, 179000, 290000 (circa 2010) 82500, 139000, 227000 (circa 2000)
Estimated number of foodborne nontyphoidal <i>Salmonella</i> spp. cases (1)	Outcome	5%, median, 95% values: 21200, 39600, 73400 (circa 2010) 15000, 28000, 50000 (circa 2000)
Estimated number of foodborne <i>Shigella</i> spp. cases (1)	Outcome	5%, median, 95% values: 150, 350, 850 (circa 2010) 175, 515, 1300 (circa 2000)
Estimated number of foodborne <i>Yersinia enterocolitica</i> cases (1)	Outcome	5%, median, 95% values: 650, 1150, 1950 (circa 2010) 300, 800, 1650 (circa 2000)

Sequelae multipliers: The proportion for each of the 4 pathogens was calculated from the literature. See Technical Appendix 1 for further explanation.

<i>Campylobacter</i> spp. sequelae multiplier	Alternate PERT	Minimum, median, maximum values: 0.028, 0.07, 0.16
Nontyphoidal <i>Salmonella</i> spp. sequelae multiplier	Alternate PERT	Minimum, median, maximum values: 0, 0.085, 0.26
<i>Shigella</i> spp. sequelae multiplier	PERT	Minimum, modal, maximum values: 0.012, 0.097, 0.098
<i>Yersinia enterocolitica</i> sequelae multiplier	Alternate PERT	Minimum, median, maximum values: 0, 0.12, 0.231
Total foodborne illness: Foodborne <i>Campylobacter</i> spp. cases × Sequelae multiplier + Foodborne nontyphoidal <i>Salmonella</i> spp. cases × Sequelae multiplier + Foodborne <i>Shigella</i> spp. cases × Sequelae multiplier + Foodborne <i>Y. enterocolitica</i> cases × Sequelae multiplier	Outcome	5%, median, 95% values: 8750, 16200, 30400 (circa 2010) 6700, 12500, 23000 (circa 2000)
Rate of foodborne illness from <i>Campylobacter</i> spp., nontyphoidal <i>Salmonella</i> spp., <i>Shigella</i> spp. and <i>Y. enterocolitica</i> per million	Outcome	5%, median, 95% values: 415, 765, 1375 (circa 2010) 380, 730, 1325 (circa 2000)

Hospitalizations and Deaths

Technical Appendix 5 Table 5. Guillain-Barré syndrome

Model input, source, and comments	Distribution	Data for model input
Average number of deaths per year: Australian Bureau of Statistics death data	Empirical	2001–2010: 24.5
Population adjustment: Australian resident population June quarter, http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Dec%202011?OpenDocument [cited 2012 Aug 16]	Empirical	By year (2001–2010): 19413240, 19651438, 19895435, 20127363, 20394791, 20697880, 21015936, 21384427, 21778845, 22065317
Domestically acquired multiplier: <i>Campylobacter</i> spp. domestic acquired multiplier	PERT	Minimum, modal, maximum values: 0.91, 0.97, 0.99
Foodborne multiplier: derived from:	Outcome	5%, median, 95% values: 0.1, 0.25, 0.43
Bacterial multiplier—the proportion of Guillain-Barré syndrome that is attributable to <i>Campylobacter</i> spp. from Poropatich et al. (7) × <i>Campylobacter</i> spp. foodborne proportion (1)	PERT	Minimum, modal, maximum values: 0.048, 0.31, 0.717
	Alternate PERT	5%, median, 95% values: 0.62, 0.77, 0.89
Total foodborne deaths: circa 2010	Outcome	5%, median, 95% values: 2, 6, 10
Rate of foodborne deaths per million: circa 2010	Outcome	5%, median, 95% values: 0.1, 0.3, 0.5

Technical Appendix 5 Table 6. Hemolytic uremic syndrome*

Model input, source, and comments	Distribution	Data for model input
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Model input, source, and comments	Distribution	Data for model input
Average number of deaths per year: Australian Bureau of Statistics death data	Empirical	2001–2010: 4.2
Population adjustment: Australian resident population June quarter, http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0De c%202011?OpenDocument [cited 2012 Aug 16]	Empirical	By year (2001–2010): 19413240, 19651438, 19895435, 20127363, 20394791, 20697880, 21015936, 21384427, 21778845, 22065317
Domestically acquired multiplier: STEC domestically acquired multiplier	PERT	Minimum, modal, maximum values: 0.93, 0.99, 1
Foodborne multiplier: derived from: Bacterial multiplier—the proportion of HUS that is attributable to STEC from Walker et al. (8) × STEC foodborne proportion (1)	Outcome PERT Alternate PERT	5%, median, 95% values: 0.17, 0.33, 0.53 Minimum, modal, maximum values: 0.3, 0.608, 0.852 5%, median, 95% values: 0.32, 0.56, 0.83
Total foodborne deaths: circa 2010	Outcome	5%, median, 95% values: 1, 2, 3
Rate of foodborne deaths per million: circa 2010	Outcome	5%, median, 95% values: 0.03, 0.1, 0.12

*HUS, hemolytic uremic syndrome; STEC, Shiga toxin–producing *Escherichia coli*.

Technical Appendix 5 Table 7. Irritable bowel syndrome

Model input, source, and comments	Distribution	Data for model input
Yearly observed hospitalizations: state and territory hospitalization data	Empirical	By year (2006–2010): 7851, 7933, 7753, 8128, 7762
Average number of deaths per year: Australian Bureau of Statistics death data	Empirical	2001–2010: 13.1
Population adjustment: Australian resident population June quarter, http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0De c%202011?OpenDocument [cited 2012 Aug 16]	Empirical	By year (2001–2010): 19413240, 19651438, 19895435, 20127363, 20394791, 20697880, 21015936, 21384427, 21778845, 22065317
Domestically acquired multiplier: a weighted multiplier from <i>Campylobacter</i> spp., nontyphoidal <i>Salmonella</i> spp., and <i>Shigella</i> spp. domestic multipliers	Alternate PERT	5%, median, 95% values: 0.88, 0.91, 0.94
Foodborne multiplier: derived from: Bacterial multiplier—proportion of IBS that is post-infectious extracted from the literature (6,9) × weighted <i>Campylobacter</i> spp., nontyphoidal <i>Salmonella</i> spp., and <i>Shigella</i> spp. foodborne proportion (1)	Outcome Alternate PERT Alternate PERT	5%, median, 95% values: 0.08, 0.13, 0.33 5%, median, 95% values: 0.06, 0.17, 0.33 5%, median, 95% values: 0.64, 0.73, 0.82
Total foodborne hospitalizations: circa 2010	Outcome	5%, median, 95% values: 550, 915, 1400
Total foodborne deaths: circa 2010	Outcome	5%, median, 95% values: 1, 2, 2
Rate of foodborne hospitalizations per million: circa 2010	Outcome	5%, median, 95% values: 25, 43, 70
Rate of foodborne deaths per million: circa 2010	Outcome	5%, median, 95% values: 0.05, 0.1, 0.11

Technical Appendix 5 Table 8. Reactive arthritis

Model input, source, and comments	Distribution	Data for model input
Yearly observed hospitalizations: State and Territory hospitalization data	Empirical	By year (2006–2010): 63, 50, 50, 70, 70
Average number of deaths per year: Australian Bureau of Statistics death data	Empirical	2001–2010: 0
Population adjustment: Australian resident population June quarter, http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0De c%202011?OpenDocument [cited 2012 Aug 16]	Empirical	By year (2001–2010): 19413240, 19651438, 19895435, 20127363, 20394791, 20697880, 21015936, 21384427, 21778845, 22065317
Domestically acquired multiplier: Weighted multiplier of <i>Campylobacter</i> spp., nontyphoidal <i>Salmonella</i> spp., <i>Shigella</i> spp., and <i>Y. enterocolitica</i> domestic multipliers	Alternate PERT	5%, median, 95% values: 0.86, 0.91, 0.95
Foodborne multiplier: derived from: Bacterial multiplier—proportion of ReA that is post-infectious extracted from the literature (10) × weighted <i>Campylobacter</i> spp., nontyphoidal <i>Salmonella</i> spp., and <i>Shigella</i> spp. foodborne proportion (1).	Alternate PERT Alternate PERT Alternate PERT	5%, median, 95% values: 0.36, 0.48, 0.61 Minimum, median, maximum values: 0.5, 0.66, 0.947 5%, median, 95% values: 0.60, 0.72, 0.82
Total foodborne hospitalizations: circa 2010	Outcome	5%, median, 95% values: 20, 25, 40
Total foodborne deaths: circa 2010	Outcome	5%, median, 95% values: 0, 0, 0
Rate of foodborne hospitalizations per million: circa 2010	Outcome	5%, median, 95% values: 1, 1, 2
Rate of foodborne deaths per million: circa 2010	Outcome	5%, median, 95% values: 0, 0, 0

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