Assessing the Differences in Public Health Impact of Salmonella Subtypes Using a Bayesian Microbial Subtyping Approach for Source Attribution

Salmonella is a major cause of human gastroenteritis worldwide. To prioritize interventions and assess the effectiveness of efforts to reduce illness, it is important to attribute salmonellosis to the responsible sources. Studies have suggested that some Salmonella subtypes have a higher health impact than others. Likewise, some food sources appear to have a higher impact than others. Knowledge of variability in the impact of subtypes and sources may provide valuable added information for research, risk management, and public health strategies. We developed a Bayesian model that attributes illness to specific sources and allows for a better estimation of the differences in the ability of Salmonella subtypes and food types to result in reported salmonellosis. The model accommodates data for multiple years and is based on the Danish Salmonella surveillance. The number of sporadic cases caused by different Salmonella subtypes is estimated as a function of the prevalence of these subtypes in the animal-food sources, the amount of food consumed, subtype-related factors, and source-related factors. Our results showed relative differences between Salmonella subtypes in their ability to cause disease. These differences presumably represent multiple factors, such as differences in survivability through the food chain and/or pathogenicity. The relative importance of the source-dependent factors varied considerably over the years, reflecting, among others, variability in the surveillance programs for the different animal sources. The presented model requires estimation of fewer parameters than a previously developed model, and thus allows for a better estimation of these factors to result in reported human disease. In addition, a comparison of the results of the same model using different sets of typing data revealed that the model can be applied to data with less discriminatory power, which is the only data available in many countries. In conclusion, the model allows for the estimation of relative differences between Salmonella subtypes and sources, providing results that will benefit future risk assessment or risk ranking purposes.

General information
State: Published
Organisations: Division of Microbiology and Risk Assessment, National Food Institute
Contributors: Pires, S. M., Hald, T.
Pages: 143-151
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Foodborne Pathogens and Disease
Volume: 7
Issue number: 2
ISSN (Print): 1535-3141
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 2.47 SJR 1.063 SNIP 1.016
Web of Science (2017): Impact factor 2.476
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.46 SJR 1.062 SNIP 1.08
Web of Science (2016): Impact factor 2.12
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 2.41 SJR 1.064 SNIP 1.035
Web of Science (2015): Impact factor 2.27
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.16 SJR 0.953 SNIP 1.051
Web of Science (2014): Impact factor 1.905
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.41 SJR 1.184 SNIP 1.129
Web of Science (2013): Impact factor 2.092
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.55 SJR 1.185 SNIP 1.144
Web of Science (2012): Impact factor 2.283
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 2.33 SJR 1.118 SNIP 1.037
Web of Science (2011): Impact factor 2.26
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.86 SNIP 0.94
Web of Science (2010): Impact factor 2.134
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.864 SNIP 1.088
Web of Science (2009): Indexed yes
Scopus rating (2008): SJR 0.72 SNIP 0.682
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.611 SNIP 0.621
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.399 SNIP 0.318
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.198 SNIP 0.45
Original language: English
DOIs:
10.1089/fpd.2009.0369
Source: orbit
Source-ID: 263309
Research output: Research - peer-review › Journal article – Annual report year: 2010