Quantitative risk assessment of hemolytic uremic syndrome associated with consumption of bulk milk sold directly from producer to consumer in South Africa

This study was conducted to estimate the hemolytic uremic syndrome (HUS) risk associated with consumption of producer-distributor bulk milk (PDBM) contaminated with Shiga toxin-producing Escherichia coli (STEC) in South Africa. Data were obtained from recently completed studies in South Africa taking into account prior collected prevalence data of STEC in raw and pasteurized PDBM and survey information from producer-distributor outlets and households. Inputs for the models were complemented with data from published and unpublished literature. A probabilistic exposure model was developed with Monte Carlo simulation in Excel add-in software using @Risk software. Hazard characterization was based on an exponential dose-response model to calculate the probability of illness from STEC infection in individuals 5 years and younger and individuals older than 5 years. The estimated mean STEC level was 0.12 CFU/mL (95% confidence interval [CI]: 0 to 1.2; r Â¼ 0.34) for raw PDBM and 0.08 CFU/mL (95% CI: 0 to 1; r Â¼ 0.27) for pasteurized PDBM. A higher risk of HUS cases per year was recorded in raw than in pasteurized PDBM and also in individuals younger than 5 years of age. For every 100,000 servings consumed, the expected median numbers of HUS cases per year from raw PDBM were 52 for 5 years and younger and 3.2 for older than 5 years. The median numbers of cases per year for pasteurized PDBM were 47 for 5 years and younger and 2.9 for older than 5 years. Sensitivity analysis revealed that serving volume and time taken to sell PDBM at producer-distributor outlets were the factors with the greatest impact on probability of illness. The models developed in this study are an example of risk assessments for milk produced and marketed from similar scenarios across the globe.

General information
Publication status: Published
Organisations: National Food Institute, Research group for Genomic Epidemiology, University of Pretoria, Lombardy and Emilia Romagna Experimental Zootechnic Institute, University of Bologna
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Pages: 472-481
Publication date: 2018
Peer-reviewed: Yes

Publication information
Journal: Journal of Food Protection
Volume: 81
Issue number: 3
ISSN (Print): 0362-028X
Ratings:
BFI (2018): BFI-level 1
Scopus rating (2018): CiteScore 1.65 SJR 0.613 SNIP 0.744
Web of Science (2018): Impact factor 1.559
Web of Science (2018): Indexed yes
Keywords: Escherichia coli, Milk, Modelling, Risk, Shiga toxin
DOIs: 10.4315/0362-028X.JFP-17-199
Source: FindIt
Source ID: 2396720612
Research output: Contribution to journal › Journal article – Annual report year: 2018 › Research › peer-review