Efficacy of primary processing interventions on contamination of beef carcasses with *Escherichia coli*: a systematic review-meta-analysis

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Interventions have been investigated to recommend effective strategies to reduce *Escherichia coli* on beef carcasses during primary processing. However, results are inconsistent or contradictory. A formal evaluation, synthesis and translation of the research knowledge is necessary to avoid recommending ineffective practices and to determine key knowledge gaps. Identify, critically evaluate and synthesize published intervention research reporting the efficacy of treatments at the abattoir level post-transport to chilling, on *E. coli* contamination of beef carcasses using replicable systematic review (SR)-meta-analysis (MA) methodology. A search of four electronic bibliographic databases identified studies for SR-MA. Separate random-effects MAs were conducted for each unique intervention outcome dataset and pooled effect estimates were presented with heterogeneity. Thirty-six citations reporting 202 trials were included in the SR-MA. MA of final carcass washing (OR 0.56, CI: 0.41-0.77), pasteurization (OR 0.09, CI: 0.06-0.14) and 24 hour dry chilling (OR 0.17, CI: 0.11-0.24) data showed a reduced odds of *E. coli* carcass contamination. The combined effects of potable water wash, steam or hot water pasteurization and a 24 hour dry chill, assuming no additional contamination and all other variables constant, resulted in the reduced generic *E. coli* prevalence of 1.22% (CI 0.17, 3.57). The existing research indicates that final wash, hot water or steam pasteurization, and dry chilling are beneficial for reducing the generic *E. coli* contamination of beef carcasses. Access to proprietary intervention research and in-plant processing unpublished data could increase understanding and confidence in current processing intervention knowledge.