Economic impact of removing arrival metaphylaxis in the U.S. stocker and feedlot industry

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Introduction

Antibiotic resistance continues to be at the forefront of issues facing animal agriculture. As policies and regulations become more restrictive regarding antimicrobial use, producers, veterinarians and industry representatives should cooperatively prepare to use fewer antimicrobials. The objective of this study was to use stock and flow value-chain models to understand how cattle markets would respond to various antimicrobial-use policies based on profitability.

Materials and methods

Vensim Personal Learning Edition, by Ventana Systems Inc., was used to model the system with causal loop diagrams and stock and flow value-chain models. A metaphylactic intervention was created within each sector of the beef chain to compare how the market would change if metaphylaxis was banned in certain sectors or across the cattle feeding industry.

Results

If metaphylaxis was in use, then there was a much higher count of high-risk calves. These high-risk calves were more likely to move directly to the feedlot. Removing arrival metaphylaxis and adding a 5% incentive for calves not treated with antimicrobial increased the number of low-risk calves relative to high risk. The feedlots then preferred the low-risk calves over their high-risk counterparts. If metaphylaxis was only permitted at the backgrounder stage, more high-risk calves moved toward backgrounding operations, although low-risk calves were more numerous overall.

Significance

Low-risk calves marketed directly to feedlots were most numerous when arrival metaphylaxis was removed from the cattle feeding industry. Restrictive antimicrobial use policies might lead to important shifts in beef production sectors. Smaller cow-calf herds, which produce the most high-risk cattle, might be most affected.

