

Research Summaries 2

Moderators: Eran Raizman, Roxanne Pillars

An Economic Model That Assesses Costs and Impacts for Dairy Producers as a Consequence of Variable Antibiotic Treatment Compliance

D. Galligan, VMD, MBA¹; R. Saltman, DVM, MBA²; G. Basse, MBA³; S. Sorensen, MPH⁴; T. Baker, BS⁴; C. Hollenbeak, PhD⁴

¹*School of Veterinary Medicine, University of Pennsylvania, Kennett Square, PA*

²*Pfizer Animal Health, Cazenovia, NY*

³*Pfizer Animal Health, New York, NY*

⁴*United BioSource Corporation's Center for Health Economics and Policy, Bethesda, MD*

Introduction

The economic impact of partial or noncompliance to antibiotic medications for infections in dairy cattle has not been well studied. In humans, there are multiple published economic models that analyze the impact of treatment compliance with antibiotic effectiveness and resolution of patient symptoms. In cattle medicine, antibiotic agents with reduced-dosing regimes have become available that may result in better compliance relative to older agents. A decision analytic model was developed to examine the costs and consequences associated with antibiotic compliance across various antibiotic regimens from the perspective of the dairy producer.

Materials and Methods

An economic model was developed with inputs that include disease occurrence, drug regimen, drug costs, producer or herdsmen drug administration time, rate of symptom resolution and milk discard (if required). Symptom resolution rates are adjusted for partial compliance by modeling the incremental benefit of treatment over the spontaneous symptom resolution rate,

which affects the likelihood of retreatment, death or culling. Spontaneous symptom resolution is considered to be the same across antibiotics. Cows with partial or no symptom resolution may incur the costs of retreatment, may die or be culled from the herd, or may experience increased milk production losses. The model is populated with data from the published literature, but has been designed so that inputs can be easily modified to reflect a specific producer or herd setting.

Results

The model compares costs of drug and administration, milk losses and replacement costs for culled or dead cows by regimen. Results are variable but are calculated based on antibiotics used, dosages used, expected symptom resolution and concomitant outcomes.

Significance

This model represents the first published approach that calculates the overall economic impact of antibiotic treatment compliance and its relationship to drug performance as well as to drug selection.