

A survey to describe beef producer opinions on antibiotic use and consumer perceptions of antibiotics in the beef industry

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Abstract

Beef producers and veterinarians work together to improve cattle health and well-being. Antibiotic use and resistance is of interest to all involved in the beef industry, including beef consumers. A 26-question survey was developed by veterinarians at Kansas State University to explore antibiotic use and opinions on contemporary issues at the beef producer level. The survey was advertised throughout the United States and Canada via popular industry outlets. A total of 260 surveys were completed by beef producers from 43 states and 1 province in Canada. Beef producers operating cow-calf operations represented 88% of the respondents. Producers managing stocker, backgrounder, and feeder operations were represented in equal proportions in the remaining survey responses. Eighty-five percent (85%) of beef producers indicated they use the services of a veterinarian regularly, while only 23% reported that they have a written, documented, and signed veterinary-client-patient relationship. Participants indicated that they rarely use oral and injectable antibiotics. The most common indication for antibiotic use in cattle managed by respondents was for the treatment of bovine respiratory disease, foot rot, and pinkeye. Seventy-two percent (72%) of producers indicated that Beef Quality Assurance is an important industry program for addressing antibiotic use and prevention of antibiotic residues. When asked if familiar with the Veterinary Feed Directive rule, 81% of respondents indicated they had knowledge of the law. These data illustrate that beef producers are willing to share information about their production systems and management strategies, including information on antibiotic use in cattle.

Key words: antibiotics, survey, beef, consumers

Résumé

Les producteurs de bovins et les vétérinaires travaillent ensemble pour améliorer la santé et le bien-être des bovins. L'utilisation des antibiotiques et la résistance intéressent tous

ceux qui sont impliqués dans l'industrie bovine incluant les consommateurs de bœuf. Un questionnaire comportant 26 questions a été développé par des vétérinaires de la *Kansas State University* afin d'explorer l'utilisation des antibiotiques et de connaître l'opinion sur les enjeux contemporains au niveau de la production de bœuf. L'existence du questionnaire a été diffusée aux États-Unis et au Canada par l'entremise de réseaux locaux populaires associés à l'industrie. Au total, le questionnaire a été rempli par 260 producteurs de bœuf provenant de 43 états et d'une province du Canada et 88% des répondants étaient des producteurs de bœuf opérant dans le secteur vaches-veaux. Pour les autres répondants, il y avait une représentation équivalente entre les producteurs de parc d'élevage, de pré-engraissement et d'engraissement. Au total, 85% des producteurs de bœuf indiquaient qu'ils utilisaient régulièrement les services d'un vétérinaire bien que seulement 23% disaient avoir établi une entente vétérinaire-client écrite et consignée. Les répondants disaient qu'ils utilisaient rarement des antibiotiques oraux et injectables. L'utilisation des antibiotiques par les producteurs se faisait surtout dans le contexte du traitement des maladies respiratoires bovines, du piétin et de la kératite contagieuse des bovins. Au total, 72% des producteurs indiquaient que l'assurance de la qualité du bœuf était une initiative importante de l'industrie concernant l'utilisation des antibiotiques et la prévention de résidus d'antibiotiques. Lorsqu'on leur demandait s'ils étaient familiers avec la directive concernant l'alimentation vétérinaire, 81% des répondants mentionnèrent connaître cette loi. Ces données montrent que les producteurs de bœufs sont disposés à échanger de l'information sur leur système de production et leur stratégie de régulation incluant l'utilisation des antibiotiques.

Introduction

Antibiotic use in the beef industry is of interest to many consumers, and has become a point of discussion for scientific professionals in recent years. Consumers are using social media and the internet to become more knowledgeable about beef production and the use of antibiotics in the beef

industry. A sizeable amount of research describes consumer opinions and perspectives about antibiotic use in all food-animal industries.^{4,6,11,12} Physicians and veterinarians have also reported on antibiotic use in peer-reviewed publications.^{5,7,8}

Beef cattle veterinarians and producers in the United States work together in all areas of production management, including the use of antibiotics for treatment, control, and prevention of disease in cattle. Beef producers' husbandry practices are documented in a number of publications,^{2,3} and producer opinions on animal welfare have also been explored.³ However, to the authors' knowledge, no literature exists which explores producers' use of antibiotics in the industry, their opinions on questions addressing antibiotic resistance, and their perceptions of consumers' opinions of antibiotic use.

A survey was developed to explore the issue of antibiotic use and resistance, and perception of consumer opinions, at the producer level. The survey was distributed to beef producers in the United States and Canada to contribute to the existing knowledge base of various groups' perceptions of antibiotic use and resistance in the industry.

Materials and Methods

Survey Participants

Survey participants were recruited through popular public and private websites and publications relating to beef cattle production. Participants were directed to the link through these resources, and all beef producers with access to these resources were invited to participate. All participants in the survey remained anonymous. The survey was made available from September 10, 2015 until October 15, 2015. Approval to conduct the survey was granted by the Kansas State University Institutional Review Board (IRB #7871).

Data Collection

Data were collected using Kansas State University's web-based survey system.^a Participants were provided a URL to the survey via popular public and private websites and publications relating to beef cattle production.

Survey Questions

The survey consisted of 26 questions addressing demographics ($n = 4$); producers' relationship with their veterinarian ($n = 5$); antibiotic use on the producers' operations ($n = 6$); and producer opinions on antibiotic use, antibiotic resistance, and consumer perception of antibiotic use in the beef industry ($n = 11$).

Data Analysis

Data collected via the web-based survey system were downloaded into Microsoft Excel^b for summary and analysis. The number of responses, mode, mean, and percentages were calculated using Microsoft Excel. Answers to open-ended questions were kept in their original form. For reporting purposes, as not all participants responded to all questions, percentages shown are expressed as the number of answers out of the number of total responses to a particular question.

Results and Discussion

General Information

A total of 260 surveys were submitted from producers in 48 states, and 1 province in Canada (Table 1). The highest reporting state was Kansas, with 40 producers participating. Some producers indicated that they owned/operated production units in multiple states (Table 2). Cow-calf production units were the most commonly reported, at 88%. Stocker, backgrounder, and finishing operations were represented as 19%, 14%, and 21% of operations described in the survey, respectively (Table 3). There are many more cow-calf operations and producers compared to stocker, backgrounder, and feedlot operations or producers in the United States.¹⁰ Producers were instructed to select all types of operations which apply to their production unit, therefore the sum of percentages shown here is greater than 100% (Table 3).

Producers' Veterinarian-Client-Patient Relationships (VCPR)

The importance of veterinary oversight of antibiotic use in the beef industry is central to impending FDA regulations (Guidance for the Industry (GFI) documents 209 and 213).¹

Table 1. Location of survey participants by region.

Region	No. respondents
Northeast (Maine, New Hampshire, Vermont, Delaware, Rhode Island, New York, Massachusetts)	1
Mid-Atlantic (Pennsylvania, New Jersey, Maryland, West Virginia, Virginia)	30
Southeast (Kentucky Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana)	50
Great Lakes (Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota)	28
Central (Missouri, Iowa, North Dakota, South Dakota, Nebraska, Kansas, Arkansas, Oklahoma)	96
Southwest (Texas, New Mexico, Arizona)	12
Mountain (Colorado, Wyoming, Montana, Idaho, Utah, Nevada)	18
Pacific West (California, Oregon, Washington)	11
Alaska & Canada	3
No response	11
Total surveys accessed	260

Table 2. Number of states in which producers own beef cattle production units.

Number of states	No. responses
0	1
1	231
2	12
3	1
8	2
No response	13
Total	260

Table 3. Type of beef production operation reported by survey participants (percent respondents > 100%, as participants were instructed to select all answers which applied to their production units).

Operation type	No. responses	Percent respondents
Cow-calf operation	218	88
Stocker operation	46	19
Backgrounder-grower yard	35	14
Finishing yard	51	21

Eighty-five percent of participating producers indicated that they use veterinary services regularly (Tables 4 and 5); however, only 23% reported that they have a written, documented, and signed veterinarian-client-patient relationship (VCPR) with their veterinarian. Stocker operations and finishing yards were more likely to have a documented VCPR on file than cow-calf operations (Figure 1). Such documents will likely be more common on beef production units in the future, as increased state and federal regulation of feed-grade antibiotics will require documented proof that a VCPR exists for producers to use such products.¹ Participants indicated the most common reasons for veterinary visits were scheduled consultation/herd-health visits, followed by scheduled appointments for diagnosis and treatment of sick or injured animals (Table 6). This may be an indicator of valid veterinarian-client-patient relationships which are already in place, and may simply need written documentation of their existence.

Antibiotic Use on Production Units

Beef producers were asked about the frequency of use of antibiotics in raising cattle on their operations. Injectable antibiotics are rarely utilized, as most producers indicated they use them less than once per month. Producers most frequently indicated that oral antibiotics are used on their operations less than once per month or never (Figure 2). Producer participants indicated that the most frequent use of antibiotics on the farm, ranch, or feedlot are for treatment of bovine respiratory disease, foot rot, and pinkeye (Table 7).

Most antibiotics purchased by the beef producers were bought directly from the attending veterinarian. Other frequently reported means of procuring antibiotics included over-the-counter purchases at feed stores and veterinary

Table 4. Number and percent of respondents who indicated whether they utilize the services of a veterinarian regularly on their beef production operations.

	No. respondents	Percent respondents
Yes	211	85
No	36	15
Total	247	100

Table 5. Frequency of beef producers' use of veterinary services.

	No. respondents	Percent respondents
Daily	2	1
Weekly	7	3
Monthly	36	14
Quarterly	58	23
Semi-annually	57	23
Annually	24	10
Other	65	26
Total	249	100

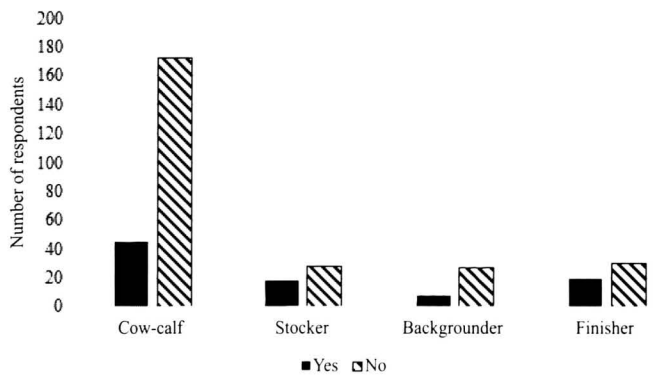


Figure 1. Documentation of valid VCPR by type of beef operation.

Table 6. Reasons survey participants utilize veterinary services (survey participants were instructed to select all answers which apply to their operation) on their beef production operation.

Response	No. respondents
A veterinarian never visits my production unit	6
Emergencies only	95
Scheduled appointments for sick/injured animals	114
Scheduled consultation visits	132

supply stores, and directly from a distributor (Table 8). With recent legislation in certain states such as California, however, over-the-counter procurement of antibiotic products may decrease at the state level.⁹

Ninety-three percent (93%) of respondents reported that they always follow label directions when administering an antibiotic, and if a drug is used off-label, 95% of respondents reported that they consult a veterinarian before doing so. Only 1 producer reported that he/she did not follow la-

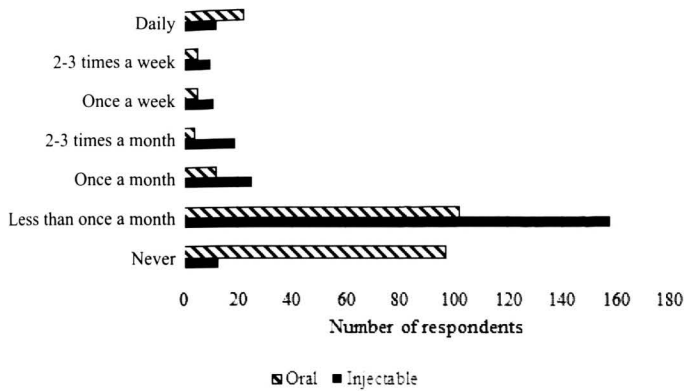


Figure 2. Frequency of use of oral and injectable antibiotics on participants' beef cattle operations.

Table 7. Diseases for which survey participants most frequently administer antibiotics to beef cattle.

Disease	No. respondents	Percent respondents
BRD	100	41
Foot rot	67	28
Pinkeye	36	15
Scours	5	2
Anaplasmosis	3	1
Lump jaw	1	0
None given	29	12
Total	241	100

Table 8. Antibiotic procurement practices of beef producer survey participants.

	No. respondents	Percent respondents
Over-the-counter (local COOP, etc.)	67	27
Directly from a distributor	59	24
From a veterinarian	120	48
Directly from a drug company	3	1
Total	249	100

beled withdrawal times; however, in a subsequent question about the importance of withdrawal times, the same producer claimed that he/she thought it important that withdrawal times are followed to avoid antibiotic residues, along with all other respondents.

Producer Opinions on Industry Issues

Ninety-one percent (91%) of producers indicated that Beef Quality Assurance (BQA) is an important industry program for addressing antibiotic use and prevention of antibiotic residues. Two respondents claimed that “common sense” is the most important program for addressing antibiotic use (Table 9). While common sense and knowledge are always very important for beef producers in the industry, it is also important for producers to use resources dedicated

to providing education about antibiotic use, management practices, and animal welfare, which BQA, university extension programs, and veterinarians provide.

Industry resources will be essential in the next few years, as the Veterinary Feed Directive (VFD) final rule is implemented. The VFD final rule is part of the FDA’s strategy to ensure the judicious use of medically important antibiotics in food-producing animals.¹ The rule outlines the authorization of use for VFD drugs (medically important drugs used in animal feed) by veterinarians, and gives veterinarians a framework for supervising the use of medically important antibiotics in feed when needed.¹ When asked about producer awareness of the new rule, 81% of respondents were familiar with the new legislation (Table 10); however, opinions on the rule varied. Negative opinions were expressed by 70 respondents, positive opinions were expressed by 46 respondents, and 56 respondents were either indifferent or had mixed opinions on the subject.

Other questions were asked to explore producers’ opinions on antibiotic use and antibiotic resistance in the beef industry, and to determine their opinions and perspectives on consumer knowledge of the beef industry. When asked “Do you believe that resistance to antibiotics is an issue in the beef industry?”, 66% of responding producers reported disagreement (answering 0 to 5 on a 0 to 10 scale), while 33% reported agreement (Figure 3). However, when asked “How much do you believe antibiotic use in the beef industry contributes to antibiotic resistance in the general population?”, 88% reported little or not at all, while 12% reflected the opposite opinion (Figure 4). In another open-ended question, producers provided their opinions on risk factors which may contribute to increased antibiotic resistance in the industry, and the most common factors cited were antibiotic misuse and antibiotic over-use (Table 11).

Beef producers were asked questions on consumer knowledge and perception of the beef industry. Ninety-eight percent (98%) of producers reported that they did not think consumers were knowledgeable about antibiotic use in the beef industry. Open-ended questions revealed that perceived consumer opinions varied, but generated mostly negative remarks.

Conclusion

Results of this survey show that beef producers are willing to share information about their production systems and management strategies, including information on antibiotic use. While most producers utilize a veterinarian, few have a documented VCPR. In addition, most producers surveyed obtain antibiotics directly from their veterinarian. Producers indicated that they rarely utilize antibiotics on the ranch or farm, and that the most common uses of antibiotics on beef operations are for treatment of BRD, foot rot, and pinkeye. In addition, 93% of producers are using antibiotics per the label directions, and when label directions cannot be

Table 9. Important industry programs for guidance on antibiotic use, as indicated by beef producer survey participants.

Industry program	No. respondents	Percent respondents
BQA	187	91
Veterinarian	9	4
American Association of Bovine Practitioners (AABP)	6	3
Label directions	2	1
Common sense	2	1
Total	206	100

Table 10. Survey participants' awareness of the Veterinary Feed Directive.

	No. respondents	Percent respondents
Yes	200	81
No	48	19
Total	248	100

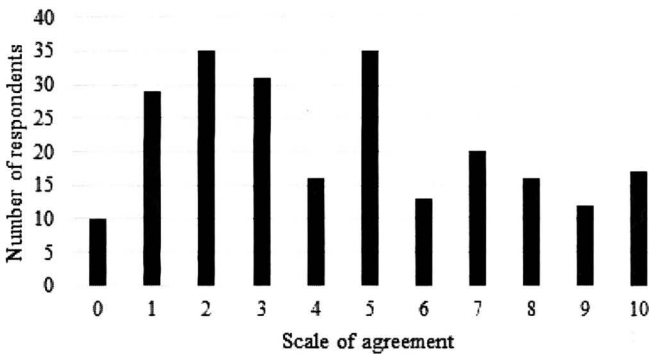


Figure 3. Results of the question “On a scale of 0 to 10, with 0 being ‘Strongly Disagree’ and 10 being ‘Strongly Agree’, do you believe that resistance to antibiotics is an issue in the beef industry?”

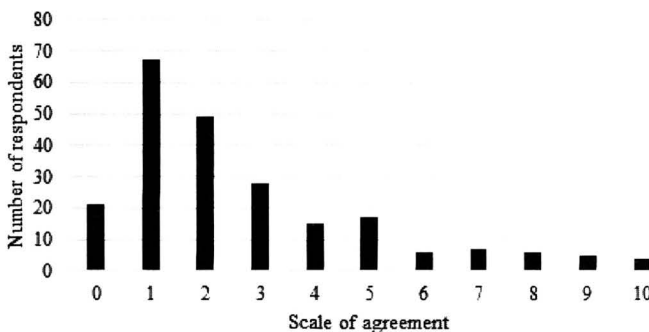


Figure 4. Results of the question “On a scale of 0 to 10, with 0 being ‘Not At All’ and 10 being ‘Contributes A Lot’, how much do you believe antibiotic use in the beef industry contributes to resistance in the general (human and livestock) population?”

followed, they seek the direct supervision of a veterinarian. The survey also demonstrated that producers use BQA as a cornerstone program for antibiotic stewardship. Over 80% of producers are aware of the Veterinary Feed Directive, and are anticipating the changes which may come with the new

regulations. When asked about antibiotic resistance and the general population of consumers, the producers surveyed do not feel that antibiotic resistance is an issue in the beef industry, which could be because they use antibiotics so rarely on their operations. Finally, the producers surveyed expressed some concern that consumers do not understand how beef is raised, and how antibiotics are used, regulated, and monitored in the United States.

The current survey provides valuable insight into the practices and opinions of producers in the beef industry, especially in regards to antibiotics. There are limitations to survey data, including differences in interpretation of questions and the inability to gather data on the population as a whole. The study population may not accurately reflect the practices and views of the total population of beef producers, as it is possible that progressive producers are more willing to share information about their operations. It must also be considered that survey participants might have felt the need to give the “correct” answer, rather than the “truthful” answer about their antibiotic use practices, especially since the survey was distributed by an academic institution. Finally, antibiotic use can vary among different types of cattle operations, operations with different cattle populations, and even operations in different geographic regions of North America. Despite such limitations, the information provided by this survey adds to the growing body of knowledge about antibiotic use in the beef industry, and provides valuable insight into the practices and opinions of producers on antibiotic use in the beef industry.

Endnotes

^aQualtrics Online, Kansas State University Survey Services, Manhattan, KS

^bMicrosoft, Redmond, WA

Acknowledgement

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Table 11. Survey participants' opinions on risk factors which contribute to antibiotic resistance in the general (human and livestock) population.

Risk factor	No. respondents	Percent respondents
Misuse	74	37.4
Overuse	49	24.7
Lack of education	22	11.1
No problem	9	4.5
Unsure	8	4.0
Other (including cost, evolution, management practices)	36	18.2
Total	198	100.0

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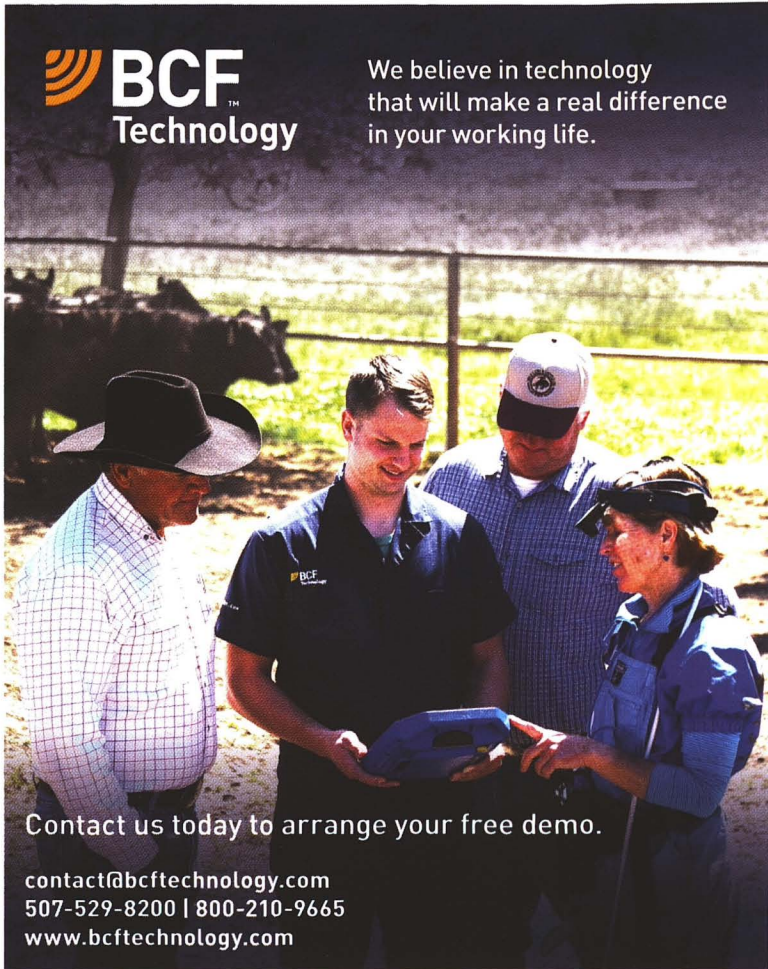
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