Talking with Friends and Clients about their Concerns with Animal Agriculture

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Abstract

It is not unusual these days for popular media stories to voice concerns about how food is produced, particularly food from animals. Important societal concerns are about how cattle production systems affect the health and well-being of humans, animals, and the environment. It takes effort to stay current on the worries of society associated with cattle production, and what to tell friends and clients when asked. It is also difficult to know which sources of information on these topics are accurate and reliable. The objective of this paper is to help veterinarians and technicians become better aware of the issues being discussed by society about how cattle production systems affect the health and well-being of the cattle, the public, and the world so they can help their friends and clients become more informed. It is a paradox that in an era with information so readily available, what we read and hear is so hard to trust.

Résumé

Il arrive souvent, ces temps-ci, que les médias populaires émettent dans leurs reportages des inquiétudes sur la façon dont les aliments sont produits, en particulier les aliments tirés des animaux élevés pour la consommation humaine. On s'inquiète notamment, d'un point de vue social, de l'impact des systèmes de production bovine sur la santé des êtres humains et des animaux, ainsi que sur l'environnement. Il faut faire des efforts pour rester au courant des inquiétudes de la société concernant la production bovine et pour savoir ce qu'il faut répondre aux amis et aux clients. De plus, il est difficile de discerner les sources d'information exactes et fiables sur le sujet. Le présent article a pour but d'aider les vétérinaires et les techniciens en médecine vétérinaire à mieux connaître les préoccupations sociales quant à l'impact des systèmes de production bovine sur la santé et le bien-être des bovins et du public, ici et à travers le monde, afin qu'ils puissent à leur tour mieux informer leurs amis et clients. Car c'est un paradoxe que, dans cette ère de grande accessibilité à l'information, ce que nous lisons et entendons soit si difficile à croire.

Introduction

It is not unusual these days for popular media stories to sensationalize concerns about how food is produced, particularly food from animals. For example, a recent Academy Award nominee for best documentary feature was the movie "Food Inc,"[18] which raised many concerns about various practices in animal agriculture. In 2008, the Pew Commission Report on Industrial Farm Animal Production outlined a number of concerns with the way animals are produced for food.[24] In the preface to the report they conclude: "The present system of producing food animals in the United States is not sustainable and presents an unacceptable level of risk to public health and damage to the environment, as well as unnecessary harm to the animals we raise for food."

That sounds pretty bad, but not everyone agrees with the commission's report. Some scientists who helped provide information for the report disagree with its conclusions and the methods by which the commission acted.[27] The American Veterinary Medical Association and Federation of Animal Science Societies have taken issue with the Pew Commission's conclusions.[13]

Throughout society, the same concerns expressed by the Pew Commission are being raised. Even mainstream organizations, such as the Girl Scouts of America, suggest that eating less beef and drinking less milk would be healthier for the planet.[2] They teach that cattle production has negative consequences for the planet because it contributes to greenhouse gases, and land used to feed cattle could be used for growing grains for humans. Their figures are based on a Food and Agriculture Organization of the United Nations (FAO) report.[31] More recently, evidence has emerged which suggests that the reverse may be true.[4,25] It seems there is little common ground.

Polarizing viewpoints about whether animal agriculture is "good" or "bad" are not productive. Better would be to investigate these issues by objectively gathering evidence in pursuit of the truth, then fairly evaluating costs and benefits. What are the real downsides of raising cattle, and how do they compare to the benefits of beef and milk? It takes effort to stay current on the worries of society associated with cattle produc-

tion, and what to tell friends and clients when asked. It is also difficult to know what sources of information on these topics are accurate and reliable. It is fair to say that many of the concerns are expressed, and sometimes misrepresented, by groups with viewpoints opposing animal agriculture in general. Therefore, it is important to stay informed because, within a community, veterinary practices are often a trusted source of reliable information on topics about animal care. The objective of this paper is to help veterinarians and technicians become better aware of how cattle production systems affect the health and well-being of the cattle, the public, and the world, so they can help their friends and clients become more informed.

Cattle Production, Zoonotic Diseases, and Food Safety

For most Americans the most likely way to be exposed to a zoonotic pathogen from cattle is through food.[6] In addition to food exposures, farm visitors may increase their risk for acquiring zoonotic infections by having direct or indirect contact with live cattle.[7,11,23] Food exposures may be beef or dairy products, or other foods directly or indirectly contaminated from cattle environments (e.g. fruits, vegetables and leafy greens produced near cattle populations). In the past, the notable food safety issues associated with foods of cattle origin were brucellosis and bovine tuberculosis. In the early Twentieth Century, these were important sources of human illness primarily transmitted via consumption of raw milk. Today, thanks to federal eradication programs, these pathogens are rare in US cattle herds; that, and milk pasteurization laws have made these rare humans infections.[32] Not in most people's lifetime have they had to worry about getting brucellosis or tuberculosis from drinking milk in the US.

Now the cattle industry is making great strides to prevent other chemical, physical, or biological hazards in foods.[24] For many years, the emphasis of beef and dairy quality assurance programs has been to reduce chemical hazards like drug and pesticide residues, as well as physical hazards like lead shot and broken needles. The success at reducing chemical and physical hazards is notable–they are a rarity today, thanks to beef and dairy quality assurance programs carried out by producers and veterinarians.[22]

Important biological hazards in beef and dairy products today are *Salmonella* spp,[33] the Shiga toxin producing *Escherichia coli* (STEC) such as *E. coli* O157:H7,[28] and *Listeria monocytogenes*.[29] According to a widely cited estimate, foodborne diseases cause 76 million illnesses and 5,000 deaths in the United States every year.[21] These numbers are based on using multipliers on known rates of disease to account for undiagnosed or under-reported illnesses and deaths. For example, the authors multiplied the known rates of sickness and death for *E. coli* O157:H7 20-fold to estimate 62,458 illnesses and 52 deaths annually from foodborne exposures. Fifty-two deaths in 300 million people is 0.017 deaths per 100,000 people. The estimated sickness and death for *Salmonella* were multiplied 38-fold.

In comparison to many other health risks, rates of illness resulting from exposure to foodborne pathogens are low. For the year 2009, the measured incidence of human illness in the US due to STEC O157 from any route of exposure was one case per 100,000 people.[6] The incidence of illness was 15 and 0.3 cases per 100,000 people for *Salmonella* and *Listeria,*[6] respectively. By comparison, the Centers for Disease Control (CDC) estimates that 36,000 people in the US die annually from influenza-associated illness.[5,12] In a population of 300 million people, that is 12 deaths per 100,000 people–almost 700 times the death rate for STEC O157.

Even though rates of foodborne illness are low, they raise important concerns. The rates of illness for pathogens associated with food are usually higher in young children. For example, compared to the overall incidence of illness in 2009, children less than four years of age were four, five, and two times more likely to get sick with STEC O157, *Salmonella*, and *Listeria*, respectively.[6] Medical costs of treating human STEC infections in the US exceed $400 million every year.[9] Cost to the beef industry from STEC alone is estimated to be $270 million per year, mostly due to loss in demand for beef.[17]

One notion popularized by the movie "Food, Inc." is that grass-fed cattle don't carry STECs, but corn-fed cattle do. The idea that grain feeding favors STECs like *E. coli* O157:H7 is a misrepresentation of science. The idea comes from research about the selection of "regular", non-disease causing *E. coli* for acid resistance.[10] The STECs tend to be acid resistant, so the theory was advanced that starch fermentation in the hindgut of cattle would cause acidic conditions that might favor STEC survival. Based on this theory, the researchers proposed that replacing grain with hay (removing starch) would be a way to reduce STEC carriage by cattle. This has not proven out. Diet changes may affect STEC shedding, but this has happened both by replacing hay with grain and grain with hay. Diet components do affect gastrointestinal bacterial populations, we just don't know yet how to modify the rations to reduce STEC carriage by cattle.[3]

Also, contrary to popular press stories, grass-fed cattle carry STECs. Researchers have shown that most (>80%) ranch calves (on grass) have been exposed to *E. coli* O157 prior to weaning, and all ranch herds have *E. coli* O157.[19] After accounting for age, researchers have not seen a difference in the rates of carriage of STECs between cattle in extensive grass pastures or in confinement.[26]

Responsible Use of Antibiotics

Antibiotics are substances produced by one microorganism and have the ability to kill or inhibit the growth or multiplication of other microorganisms, most specifically bacteria.[20] Whenever and wherever an antibiotic is used there is the potential to select for microorganisms, primarily bacteria, with mechanisms of resistance to that and other antibiotics regardless of whether those bacteria are the target of the drug therapy. There is concern that use of antibiotics in livestock populations will unnecessarily expose humans to antibiotic-resistant bacteria. In particular, there is concern that the use of low doses of antibiotics in animal feed may unnecessarily present a risk of selecting for antibiotic-resistant bacteria.[24]

The important questions are: 1) to what degree does resistance transfer from bacteria associated with livestock to bacteria associated with human populations, and 2) what human health burden does that transfer impose.[1] To date, risk assessments have estimated the burden to human health from using antibiotics in livestock to be small. For example, the risk to humans from the use of penicillin in food animals is estimated to present low or zero risk to humans.[8] The use of tylosin or tilmicosin in food animals presents a very low probability of human treatment failure for *Campylobacter*- or *Enterococcus faecium*-derived risk, less than one in 10 million and approximately one in 3 billion, respectively.[14] These low risks must be balanced with the risk to human and animal health from not using antibiotics, such as increased illness in animals and lower quality and safety of food products.[30]

Regardless of the controversy over the public health impact of the use of antibiotics in agriculture, it is reasonable to advocate for prudent and responsible use of antibiotics wherever they are used. Guidelines for prudent antimicrobial use in cattle by veterinarians have been established. Also, there are guidelines to help animal care-givers use antibiotics responsibly.[15,16]

Environmental Stewardship

The Pew Commission Report on Industrial Farm Animal Production expressed concern that concentrated animal feeding operations (CAFOs), including cattle feedyards, were harmful to the environment based on a report from the FAO which concluded that livestock contribute more to greenhouse gases than the transportation industry.[31] In its report, the FAO concludes that the livestock sector is a major player in greenhouse gas emissions, contributing 18% of greenhouse gases worldwide–which they state is more than that contributed by transportation. As you might have guessed, not everyone agrees with these conclusions. Others say the FAO statistics are misleading; for example, in the United States livestock production accounts for about 3% of greenhouse gases, while transportation contributes 26%.[25] This and other studies indicate that intensive agriculture systems, like some in the US, are more efficient than extensive systems and therefore may be better for the environment.[4,25] This analysis more fairly compares the true costs of livestock production to true costs of transportation, but it is likely that the US has a proportionately larger transportation sector than many parts of the world. Is the comparison of agriculture inputs to transportation inputs an appropriate basis for decision making? If so, compared to the environmental costs of driving to the supermarket (which society seems willing to invest) shouldn't some environmental costs be placed towards producing the healthy food we expect to find when we arrive?

Animal Well-being

Finally, the notion that the health and well-being of animals wanes in larger production systems is becoming popular. There is little evidence that this is true. In some circumstances it is easier for large livestock operators to afford improvements to comfort and health, because the costs of the improvements are spread out over a larger number of animals. It is not easy to measure health and well-being objectively, but veterinarians and veterinary technicians have the training to evaluate for themselves whether animals are well cared for or not. It is important that veterinary professionals work as advocates for all animals by encouraging production practices that favor animal health and well-being, regardless of the size of the operation.

Conclusions

Veterinary professionals have always been advocates for production systems that protect the health and well-being of animals. At the same time, the Veterinarian's Oath asks us to provide for the conservation of animal resources and to promote public health. It can be a challenge to serve these sometimes competing interests. The veterinary profession is a trusted source of knowledge about how cattle systems affect the health and well-being of animals, the environment and humans. It is important that we continue to objectively evaluate evidence on these topics to address society's current interest and concerns. The authors of this paper are dismayed by the difficulty of distinguishing fact from fiction in an era when information is so easily at our fingertips.

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