Managing organic dairy herd health: Current roles and possible future roles for veterinarians with organic dairy clientele

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ABSTRACT

This study aimed to understand the veterinary-client relationship and perspectives in organic dairy production systems. Twenty-three organic dairy producers and 12 veterinarians were interviewed using semi-structured, one-on-one interviews. Consultation with local veterinarians was typically infrequent, as there was greater reliance on other producers and organic industry professionals for advice on dairy herd health management, perhaps due to a shared focus on organic farming principles. Organic producers generally consulted local veterinarians most frequently to develop vaccine protocols, address animal health emergencies, and gain reproductive services. Common reasons organic producers cited for not regularly consulting a local veterinarian included the cost of veterinary services and a perception that local veterinarians have limited experience with organic systems and products. Some producers also expressed the idea that infrequent veterinarian usage is indicative of a healthy herd. Meanwhile, local veterinarians reported that organic dairy producers often delayed consulting them about individual cases until animal health problems were severe. Local veterinarians also identified challenges in servicing organic herds, such as the lack of standardized regulations between different organic certifiers and limited safety and efficacy data for many herd health products used by organic producers. In addition, their formal training generally did not include organic herd health strategies. Organic dairy clients were typically a small fraction of the overall workload for local veterinarians, which precluded their ability to accumulate experience. In contrast, a handful of specialized veterinarians in the organic milk processing industry work more frequently with organic producers and have published most of the available resource materials on organic dairy herd health. Veterinary-client partnerships could be improved through more open communication and discussion of the challenges identified in this study and through participatory research and outreach engagement that includes local veterinarians, organic certifiers, organic industry veterinarians, and producers. Key words: organic dairy cow, veterinarian, animal health, vaccination, antimicrobial use

INTRODUCTION

Consumer demand for organically produced agricultural products in the United States increased 31% from 2016 to 2019. Despite this recent growth in the marketplace, few studies have explored organic dairy producer attitudes and behaviors toward herd health management (e.g., Habing et al., 2016; Wemette et al., 2020), and the few that have explored this topic did not yet deeply investigate how organic dairy producers source information on animal health and management from the perspective of producers and veterinarians. Organic dairy producers can obtain information on animal health from a variety of sources, but local veterinarians have been considered ideal partners to help producers implement best management practices based on specific farm goals (Duval et al., 2016a,b). For instance, Organic Valley (OV; La Farge, WI), the largest organic cooperative in the United States, requires dairy producers to have a relationship with a veterinarian, indicating the importance of this connection within the organic sector.

Relationships between local veterinarians and organic dairy producers can be challenging to establish and maintain, in part because of how organic dairy producers source information. Several studies have documented that organic dairy producers consult veterinarians less often than conventional dairy producers (Vaarst et al., 2003, 2006; Bennedsgaard et al., 2010; Mayen et al., 2010; Bergman et al., 2014). For instance, one study found that approximately 70% of conventional dairy producers reported using regularly scheduled
veterinary services, whereas only 39% of organic dairy producers reported using such services (Mayen et al., 2010). From a veterinary perspective, dairy producers are seemingly becoming more reliant on other industry professionals than veterinarians for consultative services on herd health management (Ruston et al., 2016).

To promote the veterinary-organic client relationship and animal health, it can be helpful to understand the diverse perspectives regarding organic dairy herd health and overall production systems and the current role of veterinarians in these systems. The goals and values of veterinarians and organic dairy producers might not always be well aligned (Vaarst et al., 2011; Duval et al., 2016a,b), which may further strain the relationship. Although local veterinarians provide limited services to some organic producers, organic industry veterinarians typically have more abundant and diverse experiences with organic dairy producers, yet no studies, to our knowledge, have detailed the perspectives of these specialized veterinarians who work regionally or nationally for organic milk processing firms. Veterinarians can provide a wide array of professional services to organic dairy producers, including managing biosecurity, vaccination protocols, disease treatment guidance, infection control, and reproductive efficiency, among other services. Yet it remains unclear which specific services organic dairy clients utilize and what potential barriers might exist. To our knowledge, limited research has explored these relationships from the perspectives of both dairy producers and veterinarians in a US context, although it has been studied to a limited extent in other countries (e.g., France: Duval et al., 2016a,b, 2017). In this study, we interpret important themes explaining how Ohio organic dairy producers and local and organic industry veterinarians approach organic dairy herd health management and the role of veterinarians, other industry professionals, and other resources used in organic farmer decision-making. We also explored current challenges and future possibilities with regards to further developing relationships between veterinarians and organic dairy producers.

**MATERIALS AND METHODS**

**Study Design and Research Team**

Interviews were conducted with organic dairy producers and veterinarians. All participants signed letters of consent that included the research objectives of the study and the basic background and current positions of the researchers. There was a verbal acknowledgment that the university had not conducted much research on organic dairy herd health, so our main objective was to learn from the interviewees who were presented with a list of broad topics. This research was approved by The Ohio State University’s Institutional Review Board under IRB 2018E0701 and IRB 2019E0196.

The research questions and interview questionnaires and process of interviewing participants were informed by the background of the research team and preliminary discussions with informants immersed in organic dairy herd health. The research team had diverse academic expertise in veterinary medicine (GGH and LDC) and animal science (JAP), as well as the sociology of agriculture (CCB and DJS). More specifically, the first (CCB) and third (DJS) authors had extensive backgrounds in research and personal connections with the cultural and religious dimensions of Plain producers (i.e., Amish and Mennonite). The aggregate background in organic agriculture and Plain communities informed the research team of the multiple information barriers and disconnects between agricultural practitioners and the established scientific community, which informed the construction of research objectives. The second, fourth, and fifth authors provided the dairy herd health technical expertise and are immersed in the realities of veterinary science training and structure and have conducted some research and outreach with organic dairy producers that helped inform this project. The interviews were conducted and analyzed by 2 primary authors (CCB and JAP), who were research associates when the interviews were conducted, in conjunction with the fourth author (KW), who was pursuing a veterinary medicine degree. The research team consulted informants (e.g., a veterinarian specializing in organic dairy, various field specialists from OV) in organic herd health through the development of preliminary research questions and interview guides.

Organic dairy herd health strategies, information sourcing of producers, and the role, knowledge, and ideas that veterinarians have concerning managing organic herd health represent an understudied area, so it was impossible to identify all of the relevant questions to ask using existing literature, research team experiences, and preliminary discussions with informants. In response, we used a semi-structured interview guide that enabled the interviewee’s responses to direct the focus of the interview. The semi-structured interview guide involved asking participants open-ended questions that were used flexibly, enabling participants to discuss issues that may not have been pre-identified by the researchers (Greenhalgh and Taylor, 1997; Prokopy, 2011). This process will be further described in the Data Analysis section.
**Dairy Producers**

Semi-structured interviews were conducted with 23 certified organic dairy producers in Ohio. The dairy producer interview instrument covered a broad range of topics, and analysis of much of the findings from that instrument are described in our previous work (see Supplemental File S1 in Brock et al., 2021b). For this paper, we focused on certain sections of this instrument such as farm demographics (see Supplemental File S1, page 1, in Brock et al., 2021b) and responses to questions about sources of information for decision-making on herd health, especially on their use of veterinarians (see Supplemental File S1, pages 15–17, in Brock et al., 2021b). Producer experiences and decisions on disease prevention and treatment and a copy of the producer instrument are documented in our previous work (see Supplemental File S1 in Brock et al., 2021b). Producers were recruited from different geographic regions across the state to capture a diverse array of organic management practices and ensure that our sample was similar to the population of interest; regions with higher concentrations of organic producers were sampled more frequently. Producers were identified through the OV Cooperative and organic certifiers (n = 16) and the USDA National Organic Program Integrity Database (n = 5). Given that recruitment was conducted in a variety of ways (e.g., mailing, recruitment at producer meetings, references from OV staff), it is impossible to say how many people directly refused to participate. All organic dairy producers in Ohio were sent letters of invitation by mail (February and March 2019). Interviews were conducted in 2019 and lasted 1 hour on average (range: 50 min to 2.5 h). These interviews were all conducted in person at the participant’s farm.

**Veterinarians**

Data for this study were also collected through semi-structured interviews with 12 veterinarians from Ohio and across the country. Local veterinarians in Ohio with organic dairy clientele were identified through professional connections with The Ohio State University College of Veterinary Medicine (n = 1 veterinarian), recommendations from OV (n = 4), suggestions from organic farmers (n = 5), and snowball sampling from veterinarians (i.e., obtaining contact information from interviewees of other veterinarians with organic clientele; n = 2). Although the producers themselves were not the primary means of identifying local veterinarians, 3 of the veterinarians in our sample were mentioned in 3 different producer interviews. Given that recruitment was conducted in a variety of ways (e.g., mailing, sharing about the research at regional dairy meetings, OV staff recruitment), it is impossible to say how many people directly refused to participate.

Seven local veterinarians and 5 specialized veterinarians who work for the organic milk processing industry at the regional or national level were interviewed. To be included in this study, veterinarians needed to have at least 2 organic dairy clients. All veterinarians received an initial email solicitation and a follow-up phone call explaining the project. The first 2 authors (CCB and JAP) conducted the interviews between January and August 2019, with the semi-structured interviews ranging from 40 min to 2 h. The veterinarian interview instrument (Supplemental File S1; Brock, 2022; [https://data.mendeley.com/datasets/vm5wvx9zzz/](https://data.mendeley.com/datasets/vm5wvx9zzz/)) included subsections and broad interview questions on topics including veterinarian demographics (page 1); knowledge of organic production systems (page 1); services provided (page 2); experiences with organic herd health management (page 3); disease treatment approaches on organic dairies (pages 5–7); and sources of information (pages 8–9). About half of the local veterinarian interviews were conducted in person and at local offices, and the remainder were conducted via telephone or video link. Given that the organic industry veterinarians were in different states (e.g., Wisconsin, Illinois, and North Carolina), all interviews were conducted via Zoom or telephone.

**Data Analysis**

A full systematic thematic analysis was conducted concerning both veterinarian and producer interviews to address the specific research questions from this study. Interviews were digitally recorded and transcribed via a professional transcription service (Rev.com) and checked for accuracy by members of the research team who had conducted those interviews. The primary authors (CCB and JAP) carefully read and reread the interview transcripts to identify ways of organizing the data that may connect to research questions, a process similar to that described by Braun and Clarke (2006). The primary authors defined the decision-making criteria for ways of organizing the data into codes. These authors used NVivo (NVivo, version 11, QSR International Inc.) software as a method of organization. After working codebooks were developed for both the veterinarian interviews and relevant portions of the producer interviews, 3 veterinarian and 3 producer transcripts were coded by the 2 primary authors (CCB and JAP), and coding consistency was analyzed by the fourth author (KW) using the NVivo software. After discussing and resolving discrepancies (i.e., where consistency between coders was <95%), the codebooks were refined, and the interview transcripts...
were reanalyzed with the updated, finalized codebooks (Creswell and Miller, 2000). One of the primary authors (CCB) checked all of coding as the fourth author (KW) conducted preliminary coding. Coding discrepancies between one of the primary authors (CCB) and the fourth author (KW) were discussed with the other primary author (JAP) until a mutual decision was made among all 3 of the coding authors (Creswell and Miller, 2000).

The first author analyzed and interpreted material within the codes and identified themes in the context of the research questions. The authors further fine-tuned and revised themes through discussion with the research team and member checking (i.e., discussing with participants and informants). A combination of direct individual quotes as well as paraphrasing the essence of multiple statements from interviewees was used to exemplify themes in the results section. Quotations were deidentified to protect confidentiality. Participants were provided with a summary of the findings, and select participants were asked to provide feedback on early drafts of this article with further refined themes at the later stages.

RESULTS

Producer and Veterinarian Respondent Characteristics

Our study sample is representative of the greater organic dairy population in Ohio and other Midwest and Eastern US states; the mean herd size in our study was 44.5 cows (range: 21 to 110 cows); the mean herd size of organic dairy farms in Ohio in 2016 was 47.2 cows (USDA NASS, 2017; Brock et al., 2021b). However, these herd demographics contrast with other parts of the United States. Most producers in our study had prior experience with conventional dairy farming and had converted from a conventional to an organic dairy operation (19 of 23 producers; see Brock et al., 2021b, for more details on organic dairy producer respondent characteristics).

The majority of organic dairy producers in our sample (78%) were members of Plain Anabaptist church communities, as is typical of the organic sector in Ohio, Indiana, Pennsylvania, and Michigan, as documented in a recent survey of 800 organic producers (Brock et al., 2021a). Wisconsin and New York also include a significant number of Plain producers (Cross, 2015), likely also contributing to this intersection of Plain and organic identities in this region. Plain Anabaptists are Christians whose defining characteristics at their formation in Protestant Reformation, and that persist today, include an emphasis on the separation of church and state, as well as adult baptism. They have distinct reasons for selective use of technology, such as the preservation of family and community and living more simply and humbly, exemplifying the life of Jesus. A variety of churches are included in the Plain Anabaptists (e.g., Old Order Amish, New Order Amish, Apostolic, a variety of conservative Mennonite conferences among others). Mennonites tend to have less restrictive guidelines around farming technologies. In our sample, 11 of the producers were Old Order Amish, 3 were New Order Amish, and 3 were from conservative Mennonite conferences.

Twelve veterinarians were also included in our study. Seven were large-animal veterinarians who predominantly served nonorganic dairy clientele (i.e., an average of 19% of their clients were organic, ranging from 9 to 33%); these veterinarians will be referred to hereafter as “local” veterinarians. One veterinarian who is denoted as a local veterinarian for analysis had a local practice but was also affiliated with the OV Cooperative (i.e., 17% of his dairy cattle clientele was organic). Five of the veterinarians worked principally with organic clients and currently or previously had a relationship with OV. These veterinarians had extensive experience (mean = 30 yr of experience, range 6–60 yr) working with diverse organic dairy producers across different regions of the United States and engaged in outreach and education activities; these will be referred to hereafter as “organic industry” veterinarians. Among the veterinarians who specialized in organic dairy production, 3 had published resources on organic dairy herd health management that were widely accessible and utilized by organic producers; 1 was retired but provided a historical perspective; and 1 operated a business that sold organic products to promote animal health.

Producer Descriptions of the Veterinarian’s Role in Herd Health Management

Local Veterinarians. Although all organic dairy producers had some type of relationship with a local veterinarian, the extent of interaction was variable and included a wide range of types of consultation. Overall, most producers described having positive interactions with their local veterinarian. For many organic dairy producers, minimal use of a veterinarian was also considered an indicator of good animal health and a way to conserve money. For example, when one producer was asked about his relationship with his veterinarian and how it may have changed after transitioning from conventional to organic production, he responded, “except I worked less with veterinarians because I ha[ve] fewer problems. So, we had fewer reasons to have veterinarians out.” One producer noted that “in the course of
my life, I saved a lot of money to not have a vet out because I can give my own IVs, among other things.”

Local veterinarians seemed to play an important role on many organic dairy farms in tailoring specific vaccination protocols based on the needs of the dairy herd. When asked about the use of specific veterinary services, nearly half of producers (10/23) worked with their veterinarians on vaccination protocols. For example, one producer noted that “over the years,” his veterinarian was “probably the biggest, single source of knowledge when I think of vaccines.” Further, when one producer was asked about vaccines to prevent respiratory disease, he mentioned he would “just go and get some of whatever the vet recommends.” He went on to say, “since we’ve gone organic, we did get him out to do a herd check because we needed to buy the vaccine.”

Nearly all producers reported using their local veterinarian to diagnose or treat a sick animal, and regular herd health visits were not as frequent. Roughly 20% (5/23) of producers discussed using veterinarians for routine herd health checks, primarily to diagnose pregnancies. One producer discussed how organic producers, in general, do not rely on veterinarians for herd health checks, as the producers themselves “do blood checks for pregnancies and are cutting the veterinarians out.” Overall, producers in our sample preferred to do as much disease diagnosis and treatment on their own as possible. In the words of one producer, “We asked our vet to come and help make a diagnosis of what’s going so we know what to do going forward.” Another common comment was from a producer who stated, “I’ve used them for individual sick cows . . . occasionally. But last year, we did have them out a couple of times, but it was always for a horse.” As our previous study indicated, antimicrobials were seldom administered by organic dairy producers (Brock et al., 2021b). However, 6 producers mentioned using their local veterinarian to administer individual antimicrobial treatments, whereas other producers reportedly purchased the antimicrobial from the veterinarian and administered the treatment themselves.

Producers shared a wide variety of impressions of the ability of their local veterinarians to address organic herd health management practices. One producer stated, “They try very hard. I have no complaints about our local veterinarians.” Another producer expressed, “I’ve got some pretty good local veterinarians that understand what we’re doing . . ..” A producer shared a story about how his local veterinarian “would say” organic “never works,” but once there were organic producers in the area, he served these producers, nevertheless. However, he followed up this statement with a clarification, “I don’t know. Maybe I’m misjudging him . . ..” Producers felt their local veterinarians possessed some general knowledge of organic dairy production, but many indicated that their organic certifying agency was seen as a better resource for advice about which specific products were permitted for use. Overall, producers felt that local veterinarians were becoming more knowledgeable about organic production over time.

**Organic Industry Veterinarians.** Producers often referenced interactions or having received information on managing animal health from individual veterinarians specializing in organic dairy production (i.e., the 5 organic industry veterinarians included in this study). Several of these organic industry veterinarians have served as the staff veterinarian or were formally connected to the OV. Ohio producers’ strong connections to OV may be due to the dominance of the cooperative in buying organic milk in Ohio (all of our respondents sold to OV), and the important role OV plays in developing, disseminating, and implementing educational resources and programs for organic dairy producers. The cooperative has one veterinarian on staff at any given time, and these veterinarians, in particular, were mentioned as important sources of information for recommendations on organic treatments, particularly for the first few years of organic production. Organic industry veterinarians offer programming and free phone consults.

Producers indicated that these organic industry veterinarians offered valuable advice to address specific herd health issues and served as a source for general information and training on organic management strategies. As they became more experienced in organic production, producers relied more on local large-animal veterinarians to address emergent problems. One producer explained how organic industry veterinarians are “extremely helpful” because they can pool experiences from “2,000 organic dairy farms. If there’s a problem to be had, it’s probably happened already somewhere . . ..” One producer stated OV veterinarians are “typically for the producers that are transitioning to organic. They have a lot of questions.” Another said he used the OV veterinarian after transitioning to organic, but eventually, he “got to the point where you’re better off with communicating with your veterinarian, and not even ask them.” Another producer indicated that because OV veterinarians are unbiased (i.e., not trying to sell a particular product), these professionals can target advice “to give you the biggest return,” whereas other individuals “selling products are never going to tell you that.” As will be discussed later, organic industry veterinarians also play an important role in assisting local veterinarians with organic approaches to herd health. It should be noted that organic industry veterinarians were not necessarily seen as a substitute for local vet-
Veterinarian Descriptions of Services Provided to Organic Clientele

Local Veterinarians. There was consensus among local veterinarians that they are called less frequently by organic clients than by conventional dairy producers. When asked how many organic clients he had, one veterinarian stated that he may have a “handful” of organic clients, but “they don’t use us very often, and so you hardly know that you’re even their vet sometimes, unfortunately.” Another veterinarian stated, “I would say, honestly, probably conventional farmers utilize our services to a much higher extent than the majority of our organic dairies.” Fewer organic producers utilized veterinarians for regular herd health checks. In one example, a veterinarian stated of his clients who had converted to organic, “there are some that still use us for occasional herd checks, but none are regular, and they’ve gone away from monthly to maybe seasonal.” Another veterinarian noted that “... there’s plenty of organic dairies that just don’t use a veterinarian at all.”

Local veterinarians discussed a variety of explanations as to why organic producers might consult them less frequently. For instance, a couple of veterinarians mentioned they may be consulted less often because “we just have a lot less tools to use” to affect “nutrition” and “reproductive programs” on organic dairies. This veterinarian went on to discuss this may be related to a lack of “trust in veterinarians knowing how to treat a cow organically.” He also stated that organic producers (many of whom are also Amish) are smaller in scale, which may also explain the lower general usage of veterinarians. Another veterinarian felt confident in their abilities to assist organic producers, but attributed organic producer reluctance to seek out veterinarians to “partially not knowing what kind of wealth of information that we have that can help them out any way possible.” Another veterinarian suggested organic producers may rather go to “organic meetings” to “glean a lot of their information … they love those speakers that they listen to … but they don’t use me enough probably.” Yet another veterinarian indicated that organic producers may not consult local veterinarians as often because it is partly a “financial decision,” implying a means to save money. One veterinarian mentioned how organic producers may turn to other professionals rather than their local veterinarian for advice, such as “feed people” [nutritionists] or “anybody that had experience in organic.” This also includes soliciting advice from OV as “they [producers] contact their veterinarian that actually does organic medicine.”

Local veterinarians reported that the predominant service requested from organic producers was assistance with emergency cases. Three of the local veterinarians referred to their services on organic dairies as “more fire engine work,” as they are only consulted if organic therapies are not effective. As another veterinarian explained, “... a lot of times they won’t call … they’ll use their own organic remedies, which I’m not aware of all of them, but they use them first before they get ahold of me, usually.”

Organic Industry Veterinarians. Organic industry veterinarians described their experiences working with organic dairy farms on herd health issues in a more positive light compared with some local veterinarians, perhaps due to their shared familiarity with broader organic production practices and rules (e.g., soil health, outdoor access, forage/managed grazing). One organic industry veterinarian explained how he viewed his role in providing educational support for organic dairy operations across the region and United States. One noted, “I do a fair amount of just consultation on the phone. People just can call me directly.” Another explained this phone service as a “farmer hotline” at OV, and he also noted, “the hotline is so important to at least the OV clients because it’s used very, very heavily.” This resource is especially important because one local veterinarian affiliated with OV stated that “in some areas, there just isn’t the local support.” These discussions might be in regard to “a herd health issue or cows not getting pregnant or uterus infections or lame cows or nutrition questions.” One organic industry veterinarian explained how he works with “20 regional managers of the co-op” and “those folks really have a close relationship with farmers.” Although organic producers generally consult with organic industry veterinarians over the phone, industry veterinarians mentioned they still may “go look at a
farm that’s having a problem because in some situations, in some areas, there just isn’t the local [veterinarian] support.” Organic industry veterinarians discuss connections between herd health practices and organic farm management principles and may also recommend a variety of supplements and organic treatment options.

**Veterinarian Perspectives on the Importance of Disease Prevention**

Both the organic industry and local veterinarians emphasized the importance of disease prevention within organic production. For instance, one local veterinarian focused on “ordinary principles of management and sanitation, trying to prevent the disease,” and another on “cow comfort, ventilation, cleanliness . . . proper bedding, and . . . immunization.” Another local veterinarian emphasized environmental cleanliness, particularly on pastures, so that “they’re [cattle are] not lying in a mud hole somewhere, things like that.” Another explained how, “In the organic world, we have a very limited amount of medications that we can use effectively to treat sick animals, as compared to the conventional side” and so “coming up with ways to prevent is very, very important, but unfortunately, it’s a huge lacking area for a lot of our organic dairies.”

Organic industry veterinarians emphasized the role of farm management practices as a way to prevent disease and improve the overall health status of the herd, rather than focusing on treating disease. One organic industry veterinarian described that organic producers might not need to consult a veterinarian as frequently because they do not “push their animals. They don’t push and push to get the last drop of milk out of them. She’ll live to 13 or 14 years, and that doesn’t happen in the conventional world.” The importance of grazing, as well as general outdoor access and ventilation, was also discussed. Several organic industry veterinarians emphasized the importance of a high-forage diet compared with a grain diet as “a cow is a herbivore. She’s not a grain-eating beast innately.” Organic industry veterinarians emphasized that a holistic farming system is important; for instance, focusing on soil health will improve forage, pasture, and crop quality, as it “all ties together.”

**Vaccination**

Both local and organic industry veterinarians in our sample emphasized the importance of vaccination for organic herds and that local veterinarians should be consulted, although the way that they emphasized them differed. One local veterinarian told his organic producers, “You don’t have antibiotics, so you need to be doing as much as you can on the vaccination aspect.” He emphasized “the importance of vaccinating” as “an insurance policy” because organic producers “don’t ask for help very often, and you don’t see them on a routine basis for anything, and so, therefore, we don’t have a lot of communication . . . to discuss timings of vaccines and which one to use.”

As noted above, the majority of organic producers in our study vaccinated their cows. However, local veterinarians that we interviewed were often under the impression that organic producers had lower vaccine rates than conventional dairy farms. In their interviews, veterinarians felt this lower vaccination rate might be because of a de-emphasis on regular cow treatments, less sophisticated management facilities, smaller herds, and more focus on using a “natural approach.” This can include not always having access to a “good headlock” or “good working chutes.” Relatedly, organic producers may not “like giving shots to cows.” Producers may have “misinformation” about the function of and what to expect out of a vaccine. As an example, as one local veterinarian explained to his clients, in the case of “the pink eye vaccine . . . If you read the label, it’s a 70 percent reduction in the incidence of cases. It’s not elimination.” So, a producer might think it “didn’t work” because I have “2 or 3 cases,” but in that case, as one local veterinarian stated, “it did what it was supposed to do.” Additionally, local veterinarians discussed specific challenges in relation to vaccine type and administration on smaller operations. For instance, the use of modified-live versus killed vaccines was discussed, and a local veterinarian explained that the use of modified-live vaccines might not be economical, as smaller dairy herds cannot “justify mixing a ten-dose bottle.” The issue of multiple doses for some of the vaccines was also perceived as a barrier; one local veterinarian noted he likes to recommend a particular vaccine but “can’t get them [organic client] to do that because it requires three doses.”

**Veterinarian Descriptions of Organic Disease Treatment**

**Local Veterinarians.** Local veterinarians noted that very few organic dairy clients in their practice used antimicrobials. The USDA National Organic Program standards state that if an animal is treated with an antimicrobial, any milk or meat from that animal cannot be certified as organic for the duration of its life (USDA AMS, 2022). However, the use of antimicrobials is recommended when animal health and welfare will benefit. In some instances, veterinarians felt this left
them with few treatment options in emergency-type situations, and “usually it’s not good because they wait too long.”

Some veterinarians reported frequent antimicrobial “treatment failure” because they are consulted by organic dairy farms mainly as a “last-ditch effort” after other treatment options have been exhausted. One local veterinarian noted that the “frustration is they [organic producers] are, for humane purposes, not allowed to withdraw and withhold antimicrobials from animals that would benefit from it.” In his view, the strict penalties for use of antimicrobials (i.e., culling the animal from the herd) might lead producers to withhold antimicrobial treatment for too long. Another local veterinarian stated his specific concern that organic producers “can’t use the antibiotics within three months or six months of calving at the beginning of the lactation. Oh, my gosh, the young stock are the ones that suffer. They really do suffer. That delayed treatment.”

Organic industry veterinarians provided a more positive view about the use of antimicrobials in organic dairy production and discussed what they perceived as common misconceptions around antimicrobials within organic dairy herds. One stated that “occasionally you have to go that route, but not as often as what some people would think.” Another noted that he examined roughly 8,000 cows in his last year of full-time practice and estimated he administered antimicrobials only 25 times, primarily for cases of severe pneumonia. Further, he said that organic dairy producers might delay using antimicrobials because “their animals are generally healthy. Being an eternal optimist, they think she’ll get better.” Another organic industry veterinarian shared his perceptions surrounding the use of antimicrobials and animal welfare by stating that “antibiotics do not equal animal welfare. Period, the end. Animal welfare’s a 24/7, 365-day job.” This particular veterinarian described other treatments that are more about reducing pain and suffering (e.g., flunixin meglumine) and the benefits of using such treatments instead of relying on antimicrobials.

Sources of Information for Organic Dairy Production

Currently Used Resources. Organic producers and veterinarians discussed various resources available to obtain information on organic dairy herd health management. Important resources include their own experience, other organic dairy producers, organic industry veterinarians, organic certifiers, producer meetings, books, and agricultural consulting businesses. The reach of these organizations supporting organic producers and associated service providers include Ohio-based organizations, such as the Ohio Ecological Food and Farm Association (OEFFA, Columbus, OH). Other organizations supporting producers were based in other states but have national and global influences, such as OV (based in Wisconsin), Midwestern Bio Ag (based in Wisconsin), and Acres, USA (based in Texas).

Aside from personal experience, the most critical source of advice and information for organic producers discussed in our interviews was other organic dairy producers. One farmer stated that he appreciated the information and additional support he got from “all the Organic Valley producers” because “as a whole [they] are just super friendly producers.” A few discussed how they preferred to obtain information from other producers because veterinarians or other industry professionals may sell different products. In terms of organic treatments, one farmer stated, “some of the best stuff is way too simple for somebody to make money on” (e.g., Epsom salts).

Organic producers and local veterinarians both discussed heavily utilizing organic certification associations for recommendations and guidance. For instance, a local veterinarian discussed Ohio Ecological Food and Farm Association, and he said this particular certifier was “probably the biggest single source” of information, as he would “contact [his] local certifiers and inspectors for the organic guys to make sure” a particular substance is “allowed.” The Organic Materials Review Institute (OMRI) list of approved drugs was also noted as a good information source, in addition to “industry people like Crystal Creek, Lancaster Ag, and Agri-Dynamics.” Finally, one organic industry veterinarian discussed other industry outlets, such as the MOSES organization (the Midwest Organic and Sustainable Education Service).

Resources Needed to Support Veterinarians. Veterinarians identified several resources that are currently lacking, including readily available information on allowable treatments and research studies on the efficacy of alternative therapies. Several veterinarians discussed concerns surrounding drug withholding periods for alternative therapies. One organic industry veterinarian noted how “the organic rules are not set in stone” and, as an example, “withdrawal times change over time.” One local veterinarian noted that his “biggest frustration” is that organic products do not “have a specified withhold on the product.” He went on to explain how some “producers assume that because it’s not an antimicrobial or anti-inflammatory drug that there’s no withholding needed.”

Local veterinarians also discussed their desire for more information about specific therapy options used on organic dairy farms. For example, one local veterinarian related how a producer would use “black-
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berry leaf extract, and they gave a little bit in ... the mouth,” and the veterinarian was uncertain as to how that would help without having research or scientific studies proving its effectiveness. With conventional treatments, he explained how veterinarians could “pick up their laptop or their phone and can call up studies” and see what “has been tested and ... get efficacy studies.” An organic industry veterinarian also discussed the need for “more trials on efficacy and residue” because “there’s so many natural products out there, and organic dairy farmers think that “Wow, it’s natural. It’s okay.” However, he went on to say, “you’re not supposed to have anything except pure milk in that tank.” This veterinarian felt that information on alternative treatments could also “be helpful for conventional farming as some are trying to reduce antibiotics.” Veterinarians also reported a desire for treatment protocols that were easily accessible; one suggestion was for a decision tree or “some practical algorithms” of how to make treatment decisions in organic situations.

Veterinary-Client Information Use and Future Opportunities

Organic dairy producers and veterinarians with organic clients in our sample indicated a pressing need to disseminate basic information about organic production to other local veterinarians, especially given that organic producers are required by their cooperative to have a formal relationship with a veterinarian. Some producers discussed how, when they first transitioned to organic practice, they had to navigate organic herd health issues through “trial and error” because at that point, “there was no organization, no system ... to walk me through it.” Although it was recognized that there is now more organic herd information than there used to be, there is not equal access to this information across the country. Due to this disparity, there may be producers in many regions who do not have access to a local veterinarian with a strong background in organic production. In the words of one organic industry veterinarian, after he “started taking some phone calls from people across the region, all across the country,” he found “out in some situations, in some areas, there just isn’t the local support.”

Organic industry veterinarians often encourage dairy producers to consult their local veterinarians more frequently regarding animal disease concerns. As one stated, “we do try to get input from the local [veterinarians], and that’s one of the recommendations,” especially for “issues like vaccination.” He went on to indicate that he was not always aware of newer vaccines and “there’s also regional differences,” which is why there is a “real benefit to having a local practi-

tioner” interacting with “herds in the region.” Organic industry veterinarians were also concerned that organic producers may “not be not working with somebody professionally on a regular basis,” and instead, may get information from “a neighbor that they should do this or they should do that.” In response, this veterinarian reported he cautioned his clients, “you need to be asking somebody who works with this on a regular basis, professional-wise, to give you good guidance as to how to put it all together.” He thought that it was best if producers “don’t know what you’re doing, find somebody that does.” As another explained, “this is where it’s really critical that there’s a positive relationship between the veterinarian and the producer, “because some veterinarians just want to go to the antibiotics route right out of the gate.”

Producers indicated they are lacking general guidance and treatment protocols when antimicrobial treatment might be necessary. As one producer stated, “it might be helpful to have a protocol ... to have a threshold where you know when you should be thinking about treating with antibiotics.” Ten of the producers indicated it would be helpful for veterinarians to know more about a variety of organic herd health topics, including “the actual regulations and organic treatments.” It can be challenging for veterinarians to gain experience because disease issues “happen only sporadically,” so a veterinarian “can’t just have a handful of organic producers and get experience.” One producer noted veterinary schools should consider offering “an introductory course to what is allowed and what isn’t allowed.” A couple of the producers stated there was a lot of organic health information available, but it was a matter of the local veterinarians accessing it, as one farmer said explicitly that it was more of a “mindset.”

Likewise, local veterinarians discussed a lack of formal training on organic herd health management in veterinary school, which forces them to actively seek knowledge on their own, mostly “from the farmers” and occasionally from organic industry veterinarians. As one organic industry veterinarian stated, “it would be nice if the university would have more involvement” because “at the beginning that wasn’t the scenario ... the university is playing catch up to some degree ...” He went on to state that “organics are here to stay,” so “they [local veterinarians] wouldn’t have to wholeheartedly embrace organics as their way of life...” but he felt “it would be beneficial” to “get a little bit educated on it.”

Local veterinarians have diverse levels of interest and commitment to learning more about organic dairy herd health. A couple of veterinarians discussed having manuals on hand to refer to in terms of approved organic treatments. One local veterinarian discussed consulting
his copy of an organic herd health book written by one of the organic industry veterinarians, and another local veterinarian mentioned talking to the forage/feed specialist at OV a couple of times. Although some local veterinarians noted they are “thirsty for knowledge” on organic production, there is a desire to “gain it quickly, so you didn’t have to spend days and weeks doing it.” For some local veterinarians, the incentives to invest heavily in learning about organics were lacking because they had so few organic dairy clients and were rarely consulted.

### DISCUSSION

The objectives of this study were to use interview data to interpret how organic dairy producers and veterinarians interact and to interpret their perceptions of (1) best approaches to organic dairy herd health management, (2) the role of veterinarians or other industry professionals or resources in organic herd health decision-making, and (3) current challenges and future possibilities with regards to further developing relationships between veterinarians and organic dairy producers.

All dairy producers selling milk to OV Cooperative are required to have a relationship with a local veterinarian; for many others, this relationship is required per the National Dairy F.A.R.M. Program. Nearly 99% of the US milk supply comes from dairy farms enrolled in the F.A.R.M. Program (for more information, see [https://nationaldairyfarm.com/dairy-farm-standards/animal-care/](https://nationaldairyfarm.com/dairy-farm-standards/animal-care/)). Organic industry and local veterinarians emphasized how a strong veterinary-client relationship is necessary to support producers when making challenging decisions about treating specific disease problems and antimicrobial use, as well as disease prevention measures and vaccine use (Table 1). This research is one of a few studies to explore the current role of local and industry veterinarians in organic dairy farm decision-making, focusing on identifying ways to improve those relationships. Organic industry veterinarians also expressed that a relationship with local veterinarians and organic producers could help them develop specific vaccination plans tailored to their locales. Similar to other studies (Vaarst et al., 2003, 2006; Mayen et al., 2010; Stiglbauer et al., 2013; Bergman et al., 2014), we found that organic dairy producers generally minimize their use of veterinarians. In particular, local veterinarians were consulted less frequently by their organic dairy clients, and consultations were typically for acute cases of disease, which reflects results reported in previous studies (Vaarst et al., 2003, 2016a; Stiglbauer et al., 2013; Duval et al., 2016a). The complexity of these issues and the variability among organic producers and veterinarians in our sample illustrate some limitations of this study and the need for broader research in the future. For example, it was challenging at times to discern what exactly constituted a veterinary visit; some producers reported going to their veterinarian to obtain vaccines and receive a consultation of their use, whereas others requested a veterinarian visit to the farm for the same purpose.

Several local veterinarians in our study expressed concern that organic dairy producers are utilized only as a “last resort” instead of having an ongoing, mutually beneficial relationship. As a result, veterinarians’ perspectives about herd health on organic dairy farms are likely influenced by mainly dealing with these acute or severe disease cases, where they may consider themselves “firefighters.” These severe cases often involve difficult decisions of whether to apply antimicrobials or potentially euthanize animals (Brock et al., 2021b).

### Table 1. Summary of organic dairy producers and veterinarians (organic industry and local) perspectives on the role of veterinarians and different aspects of dairy herd health management

<table>
<thead>
<tr>
<th>Management aspect</th>
<th>Organic producers1</th>
<th>Organic industry veterinarians</th>
<th>Local veterinarians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular interaction with local veterinarian</td>
<td>Rarely mentioned</td>
<td>Mentioned frequently</td>
<td>Mentioned frequently</td>
</tr>
<tr>
<td>Prevention (e.g., cleanliness of facilities and animals, early diagnosis and treatment)</td>
<td>Mentioned frequently</td>
<td>Mentioned frequently</td>
<td>Mentioned frequently</td>
</tr>
<tr>
<td>Vaccination</td>
<td>Mentioned somewhat</td>
<td>Mentioned</td>
<td>Mentioned frequently</td>
</tr>
<tr>
<td>Organic therapies or supplements</td>
<td>Open and diverse spectrum of use</td>
<td>Very familiar; some veterinarians sell organic products</td>
<td>Unfamiliar or skeptical of efficacy</td>
</tr>
<tr>
<td>Antimicrobials</td>
<td>Minimal use; for rare, severe cases of disease; difficult decision</td>
<td>Some concern shared about delayed treatment, but countered the notion that the use of antimicrobials equates to good animal welfare</td>
<td>Very concerned about delayed antimicrobial treatment and consequences to animal welfare</td>
</tr>
<tr>
<td>Outdoor access</td>
<td>Mentioned frequently</td>
<td>Mentioned frequently</td>
<td>No mention</td>
</tr>
</tbody>
</table>

1See Brock et al. (2021b) for more discussion on organic dairy producer perspectives on herd health management.
Both producers and veterinarians agreed that delayed treatment might negatively affect treatment successes. Producers described the challenging nature of timely use of antimicrobials, given organic production restrictions; some producers recalled instances where they struggled over the decision to use an antimicrobial and pondered whether they were timely in their decision (Brock et al. 2021b). The decision-making process around using antimicrobials may be more challenging in the United States, given that organic production regulations are stricter here than in Canada and the European Union (Scholten, 2014).

There are overlapping and divergent perspectives on herd health management practices between local, organic industry veterinarians, and organic producers (Table 1). Local veterinarians may not always be aware of how the goals of organic dairy practitioners differ from those of conventional producers (Vaarst et al., 2006; Duval et al., 2016b). For example, while both local and organic industry veterinarians focus on disease prevention (Table 1), they seem to diverge on specific areas of emphasis. Standard preventative health recommendations for dairy farms include regular veterinarian visits, vaccination, documenting herd health events, and treatment, and cleanliness (Stiglbauer et al., 2013). Although many of these practices were valued by our organic industry veterinarians and producer respondents, they also emphasized the perceived importance of broader aspects of the farm management system, such as outdoor access (Table 1), grazing, and the role of soil health on feed quality as part of a preventative health program. These distinct ways of framing preventative approaches to herd health reflect findings in Brock et al. (2021b), where organic producers focused on alternative methods for strengthening immune systems.

Organic dairy producers’ experiences and strategies to manage dairy herd health are diverse, and their relationships with veterinarians are variable, as this study and other research confirm (Jones et al., 2016). For example, because so many of our respondents identified as Plain Amish and Mennonite, as is typical of states in the Midwest and Eastern United States (Cross, 2015; Brock et al., 2021a), it can be challenging to know how much the relationship between producers and veterinarians was shaped by the organic character of their farm or whether it reflected cultural differences between veterinarians and Plain community producers. Other regions of the country do not have as many Plain producers (see Brock et al., 2021b for more discussion of the Plain producer presence in this sample). Some veterinarians mentioned that very conservative Amish producers tend to be frugal and might not seek out veterinary insight, which concurs with previous research (Brock and Barham, 2009). While organic industry veterinarians spoke based on experience working with organic dairy producers across the country, our findings for local veterinarians were limited to Ohio. Given that Ohio was one of the first states to have an organic dairy presence, Ohio and other states in the Midwest may have more veterinarians working with organic dairy producers than in other regions (Sorge et al., 2019).

Although our sample population was representative of the organic dairy sector in this region, the relatively small herd sizes in our sample likely shaped patterns of veterinarian usage, which could limit the generalizability of our results. Larger organic dairy farms are primarily located in states such as Texas and California (USDA NASS, 2016). There is evidence that producers with larger herds interact more with veterinarians (Beggs et al., 2015), although this relationship is not always clear (Derks et al., 2013; Richert et al., 2013). The possible impact of herd size on veterinarian usage should be further explored in future research.

The variability in use of local veterinarians among our sampled farms suggests that other factors may be at play. Previous work has found that the “intensity” of production approaches overall (i.e., the use of nutritionists, vaccines, routine herd checks) was even more important than organic management per se in determining the use of veterinarians (Richert et al., 2013). This variability and the diversity of attitudes and behaviors around herd health among organic producers identified in this research and other research (Krieger et al., 2020) should be further explored in future research and may help to alleviate generalities and misconceptions about organic dairy.

Local veterinarians in our study shared perceptions about organic dairy herd management practices that differed from the information we collected from producers and organic industry veterinarians. For example, quite a few of the local veterinarians assumed that organic dairy producers were less open to vaccination. In contrast, most organic dairy producers in our study did use vaccines in their herds, and very few were opposed to vaccination per se (Brock et al., 2021b). Therefore, many organic producers may be more open to considering vaccinating their animals than some local veterinarians assume. Local veterinarians’ experience with organic herd health management also included several crisis calls, where antibiotic use was called for but too late to address the problem. However, they were often unaware of or not called upon to address disease or herd health problems that were resolved using other (non-antimicrobial) herd health management practices. These filtered experiences can create a mismatch between veterinarian perceptions and self-reported producer outcomes with respect to overall herd health out-
comes, which organic industry veterinarians expressed (Table 1).

Local veterinarians also reported few opportunities for formal training in organic herd management and shared concerns about a lack of both personal experience and peer-reviewed scientific research on the efficacy of a variety of “natural” treatments used by organic producers. Historically, organic philosophy or specific therapy options are not part of the veterinary school curriculum (Vaarst et al., 2011; Duval et al., 2016a; Sorge et al., 2019). Educational opportunities for more formal veterinary training and experimental research on organic dairy herd health practices could be considered an area of opportunity for the future.

Consistent with previous research in France, local veterinarians did not always feel comfortable recommending natural treatments, and organic dairy producers observed that their local veterinarians were not always familiar with organic treatments (Table 1; Duval et al., 2017). In our study, some veterinarians explicitly acknowledged that organic producers were more familiar with these natural treatments than they were at present. Local veterinarians communicated that antimicrobial treatment strategies are more evidence-based compared with natural remedies (Duval et al., 2016a). This sentiment is consistent with results from another US national survey, which reported that two-thirds of veterinarians “were concerned about livestock welfare on organic farms because of the lack of treatment options” (Sorge et al., 2019). The safety and efficacy of many of the treatments used by organic producers have not yet been documented in peer-reviewed studies. By contrast, antimicrobial treatment strategies with known dosages, safety profiles, and withdrawal times are vetted through the Food and Drug Administration.

While organic industry standards support and most of our respondents believe that there should be stronger relationships between organic dairy producers and their local large-animal veterinarians, the pathway to achieving this is not straightforward. Our study and past research found that veterinarians expect their services to be sought out by organic dairy producers (Duval et al., 2016a), whereas organic dairy producers expect more proactive action from veterinarians (Duval et al., 2017). A survey of Iowa veterinarians working with organic livestock farmers found that 80% felt there was a role for their profession in organic agriculture (O’Neill and Wells, 2013). Our findings also demonstrated a desire from some veterinarians to learn more, particularly surrounding organic treatment options.

Economic constraints influenced both veterinarians and producers in our study. Both parties discussed current challenges for the dairy industry in general and economic pressures on large-animal veterinarian practices specifically. Given that organic clients comprised only a small fraction of their business, most local veterinarians in our study felt that there was not enough economic incentive to invest much of their time to learn about organic dairy management options. This is similar to results reported in another study (Duval et al., 2016a). Similarly, organic producers in our study did not necessarily see economic value in paying for regular veterinary consulting services required for designing vaccine programs, risk assessments, and prevention services as part of an ongoing formal relationship between producer and local veterinarians. More research could help document some of the longer-term returns for producers working with local veterinarians on longer-term herd health prevention and strategies.

Future research may be able to explain how producer attitudes and behaviors around organic herd health strategies vary by farm experience, the density of operations, requirements of national organic policies, and changes over time (Krieger et al., 2020). We found that organic farmers rely more on organic industry veterinarians when they are just converting, but it would be interesting to track organic farms throughout the transition process to document how their animal health concerns and practices evolve (Bennedsgaard et al., 2003). Tailoring veterinary outreach to address cultural and religious sensitivities can also be important in this research area, given that many of the producers were Amish, where relationships and in-person interactions can be even more important (Brock et al., 2018).

Our research did generate some suggestions for how local veterinarians and organic dairy producers might work better together. More could be done to use organic dairy industry veterinarians in conjunction with organic certifying agencies to develop programs in universities and extension to train and support local veterinarians. Variation in recommendations on allowable treatment products can vary across different certification agencies, which can create confusion. These groups could work together to understand better, promote, and make consistent recommendations about organic dairy health and herd management practices. Past research in Europe has documented some success in strengthening the veterinary-organic client relationship via organic farming organizations facilitating interactions between producers and local veterinarians (Duval et al., 2016a,b). We encourage future studies that explore organic herd health strategies and veterinarian-producer relationships to include a variety of organic producers and veterinarians from different locations with varying levels of experience and utilize a participatory approach that ensures producers and veterinarians have
a stake in shaping research questions and interpreting findings (Duval et al., 2016b; Jones et al., 2016). Past research has indicated the importance of veterinarians listening to and learning from producers themselves in strengthening those relationships (Ritter et al., 2019). For example, within this region, given the importance of producer networks particularly with Amish producers, successful stories of those who have successfully managed long-term herd health challenges while proactively working with veterinarians could be promoted by organic sector veterinarians, certifiers, and other agencies so other producers can clearly see the value of these collaborations.

CONCLUSIONS

In this study, we compared veterinarian and producer perspectives for managing organic dairy cattle health and the current and future roles of local and organic industry veterinarians. While producers generally reported positive relationships with their local veterinarians, many reported limited interactions due to their perceived lack of a need for veterinary services (in general) and concerns that local veterinarians did not share their own goals and priorities around managing organic dairy herd health. Limited veterinary consultation was also viewed as a means to save money in an economically challenging time. Local veterinarians reported not always being familiar or comfortable with organic dairy health management strategies, given they had limited exposure and few organic clients. Strengthening this relationship in the future will require proactive, collaborative initiatives among producers, local veterinarians, organic industry professionals, and organic certifiers. These efforts could facilitate the relationship between parties and demonstrate the benefits to producers of working with local veterinarians. The provision of additional resources in organic dairy herd health management (e.g., scientific research, continuing education opportunities) is needed to support the efforts of local veterinarians and increase producers’ confidence in their professional abilities.

ACKNOWLEDGMENTS

The USDA National Institute of Food and Agriculture, Animal Health and Disease Research Program, Project 1017740 (Washington, DC) funded this study. We are grateful for the time and insights gleaned from the veterinarians and organic dairy producers who participated in this research. We appreciate the support and connections of Organic Valley (La Farge, WI), Ohio Ecological Food and Farm Association (Columbus, OH), and Quality Certification Services (Gainesville, FL). The authors have not stated any conflicts of interest.

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