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**ACCESS TO PASTURE FOR DAIRY COWS: RESPONSES FROM AN ON-LINE  
ENGAGEMENT**

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**ABSTRACT:** An online engagement exercise documented the views of Canadian and U.S. participants affiliated and unaffiliated with the dairy industry, on the issue of pasture access for dairy cows. A total of 414 people participated in 10 independent web forums. Providing access to more natural living conditions, including pasture, was viewed as important for the large majority of participants including those affiliated with the dairy industry. This finding is at odds with current practice on the majority of farms in North America that provide little or no access to pasture. Participant comments showed that the perceived value of pasture access for dairy cattle went beyond the benefits of eating grass; participants cited as benefits exposure to fresh air, ability to move freely, ability to live in social groups, improved health and healthier milk products. To accommodate the challenges of allowing pasture access on farms some participants argued in favor of hybrid systems that provide a mixture of indoor confinement housing and grazing. Understanding the beliefs and concerns of participants affiliated and unaffiliated with the dairy industry allows for the identification of contentious topics as well as areas of agreement; this is important in efforts to better harmonize industry practices with societal expectations.

**Keywords:** grazing, survey, attitudes, animal welfare

## INTRODUCTION

Dairy farming has changed from primarily pasture-based to confinement feeding systems (Blayney, 2002). Now about 30% of U.S. cows (and less than 5% of lactating cows) have access to pasture at some point during the growing season (NAHMS, 2010).

Studies that have explored non-producer views about farm animal welfare have found strong preferences for more natural environments (e.g. Boogaard et al., 2011a; Vanhonacker et al., 2008; Krystallis et al., 2009) and general opposition to confinement production (Boogaard et al., 2011b; Lassen et al., 2006; Miele et al., 2011). Compared to the poultry and swine industries, the public ranks the dairy industry more highly in terms of animal welfare (Ellis et al., 2009; European Commission, 2005; Maria, 2006). However, some practices within the dairy industry, like early cow-calf separation (Ventura et al., 2013) and tail docking (Weary et al., 2011), have drawn criticism.

Some concerns, such as food safety, are shared broadly by both the public and the dairy industry (Noordhuizen and Metz, 2005), but public discussion of farm animal welfare has often been dominated by “adversarial and entrenched oppositions” (Driessen, 2012). This is not surprising for management practices such as tail docking that are at odds with public expectations. However, respectful engagement between industry and non-industry participants may also identify common ground and areas for compromise.

The aim of the current study was to document the views of primarily Canadian and U.S. participants, affiliated and unaffiliated with the dairy industry, on the issue of pasture access for dairy cows. This study is one component of the Cow Views project (Weary et al., 2012), designed to provide a forum for people to share their views on contentious issues in dairy production.

## MATERIALS AND METHODS

The Behavioral Research Ethics Board at the University of British Columbia approved the study. Informed consent was obtained from all participants. Consent forms and recruitment documents outlined methods for maintaining confidentiality and a general description of the study methods and objectives.

UBC's "Your Views" web site ([www.yourviews.ubc.ca](http://www.yourviews.ubc.ca)) was originally created to engage people on ethical issues regarding science and technology (Ahmad et al., 2006). The "Cow Views" section focuses on animal welfare topics related to dairy production. We used the "N-Reasons" scenario-based survey platform (Danielson, 2009), designed to improve public participation in ethically significant social decisions. Unlike traditional survey platforms, this platform allows for the collection of responses to close-ended questions (Yes, No and Neutral) and open-ended comments (the participant's reasons for their choice). Participants are able to see and choose a reason given by previous respondents or to enter a new reason to see reasons put forward by other participants, creating a type of virtual 'town hall'. As reasoned by Moon et al. (2012), this method "reduces the reason space to broad convergent categories while encouraging iterative re-wordings for clarity." Overall this approach promotes democratic ethics by giving prominence to the numbers of participants choosing different options in a transparent way and it allows participants to have information about the reasoning used by others (Danielson, 2010).

Participant responses were collected in 2011 and 2012. Our method was not intended to collect a random or representative sample of any specific population; rather we tried to recruit participants with a wide range of views on animal use including animal advocates, individuals working in the dairy industry, undergraduate and graduate students who were studying animal

science or related disciplines, and general members of the public. Recruitment methods varied from advertisements in online newsletters, announcements at meetings and undergraduate classes, visitors to our well-established survey website. We targeted recruitment towards North American citizens, however, the survey was made available on the worldwide web, so anybody with access to the Internet could participate ("self selection"). Our sample was limited to those with Internet access, however Internet surveys having been shown to result in diverse samples comparable to more traditional survey methods (Gosling et al., 2004).

As people joined the survey they were assigned into groups ( $n = 10$ ). We aimed for a group size of approximately 40 participants, but this number was allowed to vary depending upon how rapidly participants were recruited to a given group (mean  $\pm$  S.D. group size was  $40 \pm 20$  participants). Although anyone could participate in the survey certain groups included many participants recruited by particular methods. For example, groups 1 to 4 included recruitment through invitations advertised in producer magazines (Progressive Dairyman and Ontario Farmer) and in a newsletter of the British Columbia Society for the Prevention of Cruelty to Animals. Group 5 included participants recruited at the producer-oriented Western Canadian Dairy Seminar in Red Deer, Canada. Participants in Group 6 were recruited from visitors attracted to other surveys on the Your Views website site with no specific recruiting strategy in place. Groups 7 to 10 were recruited using Amazon's Mechanical Turk crowd-sourcing service ('M-Turk'), providing access to people who are more demographically diverse than standard Internet samples (Buhrmester et al., 2011).

To provide context, participants were provided a brief description of perceived pros and cons of indoor housing and pasture access as follows:

“On many dairy farms cows are always kept indoors. Some dairy farmers believe that well-designed indoor housing provides a more comfortable and more suitable environment for

the cows. In addition, some farmers keep cows indoors to more easily provide and control diets formulated to sustain high milk production.

Others consider pasture access to be important. For example, some believe that grazing is more environmentally sustainable, that pasture provides a healthier and more comfortable environment for cows, and that grazing is a natural behavior important for cows."

Participants were then asked "Should dairy cows be provided access to pasture?" and were given the option of a response in the form of "Yes, because . . . ", "No, because . . . ", (opponents) or "Neutral, because . . . ". They could explain their choice by providing a reason, and they could select one or more of the responses left by previous participants. Participants were allowed to select more than one reason, to provide a more complete understanding of their views. Within each of the 10 groups participants could see each other's reasons, but participants in one group could not see the reasons discussed in other groups; in this way each group provided an independent test of how this type of discussion unfolded, and an especially persuasive reason could only influence the votes within a single group. The different groups also served as independent replicates, allowing us to evaluate the extent to which support and the pervasiveness of the various reasons were consistent across different groups varying in recruitment method. Overall, use of independent groups provided a platform for democratic decision-making while controlling for potential influences of group structure.

Participants were asked to provide basic demographic information including gender, age, education and country of origin. Participants were also asked: "What best describes your involvement with dairy production?" Choices included: "No involvement", "Dairy Farm Owner, Operator or Worker", "Student/Teacher", "Veterinarian", "Dairy Industry Professional (e.g. nutritionist)", or "Animal Advocate". Participants were also asked: "Please rate your familiarity

with dairy production." Choices included: "Very familiar", "Somewhat familiar" and "Not familiar").

When analyzing the distribution of votes per reason, participants could choose multiple reasons, but these were discounted by the total number of selections such that each participant contributed just one vote (e.g. if a participant voted for 2 reasons, each reason would receive 0.5 votes). Themes were extracted from the reasons using content analysis, following the methods described by Denzin and Lincoln (2000). Schuppli analysed all the reasons. All reasons were read several times and then examined line by line to identify preliminary ideas and these were grouped into dominant themes. Discussions with Weary involved talking through interpretation of reasons to agree on key ideas and themes. Analysis was structured according to reasons from proponents, opponents and those neutral to providing cows access to pasture. Many reasons included more than one theme. For example, a single opponent's reason might describe both issues associated with nutritional inadequacies of pasture and protection from the environment. These reasons were assigned to multiple preliminary codes. Voting for these entries was considered as agreeing to all of the ideas expressed in the reason. To help characterize the sample, percentages of participants (of the same vote type) who chose a particular theme are provided. However, note that the total number of opponents is small.

Univariable associations between demographic variables and support for pasture use were tested using Chi-square tests. For the analysis of participant age, we pooled data for participants over 30 years old to provide a reasonable sample size for each age category. For education we combined doctor and master's degrees as postgraduate. For familiarity with dairy production we combined not and somewhat familiar. Countries with fewer than 10 participants were pooled as 'other'. Demographic characteristics co-varied; for example, veterinarians were more educated

than others categories of affiliation. Thus associations between support and the various demographics reported below should not be considered independent.

## RESULTS

A total of 414 people participated (Table 1). Of these, 68.3% were female, 54.1% were 30 years or older, 42.9% were from Canada, 47.1% were from the U.S. and 10.0% from a range of other countries. In terms of familiarity with dairy industry, 56.2% had no experience with the dairy industry, 17.1% were students or teachers, 12.5% were animal advocates, 8.7% were producers, and 5.4% were veterinarians and other dairy industry professionals combined.

Across all groups, most (80.2%) participants responded “Yes” to the question “Should dairy cows be provided access to pasture?”, but 16.7% responded “Neutral”, and 3.1% responded “No”. Approximately 18% of participants selected more than one reason to justify their vote. Multiple reasons selected by a single participant were always consistent (i.e. participants selected either multiple “No” reasons or multiple “yes” reasons, but not both). Those who chose one reason (n=341) were less likely to support access to pasture (77.7% support) compared to participants who chose 2 or more reasons in favor of pasture access (91.8% support,  $\chi^2=13.3$ ,  $P=0.0013$ ).

Responses varied with participant demographics. Support varied by participant dairy production experience ( $\chi^2=74.6$ ,  $P<0.0001$ ); the majority of animal advocates (96.6%), respondents not associated with the industry (88.9%), producers (78.1%) and students and teachers (58.7%) felt that cows should be provided access to pasture. In contrast just 6 of the 20 veterinarians and dairy industry professionals recruited indicated that cows should be provided access to pasture. Participants who described themselves as very familiar with the dairy industry

were more supportive of access to pasture ( $\chi^2=29.8, P <0.0001$ ). Participants with an undergraduate education or below were more supportive of providing pasture access than were those with postgraduate degrees ( $\chi^2=14.2, P=0.0008$ ). Females were more supportive of pasture access than males ( $\chi^2 = 23.3, P <0.0001$ ). Age and country of origin did not affect support for pasture. In every gender, age, country of origin and dairy production experience sub-group, except for veterinarians and industry professionals, the majority of respondents were supportive of providing dairy cattle access to pasture.

A mixture of proponents and neutral participants were present in all groups, but 5 groups did not have any opponents (Table 1); 4 of these groups (groups 7-10) were recruited through M-Turk. Groups differed in their support of pasture ( $\chi^2=78.7, P < 0.0001$ ); however, in each group the majority of participants (from 60.6% to 97.4%) indicated that cows should be provided access to pasture. There were also a reasonably high number of “Neutral” responses in most groups (from 2.6% to 36.1%).

### *Analysis of Comments*

Respondents provided reasons for their views, or selected reasons provided by other participants. Across all groups, a total of 98 different reasons were provided (range 5 to 15 reasons per group); some reasons included several themes. Only 3 themes (belief about the naturalness and health benefits of pasture and willingness to consider combinations of indoor housing and pasture access) were cited in all 10 groups, perhaps reflecting differences in group composition.

*Proponents of Pasture Access.* For those who supported pasture access, over half of the reasons reflected a belief that access to pasture was more natural for cows and better for their

welfare. This theme was present in all groups. Of all proponents, 73% stated that cows should experience a natural life, which includes grazing: "... every being deserves to feel sunshine on her back, to feel earth beneath her feet, to breathe fresh air," or "cows are meant to roam on pastures" or "... cows are grazers. Green grass, fresh air and sunshine should be a basic animal right." These quotes illustrate the common view that there were benefits to being outdoors beyond eating grass. Some proponents (26%) specified that confinement in barns was considered unnatural and the cause of stress and disease. For example one respondent stated, "Many of the diseases of cows and other species are caused or encouraged by the very conditions we impose on them - confinement, and in large numbers, and the resulting stress on them."

Participants (present within every group) felt that pasture improved cow health (63% of proponents), including improving rumen health, reducing lameness, and reducing stress or disease that would result from living in confined systems. For example, "The time on pasture allows the cows to participate in their normal grazing behavior, and can help reduce the incidence of hoof problems such as lameness and sole ulcers if the pastures are kept in good condition" or pasture helps "... the build up of leg muscles, and reduce the psychological effects of confinement."

An additional suggested benefit of grazing was improved sustainability (24% of proponents). For example, "... Rotational grazing gives high production and the cheapest, most environmentally friendly sunlight harvest and fertilizing/waste removal/treatment. Well managed grazing systems are clean, healthy, and tops for animal welfare." Proponents (22%) also felt that pasture raised cows produced "healthier" milk. Some proponents (7%) echoed a common view of the "neutral" participants, that access to pasture was good as long as cows were protected from the climate (e.g. "... shelter from wind and sun and rain") or as long as they have choice (e.g.

"give them the choice whether they want to be indoors in a well designed facility, or if they want to be outside, and let both options be available for at least a considerable amount of time").

One reason suggested that minimum standards that promote some amount of natural living should be required: "the ultimate goal of food production should not be to create the most amount of product from the least amount of investment, but instead there needs to be minimum standards that allow the animals involved to lead at least a somewhat natural existence with a good quality of life."

Four comments (authored by both producers and non-producers) suggested that the image of cows grazing on pasture was good for "public perception".

*Opponents of Pasture Access.* Many of the opponents (77%) argued that confinement systems were good for cows because these met all the needs of cows. Housing was perceived to provide access to clean feed and water, comfortable bedding, protection from the sun and mud, proper air flow and cooling, an environment free of pathogens and where cows were happy. These themes are reflected in quotes such as "... pasture is not necessary, provided that you have an environment that addresses cow comfort issues (adequate water, adequate bunk space, adequate stall space, and adequate ventilation)" or "If a cow is happy indoors, there is no need to provide pasture." Some opponents (38%) also stated that meeting the nutritional requirements of high milk producing cows was difficult in pasture systems. For example, "Today's cow also isn't able to consume the nutrients necessary to support her level of production from pasture alone." Some opponents (15%) suggested that feeding cows on pasture was bad for the environment. Several comments also suggested that for dairy cows highly selected for production, grazing on pasture was no longer natural: "The cows are bred for the purpose of food and dairy production.

They have been bred for centuries by humans purely to be used as a food source. They are not wild animals and it's hard to know really what their natural behavior is. Is it so different to their behavior to be grazing instead of eating indoors?" Finally, some opponents (8%) chose a reason that stated that they did not want regulations to require access to pasture because they believed that successful pasture use is dependent on location and climate.

*Neutral about Pasture Access.* Participants who chose neutral reasons often mentioned pros and cons to grazing, and invoked similar themes as discussed above for the proponents and opponents. Arguments in support of pasture (62% of neutral participants) included that pasture allowed cows to express natural behaviors, and was good for cow health and “psychological health”. Arguments against pasture (54% of neutral participants) included that cows may have poorer health because of exposure to pathogens or mud, producers would be economically less efficient, additional land would increase costs, and grazing may not be good for the environment if it harms the soil or contributes to water pollution. For example, one participant argued “It might be a good idea in some cases, but not always possible. ... I am not sure how much grazing would be more environmentally sustainable compared with a well designed and well managed confinement system.” Many neutral participants (71%) argued that they liked the idea of pasture but implementation depended on a variety of factors such as geography, weather, and size of farm. For example, one participant stated that: “The point is that both systems have their strengths and weaknesses and there is not one size fits all for the different production systems needed in the different regions of the world.” A second participant argued that: “Certain farms have the ability to pasture successfully. Other farms are lacking in the amount and quality of pasture and would be better suited to provide comfortable, indoor housing year round.”

Several comments reflected the view that providing free access to both pasture and indoor housing would be ideal. One such comment suggested that access to the outdoors was important but the outdoor area need not be pasture: "Access to an open space (dirt lot) should be provided whenever possible, but access to a pasture in a confined system is a producer's decision."

Other participants suggested that more research needed to be done, including work on understanding cow motivation for pasture access: "While little work has been done to assess the cow's desire to access pasture, it seems that access to pasture, if managed appropriately can have many advantages for the cow and the farmer. However, we need to be very clear whose interests we're talking about so we don't simply send the cows out on pasture because WE think they should be out there. ... In principle, it would be possible, and maybe even desirable, to create synthetic environments that perfectly mimic all of the best cows want in pasture, we just have to tease out what these features are and how much they desire them (e.g. lighting, soft flooring, cleanliness, lighting, temperature, etc.). This of course neglects the argument that what cows desire may not always be what's best for them!"

Across all participants, there was mention of a variety of benefits of pasture, however regardless of how they voted, 26% were in favor of cattle having access to the outdoors without specifying grazing and 44% specified that grazing was an essential benefit. Also, 25% of all participants (present within every group) seemed willing to accept a compromise between combinations of indoor housing and pasture access.

## **DISCUSSION**

The majority of respondents indicated that cows should have pasture access illustrating a disconnect between common practice in the industry (i.e. high usage of zero grazing systems, NAHMS 2010) and the values of the diverse range of participants recruited for the current study. Veterinarians and industry professionals were the only demographic category that did not show majority support pasture access, but the readers should be cautioned that our sample included only 20 such participants. Individuals that view themselves as providing a service to producers may be less willing to oppose current practices. A study of Danish dairy found that veterinarians were more focused on financial performance and increased production than were producers (Kristensen and Enevoldsen, 2008). In addition, as medical professionals veterinarians may emphasize concerns about the physical health of animals: cleanliness, diseases control, nutrition etc., rather than concerns about natural living.

The number of "neutral" responses was higher in the current study (17%) than in our related studies on cow-calf separation (9%, Ventura et al., 2013) and tail docking (9%, Weary et al., 2011). This result suggests that the topic of pasture access is less straightforward in the minds of people. The comments of "Neutral" participants suggested that they recognized that pasture access was desirable but difficult to achieve on some farms, in part, because of a lack of available land, inappropriate environmental conditions for grazing and concerns about reduced milk production.

Preference for naturalness was a theme that was present in all groups, suggesting a widely held value. As in other studies, grazing was viewed as contributing to naturalness including values placed on access to the outdoors and to fresh air and freedom to roam (Boogaard et al., 2011a; Boogaard et al., 2008; Ellis et al., 2009; Te Velde et al., 2002) as well as producing healthier milk (Pirog, 2004). Similar concerns have been raised for pig production

systems (Boogaard et al., 2011b; Lassen et al., 2006). Other studies have found that participants not involved in animal agriculture tend to be more likely to phrase their concerns in terms of naturalness (Te Velde et al., 2002; Vanhonacker et al., 2008).

Boogaard et al. (2008) found that Dutch citizens viewed the image of dairy cows grazing on pasture as a valuable aspect of dairy farming for both aesthetic and cultural reasons. Only a small percentage of participants in our study promoted pasture access from a positive public perception or public relations perspective.

The belief that access to pasture was good for cow health was present in all groups, echoing previous work on producers (Te Velde et al., 2002) and non-producers (Ellis et al., 2009). Spooner (2013) found opposition among non-producers to a single-minded focus on animal health at the expense of natural living.

In the current study, as in Ellis et al. (2009), pasture was viewed positively but people recognized that providing access to pasture was not always straight forward for producers. For example, participants recognized that adequate protection from adverse climatic conditions was important. In both studies people were also concerned about the availability of suitable land as well as protecting the environment from damage by cows. Overall there appears to be some acceptance of farm-specific solutions and providing cows both indoor and outdoor environments.

Producers in this study typically supported pasture access. Although we did not ask producers about their own operations, in all likelihood many of these producers did not provide their own cows access. Thus it seems that producers supported pasture access in principal, but felt limited in their ability to do so in practice. In our view this makes the results of the current study particularly interesting, as they suggest understanding and addressing perceived constraints may be especially effective in facilitating changes in practice.

A combination of pasture and indoor housing concurs with scientific studies that have examined preference of cattle for pasture as well as impacts of grazing on cattle health. Preference for pasture is influenced by temperature and rainfall, with a stronger preference for pasture at night (Falk et al., 2012; Legrand et al., 2009). Moreover, lactating cows housed on pasture at night but confined indoors during the day consumed the same amount of TMR intake and produced the same amount of milk as cows housed indoors continuously (Chapinal et al., 2010). Washburn et al. (2002) found that pastured cows had reduced incidence of mastitis and lower culling rates but lower body weights and body condition scores compared to cows in confinement.

As participants in this study pointed out, there may be constraints to providing pasture, particularly on farms that do not have adequate land base or on farms whose land base is vulnerable to impacts of grazing cows. Research has demonstrated both positive and negative impacts of dairy grazing systems on the environment when compared to intensive indoor systems. For example eutrophication increases with greater use of concentrate feed and longer manure storage periods in confinement systems (O'Brien et al., 2012) but soil can be damaged through treading by cattle in grazing systems (Cuttle, 2008). There is a growing body of research showing beneficial effects of mixed systems (combination of grazing and confinement) for sustainability; for example, the water footprint appears to be least for dairy products derived from mixed systems (Mekonnen and Hoekstra, 2012). Environmental impacts will depend on the farm's ecosystem and pasture management. It seems likely solutions will need to be tailored to specific situations, taking into account the specific factors relevant in different areas (von Keyserlingk et al., 2013). For example, in arid regions such as in the western US there is a growing use of dry lots (an open dirt lot that has no vegetative cover; NAHMS, 2010). Research

needs to evaluate impacts on welfare and the environment of outdoor dry lots compared to both indoor confinement and pasture. Perhaps this or other forms of outdoor housing may act as a reasonable substitute for pasture.

Our study assessed a limited number of demographic variables. Participants with less education were more likely to support access to pasture; other studies found greater concern about animal welfare among the less educated (Kendall et al., 2006; Krystallis et al., 2009; Prickett et al., 2010). In our study, those with higher education may have understood the complexities of the industry and the implementation of pasture, therefore may have been less supportive. Females in this study were more likely to support pasture access, consistent with Boogaard's (2011a) finding that women preferred more traditional and natural dairy farms. The current study targeted participants affiliated and unaffiliated with the dairy industry; different types of affiliation also differed in other demographic characteristics. For example, the veterinarians were more educated than many other participants, and many of the producers were male. For these reasons we urge caution in interpreting demographic associations.

As interest in animal welfare continues to increase there is a growing need to understand values, beliefs and attitudes regarding farm animal welfare. This research has helped describe the range of views about access to pasture. However, our results should not be considered representative of any specific population and we cannot be certain about how well the specific findings from the current study generalize to other samples. A larger, representative survey may be useful for this reason. Understanding broad areas of social consensus, as well as disagreement, will help to identify methods of bringing industry practices better in line with public expectations. If industry practices remain out of step with public expectations, the relationship between the public and industry can erode (Brom, 2000), increasing the risk of

imposed regulatory and retailer initiatives that can cause considerable upheaval for farmers. By acting proactively the industry may maintain societal support and thus more control over changes that occur.

In conclusion, providing cows with access to more natural living conditions, including pasture, was viewed as important for many participants and very few participants opposed pasture access. Some participants showed a willingness to combine a mixture of indoor housing and pasture to accommodate the challenge of implementing grazing-based systems on all farms. Participants' views of 'pasture' went beyond the benefits of cattle eating grass; perceived benefits included exposure to fresh air, sunshine, etc. Future research should explore attitudes to dairy systems that combine access to more natural environments and indoor housing.

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**TABLE 1.** The number (and %) of participants (n = 414) who supported (“Yes”), opposed (“No”) and were “Neutral” to the question “Should dairy cows be provided access to pasture?” Responses are shown for all participants, and separately by demographic category, by those who provided a single response versus multiple responses and by replicate discussion group. Categories with fewer than 414 responses are due to some respondents not providing demographic responses.

Choice	Yes	No	Neutral
All participants (n = 414)	332(80.2%)	13(3.1%)	69(16.7%)
Gender (n =401)			
Female	237(86.5%)	3(1.1%)	34(12.4%)
Male	85(66.9%)	8(6.3%)	34(26.8%)
Age (n =401)			
19-29	141(76.6%)	5(2.7%)	38(20.6%)
30 +	181(83.4%)	6(2.8%)	30(13.8%)
Education (n=401)			
Masters/Doctorate	59(66.3%)	4(4.5%)	26(29.2%)
Undergraduate or below	263(84.3%)	7(2.2%)	42(13.5%)
Country of Origin (n = 401)			
Canada	140(81.4%)	6(3.5%)	26(15.1%)
U.S.A	156(82.5%)	4(2.1%)	29(15.3%)
Other	26(65.0%)	1(2.5%)	13(32.5%)
Dairy background (n =368)			
Dairy Farm Owner, Operator or Worker	25(78.1%)	3(9.4%)	4(12.5%)
Veterinarian/Industry Professional	6(30.0%)	3(15.0%)	11(55.0%)
Student/Teacher	37(58.7%)	3(4.8%)	23(36.5%)
Animal Advocate	44(96.6%)	0(0%)	2(4.3%)
No involvement	184(88.9%)	2(1.0%)	21(10.1%)
Responses (n = 414)			
Single	265(77.7%)	9(2.6%)	67(19.6%)
Multiple	67(91.8%)	4(5.5%)	2(2.7%)
Group (n =10)			
1 (n= 33)	20(60.6%)	2(6.1%)	11(33.3%)
2 (n = 42)	33(78.6%)	1(2.4%)	8(19.0%)
3 (n = 36)	23(63.9%)	0(0%)	13(36.1%)
4 (n= 44)	34(77.3%)	1(2.3%)	9(20.4%)
5 (n = 30)	20(66.7%)	7(23.3%)	3(10.0%)
6 (n = 44)	35(79.5%)	2(4.5%)	7(15.9%)
7 (n = 71)	61(85.9%)	0(0%)	10(14.1%)
8 (n = 77)	75(97.4%)	0(0%)	2(2.6%)
9 (n = 16)	14(87.5%)	0(0%)	2(12.5%)
10 (n = 21)	17(80.9%)	0(0%)	4(19.0%)