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Perspectives of dairy farmers on positive welfare opportunities for dairy cows in Ontario, Canada

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Positive experiences offer opportunities to improve the experiences of animals through positive affect, beyond the absence of negative experiences such as illness or pain. The objective of this study was to describe the perspectives of dairy farmers regarding positive welfare opportunities for dairy cows and calves. Five focus groups were held with dairy farmers (n = 27) in Ontario, Canada. Audio recordings of the discussions were transcribed verbatim, and applied thematic analysis was used to analyze the data. Participants initially focused discussion on pasture access, cow-calf contact, and group housing of calves. Two themes were identified from the data: 1) tacit expertise of farmers and 2) influences on farmer choice. Participants invoked their expertise and had conflicting opinions on how various positive opportunities could affect cattle health and welfare. There were divergent views when discussing dairy farming in general. However, when speaking specifically about their own farm, participants were reluctant to implement positive opportunities, citing risks of decreased milk production and avoidable health problems. Autonomy to choose which positive opportunities best suited farm-specific management and financial situations was preferred to regulation. Finally, participants prioritized minimizing negative experiences for cows and calves but maintained aspects of positive welfare (e.g., described as happy, content, or autonomy) as important characteristics of a cow's life.

KEYWORDS

qualitative research, dairy producer, dairy cattle welfare, affective state, well-being

1 Introduction

Improving the lives of animals in agricultural systems has often concentrated on minimizing negative experiences (Mellor, 2016a). The Five Freedoms provided a mechanism to ensure animals had the freedom to stand up, lie down, turn around, groom themselves and stretch their limbs (Brambell, 1965). Other theoretical conceptions of animal welfare have included physiological and affective measures as important aspects during the

assessment of welfare. The Five Domains incorporate aspects of an animal's nutrition, physical environment, health, behavioral interactions, and mental state (Mellor, 2017; Mellor et al., 2020). The Three Spheres consolidates ethical concerns for animals into three overlapping groups to address an animal's affective state, physical health, and ability to express natural behavior (Fraser et al., 1997). Both positive and negative experiences contribute to animal welfare. While research that focuses on practices which minimize suffering continues to be important (von Keyserlingk and Weary, 2023), ethical discussions have begun to recognize the value of positive experiences in the lives of animals (Mellor, 2016b; Turner, 2019). The value an animal attributes to a specific experience can be evaluated with motivation testing (Kirkden and Pajor, 2006). Cows were motivated to access pasture (von Keyserlingk et al., 2017), mechanical brushes (McConnachie et al., 2018), or a deep bedded area (Tucker et al., 2018), or to reunite with their calf (Wenker et al., 2020). Similarly, dairy calves were motivated to access a social partner (Ede et al., 2022). Therefore, these are likely desired and positive experiences for cows and calves.

The practical assessment of cattle welfare is typically accomplished with the use of protocols which incorporate animal-based or resource-based measures (see Welfare Quality® (Welfare Quality, 2023); Welfare Monitor (van Eerdenburg et al., 2021)). In Canada, animal welfare is addressed through Codes of Practice which are national guidelines that outline best management practices and requirements for the care of dairy cattle (National Farm Animal Care Council, 2023). The Canadian dairy industry's mandatory quality assurance program, ProAction, then uses animal-based measures to assess the welfare of cattle on individual farms (Dairy Farmers of Canada, 2023).

Over 3,200 dairy farms are in the province of Ontario and represent 33% of the dairy cows and heifers in Canada (Agriculture and Agri-Food Canada, 2023). Dairy farmers are the custodians of their animals but decision making on dairy farms can be influenced by herd veterinarians (Stanley-Clarke, 2019; Sumner et al., 2020) who are seen as key advisors to ensure animal health (Garforth et al., 2006; Swinkels et al., 2015) and influence animal welfare (Wolf et al., 2016). Additionally, farmers value diverse opinions when making decisions (Mills et al., 2021), and may consult with nutritionists (Swinkels et al., 2015), hoof trimmers (Wynands et al., 2021), feed sales advisors (Bruijnis et al., 2013), and other farmers (Kristensen and Jakobsen, 2011; Cobo-Angel et al., 2021). Ultimately, a myriad of information guides decisions that shape the experience of the animals on dairy farms. Reducing the negative experiences of these animals was seen as the primary management concern of livestock farmers in the UK (Vigors and Lawrence, 2019) and primary role of dairy veterinarians in Canada (Brunt et al., 2023). Nevertheless, the prospect to provide positive welfare opportunities to dairy cattle held intrinsic value for UK farmers (Stokes et al., 2022). However, the study of perspectives of farmers towards positive welfare opportunities for dairy cows in Canada is limited.

Qualitative inquiry offers a lens for in-depth and nuanced exploration of research questions in dairy science (Ritter et al., 2023). Therefore, the objective of this study was to describe the perspectives of dairy farmers regarding positive welfare opportunities for dairy cows and calves.

2 Materials and methods

2.1 Researcher positionality

All authors conduct research that involves dairy cattle and hold a doctorate degree. Qualitative research methods are frequently employed by authors MB (Michael W Brunt) and CR (Caroline Ritter). CR conducts social-psychological veterinary epidemiological research, MB conducts animal welfare research, and SL (Stephen J LeBlanc) and DK (David F Kelton) conduct veterinary epidemiological research. Natural living, affective states, and biological functioning can be used as three overlapping spheres to conceptualize animal welfare (Fraser et al., 1997). The academic training of each author will influence the prominence of certain spheres in the conceptualization of animal welfare: natural living (MB), affective states (MB, CR), and biological functioning (CR, SL, DK). These implicit biases are acknowledged and our awareness of them existed throughout the research process.

2.2 Participant recruitment

The Research Ethics Board at the University of Guelph approved this study (22-09-024). Reporting of findings was done according to the COREQ guidelines (Tong et al., 2007). Study participation was open to dairy farmers in Ontario, Canada. An invitation to participate was emailed to all farms in Ontario by the milk marketing group that represents all dairy farmers in Ontario, the Dairy Farmers of Ontario. Participants were offered a $50 gift card to compensate them for their time. Community centers and libraries were identified to host focus groups and were located near participants who responded to this invitation. Additional recruitment of participants occurred through criterion purposive snowball sampling (Patton, 1990). Participant demographic information (age, gender-identity, farm characteristics) was collected to describe the sample.

2.3 Data collection and analysis

MB (who identifies as a man) conducted all semi-structured focus groups and briefly discussed the objectives of the research and introduced himself to establish rapport. Participants were then read a statement taken from Rault et al (2020): "The rationale for animal welfare improvement is not just based on what the animal suffers from or lacks (the challenges to welfare), but also on the welfare benefits of providing opportunities for positive experiences. Deprivation of certain opportunities might not necessarily cause suffering, but it withholds the potential for positive welfare" (Rault et al., 2020). Using a semi-structured discussion guide, participants were then asked to describe their perceptions and experiences related to the provision of positive experiences for dairy cattle on their farms, its importance to the dairy industry, and the barriers to further implementation of these positive experiences. All authors contributed to development of the interview guide. We did not provide the guide to the participants. It is available online at

Borealis, the Canadian Dataverse Repository (https://doi.org/10.5683/SP3/WMWU7S). Saturation (Saumure and Given, 2008) occurred once a total of five focus groups involving 27 participants (median = 5, range = 4 to 8 per group) were held. The focus groups took place in Ontario, Canada from March 14 to April 14, 2023. Illness or unanticipated farm-related demands caused eight potential participants to drop out on the day of data collection. Focus groups lasted between 71 and 101 minutes, with an average of 83 minutes (median = 80). Focus groups were audio recorded. An external company (Otter.ai, July 7, 2023 version) was used to transcribe recordings verbatim. Transcript accuracy was validated by MB reading transcripts while listening to the corresponding focus group recordings.

We used applied thematic analysis within a pragmatism research paradigm (Guest et al., 2012a). MB coded two focus groups (NVivo, version 12.7.0, QSR International Pty Ltd.) where codes were developed from the data through iterative analysis. An initial codebook was produced by organizing codes into themes. CR independently coded the same two focus groups to establish codebook validity (Guest et al., 2012b). Codebook disagreements were resolved through discussion and consensus. The codebook was adjusted to form the final codebook (available at: https://doi.org/10.5683/SP3/WMWU7S) which was used by MB to code all focus groups. Anonymous identifiers were assigned to reflect focus group and participant number (e.g., C17 would be focus group C and study participant 17). Square brackets were inserted around added words or ellipsis to indicate deleted words to clarify participant quotes.

3 Results

3.1 Demographic characteristics

Twenty (74%) participants identified as men and seven (26%) as women. The average age of participants was 42 years (median = 37, range = 20 to 79). In total, 24 farms were represented by the 27 participants. These farms had on average 94 lactating cows (median = 80, range = 40 to 320). Twenty (83%) farms were freestall, three (13%) farms were tiestall, and one (4%) farm was a compost-bedded pack.

3.2 Overall themes

After hearing the definition of positive welfare at the beginning of the focus groups, participants initially focused discussion on pasture access, cow-calf contact, and group housing of calves, citing public expectations of these practices. Prompts were often needed for participants to discuss other potential sources or influences on the positive welfare of cattle (e.g., automatic milking systems, loose housing, self-grooming brushes). Two themes were identified from the data: 1) tacit expertise of farmers and 2) influences on farmer choice (Figure 1).

3.2.1 Tacit expertise of farmers

Tacit or implicit knowledge refers to informal knowledge, often gained by experience. Participants described how their experiences as dairy farmers provided specialized understanding of dairy cattle. Participants believed that expertise was a combination of time spent working with dairy cattle and innate husbandry ability. They also acknowledged that this form of expertise varied with differences existing between farms and between individuals on farms.

3.2.1.1 Impacts on the animals

Some of these implicit insights involved how animals could be impacted by positive opportunities. In some cases, participants described how positive opportunities could lead to negative effects on production (e.g., *"I'm losing milk when they go outside"* D22). Participant B10 also explains:

> *"That's the intuition [we have] dealing with animals every day. They create enough problems on their own before trying to introduce some positive novelties … I know this cow is doing exactly what she should be doing. She's laying down for the right*

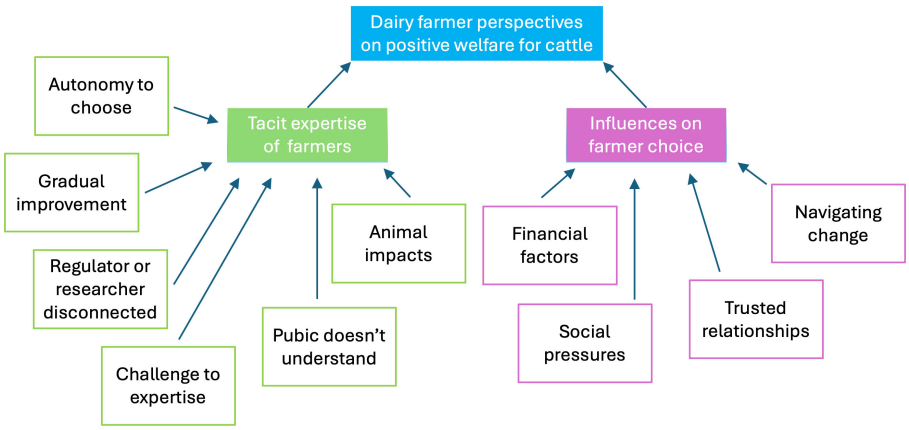

FIGURE 1
Thematic map summarising the themes and subthemes developed by Applied Thematic Analysis generated from dairy farmers (*n* = 27) in 5 focus groups held in Ontario, Canada from March 14 to April 14, 2023.

> *number of hours and I don't want her focused on doing something [else]. You want her to be resting and chewing to be the most productive. Cows certainly appear to be happy when they're doing that."*

Other participants argued that some positive opportunities could lead to negative health impacts for cows (e.g., pasture access and increased risk of mastitis) or for calves as this discussion between two farmers highlights:

> D22 – *"We have calves on automatic feeders, so they are in groups. You see them running around [playfully] … I don't see a whole lot of benefits [relating to] if they are happier."*

> D21 – *"I worry about disease between calves. We always [raise calves in hutches and] have eyes on them as individuals. Maybe with robot [milk] feeding you can still watch how much they're consuming? But I'd always worry about disease. It can spread to that whole group pretty quick."*

> D22 – *"That also can have a negative effect on those calves."*

> D21 – *"You might have gained on the happy atmosphere of the calf until that whole group gets sick and then [overall] not so happy. I question from a health standpoint, whether it's the right move?"*

There were also lines of discussion in which participants were risk averse and believed positive experiences could improve some health conditions (e.g., lameness) they would likely lead to negative outcomes for cows: *"The biggest negative is cows are just dumb and trying to die all day"* (B9). Some participants described naturalness as negative in terms of exposure to heat and rain (e.g., *"I think the environment I've created inside the barn is better than the environment outside"* D21), calf health (e.g., *"The calf will die if it doesn't get the colostrum"* B12), or having other displeasing attributes (e.g., *"Predators"* B9; *"Full of bugs and flies"* B12). Additionally, other participants did not see positive experiences as a priority and asserted that the most effective method to improve dairy cattle welfare would be to focus on minimizing negative experiences: *"I would not be creating more positive [experiences] for cattle. I would look to avoid negative [experiences] for the cattle … Let's do everything we can to avoid [as many] negative [experiences] for the cattle. That's how I would look at it. Every time."* (A7).

In contrast, participant E28 housed calves and cows together on a compost bedded pack and described a welfare balance, in which experiences do not need to be stress free but rather result in a net positive benefit:

> *"I would say that the overall amount of stress a cow experiences during those two or three months is greater because of weaning [her calf]. But I balanced that with the positive experience of [being] suckled by the calf and licking it. The calves play together and zoom around all they want. There are benefits to these animals' welfare and I consider that outweighing the negative."*

3.2.1.2 Impacts on the farm

Participants described how the unique expertise of individual farmers best positioned them to decide what positive opportunities should be integrated into their farm and business situation (e.g., *"Every farm is set up so differently. We can put a fence around the three or four acres of useless pasture behind the barn. Not everyone has that."* C15). Participant A5 explained that financial barriers to some positive experiences for cows can be partially addressed when barns are rebuilt: *"As nice as they can afford."* Even within the context of persistent financial barriers, participants described the resourcefulness of farmers who "*slowly adapt and make sensible changes [over time]*" (A4) and use their expertise to *"think outside the box"* (C19) to improve conditions for their cows. Participants also described that if standards involving positive experiences for dairy cows were incorporated into the national quality assurance program for the Canadian dairy sector (ProAction) it should include farmer guided expertise (e.g., *"[The process] should be [driven by] the people with these animals every day. Not a person in an office. Not a policymaker. Not a researcher. The people who day in and day out are producing milk…"* B9). However, other participants, like A2, did not believe additional standards were required and stressed the importance of autonomy, regardless of whether best practices are followed: *"Producers love their job and a lot of it has to do with their own free will to do their own research and make their own decisions on how they want to manage the herd … We have to accept that some farmers aren't going to do what we think is the best for their cows and even for their own profit."*

3.2.1.3 The public

Participants described the public as being "too many generations away from food production" (E27) and the dairy industry needs to *"educate them [on] why we're doing [these practices]"* (D21). Several specific reactions were identified when participants believed their expertise were challenged by society; including frustration (e.g., *"I get really frustrated when the public pushes for these things from a human perspective and not the cow's"* A7), defensive (e.g., *"Someone outside the industry says a cow needs more freedom; he's 100% wrong"* B12), dismissive (e.g., *"Providing positive experiences for cows feels like busy work"* B13) and anger (e.g., *"I detest these questions that our cows need more freedom for their best interest or more [positive experiences]. It's already provided. Do not reinvent the environment for our cows. I take offense to wherever these questions are coming from."* B12). Participant D23 acknowledged some of these sentiments and related them to impacts on the broader dairy industry: "*While the consumer doesn't know very much about cows, the consumer really is*

the boss. If they stop buying our products, we're totally done. So, we do have to listen to what they're saying."

3.2.2 Influences on farmer choice

3.2.2.1 Social pressures

Various social pressures influenced participants' perspectives on positive experiences for their cows. Participant A8 described pressure that they felt from their local non-dairy community: *"We have a robot, and we pasture our cattle purely for the fact that we are right in town. We have land that's not usable for anything else and it's literally in people's backyards. Our neighbors ask us when we haven't put the cows out yet and if we're putting them out this year. They look forward to it."* Other participants explained that broader consumer perceptions were also important and could influence practice. Public reactions from open-farm tours were used as an example by participant D23:

> *"We do a Christmas at the dairy event, and I've often guided [tours]. The hutch system is great for cattle health but from the consumer point of view, you can't defend it. It's just impossible because consumers don't like it. Consumers are just wild over cattle brushes. [On farm tours] They'll stop and watch cows at the brush for ages…"* D23).

There were mixed opinions of the value of benchmarking the degree to which cows had opportunities to engage in positive experiences among farms (e.g., *"It'd be interesting to see where other farmers are at and gauge yourself"* A6; or *"I don't think benchmarking is gonna help"* C20). A new Code of Practice for the Canadian dairy industry was also seen to influence farmers regarding positive experiences for dairy cows (e.g., *"I think DFC [Dairy Farmers of Canada] are pushing us to change at a faster rate than we want to. But I think they do see a bigger picture sometimes."* A1). The firsthand experiences of other farmers were described as influential social pressures as this discussion on housing cows and calves together illustrates:

> E27 – *"It's not going to come from having a researcher tell me it's a good idea because they're not dairy producers. But to have [E28] tell me their benefits and what they've found. If it fits my system, I might try [it] and see what happens. That needs to be producer led."*

> E28 – *"Yeah, I agree. It's always the best talking to another farmer."*

> E25 – *"You're right."*

3.2.2.2 Financial factors

Participants described financial pressures that limited their ability to implement positive welfare opportunities for cattle (e.g., *"We're still a business. Any changes we make that cost us money are less likely to happen."* E27), lack of incentives or grants (e.g., *"Supplement me for the 15 acres that I need to sacrifice for a pasture, and I'll do it."* A7), and the cost of capital construction (e.g., *"We don't have the money or a bank that would [loan us the money] just because we want to give these animals a more positive experience."* B9). Participant D21 described the undesirable impact these positive experiences could have on farm operations and chose not to pasture their cows *"…because of the labor [involved]."* There were other participants, like C15, who said an explicit link between positive welfare opportunities and increased production would influence their choices:

> *"If you told me the top 10% of farms had rotary cow brushes, and they say the brushes are great, it's in one ear and out the other. But if a vet told me that a rotary cow brush is linked to 3% increased milk production, I can bring that to the bank [and be loaned money to purchase a rotary brush]. Increase milk production by 3%, because cows are cleaner, happier, and don't have as many lice. Yeah."*

3.2.2.3 Navigating change

The process of having to navigate change was described by participants as being both a barrier and facilitator to farmers' ability to implement positive welfare opportunities for dairy cattle. The transition into an AMS (Automatic Milking Systems) provided an opportunity for some participants to reconsider cow autonomy: *"Especially now [that] I'm a robot farmer, I think you [should] improve the number of times where the cow can choose what's right for her"* (B10). Some participants discussed the challenges of changing practices when farm succession had not been finalized, thus limiting their financial and operational autonomy (e.g., *"You're playing that waiting game and sitting back waiting to see what happens."* D24). However, other participants found that challenges of securing additional labor aided their decision to house cows and calves together. For example, E28 explains they spend less time raising and treating calves:

> *"You never have to feed a calf. I give them colostrum on the first day and keep that up until I know they're sucking on the mom. That's all the labor that you do until you wean them two months later. I can raise a calf in less than an hour of labor … It works very well for us. That's the primary reason. The other is health and growth. We don't get sick calves anymore. They get as much milk as they want, and it gives them a better immunity."*

3.2.2.4 Trusted relationships

Within the final aspect of this theme, participants described trusted relationships with their veterinarians and other farmers which may influence their choices. Participant D23 elaborated on the importance of engaging with other farmers: *"Fellow farmers are where you'll learn a lot. Sometimes you think that's never gonna*

work until you see it on somebody's farm. That's how we make progress. We learn from our peers." Later in the focus group they elaborated on the role peers play when considering decisions: *"Your peers will tell you if it's a sales type of talk. [They help you] slice through that a little bit."* Other participants discussed the value of existing veterinary-client connections when discussing animal welfare:

> A10 – *"If you want to have a vet evaluate the welfare of specific animals or [the entire herd], it's better to use the vet that has a working relationship with that herd. Don't bring in an external vet even if they may be a specialist in animal welfare. Our vet sees our animals every two weeks and they would have a baseline to work from."*

> A9 – *"Yeah. They know you personally, you have a connection with them, and you're able to be more open with somebody that you trust…"*

4 Discussion

We aimed to describe farmer perspectives on positive welfare opportunities for dairy cows. We identified two themes, tacit expertise and influences on choice, through which participants explained their perspectives. Even after a description of positive welfare, participants often conflated it with the absence of negative experiences or held that positive welfare was evidenced by high milk production. While positive aspects of welfare were often described by participants as being at the center of appropriate cattle husbandry (e.g., described with words like happy, content, or autonomy), specific activities like pasture access, social housing of calves, or grooming brushes were often seen as additions to adequate husbandry or unnecessary. The provision of positive experiences was seen as 'interesting', with the priority focused on minimizing negative experiences for cows and calves. In recent research, we found that Canadian veterinarians and veterinary students indicated that the primary method for veterinarians to influence dairy cattle welfare was by minimizing negative experiences (Brunt et al., 2023), even when participants had very positive attitudes towards positive welfare (Brunt et al., 2024). Similarly, UK farmers have an innate awareness of aspects of positive welfare but regarded minimizing negative experiences for their animals as their primary role (Vigors and Lawrence, 2019). Minimizing negative welfare should remain foundational and additional research that incorporates mood assessments into a 'valance/arousal' framework would aid in the scientific assessment of affective states in dairy cattle (Ede et al., 2019). However, discussion among academics, veterinarians, and farmers should continue to seek opportunities to incorporate positive welfare into the lives of dairy cattle.

Aspects of farmer expertise are derived from repeated animal interactions and an instinctive understanding of animals (Burton et al., 2012). Participants invoked their expertise and had conflicting opinions on how various positive opportunities could affect animal health and welfare, both of which have been identified as components of being perceived as a good dairy farmer (Butler and Holloway, 2016). For example, pasture access was described as having both positive (e.g., improved lameness score) and negative (e.g., risk of mastitis that could cause decreased milk production) impacts. These findings are corroborated in a study in which dairy farmers in western Canada were split on the effects of pasture access on cow health (Smid et al., 2022). While there were divergent views about pasture access in general, when speaking specifically about their cows, participants were more unified that pasture access decreased milk production and posed avoidable health risks. These results are in contrast to findings that cows with regular access to pasture had a reduction in the risk of mastitis (Firth et al., 2019), lower rate of culling for mastitis (Washburn et al., 2002), lower prevalence of lameness (Olmos et al., 2009) and when provided access to total mixed rations had increased milk production (Motupalli et al., 2014). However, Canadian dairy farmers felt indoor systems were a better option than pasture due to its controlled environment (Schuppli et al., 2023). Furthermore, a survey of Canadian dairy farmers found less than 30% of lactating cows being provided pasture access (Smid et al., 2023). These views contrast with beef farmers who strongly believed pasture was a superior environment for cattle (Spooner et al., 2012). While these cattle industries differ substantially, there may be opportunities to identify shared priorities for positive welfare (e.g., autonomy). Our findings highlight the contrary opinions participants expressed regarding the importance for cattle to express natural behavior (e.g., pasture access); where accommodation of key natural behaviors may begin to improve welfare (Whalin et al., 2021).

Our participants valued their autonomy to choose which opportunities to provide positive experiences for their animals best suited their management system and financial situation. New Zealand and Swiss farmers also valued autonomy as it indicates a freedom of lifestyle and communicates the essence of being a farmer (Stock and Forney, 2014). Veterinarians are ideally positioned to encourage practical improvements to positive welfare on dairy farms (Russell et al., 2024) without reduced farmer autonomy. Concerns were raised that farmer autonomy would be diminished by increased regulation in this area and the subsequent financial cost, for example, to build a new AMS barn to provide cows more autonomy, loss of saleable milk to keep cows and calves together, or the cost of labor to pasture cattle were cited as barriers to implementing these positive opportunities. Research with UK dairy farmers identified similar barriers to positive welfare opportunities but also determined that these barriers were believed to be surmountable (Stokes et al., 2022). Peer-to-peer learning was presented by participants as an ideal method for farmers to 'do their own research' and decide which positive opportunities can be integrated into their farm operation. Dairy farmers have been receptive to participatory approaches in areas such as Johne's disease control (Roche et al., 2015), antimicrobial use (Morgans et al., 2021), and adoption of novel technology (Hennessy and Heanue, 2012). These programs are typically facilitated by local veterinarians to confirm best practices are

promoted but discussions are led by participants to ensure locally relevant topics are examined (see Focus Farms in Roche, 2014). Our participants raised concerns that regulators and researchers were not connected to local industry needs and farmers should lead discussions about positive welfare initiatives. We encourage peer-led extension programs which incorporate the autonomy for participants to evaluate various positive welfare opportunities.

Perceived public pressure was described by participants to influence decisions to pasture cattle and group house calves. Other studies have found that the public does not favor the practice of removing a calf from its mother soon after birth (Sirovica et al., 2022), even though dairy farmers believe this practice is beneficial to calf health (Neave et al., 2022). There were also calls from participants for education of the public regarding farming practices to assuage these concerns. They suggested farm tours and outreach at urban agricultural fairs. However, unidirectional provision of information has potential pitfalls for the dairy industry (Weary and von Keyserlingk, 2017), including new public concerns that often develop in the absence of sustained engagement (Ventura et al., 2016). Our participants described a range of reactions (e.g., feeling frustrated, defensive, dismissive, or angry) when they believed their agricultural expertise was being challenged. Similar research found that dairy farmers resented being told what to do or being criticized by the public (Schuppli et al., 2023). Discussion of shared values about dairy cattle welfare between veterinarians and dairy farmers has been identified as an opportunity to mediate animal welfare problems (Sumner et al., 2018). We encourage sustained discussion between dairy farmers and the public that initially focuses on shared values (e.g., improving animal welfare) and a willingness to engage with divergent viewpoints.

There are several limitations to our study. We explored the perceptions of dairy farmers in Ontario, Canada, thereby limiting our ability to generalize beyond this population. However, similar perceptions were reported in other Canadian (Smid et al., 2022; Schuppli et al., 2023) and international studies (Vigors and Lawrence, 2019; Stokes et al., 2022) providing confidence that our findings are trustworthy. There was a risk of self-selection of participants with strong views on our topic due to voluntary participation. Additionally, our snowball recruitment strategy may also have encouraged those with similar views to participate. While additional research is encouraged to further characterize this topic, we are confident that an adequate degree of saturation occurred for meaningful coding under the themes identified (Hennink et al., 2019). We provided our participants with a definition of positive welfare at the outset (Rault et al., 2020). This could have skewed their thinking or statements, but we felt it necessary for coherence of the topic. The results reflect that participants shared diverse perspectives that did not indicate steering of viewpoints.

5 Conclusions

In conclusion, participants invoked their experience-based expertise and had conflicting opinions on how various positive opportunities could affect cattle health and welfare. Additionally, participants were risk averse to implement positive welfare opportunities, valued their autonomy, and placed priority on minimizing negative experiences for cows and calves but retained some aspects of positive welfare. Integration of farmer expertise and autonomy may increase receptivity for future research or extension efforts and effectively address welfare concerns of dairy cattle.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: Borealis, the Canadian Dataverse Repository at: https://doi.org/10.5683/SP3/WMWU7S.

Ethics statement

The studies involving humans were approved by The Research Ethics Board at the University of Guelph. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

MB: Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Validation, Visualization, Writing – original draft, Writing – review & editing. CR: Methodology, Validation, Writing – review & editing. SL: Funding acquisition, Writing – review & editing. DK: Conceptualization, Funding acquisition, Supervision, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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