

UNDERSTANDING INDUSTRY AND LAY PERSPECTIVES ON DAIRY CATTLE WELFARE

by

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Abstract

The welfare of dairy cattle is of rising concern in North America. This thesis explores how stakeholders relevant to dairy production—including those working within but also those external to the industry—interpret issues around dairy cattle welfare, with the aim to unearth the root of disagreements and identify common values between diverse groups. Chapter 1 begins by exploring the relevant literature and identifies important gaps. Chapters 2 and 3 describe multi-cohort focus groups of farmers, veterinarians, and other industry stakeholders. Chapter 2 investigates their interpretations of the priority welfare issues facing the dairy industry and demonstrates that these stakeholders hold a broad conception of animal welfare with the potential to link to values in broader society. Chapter 3 explores how these stakeholders perceive challenges to welfare and their desired solutions for change; it shows consensus for education, particularly in the form of peer-led extension strategies, to address low welfare knowledge among farmers and veterinarians. Chapter 4 describes a survey of non-farming citizens before and after touring a dairy farm and demonstrates that, as with industry stakeholders, citizens' animal welfare values are diverse. Chapter 4 also shows that citizens respond differently to learning more about dairy farming, with some becoming more concerned and others less so. Chapter 5 then describes the use of an online engagement tool to explore in greater depth what appears to be one of the most contentious practices in dairy production—that of early separation of the dairy calf from the cow. It illustrates that support of this practice varies markedly among stakeholder groups, but that people are often concerned with the same issues regardless of their stance, providing paths for

compromise on practice and policy. Chapter 6 concludes with a summary of findings and recommendations, including: 1) farmers should engage with veterinarians and researchers to help them adopt practices in better alignment with societal values (such as pain mitigation), 2) industry decision makers should commit to transparency but also be prepared to listen and adapt to informed critiques, and 3) researchers should explore engagement strategies to aid in conflict resolution between industry and lay citizens.

Preface

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Beth – Vancouver, 2015

Dedication

This is for the ~2.5 billion farm animals in North America, whose bodies we use to sustain our own. May we learn to honor your world and enable you to live the lives you deserve.

Prologue

Until my doctorate, my academic training had focused on better understanding the needs of animals so we could better manage and house them. This is, of course, a vital activity and one in which I am proud to participate. As I neared the end of my Master's degree, however, I realized that I wanted to be part of the brigade to help ensure that what we discover about animal welfare is actually put into practice. And the main barriers within the nexus between the creation of knowledge and its implementation are of course, human—those working along the livestock production chains, but also those external to it but who nonetheless benefit from its existence.

Qualitative research demands recognition of a researcher's underlying biases so they can be accounted for to the greatest extent possible, and so I recount mine here. I absolutely came into my PhD with an agenda: I wanted nothing less than to figure out how to change society's behaviour toward animals, to begin to rectify the ways in which we have affected them. I wanted to charge in and tell consumers to buy more humanely produced animal products. I wanted to get on farms and start telling farmers that they should quit docking tails or start paying more attention to their calves, etc.

Remarkably, those are really bad approaches to achieving any sort of meaningful change. And although I sort of knew that going in, it was not until I began to immerse myself in new research methodologies that I began to figure out why.

In part, this was because I quickly learned that in order to even begin to understand how to change human behaviour, I needed to backtrack. One cannot change minds without first understanding those minds. And so I channeled my efforts to filling

in the gaps of what is known about some of the key cognitive constructs that may later help inform meaningful and effective strategies to improve animal welfare.

The other part was that qualitative approaches are characterized by openness to the social and psychological phenomena under study, and that openness extends to the researcher's own self. Becoming a qualitative researcher taught me to own my agenda. I learned to acknowledge my own biases and then to politely dismiss them. To let them sit next to me but not to let them direct me as I immersed myself in the data. This was not an entirely easy task, as it was often discomfiting when the views of participants differed from my own. It was a lesson in humility to get to a place where I could recognize those views as equally valid, both in the context of my own research, but more critically, in the real life, real time debates about farm animal welfare.

In other words, I began to listen. This was essentially how I spent the past four years: listening to my participants and trying to understand what they were really saying. With listening came respect. And with respect came a commitment to ensuring that my participants' voices were heard, without filter or agenda.

I have always been a better talker than a listener, despite my parents' best efforts and much to my dear husband's dismay. I am not exactly proud that it took going through a doctoral program to really claim that skill, but I'll take it.

Chapter 1: Introduction

1.1 Research context

Livestock agriculture in North America¹ has transformed since WWII, with tremendous repercussions for the ways in which society produces and consumes animals. This change is characterized most notably by an increase in the efficiency of animal production, which in turn has lowered the cost of producing food. At the same time, however, the changing nature of animal production has generated concern about its effects on a number of externalities, including the environment, public health, rural communities, workers' rights, and the welfare of animals in the various production systems.

To provide context for present-day societal concerns about the welfare of farm animals and dairy cattle in particular, I briefly examine two broad agro-societal trends that have marked the changing landscape of agriculture in North America since WWII: first, the widespread intensification of livestock (including dairy) production; and second, the societal exodus from rural to urban areas.

1.1.1 Intensification and industrialization

What makes the growth of the livestock sectors in Canada and the US over the past half century so interesting is that it generally cannot be attributed to a parallel growth in the number of animals produced, at least not for ruminant animals.² Rather, it

¹ For the purposes of this thesis, 'North America' is used to refer to Canada and the US only.

² For the most part, the number of ruminant animals (raised primarily on forages, e.g. goats, sheep, and cattle), have generally decreased in Canada and the US in the last half-century (FAO, 2014). In contrast, the poultry and pork sectors –in which grain feeding is predominant—have seen major growth in the number of animals raised, e.g. two-fold and six-fold increases in turkey and chicken, respectively, in the US (Ollinger et al., 2000).

is productive output per animal that has increased, through an almost universal intensification of livestock husbandry. This intensification is characterized to a large extent by a move of animals indoors as well as automation of routine management practices, and further achieved through advances in genetics, nutrition, and housing (Fraser, 2001; Mench, 2008).

For example, the American dairy industry has seen a 4-fold increase in milk yield between 1944 and 2007 (Capper et al., 2009), though both the number of farms and the total number of cows decreased within that same period. There were approximately 21 million cows on 4.6 million farms in 1940 (Blayney, 2002). By 2012 dairy cows numbered just over 9 million on approximately 51,000 licensed farms (Hoard's Dairyman, 2012; NASS, 2013). Summarizing the above in their paper on the state of the US dairy industry, von Keyserlingk et al. (2013) noted that *"today's dairy industry produces 59% more milk with 64% fewer cows, consuming 77% less feed and 65% less water per liter of milk produced compared with dairy production in 1944,"* (p. 5406).

1.1.2 The rural exodus

Concurrent with the post-WWII intensification of dairy production in Canada and the US has been the departure of the citizenry from rural to urban and semi-urban areas. As livestock production consolidated and farming jobs and services became more scarce, people moved away from rural areas, with the result that today less than 1% of the American workforce is actively engaged in farming as a career (Holecheck et al., 2003; as discussed in Guehlstorf, 2008).

This demographic shift has separated – both in place and in activity – the majority of the populace from food production, including regular contact with livestock

(Kendall et al., 2006). This in turn has meant that the actors (including the animals) that contribute to the production and associated supply of animal products have become largely invisible in the day-to-day life of most contemporary North Americans (see Kneen, 1995).

1.2 Stakeholder conflict

It is within this context that society has become increasingly critical of the various livestock industries (including the dairy cattle industry³) with respect to the adequacy of care toward the animals in their systems (Mench, 2008). As with the other livestock sectors, concerns about animal care have created tension between various stakeholder groups within as well as external to the dairy industry, including the public. In one sense these stakeholders can be seen as falling along a spectrum, with the most vehement on opposing ends in terms of their views as to whether dairy production is or is not humane. Fraser (2001) described this spectrum thus:

“Opponents of animal production often use animal welfare as one of several elements in an effort to...create an alternative image of greedy, impersonal corporations” that, among other sins, exploit animals, while “some agricultural organizations have promoted a competing image, depicting animal agriculture as fully reflecting traditional pastoral and agrarian values, while benefiting from modern knowledge and technology. According to these neo-traditional portrayals, modern farming is thoroughly beneficial for animal welfare,” (p. 184).

This dichotomization of the dairy and other livestock industries as either entirely benevolent or exploitative clearly oversimplifies the situation, and yet to date it has framed much of the interaction between industry and lay groups (Croney, 2010). For example, in 2013 the practice of dehorning of dairy cattle made media headlines

³ Henceforth referred to as ‘the dairy industry.’

when a prominent Canadian actor critiqued the dairy industry in a letter to the National Milk Producers Federation for performing what he described as a “painful” and “barbaric practice,” (Huffington Post, 2013). In response, some individuals circumvented the content of his critiques and chose instead to dismiss them based on his lack of affiliation with –and by default, assumed ignorance of—the dairy industry (Mess, 2013).

This type of exchange is problematic for a number of reasons. First, hyperbolic and inflammatory discourse distracts stakeholders from solving the issues at hand. Moreover, such polarization fuels frustration and distrust for sincere critics both within and outside the dairy industry. Erosion of stakeholder relationships in turn prevents groups from working together productively to form mutually satisfactory welfare standards and policies (or at least standards that different groups can live with). This in turn impedes resolution of the very real welfare challenges that exist on dairy farms today (for a review of key welfare issues in the dairy industry, see von Keyserlingk et al., 2009).

Productive and effective stakeholder interaction about animal welfare issues is of further importance as farm animal welfare has become increasingly embedded into notions of sustainable agriculture (Boogaard et al., 2008). This means that in addition to environmental and economic considerations, livestock production should engage with the broad values held by society (Boogaard et al., 2008; von Keyserlingk et al., 2013), which shift over time as society evolves. As described by Boogaard et al. (2008), these shifting values may varyingly be expressed through the public’s goals for agriculture as well as its concerns about it. Hodges (2006) described the changing landscape of

societal goals for sustainable agriculture as looking “*beyond cheap food.*” Consumer surveys (Rauch and Sharp, 2005; Prickett et al., 2010) support that the humane treatment of livestock has emerged as an integral part of that societal imperative. In this regard, negative interactions between stakeholders within and external to the dairy industry may erode public trust in dairy production (Brom, 2000), particularly if the dairy industry does not engage with society about animal welfare concerns.

1.3 Defining the need

What is needed, then, is for stakeholders to effectively communicate and collaborate if they are to develop solutions to the welfare challenges present in the dairy industry today. The need to integrate multi-stakeholder values has been a defining theme in the various calls-to-arms to address welfare challenges and improve societal sustainability among academics and slowly, the industry itself (de Greef et al., 2006; Lusk and Norwood, 2008; Croney, 2010; Leeb, 2011; Croney et al., 2012; Maday, 2013). And yet, effective communication and collaboration first require a solid understanding of the complexity of values and attitudes that people bring with them into debates about farm animal welfare (Kendall et al., 2006). Or as Kauppinen et al. (2010) commented, “*understanding how different actors perceive [the concept of animal welfare] is a precondition for the successful improvement of [it],*” (p. 523).

This chapter, then, will critically examine the existing research on stakeholder attitudes and values related to farm animal welfare. I will demonstrate that an in-depth understanding of stakeholder attitudes and values on this topic has only recently started to emerge. Moreover, much of the emerging knowledge results from research in Europe; there are comparatively few studies specific to the US and Canada as well as to

the dairy industry in particular. Ultimately, it is hoped that improving upon this knowledge will help identify areas of shared concern among diverse stakeholders. This in turn should aid in the creation of socially sustainable policy, as well as provide legitimate grounding for targeted solutions tailored to specific identified deficits in practice on farms.

1.4 Definitions and terminology

1.4.1 Attitudes, beliefs and values

Kristensen and Jakobsen (2011) recently lamented that a “*lack of consensus regarding what to call certain constructs*” (p. 5) exists in the emerging application of social science approaches in the animal welfare science literature. In light of this, it is important to first establish some consistency in what is meant by certain terms.

The following discussion of attitudes, beliefs and values is thus presented within the context of two prominent, well-regarded models from the social psychology and communication literatures: the Theory of Planned Behaviour (TPB)⁴ and the Integrated Model of Behavioural Prediction (IMBP). These prevailing frameworks posit a causal chain of influence in which attitudes, influenced partially by one’s beliefs and values, affect behaviour.

The TPB asserts that one’s *intention* to perform a particular behaviour is the most powerful predictor of that behaviour. Intention is in turn influenced by both *attitudes* and *subjective norms*, where subjective norms involve how a person perceives social pressure from peers to perform or eschew the behaviour in question (Ajzen and

⁴ The TPB was originally developed by Fishbein and Ajzen (1975) as the Theory of Reasoned Action and later extended into its current form (Ajzen and Madden, 1986).

Fishbein, 1980). An *attitude* is a disposition to respond favorably or unfavorably to an *attitude object*, which can be anything concrete or abstract that a person is able to hold in mind (definition adapted from Cross, 2005). For example, the general idea of a 'factory farm,' a particular production practice, or even the dairy cow herself can all be considered attitude objects toward which people may hold positive or negative attitudes.⁵

An attitude in turn is a partial function of the evaluation of the *beliefs* held about the behaviour as well as the strength of those beliefs. The study of attitudes then becomes useful because it can help reveal the values and beliefs that underlie them. According to Fishbein and Ajzen (1975), "*beliefs represent the information [a person] has about the object,*" such that beliefs link an object to some attribute. To use a welfare-relevant example, a belief that "dehorning is painful" would link the psychological object "dehorning" to the attribute "is painful." From this example it should be evident that beliefs are often evaluative in nature, meaning that they apply a value judgment (Bem, 1970) and thus serve a value-expressive function (Ajzen, 2001).

Values in turn are widely recognized as integral to both belief and attitude formation (Bem, 1970; Seligman et al., 1996; Ajzen, 2001). Values can be thought of as "*desirable, trans-situational goals...that serve as guiding principles in people's lives...values [may be] used as anchors or cognitive sources from which attitudes may emerge,*" (Seligman et al., 1996). Schwartz (1999) offered an alternative definition in which values are "*criteria people use to select and justify actions and to evaluate people*

⁵ Terms like *view* and *opinion* are often used interchangeably with *attitude*, as they also designate valenced evaluations of the issue or object in question. Indeed the term *opinion*, for example, as a verbal expression of attitude, has been used as a proxy for *attitude* for decades (Thurstone, 1931).

and events." Boogaard et al. (2008) noted that this definition leaves something to be desired in the context of evaluating whether agricultural systems can be considered socially sustainable. Drawing from Thompson's (1992) description of sustainability in relation to a series of ethically significant goals for agriculture, where sustainable agriculture is one "*that meets our goals as a society*" (Thompson, 1992), Boogaard et al. (2008) described a value as "*an aspect that people, i.e. citizens, use to evaluate that system,*" (p. 25). Finally, farm animal welfare in this sense has been described as one of many dimensions that may be "*integrated into the values of humans,*" (p. 47; Hansson and Lagerkvist, 2014).

Farm animal welfare attitudes and behaviour

The relationship between attitudes and behaviour has been explored in relation to the welfare of farm animals. A number of studies (see Waiblinger et al., 2006 for a review) link the beliefs and attitudes of farmers and stockpersons with their behaviour toward animals in terms of handling (Hemsworth et al., 2000, 2002; Waiblinger et al., 2002), management decisions (Waiblinger et al., 2001; Hemsworth, 2003) and a number of production (Seabrook and Wilkinson, 2000) and animal welfare indicators (Hemsworth et al., 2002; Waiblinger et al., 2002; Vaarst and Sørensen, 2009; Kielland et al., 2010; Kaupinnen et al., 2012). Attempts to modify behaviour by targeting underlying beliefs and attitudes have also met with some success: for example, Hemsworth et al. (2002) showed that stockpersons on Australian dairy farms who underwent cognitive behavioural therapy showed more positive beliefs about cow handling and used fewer negative tactics than did those at control farms.

Limitations of values, attitudes, and beliefs

The Integrated Model of Behavioural Prediction (IMBP) is similar to the TPB except that it recognizes that variables *external* to an individual also play a significant role in influencing behaviour (Fishbein and Yzer, 2003). This makes the IMBP relevant in addressing solutions to on-farm welfare challenges, which are so often contingent on multiple actors working together within complex production systems.

The IMBP dictates that a behaviour will likely occur if someone has the intention and skill to perform it and if there are no environmental constraints to performance (Fishbein and Yzer, 2003). This addition of external variables implies that successful animal welfare interventions are dependent not only upon an individual's internal intentions, but also upon the relevant environment. Thus,

“if people have formed the desired intention but are not acting on it, a successful intervention will be directed at either skills building or at removing (or helping people overcome) environmental constraints....If strong intentions to perform the behaviour in question have not been formed, the model suggests that there are three primary determinants of intention: the attitude toward performing the behaviour, perceived norms...and one's self-efficacy...” (p. 166-167; Fishbein and Yzer, 2003).

1.4.2 Animal welfare

That a range of values exists for what constitutes good quality of life for an animal is underscored by the diverse interpretations of animal welfare in the literature (Broom, 1991; Duncan, 1993; Rollin, 1993). In light of this, it is especially important to establish a conceptual framework from which to organize and understand the literature on how stakeholders think about animal welfare. To this end, Fraser et al.'s (1997) multi-dimensional conceptualization of animal welfare into three distinct but interrelated aspects– biological functioning (how an animal physically functions),

affective states (how an animal feels), and natural living (the degree to which an animal can live a natural life) —is appropriate. This framework is relevant because it incorporates the explicit and diverse values that people hold regarding what is necessary to ensure proper welfare. In doing so, it collates other prominent definitions of animal welfare into one holistic concept, including Broom’s (1991) focus on physical health and functioning, Duncan’s (1993) prioritization of an animal’s mental life, and Rollin’s (1993) emphasis on an animal’s ability to live in accordance with its *telos*.⁶

1.5 Industry stakeholder values

It is important to clarify what actors should be considered as stakeholders in the societal debate on farm animal welfare. I distinguish two broad categorizations: those working *within* the livestock industries in some capacity (henceforth referred to as ‘industry stakeholders’) and those *external* to them (referred to as ‘lay’ or ‘public’ stakeholders, see Section 1.7 of this chapter for further definition). I acknowledge that this distinction could be argued as arbitrary, not least because actors working within the livestock systems are also members of public society, and many actors hold multiple roles. My point is rather to draw a distinction between those with and without active working experience with livestock farming.

I use the term ‘industry stakeholder’ to describe any actor working within the livestock production chain as well as those whose work contributes to it. This includes

⁶ Others have put forth alternative frameworks from which to conceptualize broadly shared animal welfare values. De Greef et al. (2006) for example suggested that avoidance of suffering and duty to care are two defining animal welfare values. However, I argue that at this point in time the source of stakeholder conflict is not that people do not share such broad values; few, for example, would disagree that animal suffering should be minimized. Values this broad are then unlikely to be sufficient in forming effective, i.e. implementable and enforceable, standards precisely because interpretation of what it is to suffer is subjective, and indeed, dependent upon whether one or more of the value-laden aspects outlined by Fraser et al. (1997) are considered to have been met.

farmers (also referred to in this thesis as producers), industry representatives, livestock veterinarians, animal science faculty, and industry service providers. These actors may be considered as experts inasmuch as they have accumulated a unique body of knowledge and experience with livestock as a result of their respective roles. Their proximity to (and engagement with) the conditions in which farm animals are raised gives producers, for example, a unique perspective on the ethical debates on agricultural practices (Driessen, 2012). As such, producers in particular are increasingly recognized, both in the literature and in the public eye, as critical stakeholders to improve animal welfare (Eurobarometer, 2007; Feola and Binder, 2010; Kauppinen et al., 2010; Driessen, 2012; Hansson and Lagerkvist, 2014).

In Canada and the US, producers and others working within the livestock industries are also relevant because on-farm management practices are largely unlegislated, at least federally.⁷ Rather, animal care standards and policies are typically spearheaded by industry-affiliated stakeholders and are self-regulated (or not regulated).

Despite their potential to improve farm animal welfare, the voices of farmers and others working for the livestock industries have historically been largely absent from debates on the numerous ethical issues presented by modern agricultural production practices (Kauppinen et al., 2010; Driessen, 2012). The literature has begun to address questions about the attitudes and values of these stakeholders in the last two decades (e.g. Te Velde et al., 2002; Lund et al., 2004; Bock and Van Huik, 2007).

However, the vast majority of research has focused on Europeans, with far less

⁷ Though to some degree this is changing in the United States with the introduction of statewide, public referenda to ban certain livestock systems (see Mench, 2008 for a review).

attention to American or Canadian producers (Spooner et al.'s 2012, 2014b interviews of Canadian beef and pork producers being one of the few exceptions) and other relevant industry stakeholders (e.g. animal science and veterinary faculty [Heleski et al., 2004, 2005] and livestock veterinarians [Hewson et al., 2007]).

1.5.1 Producers

Biological functioning

Those involved with animal production have traditionally been shown to take a pragmatic approach toward animal welfare, in which aspects related to animals' biological functioning (e.g. nutrition, health, fertility, production) are often the most strongly emphasized (Te Velde et al., 2002; Lassen et al., 2006; Verbeke, 2009; Kaupinnen et al., 2010; Silva et al., 2013). The notion that producers tend to primarily value the health-related aspects of animal welfare seems to be first evident in Te Velde et al.'s (2002) landmark study of Dutch consumer and producer perceptions of the treatment of livestock. The farmers (in this case a mix of pig, broiler chicken, and beef cattle farmers) interviewed in that study talked about animal welfare mainly in terms of health and considered continued growth to indicate adequate welfare (Te Velde et al., 2002).

Te Velde et al.'s (2002) findings have been borne out by a number of studies of European producer views of animal welfare (much of which have resulted from the European Union-sponsored Welfare Quality® projects). From these studies it is clear that many farmers appear to use a number of biological parameters as proxies for animal welfare, most notably high productivity (Norwegian pig producers: Borgen and Skarstad, 2007; a mix of Norwegian cattle, pig and poultry producers: Skarstad et al.,

2007; UK pig producers: Hubbard et al., 2007) and maintenance of health and general physical functioning (pig, chicken, and calf farmers: Te Velde et al., 2002; European pig producers: Bock and van Huik, 2007; UK pig producers: Hubbard and Scott, 2011).

By extension, many livestock producers consider their provisions to meet animals' biological needs –including thermal regulation, dry bedding, disease monitoring, and adequate feed and water – as indicative that they are doing a good job for animal welfare (Te Velde et al., 2002; Spooner et al., 2014b). Take, for example, the collective view reached by focus groups of Dutch pig farmers that the “*provision of adequate supply, such as food and water together with a good health care, makes good welfare,*” (p. 63; de Greef et al. 2006).

To the extent that information on the values of American or Canadian producers exists (and at this point, it is scant indeed), there is some evidence that these farmers are similarly health-focused. For example, Spooner et al. (2014b)'s semi-structured interviews with 20 Canadian pig producers, the majority of which operated confinement systems, revealed an overwhelming preoccupation with the health and productivity of their pigs. A similar focus on physical indicators of welfare (in this case, body condition) also emerged in Spooner et al.'s (2012) interviews with Canadian beef producers.

The distinction between farmers' emphasis on biological performance and related implications for economic performance is hard to tease apart. A dominant trend throughout the studies reviewed above is that animal welfare and economics are inextricably linked for these farmers, such that the economic considerations embedded within caring for animals inevitably arise during conversations about animal welfare

(Hubbard et al., 2007; Skarstad et al., 2007; Kauppinen et al., 2010; Spooner et al., 2012, 2014b). Spooner et al. (2012) captured the complex, uneasy relationship between welfare and economics for Canadian beef producers; though these producers stressed the existence of economic restraints in their businesses, they also emphasized that economic considerations did not undermine the welfare status of their animals. This is a challenging concept to reconcile, particularly in light of critiques of animal agriculture that situate profit as superseding welfare considerations in every case (as discussed in Fraser, 2008a and by participants from the study in Chapter 5).

Others have argued for a more nuanced perspective of producers' motivations, one that recognizes that producer decisions are "*not always or ever necessarily aimed at the unique goal of profit*," (p. 6; Willock et al., 1999). Driessen (2012), for example, proposed a view of producers in which they possess 'mixed motives:'

The activities of most farmers are not completely guided by concerns of efficiency and profit...The morality of their motives [may indeed be] most salient at moments when farmers diverge from what is economically required...but situating the ethics solely in these exceptions to the productionist rationality implies a portrayal of animal farming as basically unethical. To grant farmers a serious ethical stance requires an appreciation of their central aim: the efficient production of food.
(p.170).

He suggests that farmers may be viewed as holding a hybrid attitude toward welfare and economics in which genuine care for the animal exists in direct conjunction with the intent to harvest it (Driessen, 2012). Other authors have also noted the complexity with which farmers approach animal welfare. For example, Lund et al. (2004), Kristensen and Enevoldsen (2008), and Kaupinnen et al. (2010) wrote of the variation in how farmers in their studies valued animal welfare, some for its instrumental value (in granting growth and ultimately economic health for their businesses), some for its

intrinsic value (in simply a duty to do the right thing), and some for both purposes. This juxtaposition of use and respect values toward animals borrows heavily from pastoralism, a prominent influence on modern Western moral approaches to animal use (Preece and Fraser, 2000; Fraser, 2008b). Observable in the second creation story of the Judeo-Christian Bible (Genesis 2), the pastoralist ethic condoned animal use but strongly emphasized 'diligent care' be taken to ensure that animal needs were met (Fraser, 2008b).

Affective states

The studies cited above demonstrate a widespread emphasis on health and performance among livestock producers, but recent work suggests that producers' conceptions of animal welfare are often multi-dimensional and include a focus on affective states such as pain (Kaupinnen et al., 2010; Vetouli et al., 2012; Silva et al., 2013).

Many livestock producers appear to have a complex and context-dependent view of pain experienced by their animals. On the one hand, chronic painful conditions are often among producers' priority welfare concerns, such as lameness in dairy cows. For example, as part of a larger lameness intervention project, Leach et al. (2010a) asked farmers to rank their top three herd health concerns. Mastitis and lameness, both known painful conditions (Milne et al., 2003; O'Callaghan et al., 2003) were the conditions most often cited. While almost certainly these issues ranked highly in part because of performance effects, the companion paper's finding that 94% of respondent dairy farmers agreed that pain and suffering were either very or extremely important

outcomes of lameness suggests that concern for the cow certainly played a role in attitudes toward these conditions (Leach et al., 2010b).

In contrast, others have indicated that producers tend to ascribe lower concern to pain arising from short-term management procedures like dehorning and castration, at least when compared to other stakeholders (Belgian producers, species unspecified: Vanhonacker et al., 2008; Australian cattle, sheep, and goat producers: Phillips et al., 2009; Canadian beef producers: Spooner et al., 2012; Flemish pig producers: Tuytens et al., 2012). For example, a randomly selected sample of 160 Flemish pig producers (almost uniformly) preferred surgical castration *without* anesthesia to castration *with* it (Tuytens et al., 2012). This preference paralleled the finding that the majority of these farmers agreed or strongly agreed that, “*castration of pigs is a very old practice which is well endured by the animals*” and disagreed that, “*castration of male pigs is so painful that I think it should be avoided.*” In another study, Australian beef, sheep and goat producers ranked dehorning and castration to have lower welfare consequences than did animal welfare advocates and scientists (Phillips et al., 2009). The authors of the last study speculated that repeated performance of these procedures might have led to desensitization, thus explaining this disparity.

Producer attitudes toward painful procedures also appear to be modulated by the perceived need to trade-off between worse welfare consequences. For example, Norwegian pig producers showed reluctance to use anesthetics during castration, not because they did not wish to control pain, but because they viewed its administration as increasing handling stress (Kjaernes et al., 2007). The majority of anesthetic-averse pig producers in Tuytens et al. (2012)’s study likewise expressed the belief that using

anesthesia actually diminished piglet welfare due to increased stress before the procedure. Spooner et al. (2012) also noted that some beef producers acknowledged the painfulness of dehorning but maintained that it was superseded by the necessity to avoid the greater harm of injury posed by intact horns. For some of these producers, this view resulted in direct dismissal of the pain associated with these procedures, e.g. *"It doesn't hurt too long"* and *"Do it young and they don't even remember,"* (p. 277; Spooner et al., 2012). The authors speculated that it may simply be that, *"some producers do not equate good welfare with making all possible or even feasible efforts to reduce pain or suffering,"* (p. 282; Spooner et al., 2012). However, Spooner et al. (2012) also noted that perceived responsibility to minimize pain varied among their respondents, with others strongly emphasizing the need to minimize the pain associated with these procedures. Farmer sensitivity to pain has also been found in other studies (Wikman et al., 2013).

The available information on producer attitudes to animal stress is somewhat conflicting. There is some evidence to suggest that stress is less important to producers than to other stakeholders. For example, producers in Belgium rated the importance of stress (and also, interestingly, skilled animal handlers, which would affect handling stress) as lower than did citizens (Vanhonacker et al., 2008). In other studies that sought to establish a broad understanding of animal welfare values in producers, the issue of stress did not arise at all, lending further weight to the idea that stress may not figure greatly in producers' conceptions of welfare (Te Velde et al., 2002; Bock and van Huik, 2007; Kaupinnen et al., 2010).

And yet, the above-cited studies in which concerns for handling stress superseded concerns around short-term pain tell a different story, as do a few studies with cattle producers. Among beef cattle producers, minimizing stress was often seen as a central priority (Kjaernes et al., 2008; Phillips et al., 2009; Spooner et al., 2012). For example, Australian stakeholders (including beef producers) ranked stockmanship as their highest welfare concern (Phillips et al., 2009). The beef ranchers interviewed by Spooner et al. (2012) were similarly concerned about stress, though they varied in their use of the term, with some using it to refer to anything that threatened the animal's growth or functioning and others describing an animal's emotional state. Reduction of stress was nonetheless viewed as universally desirable, and something that could be achieved through good stockmanship and low-stress handling (Spooner et al., 2012).

It is unlikely that only beef producers place strong value on minimizing stress in their animals (for example, Spooner et al. [2014b] also found an emphasis on low-stress handling techniques among Canadian pig producers). Possibly, some of the survey and interview structures of the previous studies may not have been designed to capture or elicit producer concerns around stress. Alternatively, it may be that concerns around stress may indeed be more prominent among beef cattle producers, perhaps due to producer sensitivity to the effects of infrequent interactions with animals raised in extensive conditions.

Natural living

Many studies of conventional producers have noted that they tend to de-emphasize the importance of natural living to livestock welfare in relation to other values (Te Velde et al., 2002; Vanhonacker et al., 2008; Benard and de Cock Buning,

2013; Spooner et al., 2014b). In some studies the distinction between producers and other stakeholders is especially stark; for example, Vanhonacker et al. (2008) asked Belgian citizens and producers to rate the importance of 72 different aspects of animal welfare, organized under seven key dimensions. On average, compared to the citizens, producers rated every aspect (save one) in the “Ability to Engage in Natural Behaviour” dimension as less important to animal welfare. These aspects incorporated elements related to the environment as well as to behaviour, including daylight, natural growth rate, natural environment, explorative behaviour, natural birth, maternal behaviour, sexual behaviour, having fun, foraging behaviour, and play behaviour.

The exception to this trend seems to be organic livestock producers (mixed species: Lund et al., 2002, 2004; Lund, 2006; pigs: Bock and van Huik, 2007; pigs: Hubbard and Scott, 2011; dairy cattle: Vetouli et al., 2012). Vonne Lund, a leading expert in the values of European organic livestock farmers, described their conception of animal welfare as differing markedly from that of most conventional farmers in that they specified that animals should be able to live a natural life⁸ (2006). She elaborated that allowing animals to live in a natural way requires that they be allowed to express natural behaviours, be fed according to their physiology, and live in environments that closely mirror how they would live in the wild. Swedish organic producers of multiple species, for example, considered natural living as a precondition to adequate welfare

⁸ Often to the extent that those in the organic sectors often viewed conventional production critically for failing to make such provisions. Interestingly, the reverse is also true such that conventional producers are often highly critical of organics, often for perceived welfare deficits in organic farming (see Spooner et al., 2012). This critique is typically two-fold: in one way, organics are perceived to cast a (undeserved) bad light on conventional production. This is viewed as particularly egregious because organic is perceived as not delivering adequate welfare. For example, Spooner et al.’s (2012) subjects voiced concern about disincentives to treat sick animals in organic production. These critiques offer another window into how animal welfare values may be prioritized differently.

(Lund et al., 2002, 2004). Bock and van Huik (2007) likewise noted that a majority of European pig producers participating in organic or voluntary welfare assurance schemes incorporated a mandate for provision of freedom and natural behaviour opportunities in their definitions of welfare. More recent work in Britain confirms the stronger emphasis on natural behaviour by organic producers (Hubbard and Scott, 2011). Prioritization of natural living has been noted to be stronger among 'pioneer' farmers, regardless of species (e.g. those who converted to organic farming early due to personal beliefs of organic husbandry as a lifestyle calling, as opposed to 'entrepreneurs,' whose organic farming activity is primarily economically motivated (Lund et al., 2002, 2004).

There is limited evidence that organic dairy producers in particular place special emphasis on the role of natural living for animal welfare. The Lund studies mentioned the inclusion of dairy producers in their samples, but the interview study (Lund et al., 2002) failed to specify the numbers involved, focusing instead on distinguishing pioneers. Some participants in a case study of Nordic dairy farmers (n=6) affirmed natural living as integral to animal welfare, but the authors noted high variation between the farms in whether these values translated into practice (Vetouli et al., 2012).

That organic farmers, particularly those who view their work as a calling, would incorporate natural living into their conception of animal welfare makes sense in light of broader organic values that hold the natural world as something to be emulated (as described in Lund, 2006). By extension, conventional producers operating in more extensive husbandry contexts may also see similar value in raising animals in more

naturalistic ways. Indeed, emphasis on allowing animals to express natural behaviour has been found in conventional cattle producers in both Europe and North America (Kjaernes et al., 2008; Spooner et al., 2012). Spooner et al. (2012) noted that some of their respondents even appeared to value the natural element so strongly that they accepted a certain degree of hardship (e.g. inclement weather) for their animals in exchange for having them outdoors. Interestingly, this preference for the outdoors was stronger than that expressed by European producers in Kjaernes et al. (2008), though Spooner et al. (2012) were unsure whether these differences were attributable to stronger personal values or to practical considerations around land use.

Finally, even within the segments of producers (organic, extensive sectors) for which orientation to nature may be more expected, exceptions are still found. For example, Borgen and Skarstad (2007) noted the existence of some nature-oriented conventional Norwegian pig producers. The difference between intensive conventional producers and extensive or organic producers, however, seems to be in whether natural elements are perceived as a welfare prerequisite or a luxury. A focus group study by de Greef et al. (2006) suggested that for conventional producers in intensive systems, it appears to be the latter; when asked how they would spend an extra 100,000€ on their animals, most of the pig producers in the study indicated that they would provide additional space. The respondents were clear, however, that they considered their current facilities as adequate and described extra space as a nice bonus. Thus, while expansive natural provisions may be desirable, many conventional producers do not appear to consider their lack to create suffering.

1.5.2 Other industry actors

Although farmers are stakeholders of key importance for improving the welfare of farm animals, the attitudes of other actors within the industry chains –including veterinarians, animal science researchers, industry service providers, processors, and retailers— should also be considered relevant. Livestock veterinarians may be especially suitable to take a leadership role on the welfare of farm animals (Lam et al., 2007). Numerous studies have shown that farmers consider the opinions of their veterinarians to be most relevant and important in this regard (Lam et al., 2007; Jansen et al., 2010b; Kaupinnen et al., 2010). Others (Kaupinnen et al., 2010) have commented on the instrumental importance of researchers, as they could have the potential to influence producers to take welfare-proactive steps on their farms.

Finally, those operating in the retail sector are clearly important to include in the conversation about farm animal welfare (Fulponi, 2006). Aerts (2013) used the hourglass model of the food industry to argue for increased attention to the relatively few corporate and supermarket buyers, given that their decisions may have the greatest potential influence over animal care standards. Nevertheless, the literature has only recently cued into the potential influence of these industry actors and to my knowledge very little research focuses on their views toward animal welfare (a study of Spanish retailers being one exception, Miranda-de la Lama et al., 2013). What literature exists regarding the attitudes of other industry actors to animal welfare seems to focus mainly on people in the veterinary and academic communities.

In one of the few examples of intensive study of *any* stakeholder's attitudes to farm animal welfare in the US, Heleski and colleagues performed a series of studies

among academic faculty (primarily animal scientists and veterinarians, Heleski et al., 2004, 2005; Heleski and Zanella, 2006). As with trends in value emphases by livestock producers, veterinarians (Heleski et al., 2005) and animal science faculty (Heleski et al., 2004) most strongly emphasized health (e.g. thirst, hunger, injury and disease) and placed the least emphasis on behavioural repertoire and freedom of movement. Moreover, 40% of veterinary and 51% of animal science faculty strongly agreed that good production equaled good animal welfare (Heleski et al., 2004, 2005).

Heleski et al. (2006) also investigated veterinary and animal science faculty concerns about the livestock sectors as a whole in addition to specific issues and practices within them. In general, academic faculty placed dairy cattle on the middle of the welfare spectrum, with the more intensive pig and poultry sectors ranking below and the beef and sheep industries as superior. In regard to specific issues, the authors found majority agreement that lameness—across species, including dairy cattle—was of high concern, which agrees with producer perceptions as well (Leach et al. 2010a,b).

Pain-related attitudes (at least pertaining to short-term pain) among veterinarians and animal science faculty likewise appear to show some similarities to the patterns observed in producers. Some work (Heleski et al. 2004, 2006) has shown skepticism among veterinarians and academics about the severity of pain associated with routine husbandry procedures. Heleski et al. (2004) for example found that acute pain states associated with procedures such as dehorning without anesthetics did not appear to be a priority issue of concern among US animal science faculty. The authors suggested either the existence of a critical knowledge gap or a difference in the severity in how acute vs. chronic welfare states were perceived. Nevertheless this finding is

disturbing, both because of academics' role in educating future industry stakeholders but also because there is abundant evidence that these practices are linked with multiple pain indicators.

In contrast, the veterinarians in these studies showed higher levels of concern about the painfulness of the practices and their influence on animal welfare, which the authors attributed to a number of factors, including veterinary training sensitizing them to pain or making them more aware of available pain relief options (Heleski et al., 2004). However, a study of Norwegian veterinary student attitudes to pain in cattle showed that upper classmen tended to perceive a range of conditions (e.g. mastitis, laminitis, dehorning, distal limb fracture) as less painful than did lower classmen, suggesting some degree of desensitization within that veterinary program (Kielland et al., 2009). Nonetheless, when compared to producers, veterinarians seem to express a stronger sensitivity to pain. Two years after the use of local anesthetics for piglet castration became mandatory in Norway, two-thirds of surveyed veterinarians judged anesthetics to have a beneficial effect on piglet welfare (vs. just one-third of producers, Fredriksen and Nafstad, 2006). It is clear from this and other work that the perception that pain is legitimate (i.e. actually exists) correlates quite strongly with the intention to take action to relieve it: Canadian veterinarians' use of analgesics for dehorning, for example, is associated with stronger perceptions that dehorning is indeed painful for the calf (Hewson et al., 2007).

1.5.3 Summary

The emerging literature is beginning to suggest some general trends among producer and industry actor attitudes and values to animal welfare: notably, that

producers often prioritize biological functioning and health indicators, have widely varying views about pain and stress, and are likely less concerned with providing animals the opportunity to live in a natural manner. The scant literature available on other industry actors suggests that these trends may also apply to members of the veterinary and animal science academic communities as well, though there is some evidence that veterinarians may be more sensitive to pain in animals than are other industry actors. However, this is an emerging field with many contradictions, and it appears that the simplistic approach of describing producers as having only one set of values around animal welfare is incorrect. Rather, it appears that farmer attitudes and values regarding animal welfare may be modulated by an array of factors. Continued research is warranted to better understand the landscape of values that may characterize these stakeholders by sector and also by region, particularly in the US and Canada.

1.6 Engagement between industry and lay stakeholders

To the extent that a relationship between the livestock industries and the public exists, it has often been fraught with tension. One reason for this dynamic is that those connected to the livestock industries often tend to dismiss the relevance of lay opinions in the debate about farm animal welfare (see Benard and de Cock Buning, 2013). For example, a mixed methods study by Kauppinen et al. (2010) recently documented how Finnish dairy and pig farmers tended to either dismiss or ignore consumers entirely when questioned about the importance of different opinions in the debate on farm animal welfare.

Two related issues may explain the tension between industry and lay stakeholders: industry distrust of external commentary as representing a threat to farmer livelihood, and perception of lay stakeholders as ignorant of the facts relevant to the debate.

Those who work with livestock often appear defensive around the topic of animal welfare, even to the extent that they shy away from the term ‘animal welfare’ because of its association with outside efforts to change livestock production (Spooner et al., 2012). For these individuals, perceived outsiders who question how their animals are raised present a direct threat to their very way of life (Benard and de Cock Buning, 2013). Cardoso and James Jr. (2012) described a study of American farmer identities by Wilson et al. (2003), which neatly captures the way many farmers view those on the outside:

Many Midwestern farmers strongly felt they must defend ‘farmer lives’—by which they meant their ‘values, beliefs, norms, and traditions’ from adversaries, including environmentalists, government regulators, and ‘city values’ [emphasis added]. Sometimes, the perceived need to stand in solidarity against outside forces was so strong that the farmers came to evaluate agricultural practices not entirely on the practices’ own merits or faults, but rather through a lens of whether the practice was seen as ‘under attack’.... (p. 398).

We see evidence of this belief in European pig farmers who describe feeling under attack from unrealistic demands from consumers and other outside forces (Bock and van Huik, 2007). Interestingly, producers do not appear unique in the belief that livestock agriculture is threatened by societal expectations; in a study of American veterinary and animal science faculty, one respondent commented that, “*One must be careful not to destroy a system that can feed those who are hungry,*” (p. 300; Heleski et al., 2006).

Often coupled with industry stakeholders' distrust of the public is the perception that the public is largely ignorant of livestock production and by extension, animal health and welfare. This assumption has been well described under the informational deficit model of public understanding (also referred to as the knowledge gap, knowledge deficit, or cognitive deficit; Einsiedel, 2000; Wynne and Irwin, 1996). The public understanding of science movement draws heavily from this model to posit four fundamental assumptions. One could easily adapt these assumptions into a Public Understanding of Welfare Risks to Livestock (adapted from Hansen et al., 2003):

- 1) Optimizing productivity in order to maximize food production (to feed the world!) is a common goal in the modern industrialized world.
- 2) There are inevitable compromises (e.g. livestock will not have a "perfect" life) that are associated with this optimal productivity, but these are widely agreed upon.
- 3) Science and technology is the most effective and desirable basis from which to improve practices and therefore science should be the (only) basis from which any changes are made, and the only language with which to discuss issues.
- 4) When experts therefore make recommendations or defend current practices on the basis of science, if the public does not accept what they are told, it is because they do not understand the science (and by extension, the reality of the situation).

The corollary of this model assumes that lay concerns about science and technology (including agriculture) are unfounded. By extension, concerns about the system in question need to be corrected, usually through unidirectional educational efforts designed to bring public opinion in line with expert⁹ views (see Hansen et al., 2003 for an excellent expansion of the thinking underlying this model).

⁹ Drawing largely from studies of lay attitudes to food risks, Hansen et al. (2003) explain that these 'experts' include scientists, food producers, and public health advisors. In our context, 'experts' could include these stakeholders along with livestock veterinarians and any other actor working with the livestock supply chain.

Denial of the public's relevance to the debate on farm animal care on the basis of ignorance has also been argued as a way for farmers to deal with the potential threat that criticism presents to farmers' way of life (as described above). Public criticism is interpreted as a 'threat message,' and as such provokes defensive reactions that include the projection of public ignorance, enabling the individual to either deny or avoid the critique (Witte, 1994). Benard and de Cock Buning (2013), for example, suggested that the pig producers in their focus group study were unable to *"step out of the denial phase"* and engage directly with citizens' concerns about pig welfare. Rather, they *"choose to disqualify the relevance of the knowledge of the urban-citizens by labeling them as ignorant,"* (p. 1033).

Hansen et al. (2003) wrote that, *"this way of looking at matters is still endemic in some quarters,"* (p. 111). Over a decade later we still find this to be the case. Pig producers in the UK, for example, found consumers to be typically ill informed and possessing inappropriate expectations as to how livestock should be treated. They likewise expressed the desire that farming organizations should dedicate more effort to educate the public (Hubbard et al., 2007).

In the Netherlands, all of the pig producers (n=11) in the above-cited study (Benard and de Cock Buning, 2013) were unanimous in their perception of public ignorance of pig husbandry and suggested the use of one-way information strategies to rectify negative perceptions and 'misinformation.' Remarkably, this perception was so entrenched that all maintained their perspectives, even after participating in a series of

frame reflection¹⁰ exercises, including role play of other stakeholder perceptions (including the critical citizen) and film recordings of parallel sessions, in which citizens discussed their concerns about pig husbandry and reflected on their own biases toward pig production (Benard and de Cock Buning, 2013).

Perceptions of citizen ignorance also appear to exist among some Canadian beef producers, who agreed that citizens lack sufficient knowledge about animal husbandry (Spooner et al., 2012). Moreover, some beef producers also viewed the public as bringing the wrong values to the debate, blaming criticism of the industry on *“too much humanizing and using human values when addressing issues for animals”* (p. 279; Spooner et al., 2012).

The question then becomes whether belief of public ignorance of farming practices is fully justified. At present there appears to be insufficient evidence to support this claim widely, let alone apply it to specific production sectors or regions. Almost certainly people will vary in their knowledge among and within production systems. For example, Frewer et al. (2005) showed that self-reported levels of knowledge differed depending on the produced species—fish or pig—in question. Miele (n.d.) noted that British citizens knew about some specific practices related to poultry and veal calves, though knowledge of other practices was low. Thus it is difficult to justify statements that generalize these stakeholders as wholly ignorant of livestock production practices.

¹⁰ Designed with the recognition that different parties have *“different perspectives and underlying norms, values, and truths,”* (p. 1015; Benard and de Cock Buning, 2013), frame reflection has been suggested as a conflict resolution strategy that enables differing parties *“to put themselves in the shoes of other actors in the environment (...) and to overcome the blindness induced by their own ways of framing the policy situation,”* (Schön and Rein, 1994).

There are some indications in the peer-reviewed literature (reviewed below) that public knowledge of livestock production may be fairly low. However, it appears that much of this is based on self-reports of low knowledge, rather than on responses to factual questions about animal agriculture. As with other areas of the literature on stakeholder attitudes to farm animal welfare, much of what is known about citizen knowledge is from studies in Europe, with less information about North American citizens.

The 2007 Eurobarometer special report, entitled *Attitudes of EU Citizens toward Animal Welfare*, surveyed over 29,000 European citizens in 25 member states. Arguably one of the largest scale efforts to date to understand broadly held public attitudes on this topic, it found that most citizens claimed little to no knowledge¹¹ of farm animal conditions, though self-reported levels of knowledge varied by country (Eurobarometer, 2007). Citizens in the Nordic countries, for example, claimed the highest levels of knowledge, while citizens in Spain claimed the lowest (Eurobarometer, 2007). The Eurobarometer's finding is supported by a number of more specific studies. For example, most of the respondents in a questionnaire study of Dutch perceptions of farm animal welfare reported that they did not know much about farm animals' quality of life (Boogaard et al., 2006). Another study, again with Dutch respondents, likewise indicated low knowledge of the welfare of animals in the aquaculture and pork industries (Frewer et al., 2005).

¹¹ Interestingly, it is not only lay stakeholders who report feeling uninformed about livestock production practices. Heleski et al. (2005) made a surprising finding that a substantial proportion (20-45%) of production animal veterinary faculty in the US reported that they were not familiar enough with 6 of the 15 different husbandry practices included in the survey to comment on them, leading the authors to conclude, "In our opinion...even veterinary college faculty are not fully aware of the modern production practices that may be associated with welfare concerns," (p. 1545).

There is some evidence that this trend holds for the dairy industry as well: 50% of British respondents reported that they felt uninformed about production methods (Ellis et al., 2009). The authors of that study also noted that during pre-tests it became apparent that, *“many participants were unaware of many aspects of dairy production that may have welfare implications and were unfamiliar with some technical or animal health terms, for example they did not understand what the terms ‘mastitis’ or ‘stockmanship’ indicated,”* (p. 273). Though it is important to note that the authors did not appear to specifically assess participant performance on knowledge-based questions about dairy production, their experience with participants in the pre-test phase led the authors to conclude that *“consumers’ general dairy farming knowledge is limited,”* (p. 273; Ellis et al., 2009).

It has been suggested that the public should be distinguished according to their differing interest in farm animal welfare (Boogaard et al., 2006; Vanhonacker et al., 2007). For example, Miele (n.d.), in summarizing a number of studies across seven EU countries, found that both the level and types of knowledge varied according to participants’ social backgrounds (e.g. politically active and vegetarian participants were more knowledgeable on these issues). In another study, Vanhonacker et al. (2007) probed animal welfare beliefs in Belgian respondents and established six distinct segments according to their attention to animal welfare issues during purchasing and their perceptions of the state of animal welfare. The authors argued that segmentation *“yielded a valuable basis to improve the societal...debate about the issue,”* along with providing insight into how products should be marketed to different consumer profiles. It stands to reason that, in a similar way that citizens ascribe differing levels of

importance to farm animal welfare, different profiles of citizen knowledge likely exist. Industry stakeholders would do well to take into account this variability in their interactions with the public.

Taken together, it is clear that the literature on public understanding of livestock production and welfare is only just starting to emerge. At present, what evidence exists on low knowledge among lay stakeholders is patchy at best. It seems evident that a more comprehensive understanding of lay knowledge of farming practices, differentiated by sector and region, is needed. This should enable more productive interactions between the public and those working in the respective industries.

However, obtaining a better understanding of public knowledge will only take us part of the way in improving the dialogue and relationship between society and the livestock industries. We also need to keep in mind that the deficit model of public understanding –together with its posit that knowledge is a pivotal factor in acceptance of industry practices—has increasingly been called into question. Upon reviewing a body of literature on lay assessments of food risks, Hansen et al. (2003) noted that there is substantial evidence that providing lay stakeholders with more information does not necessarily translate to higher acceptance. They concluded that lay perceptions and conceptualizations of food risks “*do not seem to be well explained as products of a simple lack of information,*” (p. 118).

In the context of farm animal welfare, there is some evidence that information provision may increase support of industry practices, but it is far from conclusive. The 2007 Eurobarometer study noted that those who claimed to have a lot of knowledge of farm practices were more likely to perceive farming conditions as having improved

over the last years. And yet, the report's attribution of this positive view to "*a real understanding of farming conditions*" should be viewed critically. While this is one explanation, the correlational nature of this finding begs consideration of whether positive industry perception may instead be attributed to other factors (for example, to enculturation of traditional farming values).

A few last examples also throw the deficit model's relevance to public perceptions of farm animal welfare into question. In the study where British participants were deemed to possess low knowledge about dairy production, half of them rated dairy welfare as positive (Ellis et al., 2009). A study of Dutch citizens likewise noted slightly positive perceptions of farm animal welfare juxtaposed with relatively low knowledge of production (Boogaard et al., 2006). Finally, Boogaard et al. (2011b) noted that many of their respondents showed shock and dismay when they visited a conventional pig farm and noted that the visits caused opinions about pig production to become more negative. Such results are difficult to interpret under the deficit model, which would predict high (not low) knowledge to correlate with higher opinions of the industries.

These examples highlight an important aspect of the deficit model that has made it the target of criticism: acceptance of a given practice, or indeed an entire industry, is almost certainly modulated by factors beyond someone's understanding of it. Most notably, many have suggested that the deficit model fails to recognize the role that values play in attitude formation. In other words, people may object to something that experts advocate, not because they lack knowledge of all relevant facts, but because it does not align with their basic values (Peters, 2000; Hansen et al., 2003; Kristensen and

Jakobsen, 2011). What follows then, is that *“people may have concerns other than those addressed by science-indeed other than those science is capable of addressing,”* (p. 113; Hansen et al., 2003). The deficit model’s promotion that *“risk communication is a matter of information provision, i.e. something not involving dialogue,”* (p. 115; Hansen et al., 2003) is then at best an overly simplistic and at worst wholly inadequate basis for risk communication. Applied to the context of farm animal welfare, assuming widespread public ignorance is unlikely to be an appropriate foundation from which the dairy industry should approach relations with lay stakeholders.

1.7 Lay stakeholder values

Lay stakeholders include members of the public who hold no affiliation to livestock production and who in their daily lives have little to do with any aspect of the production process. The literature on public attitudes to farm animal welfare often bundles ‘consumer’ and ‘citizen’ together, but these terms imply distinctly different roles. In contrast to the consumer, whose role as a purchaser of animal products is acted out in a market context (and whose attitudes are primarily inferred through purchasing decisions), this thesis focuses on the citizen, who as a part of civil society contributes to a social consensus (and whose attitudes are assessed via surveys, interviews, etc.; as discussed in Aerts, 2013).¹²

Understanding citizen views about animal agriculture has important implications for the long-term sustainability of the livestock industries (Boogaard et al.,

¹² Relevant to this discussion is the oft-mentioned ‘citizen-consumer’ gap, or the difference in how people express their concerns about food (or other product) issues in surveys vs. in their purchasing decisions. Explanations for this phenomenon are hotly debated. The interested reader is referred to Aerts (2013) and De Bakker and Davegos (2012).

2008). Civil society is increasingly influential over corporate and governmental agendas for issues in the food system (Fulponi, 2006). In a philosophic sense, food production is also a public good that cannot reasonably be expected to operate in isolation of societal expectations (Brom, 2000) and indeed, requires a 'license to produce' (Benard and de Cock Buning, 2013). As noted by Thompson et al. (2011),

...any system of commercial food production operates not only within a context of formal laws and policies that are imposed by government but also with respect to informal expectations that reflect the attitudes of key interested parties as well as society as a whole. (p. 2097).

Democratizing livestock production through inclusion of public views into policy has been argued as a way to help production practices align with social values (Guehlstorf, 2008). This incorporation would serve to legitimize the standards that are then developed and improve public trust in livestock production (Guehlstorf, 2008). However, this approach has generally not been adopted by the dairy industries in Canada and the US. When the livestock industries fail to respond to social concerns about farm animal welfare, they run the risk that society may turn to other avenues and circumvent the industries entirely in order to enact stronger welfare standards. It could be suggested that this scenario has played out repeatedly in the last few years in the United States, as citizens in a number of states have voted to ban specific housing and management practices deemed harmful to farm animals (NALC, 2014).

Although it is clear from the literature that Western society considers farm animal welfare to be important in a general sense (below), to date we have an incomplete understanding of not only what production practices are most objectionable to the public, but why. Moreover, much of the available data on public attitudes,

particularly in North America, is in the form of market research reports (e.g. Pirog, 2004; see AWI, 2011).

There has been more effort in the last decade to understand public attitudes to farm animal welfare in Europe, including the Eurobarometer surveys as well as the Welfare Quality® studies on stakeholder attitudes. The 2007 Eurobarometer report indicated that a considerable majority of respondents ascribed great importance to the welfare of farm animals, giving it an average rating of 7.8 out of 10. Fully one third of respondents gave it a 10 out of 10. Furthermore, the present state of welfare in current production systems also prompted concern, as 72% of respondents indicated that further improvements were either ‘certainly’ or ‘probably’ necessary (Eurobarometer, 2007).

Most American and Canadian surveys indicate a similar picture, but as with the Eurobarometer the language of these surveys is typically quite broad and designed to gauge general importance rather than delve into greater depth. Many surveys (see AWI, 2011 for a compilation; Grimshaw et al., 2014) found majority agreement with statements along the lines of, *“It is important to me that animals on farms are well cared for,”* (Prickett et al., 2010) or *“Even though some farm animals are used for meat, the quality of their lives is important,”* (Rauch and Sharp, 2005). Governmental market analysis reports in Canada likewise indicate rising levels of public concern for farm animals (AAFC, 2011). Though some only reported limited numbers of respondents (e.g. by state: Rutgers, 2003; Rauch and Sharp, 2005), others were aimed at producing data more representative of the general populace. Prickett et al. (2010) for example conducted a telephone survey with a stratified sample of 1000 American citizens and

found that the majority of participants either somewhat (26%) or strongly (51%) thought that the well-being of farm animals was more important than low meat prices.

However, other surveys have indicated that farm animal welfare, while important, is less so compared to other product attributes like cost and food safety (Verbeke and Viaene, 1999; CFI, 2008). Just 14% of respondents in an Iowa-based marketing study of consumer perceptions of pasture-raised beef and dairy cattle indicated that “*how and where beef and dairy cows were raised*” was “*very important*” to their purchasing decisions (Pirog, 2004). It is possible that the discrepancy between these studies relates to how these questions were worded, with those in the Prickett et al. (2010) study perhaps framed to draw out general feelings of how society should run (the citizen), and the Verbeke and Viaene (1999), CFI (2008) and Pirog (2004) studies forcing respondents into a consumer role. Lusk and Norwood (2010) offer an alternative explanation after they found that agreement fell substantially when participants were asked whether they vs. the average American thought farm animal welfare was important, suggesting that social desirability biases may lead people to overstate the degree of importance they ascribe to this issue. Still another explanation may be in the recognition of individual variation in how people value farm animals, with some people greatly concerned about the quality of animal lives and others relatively indifferent (Uzea et al., 2011).

Taken together, most of the available literature –both in Europe and in North America—indicates that the majority of the public believes that farm animal welfare is important. However, concerns about farm animal welfare seem to vary depending on the species in question. For example, Belgian citizens associated poultry products with

lower welfare practices compared to pork and beef products (Verbeke and Viaene, 1999). As for dairy cattle, Europeans appear to be less concerned about the welfare of dairy cows compared to other farmed species (most notably pigs and poultry, Eurobarometer, 2005, 2007; Maria, 2006). In this respect they are similar to veterinary and animal science faculty in the US, who also perceived dairy farming to have fewer welfare problems than pigs or poultry (Heleski et al., 2006). Kjaernes et al. (2005) likewise surveyed citizens in seven European countries (Hungary, Italy, France, Great Britain, Netherlands, Norway and Sweden) and found that a maximum of 15% of respondents from any one country expressed concern over dairy cattle welfare, despite a majority of respondents from each country rating farm animal welfare in general as important or very important. As outlined below, the strongest explanation for this discrepancy appears to be in how restrictive (in terms of opportunities for behavioural freedom) the different production methods are perceived to be.

Understanding that farm animal welfare is important to the public only takes us so far. To understand and resolve the conflict between industry stakeholders and the public, we must understand what lay stakeholders consider to be a good life for farm animals. Progress in animal welfare will likely be made on the basis of incremental modifications to certain housing systems and to particularly objectionable management practices. Although some information on public attitudes to the former (more below) has become available, much still needs to be done to better understand people's views (and indeed, awareness) of common management practices.¹³

¹³ There are some notable efforts in other countries to understand key concerns, e.g. a study conducted for the Australian Animal Welfare Strategy in 2006 identified battery cages for laying hens, use of growth hormones, mulesing of sheep, and feeding animal byproducts as key consumer concerns.

1.7.1 Lay value emphases

Biological functioning

Despite the impression from early studies indicating rather stark value differences between industry and lay stakeholders –in which industry stakeholders emphasize biological functioning to the exclusion of natural elements, and lay stakeholders the reverse (Te Velde et al., 2002)—more recent studies suggest some agreement between industry and lay stakeholders on the importance of certain basic necessities for animal welfare. Often these studies have presented a number of welfare attributes and asked respondents to rate their importance against each other. They indicate that receiving food and water, along with treatment for injury and disease, are the most important livestock welfare requirements according to American citizens (Prickett et al., 2010). Similarly, Belgian citizens rated availability of water as the most important issue out of a list of 72 different welfare attributes; other aspects related to appropriate feed and animal health also received very high marks (Vanhonacker et al., 2008). In line with these findings, Dutch citizens associated a lack of important resources (i.e. feed and water), as well as presence of disease or injury, with poor welfare (Boogaard et al., 2011b).

These results should warrant little surprise, as even the most naïve of citizens can be assumed to understand that food, water, and freedom from grievous injury or disease are fundamental requirements to survival. They are thus likely to align with industry stakeholders about the importance of these attributes. The key difference may be that citizens appear to be more likely to consider certain aspects related to animals’

basic functioning as fundamental prerequisites to welfare, but not sufficient in and of themselves to result in good welfare.

Affective states

There is relatively little peer-reviewed research on citizen attitudes about affective states of animals. However, there is reason to believe that suffering and pain – and particularly the intentional infliction of these states—collectively represent a major taboo among citizens. Thus far the majority of this research has focused on attitudes to routine management procedures that, when performed without pain control, are known to result in both immediate and long-term pain. Surveys in the US indicate strong citizen aversion to causing pain to livestock. For example, the majority of Ohio residents agreed that *“farm animals should be protected from feeling pain”* (Rauch and Sharp, 2005) and a high majority of New Jersey residents objected to the performance of tail docking cows and pigs without pain relief (Rutgers, 2003).

In Europe, bodily mutilations and pain arose as spontaneous welfare concerns in focus groups with Swedish and Dutch citizens (Miele, n.d.), as did tail docking and teeth clipping among Dutch citizens (Benard and de Cock Buning, 2013). Moreover, lay stakeholders’ aversion to subjecting animals to painful procedures seems to strengthen when confronted with these procedures face-to-face: visitors to pig farms in the Netherlands and Denmark expressed negative reactions ranging from disappointment to shock upon watching tail docking, castration, ear tagging, and nose ringing (Boogaard et al., 2011b). One participant commented, *“I thought it was very miserable to see...The screaming, cutting, blood and shaking piglets gave me a bad feeling. But it was good to see that the piglets received anaesthetics,”* (p. 195). The authors noted that their Dutch

respondents appreciated the use of anaesthetics for these procedures. If reactions were this strong against anaesthetized procedures, one may imagine the strength of aversion to the lack of pain control that more typically characterizes these types of procedures in the US and Canada. In support of this, a recent interview study found that Canadian citizens were concerned about inflicting pain on animals without taking steps to manage it (Spooner et al., 2014a). Likewise, in an online study, the majority (95%) of Canadian and American respondents objected to the practice of tail docking of dairy cattle (Weary et al., 2011) partly because it was believed to be painful.

Results from the increasingly frequent US state referenda can likewise be considered as indicators of public sentiment on certain specific farming practices, including painful procedures. California voters made their objection to tail docking of dairy cattle known by pushing through a ban of the practice in 2009. Other states, including Ohio and Rhode Island, have since followed suit (AVMA, 2013). It is of course difficult to say whether pain was the primary motivator in public objections to tail docking. It is possible that other issues –such as objections to violating animals’ bodily integrity and the lack of research supporting the intended efficacy of the practice in promoting hygiene— also motivated people to seek the bans. Nonetheless, media reports on the bans suggest that concerns about the painfulness of the practice were also involved (Cone, 2009; Gliona, 2013; Morrissey, 2014).

Natural living

The most apparent contrast between industry and lay stakeholders appears to be that citizens tend to include the ability to live a ‘natural’ life in their conceptions of a good life for animals (Harper and Makatouni, 2002; Spooner et al., 2014a). This

preference has surfaced in most studies of citizen attitudes to farm animals, both in Europe and in North America. The values attached to ‘natural living’ are expressed through preferences for particular attributes, which are often believed necessary to protect health and functioning of the animal (Benard and de Cock Buning, 2013; Spooner et al., 2014a). These include: the freedom to move and fulfill natural desires (Te Velde et al., 2002; Lassen et al., 2006; Maria, 2006; Morgan-Davies et al., 2006; Spooner et al., 2014a) as well as to perform ‘normal’ or natural behaviours (Vanhonacker et al., 2008; Prickett et al., 2010; Boogaard et al., 2011b; Benard and de Cock Buning, 2013; Spooner et al., 2014a); and environmental aspects like increased space (which is intimately connected to notions of freedom, Vanhonacker et al., 2008; Boogaard et al., 2011b; Benard and de Cock Buning, 2013), outdoor access (Vanhonacker et al., 2008; Prickett et al., 2010; Miele, n.d.; Benard and de Cock Buning, 2013; Spooner et al., 2014a), and even daylight (Boogaard et al., 2011b; Benard and de Cock Buning, 2013; Spooner et al., 2014a).

Preferences for these last aspects (sunshine and the outdoors) are fairly intuitive; Fraser (2001) argued that these preferences harken to nostalgic imaginings of an agrarian past in which farming families lived in close connection with animals, who in turn were embedded into the natural landscape. Nonetheless, some authors have noted that citizen preferences for animals kept outdoors are “*most susceptible to conflict*” with industry stakeholders (Vanhonacker et al., 2008). Indeed, of the aspects under debate, lay preferences for outdoor access may be the most difficult to reconcile.

As with industry stakeholders, however, it is apparent that individual variation plays a strong role in citizens’ valuations of animal welfare. Notably, not every lay

citizen prioritizes natural living in relation to animal welfare. Prickett et al. (2010) distinguished three separate classes of Americans: ‘naturalists,’ who emphasized the importance of natural behaviour and outdoor access; ‘price seekers,’ whose welfare concerns were superseded by concerns about the price of animal products; and ‘basic welfarists,’ who –like certain segments of producers – considered animal welfare needs met with basic provisioning of food, water, and treatment of disease and injury.

It seems, however, that ‘naturalists’ form a substantial portion of the lay public. Preferences for natural living often appear to coalesce in citizens’ rejections of particularly restrictive housing systems. Indeed, it is increasingly apparent that restricting farm animals from basic movement is almost uniformly repugnant to the public. Norwood (2010), for example, noted that battery cages for laying hens and gestation crates for sows are viewed as unethical by most American citizens. Likewise, a majority of surveyed New Jersey citizens disagreed with confinement systems that prevent animals from turning around (Rutgers, 2003). Under this view, not only would gestation and veal crates be viewed as unacceptable, but applied to the dairy industry, the tie-stall system is also problematic. Finally, citizen objections to restrictive housing systems can also be seen in the many voter referenda that have caused US states to institute bans on restrictive housing, including gestation crates (Florida, Arizona, California, Colorado, Main, Michigan, Oregon, Ohio, and Rhode Island), veal crates (Arizona, California, Colorado, Ohio, Michigan, Main, and Rhode Island), and battery cages (California and Michigan) (NALC, 2014).

1.7.2 Summary

While some authors have described citizen values toward farm animal welfare as rather broad (Frewer et al., 2005) or unilaterally focused on certain aspects to the exclusion of others (Te Velde et al., 2002), evidence is mounting that, like producers, citizens' conceptions of farm animal welfare are often multi-dimensional (Benard and de Cock Buning, 2013; Spooner et al., 2014a). There is some evidence that this trend may characterize citizen attitudes to the dairy industry specifically. For example, a British study showed that citizens incorporated aspects related to feeding and environmental cleanliness (biological functioning), good stockmanship (elements of which could be argued as linked to affective states, such as low-stress handling) and space and freedom to range (natural living) in their definitions of a good life for dairy cattle (Ellis et al., 2009). The key issue seems to be that providing for health and functioning alone is unlikely to satisfy members of the public; minimizing pain and providing animals with opportunities to express natural behaviours and live in naturalistic environments will likely also be required.

1.8 Gaps in the existing literature

As each of the livestock industries have their own unique challenges, and in light of evidence that national differences exist regarding attitudes to animal welfare (Phillips et al., 2012), it is clear that at present the picture of how people view the welfare of farm animals—and dairy cattle in particular—is far from complete. In this chapter I have shown that some relevant stakeholders are highly underrepresented in the literature. Further, the Canadian and American literature can still be considered in

its infancy; when focused on the dairy industry in particular, these gaps are more pronounced.

1.8.1 Methodological challenges

It is also clear that limitations exist in some of the extant research. For instance, Maria (2006) failed to clarify a number of methodological considerations, including recruitment strategy and response options, when investigating public attitudes to farm animal welfare in Spain. Other attempts to chart stakeholder values appeared to misappropriate a number of psychological constructs, leaving the reader little understanding of what their results actually represent. For example, Bigras-Poulin (1984/5) –which others (Kristensen and Enevoldsen, 2008) described as a classic paper—included various ‘value orientations’ (e.g. scientific, economic, and ‘cow as machine’) as variables in their multiple linear regression analysis to predict herd performance in Ontario dairy herds, but failed to provide any explanation of how these variables were obtained, or even defined.

Other shortcomings exist in other studies. For example, Kielland et al. (2010) attempted to use a novel tool to gauge empathy to animals in pain, but used only a single question on attitudes, which the authors acknowledged was likely insufficient to fully characterize farmer attitudes. Likewise, the methodology in Hewson et al. (2007)’s study, which attempted to link Canadian veterinarian’s use of analgesia to their beliefs about the painfulness of the procedure, applied an apparent arbitrary dichotomization to their variables (e.g. terming ‘analgesic use’ at 100% usage, with ‘non-analgesic’ use at any percentage <100%, and rating the painfulness of dehorning as either ‘very painful’ at 8-10 or ‘less than very painful’ at 1-7), rendering their results questionable. Finally,

even in cases where the methodology is clearly well designed, questions remain. For example, Prickett et al.'s (2010) telephone survey employed a 'pairwise questioning' setup, whereby they asked people whether it is more important for farm animals to be allowed to exercise outdoors or to be provided comfortable bedding. The authors defended the use of the tool in that it eased cognitive burden of their respondents, enabling them to provide a more honest answer. This tool then is acknowledged as advantageous in giving a sense of respondents' priorities, but I argue that it also inherently generates a false and perhaps meaningless dichotomy, as it is unlikely that a number of the presented trade-offs mimic real-life situations; further, it may actually misrepresent participant beliefs if both attributes are considered important.

1.8.2 The need for a multi-faceted approach

More critical is the narrow range of methodologies historically applied to inquiries into stakeholder attitudes to farm animal welfare. The overwhelming majority of North American research—even the peer-reviewed studies—is survey-based (e.g. Heleski et al., 2004, 2005, 2006; Levine et al., 2005; Heleski and Zanella, 2006; Prickett et al., 2010). There are of course, distinct advantages to the use of quantitative survey approaches: they can be deployed on a broad scale, are often quicker in terms of data collection and analysis, and perhaps most attractively, can be designed to capture representative samples that offer the opportunity to generalize to broader populations. The Eurobarometer 2007 survey on EU citizen attitudes, for example, was notable in its ability to map widespread, general trends in public beliefs about farm animal welfare.

However, in the quest for breadth, such approaches typically must sacrifice the ability to capture depth. The issue of how farm animals should be treated is complex,

and ferreting out what underlies disagreements will require a multi-faceted approach.

Hansen et al. (2003) describe the issue thus:

Social scientists tend to be skeptical about the notion that lay attitudes to distinct issues...can be studied in abstraction within a quantitative or statistical framework. In daily life, these issues rarely arise other than in an interconnected or merged way...The integrated totality of consumer [or any stakeholder] experience is less likely to be distorted if it is studied discursively within a less rigid, more qualitative framework. (p. 117).

In recognition of this, European researchers have begun to apply qualitative and mixed-method approaches to questions about stakeholder values and attitudes to animal welfare, but there are far fewer examples of the application of these methodologies in North America, the studies by Spooner et al. (2012, 2014a,b) being a marked exception.

I argue for increased application and integration of both approaches to the study of relevant stakeholders in North America in order to capture the breadth and depth of the various psychological constructs that inform how people relate to the welfare of farm animals. Surveys, for example, could contextualize qualitative study, with the qualitative aspects providing samples, or examples, that elaborate upon or clarify trends observed. Likewise, qualitative study could be used to surface and identify the range of relevant issues or views in a group of interest and used to design a targeted survey that could be deployed more broadly (Brannen, 2005).

Furthermore, more creativity could be applied in the pursuit of these questions. In light of criticism of lay citizens as uniformed or uninitiated into the rigors of farm life, there have recently been calls for citizen perception studies of farm animal production to be conducted based on real-life experience (i.e. once they have been introduced to farm life in person, Krystallis et al., 2009). And yet, aside from two citizen farm visit

studies in the Netherlands (to dairy and pigs, Boogaard et al., 2008 and 2011b, respectively), I am not aware of other studies that have exposed citizens to operating farms and gauged their responses.

1.9 Thesis aims

This thesis thus aims to elucidate the perceptions, concerns, and values of industry and lay stakeholders on matters pertaining to animal welfare, with an emphasis on the dairy industry and on the views of North Americans, as these segments are particularly understudied. Chapters 2 and 3 describe the results of two focus group studies with cattle industry stakeholders: Chapter 2 focuses on their primary animal welfare concerns and underlying values while Chapter 3 describes their perceptions of barriers to resolution and desired solutions. Chapter 4 turns to public views and describes a survey study to understand Canadian citizen perceptions and concerns related to dairy cattle welfare, in addition to how exposure to a working farm shifts these constructs. Together, Chapters 2-4 seek to provide a broad picture of the range of animal welfare concerns and values that characterize stakeholders within and external to the dairy industry. Chapter 5 functions as a case study and focuses the lens on a specific issue in dairy production—that of early cow-calf separation— and describes the use of an online engagement forum to engage and understand the range of views on this practice from a diverse audience.

Chapter 2: Dairy industry animal welfare values and concerns^Φ

2.1 Introduction

The dairy industry faces increased societal pressure to address concerns related to the care and handling of its animals. The types of animal welfare concerns identified may vary between stakeholder groups within and external to the dairy industry. In some cases non-industry groups decry standard industry practices as abusive and call for more humane treatment of animals, while stakeholders within the dairy industry maintain that practices conform to high standards of care. This type of disagreement is likely to be frustrating for both sides and unhelpful in the development and implementation of welfare improvements. In the long term, constructive engagement between industry and external stakeholders (including the public) should foster transparency and improve public trust (Brom, 2000), and ultimately improve the social sustainability of the dairy industry (Boogaard et al., 2008).

At issue here is that animal welfare may mean different things to different stakeholders. Vanhonacker et al. (2007) suggest that the livestock industries and the general public “*tend to speak different languages when talking about animal welfare*,” (p. 85). Fraser et al. (1997) provide a framework to better understand the different ways in which individuals may perceive and define animal welfare, with some focusing on biological functioning, others on the affective state of the animal, and still others on an animal’s ability to live naturally.

^Φ A version of this chapter has been published: Ventura, B. A., M. A. G. von Keyserlingk, and D. M. Weary. 2015. Animal welfare concerns and values of stakeholders within the dairy industry. *J. Agric. Environ. Ethics*. 28:109-126.

Recent research has assessed the attitudes and values of stakeholders working within the livestock industries, but much of this work has been based in Europe (e.g. Kjaernes et al., 2007; Bock et al., 2010; Silva et al., 2013). This European literature indicates that those involved with animal production often emphasize aspects related to the biological functioning of the animal, including health, fertility, and production parameters (Te Velde et al., 2002; Lassen et al., 2006; Verbeke, 2009; Silva et al., 2013). Farmers also seem to ascribe lower levels of concern to subjective states, including pain and stress, than do non-farming citizens (Vanhonacker et al., 2008).

Fewer studies have examined industry stakeholder attitudes in North America, recent exceptions being Spooner et al.'s (2012, 2014b) work with Canadian beef and pig producers and Heleksi et al.'s (2004, 2005, 2006) studies of American animal science and veterinary faculty. Moreover, there appears to be little work on groups specifically within the dairy industry. Achieving a more complete understanding of workers in this segment is critical, as producers and other stakeholders (such as veterinarians) are the primary on-farm caregivers whose decisions directly affect the welfare of the animals under their care (also, see Driessen, 2012) and policy in Canada and the United States is strongly influenced by dairy industry groups.

This chapter aims to address the gap in knowledge identified above through the use of focus groups composed of people working primarily with the dairy industries in Canada and the United States. We sought to explore (1) how industry stakeholders prioritize and conceptualize dairy welfare problems and (2) how these stakeholders interpret their own and others' roles in achieving socially sustainable solutions to

identified welfare challenges. This chapter presents results contributing to the former aim; Chapter 3 addresses the latter.

2.2 Methods

2.2.1 Study aims and approach

Five focus groups were held immediately before the Dairy Cattle Welfare Symposium in Guelph, Canada in October 2012. Focus groups were conducted in order to take advantage of the unique perspectives of people who, through their respective roles within the dairy industry, can be considered as ‘prime witnesses’ to animal welfare issues (as described by Vanhonacker et al., 2010). As group interviews, focus groups encourage dynamic communication among participants in a way that reveals their “*attitudes, priorities, language and framework of understanding,*” (p. 143; Pivetti, 2007).

The 60- to 80- min discussions were moderated by trained facilitators who followed a script of questions (Appendix A) structured to identify participants’ perceptions of the dairy industry’s priority welfare issues. Graduate students and dairy farm workers at the University of British Columbia’s Dairy Education and Research Centre piloted the focus group script before it was used. Our approach may be considered stakeholder consultation (Rowe and Frewer, 2005) in that we sought to create a working list of the specific welfare issues of most concern to people working within the dairy industry. This approach was chosen because Te Velde et al. (2002) have shown that people working within the livestock industries talk about animal welfare at more technical levels (e.g. in terms of specific parameters like stocking density or factors affecting environmental quality). We also wanted to probe beyond

these technical, specific issues to understand the broader, value-based reasoning that rooted participants' perceptions, as these are likely to prove more important in longer-term conflict resolution with groups external to the dairy industry.

2.2.2 Participants

We used a convenience sample drawn from registrants of the conference. These registrants (n=292) included 24 farmers, 73 service providers, 39 education and extension workers, 45 veterinarians, 69 researchers, and 42 people in other roles. Conference attendees were recruited after they registered via emails sent out by conference organizers inviting them to participate. Based on our participants' registration at this animal-welfare focused conference, the sample potentially over-represents industry stakeholders with a specific interest and who may hold informed and/or progressive views on this topic.

The sample was composed of 46 people (approximately 16% of the total conference registrants) with 7-10 participants in each group. To encourage engagement among stakeholders holding different roles within the industry, we structured the focus groups to be heterogeneous with respect to stakeholder role such that each of the following roles was represented at least once within each group (Table 2.1):

Industry leader	individuals holding board positions in dairy associations
Producer	dairy farm owners, managers, and workers
Researcher	university researchers, professors, and extension agents
Service provider	e.g. pharmaceutical and feed company representatives
Student	graduate students
Veterinarian	practicing dairy veterinarians

This categorization resulted from participants' self-identification in specific roles, which we then collapsed into these broader categories. Some participants claimed multiple

roles. For example, some participating producers were also members of dairy association boards, and some veterinarians also held university faculty appointments.

Table 2.1 Demographics of the participant sample (n=47) in the mixed dairy cattle industry stakeholder focus groups in Guelph, Ontario

Variable	Group label	N	Percent (%)
Stakeholder ^a	Industry leader	10	21.7
	Producer	7	15.2
	Researcher	10	21.7
	Service provider	8	17.4
	Student	6	13.0
	Veterinarian	9	19.6
Country of residence	European	8	17.4
	North American	35	76.1
	Other	3	6.5
Sex	Female	20	43.5
	Male	26	56.5

^a As n indicates the number of participants who self-identified in each role, and because some participants self-identified in multiple roles, the sum of percentages in this category exceeds 100.

2.2.3 Analysis

Focus groups were audio-recorded and transcribed verbatim, yielding 112 pages of text. Content analysis (Coffey and Atkinson, 1996) was used to identify participants' expressed issues of concern as well as the reasons cited for why participants considered the identified issues to be problematic. Welfare concerns and underlying reasons were coded into theme and sub-themes, respectively, using the Nvivo qualitative data management program (QSY International Pty. Ltd. Version 10, 2012). Each theme and sub-theme comprised several excerpts of text. Not all text was coded, but often text was coded more than once, for example, when participants embedded several reasons into their explanation of why a particular issue was important to them (see Krippendorff, 2004; Pivetti, 2007). Particularly demonstrative participant quotations for welfare concerns and underlying themes are embedded throughout the following results, each

designated by the stakeholder role and group number (e.g. G1=Group 1) of the participant who uttered them.

2.3 Results: Concerns

In response to the question, “What do you think are the most important welfare issues that affect dairy cattle?” participants raised the following issues: lameness, disease, routine management procedures, handling, end-of-life (specifically, on-farm mortality and the transport and fate of cull cows), calf care, cow comfort, and (lack of) opportunities for natural behaviour (Table 2.2).

Table 2.2 Guelph focus group participants' reasoning discussed in the context of their priority animal welfare issues

Reasoning	Discussed in the context of:							
	Lameness	Disease	Painful procedures	Handling	End-of-life	Calf care	Cow comfort	Natural behaviour
<i>Animal-centered</i>								
Pain & suffering	✓	✓	✓		✓			
Stress				✓				
Restriction								✓
<i>Industry-centered</i>								
Production & economic effects	✓		✓			✓		
Public image	✓	✓	✓		✓	✓		✓
<i>Additional considerations</i>								
Duration, prevalence & severity	✓	✓	✓	✓	✓	✓		✓
Indirect effects	✓	✓	✓	✓		✓	✓	✓

2.3.1 Lameness

Participants in every focus group and stakeholder role considered lameness to be the biggest problem for dairy welfare. Lameness was also the first issue identified in every group, with one exception in which someone's initial suggestion of cow-calf separation was quickly overruled by other participants who asserted that lameness was actually the biggest problem. Lameness was also the only issue that was expressly ranked as "*the number one*" welfare issue that superseded other issues also perceived to be critical. Lameness was considered to be a problem for many reasons, including that it is painful, leads to culling, affects production, has a high prevalence and long duration, and negatively affects public perception.

2.3.2 Disease

Concerns about disease surfaced in three of five groups, with most stakeholders (veterinarians, producers, researchers, and board members) discussing concerns about this topic. Participants tended to consider freedom from disease as a prerequisite to adequate welfare, e.g. "*To get animal welfare on a farm, you want your animals as disease-free as possible,*" [Veterinarian, G2]. Participants mainly focused on mastitis, citing the painfulness of the condition and its importance in culling decisions. Metabolic and other diseases like Johne's were also mentioned briefly in discussions.

2.3.3 Routine management procedures

Concerns about dehorning and other procedures like tail docking were raised mainly by academics and surfaced in most (three of five) of the groups. Participants did not spend a great deal of time discussing these procedures, perhaps because, as one

subject put it, “[*Dehorning*] affects all calves, but it’s also a very short welfare issue that we can probably address,” [Researcher, G3]. Rather, participants tended to articulate their concerns about specific procedures in the larger context of pain management before moving on to discuss other issues in greater depth.

2.3.4 Handling

Concerns about poor handling and stockmanship arose in most (four of five) of the focus groups, with every stakeholder category except producers commenting on stockmanship, defined by one participant as “*how we handle cows, how we work around them, how we treat them,*” [Industry leader, G2]. Individuals varied in their beliefs about the severity of poor handling as a welfare problem, with stress and other indirect effects on animal health and production discussed as repercussions. Some participants noted that how animals were handled had the potential to have widespread effects: for example, “*100% of a herd is affected by poor stockmanship...and that exists for the lifetime of the COW*” [Board member, G2].

2.3.5 End-of-life

Concerns around end-of-life –including on-farm mortality and, more predominantly, management and transport of cull cows—surfaced in all but one of the focus groups, with at least one member of every stakeholder category contributing comments on this topic. Discussions tended to focus on the welfare implications of decisions to cull animals (e.g. when, if, and why an animal might be shipped to auction or slaughter). Participants generally agreed that the potential for animal suffering was

great, particularly in the context of cull cow transport, but that instances of severe welfare problems were uncommon.

2.3.6 Calf care

Calf care was a prominent concern in three of the groups, with individuals from every stakeholder category contributing to this line of discussion. With the exception of one producer, participants were unanimous that management (especially feeding practices) and housing were often substandard for heifer as well as bull calves. Participants often attributed inadequate calf care to attitudes within the production system, including that *“the dairy calves are the leftovers of the farms”* [Researcher, G2] and although *“farmers [do] take care of the [calves], it’s not necessarily the priority...so there is a lot of room for improvement,”* [Service provider, G2].

2.3.7 Cow comfort

All types of stakeholders except students used the term *“cow comfort,”* with the topic discussed in three of five focus groups. This catchall term incorporated various aspects including environmental quality (temperature, ventilation, water availability and quality), proper stall design (space, lying surface quality), and cow behaviour (lying down vs. standing). Some participants also used cow comfort as a synonym or replacement for the term animal welfare. For example, *“I can tell you that I...use ‘well-being’ and ‘comfort’ instead of ‘welfare’...”* [Service provider, G1]. Participants also felt that cow comfort was related to other welfare issues, including lameness, stress and injuries: for example, *“Cow comfort...the space they have, how soft is it, is it dry? They get a lot of*

injuries from that. They keep standing too much [of the] time, they get foot health problems,” [Veterinarian, G2].

2.3.8 Natural behaviour

Every group brought up issues related to the natural behaviour of cattle, with all groups save one discussing behavioural issues in some depth. Participant concerns around behaviour focused on a few specific topics: confinement in tie stalls, social conflicts resulting from frequent mixing, cow-calf separation, and compromised time budgets in which management timelines were seen to trump cows’ natural rhythms and behavioural needs. With each of these concerns, participants traced their concerns back to the cow being restricted in some way, from basic restrictions (e.g. lack of postural freedom in tie stalls) to much broader infringement on the cow’s ability to be a cow.

2.4 Results: Reasons

Participants used both animal- and industry-centered reasoning in discussing their prioritization of dairy welfare issues. Animal centered-reasons included pain and suffering, inflicted stress, and restriction of behavioural freedom. Industry-centered justifications focused on production effects and subsequent economic repercussions for the farmer, along with public perception of the dairy industry as a whole. In addition, participants’ comments about every welfare issue were often modulated by concerns about herd-level factors (e.g. prevalence, duration, and/or severity of the named welfare issue) and indirect effects (i.e. a particular issue was important because it contributed in some way to the occurrence of another issue). The one exception was that discussion of indirect effects did not arise in the context of end-of-life issues.

2.4.1 Animal-centered reasoning

Pain and suffering

Concerns around pain and suffering surfaced in the focus groups when lameness, disease, routine management procedures, and cull cows were discussed. Some participants limited their comments to briefly acknowledging that the issue in question was associated with pain or suffering:

So there's pain [with lameness], there's a welfare issue for sure... [Veterinarian, G4]

The other one is the downed cow. Animals that go down in transit...again it's a small number, but it is to my mind a legitimate welfare concern in that the suffering is very great. [Researcher, G3]

Others were more explicit that pain was the primary issue governing their perception of the importance of different welfare issues and that more effective pain management strategies were necessary:

Some kind of leg disorders can be very painful, especially digital dermatitis or sole ulcers, and so on. So it means, just pain for the animal, and that's why I'm thinking it's a main welfare issue. [Researcher, G5]

So there's room for improvement and I think [lameness is] a very painful condition for the animal. So we would like to do more to improve that. Especially severely lame cases. I think we need to do more. [Researcher, G1]

Painful procedures. So dehorning, tail docking, all those kinds of things. And pain management surrounding them...I think just finding appropriate analgesics and anesthetics that we can use at the time of those procedures is really important.

[Student, G1]

Stress

Discussed briefly in the context of poor handling, concerns about animals experiencing stress figured prominently in some participants' concerns:

I don't think we know much about restraint and handling [verbal agreement from group members] and what might be less stressful for the animal...I don't see a lot of that being done all that well on farms. [Service provider, G1]

I think that there's a...large gap in folks' understanding of how we should...work with cows and how cows move around the farm and how we should move them. So things like sticks and canes and kicking and screaming. Just loud...loud boisterous, you know, movement of cattle is stressful for them. [Industry leader, G2]

Restriction of behavioural freedom

Participants voiced concerns that dairy cattle were often restricted from performing natural, motivated behaviours. Concerns often surfaced in the context of specific housing systems, most notably tie-stalls:

I would throw out there that the tie stall, as opposed to the free stall, is an issue [verbal agreement from group members]. So the animal being confined to that space and not having access to pasture...Especially the stanchion. Where the ability of the animal to move within that space is really hindered...I'm talking about the ability to move away from other cattle at times that she doesn't want to be with them. [Researcher, G3]

Participants also expressed their concern about more general infringement on cattle behaviour that seemed to stem from how dairy systems are operated:

I think that there is one issue that is not discussed because it's kind of hidden, and this is the time budget...of the cows during the day...Most of [the management routine] is best for the comfort of us...the vet...the farmer...not necessarily with the [cows'] needs...I think that the issue of time budget during the day and what is...the routine the cow would prefer, [this is] something that we actually...are not dealing with. And I think it's got a lot of importance... [Researcher, G1]

Though the academic members of the focus groups typically initiated discussion of behavioural concerns, other stakeholders also shared these concerns:

I think that housing designs and research...focused around what the cow needs and the cow wants, like [Researcher, G1] was saying, is where we should be heading. Not what is necessarily good for us as managers. It has to fit us too, but what fits the cow budget [is also important]... [Producer, G1]

It's about respect of the nature of the animal! [Veterinarian, G2]

However, not all participants shared this concern. For example, one participant shared,

I still come at it from the old sort of Christian ethic of the animal is there to serve us, and had we had that kind of approach of ‘what does the cow want?’ from the beginning, we wouldn’t have domesticated animals, would we? [Service provider, G1]

2.4.2 Modifiers

Prevalence and duration

Participants often referenced certain modifiers such as the number of animals affected or the length of time animals are afflicted when sharing animal-centered reasons about dairy welfare problems. Prevalence of a particular issue was often used to describe perceived welfare problems, for example:

One that concerns me a lot is mortality on farm...We have large dairies...averag[ing] 8% of cows that die on farm. And for me that is very scary. It’s a huge number... [Researcher, G1]

The other thing is mortality rates are huge in some operations... [Veterinarian, G5]

Duration was another important modifier, as seen in the following exchange [G2]:

Producer	<i>Mastitis is very painful.</i>
Veterinarian	<i>Yes but mastitis lasts only 3 days.</i>
Producer	<i>But it’s very painful.</i>
Veterinarian	<i>It’s very painful, but it lasts only 3 days, and lameness can last for several months [verbal agreement from producer]... That’s why I put lameness above mastitis. Plus mastitis we can cure quite easily, and lameness we still have no...</i>
Producer	<i>Tell me how [elicits laughter from group].</i>

Participants did not usually express such either-or mentality in which animal-centered concerns were pitted against more utilitarian considerations. More often, participants used the ubiquity and/or long duration of conditions to bolster their main points:

When it comes to animal handling and stockmanship, you know that’s a whole herd, so 100% of a herd is affected by poor stockmanship. And that exists for the lifetime of the cow. [Industry leader, G2]

Severity

In general, participant agreement about the importance of welfare issues, both within and between groups, was high. The high frequency of verbal and non-verbal (i.e. nods) agreements, along with the high repetition of voiced welfare concerns, was evidence of this. Remarkably, significant differences in opinion were expressed only three times. These were largely limited to the severity of the issue in question:

(1) A service provider debated whether poor stockmanship was a problem [G2]:

Veterinarian	<i>...If you have poor stockmanship you have lame cows.</i>
Service provider	<i>What's 'stockmanship'?</i>
Board member	<i>Stockmanship is how we handle cows, how we work around them, how we treat them...on an individual basis and work with them as a group.</i>
Service provider	<i>Yeah, I'm not sure that's a big issue for animal welfare, I don't agree there.</i>

(2) A producer defended the quality of calf care against the overwhelming negative opinion of the rest of his group [G2]:

Veterinarian	<i>There's very very few farms I've seen around the world that have good housing for the young stock.</i>
Researcher	<i>Well, the dairy calves are the leftovers...of the farms. So it's not just a question of housing, it's [a] question also [of] management.</i>
Producer	<i>[continued negative commentary from others] This is not...the picture you described...the young stock, not in Canada! I mean...at least if it is it's the exception you know? We take care of the young stock...the young stock is our future!</i>

(3) One veterinarian was explicit in communicating her discomfort with what she saw as a severe welfare problem for cull cows in slaughter plants and auction yards:

It's shocking what I see. It's hard...and you know, we're in these facilities, and we're euthanizing cattle that have shown up there that shouldn't be there...And from my perspective, the dairy industry is one YouTube video away from being in some serious trouble. Because...the things that I see are absolutely horrific... [G1]

In contrast, the narrative from another veterinarian who held the same role was striking in its different perspective:

We don't actually see it [lameness in cull cattle] as a large problem...we get a number of animals every year...in sales barns and abattoirs that shouldn't have been trucked. So clearly there is a problem but we don't see it as a big problem...It's not an industry-wide problem. [G5]

Thus, while both individuals acknowledged the high prevalence of compromised cattle being transported to auction of slaughter (“*It happens all the time*” [Veterinarian, G1] and “*We know that 80% of incident reports are generated by dairy cows*” [Veterinarian, G5]), their perceptions of the severity of the issue varied markedly.

2.4.3 Industry-centered reasons

Indirect and economic consequences

Participants often supplemented their animal-centered reasoning with comments about instrumental consequences of the welfare issues discussed. That is, in addition to having important, direct repercussions on the animals (e.g. lameness is painful, bad handling is stressful), welfare issues were also discussed as causing, or contributing to, additional problems:

If you have poor stockmanship you have lame cows. [Veterinarian, G2]

And lameness is one of the lead reasons for culling from a dairy herd, and that puts to your point about seeing them at the sales barns and at the abattoirs... [Producer/ Industry leader, G5]

The issue of longevity often arose in discussion, especially in the context of lameness. Many participants believed that conditions which shortened a cow's longevity inevitably translated into economic costs for the farmer as well as the dairy industry as a whole:

I see the importance [of lameness] and this relates to the fact that it really shortens a cow's life. And the durability of the cow is very important, that's something we have to look for. So there's pain, there's a welfare issue for sure, but there's the fact that economically it has a huge impact on the industry I would say. [Veterinarian, G4]

...You know, one of the major economic drivers of this whole thing, going back to the first question, is the life of the cow. Lameness is one of the big reasons why you have a high cull rate. The longer you keep that cow productively in your herd, that's going to be more profitable. [Researcher, G4]

Public perception

Finally, some participants were concerned about the effect of welfare problems on public perception of the dairy industry:

Not only do we know that [lameness] affects production, but I think it's probably more of a concern that's really obvious to the public. As they...drive by, they see a cow that's lame, they can relate to that. I think that's probably the most important one. [Service provider, G4]

I think the perception of how calves are managed, to the general public. I think that's an issue...The general public perception is the key issue there. [Industry leader, G1]

And one thing about the consumer again, it's difficult to really imagine...the separation...of the mother and the young...and after that you put [the calf] in these horrible conditions. So it doesn't give a nice picture [of] what's going on. [Researcher, G2]

2.5 Discussion

2.5.1 Welfare concerns of dairy industry stakeholders

This chapter contributes to the growing literature (Spooner et al., 2012; Silva et al., 2013) of multi-dimensional conceptions of animal welfare held by producers and

others in the livestock industries. As in past studies, our participants expressed welfare concerns that extended well beyond health considerations, including both affective states (e.g. pain and suffering) and natural living (e.g. behavioural freedom). Spooner et al. (2012) pointed out that such inclusive conceptions of animal welfare offer an alternative perspective to that used in some of the critiques of the livestock industries. These results suggest that criticisms portraying industry stakeholders as one-dimensional in their understanding of animal welfare are unfounded.

It could be argued that the broad conception of animal welfare held by participants in the current study could be attributed to the inclusion of a wide array of stakeholders from within the dairy industry. However, this breadth was evident even when results were broken down by stakeholder category, with representatives from most stakeholder roles expressing concerns for specific welfare issues that related to health, affective states, and even natural living. One exception is that only members from the research and producer communities expressed concerns around behavioural freedom in any depth, though all stakeholders except students and veterinarians at least mentioned behavioural issues. That is, although some participants expressed a strong preference for allowing dairy cattle to live more natural and unrestricted lives, this type of preference was less widely shared. This finding conflicts with a previous study of Canadian beef producers (Spooner et al., 2012), which found natural living as a core concern among beef cattle ranchers, though it is worth noting that the ranchers in that study were operating range-based systems where animals already spent most of their lives unconfined and out of doors. With respect to dairy cattle, our findings are

similar to another study that summarized the views of Portuguese dairy farmers (Silva et al., 2013).

We also acknowledge that participants in this study, as a function of their attendance at an animal welfare-focused meeting, may have held more progressive views toward animal welfare than their peers in the dairy industry. While this theoretically limits the generalizability of these findings, the intent was not to make inferences regarding a broad population but rather to describe the range and consistency of welfare concerns of the industry stakeholders that participated in these groups. However, there is reasonable expectation that most of these welfare concerns (and reasons for them) exist among other members of the dairy industry, i.e. transferability of the findings to other contexts outside this cluster of participants is likely.

2.5.2 Forward paths and potential for broader stakeholder linkages

We intended these focus groups to engage participants on specific and concrete dairy welfare issues in order to provide a basic foundation from which to understand broadly shared concerns and animal welfare values among industry stakeholders. However, concerns about welfare and production were inevitably linked together by many participants such that it was challenging for many of them to discuss welfare in isolation of economic pressures. This linkage has been noted elsewhere (Hubbard et al., 2007; Skarstad et al., 2007; Kauppinen et al., 2010; Spooner et al., 2012; Silva et al., 2013), suggesting that this association is widely held by producers and other industry stakeholders, independent of geographical location. Future efforts seeking multi-stakeholder engagement would do well to bear this linkage in mind. In particular, those

outside the livestock industries who seek improvement of farm animal welfare would likely be more effective if they acknowledge the production implications of welfare for those within these industries.

Dairy industry participants in this study demonstrated concern for animal welfare and many had a broad conception of what animal welfare encompasses. As such, there appears to be scope for the dairy industry to emphasize values that exist in broader society, including among critics. Below we outline three examples, each in varying stages of resolution, for how this might be achieved.

(1) *Tail docking*

A useful starting point is the issue of tail docking. In the United States, around 40% of dairy farms report use of tail docking (NAHMS, 2007), despite abundant evidence that the procedure has no production or health benefits (Eicher et al., 2001; Tucker et al., 2001; Schreiner and Ruegg, 2002; Fulwider et al., 2008; Lombard et al., 2010). One participant in this study shared that, “*tail docking...used to be a big problem. And I used to be a tail docking proponent at some point...I’m ashamed of that...*” [Veterinarian, G4]. With the exception of a few mentions in the context of discussion around painful procedures, this was the only thing participants had to say about tail docking.

Canada’s Code of Practice for the Care and Handling of Dairy Cattle specifies that “*dairy cattle must not be tail docked unless medically necessary*” (NFACC, 2009), so this finding may reflect a low prevalence of tail docking on Canadian farms. Alternatively, it may be simply that the progressives within the dairy industry consider the practice of tail docking to be a ‘dinosaur.’ Regardless, tail docking appears to represent a case of widespread stakeholder agreement (Weary et al., 2011) for one solution (to stop

docking cows), with the path to resolution relatively straightforward. The main barrier to implementing change appears to be the mistaken belief of some that tail docking leads to cleaner cows (Weary et al., 2011). The appropriate solution is likely targeted extension efforts toward those who have yet to fall in line with the Code of Practice.

We note here that phase-out periods are sometimes implemented to allow farmers the time to change their management strategies. For example, in 2004 Norway banned construction of new tie-stalls but provided a 20-year phase-out for existing tie-stall facilities (Skarstad and Borgen, 2007). This approach seems reasonable in cases that require major infrastructure change, but it is less clear why a lengthy phase-out should exist for issues like tail docking (see the National Milk Producers Federation's 10-year phase-out period for tail docking in 2012 [NMPF, 2014]), which does not require significant producer investment in infrastructure.

(2) Painful procedures without pain control

In 2013 the practice of dehorning dairy cattle made media headlines when actor Ryan Gosling wrote a letter to the National Milk Producers Federation in which he described the practice as “*painful*” and “*barbaric*” (Huffington Post, 2013). Some responses dismissed Gosling's concerns as ignorant, but others were crafted around the recognition that dehorning is indeed painful and pain mitigation techniques should be applied (Huibregtse, 2013). By acknowledging shared concerns, the latter approach is likely to be more appropriate if the dairy industry is to engage successfully with external stakeholders.

The percentage of US and Canadian farms reporting the use of anesthetics during dehorning is generally low (~12-45%), and use of post-operative analgesics is

exceedingly rare (0-1.8%, Misch et al., 2007; Fulwider et al., 2008; Vasseur et al., 2010). However, participants in the current study often expressed their concerns about dehorning, lameness, and disease specifically in terms of pain. Thus, it appears that the lack of analgesic use is out of step with values even within the dairy industry. It is increasingly evident that members of the public feel the same way (Rutgers, 2003; Spooner et al., 2014a). Acting swiftly to ensure that pain management procedures are included in daily farm practice would be one way for the dairy industry to achieve an 'easy win.' We encourage future work to address constraints that hinder farmers from using pain control during dehorning and other common management procedures.

(3) Pasture access and natural living

Resolving other welfare issues within the dairy industry may prove more challenging. The complex etiology of some issues (e.g. lameness and mastitis) makes simplistic solutions largely inappropriate, while other issues, like providing dairy cows with a natural life, present a more fundamental challenge to resolution.

Participants here did not discuss pasture or outdoor access as important elements for dairy welfare, in contrast to strongly expressed preferences by citizens (Ellis et al., 2009; Boogaard et al., 2011b; IGD, 2011; Schuppli et al., 2014). However, pasture access is just one element of a broader desire to provide animals with the opportunity to live more natural lives. It is within this broader concept of 'natural' that links across diverse stakeholder groups may be found. Representatives from the producer and research communities in this study routinely expressed preferences for allowing cows behavioural freedom and criticized situations where cows were restricted from normal postural movements. We see similar preferences for adequate

space (Ellis et al., 2009; IGD, 2011) expressed by citizens, which suggests that there may be some room for agreement on this issue.

It is clear that continued research is warranted to parse out which aspects of natural living are most important to different stakeholders and to more clearly define relatively nebulous concepts like 'adequate space' (which is crucial if any resulting policy is to be even marginally enforceable). It may be that the dairy industry can reduce the gap between public expectations and industry practices by phasing out its most restrictive housing and management practices, as Norway did in the example above. However, it may also be that the public is unwilling to support what they see as merely incremental change; from this perspective, something like larger free stalls may not be seen as adequate substitute for pasture access.

2.6 Study conclusions

This chapter described the use of focus groups to engage a range of industry stakeholders on welfare issues in the dairy industry and the results illustrate some promise in this method of stakeholder engagement. Agreement on 'low-hanging fruit' issues, including abolition of tail docking and implementation of pain control protocols for procedures like dehorning, would be a way to achieve easy wins that serve to strengthen stakeholder relations. More effort will be needed to tackle more complex issues like pasture access, as public and industry concerns around this issue appear to be substantially different. Even in cases where agreement on issues is widespread, however, barriers to welfare improvement persist. Chapter 3 thus addresses how people within the industry perceive these barriers and the desired strategies to overcome them.

Chapter 3: Dairy industry perspectives on animal welfare challenges and solutions[†]

"If we, the ones who know things, won't do it, who will?"

Cattle Veterinarian, Anonymous

3.1 Introduction

The conditions in which humans raise farm animals have become a common topic in discussions on the ethical challenges faced by modern society. The past two decades have seen a series of studies that have focused on the perceptions, attitudes and values regarding animal welfare held by the public, both as citizens and as consumers (e.g. Harper and Makatouni, 2002; Lassen et al., 2006; Kjaernes et al., 2007; Boogaard et al., 2006, 2008, 2011b; Vanhonacker et al., 2008, Prickett et al., 2010). Also important are the various actors who work within or tangential to the livestock industries (including producers, industry leaders, livestock veterinarians, university faculty and graduate students working in agriculture or veterinary medicine, and industry service providers), as these individuals hold much of the power over the lives of farm animals and are most affected by policy changes.

These people may be considered as 'experts' as they have accumulated a unique body of knowledge and experience with livestock as a result of their respective roles. For example, the proximity of farmers to the conditions in which farm animals are raised gives them a unique perspective on the ethical debates on agricultural practices (Driessen, 2012). Livestock veterinarians are likewise in a unique position to lead in

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improving animal welfare, as farmers often highly value their opinion on matters related to animal health (Lam et al., 2007; Kaupinnen et al., 2010).

In contrast to Europe where research initiatives such as the Welfare Quality® projects have started to address industry stakeholder perspectives, the views of North Americans have received little attention. The need to better incorporate these industry stakeholders into discussions on farm animal welfare has become critical in Canada and the United States where the debate on farm animal welfare is highly polarized (Fraser, 2001; Croney and Reynnells, 2008), the federal governments have largely remained silent on the issue, and industry-led initiatives remain largely unproven (von Keyserlingk and Hotzel, 2015).

In light of the challenges specific to different sectors of livestock farming, research should examine stakeholder perspectives on these issues within each industry. To this end, we held two cohorts of focus groups, the first in Guelph, Ontario, in October 2012 (hereafter ‘Guelph cohort’) and the second in Madrid, Spain (hereafter ‘Madrid cohort’) approximately 1.5 years later. Chapter 2 described conversations in the Guelph cohort with respect to participants’ perceptions of priority animal welfare problems in the dairy industry. To provide context for the current chapter we note that the key problems identified included lameness, cow comfort, disease, on-farm mortality, poor handling, routine management procedures, injuries, cull cow management, calf management, and inability to perform natural behaviours (see Chapter 2). The aim of the current paper was to identify cattle industry stakeholders’ perceived challenges to resolving such welfare problems as well as participants’ perceptions of their own and others’ roles in solutions to these problems.

3.2 Methods

3.2.1 Study approach

Focus groups use dynamic group interaction to elicit information grounded in individuals' experiences (see Carey and Smith, 1994), which is desirable in gaining insight into the constraints faced by these individuals. As farmers, veterinary practitioners, and other industry actors operate within complex social webs in farming communities, providing opportunities to discuss cattle welfare with their peers should elicit richer, more honest reflections on the subject (Albrecht et al., 1993).

3.2.2 Guelph cohort

For a complete description of the Guelph methodology please see Chapter 2. In brief, five heterogeneous focus groups (n=47 participants, divided into groups of 7-10), composed of dairy farmers, veterinarians, researchers, graduate students and dairy industry leaders and specialists, were held immediately before a dairy cattle welfare meeting in Guelph, Ontario, Canada in October 2012 (see Table 2.1 for Guelph participant demographics).

3.2.3 Madrid cohort

To examine the extent to which the Guelph findings were repeatable and to explore the views of veterinarians in greater depth, six focus groups were held directly before the 7th Boehringer Ingelheim Expert Forum on Farm Animal Well-Being in Madrid, Spain in June 2014. Trained facilitators prompted participants to discuss a series of five main questions over a period of 75 minutes. The groups were composed of cattle veterinary practitioners (e.g. dairy, beef, and mixed practice that included cattle)

and veterinary researchers based predominantly in Europe. We considered veterinarians to be an important focus for continued discussions on these issues, as the Guelph data indicated that they see themselves as critical “gatekeepers” to animal welfare but often struggle to fulfill their roles as leaders.

Our previous experience with the Guelph participants indicated that a significant portion of their discussions focused on the technical aspects related to welfare issues, a phenomenon documented by others (Te Velde et al., 2002). To allow more time for discussion of participants’ perceptions of welfare challenges and solutions, the guide (or script, see Appendix B) for this study was modified so that the initial question (*“What do you think are the most important welfare issues that affect cattle?”*) was asked via an online survey circulated to all participants two weeks before the conference. Participants’ answers were then displayed during the focus groups and used as a starting point for the rest of discussion. All other questions matched those used with the Guelph cohort.

Participants

As in Guelph, we used a convenience sample drawn from conference attendees. As such, we aimed to gain a deeper understanding of some of the challenges faced, and the solutions desired, by members of these groups. Conference organizers emailed invitations to all conference registrants, who then contacted the researchers if they wanted to participate. Between 7-10 people participated in each of six groups, resulting in 50 participants. The sample was predominantly European (84%) and male (70%, see Table 3.1 for Madrid participant demographics). Focus groups were largely homogeneous with respect to stakeholder role: four of the groups were composed of

veterinarians (and of those, 73% specified during the introductions that they practiced or had a history of practice with dairy and/or beef cattle). The two other groups were composed predominantly of veterinary researchers.

Table 3.1 Demographics of the participant sample (n=50) in the veterinary stakeholder focus groups in Madrid, Spain

Variable	Label	<i>n</i>	Percent (%)
Stakeholder	Veterinarian	33	66.7
	Veterinary researcher	17	33.3
Sex	Female	15	30.0
	Male	35	70.0
Nationality	France	7	14.0
	Netherlands	7	14.0
	Belgium	5	10.0
	UK+ Ireland	5	10.0
	Turkey	5	10.0
	Germany	4	8.0
	Spain	4	8.0
	Italy	3	6.0
	Canada	2	4.0
	USA	2	4.0
	Argentina	1	2.0
	New Zealand	1	2.0
	Portugal	1	2.0
	Sweden	1	2.0
	Unspecified	2	4.0

3.2.4 Analyses

All discussions were audio-recorded and transcribed to generate 112 and 130 pages of text from the Guelph and Madrid cohorts, respectively. B. A. Ventura transcribed the Guelph data, while the Madrid data were transcribed by a professional transcription service. Content from the online question used with the Madrid cohort yielded an additional five pages of data. Welfare concerns from these data were coded into themes and sub-themes using the qualitative data management program, NVivo

(QSY International Pty Ltd. Version 10, 2014) following the approach described in Chapter 2.

Both data sets were analyzed using content analysis (Coffey and Atkinson, 1996) to identify participants' perceptions of challenges to cattle welfare and potential solutions. Two authors (B. A. Ventura and A. S. Giovanetti) independently read the transcripts multiple times, making notes on emerging patterns in participants' comments and assigning codes and sub-codes to related sections of text. For example, the statement *"...we have some [farms] that are very progressive and they have a lot of capital to pull from. And then we have a lot of small farms that are really struggling and the market is swinging back and forth"* was assigned the code "Challenge-economic" and sub-code "market stability". Once transcripts were coded, researchers compared their respective code lists to evaluate consistency. As initial consistency was high, coders discussed their interpretations until a mutually consistent coding scheme, consisting of codes and sub-codes, was reached (henceforth termed themes and sub-themes). Ultimately, we developed a set of themes and sub-themes for both challenges and solutions, with stakeholder roles embedded throughout the discussion of both.

Participant quotations are used below to illustrate themes and to ensure transparency of the research process. Each quotation is followed by a subscript of the type of stakeholder and their focus group (e.g. G1 indicates Guelph Group 1 and M5 denotes Madrid Group 5).

3.3 Results and discussion

3.3.1 Perceived challenges to animal welfare

Six primary challenges emerged from the combined data sets (see Table 3.2): animal welfare definition and assessment, external regulations, economics, and farmer-, veterinarian-, and researcher-related challenges. Participants in both cohorts discussed five of these challenges; in addition, the Madrid cohort discussed veterinarian-related challenges, likely due to the high proportion of participating veterinarians in this cohort. Unless otherwise stated, there were no differences between the two cohorts in how participants discussed challenges to welfare.

Table 3.2 Themes discussed by participants in the context of challenges to animal welfare (AW) and the proportion of focus groups from Guelph (n=5 focus groups) and Madrid (n=6) in which each theme emerged

Challenges to AW	Theme description	Guelph	Madrid
Definition and assessment	Lack of consensus on meaning of AW; complexity of AW; difficulties in AW measurement and evaluation	4/5	6/6
External regulations	External regulations as insufficient, difficult to enforce, or detrimental	4/5	5/6
Economics	Low cash flow; market instability; complex relationship between AW and production	4/5	5/6
Producer		5/5	6/6
<i>Knowledge/awareness</i>	Deficits in producer knowledge or awareness of AW issues and solutions	5/5	4/6
<i>Attitudes</i>	Cultural and psychological impediments that contributed to producer unwillingness to address AW	3/5	6/6
<i>Management</i>	Reactive management; low self-efficacy	3/5	6/6
Veterinarian		0	6/6
<i>Knowledge</i>	Deficits in veterinarian knowledge about AW issues; inadequate AW education in curricula	0	2/6
<i>Attitudes</i>	Dismissal or avoidance of AW	0	4/6
<i>Self-efficacy</i>	Conflict of interest between client and animal leads to constraints against veterinary action	0	4/6
Researcher	Questionable relevance of research to farm reality; conflict between practical solutions and AW	2/5	2/6

1) *Animal welfare definition and assessment*

All groups in both cohorts, save one of the Guelph groups, described difficulties about how to define and assess animal welfare on farm. For instance, one participant stated that, “*One of the big things that stands in the way for us with welfare...a lot of it is*

definition. How you define animal welfare,” [Veterinarian, M5]. Others noted that they were often too narrow in their own definition of animal welfare, which they argued hindered progress: *“As veterinarians, I’m certainly guilty of looking at...health and production as...a proxy for welfare...and they’re not really a very good measure of welfare holistically,”* [Veterinarian, M5]. Some participants also argued that the lack of agreement surrounding the definition of animal welfare contributed to inconsistent messaging to farmers: *“I think the farmer sees a lot of consultants...I would wish that all those guys could come to the same point regarding the welfare because I know that some economical consultants also recommend overstocking of about 10%...it’s people like that I would like to come to the same point,”* [Veterinarian, M1].

Participants also noted that the complexity of many welfare issues made it difficult to track effects of management or treatment changes, citing for example the multi-factorial causes of lameness and mastitis: *“What’s the lameness status of my herd? ...How do you quickly get an assessment of that situation? And as with mastitis, it’s a multifactorial problem, so you can’t just put your finger necessarily on one thing. You have to have a systematic approach to it,”* [Researcher, G4]. Others noted that this complexity meant that a potential solution for one issue might create another.

Many participants expressed sentiments along the lines of, *“we’re still looking for good tools to measure the welfare problems,”* [Veterinarian, M3]. For example, many veterinary participants stated that the lack of tools to measure pain prevented them from helping farmers detect painful conditions like lameness. Some also criticized approaches such as the reliance on environmental versus animal-based welfare indicators. Others

commented that existing technologies to assess welfare were often insufficient or prone to malfunction.

2) *External regulation*

All but one group in each cohort contained at least one participant who believed that issues with external regulation presented a challenge to improving cattle welfare. Participants varied in their thoughts on regulations to dictate standards on farms: some participants saw value in external regulations (even if they were critical of existing measures), but others were suspicious of any regulation from outside actors.

Those in favor of external regulations tended to value the transparency of independent oversight or believe self-governance by industry to be slow or insufficient. Their concerns often involved legislation that was too lax or insufficiently enforced. This perspective appeared to exist independent of participants' nationality. For example, one North American commented, *"there is very little oversight to animal welfare on the farms in the US, and it's a big problem, in my opinion. The vets aren't on the farm, and we really haven't any legislation that dictates that farms have to have permits outside of the milk quality issues..."* [Veterinary Researcher, M6]. Along a similar vein, a New Zealander had strong concerns over what he perceived to be lax regulations on analgesic use for painful procedures, while a Canadian participant expressed frustration over the lack of enforcement in sending downer cattle to market: *"Unfortunately with [provincial] regulations there's no outcome if you don't pay your fines and there's no consequence..."* [Veterinarian, G1].

Others believed that external regulation was at best a nuisance and at worst a hindrance to improving cattle welfare. As such, mandatory regulations forcing

adherence to welfare standards were believed to negatively affect both animals and farmers. For example, participants in both cohorts were concerned that comparatively lax regulations in other countries threatened the viability of farms in countries where animal welfare regulations were stricter: *“...having more regulation dumped on us, without any increased profit, without any increased border protection to sell our product in this country without cheaper product coming in...I see red flags,”* [Farmer/Industry leader, G5]. Regardless of their position on the role of external regulation, all focus groups expressed the belief that forcing changes on people, rather than letting them come to the realization on their own, was a problem.

Another objection to external regulations was the perceived lack of farmer participation in their development, which participants argued had created unrealistic expectations or excessively burdensome regulatory environments. Veterinarians also mentioned that they had encountered regulations that worsened welfare status (e.g. excessive withholding periods for medications which discouraged pain and disease treatment). Finally, some objected to the creation or enforcement of standards by people perceived to be ignorant of the realities of farming, e.g.: *“There are laws coming through the US system...to legislate some animal welfare issues. Some of those ... are being decided out of perception issues and not backed up with science,”* [Veterinary Researcher, M6] and *“We have a lot of policy people...who are doing a lot of the big thinking stuff who didn’t grow up on a farm...”* [Industry leader, G3].

3) Economics

All groups (save one in each cohort) viewed economic challenges as a barrier preventing improvements in cattle welfare. Participants expressed concern with low

incoming cash flow, primarily due to inadequate compensation for their products and as a result of difficulties with investors (for example, banks not providing loans for farmers to invest in high welfare infrastructure changes). Some shared their frustration with the low economic value placed on some animals such as dairy bull calves.

Interestingly, one participant cited the commodification of animals as a hindrance to both welfare *and* productivity: *"We need to change something. They are not things. They are animals.... If we take care of them, they give more quality meat,"* [Veterinarian, M6]. More widespread was the complaint that low product prices constrained farmers from being more proactive on welfare (e.g. *"In Norway, one barrier is the economy... the farm economy... the milk prices are quite low,"* [Researcher, G3]). Participants sometimes specified that supermarket demand for low cost but high welfare products was problematic, with some commenting that consumer willingness to pay for high quality products must rise. One farmer echoed this through his frustration with supermarkets selling milk as a 'loss leader,' i.e. using cheap milk to entice consumers to enter the supermarket with the hope that they would buy other products.

Market instability and competing markets were also seen to be a challenge. Participants mentioned that in certain contexts such as the US, fluctuating markets made it difficult for farmers to proactively manage their farms. As one participant commented: *"We have a lot of small farms that are really struggling and the market is swinging back and forth...the timeline for making changes is often longer than what the economic realities are for many of these farmers,"* [Researcher, G3]. Others argued that highly competitive market environments discouraged individual farmers from experimenting with welfare changes or even advocating for high welfare amongst their peers. Other

concerns included the differences in economic security across countries as a result of variable animal welfare legislation, high costs of meeting sometimes unrealistic standards, and a lack of funds for inspection of standards.

Relationships between animal welfare and economics. The question of economics is one that frequently surfaces when discussing farm animal welfare with farmers and other stakeholders directly linked to the livestock industries (Hubbard et al., 2007; Skarstad et al., 2007; Kauppinen et al., 2010; Spooner et al., 2014b; de Lauwere et al., 2015). Responses from the present study often revealed a paradoxical view of the relationship between animal welfare and economics. It was clear that some participants believed the relationship between welfare and economics to be positive such that an increase in welfare is accompanied by an increase in production. For example, one veterinarian commented that, *“better welfare is linear with more production,”* [Veterinarian, M3]. This belief, documented also among Dutch dairy farmers and their advisors (de Lauwere et al., 2015), is likely rooted in values that emphasize biological health and functioning as the primary determinant of animal welfare (Moberg, 1985; Broom, 1991; McGlone, 1993), which in turn translates downstream into production benefits or losses.

Participants also argued that bad welfare was bad for business, particularly in cases of egregious abuse by “bad apple” farmers that harm the image of the industry. However, many of these same participants also appeared to believe in an inverse relationship between welfare and economics, evident through comments that high welfare provisions often required costly investments in infrastructure and/or management changes, e.g. *“and of course increasing the management, increasing the*

welfare of the animals, increasing the prevention—cost[s] them [the farmer] money,”

[Veterinarian, M2].

De Jonge and van Trijp (2013) describe an inherent conflict between the belief that current production methods are necessary to remain competitive and the desire to ensure a good life for animals (and avoid conflict with social concerns). Some of our participants clearly experienced this same conflict and seemed to believe that modifications to improve animal welfare could be both economically risky *and* advantageous. For others, this matter appeared to be context-dependent such that changes were beneficial for some issues but risky for others. Still others seemed to reconcile the conflict through beliefs that costly short-term investments (e.g. deeper bedding) could translate to long-term economic benefits (e.g. higher cow comfort and lower lameness leading to improved cow longevity and milk production).

4) *The Role of the Farmer*

As has been noted by others (Driessen, 2012), the farmer was widely perceived as the critical actor upon which action moves forward (or not). Every focus group considered farmer-related issues as being influential in determining animal welfare, with discussions centered on farmer awareness and knowledge, attitudes and culture, and management skills.

Overall there was consensus that many farmers and farm workers lacked awareness of certain welfare problems, which is in line with work on Dutch dairy farmers' perceived limitations (de Lauwere et al., 2015). Some referenced the limited conceptions of animal welfare held by farmers they encountered. Specific knowledge deficits identified by the participants included pain management, handling, animal

behaviour, and disease detection, which were generally attributed to a lack of training or extension:

I would say that a lot of farmers still don't see that there is a welfare problem when cows are sick. [Veterinarian, M2]

One good indicator in Canada is when you ask a producer the calf mortality, they have no clue...When we did the study we see that they underestimate it by 50%...You don't know if they don't see the problem or if they just don't know... [Researcher, G2].

Some producers aren't doing the lidocaine block, but that actually takes a fair amount of thinking through how you're going to do that. Who do you have to contact?...How do you learn those skills?...Each one of those is a little mini barrier... [Researcher, G3]

Welfare problems were also seen to be an artifact of farm culture, i.e. bad welfare being the norm for some farmers, evidenced for example by high calf mortality and morbidity. This was echoed by some who stated that there was an acceptance among some farmers that part of the cost of doing business meant that some animals would inevitably slip through the cracks: *"Unfortunately to these people [who ship downed cattle to auction]...you know if they get a thousand dollar fine, well it's no big deal. It's the cost of business,"* [Veterinarian, G1].

Some participants also believed that long-standing traditions translated into inaction by some farmers. One veterinarian described it thus: *"I found that the farmers love their cows, but they're not aware about these welfare issues...Because everything has been done the same way for hundreds of years, and why suddenly are we talking about welfare and pain?"* [M2]. This was seen to be especially problematic among older farmers: *"It's hard to convince the older generation that, yes, I'm going to see advantages there..."* [Farmer, G1]. Many veterinarians spoke of the difficulty of broaching the subject of welfare with their clients, noting that farmers were often reluctant to acknowledge welfare

problems on their farm: *“I will have discussions with producers and they say ‘I don’t want you to write that [problem] down,’”* [Veterinarian, M1].

Some participants linked poor knowledge, coupled with a high degree of resistance, with poor management. Some felt, for example, that farmers’ management strategies were built on reacting to problems rather than proactivity. Others commented that farmers failed to implement effective solutions even in cases where they were aware of the problem. Still others considered that farmers’ actions were limited by circumstances beyond their control, for example when farmers were required to adhere to too many standards (e.g. *“And sometimes it’s very hard for the farmer to understand all the rules,”* [Researcher, M4], or *“Producers have too much on their plate,”* [Researcher, G2]).

Both farmers and others in a supporting role, such as veterinarians, focused on farmers’ relationships to pain in cattle (and widely found these to be deficient in some way). Research has indicated that farmers tend to approach pain in farm animals according to context and issue, such that chronically painful conditions like lameness and disease are prioritized (in part because they are painful, Leach et al., 2010a,b) while shorter-term painful experiences like dehorning or castration are often dismissed (Vanhonacker et al., 2008; Phillips et al., 2009; Spooner et al., 2012; Tuytens et al., 2012). Though we did not probe the extent to which farmers in the current study valued pain mitigation against other concerns, this finding (together with work from Wikman et al., 2013) shows a level of concern and sensitivity to pain among commercial livestock farmers beyond that reported in previous research.

5) *The Role of the Veterinarian*

Previous research has shown that veterinarians are recognized as one of the most important advisors to dairy farmers (Lam et al., 2007; Jansen et al., 2010b; de Lauwere et al., 2015), but veterinarians perceived specific challenges in meeting this role as seen in comments from the Madrid cohort. As with farmer-related challenges, veterinarian challenges were categorized as deficits in knowledge, attitudes, and self-efficacy.

Some groups argued that veterinarians lacked knowledge on key topics like animal behaviour and pain, which in turn compromised their ability to help. Many attributed these knowledge deficits to inadequate animal welfare education in the veterinary curriculum, a finding that aligns with other studies on veterinarian attitudes about pain (in North America, Dohoo and Dohoo, 1996; Hellyer et al., 1999; and in Europe, Capner et al., 1999; Raekallio et al., 2003).

Participants also criticized the ‘traditional’ thinking of some older professionals that allowed welfare issues such as pain to be dismissed. For example, one person shared that, *“At the time we started as practitioners, it was a long time ago and pain management [was] never talked about, [the] cow never had pain...I think there has to be a mentality change,”* [Veterinarian, M3]. This culture of avoidance and denial clearly affected some of the participants, who noted that they often had difficulty speaking up when they encountered welfare problems on the farm:

One of the major problems is getting vets to want to talk about welfare.

[Veterinarian, M6]

I think we often ignore stuff...choose not to mention it...That’s a weakness.

[Veterinarian, M1]

I think we're allowing too much of this to go on, whether it be animals being taken to the slaughterhouse in inappropriate trucks or down. You know, we've all seen those situations, and sometimes we turn a blind eye. [Veterinary Researcher, M4]

Central to this issue is likely the conflict of interest experienced by many participants, described by one individual as, *"It's a difficult thing to—when you're part of the thing—to take it forward,"* [Veterinarian, M4]. The need to protect the economic health of their client (the farmer) at the occasional expense of the cow was viewed as a constraint by these veterinarians:

The biggest challenge in this issue is that they are our clients, so we depend on them for our income...It's easy if you have a sick cow and you heal it...but if you give advice about animal welfare...[Veterinarian, M1]

As veterinarians, sometimes we are a bit restricted because it's a client of ours. We can't say that it's not good at all, what you are doing, otherwise we'll lose a client. [Veterinarian, M1]

I do think that sometimes herd health veterinarians sort of feel like...they have to be everything to the farms...the financial expert, the financial advisor...I think that we lose perspective...We're supposed to advocate for the cow...[I'm not] supposed to worry about your bottom line. [Industry leader/Veterinarian, G2]

In some ways this conflict of interest is similar to the economics-welfare conflict described above. Morgan and McDonald (2007) refer to the balance between client and patient interests as *"the fundamental question in veterinary medical ethics"* (p. 165) and explain that, *"choices are hard to make because of contextual factors, such as potential negative responses from clients or loss of income. These situations are not moral dilemmas in a strict sense, because an ethically correct solution is apparent but is difficult to enact,"* (p. 166). These so-called *"practical dilemmas"* were clearly felt by the veterinarian participants in the present study.

Others have also observed that livestock veterinarians strongly value the relationship between themselves and the farmer, and want their clients to prosper (de Lauwere et al., 2015). We suspect that this desire to maintain a good relationship with the client may manifest in a focus on the monetary aspects of animal care – observed across the veterinary professions (Coe et al., 2007; de Lauwere et al., 2015) – and may explain why veterinarians feel so caught between their patients’ and clients’ needs.

Our findings suggest that greater support is required in veterinary curricula to equip veterinarians with confidence in their welfare-assessment capabilities. However, perhaps even more important is to look for ways to support veterinarians in upholding their professional obligations to protect their patients’ interests (i.e. the animals) while also remaining, in essence, employed. In response, Morgan and McDonald (2007) emphasized the importance of communication in addressing these dilemmas. Good communication skills are required, for example, to understand and address the financial and practical limitations of their clients (Coe et al., 2007). The veterinarians in the present study showed strong empathy with farmers’ economic limitations, but further work may be required to “*build a rapport with clients in non-urgent circumstances*” (p. 171; Coe et al., 2007) and thus better manage emergency situations. Finally, veterinarians may be better able to navigate this conflict by proactively articulating the boundaries of what they are and are not willing to do, for example as part of a designated practice policy for commonly confronted issues (see Coe et al., 2007; here, a good example would be mandated use of comprehensive pain management for the practices discussed in this study).

6) *The Role of the Researcher*

Although two groups within each cohort identified challenges related to researchers or to the research agenda, this was not identified as a major issue contributing to poor welfare. Rather, the role of the researcher was more often discussed in the context of solutions. Opinions differed on the quality and quantity of research on cattle welfare. For example, a Norwegian participant felt that there was a lack of research funding and capacity, while a UK participant suggested that the scope of animal welfare research was too narrow to be able to address more complex welfare problems.

Participants more widely agreed that researchers, like veterinarians, struggled to connect with farmers. Often as a result of scant on-farm research, many felt that it was difficult to translate research findings to the reality of working farms. Researchers' lack of understanding of the challenges associated with being a farmer was identified as a challenge: *"I think sometimes we don't realize...what the industry is pointing out as being a big issue...I've spent some time on various things that I don't know how much is going to be implemented in Canada anyway,"* [Student, G2]. Notably, researchers discussed the difficulty of relating their findings in a way that resonated with farmers. Some suggested that the best way to do this was by connecting results to economic payoff even though this was often difficult: *"I think as researchers that's always the one thing that we always struggle with, is putting that dollar sign in front of everything...It's very very difficult to measure [the economic impact],"* [Industry leader/Former researcher, G1].

Like veterinarians, some researchers also experienced a conflict of interest. Researchers felt that it was important to develop a strong rapport with farmers to

increase receptivity to the research findings. As one researcher described: *“I think if you don’t sort of go native...if they don’t buy in, the research is sort of moot, right?”* [Researcher, M6]. Alternatively, building rapport might require more compromise on the direction of research, in which case, *“the concern is that then actually the research is driven by them [the farmer]...It shouldn’t be how it works because sometimes we’re going to have to address things that they don’t really want to address,”* [Researcher, M6]. Compromising on research objectivity could then lead to a loss in credibility, as one participant witnessed: *“I...had some particular experiences with colleagues...where they’ve been really...criticized for being too close to the industry...sort of gone native and have taken over the view of the producer rather than there being some distance there...”* [Researcher, M6].

3.3.2 Desired solutions

A number of key themes emerged on participants’ desired solutions to these challenges (see Table 3.3). Themes were identified as follows: better *research* is needed to address the lack of objective, science-based measures for welfare and to develop quantifiable standards. These standards can then contribute to needed *accountability* for the industry that can be enforced via voluntary inspections or mandatory audits. Participants diverged on which approach to take and much of the discussions focused on whether monetary incentives (bonuses) or regulations were the better way to motivate adherence to standards. Finally, we observed strong consensus on the need for increased linkages between industry stakeholders, particularly in the form of *education*.

Table 3.3 Themes discussed by participants in the context of desired solutions for animal welfare (AW) challenges, and the proportion of focus groups from Guelph (n=5 focus groups) and Madrid (n=6) in which each theme emerged

AW solutions	Theme description	Guelph	Spain
Research	Development of objective measurements for AW; increased relevance of research to farm	5/5	4/6
Accountability	Industry must conform to higher standards and be transparent		
<i>Bonuses</i>	Reward-based approaches to motivate compliance	2/5	3/6
<i>Regulations</i>	Punishment-based approaches to force compliance	5/5	2/6
Education	Improved communication and education to producers, farm workers, veterinarians, and future external stakeholders	5/5	6/6

1) *Research*

Of those who discussed research as a solution, most agreed that practical objective welfare measures and more quantifiable tools to track changes in welfare were needed (e.g. *“I think in the future, the research is important, but it’s important this data is easy to collect,”* [Veterinarian, M2]). Many also felt that researchers had a pivotal role in *“developing science-based standard operating procedures,”* [Researcher, M4] that could be used on farms and for policy guidance.

Participants also expressed the desire for researchers to become more involved with farmers, primarily through increased extension. Suggested changes included minor adjustments in communication (e.g. couching recommendations in language more familiar to farmers) as well as more on-farm research to help engage farmers. Underscoring recommendations to better engage farmers was the desire for researchers to serve as a bridge between stakeholders within and external to the cattle industries. For example, participating researchers spoke of wanting to liaise with policy makers and industry to advocate for change, e.g. *“researchers also have a role to play...of*

bringing new issues to the fore,” [Researcher, M6] and *“as a researcher...I see myself listening to producers and the public, and then trying to work with the system to find better ways of managing it...”* [Researcher, G3].

2) *Accountability*

Participants recognized the need for increased accountability in the cattle industries, with many calling for greater transparency of farm practices across the production chain and with society. Many participants believed that better checks to monitor standards were needed if the industries were to progress. Participants spent much of the discussions debating the relative merits of whether to motivate adherence to these guidelines via voluntary bonuses or mandatory regulations.

Voluntary bonuses. Participants in approximately half of the focus groups explicitly discussed monetary incentives (often termed “bonuses” by participants) as a method to motivate welfare improvement. Dairy industry organizations and milk companies were the most commonly suggested groups to compensate farmers for adhering to good practice, at least in the shorter term. Others suggested increasing the price to consumers to cover longer-term costs.

Some participants believed that bonuses were necessary in order to offset farmers’ costs of adhering to standards and that more punitive approaches would compromise farmers’ economic viability. Bonuses were also seen to be a good alternative to circumvent concerns about lack of enforcement with legislated standards. Most prominent was the belief that a reward-based system would be more palatable and thus engender greater uptake by farmers:

You want to take people with you...get them to see what they're doing rather than tell them. I can see the penalty side of things...but I think it's very dangerous. [Veterinarian, M1]

If you could provide incentives for — you get more money or you get a better contract or something — that's probably a better way of getting farmers to buy into welfare. [Researcher, M6]

The need to cultivate industry stakeholders' buy-in was a unifying theme.

Participants' desire for ownership over the industry's welfare challenges was further reflected by the widespread belief that force for change must originate from within the industry, perhaps best captured by the comment, *"If we, the ones who know things, won't do it, who will do it?"* [Veterinarian, M5]. One participant suggested that the best way to increase responsibility toward animal welfare was to shift toward self-regulation:

Part of the improvement on the moral aspects...of animal welfare have to come from an ethical code...things promoted as being the right thing to do. But implementation of that could be better enforced internally by the organizations. And being able to tell to a producer...by his peers...you're out of the picture of what you should be doing. Then there's an internal process that says, that's the way you should do it. Then eventually things will keep moving step by step and then we'll have an improvement at the end.

[Veterinarian, G4].

Despite widespread support, some people shared concerns about relying exclusively on the bonuses. Some concerns related to product differentiation, with participants commenting that the bonus system may perpetuate the gap between niche and conventional farms. Others found the focus on product differentiation to be distasteful and preferred solutions to focus on improving the welfare of all animals: *"We actually are striving to improve the welfare of all cows, not just the group of cows where there's a certain segment of the population of people making mindful decisions,"* [Industry leader, G2]. Other concerns were practical. For example, traceability could be a major

challenge with pooling of milk from different farms and with movements of animals between farms throughout the production cycle.

Mandatory regulations. Participants also debated the potential of government and industry-driven regulations for which compliance was mandatory under threat of economic penalties (often through fines or market loss, e.g. milk buyers refusing to buy milk from noncompliant farms. See Canadian dairy processor Saputo's policy to refuse milk from farms implicated in cases of abuse [Saputo, 2015]). Many participants struggled with the philosophy of this approach, with some believing that compelling compliance was less effective. For example, one farmer shared, *"they see it as regulation being downloaded on them, as something that they have to do, and why do I need to do this?"* [Farmer, G1] while a service provider explained, *"they are requested to change habit, with no real explanation actually, but they just get fined if they don't do it that way...but no one tells them WHY and what is the benefit?"* [Service Provider, G2].

Others felt that the industries required greater external oversight through legislation, either because it was believed to be the only way to improve animal welfare on farms or because it was needed to increase accountability to society. One participant, for example, felt that the need to enact basic protections for animal welfare trumped the need to give individual farmers total freedom to manage their farms: *"The question is, simply because the producer is doing a sub-optimal job...is that a good reason to actually compromise on political, critical issues...is that justification to compromise on animal welfare?"* [Researcher, M4]. Others believed that this approach was simply necessary: *"...in my opinion, the only way of changing a farmer is by penalties,"* [Veterinarian, M1] and *"as much as we hate doing report cards and the producer hates them too, I think we need to do this for*

the good of the animal welfare and some of these producers that never get visits by industry,” [Service Provider, G2].

Though it may be difficult to reconcile this support for regulation with the negative attitudes toward punitive approaches in general, participants’ support makes more sense when considering that regulation was seen to confer protective benefits for complying farmers by preventing the “*bad apple*” farmers from free-riding: “*There’s always that one or two percent that won’t do the right thing, and so you need the regulations to kind of compel them to do what the vast majority are doing. Because...if they’re not doing the right thing...they’re at a competitive advantage over people...who are doing the right things in terms of animal welfare.*” [Farmer/Industry leader, G5]. Thus, unless all farmers within the industry are held to similar standards and thus bear the costs of production equitably, the free-riding problem threatens individual farmers. In this context, it makes sense that participants in the current study appeared more likely to support legislation to create minimum standards.

3) *Increased stakeholder linkages*

Within every group, participants discussed the need for greater linkages among industry stakeholders and between industry stakeholders and society. For example, participants spoke of the need for veterinarians to liaise with service providers (e.g. taking a more active role in advising in barn design); for researchers to communicate more directly to veterinarians; for all stakeholders (veterinarians, researchers, dairy organizations, and farmers) to be more connected to societal concerns about animal welfare; and most prominently, for veterinarians, researchers, and other service providers to strengthen their communication with farmers. Many also advocated for

improved consultation with farmers, both as a way to improve education (by eliciting their input on how they want to receive information; see Jansen et al., 2010a,b and de Lauwere et al., 2015 for examples of this) and also to increase farmers' agency (by involving them in standards development and other industry decisions).

Education. Participants in all groups discussed the need to engage farmers, as well as veterinarians, through improved education. Education was valued as a means to *"take people with you"* rather than forcing the change upon them, an idea that carried through to participants' ideas for the ideal messaging approach, e.g. *"Provide positive messages...through education, and what can be done..."* *"This producer's doing a good job'...rather than, 'This producer is not doing a good job, don't be like him,'" [Farmer, G1].*

Farmers were generally perceived as *"the first actors in the field"* [Veterinarian, M1] and hence those in most need of attention. Farmer education was generally felt to be a collective responsibility, with veterinarians, researchers, extension agents, and industry organizations all offered as the best groups to take leadership in this regard. Regardless of who delivered the content, participants were emphatic that messaging must be consistent: *"...From the advisors, your veterinarians, your researchers, your farmers, absolutely everyone...who's involved in the dairy industry... You come up with...a statement together on what the key messages on that issue [are]...so...you got a cluster of organizations delivering this same message," [Industry leader, G1].*

Participants envisioned many goals for farmer education, including but not limited to the following: increased awareness of animal welfare principles; improved management skills like handling, as well as practical assessment skills like disease and lameness detection; a reorientation of philosophy to place greater emphasis on the cow;

and improved proactivity (elements of which included active and sustained contact with veterinarians and other advisors and having an established herd health plan).

To reach these goals, participants offered many suggestions, among them that educators needed to consider farmers' motivations and tailor their approach accordingly, a suggestion that aligns with other research on segmentation among farmers with respect to their motivations and trust in external information sources (Jansen et al., 2010a,b). In the present study, farmers were perceived to have differing motivations. As one veterinarian commented, *"I think one of the key things is that you need to understand the farmer...Some farmers are money driven. Some farmers are [pride] driven, so they'd like to think their cows look better than the neighbors'...Depending on what farmers you're talking about, you need to press the right buttons,"* [Veterinarian, M2].

Participants believed that a certain degree of creativity was required to get welfare messages across to farmers more resistant to change. One service provider, for example, thought that avoiding certain trigger words (including 'animal welfare') would help: *"I think as [farmer participant] has already mentioned, if it's going to be in a positive framework for the producer, then it has to be packaged in things like 'cow comfort' and 'stress-free handling'...rather than 'welfare,'"* [Service Provider, G1].

Participants also stressed the need to emphasize consequences of pro-welfare management changes and equip farmers with practical evidence of changes wherever possible, e.g. *"Practical evidence. For a farmer, that can convince him,"* [Veterinarian, M3]. Specifically, it was important to use data from the farmer's own farm to chart changes over time, as one vet shared: *"When you measure something, if you had a tool to measure, it will improve...You're having a discussion with the farmer and say look, you're 3 out of 5*

here, but you could be a 4..." [Veterinarian, M3]. Another participant's suggestion to pursue benchmarking aligns closely with this suggestion. This approach, which allows farmers to compare the performance of their farm against that of their peers, has been used successfully to improve farm performance with respect to welfare indicators in the past (von Keyserlingk et al., 2012; Chapinal et al., 2014).

Many participants emphasized that successful education must include messaging to connect welfare to production and economic benefits. This was a common suggestion among veterinarians, e.g. *"We need to try to convince them that if he will ensure the welfare of his animals, he will have more money in his bank account,"* [Veterinarian, M3]. This theme was also repeated across groups. As a veterinarian in another group reiterated, *"Our work is to say...you will lose money if you don't do that,"* [M2]. Emphasizing the economic benefits of welfare changes was suggested to be a factor in prompting farmers to take a more progressive view of welfare: *"Pick the low hanging fruit where animal welfare actually goes very well together with productivity,"* [Researcher, M4]. Others commented that while it was important for communicators to emphasize immediate economic benefits, advisors also needed to capitalize on the idea of a social license to produce as a long-term economic incentive, as captured in the following exchange:

I think one of the economic drivers that producers need to understand...is the social license...for the public to allow you to continue your business.

[Industry leader, G4]

That whole economic part needs to be emphasized, as why we need to do these things, both from a production standpoint – the dollar in your pocket — but preserving a market...[and]...the social license to produce milk. That's an interesting one that I hadn't heard before. But I think that's very true. [Service Provider, G4]

Participants discussed both hands-off and interpersonal approaches to education, the former including things like articles in agriculture magazines, online articles (noted to have the advantage of cost effectiveness and quick delivery), and extension manuals. Dutch dairy farmers surveyed by de Lauwere et al. (2015) also appeared to prefer these more traditional methods of information delivery over routes like workshops.¹⁴ However, these routes have been found to be less effective in prompting behaviour change than interpersonal routes (Gielen, 2003).

Perhaps because of this, participants in this study emphasized face-to-face education. Some veterinarians shared success stories of organizing training workshops for farmers, though others did not see this approach as feasible in their current roles due to time constraints. More agreed that veterinarians could take a more proactive role in speaking up when they encountered poor management on farms, and in so doing participate in a level of informal education, or as one vet put it, *"You should stand up as a professional. Say, 'Guys, NO.' [laughs]. Just...say your opinion,"* [Veterinarian, G2]. Modeling good practice while on farm was thus suggested as a simple way for vets to change practices like pain medication for dehorning.

A popular suggestion was for veterinarians and others to facilitate peer-peer networks among farmers to increase farmers' ability to connect with and learn from each other. This approach was seen as a positive way to improve farmer uptake of information, as participants felt that farmers would listen best to each other. This belief

¹⁴ This is a somewhat surprising discrepancy between the present study and de Lauwere et al.'s (2015), but may have something to do with the differing modes of inquiry (survey v. focus group), in that who is perceived to deliver the information could greatly affect farmer support. Our participants' suggestions to incorporate farmers who are already doing things 'right' as models to lead sessions may bridge preferences to seek out advice from individual peers (as seen among the Dutch farmers) and explain the support for workshops in the current study.

was evident in participants' recommendations to incorporate farmer stories of success into messaging and in their advocacy for the creation of peer-peer education strategies like farmer-led workshops, a concept reminiscent of the farmer field schools used in Europe to foster mutual learning, empowerment, and goal-meeting among dairy farmers (see Vaarst et al., 2007):

One thing that does help is telling a success story to another farmer...because the farmer will believe another farmer before he believes anyone else. [Veterinarian, M2]

What tends to work well is case studies...If you have a producer that's done it well, and he's had a really beneficial impact of that change or implementation on his farm. Using them as case studies in agricultural magazines or even in discussion groups...I know myself I learn much more from my peers, and it's the same with producers. They learn much more from one another than we can ever try and teach them. [Industry leader, G1]

In addition to the farmer, participants often suggested that other people should be targeted with education. One interesting suggestion that emerged in multiple groups was to direct training efforts specifically at farmers' wives. For example, one veterinarian commented that he had found success organizing workshops for the wives, whom he found to be “...one of the biggest stakeholders in...pain relief,” [Veterinarian, M5]. The key idea here was that the women were perceived as naturally tending to take on more caregiving roles on the farm (particularly with regards to calf care).

Enhanced training of other farm workers was also perceived to be a critical step in improving animal welfare, which others have found effective in modifying worker behaviour as well as welfare and production indicators. For example, Hemsworth et al. (2002) showed that cognitive behavioural therapy improved dairy stockpersons' beliefs and behaviour toward dairy cows, which translated into reductions in cow flight distance to humans and improvements in milk yield.

Participants believed that efforts must also move beyond training to improve specific skills and include strategies to improve worker quality of life, as this was felt to be directly linked to animal welfare: *“Quality of the working life and quality of your job, if we can get that right and the [worker] education...then we will inevitably improve the welfare of our animals,”* [Industry leader, G1]. Suggestions to this end included training in the workers’ native languages, developing incentives for meeting goals, and fostering a greater sense of ownership, for example, *“assigning people particular pens allows them to track [animals] over time, and is a mechanism where you can put incentives in,”* [Researcher, G3].

Some participants appeared less optimistic about change occurring in the current generation of farmers and so advocated for focus on the next generation. This desire also came across in participants’ suggestions to expand veterinary curricula so to foster sensitivity to welfare and improve graduates’ ability to facilitate welfare improvements on farm, perhaps in part to combat the decline in empathy to animal welfare in veterinary students as they progress through school (Pollard-Williams et al., 2014).

Finally, there were some suggestions to reach out to other future stakeholders who required education on the realities of farming and welfare if they were to contribute to welfare policy: *“We need to interact with those that are going to be establishing our laws...They’re coming from that a lot of times out of ignorance and can be easily swayed by perception and not listening to our voice [as] animal scientists and veterinarians,”* [Veterinary Researcher, M4].

3.4 Concluding remarks

Our primary objective was to elicit perspectives from stakeholders within the cattle industries on the challenges they face, and the solutions they desire, regarding animal welfare issues. Despite differences in nationality and regulatory and market environments among participants in these groups, we observed considerable overlap in perceived challenges and solutions. Our results show a degree of generality in many of the themes identified, suggesting that the results may be transferable to others within the cattle industries beyond those sampled in the present study

We also observed some trends across most of the discussions, one of which was the complexity of the issues. The degree of variation – among farms, farming systems, farmer personalities and management strategies, and regulatory and market environments, each setting off different cascades of effects — was perceived to make simplistic solutions inappropriate. Most participants recognized this, which may explain the level of debate within groups on some proposed solutions, such as whether reward or punitive approaches stood the best chance of ensuring successful implementation of animal welfare standards. Some participants reconciled this problem by taking the view that multiple approaches were required. We see this as a positive indicator of openness to consider and deploy a range of strategies to address animal welfare challenges within the cattle industries.

We also observed consensus for positive approaches to change, seen in participants' affinity for reward-based approaches to motivate adherence to standards, their desire for proactivity over reactivity at both the farm level (in management strategies) and industry level (in terms of industries taking ownership of challenges

and initiating solutions), and in consensus for education as a positive force to motivate change. The consensus on education is likely attributable to two aspects: first, that education was seen as a fitting solution to the deficits in welfare knowledge, awareness, and attitudes cited by participants, and second, that education was perceived as a way to foster change in a positive way.

Consensus on the goals is a key step towards implementing effective solutions, but we also need to recognize that different people may have different goals. Increasing linkages between stakeholders with different roles in the industry, as discussed by our participants, may allow for greater consensus on the complex issue of animal welfare in livestock production.

In summary, we suggest that engaging stakeholders who have an intimate knowledge of livestock agriculture aids in the development of strategies to resolve animal welfare challenges on farms. This study revealed some differences in stakeholder perspectives (e.g. whether voluntary bonuses or mandatory regulations are more appropriate for compelling animal welfare standards compliance), but we also observed consensus on some desired solutions, such as the need for peer-peer educational networks to address the deficits in welfare knowledge among producers and veterinarians. We suggest that such solutions deserve attention as the cattle industries seek methods to improve the lives of their animals.

Chapter 4: Changes in animal welfare knowledge, perceptions, concerns and values among citizens visiting a dairy farm^ϕ

4.1 Introduction

Animal agriculture has come under increasing criticism with respect to farm animal welfare, although the dairy industry has received less attention than some of the other animal industries (Kjaernes and Lavik, 2008; Mench, 2008; Ellis et al., 2009; Boogaard et al., 2011a). The relatively positive image of dairy farming is probably due to two factors: (1) with the exception of tie-stalls, the predominant housing systems used in the dairy industry (free stalls and dry lots) are less restrictive of movement, and 2) the dairy industry has historically cultivated an image of farms providing an idyllic and pastoral life for dairy cows, thus positioning dairy farming as relatively immune to the concerns about industrialization in other livestock sectors (DuPuis, 2002; Molloy, 2011).

As public interest in farm animal welfare continues to rise, erosion of the industry's reputation may occur if industry practices do not align with key societal values. Negative interactions between the industry and the public may also erode public trust (Brom, 2000). Dairy producers cannot operate in isolation of societal expectations and indeed require a social "license to produce" (Croney and Botheras, 2010; Benard and de Cock Buning, 2013). In this regard, it is in the best interest of the dairy industry to proactively engage with interested members of the public on animal welfare.

^ϕ A version of this chapter is under review for publication: Ventura, B. A., H. Wittman, M. A. G. von Keyserlingk, and D. M. Weary. Changes in animal welfare knowledge, perceptions, concerns and values among citizens visiting a dairy farm.

Understanding public views also has implications for the long-term sustainability of the dairy industry since animal welfare has become embedded into notions of sustainable agriculture (Boogaard et al., 2008). This means that, in addition to environmental and economic considerations, the dairy industry must engage with broad values held by society (Boogaard et al., 2008; von Keyserlingk et al., 2013). Societal values may shift over time as society evolves. These shifting values may varyingly be expressed through citizens' goals for agriculture as well as in their concerns about it (Boogaard et al., 2008). Thus, inclusion of public values into policy can help democratize livestock production, legitimizing any standards that are then developed (Guelhstorf, 2008) and improving public trust.

Despite the importance to debates on farm animal welfare, there are challenges to integration of citizens' views in policy and practice. One challenge is resistance within the livestock industries on the basis that public concerns are misinformed (see Hubbard et al., 2007; Spooner et al., 2012; and Benard and de Cock Buning, 2013 for evidence of this assumption among farmers, for example). One implication of this knowledge deficit model of public understanding (also referred to as the knowledge gap, informational deficit, or cognitive deficit: Wynne and Irwin, 1996; Einsiedel, 2000) is that concerns can be corrected through education on 'the facts' to bring opinions into line with expert views (see Hansen et al., 2003).

This knowledge deficit model may be problematic when used to define the frame of reference for engaging with citizens on contentious issues in livestock production, not least because providing people with more information about practices does not always translate into higher acceptance (Hansen et al., 2003). Moreover, in addition to

differences in knowledge between people within and outside the livestock industries, people may differ in their values (see Fraser et al., 1997; Hansen et al., 2003). Values are critically important to conversations about farm animal welfare: as “*desirable, trans-situational goals...that serve guiding principles in people’s lives,*” (Seligman et al., 1996) values are fundamental in both belief and attitude formation (Rokeach, 1973; Schwartz, 1994). With respect to animal welfare and agricultural systems, values also function as criteria that people use to evaluate methods of production (Schwartz, 1999; Boogaard et al., 2008).

There is, however, some evidence from European research that many citizens’ experience and knowledge of livestock production is low (Boogaard et al., 2006, 2008; Ellis et al., 2009). Since factual knowledge and values contribute to people’s frames of reference (Te Velde et al., 2002), it is reasonable to expect that both be incorporated into research seeking to understand public concerns about farm animal welfare.

Thus the second challenge to integrating public input into debates about farm animal welfare is that citizen knowledge and values are poorly understood, particularly for North Americans. Although the Welfare Quality® projects have begun to examine these issues for European citizens, except for market surveys (Pirog, 2004; see AWI, 2011 for an overview) and quantitative surveys on consumer preferences (e.g. Prickett et al., 2010), until recently few North American studies have examined citizen views on farm animal welfare in depth (Weary et al., 2011; Schuppli et al., 2014; Robbins et al., in press; see also Chapter 5). Moreover, in light of concerns that citizens are ignorant of livestock farming, there have been calls for citizen perception studies of farm animal production to be conducted based on real-life experience, i.e. once citizens have been

introduced to farm life in person. Except for two studies in the Netherlands (with dairy cattle and pigs: Boogaard et al., 2008 and 2011b, respectively), we are not aware of any research that has exposed non-farming citizens to operating farms and gauged their responses. Therefore, the objectives of this chapter were to:

- 1) Document existing cognitive constructs (perceptions, concerns, values and knowledge) about dairy cattle welfare within a target group of (non-dairy farming) lay Canadian citizens.
- 2) Explore the extent to which a visit to a working dairy farm (as an immersive form of information provision) shifts dairy cattle welfare knowledge, perceptions and concerns.

4.2 Methods

We conducted surveys of Canadian citizens before and after they self-toured a working free stall dairy farm in summer 2014 in the Fraser Valley of British Columbia.

4.2.1 About the tour site

The University of British Columbia Dairy Research and Education Centre (hereafter ‘the farm’) operates as a working dairy farm in addition to a research site for the university. The herd consists of approximately 500 Holstein cattle, around 230 of which are milking at any time. Included on the tour were the calf barn, in which participants observed calves housed in individual stalls as well as in small groups, and the main barn, where cows were housed in free stall barns in groups of 12-24. Each cow had access to a stall and a minimum of 60 cm of feed bunk space. Pasture is adjacent to the barns, but cows were housed indoors during the tour.

4.2.2 Survey description

The survey took place in August 2014 during the Annual Slow Food® bicycle tour, during which members of the public toured various crop and livestock farms along a predetermined route. The farm is a regular stop on this tour. Visitors were invited to participate in a short survey before and after visiting the farm. Participants were provided an ice cream bar upon completion.

Before touring the farm, participants completed a 5-10 minute, mostly qualitative, survey ('before' survey, see Table 4.1 and Appendix C for survey guide) to gauge their baseline perceptions (i.e. top of mind impressions of the dairy industry), concerns and values relating to dairy cattle welfare. Participants also completed a five-question quiz ('before' quiz). Quiz questions were designed to measure knowledge of dairy husbandry practices relevant to animal welfare and around which there are common misconceptions.

Participants then embarked on a self-guided tour through the farm. The tour included eight stations positioned throughout the main animal facilities. These stations addressed calf management and housing, Canadian guidelines for on-farm animal care, a day in the life of the dairy cow, and cow health, feeding, reproduction and behaviour. Graduate students staffed each station and were available to answer questions. Participants were free to visit any stations they wanted and were later asked to indicate which stations they had visited. There was no time limit to the tour. Upon completion of their tour, participants completed a 5-10 minute 'after' survey designed to capture any shifts in concerns and values, and were asked to again answer the quiz questions ('after' quiz).

Table 4.1 Overview of dairy farm tour survey to measure citizens' perceptions, values, concerns and knowledge relative to dairy cattle welfare

Construct	'Before'	'After'
Perceptions	<i>Free association: Write up to five (5) words that come to mind when you think of dairy farming. (QL)¹</i>	<i>Free association: Now that you've toured the farm, write up to five (5) words that come to mind when you think about dairy farming. (QL)</i>
	<i>How confident are you that dairy cows generally have a good life?² (QT)</i>	<i>What, if anything, surprised you about the way animals are cared for on this farm? (QL)</i>
		<i>Do you feel that animals on this farm have a good life? Why or why not? (QL)</i>
Values	<i>In your opinion, what does a dairy cow need in order to have a good life? (QL)</i>	<i>Do you feel that animals on this farm have a good life? Why or why not? (QL)</i>
Concerns ²	<i>What (if any) concerns do you have regarding the quality of life for dairy cattle? (QL)</i>	<i>Now that you've toured this farm, please share any concerns about the quality of life for dairy cattle, in general or on this farm. (QL)</i>
	<i>Please rank up to three (3) of your top concerns, and indicate why they concern you. (QL)</i>	
Knowledge ³	<i>A dairy cow needs to have a calf to keep producing milk. (True/False)</i>	
	<i>Dairy cows in British Columbia are routinely tied in their stall in the barn. (True/False)</i>	
	<i>All dairy cows in British Columbia are allowed access to pasture. (True/False)</i>	
	<i>How many days after birth does the dairy calf typically stay with its mom? Response options: a) 0 days b) 1 week c) 1 month d) never separated</i>	
	<i>Which best describes what most adult cows are typically fed on dairy farms? Response options: a) milk b) grass c) pre-mixed feed</i>	

¹ QL= open-ended response analyzed qualitatively, QT=Likert scale or other quantitative response option.

² Note that we used concepts of the 'good life' and 'quality of life' as a way to gauge welfare-relevant concerns and values and avoided using the term 'animal welfare' in the survey in an attempt to avoiding both confusion about the term and possible biases. Concerns are a reflection of attitudes, which in turn shed light on underlying values (Ajzen and Fishbein, 1980; Ajzen, 2001). Thus responses to questions about concerns offered additional insight into participants' values.

³ Correct answers are indicated here in **bold**.

4.2.3 Participant sample

A total of 50 participants completed both 'before' and 'after' surveys and were included in the analysis (see Table 4.2 for participant demographics). Of these, 60% were female, 54% were between the ages of 35 and 54 with an additional 30% above the age of 55, most (60%) had a bachelor's degree or higher, and the majority had lived most of their lives in urban or suburban settings (80%). Of the 8% who indicated that they had grown up on a farm, none indicated that they had lived or worked on a dairy farm. Half of the participants indicated that they were not knowledgeable about dairy farming, with an additional 44% indicating that they were somewhat knowledgeable. All participants lived in Canada at the time of the survey and all but two consumed dairy; those who did not consume dairy indicated that they were lactose-intolerant. We note that these participants were assumed to have an existing level of interest in food and agriculture because they were recruited from a Slow Food® activity.

Table 4.2 Description of participants who completed both 'before' and 'after' surveys for the dairy farm visit (n=50)

Variable	% of n
Sex	
<i>Female</i>	60
<i>Male</i>	40
Age	
19-34	14
35-54	54
>55	30
<i>Prefer not to say</i>	2
Country of residence	
<i>Canada</i>	100
Where have you lived most of your life?	
<i>Urban</i>	44
<i>Suburban</i>	36
<i>Rural, not on a farm</i>	12
<i>Rural, on a farm¹</i>	8
Education level	
<i>Vocational/apprenticeship</i>	8
<i>High school diploma</i>	28
<i>Undergraduate degree</i>	24
<i>Graduate degree</i>	24
<i>Professional (e.g. MD, DVM)</i>	14
<i>Other</i>	2
Do you consume dairy?	
<i>Yes</i>	96
<i>No</i>	4
Knowledge of dairy farming?	
<i>Very knowledgeable</i>	6
<i>Somewhat knowledgeable</i>	44
<i>Not knowledgeable</i>	50
Confidence that dairy cattle generally have a good life?	
<i>Confident or very confident</i>	42
<i>Neutral or unsure</i>	30
<i>Somewhat or not confident</i>	28

¹Farms other than dairy cattle farms.

4.2.4 Analysis

Qualitative analysis

Content analysis was used to analyze participants' qualitative responses (Coffey and Atkinson, 1996). This process involves a thorough reading and re-reading of the generated text, with the researcher(s) noting emerging patterns and assigning themes and sub-themes to related sections of text. Comments were read with the goal to identify perceptions, concerns and values with respect to the dairy industry and animal welfare. The lead author (B. A. Ventura) coded the data, with an additional researcher trained in qualitative analysis independently coding a subsection of the data to strengthen the robustness of the codes. Codes were discussed until both researchers agreed on the final coding schemes.

Ultimately two main schemes were developed to describe participants' baseline perceptions and values, i.e. before the farm visit: 1) 'industry perceptions' to describe general perceptions of the dairy industry and 2) 'FAW values' to describe participants' values around farm animal welfare (FAW), including what they valued as part of a good life for dairy cows and their resulting concerns. The 'industry perceptions' scheme derived largely from participants' free association responses, which we had initially intended as a warm-up question to the survey. These responses resulted in generalized associations of the dairy industry (positive and negative) from many participants. Some responses were unclear and nothing of substance could be gleaned (e.g. "*hay barn cats*"); these were not incorporated into the final scheme.

As part of the coding process for FAW values, Fraser et al. (1997)'s framework—which posits that people tend to think of animal welfare in terms of biological

functioning (e.g. physical condition and health), natural living (the degree to which an animal can live a natural life), and affective states (how an animal feels)– was used as a starting point to organize comments, but the final coding scheme was expanded beyond this framework based on participants’ responses.

Particularly demonstrative responses are included below to illustrate the themes, followed by participant number in brackets (e.g. [P23] to designate Participant #23).

Quantitative analysis

Although this was a primarily qualitative study and so not designed to predict effects of measured variables on before- and after-visit responses, we did check for relationships between demographics (sex, age, education level, rural/urban status, self-reported knowledge, and ‘before’ confidence in cattle welfare) and the following before- and after-visit responses: ‘before’ quiz score (out of 5), ‘before’ confidence, FAW value expression and range, and perception shift upon visiting the farm (see Table 4.3 for explanation of variables).

We used χ^2 tests to test for relationships between categorical variables, Spearman rank correlation to test for relationships between two continuous variables, and Kruskal-Wallis tests to test for relationships between categorical and continuous variables. Alpha was set at 0.05 for all tests. Unless otherwise stated, relationships between the variables were not significant.

Table 4.3 Description, type and levels of demographic and response variables included in analysis of citizen responses before and after visiting the dairy farm

Variable	Description	Type	Variable levels
Sex	Demographic	Categorical	<i>Female or Male</i>
Age	Demographic	Continuous	<i>19-24, 25-34, 35-44, 45-54, 55-64, or 65+</i>
Education	Demographic	Categorical	<i>Vocational/apprenticeship, High school diploma, undergraduate degree, graduate degree, professional, or other</i>
Rural/urban status	Demographic	Categorical	<i>Rural or urban: where rural = (rural not on a farm + rural on a farm) and urban = (urban + suburban) responses.</i>
Self-reported knowledge	Subjective self-assessment of general knowledge of dairy husbandry	Categorical	<i>No knowledge, At least some knowledge: Only three people self-reported as very knowledgeable so these were re-categorized as At least some knowledge</i>
'Before' quiz score	Objective score on the 'before' quiz on dairy husbandry	Continuous	<i>0, 1, 2, 3, 4 or 5 (out of a total of 5 possible) correct responses. Blank responses were incorrect.</i>
'Before' confidence	'Before' visit confidence about how good of a life dairy cattle have	Continuous	<i>Confident, neutral, not confident: Created by collapsing five to three levels for analysis as we were primarily interested in valence of confidence.</i>
FAW value expression	'Before' response: was each animal welfare value criterion as determined from the qualitative analysis expressed?	Categorical	<i>Yes or No: for each of biological functioning, natural living, affective states, humane care, drugs and respect for life.</i>
FAW value range	'Before' response: number of FAW value criteria referenced	Continuous	<i>0, 1, 2, 3, 4, 5, or 6 values expressed</i>
Perception shift	'After' response: Shift in individuals' perception of the level of animal welfare after farm visit	Continuous	<i>Positive shift, no, or negative shift: Created by comparing 'before' confidence against 'after' responses on whether cows had a good life. Positive shift = improved view of FAW after visit, no = no change, negative shift = worsened view of FAW</i>

4.3 Results

4.3.1 Responses before visiting the dairy farm

Perceptions of the dairy industry

Both positive and negative perceptions of the dairy industry were evident in participants' 'before' responses, with a total of seven themes identified (Table 4.4).

Positive associations with the dairy industry were classed as follows: (1) Dairy farming as an enterprise that entails *hard work* (14% of participants): i.e. top of mind responses of "*a lot of work*" [P9], "*labour intensive*" [P35] and "*dedicated farmers*" [P10], that referenced the long hours and labour involved in dairying and often associated with respect for the farmers involved; and (2) dairy farming as an *idyllic, important* activity (8% of participants), i.e. generalized notions of dairying as a wholesome, family-friendly pursuit with a distinct place in the rural landscape, e.g. "*good way of life, essential for our area*" [P24], "*wholesome country*" [P62], and "*enjoyable environment for family life,*" [P57].

By far the most predominant theme (58%) describing perceptions of the dairy industry referenced (3) *dairy products* (e.g. "*nice good food*" [P62] and "*cheese, milk, ice cream*" [P49]). Arguably this theme could reflect positive associations with the dairy industry by way of the pleasure derived from consumption of its products, or alternatively, indicate that the participant had hitherto given little to no thought to dairy production. Because of this ambiguity, we did not assign a valence to this theme. 16% of participants also gave responses that indicated (4) *sensory* associations with the dairy farm, most notably by referencing the "*smelly*" farm environment.

Negative associations with the dairy industry included: (5) dairy farming as *industrial* (14% of participants), involving objections to "*intensification*,

industrialization, mechanization...killing" [P18] and to "*factory like conditions that are not humane,*" [P11]. Some (8%) also perceived dairy farming as (6) *profit-oriented* and so made objections about the prioritization of production and economic earnings over attention to animals, e.g. "*It's a business. I don't think people take the time...they are just pushing them through the turnstyle,*" [P2]. Embedded within some (6% of participants) of those comments were notions that (7) *big=bad*, meaning that larger farms were worse for animal welfare: "*large commercial farms seem to have more emphasis on production [than] animal welfare,*" [P9].

Table 4.4 Description of industry perception (IP) and FAW value themes and the percentage of participants referencing each theme before visiting the dairy farm

Theme	% of participants ¹	Theme description
IP (+)		
<i>Hard work</i>	14	Acknowledgement of the hard work of dairying and respect toward farmers
<i>Idyllic & important</i>	8	Agrarian views of dairying as wholesome, idyllic and positive for family and community
IP (ambiguous)		
<i>Dairy products</i>	58	Associations of dairying with its end products (e.g. milk and ice cream) and references to wholesomeness and health
<i>Sensory</i>	16	Visceral, sensory responses to dairying, e.g. references to smells of the farm
IP (-)		
<i>Industrial</i>	14	Mechanization and industrialization of dairying as harmful, particularly for animals
<i>Profit-oriented</i>	8	Prioritization of economic goals over AW
<i>Big=bad</i>	6	Growth and size of dairy farms as bad for cows
FAW values		
<i>Biological functioning</i>	72	Reference to feed and water (resources), physical health, hygiene, shelter
<i>Natural living</i>	66	Reference to allowing animals to lead natural lives, e.g. pasture and/or outdoor access, space, freedom, social and individual behaviours
<i>Affective states</i>	22	Reference to animals experiencing peace, quiet, happiness, and freedom from pain, discomfort and stress
<i>Humane care</i>	56	Reference to gentle humane care, humane treatment, routine management duties (e.g. regular milking); avoidance of abuse
<i>Drugs</i>	22	Concerns about administration of “drugs,” e.g. antibiotics and/or hormones
<i>Respect for life</i>	10	References to end of life and short lifespan; killing of bull calves

¹The sum does not equal 100% within each category as participants often referenced multiple themes, and some participants did not reference any themes within a category.

Concerns and values

Before visiting the farm, participants were divided in their assessment of the overall quality of life for dairy cattle: 42% of respondents were at least *confident* that dairy cattle generally had a good life, but 30% were *neutral* and 28% were *not confident*.

Participants considered the following elements as necessary for dairy cattle to have a good life (in decreasing order of frequency): fresh food and water, pasture access, gentle and humane care, space, shelter, hygiene, fresh air and sunshine, social companions, absence of stress, health and safety from predators. These elements were organized into the following FAW value criteria (Table 4.4):

- 1) *Biological functioning* emphasized provisions for the health and physical condition of the animal (e.g. fresh food and water, shelter, hygiene, health and safety), as indicated by requirements for a good life like, “*food, water, adequate sleep, safe environment (no predators), adequately hygienic,*” [P33].
- 2) *Natural living* emphasized an animal’s ability to live as “*natural[ly] as possible,*” [P66]. Participants articulated different elements of *natural living*. These included: exposure to pasture and other outdoor elements such as fresh air and sunshine, normal social interactions with other cattle, and space to carry out natural behaviours. For example: “*pasture with a variety of plant life, some budd[ies], sun and shelter*” [P54].
- 3) *Affective states* focused on the animal’s mental well-being and included references to peace and quiet, happiness, comfort and an absence of stress and pain, e.g. “*keep their stress level down,*” [P1].

- 4) *Humane care* emphasized the care and attention provided by humans, with participants mentioning compassionate attention at the level of the individual animal, gentle handling techniques, and consistent and predictable management. For example some felt that cows needed “*human kindness*” [P32] or even “*love*” [P35], while others focused on more practical aspects of management like regular milking.
- 5) *Drugs* condemned the overuse of drugs, most notably antibiotics and hormones, e.g. “*adding growth hormones¹⁵ to increase production*” [P11]. While this theme surfaced mainly as a specific concern about cattle quality of life, for some participants this concern was also associated with effects on the environment and human health.
- 6) *Respect for life* included concerns about the culling of bull calves and the end of life and longevity of the cow, e.g. “*I feel bad that their life is shorter than a ‘natural’ lifespan,*” [P64], which seemed to relate to fundamental concerns about lack of respect for animal life.

Biological functioning and *natural living* were the most commonly expressed FAW values, with 72 and 66% of participants incorporating these values into their responses, respectively. These were followed by *humane care* (56%), *affective states* and *drugs* (each at 22%), and *respect for life* (10%). Most participants included more than one FAW value in their responses, with a median value range of 2.5 (range: 0-5). For example, the comment “*food, water, shelter, regularly milked, space*” [P67] referenced

¹⁵ Interestingly, the hormone relevant to this comment (recombinant bovine somatotropin or rBST) has never been approved for use in Canadian dairy cattle anyway, so this concern could reflect misinformation among these participants.

values for *biological functioning* (food, water, shelter), *natural living* (space), and *humane care* (regularly milked). Although not categorized as a FAW value, 14% of participants also acknowledged that FAW is variable among farms and is affected by multiple factors, in so doing acknowledging the complexity of animal welfare, e.g. “*I think it depends on the farmers’ husbandry skills,*” [P1].

Not surprisingly, participants’ concerns about dairy cattle welfare typically reflected uncertainty about whether they believed these value criteria were being met on dairy farms. ‘Before’ FAW concerns thus included the following issues: (1) insufficient, biologically inappropriate, unnatural feed, (2) lack of pasture access and indoor confinement (with related concerns about overcrowding and behavioural restriction) and (3) abusive treatment of cattle. In addition, 18% of respondents indicated that they did *not* have any concerns about the welfare of dairy cattle, evident through responses such as, “*generally I feel that most dairy cattle would have a good quality of life*” [P2] or more simply, “*don’t have any [concerns],*” [P5].

Knowledge

We did not find any relationship between self-reported knowledge and ‘before’ quiz score. Although most participants indicated that they were either “somewhat” (44%) or “not” (50%) knowledgeable about dairy farming, ‘before’ scores on the dairy husbandry quiz were fairly high, with a median correct response rate of 3 out of 5 questions (2.9 ± 1.1 [mean \pm SD], range: 1-5).

Even before touring the farm, many participants were knowledgeable about basic feeding and housing practices: 74% answered the diet question correctly, and the majority knew that dairy cows in British Columbia were not routinely tethered in their

stalls (72%) and that pasture access was not mandatory (60%). Fifty-eight percent of participants knew that dairy cattle must give birth to a calf to give milk, but most did not know that calves were separated from the dam immediately after birth ('before' correct response rate=26%).

Relationship between demographics and 'before' survey responses

Sex, age, education, rural-urban status, and self-reported knowledge were not associated with FAW value expression or range, other than a relationship between age and expression of the FAW value around drugs ($\chi^2=4.2$, $df=1$, $p=0.04$). This relationship was driven by no respondents under the age of 34 referencing drugs versus 40% of those 45 and older who did.

We likewise did not detect any relationship between self-reported knowledge and FAW value expression or value range. However, 'before' quiz scores were related to expression of the FAW value for *biological functioning* ($\chi^2=9.2$, $df=1$, $p=0.024$) such that participants with higher 'before' scores were also more likely to incorporate the *biological functioning* value into their responses (e.g. around half of participants with scores of 1 or 2 referenced this value, versus 85% of people with scores of 3 and 4 and 100% of people scoring 5/5 who did).

We also found a relationship between 'before' confidence in the welfare of cattle and expression of the FAW value for *natural living* ($\chi^2=8.20$, $df=1$, $p=0.0042$). A lower confidence that dairy cattle had good lives was associated with references to natural living (e.g. almost 80% non-confident and over 90% neutral participants expressed the value for *natural living* versus less than 40% of confident participants who did).

4.3.2 Responses after visiting the dairy farm

Shifts in knowledge

Median quiz score after the farm visit was 4 out of 5 questions (4.0 ± 0.8 mean \pm SD), indicating that participants answered over 1 additional question correctly after the farm visit. Average performance increased for every question (Figure 4.1), with the most improvement seen on the cow-calf separation question.

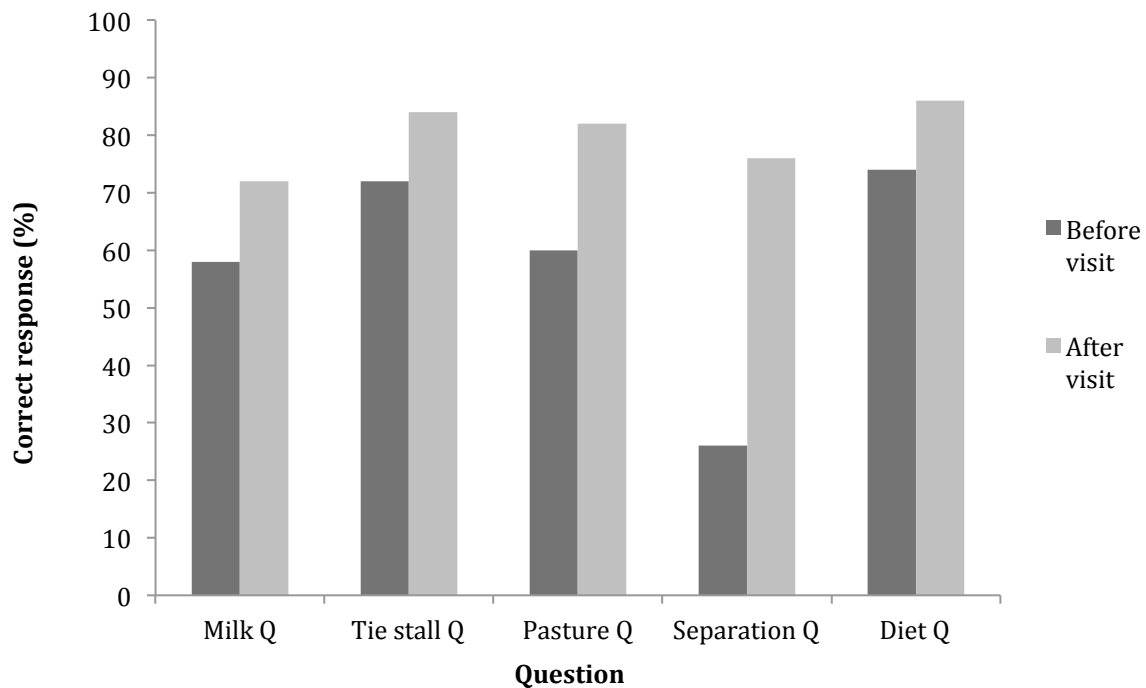


Figure 4.1. Percentage (%) of Canadian citizens with correct responses on dairy husbandry quiz questions, before and after the dairy farm visit. Milk Q= A dairy cow needs to have a calf to keep producing milk, Tie stall Q= Dairy cows in British Columbia are routinely tied to their stall in the barn, Pasture Q= All dairy cows in British Columbia are allowed access to pasture, Separation Q= How many days after birth does the dairy calf typically stay with its mom? and Diet Q= Which best describes what most adult cows are typically fed on dairy farms?"

Shifts in perception

We were also interested in whether people's overall perceptions of the level of dairy cattle welfare would shift upon touring the dairy farm. Participants' qualitative responses to the 'after' questions of whether they thought cattle had a good life on the

farm and whether they had any remaining concerns were coded into three categories as follows (Table 4.5):

- 1) *Confident* indicates those (n=14) who gave unequivocal affirmative answers that dairy cattle had a good life on the farm such that only positive attributes and no concerns were mentioned. Examples included: *"It was better than I expected...I was expecting more crowding than what I saw at this farm,"* [P17], *"Yes, plenty of food-unlimited milk for calves, yee haw!"* [P53] and *"Great life, the owners/workers actually care for the animals. This farm is great to all of the animals,"* [P62].
- 2) *Nuanced* indicates participants (n=27) who mentioned both positive and negative attributes. Many individuals in this category gave somewhat affirmative answers that dairy cattle generally seemed to have a good life on the farm, but then raised specific concerns, e.g. *"Fairly fair life for a cow [but] I am sure they would love to be outdoors,"* [P29], *"I guess so. They are healthy, they have some freedom of movement, they can eat and drink as much as they want...[but] it would be nice if they could go outside more often"* [P11], and *"yes [they have a good life] but I would still prefer to see animals grazing in the fields, eating the grass and calves not separated so quickly from mothers,"* [P61].
- 3) *Not confident* indicates those (n=9) who after touring the farm gave clear negative responses that dairy cattle did not have good lives. These individuals made no mention of any positive attributes. Examples included: *"Cows do not have a good life! Very little space to roam and are kept in unsanitary conditions ...the fact that they are always indoors and standing in their own feces concerns*

me,” [P38] and “No, conditions are poor. Industry is profit driven and animal welfare falls second to profit margins,” [P34].

Table 4.5 Citizens' perceptions in response to the question, "Do dairy cattle have a good quality of life?" before and after visiting the dairy farm¹

BEFORE VISIT Perception as indicated by answers to 'before visit'	AFTER VISIT Perception as indicated by qualitative responses		
	Confident (14)	Nuanced (27)	Not confident (9)
Confident (21)	9	10	2
Neutral (15)	1	10	4
Not confident (14)	4	7	3

¹'Before' categories indicate confidence level (confident, neutral, not confident) of whether dairy cattle have good lives before visiting the farm. The 'after' visit category of 'confident' indicates participants with affirmative answers that dairy cattle had a good life on the farm with no expressed concerns; 'nuanced' indicates participants who mentioned concerns as well as positive attributes; and 'not confident' indicates participants with negative answers and no mentions of positive attributes. The bracketed numbers adjacent to or below possible response categories indicate the total participants within the respective row or column (out of 50). The number in each cell indicates the number of participants expressing each pair of perceptions before and after the farm visit. Black cells (n=16) indicate participants whose perceptions of the level of FAW became more negative (negative shift), white cells (n=12) indicate participants whose perceptions became more positive (positive shift), and grey cells (n=22) indicate participants whose perceptions did not appear to shift in valence (no shift).

Shifts in perceptions

We then compared these 'after' visit perceptions with 'before' confidence levels about cattle welfare to determine whether participants experienced a positive, negative, or no shift in perceptions relative to dairy cattle welfare (Table 4.5). For example, a positive perception shift would describe an individual who before touring the farm indicated that they were not confident about cattle welfare but after the tour indicated that cattle on the farm did have good lives. In contrast, someone who initially expressed

confidence but indicated concerns after the tour that cattle did not have good lives would have experienced a negative shift.

We found that a minority of participants experienced a full reversal in the valence of their perception of cattle welfare: just two participants started confident but ended negatively with nothing positive observed, while four initially non-confident participants ended very positively with no concerns. Overall, shifts in perception were distributed fairly evenly among the participants such that 16 participants (32%) negatively shifted their perceptions, 12 positively shifted their perceptions (24%), and 22 did not shift (44%, Table 4.5).

Concerns behind the perception shifts

There were no detectable relationships between demographics and perception shift, or between 'before' expression of FAW values and perception shift. Thus it did not appear that expression of any particular FAW value, for example, was associated with whether or how an individual shifted their perception after touring the farm.

Qualitative analysis of the 'after' responses nonetheless identified some characteristics of those who shifted their perceptions positively or negatively. Those for whom the farm visit improved their perceptions of dairy cattle welfare (24%) seemed to be pleasantly surprised by what they observed. In particular, the following attributes were perceived as positive by individuals in this segment: the high level of care given to cattle by farm workers, plentiful food and water, a hygienic barn environment, and adequate space allotted to cattle. For example, one participant initially commented that they were concerned about "*humane treatment, cramped living conditions, and access to grazing,*" but after touring the farm remarked that they had no

concerns because “*the animals seem to be well cared for...the practices on this farm seem very ethical,*” [P65]. Moreover, the quality of care was perceived to be positive regardless of whether participants came away from the visit with an improved perception of dairy cattle welfare overall. We received no feedback that individual care toward animals was poor and many commented positively on the level of staff attention to animals.

In contrast, those for whom the farm visit negatively affected their perceptions of cattle welfare (32%) seemed either to have had their existing concerns reinforced or new concerns elicited. The most prevalent of these new concerns was early separation of the calf from the cow, reflected in an average increase of participants’ knowledge of this practice from 26% before the visit to 74% after. Interestingly, individuals in this group also commented on barn space and hygiene, but in contrast to the positive shifters, negative shifters perceived the barns to be cramped and dirty rather than spacious and clean (prompting one individual to suggest, “*maybe wash the floor more often?*” [P69]). However, the most prominent complaint was the lack of pasture and outdoor access. For example, one participant who initially “*never had any concerns*” was disappointed by the farm: “*It’s not ideal...I’m sure the cows would rather be in a field...cows should have a larger freedom area,*” [P28]. Indeed, nearly every participant who commented on pasture or calf separation, regardless of whether that participant ultimately shifted their perception, expressed disappointment about the lack of pasture and outdoor access and surprise at cow-calf separation.

4.4 Discussion

4.4.1 Citizen perceptions of the dairy industry

This chapter focused on lay peoples' perceptions of dairy farming and its effects on animal welfare. Though all but two participants were also consumers of dairy products¹⁶, our goal was to elicit *citizen* perspectives on this topic. As such, questions were focused on people's ideal visions on how dairy cattle *should* live, thus activating notions of how society in general should operate. It was not the goal of this study to determine how or whether thinking about this ideal vision may also influence participants' intents to purchase dairy products.

We also targeted participants with an existing interest in food and agricultural issues with the intent of eliciting a rich understanding of how people perceive and value dairy cattle welfare. This sampling strategy was intentional, as people with high levels of engagement tend to shape discourse on contentious issues. We were aware that these individuals would likely be more interested in and knowledgeable about livestock farming than other lay citizens in this population. Despite this bias, we observed considerable variation among individuals in FAW perceptions, concerns and values. This variation was evident, for example, in the diversity of perceptions of the dairy industry as a whole, with participants expressing positive and negative views.

Our results align with Boogaard et al.'s (2011a) conclusion that, in general, citizens seem to adopt relatively cautious opinions about dairy farming. In one respect, and similarly to how Dutch citizens "*preferred relatively traditional and natural farms*" (p. 259; Boogaard et al., 2011a), it was clear that nostalgia for the dairy farms of

¹⁶ Indeed the consumption question was only included to allow for potential explanation for how views might be affected by ethically-motivated vegetarianism or veganism.

yesterday—and alongside, rejections of industrialization and intensification as threats to that nostalgic imagining—informed perceptions of some individuals in the current study. These expectations may relate to the agrarian ideals that proliferated in America in the late 1700's (see Thompson, 1998; Fraser, 2001; DuPuis, 2002), with farming seen as a natural extension of the surrounding landscape, where *“animals on traditional farms were seen as living natural and wholesome lives, much as the human members of the agrarian family were seen as living natural and wholesome lives...”* (p. 181; Fraser, 2001).

However (here and as others have also noted, Boogaard et al., 2011a), citizen preferences for agrarian ideals did not necessarily *“imply an outright rejection of modern animal farming,”* (p. 259; Boogaard et al., 2011a). Rather, citizens seemed to balance their preferences for what is natural and traditional against their acceptance of technological advances on the farm. This was also evident for some of our participants, both in their support of the dairy industry's connection to the vitality of their local communities, as well as in comments that participants liked seeing how technology was used to improve the lives of the cows on the farm.

4.4.2 Citizen concerns and values

We sought to examine perceptions of dairy farming specifically as they related to animal welfare, and to better understand the knowledge and values that help inform these perceptions. Although participants varied in their expression of FAW values in that some people's conceptions were broader than others', collectively we observed a multi-dimensional and nuanced understanding of animal welfare. Earlier research had indicated that lay citizens tend to focus mainly on natural living and de-emphasize

other values (Te Velde et al., 2002). However, this and other research (see below) indicates that lay citizen values around animal welfare are not always so narrow in focus.

Natural living

Our findings align with evidence that natural living tends to figure strongly in what citizens believe is necessary for farm animals to live a good life (Harper and Makatouni, 2002; Spooner et al., 2014a). For example, our results resonate with others who found that citizens emphasize freedom to move and fulfill natural motivations (Te Velde et al., 2002; Lassen et al., 2006; Maria, 2006; Spooner et al., 2014a), performance of natural behaviours (Vanhonacker et al., 2008; Prickett et al., 2010; Boogaard et al., 2011b; Benard and de Cock Buning, 2013; Spooner et al., 2014a), access to increased space (which is intimately connected to notions of freedom, Vanhonacker et al., 2008; Boogaard et al., 2011b; Benard and de Cock Buning, 2013), outdoor access (Vanhonacker et al., 2008; Prickett et al., 2010; Benard and de Cock Buning, 2013; Spooner et al., 2014a), and daylight (Boogaard et al., 2011b; Benard and de Cock Buning, 2013; Spooner et al., 2014a).

We also found strong objections to the practices of early cow-calf separation and zero grazing in the current study. Our findings fit with others who found that citizens do not approve of early cow-calf separation (Boogaard et al., 2011a), in part because it is perceived to be an affront to the natural order (see Chapter 5). Boogaard et al. (2011a) found that this practice was more objectionable than other undesirable practices such as artificial insemination and slaughter of unproductive cows. Likewise (and of little surprise given similar findings, Vanhonacker et al., 2008; Ellis et al., 2009; Prickett et al.,

2010; Benard and de Cock Buning, 2013; Spooner et al., 2014a), failing to provide animals access to the outdoors was objectionable.

Biological functioning

Citizens in the current study also valued aspects related to biological functioning (particularly nutrition and hygiene) to the extent that this was the most frequently expressed FAW value among participants. For example, providing dairy cattle with unrestricted access to biologically appropriate feed and clean, fresh water were among the most frequently cited requirements for a good life. Other research has likewise indicated that provision of food and water, along with treatment for injury and disease, are included in the most important requirements of American (Prickett et al., 2010) and European citizens (Vanhonacker et al., 2008; Boogaard et al., 2011b).

Hygiene of animals' surroundings was also considered important, as also reported by Boogaard et al. (2008, 2011a). That citizens valued aspects of biological functioning should be considered promising for the dairy industry, as these are also highly valued by farmers and others connected to the livestock industries (in Europe: Te Velde et al., 2002; de Greef et al., 2006; Bock and Van Huik, 2007; Hubbard and Scott, 2011; and in North America: Spooner et al., 2012, 2014b). In other words, it seems that industry and non-industry stakeholders agree on the importance of animal health and functioning. However, there are differences in how biological functioning is ultimately incorporated into the way in which FAW is defined and evaluated by these stakeholders. Citizens in the current study often incorporated multiple FAW values in their responses of what it means for dairy cattle to have good lives, indicating that they consider health and functioning to be necessary but not sufficient for a good life.

Affective states

The existing literature on citizens' attitudes is consistent in showing that imposing pain and other negative affective states on animals is unacceptable. For example, US surveys show that the majority believe that farm animals should be protected from pain (Rauch and Sharp, 2005), and work in Canada and the US has shown that citizens object to the performance of routine painful procedures (e.g. tail docking and dehorning) without pain relief (Rutgers, 2003; Weary et al., 2011; Robbins et al., in press.)

In the present study, just under a quarter of participants made direct references to affective states in dairy cattle, including happiness and an absence of pain and stress. The lack of comments may relate to our framing of the survey questions, as asking about a good life may prime responses related to elements external to the cow rather than to the cow's internal affective state. Therefore, inferences regarding how much participants valued this aspect of FAW should be made with caution.

Beyond the three spheres of animal welfare

In this study we found that participants valued aspects of welfare that included both the state of the animal and what is provided to it (see the World Organization for Animal Health's definition of animal welfare; OIE, 2008). For example, disease incidence (a state of the animal) and provision of vaccines (an external input) both fall under the value related to biological functioning.

However, the results of this chapter indicate that citizen values for FAW extended beyond the three spheres framework (biological functioning, natural living and affective states) as traditionally understood by scientists. Notably, over half of the

respondents also saw the welfare of dairy cattle as intertwined with the actions and attitudes of humans charged with their care. Others have also noted the relevance of farmer-animal contact, gentle handling, and general humane care to citizen's perceptions of farm animal welfare (Boogaard et al., 2011a; Spooner et al., 2014a). While human actions are obviously associated with (and directly affect) biological functioning, natural living and affective states in animals, it is important to specify that the need for cattle to have attentive and loving caretakers seemed to be treated as distinct from these other three aspects (and indeed, can be considered an additional element of 'what is provided to the animal').

The importance placed on humane care can be traced at least as far as the pastoralist archetype in which human use and consumption of animals was legitimized in the context of "*diligent care*," (p. 180; Fraser, 2001). Care ethics dictate that our duties to animals are borne out of our relationships with them (see Engster, 2006), and pastoralist views envision humans and domesticated animals as contracted to each other such that animals give their lives in exchange for human provision of protection and dutiful care. Against this context, we can understand citizens' objections to poor care of farm animals (running the gamut from simply not being loving enough to physical abuse) as objections to a breach of this ancient contract.

This desire for kindness also functions reciprocally such that humans stand to benefit from positive interactions with animals. Seabrook and Wilkinson (2000), for example, interviewed Australian dairy stockpersons who considered positive interactions with their animals as integral to a good and satisfying workday. Here then, we not only see links to broader societal desires for gentle care toward livestock, but

also grounds for the argument that gentle handling is something that benefits the humans who work with them.

4.4.3 Effects of the farm visit

With one exception,¹⁷ the types of FAW values expressed by participants did not relate with their existing knowledge, or with how their perceptions of dairy cattle welfare changed after visiting the farm. As this study was not designed to test these relationships, the lack of relationships should be treated with caution. However, the ways in which perceptions and knowledge shifted upon touring the farm, and the concerns underlying them, seem to indicate that people's knowledge and values in relation to FAW may be relatively independent.

Hansen et al. (2003) addressed how and why people's evaluations of situations are affected by factors well beyond their knowledge, and how deeply embedded values are in these processes. On the surface, it seems intuitive that familiarity breeds content and unfamiliarity, suspicion: we know, for example, that people who work within the livestock industries are more accepting of contentious practices and less concerned about animal welfare than are people unaffiliated with these industries (Vanhonacker et al., 2008). However, emerging work suggests that learning about livestock practices fails to improve acceptance for many people, and in some cases may decrease acceptance. For example, Ryan et al. (2013) showed that citizens became less likely to support gestation housing for commercial sows after being exposed to various sources of information including scientific articles, images, and videos.

¹⁷ Participants with higher 'before' quiz scores were more likely to include biological functioning in their FAW value expressions. This association may be similar to the emphasis on biological functioning found among farmers (Te Velde et al., 2002; Lassen et al., 2006; Kaupinnen et al., 2010; Silva et al., 2013).

In the present study, baseline knowledge about farming practice was variable among participants depending on the practice in question, with knowledge of some practices fairly high and others low. Pronounced areas of knowledge deficit included cow-calf separation and protocols for hormone administration, the latter of which became apparent through participants' concerns about growth hormones. Knowledge about dairy farming improved on every question for nearly every participant after the visit. However, this improvement in knowledge was not accompanied by a similar improvement in perceptions of dairy cattle welfare across participants. If we look to the divergence in confidence in cattle welfare among participants before visiting the dairy farm (42-30-28% confident-neutral-not confident, respectively) and to the scattered distribution in perceptions of cattle welfare after the visit (24-44-32% positive-no-negative shift, respectively), it would seem that the farm visit did not result in an overall increase in confidence, as would have been predicted by the knowledge deficit model of public understanding (Wynne and Irwin, 1996; Einsiedel, 2000). Collectively, the farm visit only improved perceptions in 24% of participants; the majority experienced no shift or became more critical.

People reacting negatively to the farm visit provided many reasons, including poor hygiene and lack of space, but some participants also commented positively on these issues after the visit. Such differences in citizens' perception of FAW are common (Boogaard et al., 2006; Vanhonacker et al., 2007; Prickett et al., 2010), and suggest that the public cannot be considered as a single entity.

Boogaard et al. (2011a) wrote that, *"concerns about modern animal farming will only be allayed when information...addresses the more fundamental values that shape*

[public] concerns," (p. 281). Participants in this study saw humane care toward cattle as a highly positive attribute of the farm. The farm visit therefore seemed effective in demonstrating compliance with this value, even if this did not ultimately shift all participants' perceptions about dairy cattle welfare. Societal objections to large farms and to industrialization and mechanization of the industries thus make more sense in the context of a value for individualized attention and humane care for farm animals. Though Fraser et al.'s (1997) three spheres of animal welfare is an excellent foundation for understanding societal concerns about farm animal welfare, we suggest that considering this emphasis on human-animal relationships may better capture societal concerns and thus provide a more inclusive framework from which to approach societal engagement. The valuing of humane care may also make the dairy industry particularly vulnerable to reputational loss when cases of abusive practices are brought to light.

In contrast, it was clear that the farm visit failed to meet the natural living criterion for most participants, particularly in the case of pasture access and cow-calf separation. Given the importance many placed on natural living, it seems likely that people wish to see evidence that dairy cows are kept in ways that allow them to engage in natural behaviour. In light of participants' concerns about space allocated to cattle, increasing space per animal within the current barn environment might make the lack of outdoor access easier for some people to accept.

The problem of cow-calf separation will be more difficult to resolve. This practice illustrates how the interplay of knowledge and values inform acceptance, as it appeared not to be a problem for people until they were made aware of this routine practice. This issue will be addressed in more detail in the next chapter.

4.4.4 A note about study limitations

Past studies have estimated citizen knowledge of livestock farming through proxy questions on rural-urban background (e.g. Boogaard et al., 2011b). There is some reason to question self-reports as an effective barometer of citizen knowledge: for example, though citizen participants in one study reported low familiarity with pig husbandry, many of their spontaneous welfare concerns (e.g. tail docking and teeth clipping, limited space, injured legs and joints) were indeed recognized welfare issues in the industry and characteristic of at least some pork operations (Benard and de Cock Buning, 2013). In other words, their concerns were grounded in reality.

To our knowledge, this study is the first to measure citizen knowledge of livestock production practices directly. We suggest that this approach provides a more accurate picture of citizen knowledge, but also acknowledge that our approach of using quiz questions requires refinement. The inclusion of true/false questions to gauge knowledge is particularly limited; we did not measure confidence in answers and so cannot account for participant guessing. We also cannot determine whether any change in knowledge (or perceptions) lasted beyond the day of testing.

Given the constraints associated with longer surveys (e.g. participant inattention, drop-out, frustration; see Maniaci and Rogge, 2014) we were limited in the number of questions we could ask. We made every attempt to construct quiz questions that anyone with working knowledge of dairying could answer but that were also possible to know without ever having been on a dairy farm. Finally, we realized after data collection that the correct response to the cow-calf separation question was worded (“0 days”) in a way that may have confused participants, potentially over-

estimating ignorance on this question. However, due to the number of qualitative responses specifically referencing surprise at the practice, we are confident that this practice was new information for many participants.

The dairy farm used in this study was also a university research center. This role may have been seen as positive for some participants, resulting in more positive perceptions than if participants had visited another farm. Social desirability may have motivated some respondents' answers, as they may have wanted to seem complimentary of the farm given its associated role as a teaching farm. As no identifying information was collected from the participants, and the researchers did not observe participants while they filled out the surveys, we hope that social desirability bias was minimized. We also suggest that this issue underscores the considerable variation among farms in practices and the quality of care provided; we encourage constructive replication of this study to consider other types of visitors and other farms.

4.5 Conclusion

This study was the first to explore perceptions, knowledge, and values of animal welfare among North American citizens in the context of a farm visit. The results indicate that citizens hold nuanced conceptions of animal welfare that extend beyond those traditionally referenced in the scientific literature. Allowing citizens to tour a dairy farm improved knowledge of dairy husbandry practices, but did not improve perceptions of dairy cattle welfare for most participants. Shifts in perception appeared to be primarily rooted in whether various values for animal welfare were satisfied (or not). Overall, the tour appeared to satisfy values around humane care, but failed to meet values for natural living. We suggest that engaging with the public through one-way

education efforts only (even immersive experiences, such as the farm tour described in the present study) will not resolve societal concerns about animal welfare on livestock farms.

Chapter 5: Mixed stakeholder attitudes toward cow-calf separation: a case study^Φ

5.1 Introduction

The dairy industry has traditionally enjoyed a positive public image, but this may erode if practices are perceived to be out of step with societal expectations. Thus, those who work with dairy cattle should engage with the public on controversial issues related to animal care. Creating platforms for communication about contentious issues fosters engagement with, and interaction between, diverse industry stakeholders, including the public (Castle and Culver, 2006). We suggest that such engagement will help the dairy industry remain socially sustainable (Boogaard et al., 2008) – that is, maintain good standing as an industry committed to fulfilling public trust (Schweikhardt and Browne, 2001).

Animal welfare is conceptualized in different and sometimes overlapping ways (Fraser et al., 1997). For example, some people may especially value cow health or milk production as indicators of good welfare, while others may emphasize subjective experiences (such as pain and distress) or the ability to express natural behaviours. Much of the literature on farm animal welfare attitudes originates from Europe and has focused on the views of people not involved in animal production (e.g. Eurobarometer, 2007). The limited data available on North Americans (e.g. Prickett et al., 2010) also shows a high level of concern about farm animal issues. People's views toward animal welfare vary depending on a variety of factors such as the species in question (Driscoll,

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1992), the animals' perceived cognitive capacity and familiarity with the animal (Knight and Barnett, 2008), as well as family and/or personal experience with farm animals (Boogaard et al., 2006; Kendall et al., 2006). Non-industry people often conceptualize good animal welfare largely in terms of the animals' living environment (e.g. abundant space and freedom to roam) but also in terms of health, including nutritional aspects (Harper and Henson, 2001; Frewer et al., 2005; Ellis et al., 2009; see Chapter 4). Notably, the naturalness of husbandry systems (in rearing systems, housing, and behavioural opportunities) is a dominant concern among people not involved in animal production (Te Velde et al., 2002; Lassen et al., 2006; Maria, 2006; Vanhonacker et al., 2008; Chapter 4).

In contrast, natural living seems to be lower priority for those working within agriculture, who tend to instead emphasize concerns related to animal health (Te Velde et al., 2002; Vanhonacker et al., 2008), though this is not uniformly the case. For example, European organic livestock farmers also view natural living as an important component of animal care (Lund et al., 2004; Vetouli et al., 2012). Moreover, approaches to animal welfare vary among individual farmers (Vetouli et al., 2012) and farmers are often aware of the diverse elements that affect farm animal welfare (Spooner et al., 2012; see Chapters 2-3).

Some European research has addressed views on issues specifically relevant to dairy cattle (Boogaard et al., 2008, 2010; Ellis et al., 2009), but this work has focused on individuals not involved in agriculture and there is little information on attitudes of dairy producers and other dairy industry stakeholders. With the exception of our previous studies on tail docking (Weary et al., 2011), pasture access (Schuppli et al.,

2014) and dehorning (Robbins et al., in press), there has been little work on the views of North Americans on issues in dairy cattle welfare.

The aim of this chapter is to examine the views of participants from within and outside the dairy industry specific to the practice of separating the dairy calf from the dam at or soon after birth. This common management practice represents a particularly interesting case study for stakeholder engagement. In nature, a cow nurses the calf for months, weaning is gradual, and calves form strong bonds with their mother and with other cows and calves in the herd that can last for years (Kilgour and Dalton, 1984; Vitale et al., 1986). In contrast, most dairy farms separate the cow and calf within a few hours of birth, whereupon the cow re-enters the production cycle and the calf is placed in individual or group housing and fed milk artificially until weaning at 4 to 12 weeks of age (von Keyserlingk and Weary, 2007). European research suggests that separation of the newborn dairy calf from its dam elicits concern from members of the public (Boogaard et al., 2010), but again, it is unclear how North Americans view this practice.

The goals of this study were thus to: 1) examine the views of participants from within and outside of the dairy industry on early separation of the cow from her calf, and 2) compare these views with the scientific literature on the advantages and disadvantages of the practice. This study was one component of the *CowViews* project (see Weary et al., 2012), designed to provide a forum for diverse stakeholders to air their views on issues in dairy production. One intended application of this approach is to help foster agreement among stakeholders on contentious practices.

5.2 Methods

This study used the same approach as an earlier study on tail docking (Weary et al., 2011). Here we present the results of one of many scenarios describing contentious practices in dairy production, in this case cow-calf separation, hosted on an online forum. The forum was hosted on the *YourViews* site (<http://www.yourviews.ubc.ca>), designed to facilitate public engagement on ethical issues in science and technology (Ahmad et al., 2006). This methodology used the “N-Reasons” platform (described in Danielson, 2010), which collects both quantitative (responses to close-ended questions) and qualitative data (responses to open-ended questions). Knight and Barnett (2008) point out that qualitative approaches are particularly appropriate when examining people’s attitudes toward animal use, especially when little is known about the topic in question (in this case, the range of views that exist around cow-calf separation). Incorporating a qualitative aspect also overcomes some of the issues associated with more traditional survey methods (Ahmad et al., 2010) by allowing participants to generate constructs beyond those conceived by the researchers (as discussed in Knight et al., 2003; Kalof et al., 2008).

In keeping with the typology of public engagement mechanisms put forward by Rowe and Frewer (2005), this approach is one of stakeholder consultation. More specifically, the engagement process used in this study is a form of electronic consultation, which involves sending a document --in this case, a link to an interactive website-- to potential participants, with the aim of obtaining “*open responses on a significant issue*,” (p. 279; Rowe and Frewer, 2005).

5.2.1 Participant recruitment

As our sampling was not random, we did not intend our results to be representative of any specific population. Rather, our aim was to include a diverse range of participants to increase the chances of achieving saturation in views. Recruitment methods included advertisements in online newsletters and informal announcements at conferences and undergraduate classes, but the forum was made available on the World Wide Web so anyone with Internet access could theoretically participate. To encourage participation of people in the North American dairy industry, brief articles were published in producer magazines (*Progressive Dairyman* and *Ontario Farmer*) that invited readers to participate.

Most participants entered the site between November 20, 2010 and August 11, 2011 and were randomly allocated to one of four independent groups (Groups 1-4). This approach allowed the evaluation of potential differences between groups and minimized the chance that particularly persuasive individuals could dominate an argument (Henrich and Gil White, 2001). In addition, we opportunistically recruited a fifth group of participants at the farmer-oriented Western Canadian Dairy Seminar in Red Deer, AB, Canada between March 6-9, 2012 to increase representation of views from people within the dairy industry (Group 5).

5.2.2 Survey design

Demographic questions classified participants on the basis of sex, age, education level and country of origin and of residence. Participants were asked to describe their familiarity (“Very Familiar,” “Somewhat Familiar” and “Not Familiar”) with dairy production. They also specified if they had no involvement in the dairy industry (e.g.

non-industry stakeholders), or if involved (e.g. industry stakeholders), the nature of their involvement: "Farmer [e.g. dairy farmer, operator or worker]," "Veterinarian," "Student/Teacher [e.g. professor, instructor or student in animal or veterinary science]," "Dairy Industry Professional [e.g. dairy nutritionist, researcher, milking equipment dealer, livestock auction employee]," or "Animal Advocate [e.g. member of farm animal protection organization]."

To ensure equal access to the same basic information, participants were provided with the following background on cow-calf separation:

Dairy farmers often remove the calf from the cow within the first few hours of birth. This is done in response to several concerns including the following: the calf may become infected from pathogens carried by the cow or her environment; the calf may become injured by the cow or the barn equipment; the calf will not be able to nurse from the cow and receive adequate colostrum (first milk produced by the cow after birth) and milk; the calf will drink too much milk which increases the farmer's cost of feeding and increases the risk of diarrhoea; allowing the cow and calf to bond will result in greater separation distress when separation does occur; farms are often not well designed for cow-calf pairs, so keeping cows and calves together can be considered an extra chore.

Others consider that some form of cow-calf contact is an important element of natural behaviour, and believe that this contact is beneficial to the cow and calf. On these farms the cow and calf are kept together for days or even weeks after birth.

Participants were then asked "Should dairy calves be separated from the cow within the first few hours after birth?" and could respond, "Yes, because...", "No, because....", or "Neutral, because...". Participants were able to explain their response in an open text box or select one or more of the reasons left by earlier participants. In this way, the number of yes, no and neutral responses (quantitative data) was recorded along with the reasons for the responses (qualitative data). An added benefit to this approach is that it allowed participants to see and respond to reasons from other

participants, providing participants the ability to reflect upon their own reasons within a quasi-social context (Danielson, 2010).

Reasons were displayed in a list format typical of user posts on a web forum. The number of reasons accumulated over time as new participants joined such that later participants could view a larger list of reasons than those available to early participants. Within each group, reasons were displayed on the page by popularity (according to votes) to inform participants about any emerging social consensus. In addition, more recent reasons were also displayed near the top to counter any primacy effect (following Danielson, 2010).

Participants could select multiple reasons, but for analysis each selection was discounted by the total number of selections, such that each participant contributed a single vote (e.g. if a participant selected 2 reasons, 0.5 “votes” were allocated to each reason).

5.2.3 Quantitative analysis

We used χ^2 tests to test the effect of each demographic category on response (yes, no, neutral). This test requires that expected frequencies must be greater than 5. In some cases this requirement was not met due to the low proportion of neutral votes; in these cases we re-ran the test after omitting neutral votes. In no case did this change the significance of the results presented below.

5.2.4 Reason analysis

Content analysis was used to analyze participant reasons (following Coffey and Atkinson, 1996). We developed a coding scheme to understand the central themes of

concern raised by participants, irrespective of participant demographics. This process began by reading all reasons and identifying issues (e.g. repercussions of calf not receiving enough milk) that could be assigned codes (e.g. calf nutrition). Reasons were then reread to check codes for consistency and altered slightly as a deeper understanding of the reasons emerged. Two of the authors (B. A. Ventura and C. A. Schuppli) conducted this first stage independently. We compared codes to evaluate consistency; initial consistency was high. Where differences arose, we discussed our interpretations until we reached a mutually consistent coding scheme consisting of main codes and sub-codes, subsequently termed “themes” and “subthemes.”

The number of times that themes were referenced was counted. A theme was only counted once within each reason, regardless of how many times it was referenced within that reason. Because participants from different demographic groups often selected the same reason, the analysis focused primarily on how themes were used within each response category (yes, no, neutral) and not on how often demographic groups used certain themes in their reasons.

The voices of the participants are reflected in selected quotations that capture the essence of the participants’ concerns for each theme. Each quotation is followed by the number of times that other participants “voted” for that reason. Because participants could select multiple reasons, some reasons acquired non-integer votes (e.g. “4.6” times). Letters are used to differentiate any reasons that were selected the same number of times, so that each bracket also serves as a unique reason identifier (e.g. [1a] and [1b] indicate two different reasons that were each chosen once).

5.3 Quantitative results

5.3.1 Groups 1-4

A total of 163 people participated in Groups 1-4 (range 38-43 participants per group, Table 5.1); 74% were female; 48% were between the ages of 19-29 and 21% were above the age of 50; 64% were from Canada and 21% from the United States; and 65% had attended university with an additional 27% in possession of at least some graduate education. One third of the participants were academics (students or teachers), 31% had no involvement with dairy farming, 13% were animal advocates, 11% farmers, 9% veterinarians, and 3% dairy industry professionals. Most considered themselves either somewhat (43%) or very (44%) familiar with the dairy industry.

Overall, 43.6% supported early separation (chose “yes”), 47.9% were opposed (chose “no”) and 8.6% were “neutral” (Table 5.1). Decisions varied with sex ($\chi^2=22.6785$, $df=2$, $p<0.0001$), age ($\chi^2=15.7037$, $df=4$, $p=0.0034$), education ($\chi^2=10.6916$, $df=4$, $p=0.0303$), nationality ($\chi^2=14.6812$, $df=4$, $p=0.0054$), involvement ($\chi^2=74.3550$, $df=10$, $p<0.0001$) and familiarity ($\chi^2=32.7692$, $df=4$, $p<0.0001$). For example, support for early separation was higher among males, people in their 20’s, people with graduate education and participants originating from the U.S. Participants who described themselves as animal advocates or with no involvement with the dairy industry were less supportive of early separation than veterinarians, students and teachers, farmers and dairy professionals. Support for early separation was highest among participants who considered themselves very familiar with dairy production.

Most (87%) participants chose only one reason in support of their views (Table 5.1). Participants who selected multiple reasons were always consistent in their yes, no

or neutral responses (i.e. chose either all supporting or all opposing reasons). Within each group (1-4), participants were divided between yes and no decisions (Table 5.1), with no differences in vote choice between groups ($\chi^2=9.5225$, $df=6$, ns).

Table 5.1 Number and proportion of participants (Groups 1-4, n=163) who supported (“yes”), opposed (“no”) or were “neutral” to early cow-calf separation¹

	N	Yes (%)	No (%)	Neutral (%)
Total participants	163	43.6	47.9	8.6
Sex				
<i>Female</i>	117	31.6	57.3	11.1
<i>Male</i>	42	73.8	23.8	2.4
Age				
19-29	77	55.8	33.8	10.4
30-49	50	32.0	56.0	12.0
50+	34	32.4	67.7	0.0
Country of Origin				
<i>Canada</i>	102	32.4	56.9	10.8
<i>U.S.A</i>	34	67.7	26.5	5.9
<i>Other</i>	24	54.2	41.7	4.2
Dairy background				
<i>Farmer</i>	18	61.1	33.3	5.6
<i>Veterinarian</i>	15	100.0	0.0	0.0
<i>Student/Teacher</i>	54	63.0	22.2	14.8
<i>Dairy Professional</i>	5	60.0	40.0	0.0
<i>Animal Advocate</i>	21	4.8	95.2	0.0
<i>No Involvement</i>	50	14.0	76.0	10.0
Familiarity				
<i>Very Familiar</i>	72	68.1	29.2	2.8
<i>Somewhat Familiar</i>	70	24.3	61.4	14.3
<i>Not Familiar</i>	21	23.8	66.7	9.5
Responses				
<i>Single</i>	142	45.8	45.8	8.5
<i>Multiple</i>	21	28.6	61.9	9.5
Group				
1	39	38.5	56.4	5.1
2	43	41.9	55.8	2.3
3	38	39.5	47.4	13.2
4	43	53.5	32.6	14.0

¹Responses are sorted by demographic categories, by those who provided a single vs. multiple responses and by replicate discussion group (Groups 1-4). Categories with <163 responses resulted if some participants did not provide demographic information.

5.3.2 Group 5

Respondents in this group (n=28) were mostly male (64%) and directly affiliated with the industry (e.g. 52% farmers and industry professionals; see Table 5.2 for more demographic information). Although the overall level of support for early separation in this group was similar to Groups 1-4, there were more neutral responses (and consequently fewer opposing responses, Table 5.2).

Table 5.2 Number and proportion of industry-targeted participants (Group 5, n=28) who supported (“yes”), opposed (“no”) or were “neutral” to early cow-calf separation¹

	N	Yes (%)	No (%)	Neutral (%)
Total participants	28	46.4	32.1	21.4
Sex				
<i>Female</i>	9	22.2	55.6	22.2
<i>Male</i>	16	56.3	18.8	25.0
Age				
19-29	8	37.5	25.0	37.5
30-49	15	40.0	40.0	20.0
50+	2	100.0	0.0	0.0
Country of Origin				
<i>Canada</i>	20	45.0	30.0	25.0
<i>U.S.A</i>	3	66.7	0.0	33.3
<i>Other</i>	5	40.0	60.0	0.0
Dairy background				
<i>Farmer</i>	11	63.6	18.2	18.2
<i>Veterinarian</i>	1	100.0	0.0	0.0
<i>Student/Teacher</i>	5	0.0	60.0	40.0
<i>Dairy Professional</i>	3	33.3	33.3	33.3
<i>Animal Advocate</i>	3	0.0	66.7	33.3
<i>No Involvement</i>	4	100.0	0.0	0.0
Familiarity				
<i>Very Familiar</i>	17	52.9	23.5	23.5
<i>Somewhat Familiar</i>	8	37.5	37.5	25.0
<i>Not Familiar</i>	2	50.0	50.0	0

¹ Responses are sorted by demographic categories. Categories with fewer than 28 responses resulted from some participants not providing demographic information.

5.4 Qualitative results and discussion

5.4.1 Group differences

The creation of separate groups allowed the evaluation of consistency in the results across the groups. Although groups differed in participant demographics, they were similar with respect to the number of reasons, the distribution of votes and the major themes. Similarity across diverse groups suggests that these themes would likely also emerge in other samples of participants. In addition, similarity in themes across groups suggests that particularly compelling reasons voiced within a group did not lead to idiosyncratic outcomes.

Participants in Group 1-4 provided a total of 46 reasons (10-13 reasons per group) averaging 52 words in length (range 2 to 211). Group 5 participants provided 17 reasons averaging 58 words in length (17 to 144 word range). Votes were split similarly within each of the groups and all groups contributed reasons in support of all major themes identified.

5.4.2 Themes

Participants raised the following themes (in order of popularity): cow and calf emotions, calf health, cow health and production, a natural life, dissatisfaction with industry motivations, and changeability of dairy farming structure (Table 5.3). Many of these themes incorporated one of the following aspects of animal welfare (Fraser et al., 1997): biological functioning (calf health, cow health and productivity), subjective experience (cow and calf emotions), and the role of nature (a natural life). Cow and calf emotions, calf health, cow health and production, and changeability of dairy farming

structure were common themes among all types of responses; thus, although opponents and supporters reached opposing conclusions, they often referenced similar issues in defending their stance (Table 5.3).

Table 5.3 Reason themes and sub-themes used by opponents and supporters of early cow-calf separation

	Theme	Sub-themes	Description	Used by
1)	Cow and calf emotions	Emotional life; cow-calf bond; stress	Awareness of the emotional lives of cows and calves; references to the bond between them; concerns about how and when severing the bond could create stress.	Opponents Supporters Neutrals
2)	Calf health	Health; nutrition; physical safety	Beliefs about whether early separation promotes or threatens calf's ability to minimize disease risk, obtain adequate colostrum or milk, and avoid injury.	Opponents Supporters Neutrals
3)	Dairy cow health and production	Health; production; management	Beliefs about whether early separation promotes or threatens cow's health (especially related to udder health); efficiency and maximization of milk production; and ease of management.	Opponents Supporters Neutrals
4)	A natural life	Reverence for nature; natural behaviour	Belief that nature is a guide in evaluating the animals' best interest; concerns about the ability to express natural behaviours.	Opponents Neutrals
5)	Dissatisfaction with industry motivations	Dishonesty; wrong focus; profit motive	Disapproval of goals and motivations of dairy producers; beliefs that industry focuses on profit and convenience over animal welfare.	Opponents
6)	Changeability of dairy farming structure	Farm design; cost burden	Beliefs about whether farms can and/or should change to accommodate cow-calf pairs. Supporter beliefs often underpinned by acceptance of status quo as something that best minimized problems in an unchangeable system; opponent demands for change often supplemented with suggestions to shift burden of cost to consumers.	Opponents Supporters Neutrals

1) Cow and calf emotions

The most common theme was emotional repercussions for the cow and calf as a result of separation. Three sub-themes were identified: a general awareness that cows and calves have an emotional life, reference to the bond between cow and calf, and concern about how severing that bond would result in distress.

Opponents of early separation suggested that cows have feelings and that cows and calves enjoy being together (e.g. *“she has...[an] emotional investment in the calf,”* [4.6]). This concern was also echoed in a neutral response: *“it seems like an awful thing to have to do and I would ultimately prefer that we recognized the cows as sentient beings...”* [1g]. Opponents also reasoned that *“cows benefit by forming a bond with their calf...”* [12.3]. The idea of severing the bond provoked strong reactions, in part because the cow-calf bond was seen as similar to the human mother-child relationship. This can be seen in the use of language like *“divorcing or orphanage type management”* [16.5] and *“[the] cow being a mother is supposed to have an emotional string attached to her calf...by no means having a lesser degree of recognition compared to a human mother,”* [7.6]. Opponents also viewed separation as stressful, as seen in statements like *“immediate separation [would] cause a grievous trauma-like situation for both,”* [7.6].

Supporters of early separation also voiced concern about the emotional bond and acknowledged that separation distress was *“an important welfare issue,”* [10.8]. However, supporters often viewed separation as inevitable and separation distress as more serious the longer cow and calf stayed together. Many pointed out, *“it’s better for both the calf and the mom to separate sooner because otherwise there is too much attachment, and it’s very hard on the mother!”* [12]. This view is consistent with scientific

literature showing that the cow-calf bond develops rapidly and strengthens over time (as reviewed in Flower and Weary, 2003), such that cow and calf distress responses escalate when separation is delayed (after 4 days vs. 6 hours and 1 day, Weary and Chua, 2000; after 2 weeks vs. 1 day, Flower and Weary, 2001). However, there has been little research to investigate the positive emotional effects of prolonged contact, which poses challenges to meaningful harm-benefit analysis of emotional repercussions of separation.

2) *Calf health*

Concerns about calf disease, nutrition (colostrum and milk access), and injury were common. Supporters of early separation tended to believe that physical separation protected the health of the calf, for example, “*research has shown it benefits calf health,*” [17.3]. Another supporter suggested, “*the calf can be relocated to a clean housing facility where it will not be exposed to the various diseases commonly found in maternity areas,*” [2b]. This relocation was valued in part because of the individual care made possible, but more importantly because it provided a “*means to break disease transmission,*” [6.5] with reduction in Johne’s disease (*Mycobacterium avium* subspecies *paratuberculosis*) most often mentioned.

Opponents of early separation expressed skepticism that early separation reduced disease in calves. For example, a popular reason suggested that early separation “*does not work in preventing disease; current methods of management still result in high levels of disease in dairy calves,*” [12.3]. It is unclear from the comments whether opponents believed calf health could be effectively managed if calves were not

separated from their dams or if they did not consider these claims sufficient to justify early separation in light of other perceived risks to cow and calf welfare.

There was also disagreement on whether early separation was effective in meeting the calf's needs for colostrum and milk. Supporters believed that early separation made it easier to deliver and monitor colostrum intake (e.g. *"there is no way to monitor for adequate colostrum intake if the calf nurses freely,"* [3.3]). Other supporters worried about the repercussions of feeding the calf if separation is delayed: *"it's hard to feed the calf after they get used to feeding from the mom,"* [12] or *"a cow would hold her milk...and her calf cannot drink what a cow has in her udder,"* [4b]. Conversely, opponents reasoned, *"calves benefit from the care they receive from the cow (e.g. by better access to milk and colostrum)..."* [12.3]. One opponent suggested an economic incentive for allowing the calf to nurse: *"the cow produces colostrum which isn't commercially sale-able and the calf should have free access to this for the first couple of days at least,"* [1.3].

There is literature to support both opponent and supporter perspectives on calf health. Cow-calf contact appears to confer many benefits for calf health (EFSA, 2006): it has been shown that cows stimulate calves and encourage earlier meconium expulsion and better digestive function (Metz and Metz, 1986) and that calves show improved colostrum absorption (Selman et al., 1970), fewer bouts of scours (Weary and Chua, 2000), and greater body weight gains if they are kept with the cow (Metz, 1987; Flower and Weary, 2001). More generally, a number of studies report lower morbidity and mortality among nursing calves than among separated calves; a number of factors including milk quality and quantity could account for these differences (Webster et al., 1985; Rajala and Castrén, 1995; Krohn, 2001). In contrast, other work suggests a

harmful effect of prolonged contact: calves in these studies were at greater risk for failed passive transfer (Wesselink et al., 1999), diarrhea (Svensson et al., 2003), and infection by the bacterium responsible for Johne's disease (Marcé et al., 2011). As Rushen et al. (2008) noted, it is difficult to distinguish if effects on calf health are attributable to the act of separation itself or to subsequent housing and management. Regardless of whether or not the calf is with the mother, it is critical to ensure adequate colostrum intake and hygiene (Frank and Kaneene, 1993; Vasseur et al., 2010).

3) *Cow health and production*

Participants were also concerned about udder health and milk production. Supporters of early separation expressed concerns about the lack of milk letdown causing health problems for the cow (i.e. if the cow became accustomed to the calf sucking, it would be harder to trigger milk ejection during milking time). For example, some suggested, *"the farmers then have to use oxytocin on the cow to force her milk to come out...Cows can get very sick if they don't release their milk,"* [4b]. Early separation was also believed to reduce the risk of *"teats [being] scraped or damaged due to sucking..."* [1.3].

In contrast, opponents believed the calf's presence to be beneficial to the cow's health and noted that *"frequent suckling [helps to] prevent mastitis and metritis,"* [12.3] as well as milk fever. Others appeared to attribute health benefits to the cow having avoided the emotional distress of separation, as exemplified by the comment: *"It is worth consideration as to how much adverse effect this emotional trauma can cause to the physical, medical and biological health and efficiency of the mother in terms of giving*

milk,” [7.6]. Or as another participant put it, “*Allowing the cow to be with her calf certainly keeps her happy and content. I believe a happy cow produces more milk,”* [1.5c].

In this case, the available scientific literature tends to support opponents: suckling has been reported to decrease the cow’s retention of fetal membranes (Krohn et al., 1990) and has a positive effect on udder health, often through the reduction of mastitis (Krohn et al., 1990, 1999; as reviewed in Krohn, 2001). Further, overall milk yield is not reduced by the presence of calves (Metz, 1987; Flower and Weary, 2001), implying that cows can maintain high production and enjoy the health benefits associated with suckling. Whether positive health effects are also attributable to the cow’s improved emotional health is less clear. We were unable to find any evidence to address the claim that suckling is an actual risk for teat damage.

4) *A natural life*

Opponents often cited their desire for a more natural life for animals either because of inherent benefits of nature, or because a natural state has instrumental benefits in performance of natural behaviours.

Many opponents held the general belief that cow-calf pairs were what nature intended. For example, a prevalent view was that “*nature tells us the cow is born to enjoy the companionship of her calf for a certain time and vice versa...*” [16.5]. Hence opponents rejected early separation in part because “*this is not natural,*” [12.3]. Another reason suggested that early separation would hinder the development and expression of natural behaviours in the calf:

As cattle are social animals, the establishment of socialization behaviours – for example, licking and/or grooming and the self confidence toward socialization—starts at early life of the animals and thus, those calves separated early from their mothers are believed to have low socialization and [are] more stressed when mixed later with group-mates in a pen. Lastly...the suckling behaviour which has a great impact on the entire life of the calf would be hijacked by the early cow-calf separation. [16.5]

Opponent views on this theme are in keeping with the Farm Animal Welfare Council's (1997) recommendation for dairy cattle to be kept in environments permissive of natural behaviours. It is clear that systems that allow the calf to be kept with the dam, even for a restricted amount of time, allow expression of natural maternal behaviours (reviewed by Krohn, 2001). Maternal rearing also has important consequences for the calf's later social skills, as the dam is an important social model for the calf (Howery et al., 1997; Krohn et al., 1999; Flower and Weary, 2001). For example, calves raised with the dam show decreased fear of new conspecifics (with 4 days of maternal contact, Krohn et al., 1999) and interact more with other calves (with 2 weeks of contact, Flower and Weary, 2001).

5) Dissatisfaction with industry motivations

Some opponents of early separation also expressed dissatisfaction with what they perceived to be the dairy industry's motivations. For example, some viewed dairy production as wrongly prioritizing practicality or productivity over animal welfare (e.g. *"I think [that] early cow-calf separation is practiced for the purpose of reducing labour management of the owner, not for the cow-calf well-being," [16.5]*). Others maintained that any extra effort required did not sway their opposition: *"I know that keeping the cow and calf together [means] extra work for the producers. But I prefer the option of weaning the calf slowly, thinking [of] the welfare of both the calf and cow," [5]*. One reason

contextualized the practice of early separation as a symptom of a larger problem: *“our entire system of agriculture is designed around productivity, and we’ve lost track of what’s important,”* [1.6].

Some opponents considered early separation to be unacceptable because it is a profit-driven practice, a view evident from language such as *“to treat a cow as simply a money-maker is callous,”* [4.6] or *“excuses to exploit the animals for money,”* [2.8]. One respondent asked, *“Why can’t farmers treat the very thing that makes them so much money with some respect,”* [0.5], suggesting a moral obligation to provide cows with a good life in return for their provision of milk and meat (Rollin, 2010; Janzen, 2011).

6) *Changeability of dairy farming systems*

Finally, beliefs about whether dairy farms could or should change to accommodate cow-calf pairs shaped some participants’ views on separation. Some supporters tended to situate the issue within the larger context of current production systems, where early separation was the only feasible solution:

[Continued contact] is probably impossible to implement in most dairies. Dairy farms in Canada and the US would have a severe limitation of space, proper housing for cows and calves to stay together, feeding system and labor in order to try such a change...In this case, the change would probably lead to another problem. Looking at the big picture from an entire dairy operation point of view, removing the calf soon after birth is currently the practice that best minimizes the possible negative consequences. [10.8]

This view seemed to resonate with some neutral respondents who appeared unable to decide between the perceived benefits of separation and impracticality of cow-calf pairs: *“given the present circumstances of society and intensive agriculture, I don’t think it is possible...on the other hand [if evidence shows benefits for the calf]...farming units should be built to accommodate these two together,”* [1g].

In contrast, opponents were more likely to believe that dairy systems could be changed to accommodate both producer and animal needs. One reason suggested, *“consideration should be made into farm design that accommodates both the cow-calf relationship and production efficiency,”* [2.3]. A few neutral participants also reasoned, *“if most of the problems around leaving the cow and calf together are a matter of environment, why not change the environment?”* [3c].

5.5 General discussion and conclusions

5.5.1 Strengths and limitations of the current study

This study used an online platform that enabled diverse stakeholders to share their views on the issue of cow-calf separation. One advantage of this approach is that it provides a rapid, practical, and cost-effective way of reaching and collecting information from diverse groups (Danielson, 2010). Likewise, the use of mixed stakeholder groups may overcome some of the hurdles (such as cost and organizational barriers) related to carrying out face-to-face town hall meetings or focus groups. Though we collected quantitative data, these results cannot be considered representative on a regional or national scale, nor should they be extrapolated to predict participants' behaviour as consumers or as citizens. Rather, by combining quantitative and qualitative response options, we obtained results that gave a sense of the level of contention generated by the issue of cow-calf separation along with the reasoning behind these diverse views.

The platform did not require participants to directly engage with responses from previous participants. Although many participants selected reasons authored by others,

showing some level of engagement, some likely ignored the arguments of others and simply entered their own response. Another potential limitation of this approach is that more background information in favor of early separation than against was provided, and this difference may have biased participant responses in favor of support. We also acknowledge that the mere provision of background information may have primed or constrained participants. However, participants introduced new issues (e.g. the health of the cow), suggesting that the provision of the background was not limiting. We encourage future work to consider a range of engagement methods, but suggest that this online approach of collecting open-ended responses from multiple stakeholders was effective in describing a variety of themes relevant to views on this topic.

5.5.2 Bridging industry and non-industry concerns

This study recruited participants within and outside the dairy industry. It was beyond our aim to fully explain differences between the stakeholder groups who took part in the study, but the inclusion of the 5th group (consisting primarily of individuals closely connected to the dairy industry) provides some insight into how views differ between industry and non-industry stakeholders. Producers have a valuable perspective on the practices that prompt ethical debates in farming (Driessen, 2012), and those in this sample often showed nuanced reasoning in relating how they decided on their current practice. For instance, one producer acknowledged, *“I end up varying quite a bit on when I [wean] calves. I falter on whether it’s more beneficial for the calf to get that initial contact with the cow...”* [1m]. Another suggested, *“ideally you would separate them physically but not visually for 24 hours (and then remove the calf)...if they could be in close proximity but not physical contact, then that would help the cow in her*

transition..." [1n]. These comments illustrate how producers are well positioned to formulate creative methods of management that address the competing concerns.

Participants with close ties to the dairy industry and who expressed their support of early separation also tended to evaluate the practice within the larger context of the industry and viewed this issue as one of many issues to balance. In contrast, some of the non-industry participants may have been less able to see the 'big picture,' perhaps because they had little understanding of the complexity of farming, or were unwilling to make some trade-offs that supporters believed were required. Further work is needed to better understand how the connection to and knowledge of the dairy industry influences views on such practices (see Chapter 4), but perspectives from outside the dairy industry have an important role to play in the development of socially sustainable practices (Boogaard et al., 2008).

5.5.3 The role of science and values in forming solutions

We also compared views expressed by our participants to the scientific research on cow-calf separation, as policy makers often turn to science to address social concerns about animal production. In some situations, disagreements on contentious issues can be resolved by applying appropriate scientific research (Croney et al., 2012). For example, Weary et al. (2011) found that supporters of tail docking often expressed the belief that the practice improved udder health and cleanliness, despite abundant evidence showing no such benefit (see Sutherland and Tucker, 2011). This finding points the way to improved extension strategies to correct this misunderstanding among farmers, which will ultimately help inform a change in practice in keeping with societal concerns.

If we look to the literature on cow-calf separation, existing research on effects of cow-calf contact on cow health, calf social development, and natural behaviour supports prolonging the time the cow and calf spend together. At the same time, the literature is less clear on effects of separation on calf health, while findings on separation distress clearly favor swift separation. Resolving this issue will no doubt require more research in determining when and how separation is best achieved to clarify some of these inconsistencies. However, scientific efforts that address just one area of concern are unlikely to be considered persuasive by participants who prioritize other issues.

A key finding from the current study was that participants on both sides of the issue raised similar concerns, and it is here that we might focus to find ways to move forward on this issue. For example, both opponents and supporters of early separation expressed concern for the calf's well-being, suggesting opportunities for practical solutions that both sides may be able to live with. One participant suggested that changing calf management may help resolve some concerns around early separation: *"My bigger issue is that calves not be housed individually after separation, and that proper management skills be in place to make sure that calf health and nutrition is not compromised,"* [4]. This type of suggestion highlights areas of compromise that might be implemented fairly rapidly; social housing in small groups can meet many of the calf's social needs (De Paula Vieira et al., 2010; 2012) without necessarily compromising health (Losinger and Heinrichs, 1997; Hänninen et al., 2003). Providing social housing for calves would not address all the issues mentioned above, but would likely be considered a step in the right direction by some of the opponents in this study.

5.5.4 Summary

At present, it seems unlikely that science alone can bridge the gaps identified in the current study, in part because disagreements are rooted in value differences among individuals (Croney et al., 2012). Ultimately, we suggest that by bringing diverse groups together in a common forum, engagement efforts like the one described here serve as a feedback mechanism and highlight areas of disagreement that policy makers may need to address. For example, it appears that emotional distress and calf health are critical areas of concern around cow-calf separation; policy that addresses only one concern at the expense of the other is likely to be ill received, at least by some stakeholders. Ultimately, a balanced discussion that takes into account multiple perspectives is required to avoid conflict (Callon et al., 2009); from there, the industry will be able to better understand whether (and how) to change certain practices to better align with the values of multiple stakeholders.

Chapter 6: General discussion and recommendations

6.1 Overview

This thesis aimed to provide a better understanding of how key stakeholder groups perceive and value the welfare of dairy cattle. I opened with a review of farmer and other industry stakeholder concerns and values about farm animal welfare that illustrated a pronounced focus on biological health and functioning among these groups. I then critiqued the framing of industry-society engagement as something that requires the industry to educate the public in order to resolve concerns about farm animal care. This review also examined the values and concerns of lay stakeholders as citizens, showing an emphasis on natural living. The chapter closed by highlighting the lack of qualitative approaches to these questions, including how North American stakeholders value the welfare of dairy cattle.

Chapter 2 described the animal welfare concerns and values of focus group participants working in the dairy industry as farmers, veterinarians, researchers, industry leaders and service providers. Lameness emerged as the most important welfare concern, but cow comfort, disease, mortality, poor stockmanship, painful procedures, calf management and lack of behavioural freedom were also considered priority issues. The majority of these issues were considered important due to pain and stress on the animals. Thus this research demonstrated areas of shared concern not only among these diverse industry groups but also with calls from the broader public that farm animals be protected from pain and stress.

Chapter 3 sought to understand the challenges industry stakeholders faced in their work to ensure good animal welfare and implement their desired solutions for change. I again used focus groups for this study. Despite the inclusion of participants from diverse regulatory and economic environments, I found that these stakeholders perceived similar challenges to animal welfare—including assessment of welfare, external regulations, economic barriers, and farmer-, veterinarian- and researcher-related deficits in knowledge and self-efficacy. The solutions desired by all participating groups (most notably, improved education for farmers and veterinarians) provides policy makers with a list of strategies that may stand a greater chance of uptake.

Chapter 4 explored the perceptions and values of citizens external to the dairy industry through the use of surveys before and after a visit to a working dairy farm. I found that, like the industry stakeholders described in Chapters 2 and 3, citizens' values were often multi-dimensional and extended beyond the three spheres described by Fraser et al. (1997). Moreover, despite becoming more knowledgeable about farm practices, these values persisted after visiting the farm. In some cases individuals became more critical of dairy farming, in part because they became aware of practices of which they had no previous knowledge.

One such practice is the early separation of cow and calf. This practice provided a compelling case study to explore the way in which diverse groups interpret contentious issues around livestock farming. Chapter 5 used an online town-hall forum to elicit views on this issue. Supporters and opponents of this practice often traced their reasoning to similar core issues, suggesting that both sides may be able to live with certain compromises (such as more comprehensive health care and nutrition for

separated calves and housing calves in small groups to address concerns about emotionally and socially barren environments).

6.2 Success and limitations of research

6.2.1 Clarification of stakeholder priorities and values

The modernity of dairy farming today—and the framing of the animal welfare issues generated by it—has created an interesting juxtaposition between “*progress, convenience, technological innovation, efficiency and prosperity*” and “*loss of traditions, customs and values*,” (p. 261; Boogaard et al. 2011a). We see this, for example, in the move of dairy cattle away from pasture with abundant opportunities for behavioural freedom to indoor environments that provide calibrated access to feed and water, protection from the elements, and various amenities designed with the animals’ comfort in mind (automated backscratchers, to take one example). It is clear that this juxtaposition has created tension between and among the stakeholder groups studied in this thesis, with the same practices valued by some and reviled by others.

In general, farmers and others working in the livestock industries seem to be more accepting of existing practices compared to citizens outside the industry (Maria, 2006; Vanhonacker et al., 2008). It has been suggested that this gap can be explained by a divergence in values of the different groups. My research suggests that this is true to a certain extent, but value differences are probably not the whole story. Indeed, my thesis has shown that value *emphases* are variable, not just between these diverse groups but also within them.

It is becoming clear from recent research (Spooner et al., 2012, 2014a,b; Silva et al., 2013), including the research presented in this thesis, that people often hold multi-

dimensional values around animal welfare regardless of whether or not they work with livestock industries. It also seems that certain values are stronger and more prevalent in some groups than others. For example, dairy farmers and veterinarians prioritize the physical health and functioning of animals. Farmers seem to have more context-dependent attitudes to pain (particularly shorter term procedural pain when the procedure is perceived to provide other benefits to the animal), but veterinarians and others within the industry (like researchers) place more emphasis on alleviating pain regardless of the cause. Moreover, even among farmers there exist individuals who demonstrate strong concerns for pain and suffering in dairy cattle. Dairy industry stakeholders are more likely to view aspects related to natural living (at least certain elements like outdoor and pasture access) as luxuries rather than necessities for good welfare, but lay citizens emphasize natural living and close human-animal relationships in addition to good health and functioning.

There is, of course, considerable variation even within stakeholder groups. Earlier research has indicated that some citizens are critical of animal welfare on farms, while others are indifferent (Vanhonacker et al., 2008). I also found this to be true for the citizens described in Chapter 4: some were clearly unconcerned about dairy cattle welfare, while others were ardent critics of practices in dairy farming. Likewise, some farmers appear satisfied with current levels of welfare while others continually strive for improvement (Vetouli et al., 2012). Though most people interviewed in the focus groups described in Chapters 2 and 3 appeared proactive about animal welfare, I also sampled people with relatively low levels of concern. These differences underscore that membership in a given stakeholder category, while relevant, may be superseded by

other factors. I conclude that we must take a holistic view when trying to understand what informs acceptance or rejection of contentious issues in livestock production.

Finally, despite the differences in emphasis on animal welfare values observed between industry stakeholders and citizens, I observed considerable overlap in value expression among the stakeholders sampled. Notably, the farmers and veterinarians in Chapters 2 and 3 readily discussed animal pain and suffering and the need to minimize it (traditionally understood as an important public concern), while the citizens in Chapter 4 spoke of biological functioning more frequently than other animal welfare values, including natural living. These examples suggest that there is more common ground between these stakeholders than we have previously acknowledged. Indeed, this finding may be the most promising result from the body of research presented in this thesis, as it justifies the hope that the dairy industry can better align with societal values for animal welfare.

6.2.2 Clarification of relationships between knowledge, values, and acceptance of dairy and livestock farming

Throughout this thesis I have presented arguments and evidence that the informational deficit of public understanding is an inappropriate model to frame relations between the dairy industry and the public. Chapter 4 demonstrated that learning more about dairy farming did not always translate into improved perceptions of dairy cattle welfare. Indeed, learning had different effects depending on the individual in question, and for many led to increased concern. Backfiring effects of information provision have also been shown in the context of poultry farming

(Bonamigo et al., 2012). In light of this evidence, it seems unlikely that ‘educating the public’ will meaningfully address animal welfare concerns.

What makes the shift away from this model challenging (at least from an academic standpoint) is that demographic factors related to knowledge are also associated with attitudes towards farming practices. For example, there is evidence that those who live in rural areas, or who grew up on farms, are more accepting of modern farming practices than are people unaffiliated with these environments. Boogaard et al. (2011a) showed that Dutch respondents who grew up and still lived in rural areas, along with those with agricultural work experience, were most satisfied with the effects of modern methods of dairy production (taking into account not only animal welfare but also landscape and community impacts). Moreover, these groups were more likely to accept modern technology as a tradeoff for the reduction in naturalness in dairying.

People with rural and agricultural connections also tend to have more expertise on these issues (see Driessen, 2012; Benard and de Cock Buning, 2013), particularly on the day-to-day operational aspects of running a farm. However, given the evidence described in this thesis, I believe it is mistaken to conclude that this demographic is more accepting *because* they are more knowledgeable. I hypothesize that what makes those with rural and agricultural backgrounds more accepting of livestock farming is not so much knowledge but culture—specifically, the cultural environment in these communities that rewards expression of certain values over others.

Dan Kahan has explored the effect of the ‘in group’ cultural environment on perceptions of risk and acceptance (or rejection) of a given issue (Kahan and Slovic, 2006; Kahan, 2012). I believe this idea may help to better understand farmer responses

to citizen concerns. From this perspective, citizen critiques of farm animal welfare can prompt farmers to band together against a perceived external threat. Kahan aptly described this as, *“if you are one of us, believe this; otherwise we’ll know you are one of them,”* (p. 255; Kahan, 2012). This then could lead to farmers’ evaluations of *“agricultural practices not entirely on the practices’ own merits or faults, but rather through a lens of whether the practice was seen as ‘under attack,’”* (p. 398; Cardoso and James, 2012). This explanation lends context for Benard and de Cock Buning’s (2013) findings that despite engaging in prolonged frame reflection, Dutch pig farmers failed to dislodge from their original (uncritical) stances on their farming practices, even in the face of concerns from citizens who had *“a reasonable understanding of farm practices,”* (p.1022, Benard and de Cock Buning, 2013).

This type of response indicates that people with different cultures (and therefore, different values) draw different conclusions from the same evidence, not because they are irrational but perhaps because, as Kahan argued, they are *“too rational—at filtering out information that would drive a wedge between themselves and their peers,”* (Kahan, 2012). In this way, farmers avoid the social cost associated with expressing a different view from their peers. Following this line of reasoning, frame reflection exercises with farmers may be more successful if farmers are not tested in their social group.

Finally, when looking to how the public interprets information about livestock farming, Kahan (2012) provided further clarity for why lay citizens are more critical overall; because their cultural identity is not wrapped up in how they evaluate farming,

they are freer to evaluate and critique the system independent of their personal interests.

6.2.3 Addressing limitations

How relevant are my results beyond the individuals sampled? Given the nature of my work, I used convenience and purposive sampling to recruit my participants. As such, my data cannot be considered representative of broader populations, but I would argue that this is rarely the goal of qualitative research.

I accept that one of the challenges facing qualitative researchers is accessing the opinions of those who would not otherwise talk to us (Groger et al., 1999). My approach to this challenge was to specifically target individuals who were already interested in dairy cattle welfare. This was, in one respect, a matter of practicality in deference to the barriers of reaching busy and often hard-to-reach individuals. By recruiting at conferences, for example, I was able to access a geographically diverse range of people who otherwise would have taken months to organize into group discussions. These sampling strategies were also a matter of intent, as so little is known about the constructs I was interested in among North Americans. It thus made sense to start with individuals who likely held more developed views on these topics. The information gathered from these people is also of interest because the voices of those most interested in controversial issues are often those who construct and frame debates. In addition, the repetition in themes across groups drawn from diverse regions, as demonstrated in Chapter 3, suggest that at least some of the core issues of concern may be transferable to other stakeholders within the dairy (and cattle) industries.

I was also interested in the broader question of how best to engage people about farm animal welfare, and thus used a variety of methodologies. This range of methods can be used to cross validate important findings, but each of the methods used have different benefits and drawbacks.

The focus groups, for example, were used to elicit responses grounded in the complicated reality of farming amidst competing agendas and concerns. Sitting farmers next to researchers and veterinarians was reflective of the diverse set of experts working within the dairy industry who often hold different perspectives. My hope was to elicit frank responses, since participants were assumed to be among peers and thus theoretically more comfortable sharing their opinions. Efforts were also made to establish ground rules for discussion so that respectful dissenting opinions could be voiced in a safe space. That individuals who disagreed with the group did speak up indicates that our efforts were at least partially successful. That said, I do not know if this was reflective of the force of their individual personalities or if they truly felt safe in voicing dissent. One obvious weakness in the design of the heterogeneous focus groups was the lack of comments from the graduate student participants, who may have felt intimidated by the farmers and more senior academics. Ensuring that at least two graduate students were allocated to each group may have encouraged more commentary from this group. Finally, the magnitude of agreement on major issues suggests that our efforts to foster discussion amongst peers may also have generated increased pressure to conform to the group.

A strength of focus groups, like any in-person interview, was the ability to clarify participant comments or follow up with them on interesting lines of discussion. I also

found the focus group interactions to be useful in themselves, as they allowed people working in the dairy industry to interact with each other on the topic of animal welfare. I advocate for this approach as a useful form of engagement for the industry. Farm visits, on the other hand, are not likely to change the views of people who are not part of the dairy industry, but these might be useful in conjunction with other forms of engagement like that described in Chapter 5. Engaging people through online surveys have been shown to reach more diverse participants than other survey methods (Gosling et al., 2004).

6.3 Forward paths: recommendations and next steps

6.3.1 For the farmer

There exists a community around farmers ready to support them in their work. I suspect some of the hesitancy expressed by some participant farmers to access this network stems from the concern that there is insufficient respect for the constraints—economic and otherwise—faced in their daily work. The comments from veterinarians and researchers in Chapter 3 indicate that they do have a healthy respect for these constraints. These participants also displayed a desire to work with farmers to navigate through the identified barriers. I encourage farmers to form stronger alliances with these groups and be more vocal about their needs. Researchers and veterinarians in turn need to remain committed to helping foster connections and networks among farmers. The potential for peer-peer learning seems especially strong given the support I observed in the focus groups described in Chapter 3. Actions that capitalize on the willingness of farmers to learn from each other, whether through benchmarking (von Keyserlingk et al., 2012) or more directly through community projects modeled after

farmer stable schools (Vaarst et al., 2007), seem to be a promising avenue for continued improvement in practice.

As for specific welfare issues in the dairy industry, farmers need to do a better job of preventing and controlling the pain experienced by their animals. Some causes of pain are harder to address (e.g. chronic ailments like lameness and metritis) than others (e.g. procedural pain due to castration, disbudding and dehorning). In some cases the solutions are clear; for example, painful surgical procedures like dehorning should always include appropriate anaesthetics and analgesics. This thesis has demonstrated that pain control is a broadly held value among stakeholders and I argue that farmers must ensure that pain mitigation is used consistently and appropriately on their farms.

6.3.2 For the dairy industry

Kahan (2012) traced the root of science debates between society and experts to a “*polluted science-communication*” environment with sides pitted against one another and unable to truly engage on the issues. To a large extent I have seen this apply to how dairy industry and lay stakeholders interact on the subject of animal welfare. Before we can realistically address the critiques of how dairy cattle are cared for on farms in Canada and the US, we must change the environment in which these debates take place. We must encourage a sustained commitment from both industry and lay stakeholders to reframe their approach to this debate, but I think the dairy industry must take the lead here.

Increased transparency from the livestock sectors will help reduce the gap between those in favor of current practices and those in favor of reform. This may seem

counterintuitive in the face of Chapter 4's conclusion that farm visits can make people more critical of dairy farming. However, those who work with livestock, and especially those in decision-making capacities, cannot decry public ignorance about farming in one breath while supporting efforts to greenwash (or rather, "welfarewash," i.e. engaging "*in symbolic communications of [issues] without substantially addressing them in actions,*" [p. 227, Walker and Wan, 2012]) practices on the other. For example, marketing efforts to depict "happy cows" on green pasture position dairy farming as something it is not (see the California Milk Board's "Great Cheese Comes from Happy Cows" campaign, Sherman, 2002). This approach constructs an unrealistic, narrow vision of dairying and may backfire because it positions the majority of current dairy farming systems as insufficient.

There was an interesting public relations campaign by Domino's pizza a few years ago in which they responded to widespread consumer criticism of their product in the following way: they heard the critiques, they announced that these critiques resonated with them, and they went back to the drawing board to change their recipes (Ellett, 2011). Perhaps the dairy industry could apply a similar model. It is crucial, however, to note that transparency by itself will not solve the industry's problems. Transparency should be the first of a multi-step process that culminates in productive two-way communication. The dairy industry risks much if it continues to defend practices that fail to resonate with broadly held societal values. Instead, the industry should work to hear—and *respond to*—the comments that result from this openness. 'Closing the doors' only provokes reactions that there is something worth hiding. As Chapter 4 demonstrated, providing knowledge will not in itself resolve concerns, but

will allow for informed discussions that could be used to decide where the industry needs to change. Listening to the voices of stakeholders, including those external to the industry, will enable the industry to anticipate current and future animal welfare issues. It will also give the industry a chance to highlight its successes and underline values that are shared with society, providing a solid foundation for conversations about more contentious issues.

6.3.3 For the researcher

The research described in this thesis is the first step in what I hope will be a series of future projects to better understand stakeholder priorities around farm animal welfare in North America. I would like to see, for example, an expansion of the citizen farm visit study described in Chapter 4 to an online platform. The in-person farm visit—though irreplaceable in terms of providing a fully immersive experience—is not a viable engagement strategy if the goal is to reach large numbers of people. To complement this approach, I encourage the use of Amazon Mechanical Turk or similar crowd-sourcing online recruitment tools to explore similar concepts among lay citizens, with virtual tours, photographs, or other forms of information provision replacing the farm tour. Such an approach would allow us to test how different types of media frame perceptions and concerns about livestock agriculture and thus inform future engagement strategies. Crowd sourcing would also generate larger sample sizes, providing more power to detect how farm animal welfare values and other factors of interest may predict how people respond to farming systems.

With the exception of the online tool to understand conflicts around cow-calf separation in Chapter 5, the research described in this thesis did not engage industry

and non-industry stakeholders in discussions together. This is a logical next step if we are to realistically address the lack of inter-stakeholder dialogue and polarization of values on farm animal welfare. There are a variety of ways to bring these groups together, but in my view frame reflection (as described by Benard and de Cock Buning (2013) provides a particularly compelling approach. This methodology asks disparate groups to “*put themselves in the others’ shoes*,” which ultimately allowed citizens’ frames of reference to become more differentiated and inclusive of farmers’ values. To my knowledge, this approach has not yet been explored in Canada or the US with respect to farm animal welfare. This approach may, in the words of Benard and de Cock Buning (2013) help develop a “*shared vision*” for the future of animal husbandry.

6.4 Conclusion

The research presented in this thesis has used qualitative and mixed-method approaches to engage dairy industry and lay stakeholders on their perceptions, concerns and values relative to the welfare of dairy cattle. My work has identified areas of overlap and disconnect between societal and industry concerns, highlighted the relevance of values in informing support of contentious practices, and identified promising resolution strategies desired by diverse stakeholders in the dairy industry. Overall, this research provides greater clarity on which standards and practices are likely to resonate with societal values while remaining realistic for farmers. Continued commitment to open engagement between and among industry stakeholders and interested members of society is recommended to allow the industry to improve welfare on farms.

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Appendices

Appendix A: Focus group interview guide—Guelph

CEE-Ethics: Dairy Industry Views Focus Groups

GUELPH FOCUS GROUP SCRIPT

(Moderator script in italics. Main questions and follow-ups are in bold.)

Introduction:

Moderator says:

- *Welcome! Thank you all for agreeing to participate in this focus group. We know you are all very busy this week so we really appreciate your time.*
- *These focus groups are being conducted as part of our research at UBC. The aim is to run a guided discussion about the welfare of dairy cattle among folks connected to the dairy industry.*
- *I am going to ask you some questions about dairy cattle welfare. We'd like to hear your thoughts and have you discuss these openly with each other. Keep in mind that we want your own opinions, and encourage you to share examples from your own experiences.*
- *Quick rules of discussion –always be respectful, please try not to talk over each other, no side discussions, try not to judge other peoples comments, and really listen to what is being said by other participants (even if you don't agree!). We're here to have a conversation and are interested in the range of views! If someone has not voiced something that you feel is important, please do this yourself. Hearing your views contributes to the research.*
- *If you don't understand my questions, just ask me to clarify at any time.*
- *Before we begin, are there any questions or concerns you wish to discuss at this time? Also, feel free to indicate if there are any questions or topics that you do not wish to be discussed in this group*

Q1: What do you think are the most important welfare issues that affect dairy cattle?

Follow up questions:

- ***Are there any specific issues that you feel do not get enough attention in the dairy industry?***
 - ***Can you share personal experiences that led you to feel this way?***
 - **Q2: What do you think are some of the barriers that prevent dairy welfare issues from being resolved?**
 - **Q3: How do you think welfare issues in the dairy industry should be resolved?**
- Follow up question:
- Can anyone suggest any specific steps to overcome the barriers we discussed earlier?***

- **Q4:** *One of the aims of this exercise is to bring different industry stakeholders together in a conversation about dairy welfare. Around the table we have a variety of stakeholders: What roles can these different groups play in addressing these dairy welfare issues?*
Follow up questions:
-*Which of these groups should be taking leadership?*
-*Are there any groups that have not been mentioned that you think should have a role in addressing these issues?*
- **Q5:** *Should the public have a role in helping to address dairy welfare issues? If so, how?*
- **Q6:** *What do you think are the public's key concerns about dairy cattle welfare, and to what extent are these concerns valid?*
Guide point question:
• *Can you comment on what you think the public knows about dairy farming, and how this affects what they are concerned about?*

Appendix B: Focus group interview guide—Madrid

Q1: *So you all had a chance to take the online survey about your main cattle welfare concerns. We've put them up on the board, so let's keep them in mind as we move through the discussion today.*

[Walk participants through key themes that came out of the online results]

To start off, is there anything here that should be added (or deleted!) or that you'd like to comment on? [10 min max for discussion]

Q2. *Moving on, how do you see your role as an industry professional in addressing these issues that we've been discussing?*

-If group is silent, ask *"For example, the vets in the room...what do you think?"*

Follow up: ***→What are you currently doing to address these issues, and what would you like to be doing but currently are not?***

Q3. *What other important stakeholders [groups] do you need more support from in order to meet these goals (and how so)?*

Follow up: ***→Are there any other challenges to meeting your role that haven't already been mentioned?***

Q4. IF PUBLIC HAS NOT YET BEEN MENTIONED: *Should the public have a role in helping to address cattle welfare issues? If so, how?*

IF PUBLIC HAS BEEN MENTIONED: *(Name who brought it up) "Bob mentioned the public, and I'd like to explore this further: Can you elaborate on the role that the public should take?"*

**they may bring up the fact that public is ignorant or needs to be educated in this question, in which case, you can make a smooth transition to the next question, i.e. "Can you speak a little more to...(lead into Q5)*

Q5. Thank you all for your great comments so far. This is the last question for this morning's session: *What do you think are the public's main concerns about the welfare of cattle, and to what extent are these concerns legitimate*?*

**Can clarify legitimate as "should the industry take them seriously?" vs. not worth attention.*

Final: *Does anyone have any final comments they'd like to make?*

That concludes the focus group. Thank you for your participation, and we look forward to discussing more this afternoon!

Appendix C: Citizen farm tour survey

PRE-TOUR:

Welcome to the UBC Dairy Cattle Survey!

Is this your first visit to the UBC Dairy Education and Research Centre?

- ☐ Yes
- ☐ No

Please tell us a little about yourself:

1. Age (years)

- ☐ 19-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65 or Above
- ☐ Prefer Not to Answer

2. Sex

- ☐ Male
- ☐ Female
- ☐ Prefer not to answer

3. In which country do you currently reside?

- ☐ USA
- ☐ Canada
- ☐ Other _____
- ☐ Prefer not to answer

4. What best describes your highest level of education?

- ☐ High school graduate
- ☐ Vocational or apprenticeship degree
- ☐ Undergraduate degree
- ☐ Master's degree
- ☐ PhD
- ☐ Professional degree (e.g. DVM, MD, LL.B or JD)
- ☐ Other: _____
- ☐ Prefer not to answer

5. Which best describes where you have lived for most of your life?

- ☐ Urban
- ☐ Suburban
- ☐ Rural (not on a farm)
- ☐ Rural (on a farm)

- ☐ Prefer not to answer

6. Have you ever been on a commercial livestock farm?

If yes, please indicate which type(s) of farm in the blank.

- ☐ Yes _____
- ☐ No
- ☐ Prefer not to answer.

6b. Have you ever been on any other kind of farm?

If yes, please indicate which type(s) of farm in the blank.

- ☐ Yes _____
- ☐ No
- ☐ Prefer not to answer

6c. Have you ever worked on a farm?

If yes, please indicate which type(s) of farm in the blank.

- ☐ Yes _____
- ☐ No

7. How knowledgeable are you about dairy farming?

- ☐ Very knowledgeable
- ☐ Somewhat knowledgeable
- ☐ Not knowledgeable
- ☐ Prefer not to answer

8. How many years have you lived with a household pet?

- ☐ I have never lived with a pet
- ☐ Less than a year
- ☐ 1-5 years
- ☐ 5 or more years
- ☐ Prefer not to answer

9. Do you consume dairy products?

If no, please share why:

- ☐ Yes
- ☐ No _____
- ☐ Prefer not to answer

10. Write up to five (5) words that come to mind when you think about dairy farming:

11. In your opinion, what does a dairy cow need in order to have a good life?

12. How confident are you that dairy cows generally have a good life?

- ☐ Very confident
- ☐ Confident
- ☐ Neutral
- ☐ Not confident
- ☐ Not at all confident
- ☐ Prefer not to answer

12b. Feel free to comment on your above answer:

13. What (if any) concerns do you have regarding the quality of life for dairy cattle?
Please rank up to three (3) of your top concerns, and indicate why they concern you:

What's your dairy cow know-how?

True or False: Dairy cows in Canada are routinely administered hormones to increase their milk production.

- ☐ True
- ☐ False

True or False: A dairy cow needs to have a calf to keep producing milk.

- ☐ True
- ☐ False

True or False: Dairy cows in British Columbia are routinely tied in their stall in the barn.

- ☐ True
- ☐ False

How many days after birth does the dairy calf typically stay with its mom?

- ☐ 0 days
- ☐ 1 week
- ☐ 1 month
- ☐ It never leaves mom

True or False: All dairy cows in British Columbia are allowed access to pasture.

- ☐ True
- ☐ False

Which best describes what most adult cows are typically fed on dairy farms?

- ☐ Pre-mixed feed
 - ☐ Grass
 - ☐ Milk
-

POST VISIT

Now that you've visited the UBC Dairy Education and Research Centre, we have a few more questions...

Please enter your participant ID number to proceed:

1. Please check off all stations you visited during the tour:

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8

2. Now that you've toured the farm, write up to five (5) words that come to mind when you think about dairy farming:

3. What, if anything, surprised you about the way animals are cared for on this farm?

4. Do you feel that animals on this farm have a good life? Why or why not?

5. Fill in the blank: "In my opinion, the animals on this farm seem to have _____ lives than animals on other dairy farms in British Columbia."

- ☐ better
- ☐ about the same
- ☐ worse
- ☐ unsure

6. Now that you have toured this farm, please share any concerns you have about the quality of life for dairy cattle, in general or on this farm:

7. To what extent do you feel that your concerns are shared by the dairy industry?

Now that you've toured the farm, show off your "dairy cow know how"!

True or False: Dairy cows in Canada are routinely administered hormones to increase their milk production.

- ☐ True
- ☐ False

True or False: A dairy cow needs to have a calf to keep producing milk.

- ☐ True
- ☐ False

True or False: Dairy cows in British Columbia are routinely tied in their stall in the barn.

- ☐ True
- ☐ False

How many days after birth does the dairy calf typically stay with its mom?

- ☐ 0 days
- ☐ 1 week
- ☐ 1 month
- ☐ It never leaves mom

True or False: All dairy cows in British Columbia are allowed access to pasture.

- ☐ True
- ☐ False

Which best describes what most adult cows are typically fed on dairy farms?

- ☐ Pre-mixed feed
- ☐ Grass
- ☐ Milk

Thank you so much for your participation! Any feedback you have is greatly appreciated.