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USING THE HEALTH BELIEF MODEL (HBM) TO UNDERSTAND THE BELIEFS AND ATTITUDES OF ONTARIO BEEF PRODUCERS: THE CANADIAN BOVINE SPONGIFORM ENCEPHALOPATHY (BSE) SITUATION

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Michelle Marie Ruth McMullen

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By

Michelle Marie Ruth McMullen

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ABSTRACT

USING THE HEALTH BELIEF MODEL (HBM) TO UNDERSTAND THE BELIEFS AND ATTITUDES OF ONTARIO BEEF PRODUCERS: THE CANADIAN BOVINE SPONGIFORM ENCEPHALOPATHY (BSE) SITUATION

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This study uses the Health Belief Model (HBM) as a framework to determine the attitudes and beliefs of Ontario beef producers concerning the bovine spongiform encephalopathy (BSE) situation in Canada and to determine preferred producer sources for agricultural information. Data from beef producers across four counties in Ontario were analyzed using a coding scheme based on the HBM and knowledge categories. Thought units (n=4974) gathered from questions asked in the four focus groups (n=28) uncover beliefs and attitudes about severity, susceptibility, barriers, benefits, and self-efficacy as well as knowledge concerning BSE, media preferences, behavior, and stigma.

Findings showed that participants perceive the BSE issue as very serious, but do not feel that their own cattle are susceptible to BSE. Many said that they believed that the BSE government protocols did reduce the risk of BSE and had the ability to follow BSE protocols, but would weigh all options before following the recommended behaviors. In addition, perceived barriers to complying with BSE protocols included a lack of resources and the potential negative impact a BSE-positive animal would have on the industry. Perceived benefits included increased awareness of consumers about food safety, the availability of a safer beef product, and identification of new export markets. Implications for message design are discussed.

DEDICATION

This thesis is dedicated
to my parents, Jim and Marie-Paule,
whose love, support, and encouragement
helped me achieve my academic dreams.

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CHAPTER ONE

INTRODUCTION

In recent years, risk communication has shifted to become a focal point of the agriculture and agri-food production system (Scherer & Juanillo, 1992). Agricultural risks related to food safety such as pesticides and genetically modified foods (Miles & Frewer, 2001) and recent outbreaks of foodborne illnesses including bovine spongiform encephalopathy (BSE), dioxin, *E.coli*, and salmonella are all issues that may negatively affect consumer confidence in agricultural practices (Schlundt, 2002). Society's dependence on agriculture makes it a unique type of business and industry. The relationship between agriculture and society are interdependent, best described as a two-way street. In one direction, society is dependent on the agricultural community for food production. While in the opposite direction, the agricultural community has become more dependent on public perceptions, which, in turn, shape policy development and control agricultural practices (Wimberley, 2002). Food safety is becoming an increasingly important part of public health initiatives, which strengthens its link to agriculture and other aspects of the food production chain from the primary producer to the consumer (Schlundt, 2002).

Agricultural producers have become more susceptible to social risks in recent years. Research in agriculture is needed to reduce the social risks associated with production practices and to heighten or maintain agricultural sustainability for both the farming and non-farming publics (Wimberley, 2002). Thus, it is important that risk communication efforts also target primary producers. Primary producers are first in the food production chain, from field to fork. BSE is a one of the social risks that is currently

facing Canadian beef and dairy producers. Other social risks facing the farming community include: farm injuries and fatalities (Arcury, Quandt, 1998; Freeman, Schwab, & Pollard, 2003), exposure to pesticides (Martinez, Gratton, Coggin, Rene, & Walker, 2004; McDuffie, Pahwa, Spinelli, McLaughlin, Fincham, Robson, et al., 2002), and access to appropriate health care (Martinez-Brawley & Blundell, 1991). Therefore, theoretically driven formative evaluations about farmers' attitudes about BSE are needed to increase the effectiveness of risk communication efforts with farmers (Witte et al., 1993).

One major issue facing the Canadian livestock industry, especially the beef and dairy sectors, is the discovery of BSE in Canada. BSE is a rare fatal neurological disease in cattle, first diagnosed in the United Kingdom (U.K.) in 1986 (Animal Health Risk Analysis (AHRA), 2002; Environmental Literacy Council (ELC), 2004; World Health Organization (WHO), 2002a). Canada's first homegrown BSE case was discovered in May 2003 on an Albertan farm. In December 2003, BSE was confirmed in a cow in the state of Washington, and two additional Canadian cattle were identified as BSE-positive in January 2005. BSE is characterized by its long incubation period of approximately 5 to 6 years, which ends in the death of the animal. Currently there are no tests on live animals to confirm infection or treatment (WHO, 2002a).

BSE was recognized as a societal risk in 1996, during the BSE epidemic in the U.K. During the epidemic in the U.K., scientists revealed a probable link between BSE and the variant Cruetzfeldt-Jakob disease (vCJD) in humans, making BSE a possible threat to public health. Research has linked vCJD in humans to eating meat contaminated by BSE (WHO, 2002b), which has implications for communicating about risks.

What is Risk?

'Risk' is a term with multiple meanings, and the definitions differ by contexts. In the context of health and the environment, risk incorporates two principles: (a) the probable risk situation has the potential for undesirable consequences, and (b) there is uncertainty regarding the potential negative consequences. In other words, 'risk' in these contexts embodies both the probability and the characteristics of the risk occurring (Jardine & Hrudey, 1997). Social scientists also argue that risk is a social construct that means different things to different individuals. The social context of risk issues should be incorporated into all aspects of risk analysis (Lundgren & McMakin, 1998), and should be considered in risk communication efforts.

BSE and Risk Communication. Risk communication is a relatively new area of study, which limits the amount of empirical research available to risk communicators (Lundgren & McMakin, 1998). Risk communication efforts in agriculture are based on the transfer of information between regulators, stakeholders, and interested groups such as the general public and primary producers (Schlundt, 2002). The National Research Council (NRC) (1989) defined 'risk communication' as:

"an interactive process of exchange of information and opinion among individuals, groups, and institutions. It involves multiple messages about the nature of the risk and other messages, not strictly about risk, that express concerns, opinions, or reactions to risk messages or to the legal and institutional arrangements for risk management" (p. 21).

Communicating uncertainty, especially in the food safety arena, has been debated extensively in recent years. For example, BSE is a relatively new disease, and there is

much uncertainty concerning the science of BSE and other transmissible spongiform encephalopathies. The threat to humans from BSE is largely unknown (WHO, 2002a).

Miles and Frewer (2001) state that risk regulators need to ensure that risk communication efforts regarding food-related issues are relevant and salient to the general public, by identifying and focusing on their concerns. Furthermore, Miles and Frewer (2001) argue that the effectiveness of risk communication efforts must be evaluated to determine the impact of messages on the salient concerns of the public.

Purpose of the Study

The purpose of this study is to improve risk communication, paying particular attention to making information-based messages accessible and understandable to producers. Theoretically driven research will determine the factors that are important to Ontario beef producers when assessing risks associated with BSE.

Food quality and safety are the responsibility of all components of the food production chain, from production to consumption (NRC, 1998). This study will focus on enhancing communication with the farming community and will help ensure high quality, safe products reach consumers and maintain or improve animal health. Research to guide health message design has been conducted to determine consumers' beliefs and attitudes about food safety such as risks and benefits associated with BSE (Weitkunat et al., 2003) and genetically modified foods (Silk, Parrott, & Dillow, 2003).

Little message design research has been conducted with beef producers regarding the risks associated with BSE, and effective communication campaign development targeted at producers is non-existent. Thus, this study, using the HBM framework, will identify what influences farmers' decision-making about BSE. Identification of the HBM

constructs that influence decision-making will lead to improvements in risk message design for the agricultural community. Improved message design will in turn, increase the likelihood of accurate messages effectively reaching Ontario beef producers and may result in the adoption of desired behavior. Furthermore, the findings from this study may be beneficial to guiding the development of appropriate messages in response to other agricultural-based issues.

Study Objectives. The objectives of this study are:

1) To investigate and assess Ontario beef producers' attitudes toward risk, using the HBM as a framework.
2) To identify the information sources used by Ontario beef producers.

To gain insights concerning the HBM components that most influence message appropriateness when communicating about risk issues, it is critical to understand the attitudes, beliefs, and opinions of beef farmers to help determine communication strategies for effective risk communication with Ontario farmers about BSE. Attitudes are defined as "positive or negative evaluations of a person, object, or event" (Murray-Johnson & Witte, 2003, p. 485). Beliefs are defined as "the thoughts about a person, object, or event that are either true or false" (Murray-Johnson & Witte, 2003, p. 486).

Research Questions. This study will answer the following research questions:

1) What do Ontario beef producers report as their preferred sources for agricultural information? (RQ 1)
2) What attitudes do Ontario beef producers have regarding their susceptibility or vulnerability to BSE? (RQ 2)

3) What attitudes do Ontario beef producers have toward the perceived severity of the BSE issue in Canada? (RQ3)
4) What do Ontario beef producers report as benefits to discovering BSE in Canada and following BSE protocols established by the Canadian government? (RQ 4)
5) What do Ontario beef producers report as barriers to following BSE protocols established by the Canadian Government? (RQ 5)
6) What attitudes do Ontario beef producers have toward the effectiveness (response-efficacy) of the BSE protocols established by the Canadian government? (RQ 6)
7) What attitudes do Ontario beef producers report as their ability (self-efficacy) to comply with BSE protocols established by the Canadian government? (RQ 7)

Outcomes of this study will help communicators develop effective risk messages for BSE to enable farmers make informed decisions about BSE based upon their knowledge and perceptions of the risk. Results from this study will also provide baseline data for further research.

Study Limitations

This study will be geographically limited to beef producers in Grey, Lanark, Renfrew, and Wellington counties in Ontario. Therefore, the data and results produced cannot be generalized to farmers across Ontario or Canada. The conclusions from this study will be used to provide a baseline understanding of the ways that farmers assess

risk. Baseline data from this study could be used to conduct survey research over broader geographic areas.

CHAPTER TWO

LITERATURE REVIEW

What is Risk Communication?

Risk communication is defined by Trautman (2001) as "a complex undertaking involving multiple participants, perspectives, and messages" (p. 1130). Risk analysis is typically more scientific in nature and technical experts such as scientists can successfully interpret the issues (Palenchar & Heath, 2002). Risk communication addresses technical or scientific evaluations of risks, the perceptions of the non-scientific or lay public, and recommended behaviors to reduce or eliminate the risk and society's tolerance of the risk (Palenchar & Heath, 2002). Palenchar and Heath (2002) define risk communication strategies as addressing actual risks, society's perception of risks, and the content of the society's thoughts and comments. Risk analysis has three components: risk assessment, risk management and risk communication. Typically, risk analysis is seen as a linear progression moving from risk assessment to risk management to risk communication. Risk communication appears be the final component, but the most effective risk communication efforts occur through the risk analysis process of evaluating and managing risks and involving all stakeholders in the process (Trautman, 2001).

According the Office International des Epizooties (OIE), World Health Organization (WHO), Food and Agriculture Organization (FAO) (2001) risk communication is a vital aspect of risk analysis because "safety is a negotiation about the acceptability of risks by those who are the bearers of the risks" (p.15) and continue to

define risk communication as the "process by which this acceptance is established and maintained" (p.15).

Traditionally, risk communication has been driven by experts' perceptions of public information needs. Specifically, in some cases experts seem to believe that the public is unable to understand uncertainty and that providing them with the facts or scientific information will have a negative impact on society's perception of a risk and attitudes related to the risk (Frewer et al., 2002).

Risk communication efforts cannot be effective without considering the emotions, beliefs, and political stance of the target audience (Lundgren & McMakin, 1998). Furthermore, perceptions of risks such as BSE, can differ considerably depending on the stakeholder group, meaning that risk communication efforts should be based on a solid understanding of the key aspects of the risk that are of greatest concern to the target audience, through stakeholder involvement and consultation (OIE, WHO, & FAO, 2001).

Uncertainty is the defining characteristic of most health scares, with the degree of the risk varying depending on the length at which the uncertainty of the health risk lasts (Anand, 1998). For example, the BSE issue illustrates the problems and challenges of decision making and developing appropriate regulations under the condition of uncertainty. A scientific link has been established between BSE and the new variant Creutzfeldt-Jakob disease (vCJD), also known as the human form of BSE, but still little is known about the science of this very recent public health issue. The medical community first classified the BSE issue as a veterinary issue, while veterinarians believed that it was a government and public health issue (Ratzen, 1998). BSE has been examined and

discussed beyond the context of agriculture. The BSE issue has transformed into a social and public health issue with increases in the number of cases of vCJD (Anand, 1998).

Scientists have found that the BSE agent (abnormal prion protein) has caused similar diseases in other animals such as domestic cats and exotic animals, with transmission most likely from the consumption of BSE-contaminated feeds. The spread of spongiform encephalopathies across species has heightened concerns about possible threat to human health (Harpold, Levy, & Savage, 1998). However, without complete scientific knowledge about the biology of BSE and vCJD, it is not possible to accurately predict the probability of an individual becoming exposed and infected (Harvard Center for Risk Analysis (HCRA), 2003). It is necessary for risk communication efforts to be theoretically grounded and appropriate for the target audience to ensure messages reach the receivers and contain accurate information, including any uncertainties about the risk issue.

The Canadian Beef Cattle Industry - An Overview

The Canadian agricultural and agri-food industry, valued at $130 billion (CDN) is a key player in the economy, ranking second only to the manufacturing sector. One in seven Canadian jobs are found in the agriculture and agri-food sector (Animal Health Risk Analysis (AHRA), 2002).

In 2002, the beef industry accounted for more than $7.57 billion in farm cash receipts (Canadian Beef Export Federation (CBEF), 2003), with over 3.4 million head of cattle processed by Canadian beef and veal packers. Currently, Canada exports approximately 50 percent of the cattle it produces, to key markets in the United States (U.S.), Mexico and Asia. One million head of live cattle have been exported to the U.S.

annually (AHRA, 2002). Seventy-seven percent of exported Canadian beef was sent to the U.S. Since 1970, total beef production in Canada has increased 78 percent to a level of 1.51 million tons (AHRA, 2002).

The Canadian beef industry typically follows an 11-year growth cycle, which is followed by contraction from market supply-and-demand pressures. Canada's cattle population has remained stable over recent years. In July 2001, 14.7 million cattle were raised compared to 14.6 million cattle in July 1995 and 14.9 million in July 1997. The Canadian beef production is concentrated in Western Canada, with Alberta and Saskatchewan having the largest beef population (AHRA, 2002).

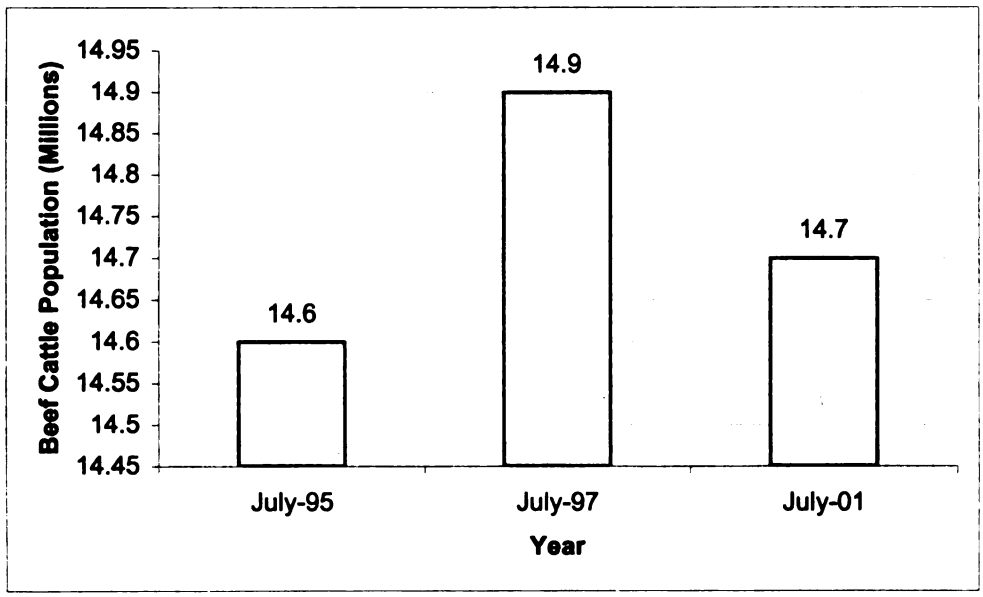

Figure 1: Canadian Beef Cattle Population July 1995, July 1997, and July 2001

In January 2003, the Canadian population of beef breeding cows and heifers was 5.27 million. Beef cattle represent 75 percent of Canada's cattle population and for the most part are not fed meat-and-bone (MBM); high producing dairy cattle are typically fed protein supplements containing MBM (AHRA, 2002). Canada's entire beef herd is based upon *Bos taurus* animals, which includes breeds such as Herefords, Angus, Charolais,

Simmental, and Limousin. *Bos indicus* cattle such as Brahna and Cebu are not part of the Canadian beef herd (CBEF, 2003).

Importance of Trade to the Canadian Beef Industry. Before the trade restrictions placed on Canadian beef, Canada was the third largest exporter of beef in the world. In 2001, Canada held approximately 15 percent of the world beef market. Following the ban, Canada's exports dropped to zero. (Statistics Canada, 2003)

Due to restructuring in the Canadian/U.S. market, trade has increased in both directions, resulting in Canada developing a strong trade surplus of cattle and beef. Canada's export volume of beef and veal to Asia and Mexico increased 5 percent in 2001 and an additional 10 percent in 2002, meaning that approximately 70 percent of cattle and beef production were exported. Roughly 72 percent of Canadian beef products are shipped to the U.S. market (CBEF, 2003).

Canada is an important importing and exporting country for beef products and live cattle. In 2002, Canada exported approximately $4 billion and imported approximately $1 billion in beef products and livestock, respectively (Agriculture and Agri-Food Canada, 2004). Canada's exporting success has relied predominately on the U.S. market. The U.S. is Canada's top trading partner. The majority (99.6 percent) of Canada's livestock exports went to the U.S. in 2002 (Statistics Canada, 2003).

The continued population growth of beef cattle in Canada and the moderate growth potential in the Canadian market for beef products, makes trade a very important consideration, which can only be continued through market growth for beef products. Canada has identified such opportunities in Japan, South Korea, Mexico, Taiwan, Hong Kong, China, South East Asia, and the U.S. (CBEF, 2003).

Beef Slaughter in Canada. Ninety-five percent of Canadian beef slaughter happens in federally inspected plants, which are the only mandated operators permitted to transport meat products across provincial and international borders. More than 70 percent of Canadian beef slaughter in federally regulated plants occurs in Alberta. Approximately, 2.6 million pounds of Canadian beef was processed from federally inspected processing plants in 2002. The other 5 percent of animal slaughtering occurs in provincially inspected plants. Alberta, Ontario and Quebec require that all cattle be inspected before slaughter. In addition, Canada exported approximately 1.1 million young beef cattle and 174,000 cull cows and bulls to the U.S. in 2000 for slaughter (AHRA, 2002).

Approximately 85 percent of cattle are slaughtered at a young age, under the age of 30 months, meaning that it is less likely that the cattle will develop BSE, even if BSE is present in Canada (AHRA, 2002).

What is BSE?

BSE is a fatal neurological disease in cattle that was first diagnosed in the UK in 1986. BSE is part of a group of slowly progressive neurodegenerative disorders that are classified as transmissible spongiform encephalopathies (TSE) (AHRA, 2002; Environmental Literacy Council (ELC), 2004; Woodgate, 1996). Within herds, BSE is not contagious and cannot spread from animal to animal. Isolated cases cannot ignite an epidemic if infected cattle are destroyed and the carcass of the infected animal is not rendered for use in feed (WHO, 2002a).

TSE are fatal diseases, with no method of diagnosis before death and no known treatment. TSE are slowly developing diseases, where the infective agent appears to

move from peripheral tissues to the central nervous system. The TSE agent has been located in all tissues of the body, but higher concentrations of the agent have been identified in the brain and spinal cord areas (Dealler, 1998). Other diseases in the TSE family include: scrapies in sheep, TME in mink, and Kuru, a TSE found in humans native to Papua New Guinea (Woodgate, 1996).

Raiden, Sumner and Pierson (2001) reported that three cellular changes occur in all TSE diseases. One change that occurs is the degeneration of neurons, which are responsible for producing and sending out nerve impulses. This change explains the loss in motor skills, which is a symptom of BSE. Another cellular level transformation is the enlargement of astrocytes, which are the most abundant support cell found in the nervous system. Astrocytes make exchanges between capillaries and neurons possible, which presents antigens during immune responses and control the chemical environment of the nervous system. The third cellular level change is the sponge-like appearance of the brain.

There are aspects of the science of BSE and its emergence that are still unknown; however, the theory that is most supported by the science community is the prion theory (Ratzen, 1998). This theory suggests that BSE is caused by a structurally modified form of the cell-membrane-associated prion protein, which has the capacity to promote changes in additional normal prion molecules into an abnormal form. An increase in these abnormal prion molecules in a cell interferes with normal cell function, which contributes to the development of typical spongiform changes and eventually results in cell death. This abnormal prion protein is resistant to heat, ultraviolet and ionizing radiation and extensive range of common chemical disinfectants (AHRA, 2002).

Symptoms of BSE. BSE is very difficult to diagnose because there are a number of different symptoms and not all cattle display all symptoms linked to the disease (Raiden, Sumner, & Pierson, 2001). BSE infected cattle can display a number of symptoms including nervousness or aggressive behavior, abnormal posture, lack of coordination or difficult standing up from a lying position, decreased milk production, and weigh loss accompanied with an increase in appetite. These symptoms may not be observable to farmers and veterinarians until two to six months before the animal dies (CFIA, 2003a).

In the early stages of this disease, infected cattle are mentally alert, but unusually anxious and hesitant. Symptoms typical during the later stages of the disease include a wide-base stance while standing still, drawing up of the abdomen, an elongated way of walking, and splaying at the hind limbs when turning sharp corners. In addition, cattle can display skin wounds, firm feces, vigorous and repetitive jerking of small muscles all over the body, a change in the tone of the "moo", and aimless head butting and other frantic movements (Raiden, Sumner, & Pierson, 2001). The behavioral traits of advanced BSE are widely recognized, meaning that only a farmer familiar with their herd may be able to detect the early signs of BSE (Loader & Hobbs, 1996).

BSE risk to human health. There is a strong likelihood that the spread of BSE to humans has occurred, but the link between BSE and Creutzfeldt-Jakob disease (vCJD) still has not been proven. The potential negative impact of this disease on animal health and its probable transmissibility to humans is very important, as there are no known treatments or tests to screen for TSE in humans (Dormont, 2002; Health Canada, 2003a; Health Canada, 2004; Weitkunat et al., 2003; WHO, 2002a). Furthermore, other health

factors intensify the risk of BSE such as the invisibility of the disease - only after death can a positive diagnosis of BSE and vCJD be confirmed from brain tissue; the long incubation period associated with transmissible diseases; BSE or vCJD are fatal diseases with no known cure. Lastly, the potential spread of the disease across the global has lead to subsequent trade restrictions with confirmed BSE-positive nations, until the disease is controlled or eradicated (Richardson, 2001; WHO, 2002b).

vCJD is a degenerative brain disease that affects the central nervous system in humans, thought to be caused by an abnormal prion protein in the brain. Infectious tissues include the brain, spinal cord, pituitary gland and parts of the eyes. In vCJD, tonsil and appendix also have high infectivity (Health Canada, 2003b).

vCJD is mostly likely contracted from eating BSE infected beef products (Health Canada, 2004; Weitkunat et al., 2003; WHO, 2002b). In order to contract vCJD, humans must actually eat the brains of an infected cow. Due to the threat posed by BSE, practices such as including brain and nervous system tissue in food products has been largely discontinued (ELC, 2004). The majority of individuals diagnosed with vCJD typically die within a year following the onset of the disease (Center for Disease Control, 2003).

The transmission of vCJD between people is not well understood and no cases of this kind of transmission have been reported. Symptoms of vCJD included psychiatric symptoms such as anxiety, depression, withdrawal, and behavioral changes; development of persistent pain or odd sensations in the face or limbs; onset of motor difficulties, involuntary movements and mental deterioration in later stages of the disease (ELC, 2004; Health Canada, 2004). The period between initial exposure to vCJD and the onset

of symptoms is thought to be 10 to 15 years, but could be longer (Harpold, Levy, & Savage, 1998). Scientists speculate that vCJD in humans has resulted is approximately 145 deaths in the U.K. since the beginning of the BSE epidemic (ELC, 2004). In Canada, the first case of vCJD was confirmed in August 2002. However, all evidence indicates the individual contracting the disease in U.K. No other cases in Canada have been confirmed (Health Canada, 2004).

Background on the Canadian BSE situation

There have only been four confirmed cases of BSE in Canada. The first case was identified in 1993 in a beef cow imported from the United Kingdom (UK), resulting in the culling of the herd, all offspring and remaining cattle imported from the UK (AHRA, 2002). The first domestic case of BSE in North America was confirmed on May 20, 2003 (CFIA, 2004a). Two additional cows were confirmed as BSE-positive in January 2005 (CFIA, 2005a, CFIA, 2005b).

The First BSE-Positive Cow in Canada. The first BSE-positive animal was a six to eight year old cow that was sent for slaughter in Alberta in January 2003 (OMAF, 2003). The animal came from a Saskatchewan farm and all animals from this farm were culled during the investigation (CFIA, 2004b). The cow suffered from pneumonia and was sent for rendering (OMAF, 2003), a process "where animal by-products are prepared or treated for use in, or converted into fertilizers, animal food, fats or oils, other than fats or oils used for human consumption, or where such substances are stored, packed, marked, and shipped" (CFIA, 2003h). The cow was reported as not showing symptoms associated with BSE (OMAF, 2003). The diagnosis of BSE in a single cow on a farm in

Alberta, which led to the disruption of Canada's export markets, resulted in state of chaos for the Canadian beef industry (Daynard, 2003).

In Ontario, the discovery of the Albertan BSE-positive case led to immediate and direct producer losses estimated at approximately $4 million (CDN) per week, with losses to truckers, packers, auction barn operators and other agricultural players totaling approximately $23 million (CDN) (Daynard, 2003). This case led to trade restrictions with the United States. The United States Department of Agriculture (USDA) immediately closed its borders to Canadian beef and ruminant-derived products (APHIS, 2003).

Canada's Response to First BSE-positive Animal. A comprehensive investigation was conducted by the Canadian Food Inspection Agency (CFIA), which included trace-back, trace-forward and feed investigations spanning four provinces. Approximately 2,000 cattle were tested, with negative results in all cases (CFIA, 2003b). The animal was condemned at slaughter and no meat from its carcass entered the food system. The animal's remains were sent to a rendering plant. The rendered product revealed that some of the remains of the infected cow were processed into poultry feed. The CFIA identified three farms in British Columbia that had acquired the contaminated feed. Consequently, these farms were quarantined because conclusive evidence was not gathered to prove that ruminant animals were not inadvertently exposed to the feed (CFIA, 2004b). More than 2,700 cattle were killed during the investigation (CFIA, 2003e). Investigations revealed that some herds where the cow resided had access to feed concentrates and/or high energy feed blocks, which may have contained MBM prior to the feed ban (CFIA, 2003e). In January 2003, the Canadian Government announced

that BSE surveillance testing would be increased to 8,000 cattle in the first year and up to 30,000 annually in later years, which would calculate the prevalence of BSE in Canada (CFIA, 2004c).

Canadian Publics' Responses to BSE. Canada is the only country worldwide known to have an identified single case of BSE and actually observe an increase in the consumption of beef products. In July 2003, consumption statistics indicate that Canadians were confident in buying beef, with record sales and consumption of beef products. The consumption rate of beef increased 62 percent in July 2003 in comparison to July 2002 figures (Daynard, 2003).

Trade Restrictions. The confirmation of one-BSE positive animal in 2003, initially led to trade restrictions for all live ruminants, ruminant-derived meat and meat products, and other ruminant products from Canada by more than 30 countries including the U.S. and Mexico (CFIA, 2004b; OMAF, 2003). This trade restriction had a deep economic impact on the Canadian beef industry and individual beef producers (Ontario Agricultural Economics and Business Research and Services Committee (OAEBRSC), 2004).

In the Fall 2003, the opening of the U.S. border to limited imports of beef products, temporarily strengthened beef prices and increased optimism among the Canadian Agri-food system (OAEBRSC, 2004). Mexico also lifted restrictions on certain beef imports. However, live cattle are still not eligible for export to the U.S. and Mexico (CFIA, 2004b). In September 2003, Canada was able to ship boneless beef from animals under the age of 30 months to the U.S. under a special permit (Statistics Canada, 2003). Additionally, a number of Canada's smaller export partners, Antigua and

Barbuda, Barbados, Jamaica, Philippines, Russia, and Trinidad and Tobago have partially lifted their trade bans on Canadian beef products (Statistics Canada, 2003). To re-establish active trade, Canada is required to demonstrate a low prevalence of BSE through progressive surveillance and BSE testing (OMAF, 2003).

Confirmed BSE Case in Washington State. In December 2003, a cow in the state of Washington was confirmed as having BSE. Through a comprehensive investigation, the animal's origin was traced back to a farm in Alberta. The animal was born in April 1997. The CFIA conducted an investigation of the feed to identify all feeds fed to the animal to determine if any feed containing MBM was included in the animal's diet. The investigation determined that MBM exposure through feed acquired prior to the feed ban was responsible for this case (CFIA, 2004d). Following OIE guidelines, all animals born one year before and after this case were culled. In total, 12 animals were killed and tested for BSE. All tests came back negative (CFIA, 2004d).

Second Confirmed Case of BSE in Canada. On January 2, 2005, the CFIA confirmed Canada's second homegrown BSE-positive cow. The animal was identified through Canada's BSE Surveillance Program. The infected animal was born in 1996, before the implementation of the 1997 feed ban. The CFIA suspects that the animal contracted BSE from contaminated feed acquired before the feed ban (CFIA, 2005c). The animal was an eight-year old dairy cow from Alberta (CFIA, 2005a).

No part of the animal entered the Canadian food supply or animal feed system. The animal's farm origin was identified and all cattle on the farm were quarantined. The farm operator provided detailed records for all animals on the farm to the CFIA, which may have contributed to a quicker investigation. The CFIA investigation will identify the

location of the cow's most recent offspring and all animals on the farm that were born within a year of the infected cow (CFIA, 2005a).

Third Confirmed BSE Case. On January 11, 2005, the CFIA announced that BSE was found in an Alberta beef cow just under the age of seven. No part of the animal entered the Canadian food supply. The CFIA has speculated, based on preliminary information that the source of infection was most likely from feed containing MBM, prior to the feed ban (CFIA, 2005b).

Canada as Minimal Risk Country. Canada is classified as a minimal risk country as defined by the Office International des Epizooties' (OIE) Terrestrial Animal Health Code. According to the OIE, a nation is classified as minimal risk based on the primary criteria that there have been less than two BSE-positive animals per one million animals in each of the last four consecutive 12-month periods in cattle over the age of 24 months (CFIA, 2003c).

Acts and Regulations Governing BSE in Canada.

The Ministry of Agriculture and Agri-Food is responsible for providing overall direction to the CFIA, who is responsible for administering and enforcing the acts and regulations designed to prevent and eradicate BSE in Canada. The acts and regulations relevant to the BSE issue are: the Health of Animals Act and Regulations (1990); the Feeds Act and Regulations (1985); the Meat Inspection Act and Regulations (1985); and the Agriculture and Agri-Food Administrative Monetary Penalties Act and Regulations (1995).

The Health of Animals Act. The Health of Animals Act regulates animal diseases and toxic substances and works to prevent the introduction of new animal diseases into

Canada or to control or eradicate disease that may negatively affect public health or adversely impact the Canadian cattle industry. Furthermore, this act ensures the humane treatment of animals during transportation. The Health of Animals Regulations spells out the requirements related to preventing, controlling and eradicating animal diseases and the humane handling of animals during transport (AHRA, 2002).

The Meat Inspection Act and Regulations. The Meat Inspection Act and Regulations controls international trade and trade between provinces of meat and meat products; the registration of abattoirs, processing/packaging plants and cold storage facilities; federal inspection of animals and meat products at registered abattoirs, processing/packing plants and cold storage facilities; and standards for slaughtering and any meat products produced in these locations (AHRA, 2002).

The Feed Act. The Feed Act regulates any animal feed manufactured, imported or sold for livestock consumption. In Canada, feeds can only be manufactured, sold or imported if they are registered (with a few exceptions), meet approved standards, and are properly labeled. In addition, this Act also controls the ingredients that can be used in livestock feed (AHRA, 2002).

The Agriculture and Agri-Food Administrative Monetary Penalties Act. The Agriculture and Agri-Food Administrative Monetary Penalties Act creates a reasonable administrative monetary penalty system used to enforce the Agriculture and Agri-Food acts and regulations. This Act is designed to increase compliance and provide immediate enforcement and remedial action (AHRA, 2002).

Actions taken by Canada in response to confirmed BSE case

Experts concluded through epidemiological evidence that the first homegrown case of BSE was the result of the animal being exposed to the BSE infectious agent through contaminated feed, prior to the 1997 feed ban. Actions taken by the Canadian government to prevent, control or eradicate BSE include: implementing a feed ban on ruminant-to-ruminant feeding in 1997; creating a National BSE Surveillance Program; requiring the specified risk materials are removed to reduce the risk of BSE to human health (CFIA, 2003d); and implementing a Canadian Cattle Identification Program (CFIA, 2003f).

Feed Ban. In August 1997, the CFIA banned ruminant-to-ruminant feeding, in response to recommendations made by the World Health Organization (WHO). Ruminant-to-ruminant feeding is assumed to be the leading factor in the spread of BSE. The feed ban states that feed containing banned material cannot be feed to ruminants. Equine, swine, chicken, turkey, duck, geese, ratite or game bird feed containing banned mammalian material must be clearly labeled with a cautionary statement indicating that it cannot be fed to ruminants. Renders, feed manufacturers and primary producers must take steps to reduce the chance of cross-contamination between different types of feed. In addition, primary producers feeding prohibited materials must keep labels and invoices for all purchased feed for a two-year period (AHRA, 2002).

Feed manufacturers and retailers are inspected under the National Feed Inspection Program to determine if feeds are being manufactured, distributed and managed in compliance with government regulations (AHRA, 2002).

BSE Surveillance in Canada. In 1990 BSE became a reportable disease, meaning that any suspect BSE cases must be immediately reported to a veterinarian at the CFIA. CFIA veterinarians have the authority to send suspect animals for testing. This policy is designed to prevent the entry and establishment of BSE (CFIA, 2003g). Non-compliance of this policy by producers may result in prosecution and monetary fines or imprisonment (CFIA, 2003h).

The CFIA describes effective BSE surveillance as requiring "testing of an adequate number of samples from an appropriate target population in a laboratory system with the required diagnostic capabilities. Education and awareness programs for veterinarians and producers facilitate identification and reporting of suspect cases, and effective compensation programs also support reporting. Animal identification facilitates trace-back to the herd of origin (CFIA, 2003h)."

Surveillance is one of the BSE measures that the Canadian government has established to control the spread of the disease. The Canadian BSE surveillance program, a national initiative was enacted in 1992 and is based on testing brain tissue that is submitted to federal, provincial, and university laboratories (CFIA, 2003g). In 1990, Agriculture and Agri-Food Canada had initiated continuous monitoring of animals imported from the U.K. before a ban on imports in 1992 (CFIA, 2003h).

As part of its surveillance program, Canada has tested the brains of cattle for BSE since 1990. Initially, the surveillance program was designed to determine the presence of BSE in Canada. However, following the discovery of one BSE-positive animal in 2003, the objectives were modified and the testing protocol was increased. Now, the surveillance system has two objectives: 1) to confirm the level of BSE in Canada and 2)

to track the effectiveness of the BSE risk management measures that Canada has established (CFIA, 2004e).

Since Canada's surveillance program was first implemented in 1992, it has been revised and updated to ensure that efforts are based on the most current scientific information (CFIA, 2003h). Since its induction, the surveillance program has been administered through the shared responsibility of federal and provincial governments, universities, and veterinarians (CFIA, 2004c).

Enhanced and continually updated surveillance measures illustrate Canada's commitment to actively identifying BSE cases and demonstrate the prevalence of the disease in Canada. Another aim of the surveillance system is to help maintain consumer confidence in Canadian produced beef products and work to reestablished weakened international markets, following the confirmation of one BSE-positive cow in May 2003. Furthermore, increased surveillance will indirectly help improve the tracking of BSE in Canada (CFIA, 2004e). The effectiveness of this program relies on the participation and cooperation of the agri-food industry and the members of the animal health community, federal and provincial government, and stakeholders. Primary producers are viewed as a vital component of Canada's surveillance efforts (CFIA, 2004f).

BSE Testing. BSE testing began in early 1991, with the development of a program to test rabies-negative mature cows for BSE. In 1992, a national program was implemented based on collected samples from mature cattle with neurological signs from federally inspected abattoirs and provincial and university laboratories. Before the BSE Surveillance Program, Agriculture and Agri-Food Canada (AAFC) had started

monitoring animals imported from the UK before the ban was enacted in 1990 (CFIA, 2003h).

Currently, BSE surveillance testing is located in federally inspected slaughterhouses to target surveillance and neurological cases. Surveillance cases refer to "mature animals that are non-ambulatory, downer or unable to stand up, emergency slaughter, dead on arrival, or found dead" (CFIA, 2003h). Neurological cases include "BSE suspect" cases that do not fit the definition of a BSE suspect. A BSE suspect is "a mature bovine that on clinical examination exhibits all of the following signs: poor body condition, ataxia, abnormal head carriage, nervousness, apprehension, hyperaesthesia, and tremors" (CFIA, 2003h).

BSE testing is used to measure the incidence of disease and determine the effectiveness of the surveillance program in controlling the spread of BSE in Canada. BSE testing is not used as a method to protect human health (CFIA, 2004g).

The prevalence of BSE is estimated as being extremely low and only through continued and increased BSE surveillance can its prevalence be confirmed (CFIA, 2003i). de Koeijer, Schreuder and Bouma (2002) reported that if the prevalence of BSE in a nation is classified as low, a large quantity of animals should be tested to accurately detect the prevalence of the disease. The number of tests conducted annually can be reduced if groups with high BSE risk are identified. If the surveillance program is designed to determine the presence of BSE, targeting a surveillance program to the high-risk groups can lower the number of animals needed to establish the presence of BSE.

BSE Testing Methods. Testing focuses on the high-risk cattle population, with a heightened probability of becoming infected with BSE. Currently, no live animal test is

available to determine BSE in cattle. BSE testing can only be conducted on the brains of dead cattle following slaughter (CFIA, 2004h; Dormont, 2002; Loader & Hobbs, 1996). Samples are screened using rapid testing techniques that can accurately detect the BSE-positive sample. Inconclusive results are sent to the National Centre for Foreign Animal Disease, Canada's national BSE reference laboratory for confirmation (CFIA, 2004h).

In 2004, the Canadian government aimed to test approximately 8,000 cattle. In upcoming years, testing levels are anticipated to increase to 30,000 animals annually. Currently, cattle samples are available from the following sources: farms, slaughterhouses (federal, provincial, and territorial levels), rendering and deadstock operations, veterinarians, and diagnostic laboratories (CFIA, 2004h).

Removal of Specified Risk Materials. The Canadian Government defines the specified risk materials (SRM) in regulation as "skull, brain, trigeminal ganglia (clusters of nerve cells connect to the brain and closed apposed to the exterior of the skull), eyes, tonsils, dorsal root ganglia (clusters of nerve cells connected to the spinal cord and closely apposed to the vertebral column) of cattle aged 30 months or older, and the distal ileum (part of the small intestine) of cattle of all ages" (CFIA, 2003j). These tissues, excluding the skull have been found to contain the infective agent responsible for transmitting BSE. The skull has been included in this classification due to the high probability of it becoming contaminated from stunning and during the removal of other high risk SRM tissues. SRM tissues are removed during slaughter, with the exception of the dorsal root ganglia, which is removed during the cutting/boning process (CFIA, 2003j).

Canadian Cattle Identification Program. Improved risk surveillance for animal diseases such as BSE, tuberculosis and brucellosis are not effective without a national cattle identification program that can trace-back the source of the problem. Especially in today's society, it is critically important to protect industry markets by maintaining consumer confidence in food safety and on-farm practices (CFIA, 2003f).

Cattle trace-back occurs when any reportable disease, which represents serious health risks for animals and/or humans, is reported to the Canadian Government. Farmers will apply ear tags that are registered in a national database to cattle leaving their operation. If a serious disease is reported, the CFIA will be notified regarding all the origin of all tagged cattle involved (CFIA, 2003f).

Investigations will be conducted at the site where the problem was discovered and at the location where the animals were originally housed. The two investigations will uncover where the animals were since they left their herd of origin. This system can help veterinarians determine the source of the disease and how to eradicate the problem (CFIA, 2003f).

The Health Belief Model

The Health Belief Model (HBM) (Rosenstock, 1990), a social-psychological model and the value-expectancy theory offers a theoretical framework for explaining health-related behaviors. The HBM has been used to explore a variety of health behaviors such as getting immunized, using health and dental services, disease screening and diagnostic testing, assessing risk behaviors, following medical advice, etc. (Chew, Palmer, Slonska, & Subbiah, 2002). Thus, it could be applied in other risk contexts including BSE.

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The HBM was developed in the 1950s to explain the widespread failure of individuals to participate in programs to prevent or detect disease. The model was later extended to apply to people's responses to symptoms and to their behavior in response to a diagnosed illness. The HBM explains change and the maintenance of a desired behavior change. There are five components to the HBM: perceived severity, perceived susceptibility, perceived benefits, perceived barriers, and self-efficacy (Volk & Koopman, 2001).

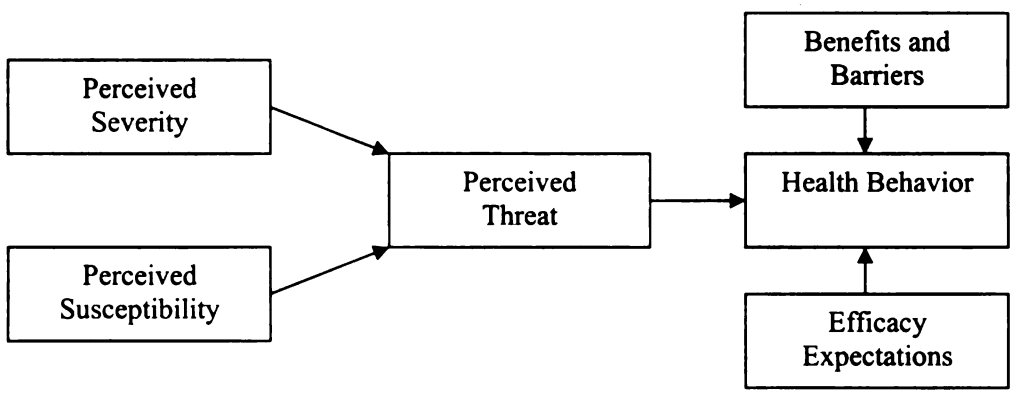

Figure 2: The Health Belief Model.

Perceived Susceptibility. This component of the HBM refers to an individual's subjective perception of the risk of contracting the health condition. If individuals believe that the threat is serious, but do not believe that they are at risk they will ignore the threat. However, if they believe themselves to be at risk, they will be motivated to change their behavior to avoid the threat. Message designers must persuade the target audience that the potential harm is real and severe to maximize the response of the target audience (Murray-Johnson & Witte, 2003).

In a study on preventing tractor-related fatalities in rural Texas, Witte et al. (1993) found that farmers believed that farm machinery accident were serious and dangerous,

but felt that they were invulnerable to being a victim of such as accident. In addition, farmers believed that recommended safety measures could help reduce the prevalence of accidents and prevent farm equipment-related accidents (Witte et al., 1993).

Furthermore, Parrott, Steiner, and Goldenhar (1996) in a study about farmers and sun safety practices found that farmers are well informed about the risk of skin cancer, but do not use sun screen because they reported that their skin had toughened to the sun and felt that they did not need to use sunscreen. The findings from these two studies can be paralleled to the BSE issue, as it is possible that farmers are very aware and knowledgeable about the threat but may feel invulnerable to the risk. Specifically, this perceived might be low because there have only been three confirmed BSE cases in Canada and one BSE-positive animal in Washington state, making it less likely that they will adopt recommended behaviors.

Perceived Severity. This construct of the HBM refers to an individual's feelings regarding the seriousness of contracting an illness or leaving it untreated include evaluations of both medical and clinical consequences and possible social consequences (Rosenstock, 1990). Greater perceived severity should improve both attention to the message and heightened motivation for self-protection against the threat (Murray-Johnson & Witte, 2003). Perceived threat is the combination of perceived susceptibility and perceived severity.

Thu et al. (1997), in a study exploring stress as a risk factor for agricultural injuries, found that stress plays a significant role in agricultural injuries. The analysis of the Iowa Farm and Rural Life Poll reveals that farmers who reported suffering from high levels of stress were 1.7 times more likely to experience a serious farm-related injury

than farmers who report low to moderate stress levels. This can be paralleled to the farmers facing the BSE situation in Canada, as the current economic losses taken by farmers may have increased their perception of the seriousness of the issue, compared to the BSE crisis in the U.K. in the 1990's.

Perceived Benefits. While perceived susceptibility and perceived severity produce a force leading to a desired behavior, they do not define the particular action that is most likely to be taken. It is thought to depend on the beliefs regarding the effectiveness of the available actions in reducing the threat, or perceived benefits in adopting the recommended action. Perceived benefits can help define the behavior or action that the target audience should adopt, and specify: how, what, where, and when. The perceived benefits should also clarify the positive effects of the adoption of the recommended behavior (Rosenstock, 1990).

Witte et al. (1993), in a study exploring reducing tractor-related injuries through theoretically-based communication efforts, found that farmers reported farm safety measures as effective in reducing incidents of farm fatalities and injuries involving farm machinery. This study's findings also indicated that respondents failed to incorporate farm safety precautions on their farms. This case can be compared to the BSE situation in Canada, as farmers may be knowledgeable about the benefits of knowing about BSE and the benefits of complying with recommended surveillance protocols. However, in the event that perceived barriers outweigh the benefits, farmers may opt to not follow recommended practices.

Perceived Barriers. Potential negative aspects of a particular action may be obstacles to adopting a suggested behavior or action. An unconscious, cost-benefit

analysis is thought to occur where an individual weighs the effectiveness of an action against the perception that it may be expensive, dangerous, unpleasant, inconvenient, time-consuming, and so forth (Rosenstock, 1990).

In a study conducted by Wadud, Kreuter, and Clarkson (1998) regarding disease prevention in a farm setting, farmers reported a number of reasons for not incorporating breathing protection when working. Farmers claimed they didn't need protection because: (1) they worked in an open area (57 percent); (2) they didn't think of it (41 percent); (3) and that they felt that protective gear was inconvenient (40 percent). In the same study, farmers reported that the main reasons for not using skin protection measures included (1) it was too hot to wear long sleeved shirts (67 percent); (2) sunscreen was messy (43 percent); and (3) recommended clothing was too restrictive or uncomfortable (31 percent).

Self-efficacy. In 1977, Bandura introduced the concept of self-efficacy to the model. Self-efficacy is the belief that an individual can successfully perform the behavior or action required for the desired outcome (as cited in Rosenstock, 1990).

In a formative study assessing farmers' understanding of sun safety procedures, Parrott et al. (1996) found that nearly three fourths of participants selected wearing a wide-brimmed straw hat as being more protective than wearing tightly woven cap with a neck flap. This finding affirms that farmers lack specific knowledge regarding the procedures for proper sun protection. The less aware farmers are about such procedures the more unlikely it will be that they will adopt the recommended behavior or action. In comparison to the Canadian BSE situation, Ontario farmers' self-efficacy may be dependent on their understanding of the surveillance measures implemented by the CFIA,

uncertainty about how to begin the testing process for suspect animals, due to a lack of direction, or they may lack knowledge or awareness of the established surveillance measures.

Knowledge and Farmer Behavior. Accurate knowledge is commonly deemed as necessary, but not strong enough to stimulate the adoption of recommend behaviors. However, knowledge does play an important role in lifestyle decision-making and continued compliance with recommended behaviors. Knowledge, as well as other demographic variables such as education, age, and ethnicity are modifying factors of the HBM, which are also believed to have an indirect effect on behavior by influencing the perceptions of the following HBM constructs: perceived susceptibility, perceived severity, perceived benefits, perceived, and barriers (Rosenstock, 1990). If individuals lack knowledge of risks, their ability to maintain or promote the recommended behavior is reduced (Rudd & Glanz, 1990).

Knowledge of an issue can be conceptualized as "awareness, consciousness raising, familiarity, recognition or recall" (Salmon & Atkin, 2003, p. 466). However, for the purpose of this study, knowledge is conceptually defined as the factual knowledge of BSE held by farmers.

In an evaluation study of the impacts of education regarding integrated pest management (IPM) on perceptions of pesticides and pesticides application practices, Kishi (2002) found that farmers' knowledge about the health risks associated with pesticides, following attendance at an IPM school was not sufficient to change or motivate behavioral changes.

Most communication approaches designed for the farming community assume that a knowledge deficiency is to blame for their heightened susceptibility to health problems and it is presumed that if farmers are knowledgeable about the risks, they would adopt the recommended behaviors (Thu, 1998).

CHAPTER THREE

METHODOLOGY

Introduction

Strauss and Corbin (1998) define qualitative research, as "any type of research that produces findings not arrived at by statistical procedures or other means of quantification. It can refer to research about person's lives, lived experiences, behaviors, emotions, and feelings as well as about the organizational functioning, social movements, cultural phenomena, and interactions between nations" (p. 10).

There are a number of reasons for conducting qualitative research, perhaps the most valid reason being that the nature of the research problem is best suited to qualitative research methods. Qualitative research methods are used to explore substantive areas where little is known about an issue or to gain novel understanding. One might think of formative research in this context (Strauss & Corbin, 1998). Formative research helps "develop targeted, culturally appropriate health risk messages that work" (Witte, Meyer, & Martell, 2001, p. 52). Formative research helps identify the characteristics of a target audience, develop prototypical members and determine the important demographic variables, past experiences, attitudes, beliefs, opinions, and perceptions toward the risk and the recommend behavior to be promoted (Witte, Meyer, & Martell, 2001). Furthermore, qualitative research methods are also used to obtain details about feelings, thought processes, and emotions that are often difficult to obtain using quantitative research strategies (Strauss & Corbin, 1998). This study will use focus

groups to better understand the attitudes, beliefs, opinions and thoughts of Ontario beef producers regarding BSE.

Focus Groups. Focus groups were used to conduct this formative research because they provide a comfortable environment where participants can share and discuss their attitudes and beliefs (Krueger, 1994). Focus groups promote "self-disclosure among participants" (Krueger & Casey, 2000, p. 7). Focus groups are used to determine "what people really think and feel" (p. 7).

According to Krueger and Casey (2000), focus groups have the following characteristics: (a) involve similar individuals in a social setting; (b) gather qualitative data from a focused discussion between participants; (c) gather inductive and naturalistic information; and (d) can provide valuable baseline information that can guide the collection of large-scale quantitative data.

Focus groups are used to collect data dealing with an issue of interest to the researcher, with a goal of finding a range of opinions across a population. Data collected from each group are compared and contrasted. It is important to create an environment where participants feel comfortable sharing what they think and feel (Krueger & Casey, 2000). Krueger and Casey (2000) described the benefits of including food (i.e., light dinner) at the session as a helpful tool in promoting conversation and communication between the participants, which helps establish a comfortable environment. Food can also act as an incentive to recruit potential participants. Usually, focus groups consist of seven to ten participants (Krueger, 1994).

Participants and Procedures

A total of 28 participants in four focus groups participated in the study approved by the University Committee for Research Involving Human Subjects (UCRHIS) (Appendix A). The number of participants ranged from 5 to 11 participants in each group. Potential participants were recruited through county advisors of the Ontario Cattlemen's Association. Advisors for Grey, Lanark, Renfrew and Wellington counties provided a list of potential candidates interested in participating in the study.

All potential participants were recruited through an invitation letter (Appendix B) explaining the purpose and goals of the study. Participants also were informed that the discussion would take approximately an hour and a half to two hours. As an incentive to participate, participants also were told that they would receive a $10 honorarium and dinner for participating in the study.

The focus group discussions were conducted in January 2005 in four geographic areas in Ontario: Grey, Lanark, Renfrew and Wellington counties. These four counties were selected with guidance from the OCA, based on involvement in the BSE issue and to cover the general scope of ideas and feelings that Ontario beef farmers have about the current Canadian BSE situation and to determine the factors that influence their opinions, attitudes, behaviors and motivations.

A tape recorder was used at each focus group sessions for transcription purposes. Participants were reminded that the discussion would be recorded at the beginning of the focus group discussion. Before dinner was served, consent forms, approved by UCRIHS, were signed and returned (Appendix C).

A brief survey also was administered prior to dinner at each focus group sessions to collect demographic data and media related questions. Items that were included on the survey include age, gender, educational level attained, farm size and preferred sources for agricultural information (Appendix D). The Statistical Package for Social Science (SPSS) 11.0 was used to analyze demographic and mediagraphic responses gathered in the survey.

Moderator Guide

Typical focus groups include approximately 12 questions. Asking questions to a group can stimulate a discussion that can last for a number of hours. As participants answer questions, their responses generate ideas from other participants. Participant comment can trigger memories or thoughts of other participants that can stimulate the sharing of a wide range of perceptions (Krueger & Casey, 2000).

A moderator guide was developed based on the information gathered from the literature review (Appendix E). The moderator guide was developed to facilitate discussion and obtain information, thoughts, feelings, perceptions, and opinions about the issue. Questions and probes were developed using the components of the health belief model (HBM) (Rosenstock, 1974): perceived severity, perceived susceptibility, perceived benefits, perceived barriers, and efficacy. Media-related and BSE knowledge questions also were included.

Members of the researcher's Thesis Committee and faculty members from the Department of Agriculture and Extension Education reviewed the moderator guide for face and content validity. Ary, Jacobs and Razavieh (2002) define validity as " the extent to which an instrument measures what it claimed to measure" (p. 242). Validity is

necessary to ensure that questions are appropriate to the topic and will generate accurate responses. The same moderator guide was used at each of the four focus group sessions.

Unitization

The commentary from each of the four focus groups was transcribed verbatim, and participant numbers were given to each participant to ensure confidentiality. The unit of analysis was a thought unit, which was defined as a subject/verb pairing or a simple sentence (e.g., "The only media coverage that you get is negative." and "I think they've done a good enough job of this surveillance testing.") (Appendix F). All data were unitized with the exception of questions and statements made by the moderator. The data resulted in 4974 thought units for analysis. (Silk, Parrott, & Dillow, 2003)

Coding

Data were analyzed using the HBM (Rosenstock, 1974). Perceived severity, perceived susceptibility, self-efficacy, perceived barriers, and perceived benefits provided the framework for assessing the perceptions, thoughts, beliefs, and opinions of Ontario beef farmers regarding the BSE issue in Canada. Furthermore, additional categories and subcategories were identified based on the major concepts and themes that surfaced in participant responses to the questions asked in the four focus groups. Knowledge and media questions also were included in the focus group and were coded to help better understand participants' knowledge of BSE and uncover preferred media sources accessed by the farming community.

A codebook (Appendix G) was developed. The data were coded by two coders using the QSR Nvivo software. QSR Nvivo was used as an organizational tool in this

study to help code thought units into their appropriate category. Data were coded into six main categories, with 15 sub-categories: (a) Threat, severity [SEV-1], susceptibility-own herd [SUS-2A], susceptibility-other herds [SUS-2B], susceptibility-humans [SUS-2C], (b) knowledge, BSE [BSE-3A], government regulations [GOV-4], food chain [FC-5], stigma [STIG-6], (c) efficacy, perceived benefits [BEN-7], perceived barriers [BAR-8], self-efficacy [SE-9], response-efficacy [RE-10], (d) behavior [BEH-11], (e) media, accuracy/inaccuracy of media sources [MED-12], preferred information sources [INFO-13], preferred message style [STYL-14], and (f) other [OTH-15]. The subcategories were created based on themes that emerged from the discussions and were clear to the researcher (Mayan, 2001). Using the categories and subcategories included in the codebook, nodes were created in QSR NVivo for coding and organizational purposes. The QSR NVivo software allowed the researcher to easily identify common themes mentioned by participants and to retrieve representative statements that depict the main themes that resonated across the six main categories and 15 subcategories.

Threat. Threat was defined as any statement suggesting a source of danger. Threat was broken down into two subcategories: perceived severity and perceived susceptibility to the danger. Perceived severity responses were coded for any statements about the significance or magnitude of the threat of BSE (e.g., "One cow destroyed the whole country."). Perceived susceptibility was further broken down into three sub-categories: susceptibility-self responses were coded using any statements referring to the likelihood of a farmer's herd contracting BSE (e.g., "I don't feel that my herd is at risk."); susceptibility-other responses were coded according to statements about the likelihood of other farms in Ontario/Canada contracting BSE (e.g., "I think that the probability is very

high."); and susceptibility-human responses included any statements about the likelihood of humans contracting vCJD (the human form of BSE) (e.g., "We don't eat brain here.").

Efficacy. Efficacy was conceptualized as a farmer's ability, beliefs, and perceptions about the actions and behaviors used to prevent, control or eradicate BSE in Canada. This category was further divided into four subcategories: perceived benefits, perceived barriers, self-efficacy, and response efficacy. Perceived benefits were coded for any statements about advantages gained from adopting the advised action to reduce risk or seriousness of BSE (e.g., "...maintain consumer confidence"). Perceived barriers were coded by statements made regarding a farmer's belief about obstacles (either tangible or psychological costs) to adopting the recommended behavior (e.g., "And every time we report on [BSE-positive cow] look what happens."). Self-efficacy was coded by any statements made relating to the ability of farmers the do the recommended behavior (e.g., "I'm not sure that we would report them [suspect animals]."). Response-efficacy was coded according to statements made regarding a farmer's belief that a recommended action will help reduce, control or eradicate BSE (e.g., "Taking out SRMs, that's going to prevent transmission.").

Behavior. Behavior responses was coded according to statements made about any actions or current on-farm practices used by farmers to lower risk the risk of BSE and other animal diseases (e.g., "I have written records of every health treatment I've done in the last five years.").

Media. Media responses were coded for statements made about he accuracy/inaccuracy of media reports, preferred media sources, and preferred message style (e.g., "Media sells by sensationalizing.").

Knowledge. Knowledge was conceptually defined as the factual knowledge about BSE held by farmers. Knowledge was further broken down into four sub-categories: the science of BSE, familiarity with government regulations, the role of any aspect of the food production chain, and stigma. BSE knowledge was conceptualized as any statements about BSE symptoms, cause, infection, diagnosis or treatment (e.g., "A prion in the meat source"). Knowledge of government regulations was conceptualized as any statements about the BSE Surveillance Program, testing, removal of specified risk materials (SRMs), the feed ban and other applicable regulations (e.g., "They are putting extreme pressure on us to report these cows."). Knowledge of the food chain was defined as any statements about the role and responsibilities of producers, slaughterhouses, packers, processors, consumers, etc. (e.g., "Everybody has to be prepared to do a 100 percent job right up to the store that's got meat in the cooler."). Stigma was conceptualized as any statements about societal attitudes and potential discrimination stemming from a particular characteristic or affiliation with a particular group or behavior (e.g., "I'm a bit concerned about how the public views us.").

Other. Other was defined as any statement that could not be clearly defined by the five other categories. Coders were instructed to use this category in moderation.

Decision Rules. The amount of data collected and the six categories and 16 subcategories in the codebook resulted in researchers needing to develop decision rules to help coders code the units of analysis into the appropriate category. Since the HBM (Rosenstock, 1974) was being used to analyze the data, the constructs of the model, perceived severity, perceived susceptibility, perceived benefits, perceived barriers and self-efficacy had precedence over the knowledge and media categories. For example, if a

unit could be coded as both knowledge and perceived severity, the unit would be coded as perceived severity. This decision rule seems justified given the objectives of this study.

Intercoder reliability. Overall, two coders spent approximately six hours reviewing the codebook and resolving through discussion any discrepancies. Using the codebook, two coders individually coded a total of 4974 though units. Cohen's Kappa assesses intercoder reliability when coding qualitative or categorical variables was used to establish intercoder reliability, as it compensates for agreements by chance. Initially, reliability based on five percent of the data was somewhat uneven over the six categories (Cohen's Kappa = 0.59). In order to resolve discrepancies and clarify the rules for units that may fall into one or more categories, another 2 percent of the data was coded (Cohen's Kappa = 0.71). Reviewing and modifying the coding rules further improved the coding scheme, and approximately another three percent of the data was coded and an acceptable level was established (Cohen's Kappa = 0.85). Upon further examination of the units of analysis, in both attempts to establish intercoder reliability, the thought units were not evenly distributed among the six categories, which may account for the difficulty in establishing intercoder reliability. Coders then divided the remaining data and coded it independently.

Chapter Summary

Chapter three provided an overview of the mixed methodology used to conduct this study. The chapter provides rationale for the use of a mixed methods approach and outlined the procedures involved in focus group and survey aspects of the study. Data analysis was also described. Chapter Four will highlight the study's key findings.

CHAPTER FOUR

FINDINGS

Introduction

This chapter reports the results of the study and presents the data gathered to answer the research objectives:

1) To investigate and assess Ontario beef producers' attitudes toward risk, using the HBM as a framework.
2) To identify the information sources used by Ontario beef producers.

Two individuals unitized the data. Two coders coded the data, with an established intercoder reliability of 0.85 (Cohen's Kappa). Coded data was entered into the qualitative software program, QSR Nvivo. Demographic and mediagraphic data gathered from a short survey was analyzed using the Statistical Package for the Social Sciences (SPSS) version 11.0.

Demographic and Mediagraphic Results

A total of four focus groups were held in four different counties in Ontario, which attracted a total of 28 participants. All participants completed a short, 17-question survey that asked demographic and media related questions before the focus group. Twenty-one surveys were completely filled out.

Table 1 shows that the majority of the participants were male (89.2 percent; n = 25) and women (10.8 percent; n=3) participated in the study. Participants ranged in age from 18 to 71 and the average age of respondents was 49 years. Participants were asked to identify their highest level of education completed. Of the participants, 21.6 percent

(n=6) completed high school, 7.1 percent (n=2) completed some college, 32.1 percent (n=9) were community college graduates, 7.1 percent (n=2) had completed some university, and 32.1 (n=9) percent were university graduates.

Table 1: Participant Demographics (n=28)

Variable	n	%
Gender		
Female	3	10.7
Male	25	89.3
Total	28	100.0
Age		
Under 30	2	7.1
30 –55	8	28.6
56-69	14	50
70 and over	4	14.3
Total	28	100.0
Education		
Some high school	-	-
High school graduate	6	21.4
Some community college	2	7.1
Community college graduate	9	32.1
Some university	2	7.1
University graduate	9	32.1
Total	28	100.0
Involvement in farming		
Full time	25	89.3
Part time	3	10.7
Total	28	100.0
Responsible for decision-making		
Yes	23	82.1
No	4	14.3
No response	1	3.6
Total	28	100.0
Number of years farming		
0-10 years	2	7.1
11-20 years	7	25
21-30 years	8	28.6
Over 30 years	9	32.1
No response	2	7.1
Total	28	100.0

Table 1 also shows that 89.3 percent (n = 25) of participants were full time farmers and 10.7 percent (n = 3) were part time farmers. Participants also were asked if they were responsible for the decision-making on their farm and 82.1 (n=23) reported themselves as making the decisions on their farm and 14.3 (n=4) said that they were not the decision-makers. Participants were asked to identify the number of years they had farmed, 7.1 percent (n=2) had farmed under 10 years, 25.0 percent (n=7) had farmed 11 to 20 years, 28.6 percent (n=8) had farmed for 21 to 30 years, and 32.1 percent (n=9) had farmed over 30 years.

The remaining demographic questions included: farm acreage (owned and rented land), income generated from farming, income generated from beef cattle and herd size. These demographic questions are depicted in Tables 2 and 3. The participants were asked to report their farm acreage, including both owned and rented land. The acreage was distributed into 5 categories, 0 to 500 acres, 501 to 1000 acres, 1001 to 1500 acres, 1501 to 2000 acres, and over 2000 acres. Approximately, 40 percent (n=11) reported farming 1 to 500 acres, 28.6 percent (n=8) farmed 501 to 1000 acres, 17.9 percent (n=5) farmed 1001 to 1500 acres, 7.1 percent (n=2) farmed 1501 to 2000 acres, and 7.1 percent (n=2) report farming over 2000 acres.

Approximately 7 percent (n=2) reported that 25 to 49 of their income was farming, 14.3 percent (n=4) said that 50 to 74 percent of their income was from farming, and 75 percent (n=21) said that over 75 percent of their income was from farming. Of participants' farm income, 50 percent (n=14) said that over 75 percent of their income was from beef cattle, 32.1 percent (n=9) shared that 50 to 74 percent of their farm income came from beef cattle, 10.7 percent (n=3) reported that 25 to 49 percent of their farm

income came from beef cattle, and 7.1 percent (n=2) said that under 25 percent of their farm income came from beef farming.

Table 2: Participant Farm Size and Income (n=28)

Variable	n	%
Farm acreage (owned and rented land)		
0-500 acres	11	39.3
501-1000 acres	8	28.6
1001-1500 acres	5	17.9
1501-2000 acres	2	7.1
Over 2000 acres	2	7.1
Total	28	100.0
Income from farming		
Less than 25 percent	-	-
25-49 percent	2	7.1
50-74 percent	4	14.3
75-100 percent	21	75.0
No response	1	3.6
Total	28	100.0
Income from beef cattle		
Less than 25 percent	2	7.1
25-49 percent	3	10.7
50-74 percent	9	32.1
75-100 percent	14	50.0
Total	28	100.0

Table 3 shows that approximately 68 percent (n=19) had 0 to 3 bulls over the age of one on their farm, 17.8 percent (n=5) had 4 to bulls, 3.6 percent owned 8 to 11 bulls and 10.7 had 11 or more bulls on their operation. In regards to the number of cows (including heifers that had calved) on their farm, 53.6 percent (n=21) of the participants had 0 to 75 cows, 28.6 percent (n=8) had 75 to 150 cows, 10.7 percent (n=3) owned 151 to 225 cows, and 7.1 percent (n=2) owned over 225 cows. Seventy-five percent (n=21) of participants reported that they had 0 to 50 heifers, 10.7 percent (n=3) had 51 to 100 heifers, and 7.1 percent (n=2) had over 150 heifers. Approximately 79 percent (n=22) of participants reported that they had 0 to 25 steers on their farm, 3.6 percent (n=1) had 26 to 50 steers, 3.6 percent (n=1) owned 51 to 100 steers, and 10.7 percent (n=3) reported

that they owned over 100 steers. Sixty-four percent (n=18) of the participants had 0 to100 calves, 17.8 percent (n=5) had 101 to 200 calves, 3.6 percent (n=1) owned 201 to 300 calves and 10.7 (n=3) farmed over 300 calves

Table 3: Participants' herd demographics

Number of bulls one year or older		
0-3 bulls	19	67.9
4-7 bulls	5	17.8
8-11 bulls	1	3.6
Over 11 bulls	3	10.7
Total	28	100.0
Number of cows (including heifers that have calved)		
0-75 cows	15	53.6
76-150 cows	8	28.6
151-225 cows	3	10.7
Over 225 cows	2	7.1
Total	28	100.0
Number of heifers one year or older		
0-50 heifers	21	75.0
51-100 heifers	3	10.7
101-150 heifers	-	-
Over 150 heifers	2	7.1
No response	2	7.1
Total	28	100.0
Number of steers		
0-25 steers	22	78.5
26-50 steers	1	3.6
51-100 steers	1	3.6
Over 100 steers	3	10.7
No response	1	3.6
Total	28	100.0
Number of calves		
0-100 calves	18	64.3
101-200 calves	5	17.8
201-300 calves	1	3.6
Over 300 calves	3	10.7
No response	1	3.6
Total	28	100.0

Preferred Sources of Agricultural Information.

One quantitative research question (RQ1) asked, what do Ontario beef producers report as their preferred sources for agricultural information? In Table 4, participants

were asked to select their five most preferred agricultural information sources from a list of 12 and rank the five from most preferred to least preferred. Seven participants were classified as no-response because they did not rank five of their most preferred sources for agricultural information. Weighted mean values closer to one showed greater preference, while weighted mean values closer to six indicated no preference. Agriculture information sources for participant ranking included: farm publications, newspapers, Internet, commercial literature, radio programming, television programming, farm shows, government publications, commodity group literature, government commodity specialists, neighbors, and other farmers.

Participants ranked farm publications as their most preferred agricultural information source (mean ranking=1.62), the Internet as their second most preferred (mean ranking=2.48), commodity group literature was ranked third (mean ranking=4.19), newspapers were ranked as fourth most preferred (mean ranking=4.71), and government publication was fifth most preferred (mean ranking=4.76). Radio (mean ranking=5.95), television (mean ranking=5.76), neighbors (5.57), and government commodity specialists (n=5.52) were not ranked as preferred sources of agricultural information.

Table 4: Preferred Agricultural Information Sources

Agricultural Information Source	Weighted Mean	Ranking
Farm Publications	1.62	1
Internet	2.48	2
Commodity Group Literature	4.19	3
Newspaper	4.71	4
Government Publications	4.76	5
Farm Shows	4.95	6
Other Farmers	5.00	7
Commercial Literature	5.38	8
Gov ernment Commodity Specialists	5.52	9
Neighbors	5.57	10
Television	5.76	11
Radio	5.95	12

(1=most preferred, 2=second most preferred, 3=third most preferred, 4=fourth most preferred, 5=fifth most preferred, 6=no preference)

Qualitative Data

Results of the quantitative data reflect all the data unitized and coded for the transcripts from the four focus groups discussions. For the qualitative aspect of the results, examples were selected from the transcripts to illustrate the key themes from each of the six categories and 15 subcategories. Thematic examples were selected that captured the essence of the main ideas shared by participants, which will combine multiple thought units from the same category. Six qualitative research questions were posed in this study to determine the attitudes that Ontario farmers have regarding the severity of the BSE situation, their susceptibility to BSE, the barriers to effectively dealing with BSE, and the benefits of effectively dealing with BSE. One qualitative

research question was posed to determine beef producers' preferred sources of agricultural information.

Health Belief Model Constructs

Thought units coded as HBM account for 46.2 percent (n =2298) of the data. Table 5 highlights the frequency distributions of the thought units across all categories (perceived severity, perceived susceptibility, perceived benefits, perceived barriers, self-efficacy, and response efficacy).

Perceived Susceptibility. The one qualitative research question, "What attitudes do Ontario beef producers have regarding their susceptibility or vulnerability to BSE?" determined the perceived susceptibility of Ontario beef producers. Thought units for susceptibility accounted for 11.3 percent (n=569) of the data. Overall, farmers' discussions regarding susceptibility dealt with how "other farmers", such as dairy and beef farmers that feed supplements to their animal are more susceptible to contracting BSE. Furthermore, many farmers shared that they did not believe that their own herds were at risk because they had a closed herd or grew their own feed for their animals. Farmers also discussed the probability of BSE showing up in other nations such as the United States, which have strict trade restrictions on Canadian beef products. Farmers also discussed the possibility of humans contracting the variant Creutzfeldt-Jakob disease (vCJD) by eating Canadian beef.

For example, one participant stated, "Beef farms, I don't think it's – it's almost impossible. If it only comes from that ruminant type feed in their feed. It's almost impossible and since it's also been banned since '97...(Group 1)." Another farmer supported this view by stating, "...People with closed herds are at much lower risk than

people who are constantly bringing in new breeding stock because they don't know what they've been fed and where they came from. So, the closed herds that don't get much supplements are at less risk (Group 2)."

Participants also provided explanations as to why they felt that their herds were not susceptible to BSE. One participant shared, "I don't feel that my herd's at risk. I hope someday that I don't ship a cow or 20 months old animal or something and all of a sudden I get a report back that I've got it, cause I'd feel like the guys that called the vet out the farm. I'd say no, if I ever shipped something that had it. I'd totally be blown away from it. I don't think it's possible (Group 1)." In addition, another participant shared, " The thing with myself, I have 130 cows and the only reason I would ever be concerned about BSE coming in my herd, is an animal I bought in from another somebody else. Like, a bull for breeding purposes. I don't know the feed that that bull had with the previous owner, bought feed from the feed store and I don't know the protein that was fed to that animal, but basically with my cows, I don't purchase any feed, I just make my own. So, that's the only way that it would come into my herd (Group 4)."

Table 5: Distribution of Thought Units Across Constructs

	n	%
Health Belief Model Constructs		
Severity	838	16.8
Susceptibility – Participant's Own Herd	131	2.6
Susceptibility – Other Farms/Areas	364	7.3
Susceptibility – Contract vCJD	74	1.5
Self-Efficacy	324	6.5
Response	184	3.7
Benefits	197	4.0
Barriers	186	3.8
Subtotal	**2298**	**46.2**
Knowledge		
BSE	233	4.7
Government Regulations	343	6.9
Food Chain	143	2.9
Subtotal	**719**	**14.5**
Media		
Accuracy/Inaccuracy	458	9.2
Preferred Sources	469	9.4
Preferred Style	91	1.8
Subtotal	**1018**	**20.4**
Behavior	**197**	**4.0**
Stigma	**243**	**4.9**
Other	**499**	**10.0**
TOTAL	**4974**	**100.0**

Another participant explained how any animal in North America is susceptible to contracting BSE, "...There's as much chance of you finding it in Michigan as there is us finding it in Ontario. We're closer to the state of Florida then we are to Alberta, in my eyes. So, the question is basically, anywhere in North America has as much exposure to it as we have, with international trade and the way cattle move across the 49th parallel for the last hundred and some years. The risk in North America and Mexico, any place is every bit as high as – there's no differential. It can show up anywhere (Group 3)."

One participant shared information he received from his family physician about the likelihood of Canadians contracting vCJD, the human form of BSE, "...you'll have a better chance of getting hit by lightning than you'll ever have of coming down with BSE from related – eating infected beef (Group 3)."

Perceived Severity. One qualitative research question, "What attitudes do Ontario beef producers have toward the perceived severity of the BSE issue in Canada?" determined participants' perception of the severity of the BSE situation. Thought units coded as severity accounted for 16.8 percent of the data (n =838). Overall, participants in each focus group spoke at length regarding the severity of the BSE issue for Canadian beef farmers. Key ideas reported by participants regarding the severity of the BSE situation included: economic losses to all aspects of the food production chain, political pressures (e.g., length of trade restrictions); health risks to farmers (e.g., stress and health risks); the number of producers exiting the industry; and the impact that this situation will have on potential young farmers and their commitment to the industry.

Many participants provided personal accounts about the effect that the confirmation of BSE has had on their operation. For example, one participant stated, "Your equity is gone. I'm almost back to where I was 20 years ago because of this right now and if things can turn around may we can recover a fair bit of that, but if I was to exit the business right now, it will cost me two farms that I paid for (Group 3)."

Similarly, another participant mentioned, "...You can't survive on what you're making now. Everyone's losing money. They're eating up whatever equity they have. Like, the people that are hanging it up are putting everything on the line (Group 1)."

Another participant compared the severity of this situation to the discovery of foot and mouth disease in the 1950's, "...I said that it will be something like foot and mouth and he said that it's not like foot and mouth at all. He said that in '52 when we had foot and mouth, he said we had 50 or 60 cattle and we played around with them. But he said we milked cows, we had sows, we had chickens, we had sheep. He said we could work our way out of it because we were diversified. Where now, we take it and specialize something, so you have your eggs too much in one basket, but it's the only way that you can be in business anymore because you can't be in agriculture in Ontario. You cannot be in a whole bunch of things because you can't do it. It's not economically viable. So, if you talk to some of the older guys that talk about it, realize that this is a lot worse than the foot and mouth...(Group 3)."

One participant explained his views concerning the severity of BSE from a political standpoint of the U.S. border not opening to Canadian beef products and livestock. "It's also political because it has been proven that it is not a high-risk thing. So, all of it is politics and from there on in. As soon as that's been proven that's it's not a high-risk health problem than the whole thing is political. Has been right from day one (Group 1)."

Another participant stated, "Politically it looked like it's a short-term problem. A lot of us carried on business as usual. In hind sight, it was the wrong thing to have done, but anybody as I said earlier, anybody can second guess that, so there's no point in looking back, we've got to worry about what's ahead...(Group 3)."

In regards to how the BSE situation has affected the health of farmers, one participant shared, "Stress. There's always health risks that stress causes people (Group

1)." Another participant agreed, "...you go to farm meetings, you always get a lot of bitching, but now, it's not just the bitching, but you know, guys have been getting sick, things that have been going on that you've never heard of before (Group 4)."

Many participants spoke about the effect that the severity of this situation has had on the number of farmers deciding to exit the beef industry. One participant reports, "I was on the phone to a guy and we thought of 4 producers that are out of their business in the last six months that will never be back in the business and it's a week and a half kill at Better Beef. So, that's financial reasons and another one was age factor and another one was just that they decided that they weren't going to take the risk any more. Why expose yourself if you don't have to and they could get out (Group 3)." Another participant talked about the seriousness of the issue as it applied to future generations of farmers, "I think that this is so serious that this is going to cause a lot of younger people, say in their 20s that are thinking – we're thinking of getting into this business. I'm sure that it's going to cause a lot of them some second thoughts (Group 2)."

Perceived Benefits. One qualitative research question, "What do Ontario beef producers perceive as benefits to discovering BSE in Canada and following the BSE protocols established by the Canadian government?" determined participants' perceived benefits of BSE. Thought units for perceived benefits accounted for 4.0 percent (n=197) of the collected data. Many participants agreed that benefits to the farming community were minimal, if any. After some consideration and discussion, participants did share a number of benefits about knowing about BSE and the Canadian surveillance measures finding BSE in Canada included: the outcomes gained from having an efficient surveillance system; highlighting Canada's export dependence on one market – the North

American market; the Canadian slaughter and packing industry grew to meet the needs of beef farms; the Canadian public was made more aware of the Canadian food safety system; new protocols will result in a safer beef product; the lessons learned from living through a situation of this magnitude; and the highlighted need for proactive risk management to effectively deal with future risks.

A participant shared his insights into the benefits of Canada's surveillance system, "...if an animal has a problem, it's traceable....every animal is traceable to where it came from (Group 1)."

One participant shared in respect to the Canadian beef industry's dependence on the North American markets for its exports, "We will have a strong industry when we are doing this because we've realized that we cannot depend on the United States for a marketplace for 50 or 60 percent of our Canadian product. So, yeah we will have packing capacity hopefully, then we'll help develop markets in other parts of the world that we can maybe reduce our dependency on the – being on the North American market. We can develop world markets (Group 3)."

To further illustrate the benefits gained by different segments of the industry from the Canadian BSE situation, another participant shared, "There's benefits to certain segments of the industry, but nobody would ever say that anybody benefit from it...The United States benefited immensely, they had the best cycle of the cattle industry that they ever had. The packing industry in Canada flourished. The government spent some money to try and sustain us. Taxpayers were made more aware of their health – of the food safety system, but as far as we – as the primary producers, the benefits are minimal (Group 3)."

Another participant shared similar insights stating, "But the general public is going to understand our inspection systems and probably have an understanding of how our food is checked and the cautions that are in place. One of the things, you know, these three animals never got into the food chain and that's our system working (Group 4)." Another participant echoed the same belief saying, "Public confidence is high...beef consumption went up...(Group 1)."

In regards to lessons learned, one participant shared, "...From within the industry, BSE has taught us a lot of things. A lot of organization problems that need to be boned up, funding problems, PR problems that need to be addressed when this is over – alliance problems is a nice way of saying the big word of who was on our side and who wasn't...international affairs and negotiations (Group 4)."

In a different discussion, another participant echoed a similar view, "We should have learnt for this that you have to be prepared for the worse case scenarios of what could happen. Be prepared (Group 2)."

Perceived Barriers. One qualitative question, "What do Ontario beef producers report as barriers to following BSE protocols established by the Canadian government?" determine perceived barriers to following BSE protocols. Thought units for perceived barriers represented 3.8 percent (n=186) of the data. Common themes mentioned by participants regarding barriers limiting their ability to follow BSE surveillance protocols established by the Canadian government (e.g., reporting a downer animal) included, financial costs, the economic threat to their business and livelihood, and lack of resources (such as equipment).

One participant explained that the financial cost of associated with submitting an animal for testing would discourage him from doing so. "If they want to test more, they should fund the dead livestock removal. We don't call them anymore. If they want to test more, we'd call them. It costs us an arm and a leg to get rid of them. We bury them now. Then they would have their test (Group 2)."

Another participant stated that financial threat to farmers would limit them from reporting a suspect animal. "If it affects too many – if it affected just us, as ourselves, then that's okay, but we've seen what it did to a whole industry...and every time we report one, look what happens (Group 2)."

In regards to having a lack of resources needed to follow BSE protocols, one participant said, "If they don't have a head gate and chute to put them in [cows], some guys aren't equipped to do it [tag cattle] (Group 1)."

Response-Efficacy. One research question, "What attitudes do Ontario beef producers have toward the effectiveness (response-efficacy) of the BSE protocols established by the Canadian government?" determined participants' perceptions about whether BSE protocols to work. Thought units regarding response-efficacy accounted for 3.7 percent (n=197) of the analyzed data. Many participants believed that the policies and protocols established by the Canadian government were necessary and were effective, as long as everyone followed them. Participants seemed to believe that the future strength of the Canadian beef industry depended on following these protocols, as they realized that Canada's classification as a minimal risk country is dependent on annual testing of an appropriate number of animals in the high-risk category.

"It is critical that they be followed. If we ever lose the right number and be reclassified, we're back to square one (Group 3)."

Another participant agreed, saying "It's a very good supporting statement to the proactive approach that Canada has – their ear tagging system, the feed ban, even though it's a bit in the press about it now and finally the way they investigated the first case. If you compared all those to what they've done in the U.S., you would see that Canada is the leader. They set the standard for the rest of them to follow (Group 3)."

Another participant shared in respect to the protocols, "It's actually going to make our beef safer because we are testing for it, we are going to catch it. It's going to make it safer (Group 2)."

Self-Efficacy. One research question was posed to determine producers perceived ability to follow BSE protocols, " What attitudes do Ontario beef producers reports about their ability (self-efficacy to comply with BSE protocols established by the Canadian government?" Thought units coded under self-efficacy total 6.5 percent (n=184) of the total data. The primary focus of response from participants were beliefs about the their ability to control the risk of BSE and suggestions about the behaviors they could do to reduce the risk. Participants felt that they were unable or minimally able to control the threat of BSE. Many farmers admitted that some of these behaviors did not follow the protocols established by the Canadian Government. Fewer farmers said that they would report suspect animals to be submitted for testing.

One participant admitted, "...it's a helpless feeling because it's out of our control (Group 2)." Another participant shared the same sentiments, "Agriculture has to be the

only business in the damn world cannot – absolutely no control over what you're going to get for your finished product (Group 1)."

Another participant stated, "Basically, if I have a sick animal, I'm not going to eat it and I'm not going to sell it to someone else (Group 4)."

In regards to following surveillance protocols, one participant admitted that they didn't believe couldn't do so, "If we had a cow that went down and look suspicious. I doubt it very much –I'm sure we wouldn't [report it] (Group 2)."

Knowledge Constructs

Thought units coded as knowledge accounted for 14.5 percent (n=719) of the data. Knowledge statements were not coded for accuracy, but were coded as statements about farmer understanding and beliefs about the science of BSE, government regulations, and the role of members in the food chain.

Science of BSE. Units coded as knowledge regarding the science of BSE accounted for 4.7 percent (n=233) of the data. Participants in most groups had a basic understanding of the science of BSE, but were unsure about what it all meant. Many participants speculated about alternative causes of the BSE and the most accepted theory of the origin of BSE. Few participants mentioned common symptoms of BSE or how to identify a suspect animal.

One participant shared his view of, "I know what the technical stuff they've talked about, but I don't understand it, but I know it's about the disease in their brain. I don't exactly know what that means. I haven't figured it out. It's infuriating. It can be passed to humans if you eat the wrong parts...(Group 4)." Another participant added,

"...From the brains or the spine of an animal, any ways. Sheep or something like that (Group 1)."

Another participant shared, "...From the information that I've got anyways that the transmission of BSE came with imported cattle from the UK where this disease first showed up (Group 2)."

One participant characterized the symptoms of BSE as, "So, there's some type of quivering or unsteadiness (Group 2)."

Government Regulations. Units coded as knowledge of government regulations represented 6.9 percent (n=343) of the data. Of the three knowledge categories, the majority of comments made pertained to government regulations. Overall, participants as a whole were very knowledgeable about the regulations governing the BSE issue in Canada. One participant shared, "To keep our minimum risk status we have to test about 30,000 cattle a year that are 30 months of age and older (Group 3)."

Another participant was familiar with the how to gain the minimal risk classification, "...but the minimal risk, the World Organization, the OIE, minimal risk is category is 2 cases per every million head of cattle per every 12 months (Group 1)."

Food Chain. Units coded as knowledge of the responsibility of other members of the food chain accounted for 2.9 percent (n=143) of the data. Participants comments centered around the fact that the responsibility of food safety in Canada was the responsibility of not just the farmer, but all members of the food chain.

A participant said, "Everybody has to be prepared to do a one hundred percent job right up to the store that got meat in the cooler (Group 3)."

Another producer put some of the responsibility of ensuring food safety on consumers, "The consumer is part of the picture too (Group 3)."

Preferred Sources for Agricultural Information.

One research question was posed to determine what sources Ontario beef producers prefer for agricultural information, " What do Ontario beef producers report as their preferred sources for agricultural information?" Thought units coded as media accounted for 20.4 percent (n=1018) of the data. The media category was subdivided into three categories: media accuracy/inaccuracy (9.2 percent; 458), preferred sources (9.4 percent; n=469) and preferred style (1.8 percent; n=91).

Media accuracy/inaccuracy. Thought units regarding the accuracy/inaccuracy of media represented 9.2 percent (n=458) of the data. Main themes shared by participants revolved around the media not presenting the whole story, media sensationalism, the media not understanding the science that they are communicating, and the accuracy of the farm media, and the media's role in increasing the negative impact on the farm community.

For example, one participant shared regarding the inaccuracy of the media, "The only media coverage that you get is negative. You don't get the positive side, when things are good. You get a bad case, bang second story, third page of the paper or first page when it came out, but other stuff when things start to turn around like, you hear nothing (Group 1)." Similarly, another participant shared, "The media, all they do is highlights. The night it was on the news, of course, that's the night when the tsunami had hit. So, I was just sitting there watching that, and all of a sudden, 'oh another case of BSE', and that was it. And so, it wasn't described more fully. So, even you know, what,

where is it? All these unanswered questions and I'm a producer. So, imagine what the public thinks (Group 2)." In addition, another producer shared, "So much information is out there that's inaccurate, or omits points that could – key points that wouldn't be so harmful to the industry. For example, the Mad Cow, five seconds, whatever was said, we have another case of Mad Cow, but no details. You know, those types of headlines don't help if they don't have the facts right. They should have all the facts (Group 2)."

Another participant felt that the media did not do a good job of getting the whole story out to consumers, "...They [the media] haven't been unfair [to the beef producers], but what I'm saying is their synopsis is not enough to properly inform them [consumers] (Group 4)."

Media sensationalism to sell news was another key theme mentioned by participants. For example, a participant claimed, "...media is just sensationalism selling. That's all media is (Group 1)." Another participant shared, "Media sells by sensationalizing (Group 2)."

Many participants commented about their use of farm media publications. One participant stated, "Farm publication are really good...our own publication s are excellent, but unfortunately the public don't have access to it (Group 2).

In regards to the role of media in increasing the severity of the BSE situation, a participant shares, "We could stress enough how it's so media related (Group3)."

Preferred Sources. Comments regarding preferred sources for agricultural information accounted for 9.4 percent (n=469) of the data. Participants' responses regarding their preferred sources for agriculture information varied depending on the type

of information they were seeking. Furthermore, participants shared characteristics and personality traits that made a source more creditable.

One participant admitted, "I read two or three papers and everyone has a different angle on it and you try to decide what is the truth out of it and usually you can come up with a good idea of what it is. And then you talk to some other people about it – other farmers or somebody that knows more about whatever the topic is...I think read as much as you can – any information that you can get your hands on (Group 1)." Another participant shared in regards to preferred agricultural sources, "I would say the Internet and perhaps farm newspapers and publications (Group 2).

For example, one participant shared the characteristics that are important in a source, "Age and experience. I'd turn to an older farmer in the area any day before I want to a government source or anybody else (Group 1)."

Preferred Style. Thought units coded as preferred style of messages accounted for 1.8 percent (n=91) of the data. Comments focused on the format and length of communication pieces and ideas to increase dissemination of information to farmers through preferred communication channels.

With regards to the media message that was included in the focus group activity, one participant shared, "It's easier to understand cause you can go to the question you want and there's the answer (Group 3)." In another session, another participant shared a similar opinion, "...it's just the format. It's in a question/answer format. It's typical questions that we as producers may be asking (Group 2)."

Another participant commented that attracting producers to a farm/town hall type meeting might enhance communication efforts with producers about BSE, "If you could

attract them [producers] to a meeting and go over it, face-to-face or with a movie or something – visual communication would be far better. But, written – any of us involved in any organizational type thing, it just does not get read. It sits on the corner of their desk and they may or may not ever get to it (Group 4)." Another participant felt that communication efforts should rely on just one channel to disseminate information, "You'll get a certain percentage of people, but you're not going to get them all. I don't think that you can effectively ask one media to - - get your message out to everybody. It just doesn't happen that way.

Behavior

A research question was not posited regarding current behaviors; however current behavior and agricultural practices used by participants was a common theme that emerged from the discussion. Data coded as behavior accounted for 4 percent (n=197) of the gathered data. Overall, participants' comments about current behaviors they implement on their operations to reduce risk revolved around issues of animal health, keep veterinary records for their animals, finding alternative avenues to market their beef, and the need to do so to ensure the continued viability and sustainability of their farm operations.

For example, one participant shared, "...we can take you and show you every animal...any animal that has been doctored, the date, when it's repeated and where that animal came from, what sale it come from, what day it was marketed, what day it went on feed. It's just part of what we have to do to be in business in the feedlot sector anymore because it's part of our efficiencies, we have to have...(Group 3)."

Another producer talked about his successes at finding a new market to sell his beef as a product rather than a commodity, "We just started last year to market beef directly to the consumer in Ottawa (Group 2)."

Stigma

Data coded under the stigma category accounted for 4.9 percent (n=243) of the data. Data coded as stigma included any statements made regarding the perceptions of consumers and other farmers about the BSE issue and fears about being blamed for the collapse of the Canadian beef industry. Key themes emerging in this category included, consumer perceptions about the BSE situation and the support of the Canadian public toward beef products.

For instance, one participant mentioned, "Most consumers think that it's over. They think the big problem is over (Group 1). Another participant added, "Most consumers think that their food comes out of the back of the grocery stores, the don't even realize that it's on-farm (Group 1)."

In another focus group session, a participant shared, "There's lots of perceptions that are the same. That everything is back to where it was [before BSE] (Group 3)."

Another participant shared his views regarding the Canadian public support of Canadian beef producers,"...But we have to give the general population the credit, really. I mean the fact that beef consumption has gone up in this country in some ways is sort of a miracle and in the small world that I circulate in, I mean I've heard nobody say, well you know, I'm not going to eat beef anymore. Now, the odd vegetarian, you know, may say, you know, I've been right all along. You know, I was thinking of maybe having

some snip-it of beef, but I will never, ever. You know, these people didn't eat beef anyhow (Group 4)."

Summary

Chapters Four presented the findings gathered from four focus groups, with a total of 28 participants. Findings for the HBM, knowledge, media and stigma categories were thoroughly discussed. Participant quotes were included to demonstrate the common themes that surfaced for each of the categories. Chapter Five will share the implications and recommendations for these formative research results.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

Introduction

In this chapter, conclusions, recommendations and implications for future communication strategies targeting BSE will be presented based on the findings of the study's two objectives:

1) To investigate and assess the degree to which the main components of the HBM influence Ontario beef farmers' attitudes toward risk.
2) To identify the information sources used and trusted by Ontario beef farmers.

The goal of this study was to investigate Ontario beef farmers' attitudes and beliefs about bovine BSE using the health belief model (HBM). Findings could be used to direct future message design and dissemination. Focus groups provided the setting for an open discussion among farmers affected by the current BSE situation in Canada. Open discussion amongst farms helped identify the relevant concerns of this community, which will help communicators to develop more effective messages. By developing messages that encourage appropriate behaviors that reduce the risk of BSE, increasing the accessibility of reference material, and taking into consideration the barriers limiting the adoption of recommended behaviors, communicators can play a vital role in reducing or eradicating the risks associated with BSE.

Objective One Conclusions

This study assessed the degree to which the components of the HBM (perceived susceptibility, perceived severity, self-efficacy, response-efficacy, perceived benefits, and perceived barriers) influenced farmers' perceptions of the risk of BSE.

Perceived Susceptibility. Approximately 11 percent of the thought units were coded under the perceived susceptibility construct. The majority of comments shared by the participants illustrated that they were knowledgeable about the factors that make herds more vulnerable to contracting BSE. On average, farmers in the focus groups perceived their own herd to not be at risk of exposure to BSE. Farmers believed that their herds were not at risk because they had closed operations, meaning that they did not bring in cattle from other herds and did not feed protein supplements to their animals. For example, one participant explained that his herd was not at risk because he grew everything he fed to his cattle and he did not feed ruminant-derived feed to his animals. Many of the comments shared revolved around the factors that make other farms, e.g., dairy farms or farms in Western Canada susceptible to BSE. Other comments shared revolved around the likelihood of BSE occurring in Ontario and in the U.S. and how the probability of infection is equally likely anywhere in North America.

Perceived Severity. Overall, statements concerning the perceived severity of the situation dominated the four focus group discussions. Approximately 17 percent of thought units were coded under this category. One common theme emerging from the focus group discussion dealt with participants believing that the severity of the situation has been magnified due to political pressures limiting the distribution of Canadian beef into export markets for the past two years. The majority of farmers felt that this situation

was political because if the science is correct and Canada is still classified as a minimal risk country, then export markets should have opened their borders to Canadian beef a number of months ago. They also believed the severity of this situation was far reaching because the farming community was not the only sector feeling the impact of BSE in Canada. Participants shared that farming is a traditionally stressful occupation, but the BSE situation was unlike any they had ever experienced and knew other farmers who were experiencing a wide range of health issues. Participants' comments focused on the number of that had or may soon exit the industry due to the impact that BSE has had on the Canadian beef industry. In addition, participants felt that the impact of BSE would prevent some future farmers from entering the industry, due to the uncertainty of the future and Canada's lack of export markets to Canadian livestock and beef products. Furthermore, participants mentioned that this situation was affecting other industries, such as farm equipment dealers and trucking companies.

Perceived Benefits. Four percent of thought units were coded under this construct. Participants briefly mentioned benefits that have been gained from living through the BSE situation and the benefits to establishing and following BSE protocols. Some of the benefits shared by participants included: 1) that the Canadian beef industry was too dependent on the North American market and establishing a diverse market was critical to the continued viability of the industry; 2) the Canadian public became more aware of food safety initiatives; 3) the protocols developed in response to the treat of BSE will result in safe beef products reaching the consumer; 4) and there were important lessons to be learned from this situation.

Perceived Barriers. Overall, farmers did not spend much time discussing obstacles to following recommended protocols, e.g., reporting a suspect animal. Comments pertaining to perceived barriers accounted for approximately four percent of the data. Farmers were candid about the factors that would limit them from incorporating the recommended protocol established by the Canadian government. The main factors shared that would limit participants' ability to follow these measures, e.g. reporting a suspect animal for testing included the potential negative impact it may have on the industry and lengthening the amount of time that export markets keep borders closed to Canadian livestock and beef products. Furthermore, participants shared that they were concerned about the potential negative impact on their livelihood and the livelihood of other farmers. Many participants reported that how members of the farming community and non-farm public would view them could impede their ability to follow recommended protocols.

Response-Efficacy. Discussion concerning the effectiveness of BSE protocols was limited. Approximately 4 percent of thought units were coded as response efficacy. Overall, the majority of participants believed that the recommended protocols such as BSE testing and the removal of specified risk material (SRM) were necessary and did work. In addition, the majority of participants agreed that the feed ban established by the Canadian government in 1997 was an effective way to control the spread of BSE in Canada.

Self-Efficacy. Thought units surrounding the issue of self-efficacy accounted for approximately 7 percent of the data. Overall, many participants shared their beliefs about how they could possibly control or reduce the risk of BSE infecting their herds. On

average, participants felt they were helpless and had little control over this situation. In addition, many farmers admitted that that some of their behaviors did not follow the recommended practices. Many farmers reported that they would have to really think about all their options before they reported a suspect animal. Few participants said that would definitely report a suspect animal.

Knowledge. Statements made by participants showed they were knowledgeable about the risks associated with BSE. Participants were familiar with leading scientific explanations for the cause of BSE. However, many farmers shared other theories about alternate causes of BSE, such as "naturally-occurring" BSE or BSE being caused by environmental factors. Farmers felt that this other causes of BSE were possible because BSE cases in Canada have only been confirmed on farms in Alberta. This uncertainty regarding the cause of BSE seemed to make some participants speculated if the protocols based on the "ruminant-derived" feed, along with the SRM removal, were enough to eradicate the disease, especially if there are natural occurrences of the disease. Participants were knowledgeable about the regulations and protocols established by the Canadian government, such as the feed ban, removal of specified risk materials (SRM) and testing protocols as part of the National Surveillance Program.

Behavior. Thought units about current behaviors practiced by farmers accounted for four percent of the data. Comments regarding current behaviors focused on animal health practices, keeping up-to-date veterinary records for all animals in their herds, and finding alternative ways to market beef products.

Stigma. Approximately five percent of the data was coded under stigma. Key themes emerging from the four focus groups included consumer perceptions about the BSE situation and the support of the Canadian public since the discovery of BSE.

Objective Two Conclusions

In the mediagraphic questionnaire, participants were asked to rank their five most preferred sources for agricultural information from a list of 12 sources. The majority of participants ranked farm publications (mean ranking=1.61) as their most preferred source of agricultural information. The second most preferred source was the Internet (mean ranking=2.48). Commodity group information was ranked in third (mean ranking=4.19). Newspapers followed in fourth (mean ranking=4.71), and government publications were ranked fifth (mean ranking=4.76). This preferred channels reported by the participants could be impacted by other demographic variables such as the age and education level. For example, with the average age of participants in the study being 49 years of age may explain the popularity of farm publications, commodity group information, newspapers, and farm shows among the participants. Unexpectedly, the Internet ranked second most preferred source of agriculture, but this could have been influence by the fact that the majority of participants had (64.3 percent, n=18) pursued and completed post-secondary education at the community college or university level. In addition, the majority of participants stated that they were responsible for the decision-making on their farm (82.1 percent, n=23). These results illustrates that many of these farmers may use these information sources to gather the information they need to make decision regarding their farm operations. Therefore, farm publications, the Internet, commodity group information, newspapers, and government publications should be considered for

disseminating BSE information to the farming community, which may result in the message reaching the target audience. Furthermore, participants shared that they access a number of different sources before coming to a decision. Therefore, in order to disseminate agricultural information effectively to producers, a number of sources should be used.

Approximately 9 percent of thought units centered on the accuracy/inaccuracy of the media regarding the BSE issue. Many participants spoke at length about the inaccuracy of the media in reporting the BSE issue and the accuracy of the farm media in communicating the issue to farm publics. Participants did realize that information channels such as radio and television did not devote the time needed to accurately cover the issue. Perhaps, this is linked to participants not ranking radio and television among their preferred sources for agriculture information, as they did not receive adequate information about the issue from these sources compared to other sources.

During the focus group discussions, thought units regarding preferred sources for agricultural information accounted for approximately 9 percent of the data. The majority of participants shared that they looked to a number of different agricultural information sources before making decisions regarding their farm operations. Furthermore, participants shared that they access different information sources depending on the situation. This has implications for disseminating information to farmers, as risk communication efforts should use a number of information channels to ensure that the message will reach producers.

In regards to the style of messages, thought units accounted for 1.8 percent of the data. Participants shared that there was more than enough information available about

BSE; however, they preferred the information be in a form, such as question/answer format that could be easily accessed or placed on the fridge or tack board. Perhaps, future communication efforts should attempt to deliver messages in this type of format to help disseminate important information such as BSE symptoms and the steps needed to report a suspect animal to ensure this information reaches beef producers.

Implications for Future Communications Efforts

This section will discuss the implications of the results found in this study and how they can be applied to help guide future BSE communication efforts.

Witte, Meyer and Martell (2001) state that the threat (perceived susceptibility and perceived severity) and the efficacy of the recommended response are among the aspects of a health-related risk message that remain consistent regardless of the health issue, characteristics of the target audience, and the type of message.

Participants in this study felt that their herds were not susceptible to contracting BSE, but feel that the threat of BSE is severe for the Canadian beef industry. Since participants' perceived susceptibility is low, it is important that messages focus on increasing beef producers' perceived susceptibility to BSE to increase beef producers' perceived threat. Witte, Meyer and Martell (2001) recommend that the threat component of messages should focus on how vulnerable the audience is to a threat that is severe in nature. To increase participants' perceived susceptibility to their herd becoming infected with BSE, communication efforts should emphasize to all Canadian beef producers, even those classified as 'low-risk,' that they must be diligent in reporting suspect animals to the Canadian Food Inspection Agency. Communicators will have to create messages that motivate the farming community, especially beef producers, to take a proactive approach

to managing BSE and reducing or eliminating the threat of the disease in Canada. For example, the threat component of a message could say, 'My herd is at risk to contracting BSE and I could lose my farm'. Increasing farmers' perceived susceptibility to the risks associated with BSE may lead producers to proactively deal with and follow recommended protocols for other potential animal diseases such as bovine tuberculosis and foot and mouth disease.

Because the majority of the comments made by participants highlighted the seriousness of this situation to Canadian beef farmers, communication efforts should depict the seriousness of BSE. However, messages should focus on efficacy components to illustrate how following the recommended protocols and anticipating and preparing for potential risks can lessen the severity of the impact. For example, the efficacy component of a BSE message could say, 'It's critical that BSE protocols are followed. They will only work if every farmer follows them. By submitting a suspect animal for BSE testing, I can help the Canadian government track the spread of BSE in Canada'.

Although participants did not discuss benefits of finding BSE in Canada, living through the Canadian BSE situation and following the BSE protocols, communication efforts should attempt to illustrate and promote these benefits to Canadian beef producers. For example, a message about the benefits of discovering BSE and following BSE protocols, could say, 'Finding BSE in Canada has strengthened our food safety system and made consumers aware of the protocols that are in place to ensure that a safe beef product reaches the consumer. By following BSE protocols, we'll have a safer beef product for our consumers'.

Farmers in this study were very much aware of the risks associated with BSE and the cause of the disease, but many barriers seem to limit their ability and desire to follow recommended protocols, even though they believe that the protocols were necessary and worked. Future messages must acknowledge the barriers farmers face and will again have to provide efficacy components to illustrate the positive impact that following these protocols will have on individual farmers and the beef industry as a whole. For example, a message acknowledging the barriers to following the recommended BSE protocols, could say, 'Financial costs to tag all animals for the National Cattle Identification, and the risk of finding another BSE-positive animal will have on the opening of exports markets are valid reasons for not following BSE protocols, however, not following the BSE protocols is putting the Canadian beef industry at risk, as it will make it much for difficult for the Canadian government to determine BSE levels in Canada. By following BSE protocols we can offer a safer product to consumers'.

Communication efforts will have to motivate farmers to follow recommended protocols and provide them with the confidence and belief to successfully adopt the behavior. For example, one farmer admitted that he was not confident that he could determine if an animal fell under the classification of "suspect animal" because he was not familiar with the symptoms of BSE and would have to get a more knowledgeable person to help make the decision. Another participant added that he only had one BSE animal in the news- - the Holstein cow in England, as a reference. Therefore, future communication efforts should attempt to further educate farmers in a concise manner and reflect their knowledge and level of involvement. Perhaps, town hall type meetings in each county, featuring a veterinarian, who is knowledgeable about the symptoms of BSE

and the types of animals that should be reported for testing, should be held to help disseminate this information to the beef producers. In addition, incorporating a producer panel of top beef producers in Ontario at an annual convention or conference to discuss practices that have been implemented to reduce the risk of their livestock contracting diseases such as BSE may help get the message to other producers and evoke change in on-farm practices.

In addition, messages will need to accurately present scientific evidence and take into account that, on average, farmers are very involved in this issue and knowledgeable about the Canadian BSE situation. However, there is a lot of uncertainty concerning BSE, which makes communication efforts challenging. Communicators will want to consider a number of different communication channels, such as the five preferred information sources reported by participants (farm publications, the Internet, commodity group literature, newspapers, and farm shows). By using these preferred information sources, communicators can target messages to increase perceived threat based on the severity and susceptibility of BSE and to provide efficacy components to illustrate how producers can reduce the risk on their farms.

To increase the dissemination of accurate information to the farming community, communication initiatives to beef farmers will have to clearly and concisely dismiss the myths or alternate theories about the cause of BSE and focus on explaining the most widely accepted theory that BSE is caused by contaminated, ruminant-derived feed.

Some farmers also expressed concerns about the transmission of BSE through the feed. Reassurances will have to be included in messages to illustrate how other members of the food chain are working to reduce BSE in Canada. For example, one participant

mentioned that ruminant-derived feed has not been banned for poultry and swine use. Could contamination of cattle feed occur if a load of poultry feed was shipped before a shipment of cattle feed and the transport was not properly cleaned?

Although farmers were familiar with the protocols, many shared that they were uncertain about all the steps that were required to submit a suspect animal for testing. The majority of the participants said that there was ample information about BSE in Canada available to them. However, they felt that they needed information to be in more accessible form. They suggested information could be placed on the refrigerator or placed on a bulletin board, rather than having to dig through piles of publications or surf the Internet. Perhaps the government, industry, or commodity groups could allocate dollars to developing a reference tool that farmers could quickly refer to that has all the key points.

By increasing farmers' perceived susceptibility and perceived severity to the risk, and providing efficacy components and acknowledging the barriers that participants reported, messages will successfully reach beef producers and evoke positive changes.

Implications for Beef Producers Disseminating Information to Media and Consumers

An unexpected result gained from this study was that many participants admitted that the farming community was not effective in communicating their message to non-farm publics. For example, one farmer mentioned that he was surprised at the level of commitment that Canadian consumers held for Canadian beef products - - as beef consumption in Canada has grown since the discovery of BSE. Canadian consumers seem to be very supportive of the Canadian beef industry. However, in saying this, the industry should not take for granted the consumers level of commitment. For example, a

number of participants shared that the majority of consumers are unaware of the plight of the Canadian beef farmer, do not realize that the U.S. border continues to restrict beef imports from Canada, which is intensifying the severity of the situation for the farming community. Therefore, money and communication efforts should be directed by the farming community to ensure that the Canadian public has access to their message. Furthermore, participants' also spoke at length about the media not adequately presenting all angles of the BSE story. It can be argued that farming community has an equal responsibility in insuring that they communicate their stance on the BSE situation to media to ensure that accurate and balanced information is disseminated to consumers and other non-farm publics.

For instance, agricultural commodity groups at the national, provincial, and county level may consider allocating a percentage of their operating expenses into communication initiatives and public relations, to get their message out and heard by the non-farm publics.

In addition, some participants mentioned there are definite lessons that can be learned for this situation. The area of risk management and risk communication has seemed to move to the focal point of the agricultural industry. In recent years, industry and government have been working to incorporate risk management strategies into the agricultural sector, such as implementing on-farm HACCP programs and requiring farms in Ontario to develop nutrient management plans (OMAF, 2002). Perhaps, in the same token, commodity groups and farmers should invest in proactive risk management or contingency planning for future animal and public health issues. Such an approach may reduce the negative impacts of futures, as steps will be in place to immediately handle

potential agricultural risk that may hit the beef industry such as bovine tuberculosis, foot and mouth disease, and environmental and nutrient management issues.

Future Research

This study was conducted to gather baseline data about the attitudes and beliefs of farmers from four counties in Ontario hold regarding the BSE situation they are currently facing. Because a convenience sample was used in this study and not all counties in Ontario were included, the findings cannot be generalized to all beef farmers in Ontario or to all farmers in the counties were the focus groups were held. Therefore, further research should be conducted, perhaps using a mail questionnaire, based on the findings from this study and using a random sample of beef farmers in Ontario. In addition, it would be interesting to conduct similar focus groups in the Michigan or other high beef producing states to compare the beliefs of farmers in the North American market.

As mentioned by many participants, a number of aspects of the food production chain have been negatively impacted by the BSE situation. It would be beneficial to conduct focus groups with individuals representing various components of the food production chain to better understand their attitudes and beliefs about BSE.

Conclusion

In conclusion, this study provides insight using the HBM to organize and code data about the beliefs and attitudes of Ontario farmers about the BSE situation. The scientific community is still working to uncover more about the science of BSE. As scientific knowledge about BSE grows and uncertainty decreases, it will be necessary to further understand how farmers perceive the threat of BSE and assess their risks to help

create effective communication campaigns targeted at beef farmers. This research study provides preliminary insights that can help direct future message development around the issue of BSE. Additionally, this study may prompt government, industry and commodity groups to assess the effectiveness of their communication efforts toward farmers and reconsider priorities regarding BSE and other potential threats that may negatively impact the industry after BSE.

APPENDIX A

MICHIGAN STATE
UNIVERSITY

Revision Application Approval

December 13, 2004

To Luke Reese
409I Agriculture Hall

Re **IRB # 04-592** Category: EXPEDITED 6,7
Revision Approval Date: December 10, 2004
Project Expiration Date: August 11, 2005

Title USING THE HEALTH BELIEF MODEL (HBM) TO DETERMINE THE BELIEFS AND ATTITUDES OF ONTARIO BEEF FARMERS CONCERNING THE CANADIAN BOVINE SPONGIFORM ENCEPHALOPATHY (BSE) SITUATION

The University Committee on Research Involving Human Subjects (UCRIHS) has completed their review of your project. I am pleased to advise you that **the revision has been approved**

This letter notes approval for changes made in the informed consent, instrument(s), and subject incentive.

The review by the committee has found that your revision is consistent with the continued protection of the rights and welfare of human subjects, and meets the requirements of MSU's Federal Wide Assurance and the Federal Guidelines (45 CFR 46 and 21 CFR Part 50). The protection of human subjects in research is a partnership between the IRB and the investigators. We look forward to working with you as we both fulfill our responsibilities.

Renewals: UCRIHS approval is valid until the expiration date listed above. If you are continuing your project, you must submit an ***Application for Renewal*** application at least one month before expiration. If the project is completed, please submit an ***Application for Permanent Closure***

Revisions: UCRIHS must review any changes in the project, prior to initiation of the change. Please submit an ***Application for Revision*** to have your changes reviewed. If changes are made at the time of renewal, please include an ***Application for Revision*** with the renewal application.

Problems: If issues should arise during the conduct of the research, such as unanticipated problems, adverse events, or any problem that may increase the risk to the human subjects, notify UCRIHS promptly. Forms are available to report these issues.

Please use the IRB number listed above on any forms submitted which relate to this project, or on any correspondence with UCRIHS.

Good luck in your research. If we can be of further assistance, please contact us at 517-355-2180 or via email at UCRIHS@msu.edu. Thank you for your cooperation.

Sincerely

Peter Vasilenko, Ph.D
UCRIHS Chair

c Michelle Marie Ruth McMullen
1404 Spartan Vlg
APT H
East Lansing MI 48823 5705

OFFICE OF
RESEARCH ETHICS AND STANDARDS
University Committee on Research Involving Human Subjects
Michigan State University
202 Olds Ha
East Lansing, MI
48824
517/355-2180
FAX: 517/432-4503
Web: www.msu.edu/unit/humansubjects/
E-Mail: ucrihs@msu.edu

APPENDIX B

<date>

Michelle McMullen
Graduate Student
406 Agriculture Hall
Agriculture and Extension Education
Michigan State University
East Lansing, MI 48823

Dear <name of Ontario Cattlemen's Association Member>,

My name is Michelle McMullen and I am a graduate student at Michigan State University. My Master's research project is related to improving agricultural-based risk communication efforts with farmers in Ontario. I am writing to invite you to a focus group interview to discuss your insights, views, beliefs and attitudes regarding the BSE issue currently facing Canadian farmers. Your time and honest comments will provide valuable insights into the important factors that guide farmers decision-making related to agricultural-based risk issues, such as BSE and will be beneficial to the design of future communication campaign initiatives and research projects.

Your participation in this study is completely voluntary. You can choose not to participate or not answer certain questions. This study will consist of a 1.5 to 2 hour group interview (focus group). The focus group will be tape-recorded to ensure that no participant comments are missed and increase the accuracy of the data collection. If you are uncomfortable with being tape-recorded, please do not agree to participate in this study. At any point during the focus group, you can request to have the tape recorder turned off for a question or elect not to respond.

Dinner will be served at the beginning of the interview. You will receive an honorarium of $10 (Canadian) for participating in this study.

The focus group session will be held on [date] at [time] at [location].

All comments shared during the interview are confidential. I will be solely responsible for analyzing the data and writing the report, which will be completed by December 2004. At the end this study, all documents with your name or address will be destroyed. Your privacy will be protected to the maximum extent allowable by law. If you are interested in participating please contact <name> at the Ontario Cattlemen's Association by <date>. If you have any questions, please contact me at (517) 420-0448 or at mcmull30@msu.edu.

Thank you in advance for your consideration. Please feel free to contact Dr. Peter Vasilenko, Chair of the University Committee on Research Involving Human Subjects at (517) 355-2180, if you have questions concerning your role and rights in this study.

Sincerely,

Michelle McMullen
Graduate Student

APPENDIX C

Informed Consent

Project Title: Using the health belief model (HBM) to determine the beliefs and attitudes of Ontario beef farmers concerning the Canadian BSE situation

Participation in BSE Focus Group <date, location>

This focus group interview will address your thoughts, beliefs and attitudes about the Canadian BSE situation. By signing this form, you give the researcher your permission to share reports from the comments shared in the focus group discussions with the extension education and agricultural communication research communities, via professional journals, conferences and / or conference proceedings. Names of participants will not be used in any reports. Your comments will be very beneficial in future agricultural-based risk communication efforts with farmers and direct further research opportunities.

Your participation in this study is completely voluntary and you will receive an honorarium of $10 Canadian for participating in this study. Focus group sessions will be audio taped to increase accuracy of transcription, and the audiotapes will be destroyed at the end of the research study. At any point during the focus group, you can request to have the tape recorder turned off for a question or elect not to respond. The focus group will last for approximately 1.5 to 2 hours depending on the length of the discussion. You may refuse to respond to any questions that you feel uncomfortable with and we can stop the taping anytime at your request. The researcher will be the only person to see your remarks and all input will be kept confidential. Electronic data will be stored on a password-protected computer and / or in a locked cabinet.

My involvement in this study includes moderating the focus group session and analyzing data generated from the focus groups. A scribe will be present during the focus group to record key themes and comments shared during the discussion. Again, your information will be kept strictly confidential and your comments will not be identifiable in any reports or findings.

Your privacy will be protected by the maximum extent allowable by law.

Your cooperation will help increase our knowledge regarding the beliefs and attitudes of Ontario farmers about BSE, which will lead to enhanced communication efforts with the agricultural community about risk issues such as BSE.

If you have any questions, please contact:

Michelle McMullen
406 Agriculture Hall
Michigan State University
East Lansing, MI 48823
mcmull30@msu.edu
(517) 355-6580 ext. 234 or (517) 420-0448

If you have any questions about your role and rights in this study, please contact:

Peter Vasilenko, Chair
University Committee on Research Involving Human Subjects (UCRIHS)
202 Olds Hall
East Lansing, MI 48824-1046
ucrihs@msu.edu
(517) 355-2180

I, _____ voluntarily agree to participate in the focus groups about the Canadian BSE issue conducted by Michelle McMullen and agree to have my voice audio-taped.

Signed _____
Date _____

APPENDIX D

Demographic and Mediagraphic Questionnaire

1. Are you? (*Please check one*)

   ☐ Male ☐ Female

2. How old are you? _____ years

3. Identify the highest level of formal education you have completed. *(Please check one)*

   ☐ Some high school ☐ High school graduate
   ☐ Some community college ☐ Community college graduate
   ☐ Some university ☐ University graduate

4. Where is your farm located? _____ County

5. Please describe your involvement in farming. (*Please check one*)

   ☐ Part time ☐ Full time

6. How many years have you been farming? _____ years

7. Are you responsible for the decision-making on your farm?

   ☐ Yes ☐ No

8. How many acres of land do you farm (*Include both rented and owned land*)? _____ acres

9. Approximately what percent of your gross income comes from farming? (*Please check one*)

   ☐ Less than 25% ☐ 25 to 49%
   ☐ 50 to 74% ☐ 75% or more

10. Approximately what percentage of your gross farm income is earned from raising beef cattle? *(Please check one)*

    ☐ Less than 25% ☐ 25 to 49%
    ☐ 50 to 74% ☐ 75% or more

11. How many bulls are currently on your farm that are one year or over? _____ bulls

12. How many cows (including heifers which have calved) are there on your farm? _____ cows

13. How many heifers are currently on your farm that that are one year old and over? _____ heifers

14. How many steers are currently on your farm that are one year and over? _____ steers

15. How many calves are currently on your farm that are under a year old? _____ calves

16. Do you raise other livestock?

    ☐ Yes ☐ No

    If yes, please identify the other types of livestock on your farm.

    _____

    _____

    _____

17. How do you prefer to receive agricultural information? (*Please rank your top five, please put a 1 beside the information source you most prefer, 2 beside the information source you prefer second most, and so on.)*

__ Farm publications
__ Internet
__ Radio programming
__ Farm shows
__ Commodity group literature
__ Neighbours
__ Newspaper
__ Commercial literature
__ Television programming
__ Government publications
__ Government commodity specialists
__ Other farmers

APPENDIX E

Moderator Guide

Section A – INTRODUCTION

Good evening and welcome to tonight's session. Thank you for agreeing to participate in tonight's discussion about the Canadian BSE issue. My name is Michelle McMullen and I am a graduate student at Michigan State University, studying agriculture and extension education. I am interested learning about how you feel about the BSE issue in Canada. Farmers from across Ontario have been invited to share their perceptions, beliefs and attitudes about this issue.

Before we begin, let me share some ground rules for tonight's session. Please speak up and only one person should talk at a time. This session will be tape recorded because we don't want to miss any of your comments. If several people are speaking at one time it will make transcription more difficult and we may miss some of your comments. We will be one a first name basis tonight. No names will be will be included in any of the reports. Your comments are confidential. Keep in mind that your comments – both positive and negative will help us in our efforts to improve communication about agricultural-based risk issues with the farming community.

There are no right or wrong answers. We want everyone to feel comfortable sharing their ideas, thoughts, beliefs and feelings. Please do not be afraid to tell the group what you think, even if it sounds that you are disagreeing with others or if it sounds strange. We expect that you will have different points of view. Please feel free to share your opinions even if it differs from what others have said. Sometimes it might seem hard to speak up, but everyone should try to talk if they have something to say. Next, do not interrupt each other. Finally, be respectful of others comments, even if you don't agree with what has been said.

Feel free to get up and get more refreshments if you would like. Finally, if you need to use the washroom, please get up quietly and come back so we can hear more of your thoughts. Are there any questions? Okay, let's begin.

SECTION B – WARM UP

I'd like to begin by having everyone tell us their name and the number of years they have been farming.

SECTION C - ACTIVITY

1. We'd like you to take a look at a media message about an agricultural-based risk issue. Please take a moment to look at it.

Probe: What do you like about it?
Probe: What do you dislike about it?
Probe: Is there anything that is "important" to remember about this message?
Probe: Do you understand the content of this message?
Probe: Do you like the style in which the message was presented?

2. Where do you usually look for advice or information to make decisions regarding your farm?

Probe: Whom would you prefer to talk to about agricultural issues that may influence or impact your profitability (or long term viability) of your farm? Why?
Probe: What makes someone or a source better than another? Why?
Probe: Are there certain agricultural-based issues or situations where one source would be better than another?

3. How often have you discussed mass media coverage with a) family members b) other farmers c) extension agents (TV, newspaper, farm publications, radio, etc.) about the BSE situation currently facing farmers in Canada?

Probe: What kinds of things did you talk about?
Probe: Are there others who you have discussed this issue with?

SECTION D - KNOWLEDGE OF BSE

4. What does BSE stand for?

5. What is it?

Probe: How do cows become infected with BSE?
Probe: How is BSE passed onto other cattle?
Probe: What steps should be taken if a farmer thinks one of their cows is infected with BSE?

SECTION E - PERCEIVED SUSCEPTIBILITY

6. How likely do you feel that it is for cattle from Ontario farms to get BSE?

Probe: Can BSE be passed from one animal to another animal?
Probe: What symptoms do BSE infected cows display?

Probe: Do you feel that your herd is at greater risk of contracting BSE following the discovery of the BSE-positive cow in Alberta in 2003 than during the BSE epidemic in the UK?

7. What makes one herd more at risk to BSE than another herd? Why?

SECTION F - PERCEIVED SEVERITY

8. In your opinion is BSE more than just an animal health issue?

9. How serious is the BSE issue for beef farmers in Ontario?

Probe: What does the confirmation of one BSE-positive cow mean to you and your farm operation?
Probe: Other than economic risks of BSE to farmers, can you think of any other risks that are associated with BSE?
Probe: Have you ever worried about your herd becoming exposed to BSE?
Probe: What does BSE mean to you and your farm operation?
Probe: Do you think that Ontario beef farmers should be concerned about BSE?

SECTION G - PERCEIVED BENEFITS

10. What are the benefits of knowing about BSE?
Probe: Are you familiar with BSE surveillance measures at the federal and provincial level?
Probe: What are the benefits of following surveillance measures established by the Canadian Food Inspection Agency?
Probe: Are there any benefits to the Canada's Surveillance System discovering a BSE-positive animal?

SECTION H - SELF-EFFICACY

11. Can you control the chance of your herd becoming exposed to BSE?

12. What can you do to protect your herd from BSE?

13. What can farmers do to reduce the risk of BSE?

Probe: Does the BSE surveillance measures adequately reduce the risk of BSE in Canada?
Probe: What role does the farming community play in ensuring safe food reaches consumers?

14. How confident do you feel that you can follow BSE surveillance measures? Why?

SECTION I - BARRIERS

15. What factors would limit you from incorporating the recommended surveillance protocols developed by the Canadian Food Inspection Agency (i.e., reporting of a downer cow or suspect animal)?

Probe: Do you think that you will worry less, more or the same about BSE in the future?

Probe: Are the recommended BSE surveillance measures clear and easy to understand?

SECTION J – CONCLUSION

We have completed the focus group questions. Do you have any other comments or questions that you would like to share with the group? Thank you for your taking time out of your busy schedule to participate in this study. Here is my business card if you need to get in touch with me with any questions, concerns or other input. Thanks again.

APPENDIX F

Unitization

Approach: To use a level of analysis that allows the researchers to capture the richness and complexity of the data. Researchers are seeking 100% coder agreement on unitization.

Unitization rules

- Unit of analysis is a thought unit. Typically, a thought unit consists of a subject/verb pairing or a simple sentence.
  - Example: "The only media coverage that you get is the negative."
  - Example: "I think they've done a good enough job of this surveillance testing."
  - Example: "I think producers are waiting to see what happens with the latest case."
  - Example: "The style is good."

- Within compound and complex sentences, multiple thought units will exist and should be coded individually as thought units.
  - Example: Yeah, so. If it hadn't been BSE, it would have been something else. / I think that the timing was really bad for us. / As Participant [X] says it's a political issue / and it unfortunately, BSE we had a case / and it was just really bad timing / and once again the media, / it's from the sensationalism / and the psychological...

- Key words to look for between thought units: but, because, and as well as, so, etc...

- Do not allow punctuation to guide coding, as it is subjective to the transcriber.

- Qualifiers should not be coded as an individual thought unit.
  - Example: You know, so what you're say, in other words

APPENDIX G

Coder Definitions				
OVERALL CATEGORY	SECONDARY CATEGORY		CODE	EXAMPLES
Threat: Any statement suggesting a source of danger	Severity: How bad is BSE?		SEV-1	• "…most serious issue we've ever faced…" • "We're hanging by our fingertips and it looks like they're going to break." • "It's cost me equity…" • "One cow destroyed the whole country." • "We'll always think about this equity erosion for the problems we're facing."
	Susceptibility: How likely is your herd to contract BSE?	Self: How likely is your herd to get it?	SUS-2A	• "I don't feel that my herd is at risk."
		Other: How likely are other farms to contract BSE?	SUS-2B	• "I think that the probability is very high." • "But, I think that it was a Western [Canada] problem."
		How likely are people to contract vCJD?	SUS-2C	• "We don't eat brain here." • "Taking out the SRM's that's going to prevent transmission."
Knowledge: Any statement or belief about BSE	BSE: What is BSE? What are the symptoms? How do cows become infected with BSE?		BSE-3A	• "A prion in the meat source." • "…you could come down with Creutzfeldt-Jakob Disease."
	Government regulations: Familiarity with government regulations (i.e. surveillance and risk reduction)		GOV-4	• "They're putting extreme pressure on us to report these cows." • "The surveillance has nothing to do with the risk…"

	Food chain: Any statements about the role of producers, slaughter houses, packers, government, etc.	FC- 5	• "Everybody has to be prepared to do a 100 percent job right up to the store that that's got meat in the cooler." • "The consumer is part of this picture too."
	Stigma: Fear of being blamed for collapse of Canada's beef industry, fear of consumer perceptions, perceptions of other farmers	STIG-6	• "I'm a bit concerned about how the public views us." • "...the consumer thinks BSE is over..." • "...is it safe now to eat beef?"
Efficacy: Any statement about a belief about whether or not you can do something	Perceived Benefits: Advantages gained as a result of following surveillance protocols or knowing about BSE or finding BSE in Canada	BEN-7	• "...from a health perspective maybe." • "Keep it [BSE] out of our foods." • "...maintain consumer confidence." • "...every animal is traceable to where it came from."
	Perceived Barriers: Things that stop farmers from following recommended practices (i.e. reporting suspect animals)	BAR-8	• "Might be fear of community or public response..." • "And every time we report on [BSE-positive animal] look what happens."
	Self-Efficacy: Ability of an individual to do the recommended behavior	SE-9	• "If we had a cow that went down and looked suspicious, I doubt it very much [reporting it to authorities]..." • "I'm not sure that we would call them." • "I'd report it."
	Response-Efficacy: Will the recommended behavior work?	RE-10	• "Taking out the SRMs, that's going to prevent transmission." • "It's actually going to make our beef safer..."

Behavior: Any statements about things being done to prevent/protect	Statements of behaviors that farmers are actually doing. This includes knowledge of BSE symptoms and prevention.	BEH-11	• "We did more to value add to them..." • "I've written records of every health treatment I've done in the last 5 years."
Media	Statements about accuracy/inaccuracy of media sources.	MED-12	• "The media all they do is the highlights." • "Media sells by sensationalizing." • "The only media coverage that you get is the negative."
	Statements about preferred information sources.	INFO-13	• "Other farmers, vets." • "I read and talk to farmers too. A combination of the two." • "I'd say the Internet and perhaps farm newspapers and publications."
	Statements about preferred message style.	STYLE-14	• "It be nice to see the media put something like this in plain form like that for the general public..." • "I like it better when there are questions."
Other: Any other statement that does not explicitly fit in the above categories		OTH-15	• "Along with most colleges don't care..."

Note: Each thought unit is only to be coded into one category.

Decision Rules: any unit that could fit into a knowledge category OR threat, efficacy, or behavior category will be placed in the category that is not knowledge. In other words, threat, efficacy, or behavior categories take precedence over knowledge.

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