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Examining the Current U.S. Beef Trade Policies Concerning the Testing for Mad Cow Disease

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Examining the Current U.S. Beef Trade Policies Concerning the Testing for
Mad Cow Disease

by

David C. Miller

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science
Department of Environmental Science and Policy
College of Arts and Sciences
University of South Florida

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Dedication

This work is dedicated to Alexander Caleb Montgomery and his yet to be born sister.
May you have wisdom and courage.

Acknowledgements

The list of people who helped to make this thesis possible is extensive, and I will do my best to remember them all: Mom, Dad, Crystal, Paul and Teresa, Dr. L. Baird and Mrs. J. Baird, for their constant assistance and encouragement during my undergraduate years. Dr. Andrew T. Price-Smith, for his wisdom, patience and guidance over the past four years. Dr. John Daly and Dr. Dave Morgan for their assistance and expertise. All of those who assisted with my research. The faculty and staff of the Environmental Science and Policy Department at the University of South Florida, Tampa, FL, Dr. Robert Brinkmann and Dr. Eric A. Oches. The best teaching assistants I could hope to work with: Robert Mrykalo, Kelly (Wilson) Cupoletti, Lisa Fairchild, Per Nixon, Jeanne Lambert, Kirk Sander, Mark Mueller, Erin McMahan, Lindsay Griffen, Jason Hosford, and Kelly Gleaton. Jonathan I. McDaniel, my friends at The McNeil Group, Sunrise, FL, Rachel Connors, James Lovelace, Matthew and Melanie Montgomery, Ron Sarno and Melissa Grigione and anyone else I forgot to mention.

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ABSTRACT

Despite existing mad cow disease surveillance efforts in the United States, in place since the 1980's, a cow that tested positive for mad cow disease was granted entrance into the U.S. in December, 2003. The cow that tested positive, according to witnesses, displayed no symptoms that are synonymous with advanced bovine spongiform encephalopathy, BSE. This occurrence had detrimental effects on the U.S. beef export market, as many countries banned American beef. Estimates of the damage inflicted reach into the billions of dollars. BSE in the U.S. has the potential of causing damages in other aspects as well. Aside from the fact that BSE is a public health issue, it has caused political rifts between nations, particularly between Canada and the U.S. It can undermine confidence in the USDA and confidence in the government's ability to handle emergencies. BSE can imperil American good that contain beef or beef products. Finally, it can undermine trust in scientists to provide useful guidance. The subtle changes in U.S. BSE surveillance efforts in the 1980's were greatly surpassed by the changes that were made when a BSE-positive cow was discovered in Washington State in 2003. However, there remains room for much needed improvement in U.S. BSE surveillance efforts. These changes include: increased testing to include all cows

slaughtered in the U.S. and all imported beef products, a nationwide animal tracking program, increased proficiency in training of inspectors, and the implementation of strict rules governing the ingredients of animal feed. The implementation of regulations based on economics instead of public health concerns has the potential to leave loopholes in regulations that the BSE agent might exploit. By enacting the recommendations made in this thesis, the U.S. will greatly increased its' odds of stopping the entrance and proliferation of BSE within its' borders.

Introduction

Within the past few decades, several new threats to human and national security have emerged including terrorism, environmental change and infectious disease. In the past half century, the world has experienced dramatic changes in the ways in which business is conducted. The overall trend has been toward a global market system or globalization. Globalization is defined as “to make global or worldwide in scope or application.”¹ The globalization of markets can create conditions where the economic and social aspects of struggling states can be improved, creating opportunities for increased foreign investment and increased gross domestic product output. However, with increases in the volume and speed of trade comes increasing probability of a given society’s exposure to novel pathogens. Increased pathogenic exposure, due to growing volumes of imported goods and migration, without significant increases in the capacity to monitor for such things as pests and disease, can have the effect of stressing and overwhelming surveillance efforts.

The importation of infectious disease can be detrimental to both the importing state and the exporting state as it induces stresses on trade and political relations. In *Plagues and Politics*, Davis and Kimball state: “The state of food and water safety ‘at home’ among trading economies affects the risk of epidemics in their own economies,

¹ www.websters.com, (6-2-04).

and the risk of economic impact to their trading partners.”² The introduction of disease can have dire consequences including increased morbidity and mortality in human and animal populations, economic decline, and decreased state capacity. Conversely, improving public health can contribute to the economic productivity of a society. This growing "economic capacity" may in turn be channeled back into public health infrastructure to create a positive feedback loop.³ In the post-Cold War era, policy-making communities are increasingly confronted with significant new challenges to the security and prosperity of the citizens over which they preside.⁴ The emergence of bovine spongiform encephalopathy, BSE, also known as “mad cow disease,” in the U.K. in the 1980s and its proliferation throughout Europe during the 1990s exemplifies the fact that a pathogen can generate significant economic damage and political acrimony between nations. BSE emerged in the U.S. when a cow that was imported from Canada tested positive in December, 2003. Despite existing surveillance measures, this cow was allowed entrance into the U.S. Its' infected condition was not discovered until the time of slaughter on December 9, 2003 and a positive test result was not confirmed until December 23, 2003.⁵ The discovery of one case of mad cow disease took a heavy toll on both domestic and export beef markets, inflicting an estimated \$6 billion worth of economic damage. While the number of cases of the human form of BSE is relatively low, the fear that the disease induces is very high, possibly because of its' incurable, and to a large extent, untreatable nature or because it comes from a product that many

² Davis and Kimball, p.70.

³ Price-Smith, p. 80.

⁴ Ibid., p.1.

⁵ United States Department of Agriculture, "USDA Makes Preliminary Diagnosis of BSE," December 23, 2003, <http://www.usda.gov/Newsroom/0432.03.html>, (5-29-2004).

Americans consume on a daily basis. The International Health Regulations, IHR, were enacted to provide maximum security against the international spread of disease with minimal interference with world traffic.⁶ The IHR has been revised since its inception in 1851; however, the latest edition only recognizes cholera, plague, and yellow fever, with no reference to prion (PREE-on) diseases.⁷ ('Prion' is derived from '*proteinaceous infectious particle*').⁸ Ridley and Baker give a description of prion disease in humans:

"The patient's condition deteriorates almost daily as doctors attempt to make a diagnosis and the family struggles to accept what is happening. It can be so rapid that, initially, the illness may be misdiagnosed as 'stroke', and the patient may progress from health to death in a week or two. But the disease process actually bears a close resemblance to those of the much slower neurodegenerative diseases of old age, and some patients with prion disease may suffer mental and physical incapacity for many years."⁹

Since 1986, BSE cases have been identified in 20 European countries, Japan, Israel, and Canada.¹⁰ Worldwide there have been more than 180,000 cases since the disease was first diagnosed in 1986 in Great Britain.¹¹ Data suggests that BSE is continuing to increase in certain countries (see Table One). For example, between the years 2003-2004, the Czech Republic, Poland, and Slovakia experienced increases of 75%, 220%, and 350% respectively. BSE incidence in these countries, as well as other countries where the number of BSE cases have increased since cattle tracking began in 2003, should be kept

⁶ <http://www.who.int/csr/ihr/en/>, (26 February 2005).

⁷ <http://www.who.int/csr/ihr/current/en/> (26 February 2005).

⁸ Ridley and Baker, p.12.

⁹ Ibid., p.1.

¹⁰ Centers for Disease Control, "Bovine Spongiform Encephalopathy in a dairy cow --- Washington State 2003," January 9, 2004, <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5253a2.htm>, (5-28-2004).

¹¹ Animal and Plant Health Inspection Service, "Bovine Spongiform Encephalopathy (BSE)," <http://www.aphis.usda.gov/lpa/issues/bse/bse-overview.html>, (6-1-04).

under close observation; a continued increase in the number of cases a country confirms could indicate a breakdown in the BSE surveillance system process, improper implementation of surveillance protocols, or new means of transmission.

Table One
Number of Cases of BSE for Selected Countries 1989-2004

| Country | Number of cases of BSE (1989-2004) ^{12,13} | BSE cases identified in 2003 | BSE cases identified in 2004 |
|----------------|---|------------------------------|------------------------------|
| Austria | 1 | 0 | -- |
| Belgium | 129 | 15 | 11 |
| Canada | 5 | 2 | 1 |
| Czech Republic | 15 | 4 | 7 |
| Denmark | 14 | 2 | 1 |
| Finland | 1 | 0 | -- |
| France | 945 | 137 | 54 |
| Germany | 357 | 54 | 59 |
| Greece | 1 | 0 | -- |
| Ireland | 1488 | 183 | 126 |
| Israel | 1 | 0 | 0 |
| Italy | 124 | 29 | 7 |
| Japan | 14 | 4 | 5 |
| Liechtenstein | 2 | -- | -- |
| Luxembourg | 2 | 0 | 0 |
| Netherlands | 77 | 19 | 6 |
| Poland | 22 | 5 | 11 |
| Portugal | 950 | 133 | 92 |
| Slovakia | 20 | 2 | 7 |
| Slovenia | 20 | 1 | 2 |
| Spain | 491 | 167 | 131 |
| Switzerland | 456 | 21 | 3 |
| U.K. | 184045 | 612 | 242 |
| TOTAL | 189165 | 1390 | 765 |

In 1996, ten years after the initial BSE diagnosis, a new form of Creutzfeldt - Jakob disease was discovered: new variant Creutzfeldt-Jakob disease, (vCJD), a rare,

¹² http://www.oie.int/eng/info/en_esbmonde.htm (26 February 2005).

¹³ http://www.oie.int/eng/info/en_esbru.htm (26 February 2005).

degenerative, fatal brain disorder in humans.¹⁴ Studies by Almond and Pattison have indicated that the prion agent responsible for the two diseases (BSE in cattle and vCJD in humans) is identical.¹⁵ As of December 1, 2003, a total of 153 cases of vCJD had been reported in the world: 143 from the United Kingdom, six from France, and one from each of Canada, Ireland, Italy, and the United States.^{16,17} The economic impact of BSE has been far reaching, affecting many different aspects of the beef industry in the U.K. and in the U.S. These major impacts include decreased demand for beef, closing of export markets, destruction of animal stocks, increased spending due to heightened disease surveillance, and loss of confidence in the beef industry and/or government disease surveillance ability. In 1990, the ban of British beef and the accompanying fear that BSE induced, cost the British meat industry about 500,000 pounds a day;¹⁸ the equivalent of \$780,650 U.S. dollars per day (in 2003 U.S. Dollars).¹⁹ The cumulative budgetary cost of BSE since March 1996 is likely to reach 3.5 billion pounds by the end of the present financial year.²⁰ In 2003, the quantity of U.S. beef exports was estimated at about 2.6 billion pounds, accounting for 10 percent of U.S. beef production. The value of exports of our [U.S.] beef, veal and variety meats is estimated at about \$3.8 billion for 2003, and we [U.S.] exported another \$65 million worth of live cattle.²¹ The fallout from

¹⁴ Centers for Disease Control, "Creutzfeldt-Jacob Disease Fact Sheet," http://www.cdc.gov/ncidod/disease/cjd/cjd_fact_sheet.htm, (5-28-04).

¹⁵ Almond and Pattison, p. 437-438.

¹⁶ The Canadian, Irish, and U.S. cases were reported in persons who resided in the United Kingdom during a key exposure period of the U.K. population to the BSE agent.

¹⁷ Centers for Disease Control, "Fact Sheet: New Variant Creutzfeldt-Jakob Disease," January 20, 2004, http://www.cdc.gov/ncidod/diseases/cjd/cjd_fact_sheet.htm, (5-28-04).

¹⁸ Thomas, David, David Goodhart and Tim Dickson. "W. Germans join boycott of UK beef." *Financial Times*. 2 June 1990. Section 1. p. 1. (Lexis-Nexis Universe).

¹⁹ <http://www.indosite.com/currency.html>. (4-06-05).

²⁰ <http://www.iica.org.ar/Bse/14-%20Atkinson.html>. (9-12-04) (Link no longer active.)

²¹ U.S. Department of State, Embassy of the United States Japan, <http://japan.usembassy.gov/e/p/tp-20040123-04.html>. (8-08-04).

the 2003 U.S. mad cow scare included the banning of American beef from such countries as Japan, South Korea, Mexico, Russia, Thailand, Malaysia, Chile, Australia, Singapore, Taiwan, and the Chinese territory of Hong Kong.²² A more conservative estimate states that the discovery of a cow in the U.S. that tests positive for mad cow disease can pose a \$2 billion threat to the U.S. economy.²³ The emergence of mad cow disease in Canada had a similar effect.

“Officials there [in Canada] also have pointed out that when the Canadian case was revealed in May, the United States imposed a complete and sweeping ban on Canadian beef. Canadian ranchers were suddenly cut off from their most important market and destination for 70 percent of Canada’s beef exports. Now, there are too many live cattle not being sent to slaughter, cattle prices are depressed and some ranchers are facing the prospect of bankruptcy. The industry as a whole has lost more than \$1 billion in sales since May because of mad cow disease.”²⁴

Over a seven month time period, from May 2003 to December 2003, the Canadian cattle industry lost \$1 billion in sales. Another estimate states that the decrease in export of Canadian beef resulted in a \$1.9 billion hit in export sales.²⁵

²² Patrick E. Tyler, “Mad Cow Disease in the United States: Reaction; Long String of Countries Suspend Imports of American Beef.” *The New York Times*. Late Edition – Final, 25 December 2003. A-22. (Lexis-Nexis Universe).

²³ Tracy Connor. “There’s Cows for Concern dozen nations ban U.S. Beef as a precaution.” *Daily News*. Final Edition, 25 December 2003. sec. News, p.5. (Lexis-Nexis Universe).

²⁴ Denise Grady. “U.S. Issues Safety Rules to Protect Food Against Mad Cow Disease.” *The New York Times*. Late Edition-Final, 31 December 2003. sec. A, p. 1. (Lexis-Nexis Universe).

²⁵ Lisa Schmidt. “U.S. delays reopening border to beef: Will wait out mad cow probe results.” *Calgary Herald*. Final Edition, 3 January 2004. sec. News, p. A1. (Lexis-Nexis Universe).

Objectives

The objectives of this thesis are as follows. The first objective is to determine the shortcomings in policy and surveillance that led to the emergence of BSE in the U.S. in 2003. The second objective is to determine the resulting effects on the U.S. economy. This objective will be approached from the macro and sectoral levels. The third objective is to analyze the policy changes that were generated by the discovery of BSE on U.S. soil. The final objective is to make appropriate recommendations to ensure that further cases do not appear.

Methodology

In order to examine this topic, the variables need to be operationalized. For this thesis, the variables will be classified into three categories. The independent variable will be the emergence of the pathogen (BSE, mad cow disease) in the United States. The intermediate or intervening variables will be epistemic communities and interest groups. For this thesis, I will use the definition of “epistemic communities” as defined by Peter M. Haas. In *Saving the Mediterranean*, Haas defines “epistemic communities” as follows:

“An epistemic community is a professional group that believes in the same cause-and-effect relationships, truth tests to assess them, and shares common values. As well as sharing an acceptance of a common body of facts, its members share a common interpretive framework, or “consensual knowledge,” from which they convert such facts, or observations, to policy-relevant conclusions. They identify problems in the same manner and process information similarly. They also share a common vocabulary,

common political objectives to which such policies should be addressed, and a common network in which findings are exchanged and shared concerns are formulated.”²⁶

The formulation of any type of policy that will affect an industry that is as multifaceted as the cattle industry will have many factors that must be considered before effective policy decisions can be made. Therefore, the decision making will require input from not only the academic community, but also those involved in every aspect of the beef industry. These interest groups include the farmers, ranchers, meat packers, transporters, the feed industry, animal health experts, renderers and economists, to name a few. With approximately 35 million cattle being processed on an annual basis in America, a multi-billion dollar market is supported. Formulation and implementation of policies that increase the price that consumers must pay, or policies that reduce producer profits, will be frowned upon by the industry, and those opposed through the mechanisms of government (i.e. Congress, Federal bureaucracy.) Changes in protocol concerning the raising of cattle, i.e. protein sources, will no doubt cause some initial economic pain as other sources will have to be located. However, long term changes regarding protein sources have the potential to save the industry assets, as the chance of the emergence of BSE is decreased.

The dependent variable is U.S. policy innovations that have been implemented to keep BSE out of the U.S. Certain policy innovations were enacted very quickly after the first case of BSE was detected in December 2003. These newly enacted policies, such as the banning of downer cattle in sources of human food, the testing of high risk animals or animals that appear to be at high risk, and the banning of neural tissues from the human

²⁶ Haas, p.55.

food supply, are strides in the correct direction. However, even with these newly enacted policies, there remain serious flaws in the U.S. BSE surveillance system that could allow the entrance of BSE into the U.S. One such issue involves the technical limits to the testing of animals that appear to be at high risk. While this type of testing has the ability to detect animals in advanced stages of the onset of BSE, it cannot detect animals that are infected, but remain asymptomatic. The symptoms of BSE only appear in the advanced stages of the disease, allowing carriers to pass as disease-free for some time. Other existing flaws include: underdeveloped inspection capacity, growing import levels, no testing of animals that die on farms, flawed data on inspections, unknown industry compliance and the inability of consumers to know what foods may contain nervous tissues. The USDA, United States Department of Agriculture, (as a result of industry pressure) has prohibited comprehensive testing of U.S. cattle stocks, potentially compromising both the economic future of the industry and the health of the U.S. population.

The response rate encountered for this thesis was less than ideal. Many different agencies were contacted from various sectors including government, private, and academic sources. The target response rate was 15%, however, the actual response rate was 9% overall. Approximately 175 invitations to participate in the study were initially sent out via email. Sixteen participants responded and filled out the questionnaires in various degrees of completion. Fifty paper questionnaires, along with self addressed stamped envelopes, were taken to Washington D.C. to be completed by various senators and representatives or their office staff. Ten offices refused to accept the questionnaire, as it was their office protocol to not participate in policy surveys. Of the 50 initially

taken, 40 were handed out and 4 were returned, again, in various degrees of completion; a return rate of 8%. This low return rate might be explained by John Kingdon. He states:

"In some Washington quarters, there is a distrust of, and even a disdain for, academic work. In other quarters, the value of the work is accepted, but practical people realize that its recommendations cannot always be implemented."²⁷

Data

For this thesis, I examined the efficacy of the strategies that are currently imposed on cattle concerning the identification of animals that might carry or exhibit advanced stages of BSE. The analysis of existing regulations was carried out through the comparison of current policies with proposed policies that would improve the federal governments' ability to locate, track or identify cattle that could possibly carry BSE. As per sources, I used government documents, internet data sources, telephone interviews and personal interviews. Questions were based on two kinds of scales. These scales were the Likert scale and the thermometer scale (ranking scale). For the Likert scale questions, participants were asked to state the extent to which they agree or disagree on a scale of one to ten; one was assigned to mean completely disagree and ten was assigned to mean completely agree. For this type of questioning, the questions are facile initially, and become progressively more difficult to answer. The other type of scale that was used is the thermometer scale or ranking scale. For this scale, questions were answered by choosing a number from one to ten with one being assigned the lowest value and ten being assigned the highest value. Elites were also asked to elaborate on their responses.

²⁷ Kingdon, John W. *Agendas, Alternatives, and Public Policies* (Boston: Little, Brown and Company, 1984). p. 60.

The intended outcome of this thesis was to determine why the U.S. BSE surveillance system in 2003 initially failed to detect the presence of BSE in a cow that was imported from Canada. Improving our identification techniques has the potential to reduce the number of infected cattle that are introduced into this country, thereby reducing the risk of proliferation of the disease in the U.S. This thesis will restrict its temporal parameters to the years 1986 through February 2004.

The uncertainties surrounding BSE, in combination with the media coverage this condition has received in recent years (1986 through February, 2004), has the ability to reduce consumer confidence in the beef and/or beef products they consume. This has historically induced shockwaves throughout the beef industry (U.K., Canada, and U.S.) mainly as a result of decreased consumption and/or bans on the export/import of cattle. The U.S. beef industry is very large, comprising a \$38 billion per year industry.²⁸ Boycotts and/or bans of products will therefore generate a ripple effect, negatively influencing many other businesses that support the beef industry in the U.S.

Mad cow disease made its first appearance on the international scene in 1986 when it was discovered in cattle in the United Kingdom. It is believed that the initial cases resulted from the rendering of sheep that were infected with scrapie. Protein rich sheep offal, added to cattle feed, is thought have been the pathway through which the agent made its way into the greater domestic cattle population.²⁹ The epidemic in cattle in Britain reached incredible proportions; by 1993 more than 1,000 cases per week were

²⁸ "Tighter U.S. beef regulations still too lax for comfort." *USA Today*. Final Issue, 29 January 2004. sec. NEWS, p.14A. (Lexis-Nexis Universe).

²⁹ Offal is defined as "waste animal parts, especially of a butchered animal." www.websters.com (3-19-05).

being reported. More than 160,000 infected cows have now been identified, involving more than 50% of the dairy herds in the UK. Those cattle suspected of having BSE were destroyed, causing enormous economic damage. Protein supplements containing sheep and cattle offal were banned in the UK in 1988, but it was not until 1991-1992 that the ban was strictly enforced.³⁰

Literature Review

The principle sources for the paper will include, but not be limited to the following. One comprehensive book on the topic of disease and society is the work of Andrew T. Price-Smith. In *The Health of Nations* (2002), Price-Smith gives a compelling overview of how disease can compromise the economic and social development of countries. This is tied in with the degradation of the environment, which, in turn, can expose populations to pathogens, which would otherwise be confined to their indigenous areas. These two factors may act synergistically to reduce state capacity, increase economic deprivation, and drain the reservoir of human capital within affected areas. If the state cannot live up to its end of the social contract, its legitimacy is undermined. Taken together, such negative outcomes can constrain economic development and compromise political stability. This book is thorough in its ability to weave the different strands of environmental, social and economic factors together to form a concrete bridge between seemingly unrelated subjects.

Prion Biology and Diseases, by Stanley B. Prusiner, was a great source for this project. This book begins with an introduction to prion biology and diseases and makes

³⁰ Sean Henahan, "Mad Cow Disease The BSE Epidemic in Great Britain," <http://www.accessexcellence.org/WN/NM/madcow96.html> , (5-12-04).

the analytical distinction between prions and viruses. It continues by discussing the discovery of the prion protein and the spectrum of human prion diseases. The prion diseases of animals are also discussed, including scrapie of sheep and goats, bovine spongiform encephalopathy, chronic wasting disease of mule deer and elk, feline spongiform encephalopathy, and exotic ungulate encephalopathy. Chapter two discusses the development of the prion concept and goes into detail describing other aspects of prions. This thesis is more concerned with chapters 10 through 17 which discuss prion disease in animals, human prion diseases and methodology and future studies.

Fatal Protein, by Rosalind M Ridley and Harry F. Baker is a good source for this project. This book will benefit this project in that it gives a history of prion diseases including Creutzfeldt-Jakob disease, bovine spongiform encephalopathy and other prion diseases. The plight of the prion diseases is summed up in the first few sentences of this source: “The story of prion disease is a story of tragedies. Prion disease can affect both humans and animals and, when it does; it is invariably fatal, since it causes a neurodegenerative process in which the brain cells fall apart.”³¹ This book addresses the prion diseases of importance in animals and then discusses early cases of human disease caused by prions. This includes a discussion of the appearance of Kuru in Papua, New Guinea, the connection cannibalism played in the spread of the disease and the demise of the disease with the cessation of cannibalism. This book also includes a discussion of the genetic variables, laboratory testing methods used in the classification of prions as a new entity. It also discusses an important topic, the prion hypothesis, as proposed by Stanley Prusiner. Finally, this book discusses new variant Creutzfeldt-Jakob disease, the possible

³¹ Ridley and Baker, p.2.

relationships between nvCJD and BSE and the possibility of finding a cure for prion diseases.

A great source for this thesis project is *Mad Cow U.S.A.* by Sheldon Rampton and John Stauber. This book begins with a description of mad cow disease and gives a history of Kuru in Papua, New Guinea. It also gives a description of the initial technical hurdles that were faced by the scientific community as they sought a virus that simply wasn't there. The culprit was a prion, not a virus. This book goes on to explain the everyday practices of the rendering industry. This book notes it is evident that the room for error and the possibility of contamination is very large. Therefore, if a diseased carcass were introduced into the protein production process, and the disease was caused by a prion, the prion would not be disabled by the rendering process and it would be distributed among the recipients of the protein food product that was the end result. This book unveils the repulsive habits of this industry and illustrates the blatant disregard for the health of their stocks (the cattle) or the possible consequences of feeding their final product to other animals, which imperils human health. It illuminates the corporate mindset of profit over health risks, and the industry's callous disregard for the "what if" scenarios surrounding the rendering industry's practices.

The Coming Plague by Laurie Garrett is good source for this thesis. In this book, Garrett intertwines the effects of social unrest, unemployment, environmental degradation, antibiotic microbial resistance, and the hope of disease eradication, to illustrate the ongoing competition between humans and microbes. Using different disease scenarios, Garrett describes the devastating effects of disease on everything from economics to community stability. In the small town of San Joaquin, Bolivia, the

Machupo virus, carried by rats, killed at least one member of every family. Garrett also discusses the illusion of disease eradication, brought about by the discovery of antibiotics. Unfortunately, the increased use of antibiotics has led to resistance and the emergence of microbial resistance. This source outlines the occurrences of several disease outbreaks including: Lassa fever, Ebola, Swine flu, Legionnaires disease and AIDS. This source also describes how the growth of cities and international trade, while good for commerce, can also spread disease across oceans to different continents. This book is a good source for this project because it views the problems associated with public health and disease through several different angles, not concentrating all the efforts for the stopping of disease proliferation on the health care professionals.

The book *Betrayal of Trust: The Collapse of Global Public Health* by Laurie Garrett is a good source for this project. In this book, Garrett gives several examples of different societies collective failures to be prepared and remain prepared for outbreaks of infectious disease. This book stresses lapses in public health and the outcomes of the failure to promote the continuing support of such programs. It also stresses the importance of developing and maintaining emergency protocols pertaining to the exposure of large volumes of people to a virulent pathogen over a short period of time. Garrett stresses the need for increased funding of public health systems, improved networking and communication between agencies, increased disease surveillance, increased attention to diseases that were once thought to be eradicated and improved emergency response to possible outbreaks. This book is valuable to this study because it illuminates weaknesses in current public health structures and indicates areas where more

research and development are needed in order to support the public health systems currently in place.

Philip Yam's book *The Pathological Protein* is a great source for this thesis. In this book, Yam describes the historical cases of Kuru, as well as scrapie in sheep. It also describes the attempts in connecting the causes of scrapie and Kuru, as well as the link between Kuru and CJD. This book goes on to describe the prion and how it differentiates from other disease causing organisms like viruses, bacteria and fungi. Also discussed are the methods in the development of the prion hypothesis, a discussion of how prions can possess hereditary information and change their shape and how modern agriculture is promoting the adaptation of prions to new hosts, and thereby creating mad cow disease. This book continues by discussing ways that food supplies can help to keep animal prion disease out. Finally, this book discusses how similar diseases have spread and looks at some of the medical mishaps that have let prion diseases spread to humans.

The United States General Accounting Office Report to Congress entitled: *Mad Cow Disease, Improvements in the Animal Feed Ban and Other Regulatory Areas Would Strengthen U.S. Prevention Efforts* is an excellent source for this thesis. This report discusses the many aspects of the BSE dilemma, and the current efforts by the various federal regulators (including Food and Drug Administration, FDA, and the USDA) to further strengthen the surveillance network to prevent the entrance of BSE into the U.S. The main strength of this report is its discussion of the numerous flaws that plague the current surveillance system. This report makes recommendations to USDA and FDA to, among other things, strengthen enforcement of the feed ban, develop a coordinated

strategy to identify resources needed to increase inspections of imported goods, and alert consumers when products may contain central nervous system tissue.³²

The report entitled *Evaluation of the Potential for Bovine Spongiform Encephalopathy in the United States* is a valuable source. It discusses a wide variety of the possible origins of BSE including measures taken to prevent its introduction into the U.S., U.S. surveillance for BSE, discussions of cattle populations, birth-death rates, BSE incubation rates, rendering, as well as alternative sources of infectivity. The executive summary states the following:

"In summary, measures taken by the U.S. government and industry make the U.S. robust against the spread of BSE to animals or humans should it be introduced into this country. Preventing sick animals or contaminated feed from entering the country, ensuring compliance with the FDA feed ban, and reducing the potential for infectious tissues to enter the animal or human food supply will ensure that these risks remain low."³³

An interesting note, this report, written in 2001, mentions the prevention of the entrance of sick animals into this country as one of the methods of reducing the chance of the occurrence of BSE. The flaws of this report are obvious, as the lack of robust monitoring has allowed the entrance of a cow infected with BSE into the U.S.

The United States General Accounting Office Report to Congressional Committees: *Agricultural Inspection, Improvements needed to Minimize Threat of Foreign Pests and Diseases* is a good source for this thesis. This report discusses some of the challenges facing the inspection of food. These include the rapid growth in international trade and travel since 1990, increased cargo and increased passengers. The

³² United States General Accounting Office, "Report to Congress MAD COW DISEASE Improvements in the Animal Feed Ban and Other Regulatory Areas Would Strengthen U.S. Prevention Efforts," January 2002, <http://www.gao.gov/news.items/do2183.pdf>, (5-16-04).

³³ Cohen, p.iv.

redirecting of the focus of inspections to facilitating trade and customer service forcing inspectors to increase their efficiency in order to increase that flow of trade and passengers. The report discusses what alterations have been made to deal with these changes, and what new problems have arisen.

The United States General Accounting Office Report: *Food Safety and Security, Fundamental Changes Needed to ensure Safe Food*, a Testimony Before the Subcommittee on Oversight of Governmental Management, Restructuring and the District of Colombia, Committee on Government Affairs, U.S. Senate, is a good source for this thesis. This report describes the current food safety network system and describes some of the flaws the system incorporates. The report recommends a single food safety agency instead of the patchwork system that is in place currently. It gives a background of the 12 agencies that now administer as many as 35 laws that comprise the food safety system. This report describes the flaws in the food safety system and recommends changes to improve the system.

Historical Review

The practice of what is now called rendering is not a new procedure, however, the scale at which it now occurs is much larger than it was initially. Presently, rendering is defined as follows: "...rendering – the practice of converting waste animal parts into marketable products..."³⁴ Discretely hidden from the public, the rendering industry has a pivotal role in the meat industry. Since all of the products that are produced within the meat industry cannot be used, they must be disposed of. However, the disposal of

³⁴ Rampton and Stauber, p.61.

biological wastes is not as certain and final as the disposal of other products such as solid waste. The biological waste products provide an ideal location for the reproduction of microorganisms, they contain large amounts of water and their sheer numbers in the U.S. are substantial. Therefore a special means of disposal came into being almost of necessity. These biological waste products would not be suitable for landfills, as they would provide excellent locations for disease replication, making pathogen laden landfills even more conducive to disease proliferation. The incineration of animal by-products is not very feasible due to the large amounts of water they contain. The rendering industries emerged as a means of disposing of, or, as some now claim, a means of recycling, animal by-products. Rampton and Stauber state:

“These are the raw materials...which are processed into marketable products for high profit at the... rendering plant...In a gruesomely ironic twist...the most inedible dead-animal parts, including dead pets, end up in feed used to fatten up future generations of their kind.”³⁵

Descriptions of rendering date back to the days of the ancient Greeks, and rendering animal products first came into significant use in the manufacturing of soap and candles during the middle ages.³⁶ With the technical improvements of the industrial revolution, came improvements in almost every industry. The infantile rendering industry was no exception. Usually done on a small scale by individual farms, the practice of rendering grew into large, transnational businesses. Applications of new technology brought railways and other innovations in mass transportation, coupled with

³⁵ Ibid. p.62

³⁶ Ibid. p.64.

the availability of ice which made it easier to refrigerate and store meat.³⁷ Advances in rendering technology also meant that the process of distilling the products out of the animal by-products improved. The initial method of removing fat and other marketable products from animal by-products was to boil them in kettles. This technology was replaced with newer methods that allowed for a continuous feed type of production line and other advancements included ways to render with lower temperatures. It is obvious that these types of improvements lead to a tremendous increase in waste products. Then in 1912, Swift and Company decided to try something new. Rampton and Stauber give a description:

“As we got more sophisticated over the years, we went to a wet rendering process where the raw material was added to a closed vessel with water,” said Fred Bisplinghoff. “The fat would actually float on the top. The water would be drained and go to the water treatment facility...The protein product was called tankage. For many years, this tankage was used as a fertilizer. It wasn’t until 1912 that Swift and Company in Chicago decided to take the tankage and add some blood meal to it and make a product called digester tankage that was 60% protein and decide, perhaps, it could be used as a food ingredient versus a fertilizer, and fed it to hogs. So they did, and the animals responded remarkably. It was the first instance of feeding hogs something other than garbage and corn...The hogs grew remarkably well, and they won first prize at the International Livestock Show in Chicago in 1914.”³⁸

This change in the rendering process, replacing high temperature open vats with lower temperature autoclaves, it appears, might have helped in the dispersion of the mad cow epidemic.

³⁷ Ibid. p.64.

³⁸ Ibid. p.65.

Rampton and Stauber explain:

“Ironically, this change in the rendering process, combined with the lower temperatures used in continuous cookers, is now thought to have contributed to the mad cow epidemic by making it easier for the infectious agent to survive the rendering process.”³⁹

In a capitalist society, it would appear that any action that would decrease waste and appear to increase profits would be optimal: this is what rendering appeared to do.

Instead of wasting animal by-products, these products are recycled and re-fed to the animals. Essentially, herbivores, such as cattle, are fed the remnants of those that have gone before them in an effort to produce the largest achievable product yield with the least cost and in the shortest time frame possible.

Agreement with the increasing technological advances used in the production of animal feed in the meat industry was not unanimous, however, opposition was limited. Rampton and Stauber give an account of the attitude of those who promoted the idea of rendering:

“The industry’s enthusiasm for these productivity-enhancing and cost-cutting innovations met few obstacles. “Some have said that with our growing management sophistication and heavy concentration of animals in small areas, there’s a danger of some entirely new disease popping up – not unlike the Andromeda Strain in science fiction,” observed a contributor to the March 1978 Farm Journal. But cautionary voices like these were few and went largely unheeded. The benefits seemed to outweigh the risks.”⁴⁰

³⁹ Ibid. p.70.

⁴⁰ Ibid. p.68.

It is unfortunate that the warnings raised by those who saw the increasing technology as a means of possibly creating niches for new diseases were not taken seriously.

The worldwide response to the emergence of mad cow disease in the U.K. was almost unanimous. In 1988, Israel and Australia banned the importation of British beef. The U.S. response to the threat of BSE included a ban on imports from England since before 1985, and in 1989, USDA implemented a ban on imports of live ruminant animal and animal products from BSE countries.⁴¹ The ban was extended in 1997 to include all European countries.⁴² Efforts to stop the spread of the disease were costly. For instance, in Europe, more than 5 million head of cattle have been destroyed to thwart the spread of BSE since 1986.⁴³ The continued discovery of BSE in other countries led to rapid policy innovations in the U.S. In August 1997, FDA banned potentially BSE-infective animal proteins in feed for cattle and other ruminants.⁴⁴ Initially, the USDA specified that the infectious agent has only been identified in certain nervous tissues including the brain, spinal cord and retina. It has not been found in muscle, meat or milk. Nevertheless, a surveillance program was initiated to detect the presence of BSE in certain adult cattle. However, this surveillance was designed around testing animals that were thought to exhibit signs of the disease, those that appeared to be asymptomatic were not tested. This surveillance method is flawed in that it only identifies the animals that exhibit the symptoms of advanced mad cow disease. The long incubation period the disease

⁴¹ "Ruminant" is defined as "Any of various hoofed, even-toed, usually horned mammals of the suborder Ruminantia, such as cattle, sheep, goats, deer, and giraffes, characteristically having a stomach divided into four compartments and chewing a cud consisting of regurgitated, partially digested food."
www.websters.com (3-19-05)

⁴² William G. McCoy, "'Mad cow' protections in place here." *Intelligencer Journal*. 21 February 2001 sec. EDITORIAL, p. A-15. (Lexis-Nexis Universe).

⁴³ "Report to Congress MAD COW DISEASE Improvements in the Animal Feed Ban and Other Regulatory Areas Would Strengthen U.S. Prevention Efforts," p.1.

⁴⁴ Ibid. p.9.

possesses has the opportunity to allow the disease to infect an animal, yet remain undetected for long periods of time, thereby allowing diseased animals to enter the human food chain. New research suggests that the prions that cause BSE might be found in more tissues than previously thought.⁴⁵ Researchers from the University Hospital of Zurich, the Institute of Neurology in London and Yale University School of Medicine have been studying the possibility of a link between inflammation and prions. An article in *Fort McMurray Today* states:

“Their theory was that inflammation might provoke migration to and propagation of prions in tissues where they are not normally found. Inflammation would be found in animals sick with viruses or auto-immune conditions. The scientists injected prions into mice suffering from one of five different conditions causing inflammation in the kidney, pancreas or liver. (Those organs, normally thought to be prion-free, were randomly selected.) They then looked to see if they could detect the misfolded proteins in those organs. They did, in all of the mice.” “Three organs, five different inflammatory conditions -- this makes a very tight case,” Aguzzi said. “I have hardly any doubt that these findings can be extrapolated to additional organs as well.”⁴⁶

Other evidence suggests that there is more than one form of mad cow disease.

Experiments in mice now suggest that at least one and possibly two other forms of [prion] disease might exist in people.⁴⁷

USDA began testing cattle brains to detect BSE in domestic stock in 1990. This surveillance program consists primarily of collecting and analyzing brain samples from

⁴⁵ Helen Branswell, "Human food chain may be more at risk from BSE: Malformed proteins that cause mad cow disease can be found in more tissues than first thought," *The Standard* (St. Catharines, Ontario), 21 January 2005, C7. (Lexis-Nexis Universe).

⁴⁶ Helen Branswell, "BSE RISK MAY BE HIGHER THAN WE THINK," *Fort McMurray Today*, (Alberta), 24 January 2005, p. 4. (Lexis-Nexis Universe).

⁴⁷ Coghlan, Andy. "Humans may get different forms of BSE." <http://www.newscientist.com/article.ns?id=dn6660>, (3 April 2005).

adult cattle with neurological symptoms and adult animals that were non-ambulatory at slaughter.⁴⁸ Animals that did not fit into these specific categories were not tested; this included animals that die on farms. When animals die on farms, they may be buried on the farm, taken to landfills, or collected by renderers who recycle animals and other animal tissues into, among other things, animal feed.⁴⁹ It has also been shown, (for obvious reasons) that farmers might not be willing to send animals that display neurological disorders to slaughter, reducing the opportunity for USDA to inspect and test for the presence of BSE. Other major problems that exist in the testing network include the following: rapid growth in international trade and travel increasing the amount of cargo that must be inspected, heavy workloads force inspection shortcuts and departmental fragmentation. A 2001 U.S. General Accounting Office testimony on food safety and security made the following statement:

“The current [food safety] system is not the product of a comprehensive planning process; rather, it was cobbled together over many years to address specific health threats from particular food products. The resulting fragmented organizational and legal structure causes ineffective coordination, which together hamper federal efforts to comprehensively address food safety concerns.”

The flaws that are present in the current surveillance system appear to be those typical of a capitalist society: producers spend as little as possible to defend themselves and their customers against an infectious agent whose etiology is largely not known and the changes that might be necessary have the possibility of inducing great costs through the revamping process. In order to get the most out of every head of cattle, almost every

⁴⁸ "Report to Congress MAD COW DISEASE Improvements in the Animal Feed Ban and Other Regulatory Areas Would Strengthen U.S. Prevention Efforts," p.20.

⁴⁹ Ibid p. 21.

part of the cow is used, very little is thrown away. Parts that cannot be used directly are ground up and inserted as fillers. Limiting the parts that can be used places a boundary on the amount of money each cow yields. New regulations on what can and what cannot be used in products fit for human consumption control what meat packagers can produce. Perversely, the ignominious pursuit of short-term economic gain undercuts the long-term viability of the industry.

Several new bills have been introduced in order to protect the public from tainted beef supplies. *The Mad Cow Testing Act of 2004* (HR 3705 IH) was introduced to amend the Federal Meat Inspection Act. Introduced by George Miller (D-CA), and known as the ‘Mad Cow Testing Act of 2004’, the purpose of this bill is as follows: “To amend the Federal Meat Inspection Act to enhance the safety of beef and beef food products originating in the United States by requiring the testing of cattle for bovine spongiform encephalopathy (commonly known as mad cow disease) at the time of slaughter, and for other purposes.”⁵⁰ As of January 20, 2004, this bill was referred to the House Committee on Agriculture.

The Country of Origin Labeling Amendment Act of 2003 (HR 3083IH) was an amendment to the country of origin labeling requirements of the Agricultural Marketing Act of 1946. The purpose of this bill is as follows: “To amend the country of origin labeling requirements of the Agriculture Marketing Act of 1946 to specify the model upon which the certification program for producers shall be based, to facilitate verification of compliance with the requirements, to impose a schedule of penalties for

⁵⁰ "Mad Cow Testing Act of 2004," 108th Congress, 2nd sess., H.R. 3705 IH

violation of the requirements, and for other purposes.”⁵¹ In the case of beef, this bill requires that the animal be born, raised and slaughtered in the U.S. if it is going to carry a label signifying that its country of origin is the U.S.

The Animal Feed Protection Act of 2004 (S 2051 IS) is a bill that was introduced to: “...promote food safety and to protect the animal feed supply from BSE.”⁵² This proposed bill would make it illegal for any person to introduce into interstate or foreign commerce a covered article if the covered article contains a specified risk material from a ruminant. This includes the skull, brain, trigeminal ganglia, eyes, tonsils, spinal cord, vertebral column, or dorsal root ganglia of cattle and bison 30 months of age or older or sheep, goats, deer, and elk 12 months of age or older or the intestinal tract of a ruminant of any age and any other material of a ruminant that may carry a prion disease.

The BSE and Other Prion Disease Prevention and Public Health Protection Act (HR 3714 IH) is a bill that was introduced with the purpose being: “To provide better protection against bovine spongiform encephalopathy and other prion diseases.”⁵³ For the purposes of this bill, a covered article would include: food or feed for a plant, animal, or human; a food or nutritional supplement; a medicine; a pituitary-derived hormone; transplant material; a fertilizer; a cosmetic; and any other article of a kind that is ordinarily ingested, implanted, or otherwise taken into a living organism.⁵⁴ This bill would provide for protection of borders by not allowing any covered article to be imported, it would provide protection of food and animal feed supplies and public health

⁵¹ "Country of Origin Labeling Amendment Act of 2003, 108th Congress, 1st sess., H.R. 3083 IH.

⁵² "Animal Feed Protection Act of 2004, 108th Congress, 2nd sess., S 2051 IS.

⁵³ "BSE and Other Prion Disease Prevention and Public Health Protection Act," 108th Congress, 2nd sess., HR 3714 IH.

⁵⁴ Ibid.

by prohibiting the introduction of a covered article into interstate or foreign commerce. This bill would also require that annual reports be submitted to Congress describing the surveillance programs to assess the prevalence of prion diseases in the U.S. and the surveillance of prion disease infectivity and the testing of cattle in the U.S. This bill also required the Ruminant Identification Program. This program requires a system of tracing, in which, within 48 hours after an animal is diagnosed with any reportable disease or condition that can cause disease in humans, the movements of all exposed animals can be determined from birth to slaughter.

Along with the new proposed bills, the U.S. has changed its' policies concerning the testing for mad cow disease. In January of 2003, Agriculture Secretary Ann M. Veneman stated: "We remain vigilant at strengthening programs to keep BSE out of this country."⁵⁵ Veneman further stated: "Our surveillance level far exceeds international testing standards and is just one component of a multi-faceted regulatory and compliance system that is keeping the United States free of BSE."⁵⁶ The USDA increased its' testing from 5,272 head of cattle during FY 2001 to 19,990 head of cattle in FY 2002. However, the surveillance that was in place was designed to target those animals that were thought to pose the highest risk. These included "downers," those that were non-ambulatory at the time of slaughter, animals that die on farms, older animals, and those that exhibit signs of neurological disorders. While the number of animals being tested was significantly increased from 2001 to 2002, when the total number of cattle produced in the U.S. is compared to the number of head that are tested, the percentage of cattle being

⁵⁵ United States Department of Agriculture, "USDA Marks Progress on BSE Prevention Action Steps," January 15, 2003, <http://www.usda.gov/news/releases/2003/01/0012.htm>, (04-28-04).

⁵⁶ Ibid.

tested is dismal. The testing of approximately 20,000 head of cattle out of approximately 35,000,000 cows that are slaughtered annually yields 0.057%; far less than one percent. Furthermore, because of the lack of understanding of mad cow disease, its etiology and the inability to diagnose quickly positive cases before they are manifested physically, it is possible that the disease will continue to elude our domestic surveillance systems. John Stauber, co-author of *Mad Cow U.S.A.*, stated that an F.D.A. memorandum in 1997 predicted that if a single case of BSE was found in the United States and a total ban on all feeding of animal protein to animals was immediately enacted, it was still possible that as many as 299,000 infected cows would be found over the next 11 years.⁵⁷ The report entitled: *Mad Cow Disease: Improvements in the Animal Feed Ban and Other Regulatory Areas Would Strengthen U.S. Prevention Efforts*, by the U.S. General Accounting Office, printed in 2002, states the following:

“No cases of BSE-infected animals have been detected in the United States, but the continuing discovery of new cases in other countries, as well as a limited understanding of the disease and its prevention, have heightened concerns about the adequacy of federal efforts to keep BSE out of the United States.”⁵⁸ “While BSE has not been found in the United States, federal actions do not sufficiently ensure that all BSE-infected animals or products are kept out or that if BSE were found, it would be detected promptly and not spread to other cattle through animal feed or enter the human food supply. With regard to imports, the United States has imported about 125 million pounds of beef (.35 percent of total imported) and about 1,000 cattle (0.003 percent of total imported) from countries that later discovered BSE – during the period when BSE would have been incubating. In addition, weaknesses in USDA’s and

⁵⁷ Marian Burros and Donald G McNeil Jr., "U.S. Inspections for Disease Lag Behind Those Abroad," *The New York Times*, 24 December 2003, Late Edition - Final sec. A, p.19. (Lexis-Nexis Universe).

⁵⁸ United States General Accounting Office, p. 2.

FDA's import controls, such as inspection capacity that has not kept pace with the growth in imports, may allow BSE-infected products to enter the country."⁵⁹

The year after this report was printed, the unexpected occurred.

In December 2003, the USDA made a preliminary diagnosis of BSE from a downer animal at a slaughterhouse in Washington State.⁶⁰ This preliminary diagnosis was later confirmed as positive. This discovery sent a shockwave through those countries that import American beef, and the American beef producers. Japan and South Korea banned the importation of American beef, and removed it from their supermarket shelves. Approximately 48 other countries also banned American beef. This discovery also led to policy innovations in the U.S., such as the banning of downer animals in human food supplies and the banning of "high risk" tissues from older cattle such as brains, spinal cords and other nervous system tissues and small intestines. The use of air injection as a method to stun cattle before slaughter was also banned due to the fact that this method can dislodge brain material and possibly spread it throughout the cow's body. Also regarding cattle that are at least 30 months old, the USDA banned the use of automated machines used to harvest additional meat. The machines scour remaining meat from bones, a process consumer advocates say results in central nervous system tissues ending up in food products.⁶¹

"After insisting for years that blood from cattle is safe to feed young calves as a substitute for cow milk, the Food and Drug administration (FDA) suddenly reversed itself. It banned the practice as part of a series of new rules meant to prevent the spread of mad cow disease, which cattle can get from eating infected beef products. That was not the FDA's only turnaround from long-held food-safety policies. It also banned

⁵⁹ Ibid. p.3.

⁶⁰ Witnesses indicate that the animal in question was not a downer.

⁶¹ Anne C. Mulkern, "Mad-cow discovery stirs policy critics, U.S. slow to correct problems, they say," *The Denver Post*, 4 January 2004, Final Edition, sec. A, p. A-01. (Lexis-Nexis Universe).

restaurant scraps and chicken coop waste as protein supplements in cattle feed. The move will end the possibility of feed contamination from infected beef left on tables or in chicken feed.”⁶²

These steps taken by the USDA and the FDA exemplify some of the immediate policy changes that took place concerning the U.S. and mad cow disease. However, more changes need to be initiated to prevent future cases of BSE from entering this country.

Discussion

The discovery of a cow that tested positive for bovine spongiform encephalopathy, BSE, in Washington State in December, 2003, was met with swift action by the USDA. The USDA implemented new safeguards to protect the American food supply and the public against the possibility of any specified risk material, SRM, entering the human food supply. Specified risk materials including the skull, brain, trigeminal ganglia, eyes, vertebral column, spinal cord and dorsal root ganglia of cattle over 30 months old. The small intestines of all cattle were also prohibited from entering the human food supply. The entrance of downer cattle into the human food chain was explicitly prohibited; downer cattle were to be condemned.⁶³ A "downer" cow is described as being non-ambulatory at slaughter.⁶⁴ Cattle will only be marked as "inspected and passed" when confirmation is received that the animal in question tested negative for BSE. Products manufactured using advanced meat recovery methods, which

⁶² “Tighter U.S. beef regulations still too lax for comfort.” *USA Today*. 29 January 2004., sec. NEWS, p.14A. (Lexis-Nexis Universe).

⁶³United States Department of Agriculture, Federal Register Part V Food Safety and Inspection Service USDA Docket No. 03-025IF, January 12, 2004, <http://www.fsis.usda.gov/OPPDE/rdad/FRPubs/03-025IF.pdf> (2-7-05).

⁶⁴ Cohen, et al., "Evaluation of the Potential for Bovine Spongiform Encephalopathy in the United States," November 26, 2001. http://www.aphis.usda.gov/lpa/issues/bse/risk_assessment/mainreporttext.pdf, (2-7-05).

removes muscle tissue from bone, cannot include the dorsal root ganglia, clusters of nerve cells connected to the spinal cord and spinal cord tissue. USDA enacted regulation that prohibited the utilization of air injection stunning, which is used to immobilize cattle during slaughter.⁶⁵ The use of mechanically separated meat in the human food chain was also banned by the USDA.⁶⁶ These actions along with the continued surveillance for cattle that exhibit signs of neurological disease were implemented in order to further protect the U.S. human food supply from BSE.

U.S. - Canada Cattle Trade Relationship

Following the discovery of a cow that tested positive for BSE in Washington State in December, 2003, the trade relationship between the U.S. and Canada diminished.⁶⁷ Additionally, new occurrences of BSE in Canada have prompted the U.S. to implement certain measures to ensure the safety of the U.S. food supply. The discovery of a cow that tested positive for BSE in Canada in May, 2003, caused the U.S. to close its borders to Canadian beef; ultimately costing the Canadian economy \$1.9 billion in export losses,⁶⁸ ravaging the \$7 billion Canadian beef industry.⁶⁹ The Guardian describes the condition of the Canadian beef industry as [an industry that] has

⁶⁵United States Department of Agriculture, Federal Register Part V Food Safety and Inspection Service USDA Docket Number 01-033IF, January 12, 2004, <http://www.fsis.usda.gov/OPPDE/rdad/FRPubs/01-033IF.pdf> (2-7-05).

⁶⁶ United States Department of Agriculture, Federal Register Part V Food Safety and Inspection Service, USDA Docket No. 03-038IF, January 12, 2004, <http://www.fsis.usda.gov/OPPDE/rdad/FRPubs/03-038IF.pdf>, (2-7-05).

⁶⁷"US, Canadian leaders discuss beef trade issue." *XinHua General News Service*, 13 January 2004. World News; Economic. (Lexis-Nexis Universe).

⁶⁸ Jack Aubry and Lisa Schmidt, "A frantic search for mad cow herd: More than 80 animals sold from Alberta farm ate same feed as stricken cow in U.S," *The Ottawa Citizen*, 29 December 2003, A1. (Lexis-Nexis Universe).

⁶⁹"Martin to talk mad cow with Bush," *The Standard* (St. Catharines, Ontario), 9 January 2004, C5. (Lexis-Nexis Universe).

been "tossed into chaos."⁷⁰ After discovering a cow that tested positive for BSE on U.S. soil in December, 2003, the U.S. stated that Canada might have been the source, before any conclusions had been drawn as to the origin of the infected cow. According to an article in *The Independent*, "Canadian officials were cynical toward their American counterparts in their announcing that the animal found suffering from bovine spongiform encephalopathy (BSE) on a farm in Washington State had necessarily entered the United States from Canada."⁷¹ It was subsequently determined that the diseased cow originated from Canada. Consequently, "tensions between the two countries grew when it was revealed that Canada had been given just one minute's warning before American officials held a news conference... asserting that a ranch in Alberta had been the source of the infected cow."⁷² Canadian cattle ranchers have become irate over the ban on live cattle, stating that their cattle are just as healthy as their American counterparts, and that the ban has cost the industry billions of dollars.⁷³ After enduring 15 months of hardship, due to the U.S. ban on live cattle from Canada, Canadian cattle producers launched a multi-million dollar lawsuit against the U.S. in an attempt to reopen the border to live cattle trade. According to *The Associated Press*, "there is an increasing level of frustration that the border may not have been closed legitimately, and that the border has not reopened quickly enough."⁷⁴ Wayne Easter, the former Solicitor General, a senior Liberal member of parliament stated: "Canada should risk a trade war with the U.S. over mad cow disease

⁷⁰Wayne Thibodeau, "Easter calls for challenge to extension of beef ban," *The Guardian* (Charlottetown, Prince Edward Island), 7 January 2004, A2. (Lexis-Nexis Universe).

⁷¹ David Osborne, "CANADA ANGRY AS AMERICAN OFFICIALS CLAIM BSE-INFECTED COW CAME FROM ALBERTA." *The Independent*, 29 December 2003. (Lexis-Nexis Universe).

⁷² Ibid.

⁷³ Elisabeth Bumiller, "Bush, Visiting Canada, Aims to Smooth Ruffled Relations." *The New York Times*, 1 December 2004, A3. (Lexis-Nexis Universe).

⁷⁴ "Canadians file claim over mad cow ban," *The Associated Press*, 12 August 2004, <http://www.msnbc.msn.com/id/5688084/>, (1-28-05).

in an attempt to completely reopen the border to Canadian cattle."⁷⁵ Canadian Prime Minister Paul Martin has expressed his discontent with the rate of progress the U.S. has made concerning the reopening of the border. In a private meeting with U.S. President George W. Bush, Bush states: Martin vented "a great deal of frustration that the issue hadn't been resolved yet."⁷⁶ The U.S.-Canada border has been reopened to certain cuts of beef, but has remained closed to live cattle. The magnitude of the damage that the closing of the U.S. border to live Canadian cattle has inflicted upon Canadian ranchers was made evident in a statement by Canadian Federation of Agriculture President Bob Friesen. Mr. Friesen stated: "This is fast climbing the ladder as the worst crisis ever in Canadian agriculture." The Canadian border is set to reopen March 7, 2005, with restrictions on live cattle. Ironically, the discovery of a second cow in Canada that has tested positive for BSE on January 2, 2005 has not deferred the reopening of the U.S. - Canada cattle trade market. *The Associated Press* stated:

"The U.S. Department of Agriculture announced... that the border could be opened to Canadian beef in March [2005]. Despite learning of the new suspected [BSE] case, the Bush administration said the next day that it would stand by its decision to renew Canadian cattle imports, expressing confidence that public health measures in both countries will protect U.S. livestock and consumers."⁷⁷

A third case of BSE was discovered in Canada on January 12, 2005. This event was no deterrent to the March 7, 2005 scheduled reopening of the Canadian cattle market to trade with the U.S. Canadian cattle producers grew concerned that this most recent discovery

⁷⁵ Joe Paraskevas, "Canada must play 'hardball' with U.S. over mad cows, senior MP says," *Edmonton Journal*(Alberta), 5 February 2004, A16. (Lexis-Nexis Universe).

⁷⁶ Scott Lindlaw, "Bush says he wants better relations with Canada but stands by his policies," *The Associated Press*, 30 November 2004. (Lexis-Nexis Universe).

⁷⁷ Rob Gillies, "Canada Confirms Second Mad Cow Case." *The Associated Press*, 2 January 2005. (Lexis-Nexis Universe).

would have a detrimental effect on the promised reopening of the U.S. to cattle trade with Canada. *The Associated Press* stated: "The third case raised concerns about the safety of Canada's feed supply and prompted fears that the key U.S. market would not reopen its border to young Canadian cattle as promised on March 7 [2005]."⁷⁸ However, the U.S. exhibits a surfeit of support for Canada's BSE surveillance system. *The Associated Press* stated: "U.S. officials have said that despite the third case, they are confident that Canada's safety measures are adequate."^{79,80,81}

Legislation

In the 109th Congress, The Animal Feed Protection Act of 2005 was introduced in the Senate on January 24, 2005 by Maria Cantwell (D-WA). The purpose of this bill is to: "...promote food safety and protect the animal feed supply from bovine spongiform encephalopathy."⁸² If passed, this bill would prohibit certain specified risk materials from entering the animal feed supply and therefore lowering the risk of an occurrence of BSE in the U.S. As of January 24, 2005, this bill was referred to the Senate Committee on Agriculture, Nutrition, and Forestry.

In the 108th Congress, two bills were introduced in response to the threat of BSE emerging in the U.S. The *Mad Cow Testing Act of 2004* was introduced to the House of Representatives on January 20, 2004 by Representative George Miller (D-CA). The

⁷⁸"Investigators: Cattle from same farm as Canada's third case of mad cow free of disease." *The Associated Press*, 2 January 2005. (Lexis-Nexis Universe).

⁷⁹ *Ibid.*

⁸⁰ On 3 March 2005, three days before the reopening of the U.S.-Canada border to live beef trade, the U.S. Senate voted to block the resumption of live beef trade with Canada, stating that Canada had failed to demonstrate that its cattle were free of mad cow disease.

⁸¹ Edward Alden and Bernard Simon, "Senate blocks way for Canada cattle MAD COW DISEASE," *The Financial Times Limited*, 4 March 2005, THE AMERICAS, p.4. (Lexis-Nexis Universe).

⁸² *Animal Feed Protection Act of 2004*, 109th Cong., 1st sess., S. 73.

purpose of this bill was: "To amend the Federal Meat Inspection Act to enhance the safety of beef and beef food products originating in the United States by requiring the testing of cattle for bovine spongiform encephalopathy (commonly known as mad cow disease) at the time of slaughter, and for other purposes."⁸³ This bill states: "As part of the post-mortem examination and inspection required...of all carcasses and parts thereof intended for use as human food, the Secretary shall require that a test be conducted to determine the presence of bovine spongiform encephalopathy."⁸⁴ As of January 20, 2004, this bill was referred to the House Committee on Agriculture.

The *BSE and Other Prion Disease Prevention and Public Health Protection Act* was introduced January 21, 2004 by Representative Rosa L. DeLauro (D-CT). The purpose of this bill is: "To provide better protection against bovine spongiform encephalopathy and other prion diseases."⁸⁵ This bill recommends better protection at U.S. borders by prohibiting the importation of ruminant derived products without written statements declaring that the product contains animal derived material, the name of the animal, and if the animal is a ruminant. It also requires the protection of food and animal supplies, surveillance of BSE and prion diseases in humans and animals, and a ruminant identification program. As of January 28, 2004, this bill was referred to the House Subcommittee on Trade.

⁸³ *Mad Cow Testing Act of 2004*, 108th Cong., 2d sess., H.R. 3705.

⁸⁴ *Ibid.*

⁸⁵ *BSE and Other Prion Disease Prevention and Public Health Protection Act*, 108th Cong., 2d sess., H.R. 3714.

Discussion of Research

The following pages describe the questions that were asked in the interviews and the questionnaires as well as responses from various anonymous, government and private, and academic participants. The quantitative data that was collected can be found in Appendix A.

Question number one asked the participants to rate their concern regarding the prevalence of bovine spongiform encephalopathy, BSE, in the U.S. The responses for this question vary widely from a low of one to a high of ten, with the average score being 5.1. The anonymous sector rated this question the highest, assigning an average of 5.5, followed by the government and private sector with an average of 5.28 and academics assigned an average value of 4.57. The graphic representation of this data (see figure one) shows that the responses appear to be clustered on either end, with only one participant choosing a rating of five. When comparing the different sectors, the anonymous responses range from three to eight. This might be explained by the fact that this sector is composed of participants that are members of government and private organizations and academics. Academic participants might be more informed and thus rate the question in a more honest manner; whereas the government and private responders might be more apt to reply in a manner that protects industry. Anonymous responses to this question indicate that there is some confidence in the current U.S. and Canadian surveillance system. A participant stated: "...the new regulations with regard to feed will go a long way to prevent future BSE." Another participant stated: "We have

just seen one case...and there has been some changes at USDA for testing purposes." On the other hand, there appears to be an acknowledgement that flaws do exist and that the future might hold problems. One participant stated: "I am aware that potential exists for problems to occur again." Another participant supports this by stating: "The reason I do worry is that there are few incentives to actually report the disease, and we do not test enough." Sen. Patrick Leahy (D-Vermont) supported this statement by commenting in a Hearing before the Committee on Agriculture, Nutrition, and Forestry in the U.S. Senate. He stated: "Now, in the U.S., we test about half of one percent of the slaughtered cattle. EU [European Union] is testing about 500 times more than we do."⁸⁶ Sen. Leahy also stated: "...during the first seven months of 2003, not a single cow was tested in Washington State..."⁸⁷

A dichotomy exists between the government and private industry sector with slightly more responding on the lower end; this might be in the interest of avoiding the appearance of possible problems with the U.S. meat supply. There also appears to be an indication that some in government do not think of BSE as a public health issue. Dr. Don Hoenig, Maine State Veterinarian, stated: "BSE is a public relations issue, not an animal health issue." Another participant, Dr. Burt Pritchett, from the USDA Center for Veterinary Medicine, appeared to minimize the potential effects of BSE as a public health issue by stating: "It's [BSE] important...on the risk to...our livestock in the United States and to a much lesser degree, to public health." One final participant in this sector,

⁸⁶ "To Examine the Current Situation Regarding the Discovery of a Case of Bovine Spongiform Encephalopathy in a Dairy Cow in Washington State as it Relates to Food Safety, Livestock marketing and International Trade," Hearing before the Committee on Agriculture, Nutrition, and Forestry United States Senate, http://frewbgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_senate_hearings&docid=f:91649.wais (13 September 2004).

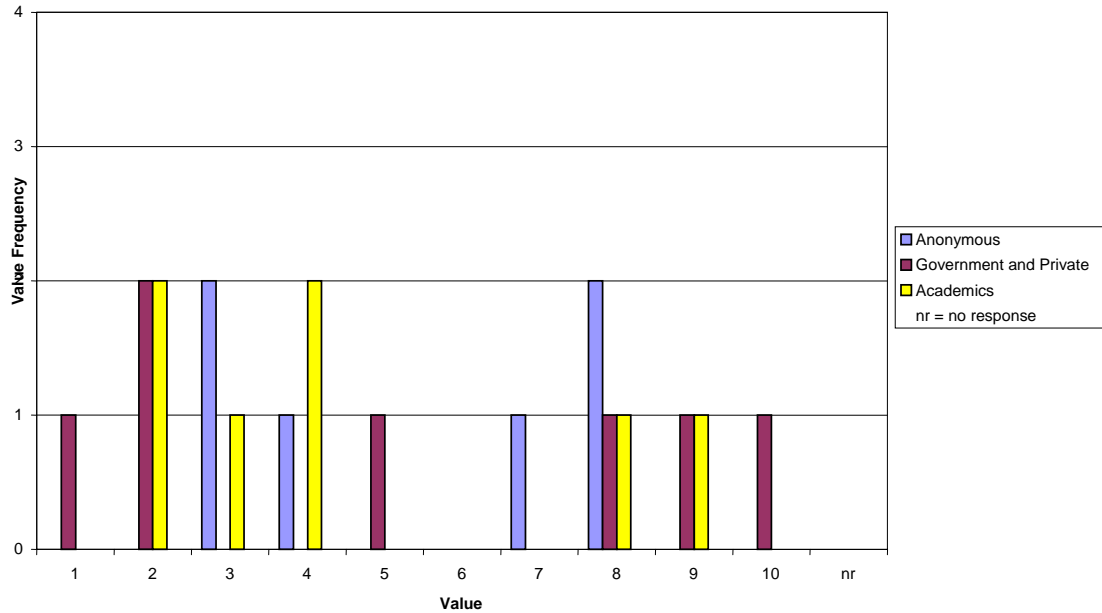
⁸⁷ Ibid.

Andrew T. Maccabe, Associate Executive Director of the Association of American Veterinary Medical Colleges, concurred with the two previous statements by commenting: "Policies and procedures regarding rendering and feeding of cattle in the U.S. have been in place long enough that it would be **HIGHLY UNLIKELY** to have a domestic case of BSE."

The academic responses are clustered more toward the lower end of the spectrum with five participants responding with scores ranging from two to four and three participants responding with values ranging between eight and nine. The reason for this split might be because some of the academic respondents have greater proficiency in the area of food safety. Conversely, they might not view BSE as a prominent and immediate threat, and therefore might be more concerned about other pathogens. This is supported by Dr. Jeffrey Levi, Associate Professor of Health Policy, at the George Washington University Medical Center, he stated: "This [BSE] is an important public health problem - in terms of surveillance and prevention, but as a broad-scale threat to public health, it is minor compared to many other issues." Dr. Tee Guidotti, Chairman of the Environmental and Occupational Department at George Washington University, emphasized the importance of the impact BSE has had on trade by stating: "I am very concerned about the highly negative effect this has had on trade and perception of food safety and especially relations between Alberta and the U.S....given that Canada exports so much beef to the U.S....I'm very concerned about the impact it has had. As far as the actual human health effect, I consider it a small and manageable problem." It is interesting to note that this participant put the importance of trade before the importance of human health. Other academics show concern toward BSE as a public health issue.

Levi stated: "This is an important public health problem - in terms of surveillance and prevention, but as a broad-scale threat to public health, it is minor compared to other issues."

Figure One
Response Distribution for Question One



Question number two asked the participants how concerned they were about the safety of the American meat supply. As before, the responses range from one to ten, with the average being 4.95. Averages by sector for anonymous, government and private, and academics were 7, 4.71, and 3.42 respectively. The anonymous responses in this case were clustered more toward the higher end of the spectrum, with 67% ranking this question a five or higher, indicating concern about the safety of the American meat supply. Again, one respondent pointed out that there are other issues to be concerned about by stating: "...a lot more issues related to that [meat safety] and not that USDA is

not doing a good job, it's just that a combination of all the various infectious agents that can get involved in the meat supply."

The government and private sector's responses' were again clustered around the lower end of the spectrum with 71% assigning a value of five or less. Responses seem intended to appease any fears that might be growing. Hoenig stated: "I'm not concerned at all about the beef supply with respect to BSE, but there are other food borne pathogens which are of some concern e.g. *e. coli* 0157H7, Salmonella, etc." These participants appeared to be taking the focus off BSE. Another example of this apparent detraction from BSE is the following statement from Maccabe: "There continue to be potential problems with antibiotic residue, heavy metals and steroids as well as post-harvest bacterial contamination." This response from Pritchett adamantly states his assessment of low risk to the meat supply: "I'm very concerned about the safety, but I think the risk to the meat supply is very low, so I want to make that perfectly clear."

The values the academics assigned were also clustered around the lower end, with 71% of the respondents assigning values of four or less (see figure two). Dr. Peter Jacobson, Professor of Health Law and Policy from the University Of Michigan, School Of Public Health stated: "I'm somewhat concerned that if it [BSE] spreads, it could infect the nation's food supply. But because of close surveillance and public health intervention, I expect any outbreak to be contained very quickly." Jacobson mentioned the infection and tainting of the nation's food supply, but then appeared to reassure the reader that any outbreak would be contained hastily; this might have been stated in order to avoid the appearance that the food supply may be vulnerable. Levi mentioned other issues by stating: "...there is more at issue than BSE." Academic respondents appeared

to be less than concerned about the effect BSE can have on the safety of the American meat supply and more concerned with other problems. Guidotti stated: "...overall, I believe it [BSE] is a second tier public health problem and thus far is less critical than some other sources of emerging infections that we face." Finally, Jacobson stated: "I see no reason to be concerned at the present time. The few reported incidents have been localized, and I don't perceive any current danger to the overall meat supply." This appearance of few incidents might be due to the fact that millions of cattle are slaughtered in the U.S. annually and less than one percent are tested. Increased testing efforts might lead to the discovery of larger numbers of cattle testing positive for BSE. An interesting note, since January 2, 2005, two new cases of BSE have occurred in Canada.⁸⁸ Recent evidence suggests that the human food chain might be more vulnerable to BSE than previously realized, as new research suggests that the prions that cause the brain wasting-disease can be found in more tissues than previously thought.⁸⁹ Dr. Neil Cashman, a prion expert at the University of Toronto stated: "The specified risk material ban is to protect us from being exposed to BSE prions. If there's a way for BSE prions to circumvent this barrier to actually propagate in muscle (meat), then we are in trouble again."⁹⁰

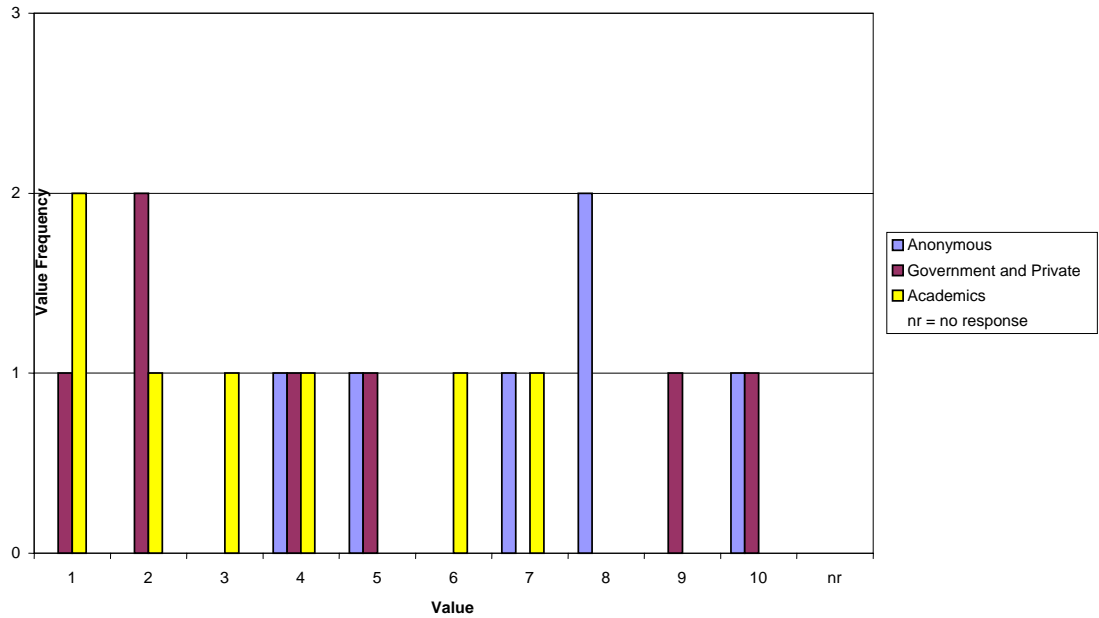
⁸⁸ Colum Murphy, "Boom in Canadian Beef Sales." *The Standard*, 25 January 2005. (Lexis-Nexis Universe).

⁸⁹ "Human food chain may be more at risk from BSE: Malformed proteins that cause mad cow disease can be found in more tissues than first thought," p. 1.

⁹⁰ Ibid.

Figure Two

Response Distribution for Question Two



Question number three asked the participants to rate the extent to which they agreed with the following statement: Current domestic surveillance efforts are efficient in prohibiting the entry and spread of BSE. Again, the responses ranged from one to ten, with the average being 5.05. The anonymous responses were clustered more toward the high end with 67% rating it a six or higher (see figure three), indicating that the anonymous participants perceived current surveillance efforts as being efficient in preventing the entry and spread of BSE in the U.S. However, some responses insinuate that the current system can be improved. One participant stated: "They are [efficient in prohibiting entry and spread of BSE] - no BSE yet - but should be strengthened." Yet another participant states: "I think loopholes and problems exist..." This opinion is supported by another participant who stated: "There is some surveillance, but not enough

due to costs and lobbying...” It appears that the anonymous participants perceive current surveillance efforts as efficient in prohibiting the entry and spread of BSE, but room for improvement exists.

The responses from the government and private sector were also clustered more toward the high end, with 71% ranking the statement a five or higher. The responses from this sector are as follows. Hoenig avoids the whole issue of efficiency in prohibiting the entry of BSE by simply stating: "Remember, this is not a contagious disease." Pritchett is very terse in his opinion of the current system by stating: "I think it [current BSE surveillance efforts] does really nothing to prevent entry... so it's not a very direct means of preventing either entry or spread." This succinct response from a government participant was unexpected. Maccabe stated: "In fact, too much testing of low-risk populations will lead to high numbers of false positives and decreasing public confidence..." As stated before, increased testing, it appears, is being frowned upon because of the increasing number of cases that might be found.

The responses from academics were variable in this instance with 57% assigning values of five or greater. Jacobson raised the issue of whether or not BSE testing will be decreased due to the diversion of resources to deal with other pressing issues such as bioterrorism. He stated: "So far, the efforts have been fine. The concern I have for the future is that reduced investment in public health and the "crowding out" effect of bioterrorism preparedness could reduce surveillance capacity." This is a salient point; however, one could argue that because of the possibility of agroterrorism and/or bioterrorism, testing should be increased. Guidotti stated: "I do believe that the current test is probably sufficiently sensitive although the screening test is very specific. The real

issue has to do with the sampling frame and whether or not we are logistically able to test every animal." The latter part of this statement is specious; other countries are able to test every animal. Japan, for instance, tests all the cows it slaughters each year.⁹¹ The U.S. possesses the resources required to implement a similar testing regime if its' surveillance efforts were designed to keep all cases of BSE out of the human food supply. A *New York Times* article stated the purpose of the U.S. surveillance system: "... the American [BSE surveillance] system was never intended to keep sick animals from reaching the public's refrigerators, said Dr. Ron DeHaven, the Agriculture Department's chief veterinarian. It is "a surveillance system, not a food safety test," Dr. DeHaven said in an interview ... Statistically, it is meant to ensure finding the disease only if it exists in one in a million animals, and only after slaughter."⁹² Tests in Japan have found the brain-wasting disease in animals that appear healthy.⁹³ Economic gain appears to precede concern for public health in the American BSE surveillance system. The following quote exemplifies this statement: "But inspectors and slaughterhouse workers have said that they see near-dead animals dragged in by chains or forklifts, and inspectors complain that they are pressured to approve them."⁹⁴ Another scenario describing the salience of economics in the beef industry describes the pressures with which inspectors must deal. Dr. Lester Friedlander, an Agriculture Department veterinarian from 1985 to 1995 describes his duties: "...he [Dr. Lester Friedlander] rejected 25 to 30 cows a day worth about \$500 each, and when he stopped the production line, managers complained that he

⁹¹ Donald G. McNeil, Jr., "Mad cow disease in the United States: The Overview," *The New York Times*, 26 December 2003, A1. (Lexis-Nexis Universe).

⁹² Ibid.

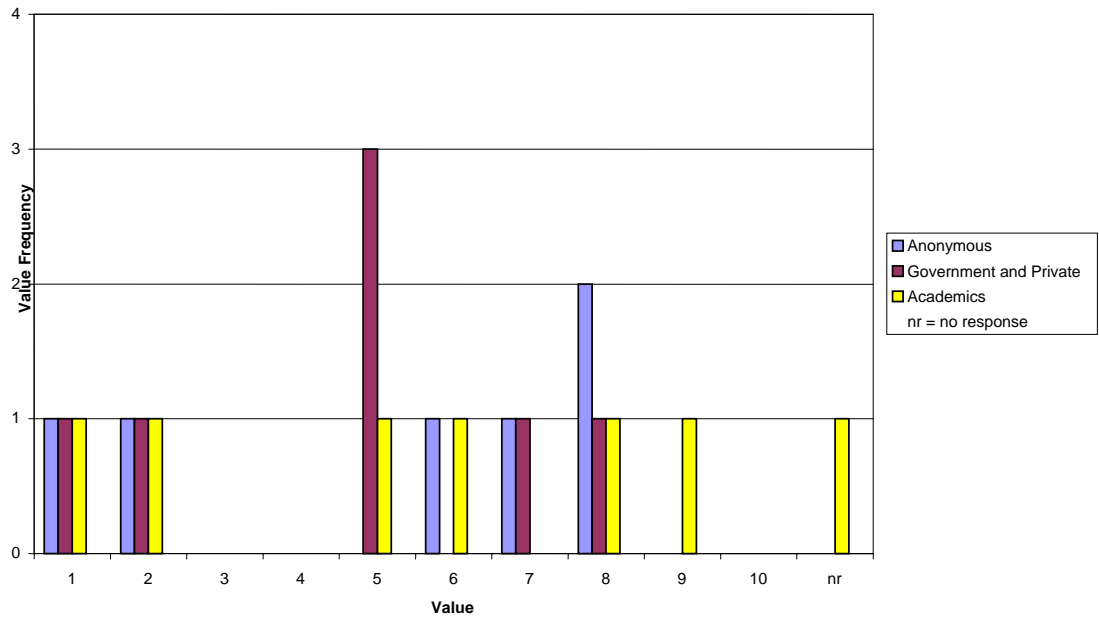
⁹³ Ibid. p.2.

⁹⁴ Ibid. p.3.

was costing them \$5,000 a minute. Ultimately, he said, they complained to Washington, and he was transferred."⁹⁵ It is interesting to note that this question is the first where a participant from academia decided to respond with a "no response" answer; this might indicate no knowledge of testing specifics.

Figure Three

Response Distribution for Question Three



Question number four asked the participants to rank the extent to which they agree or disagree with the following statement: The beef industry has an influence on the formation of BSE policies. The values assigned to this question indicate that most respondents agree (see figure four) and perceive the beef industry as having an influence on the formation of BSE policies. The average response for this question is 6.85. The averages for the anonymous, government and private sectors, and academics were 8.16,

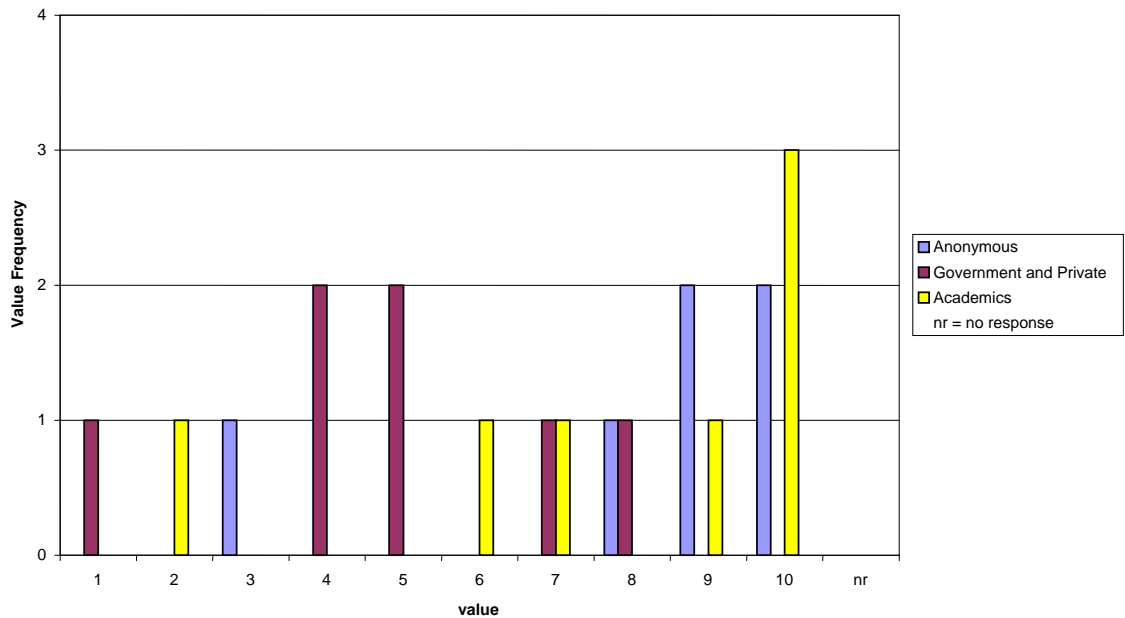
⁹⁵ Ibid.

4.85 and 7.71 respectively. The anonymous responses were again clustered toward the high end with 83% ranking this question an eight or higher. Most participants in this sector provided very direct responses to this question. One participant stated: “I think lobbying by the beef industry is the number one factor influencing current policy.” Another participant simply stated: “Of course.” The beef industry is driven by economics and any indication of problems with the beef supply or the implementing of extra measures, such as changing feeding habits, documenting sick animals or testing suspect animals will surely increase the cost of production.

The government and private sector’s perception of the beef industry’s influence on the formation of BSE policies was contrary to the anonymous sector with 71% ranking this question a five or lower. The government and private sector participants who responded to this statement belittled the influence of the beef industry over the formulation of BSE policies. Dr. Tim L. Tinker, Vice President of Science and Health, Widmeyer Communications, stated: “Have no first-hand knowledge or expertise.” Maccabe stated: “The beef industry should and does have input into the formulation of BSE policies, but I don’t believe there is undue influence.” Pritchett explained how the U.S. rulemaking body and the beef industry attempt to work together: “...we solicit their comments in our rule making, in our commenting rule-making system. We...want to know...their view and we ask them to provide us with scientific information and economic, environmental impact and so forth. So, we do have a role and then they do also try to use their influence and that I’m not familiar with...” Again, it appears that the government and private sector is downplaying the influence the beef industry is having on the formulation of policies concerning BSE.

The academic sector concurred with the anonymous respondents in that 86% of the respondents ranked this question a six or higher. It appears that the majority of the academics perceive the beef industry as having a great influence on the formulation of BSE policies. Jacobson stated: “At the federal level, there are now few checks on business lobbying and involvement in policy. Business interests are less powerful at the state level, but nonetheless quite influential. In an era of economic insecurity, few public officials are willing to antagonize large industries.” Guidotti agrees that the beef industry has an influence. He stated: “I think the beef industry does have a great deal of influence, and I think that some of the trade restrictions that were imposed have to do with protecting the American [beef] industry.” Levi made an interesting comment by stating: “The regulatory function here [in the U.S.] housed at USDA, makes suspect the independence of the surveillance and regulation. Were decision making regarding surveillance and regulation housed at a public health agency, there might be less concern that the USDA is influenced by the industry (since part of the mission of the USDA is to promote beef exportation.)” The data suggests that the beef industry is influencing the policies of the USDA and that it is an accepted practice. The government and private sector appears to be attempting to minimize the appearance that the beef industry has influence on the formulation of policies regarding BSE.

Figure Four
Response Distribution for Question Four



Question number five asked the participants to rate the extent to which they agree or disagree with the following statement: The current policies governing the rendering industry adequately protect the American public from all known forms of prion disease. The average value for this question was 5.27. The averages for the anonymous, government and private, and academic sectors were 5.33, 5.57 and 4.8 respectively. Once again, the anonymous scores were shifted to the right, with 83% of respondents assigning a value of five or greater (see figure five). This suggests that the anonymous sector perceives the rendering industry as adequately protecting the American public from all known forms of prion disease. However, not all participants in this sector agree. One participant stated: “Not true, as you know...” Another participant reiterated an account that was made earlier by stating: “I think lobbying by the beef industry is the

number one factor influencing current policy.” Part of the reason for the distribution of the values might be because most people are not aware of the practices of the rendering industry; in fact, it is sometimes referred to as “the invisible industry.”⁹⁶

The government and private sector assigned similar scores with 71% assigning a value of five or greater. The participants in this sector perceive the rendering industry as adequately protecting the American public from all known forms of prion diseases. Pritchett explains: “...the rendering industry is subject to the FDA’s BSE feed regulations and under that they are responsible for preventing inclusion of mammalian protein in feed for ruminant animals and that is the firewall for preventing further exposure to other cattle and then indirectly to the public...” The rendering industry is subject to FDA regulations; however, the enforcement of these regulations can be problematic due to the logistics of an agency that is diminutive compared to the magnitude of the beef industry. Another concern is that the rendering process does not destroy the prion agent. Pritchett also emphasized this apprehension by stating: “...the rendering conditions do not totally inactivate the BSE agent; it’s not a complete inactivation...” Conversely, an anonymous participant states that the precautions are adequate. This participant states: “Apparently adequate because of low incidence.” Again, the low incidence of BSE could be attributed to low numbers of animals being tested. For example, in 2001, 8.5 million older cattle were tested in Europe, and more than 2,000 cases of BSE were found.⁹⁷

For the academic sector, 60% of respondents assigned a value of four or less.

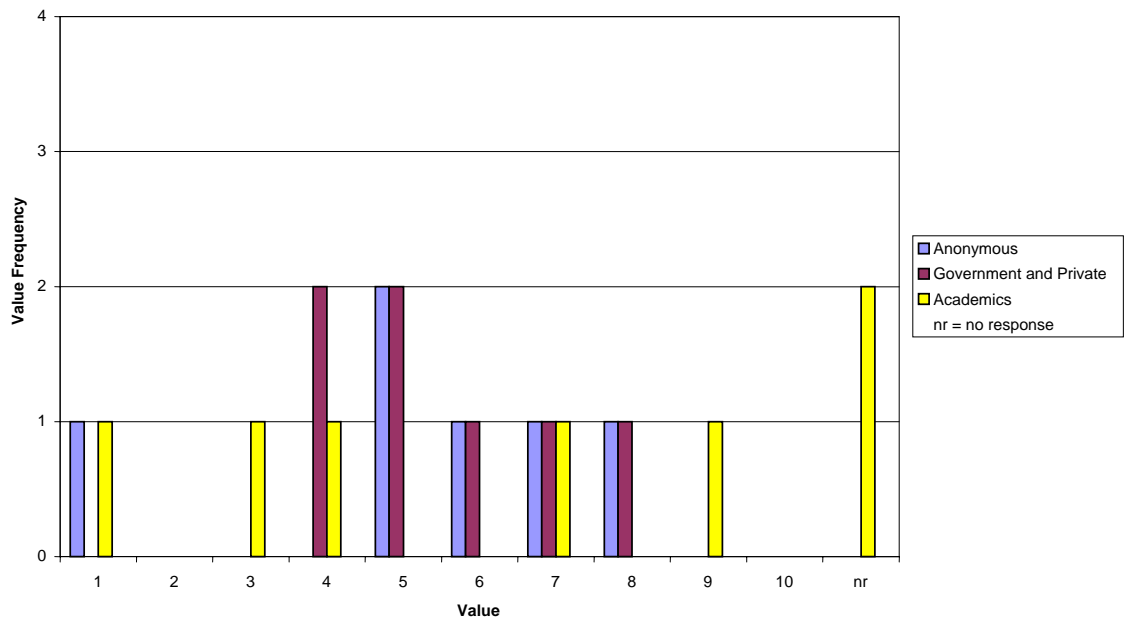
There appears to be a dichotomy between the government and private sector and the

⁹⁶ Rampton and Stauber, p.61.

⁹⁷ Les Blumenthal, "Will new beef rules help?; Mad cow: Safety measures designed to reassure U.S. consumers are also meant to convince other countries that imports are safe," *The News Tribune*(Tacoma, Washington), 5 January 2004, A1. (Lexis-Nexis Universe).

academic sector. One concern of the academics is the level of regulation. Levi states: “...this is based ...more on concern that the level of regulation is relatively low.” Noncompliance would be difficult to recognize and also difficult to correct. It is interesting to note that this question had two academic participants that did not respond. Again, the lack of response might be due to little familiarity with the rendering industry, as they have a propensity to keep their operations secretive. The rendering industry remained largely invisible until the 1990s, when they found themselves thrust into the public view as a result of their role in the spread of mad cow disease.

Figure Five
Response Distribution for Question Five



Question number six asked the participants to rate the performance of the United States Department of Agriculture, USDA, in terms of its response to the occurrences of

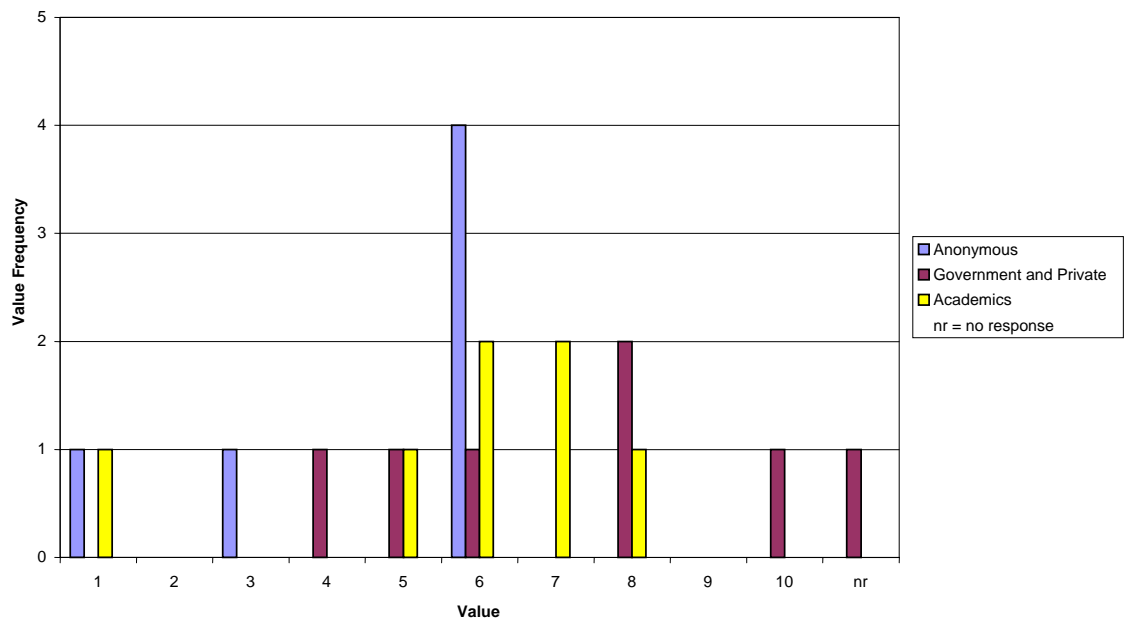
December, 2003 (referring to the discovery of a cow that tested positive for BSE in Washington State.) The average value assigned was 5.71. The average value of the anonymous, government and private, and academic sectors was 4.66, 6.82 and 5.73 respectively. The anonymous values for this question were shifted to the right, with 67% of respondents assigning a value of 6 (see figure six). Two participants responded with statements. The first participant stated: “I think the USDA did a fairly good job of tracing the animal and communicating with the public.” The second participant appeared less than content with the actions of the USDA. They stated: “Pretty ham-handed – too many agencies overseeing food safety.” Closer surveillance and increased testing efforts might have eliminated the introduction of the diseased cow into the U.S.

Of the government and private sector, 57% of respondents assigned a value of five or greater. Once again, it seems as if the government sector might be responding in an effort to support the surveillance efforts currently in place and to protect the beef industry. The fact that a BSE-positive cow penetrated the USDA surveillance system appears to have caught the U.S. by surprise. Tinker shares this view, he states: “The USDA wasn’t well prepared and didn’t deliver clear and convincing messages to the public.” On the other hand, Maccabe believes that the USDA’s response was good. He states: “I think the USDA did a very good job of stating the facts and basing their decisions on the scientific information.” The problem might be that our understanding of BSE is so limited at present that it is going to be difficult to make scientifically sound decisions.

Of the academic sector, 86% assigned a value of five or greater. Again, the statements made by the participants illustrate a dichotomy that exists. Levi states: “...I

think they recognized the importance of a quick response and they acted accordingly—even if the motive was to protect industry, not just the public’s health.” In opposition, Dr. D.A. Henderson, Dean Emeritus, Johns Hopkins University School of Hygiene and Public Health, was not content. He stated: “It [USDA] has denied obvious problems; defended a system that tests few animals; has done virtually nothing in the research field to elucidate problems or to develop testing methods; etc.”

Figure Six
Response Distribution for Question Six



Question number seven asked the participants to rate the efficacy of the USDA's testing efforts since December, 2003. The average value assigned was 6.5. The average value of the anonymous, government and private, and academic sectors was 6.8, 7.33 and 5.57 respectively. For the anonymous values, 83% assigned a value of five or greater

(see figure seven). Two participants in the anonymous sector responded to this question with a written statement. One stated: “[surveillance] need[s] to be greatly expanded.” However, expanded testing is going to cost the beef industry and possibly the consumer. Data suggests that, if implemented, increased testing will cost only pennies per pound.⁹⁸

For the government and private sector, 86% assigned a value of five or greater. Pritchett praised the USDA’s efforts by stating: “...they see the risk is low but I think their concern is extremely high, for public health concerns.” Alternatively, Maccabe appears to discourage the USDA’s efforts to increase the number of animals tested. He stated: “...it is not appropriate to test a low-risk population when there is a very low incidence of a disease. There may be too much emphasis on increasing the number of animals tested without regard to their risk of having the disease.” Evidence suggests that the number of animals being tested should be increased regardless of whether or not they are in a high risk category; this is the only way to be sure that animals that are indeed infected, but, asymptomatic, do not elude surveillance measures and ultimately taint the human and animal food supply. Animals with mad cow disease usually do not show symptoms for several years.⁹⁹

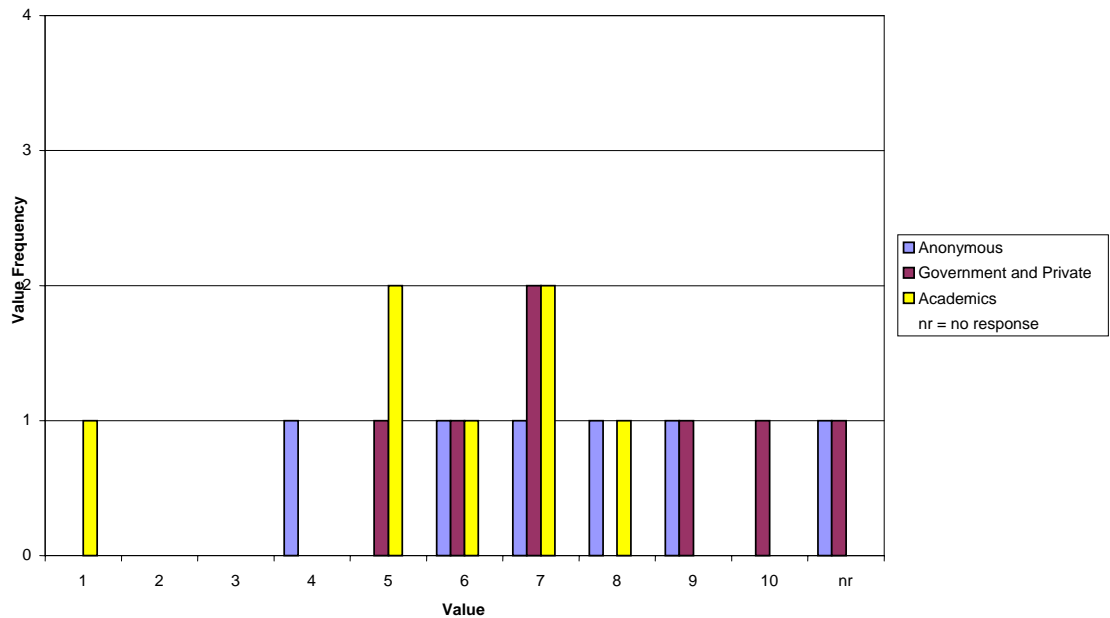
Eighty-six percent of the academic sector assigned a value of five or greater. Two of the respondents perceived the USDA as having improved its efforts. Levi stated: “Probably improved.” Guidotti stated: “...my impression is that they have been adequate.” Henderson was in disagreement with Levi and Guidotti. He stated: “[Testing efforts are] best described as little testing being done compared to Europe or Japan for

⁹⁸ McNeil, Jr., Donald G., "Mad cow disease in the United States: The Overview."

⁹⁹ Scott Allen and Stephen Smith, "Mad cow case looks at feed, 'leaky' defenses mad cow probe focuses on feed." *The Boston Globe*, 25 December 2003. (Lexis-Nexis Universe).

example; strenuous efforts being made to block from self-financed testing those meat packers who want to do testing; little being done to improve testing methodology.” Two participants, one from the anonymous sector and one from government and private sector chose not to answer number seven.

Figure Seven
Response Distribution for Question Seven



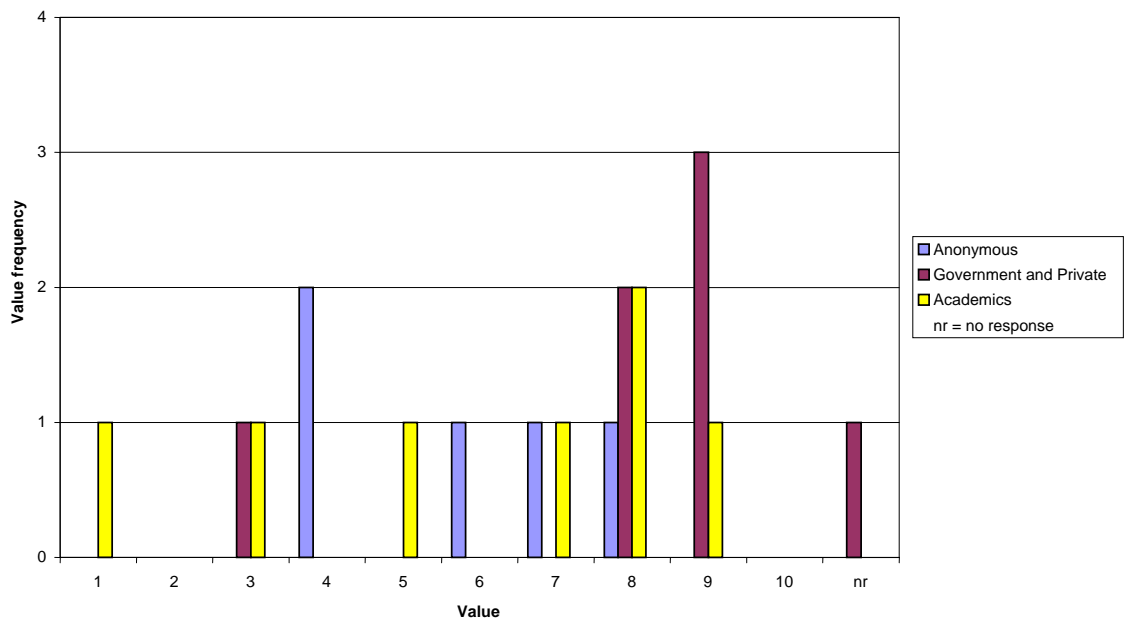
Question number eight asked the participants to rate the beef industry's concern for the health of its consumers. The average value was 6.26. The average value of the anonymous, government and private, and academic sectors was 5.33, 7.66 and 5.85 respectively. Again, the distribution of the data indicated that the general opinion is that the beef industry is concerned about its' consumers health (see figure eight). Among the anonymous respondents, 60% assigned a value of five or greater, indicating that they believe that the beef industry cares about the health of its consumers. However

respondents state economic concerns as underlying reasons for the beef industry to be concerned about its consumers. One participant states: “They [the beef industry] must be concerned. If something bad happens the market will suffer, but this seems to be overridden by current fear of the costs and implications of testing.” It appears that the beef industry is taking a gamble by not testing every cow and hoping that BSE doesn’t appear in the U.S. The second participant states: “On the one hand they need a happy customer base and on the other they cut costs and avoid oversight.” Again, it appears that the beef industry is willing to cut costs, such as not testing every cow, and risk the health of its’ consumers. The final participant states: “They have the most to lose from any outbreaks.” With the potential to loose so much, one would think the beef industry would be putting all its resources into revamping its surveillance efforts. Apparently, they [the beef industry] view the risk of BSE as acceptable; they are spending as little as possible to improve current surveillance efforts.

Seventy-one percent of the government and private sector assigned a value of five or greater. It is interesting to note that of the responses, three chose nine and two chose eight. Two participants elaborated with statements. Both indicate that the beef industry is concerned about the health of its consumers, because if they were not concerned, they would lose money. Maccabe states: “It seems to me that the beef industry is more concerned with the health of cattle and market share (including exports) than the health of consumers.” Tinker made a similar statement: “Clearly, they [the beef industry] have an economic imperative to make sure the public’s health is protected through cooperation with government agencies, regulators, etc.” Economic incentives appear to be driving the impression that the beef industry cares about the health of its consumers.

Seventy-one percent of the academic sector assigned a value of five or greater; indicating that the academics believe the beef industry is concerned with the health of its consumers. Henderson stated: “So far as one can tell, the primary concern of the beef industry is to make as much money as possible using whatever methods and means can achieve this.” Guidotti stated: “...if the beef industry gets a reputation for ill health, then consumption will drop...I’m not necessarily sure it is altruistic, but the concern is definitely there.”

Figure Eight
Response Distribution for Question Eight



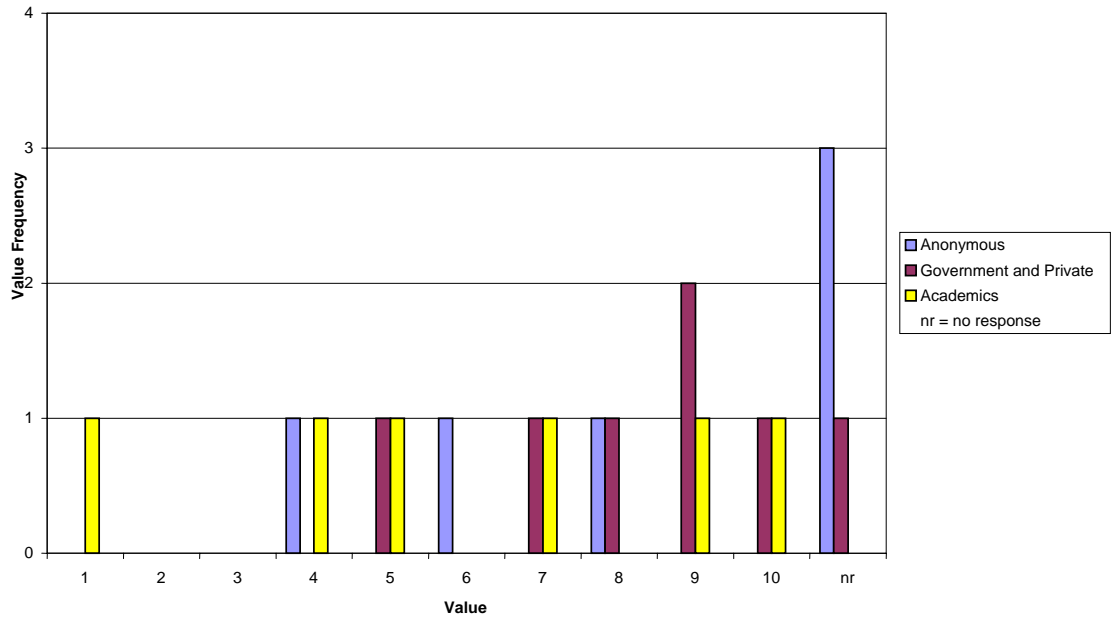
Question number nine asked the respondents to rate the accuracy of the following statement: The Bush Administration has been successful in influencing the USDA’s surveillance and control efforts. The average assigned value was 6.81. The average

value assigned by the anonymous, government and private, and academic sectors was 6, 8, and 6.14 respectively. Again, this graph was shifted to the right with 66% of anonymous respondents assigning a value of five or greater, 50% did not respond (see figure nine); this might be because the question asks the participants to speak out about the current Presidential administration and the participants might not feel comfortable doing so, even if they were anonymous. Of those who did respond, only one participant made a statement. They stated: “They [the Bush Administration] don’t embrace regulation reflecting the industry.”

The government and private sector's responses above five were 100%. Two participants responded with interesting statements. An anonymous participant from the South Dakota Cattlemen's Association stated: “After all, USDA is a Cabinet department, so one would expect the White House to have influence with the Department on its BSE surveillance program. I seriously doubt the White House was the architect of the policy, but they surely had a hand in approving it.” Pritchett stated: “...it was the Bush administration that made the decision to go through with the enhanced BSE surveillance...”

Sixty-seven percent of the academic sector assigned values of five or greater. Henderson stated: “Well, documented in the Press are the number of high level political appointments in USDA whose background had been lobby groups financed by the cattlemen.” Levi concurred with this comment. He stated: “...is USDA responsive to political leadership? Probably...” These responses indicate that the academic sector agrees that the Bush administration has been successful in influencing the USDA's BSE surveillance and control efforts.

Figure Nine
Response Distribution for Question Nine



Question number ten asked the respondents to assign a value to the following statement based on the extent to which they agreed: Technology has advanced to the point where prion diseases can be detected quickly and accurately. The average assigned value was 4.72. The average anonymous, government and private, and academic values were 5.33, 4.33 and 4.5 respectively. This indicates that those sampled tend to disagree with the statement (see figure ten). There is some discrepancy between the anonymous sector and the academic sector. Sixty-seven percent of the anonymous respondents assigned a value of five or greater, conversely, 57% of the academic sector assigned a value of five or less. An anonymous participant stated: "...I don't believe this is the case." Another anonymous participant stated: "There are test[s] in development that can do this, but they are not on the market and are not currently cost effective. The tests on

the market have...limitations..." Current scientific understanding of prion diseases and our ability to quickly and accurately detect prion disease is limited.

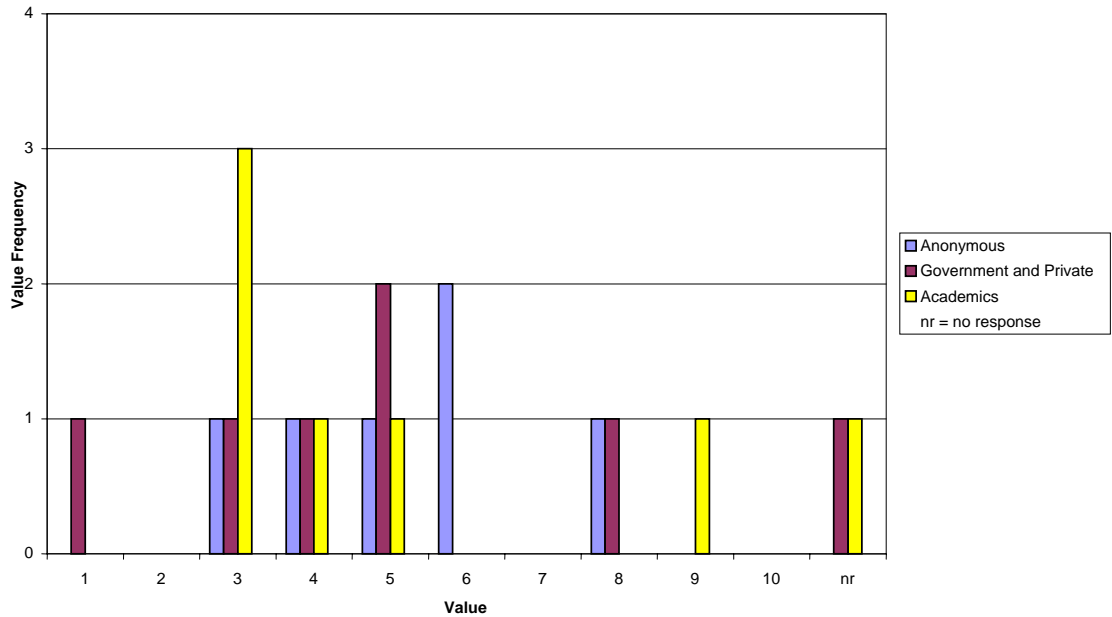
Seventy-one percent of the governmental and private sector assigned a value of five or less. Hoenig stated: "We still don't have a live animal test for cattle and the rapid tests are good, but not great." Pritchett emphasizes the same shortcomings in technology by stating: "...there is still no ante-mortem test for BSE ...they are not very good for detecting BSE agents, they are not good for detecting it in animal feed...they don't exist..." Maccabe supported the limitations of confirmatory and preliminary tests by stating: "I think the confirmatory test is accurate, but not very quick. Conversely, the preliminary tests, while quick, are not as accurate."

The academics agree that better testing technology is available than what is currently being implemented. Levi stated: "...my sense is that the science is better than what is being used..." For instance, Prionics AG's newest test, a luminescence immunoassay, lets one worker screen 200 samples in three hours.¹⁰⁰ The "gold standard" used to test the cow that was suspected of having BSE in Washington State was the immunohistochemistry test: it took five days to yield results.¹⁰¹ Henderson was to some extent more optimistic about testing, he stated: "...progress has been made in detection and diagnosis, but much remains to be done." Finally, Guidotti stated: "...I think they can be identified quickly but not necessarily accurately." The tests have improved; however, the science needs to improve exponentially if detecting diseased animals is to be accomplished quickly and accurately.

¹⁰⁰ McNeil, Jr., Donald G., "Mad cow disease in the United States: The Overview."

¹⁰¹ Matthew L. Wald, "Mad Cow Disease in the United States: The Overview; U.S. Scours Files to Trace Source of Mad Cow Case," *The New York Times*, 25 December 2003, A1. (Lexis-Nexis Universe).

Figure Ten
Response Distribution for Question Ten



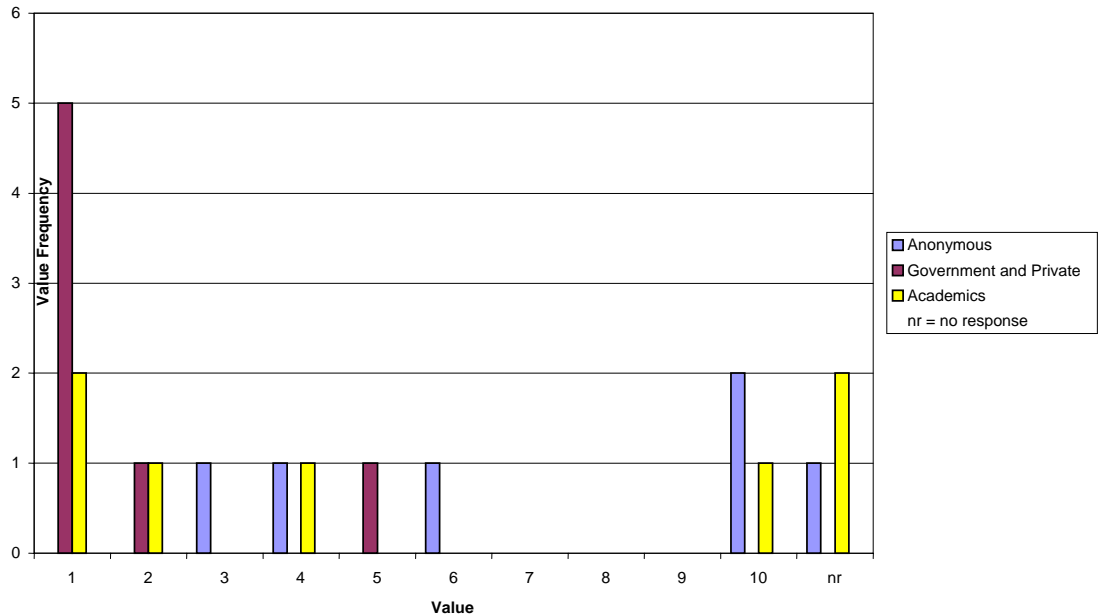
Question number eleven asked the respondents to rate the extent to which they agree with the following statement: The testing of every cow in America is not only possible, it is economically feasible. The average value assigned was 3.7. The average anonymous, government and private, and academic values were 6.6, 1.71 and 3.6 respectively. Sixty percent of the anonymous respondents assigned a value greater than five (see figure eleven). One participant stated: “Currently, it is not economically feasible – but if this policy were in place, testing options would become more cost effective and it should be done.” Another participant stated: “It’s inevitable, either through smart regulatory efforts or in reaction to a severe disease outbreak.” It is only a matter of time before every cow in America will be tested for BSE.

Of the government and private sector, 100% assigned a value of less than five. Seventy-one percent assigned a value of one. These low values indicate that the government and private sector believes that it is not economically feasible to test every cow in America. This is supported by the following comments. Maccabe stated: "...Whether or not it is possible to test all cattle for BSE, it is certainly bad science and bad economic policy to do so." Concurring with Maccabe, Hoenig states: "This is not necessary nor scientifically justified." In accord with Maccabe and Hoenig, Pritchett stated: "...it may be feasible, but it is not economically feasible... and I believe it is totally unnecessary."

The academic sector was similar with 57% assigning a value of less than five. Two participants made comparable statements as those in the government and private sector. Henderson stated: "Unquestionably, testing every cow is possible, albeit at a cost though, as I understand it, the cost is not that great..." Guidotti stated: "It is possible but, I'm not sure it is economically feasible." Jacobson stated: "The reality is that the costs of a wide BSE outbreak are so significant that even an expensive set of tests will be economically feasible." The balance of evidence suggests that increased testing will not significantly increase the cost of beef, and it also suggests that consumers would be willing to pay more for increased confidence in the beef they consume. A survey in January 2004 of 1085 adults showed that 71% would pay more for stricter beef-safety rules.¹⁰²

¹⁰²"Tighter U.S. beef regulations still too lax for comfort," *USA Today*, 29 January 2004, 14A. (Lexis-Nexis Universe).

Figure Eleven
Response Distribution for Question Eleven



Question number twelve asked the respondents to rate the extent to which they agree with the following statement: If the USDA’s policies concerning the testing for BSE were not influenced by the beef industry, current policies would be significantly different than they currently are. The average value assigned was 4.6. The average anonymous, government and private, and academic values were 7, 3.14, and 4 respectively. Eighty-three percent of anonymous responses assigned a value of five or greater (see figure twelve). The respondents in the anonymous sector appear to agree that BSE testing would be different if policies were not influenced by the beef industry. One participant succinctly stated: “Politics 101.” Policies regarding BSE testing would be different if they were not influenced by the beef industry. They [the beef industry]

appear to be doing everything in their power to keep testing low, which will keep the perception of safety of their products high and thus translate to unaffected sales.

Eighty three percent of the government and private sector assigned values of five or less. Maccabe states: "I don't believe the beef industry exerts undue influence over USDA." Pritchett states: "...I disagree that they would be significantly different...and that's because we ask for their input, but I think ultimately the decision is based on public health risk and economic risk to U.S. livestock industry." Evidence suggests that the pertinent issue is the economic effect mad cow disease will have on the beef industry. Former Vermont governor Howard Dean reinforces this initiative. The larger problem, he said, was the economic damage the [BSE] scare would cause.¹⁰³

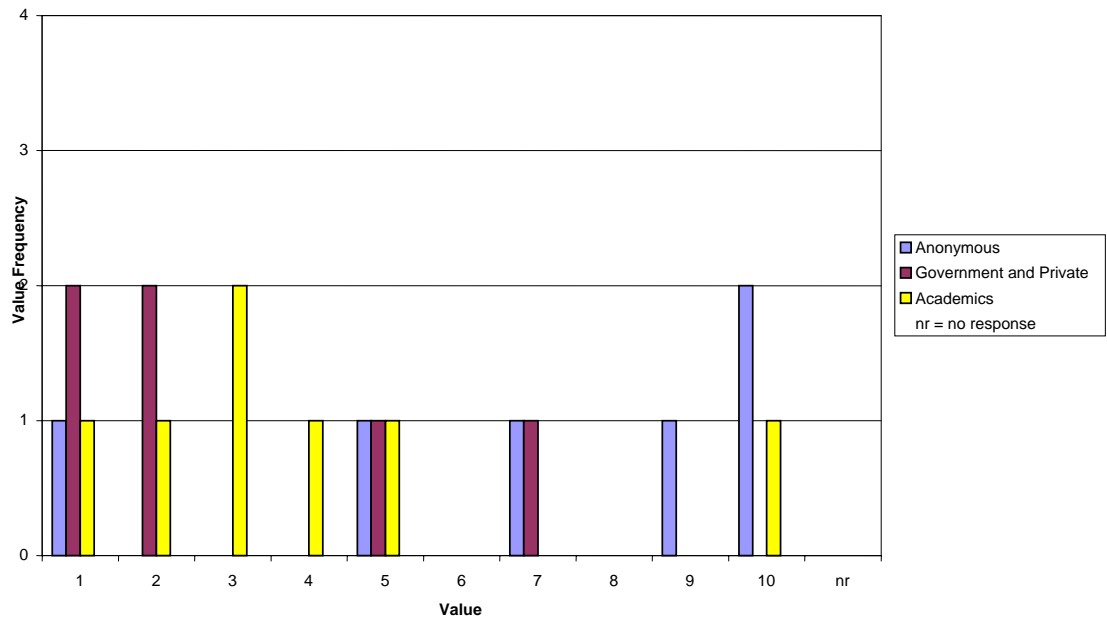
The academic sector's responses mimicked those of the government and private sector with 86% assigning a value of five or less. However, there is a dichotomy between responses to this question. Jacobson stated: "...I see no difference in how USDA would behave." Henderson contrasts this response by stating: "That is all too obvious. Look at other countries!" The evidence suggests that the beef industry resists changing their processes. For instance, FDA officials encountered resistance in getting feed producers to stop grinding up cattle parts for use in cattle feed - the main cause of the diseases' spread in Britain.¹⁰⁴ The beef industry also vehemently opposed the prohibition of downer cattle from the human food supply. The measures [to block downer cattle from

¹⁰³Matea Gold and Jube Shiver Jr., "Democrats Criticize Bush on Beef Policy; The White House isn't doing enough to test and track cattle, candidates say. Four more states are reported to have gotten meat from infected cow," *The Los Angeles Times*, 29 December 2003, A12. (Lexis-Nexis Universe).

¹⁰⁴ Scott Allen and Stephen Smith, "Mad cow case looks at feed, 'leaky' defenses mad cow probe focuses on feed."

the human food supply] have been vigorously opposed by the farm lobbies and have been blocked by leaders from both parties on the House Agriculture Committee.¹⁰⁵

Figure Twelve
Response Distribution for Question Twelve



Finally, question number thirteen asked the participants to rate the extent to which they agree with the following statement: The USDA has not supported testing every single cow in the U.S. for BSE because the actual number of cases, if made publicly known, would devastate the beef industry. The average value assigned was 2.23. Sixty-seven percent of the anonymous responses were five or less. One participant stated: “I think this unlikely...industry resists change because of cost, trouble and desire to fight

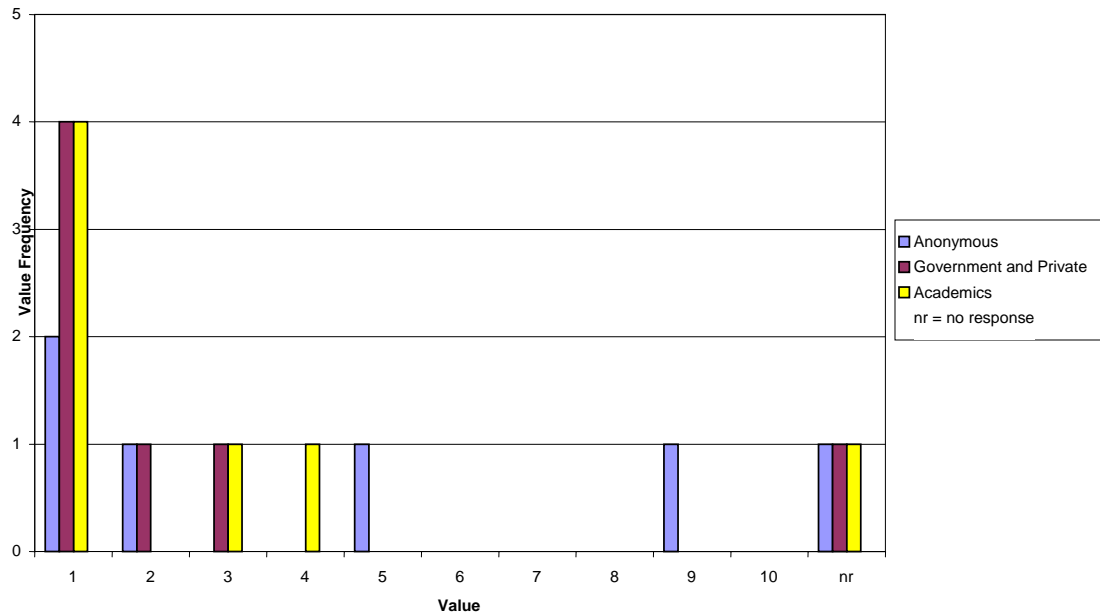
¹⁰⁵ Wald, p.3.

any perception their product isn't safe." Another participant stated: "I think it is more the perception of testing – it makes the meat look dangerous."

One hundred percent of the government and private sector assigned values of three or less (see figure thirteen). Several participants made comments regarding this last statement. Hoenig stated: "The actual number of cases is extremely low. We've tested over 100,000 animals since July 1st and haven't found another case." An anonymous participant stated: "If BSE were really widespread, then CJS [vCJD] would occur more often in the U.S." Pritchett strongly disagrees. He states: "I strongly disagree and I don't think learning the prevalence has anything to do with the decision to not test every animal."

Eighty-six percent of academics assigned values of four or less. Levi stated: "I have seen no evidence that there is a widespread problem, even in the claims of those who are supporting broader testing." In accord with Levi, Henderson stated: "I disagree with the statement because I suspect both the cattlemens' association (and its federal partner, USDA) believe that BSE is a small enough problem that they can avoid discovering its presence by severely restricting testing. Once the problem is ascertained to be present (which I think it is), the implications for the U.S. beef producers is profound. ...The discovery of even a few cases would create serious problems for the industry."

Figure Thirteen
Response Distribution for Question Thirteen



Conclusions and Recommendations

As stated in the introductory chapter, the objectives of this thesis are as follows. The first objective was to determine the shortcomings in U.S. BSE surveillance that allowed an infected cow to enter the U.S. in December, 2003. The balance of evidence suggests that the lack of testing for BSE allowed the infected animal to enter the U.S. The second objective was to determine the effects of BSE on the U.S. economy. The third objective was to analyze the policy changes that were generated by the discovery of a cow that tested positive for BSE on U.S. soil. The final objective was to make appropriate recommendations to ensure that additional BSE cases do not elude U.S. BSE surveillance efforts.

The limitations of the U.S. BSE surveillance system originate from its fundamental goals in that it was never originally intended to completely eliminate BSE from the human food supply. This system will only identify those animals that exhibit clinical signs of advanced BSE. Initially, there was no pre-clinical or clinical test available to identify BSE in the field except when the disease was very near the end of its incubation period.¹⁰⁶ This results from the fact that animals may not show clinical signs of the disease for an extended period after becoming infected.¹⁰⁷ Research in rapid BSE field tests is leading to the development of methods of detection of BSE in live cattle. Chris Pomfrett, a researcher at the University of Manchester, has developed such a test. Pomfrett argues that the test he developed in 1997 is the first non-invasive test for the disease [BSE].¹⁰⁸ In tests at Britain's experimental farm, Pomfrett and colleagues were able to tell which animals had the disease [BSE], though none displayed symptoms.¹⁰⁹ The test identifies up to 85% of infections six months before symptoms develop; false positives can be retested in a week or two.¹¹⁰ The implementation of this testing method has been delayed due to the lack of specifics concerning how Pomfrett's research was done and validated.¹¹¹ A spokesman for the Canadian Food Inspection Agency said a test such as Pomfrett's would have to be validated and approved by a regulatory agency before it could be used.¹¹² The testing of only those animals which display the clinical signs of advanced BSE will allow infected animals that are asymptomatic to enter the

¹⁰⁶ Cohen, p.35.

¹⁰⁷ Ibid.

¹⁰⁸ Andy Ogle, "Britain has live test for mad cow: Can detect BSE in animals and human form of disease, but has 10-15-percent failure rate," *Edmonton Journal*, 18 June 2004, A2. (Lexis-Nexis Universe).

¹⁰⁹ Ibid.

¹¹⁰ Ibid.

¹¹¹ Ibid.

¹¹² Ibid.

human and animal food chain. When asked how concerned they were regarding BSE in the U.S., an anonymous respondent commented: "...we do not test enough." Increased testing to include all cattle in the U.S. will ensure that those animals that are asymptomatic, yet positive for BSE, will be identified and removed from the human and animal food chains. The discovery of a cow that tested positive for BSE in Washington State, in 2003, appears to be somewhat of a fluke. According to Dave Louthan, the former slaughterhouse worker who killed the cow, the cow was not a downer. Louthan states:

"The cow [that tested positive for BSE] was not a downer. I killed that cow and I'm telling you it was a good walker. A big white cow with no BSE symptoms at all. I killed that cow along with the down cows because I was in a hurry and did not feel like separating her out."¹¹³

Louthan's statement articulates the danger of testing only those cows that show symptomatic traits of BSE infectivity. If the asymptomatic cow had not been grouped with the downer cows, it probably would have been processed along with other cows that were thought to be healthy; thus allowing the diseased cow to enter the human food chain. The actual number of BSE-positive animals that have entered the human food chain because of their asymptomatic status will never be known. The only way to ensure the safety of the U.S. meat supply with regards to BSE is to test every animal that is slaughtered, to use more accurate and expeditious testing methods, and to develop the political will required to stop the entrance and proliferation of BSE in the U.S.

¹¹³ Dave Louthan, "Updates from Dave; I would like to keep you updated," [http:// www.davelouthan.com](http://www.davelouthan.com), (8 February 2005).

The discovery of BSE in the U.S. had a substantial impact on the U.S. economy. Forty-eight countries immediately refused imports of American beef, negatively affecting the U.S. beef export market. Further, the ban on U.S. beef by 28 countries will conceivably negate \$4.9 billion annually in lost export revenue.¹¹⁴ Four days after the announcement of the discovery of BSE on U.S. soil; the sick animal was tentatively traced to a herd that came from Canada. If the suspect animal could be traced back to Canada, then the U.S. could retain its' BSE-free status. The American beef industry has a clear economic incentive to ensure that it retain this title. A comprehensive testing regime should be implemented in order to ensure that BSE does not elude U.S. surveillance efforts. Opponents of such a testing system, notably the beef industry, claim that testing every cow in America will not be cost effective and will only augment the cost of beef. Advocates of an increased testing regime claim that enhanced testing will cost only pennies per pound. Nobel Prize winner Dr. Stanley Prusiner, developer one of the more sensitive tests, claims a price amplification of only six cents per pound.¹¹⁵ Other advocates of increased testing state that even if enhanced testing does inflate the cost of beef, consumers will be willing to pay more for the added confidence that their beef is safe. Additional measures, such as required labeling of the country of origin for beef products, have also been opposed by the beef industry due to the increased costs they claim it will inflict. Critics, which include meatpackers and the major organization representing cattlemen in the United States, the National Cattlemen's Beef Association,

¹¹⁴ "Lax rules and testing put public, cattle industry at risk," *USA Today*, 29 December 2003, 11A. (Lexis-Nexis Universe). The \$4.9 billion figure is the mean of \$3.8 billion and \$6 billion.

¹¹⁵ "The USDA's Bad Choice." *The Boston Globe*, 6 March 2004, A12. (Lexis-Nexis Universe).

say labels are too costly and do not improve food safety.¹¹⁶ On the other hand, proponents of labeling claim that consumers have a right to know where their food comes from.¹¹⁷

Implementation of measures to protect the U.S. food supply from BSE began in the 1980's with the ban on importation of ruminants from countries where BSE was known to exist in native cattle. As further cases were discovered, these now BSE-positive exporters were added to the list of countries that were banned from exporting to the U.S. In 1997, the USDA extended its restrictions to include most of the countries of Europe, owing to concerns about widespread risk factors and inadequate surveillance for BSE.¹¹⁸ As of December, 2000, the USDA prohibited all imports of rendered animal protein products, regardless of species, from BSE-restricted countries.¹¹⁹ These major limitations on imported meat and meat products took place over a period of 11 years. The discovery of a BSE-positive cow on American soil brought major revisions of USDA regulations within days.

Several policy changes were enacted due to the discovery of BSE in Washington State in 2003. The actions taken by the USDA were significant and appear to be effective in the sense that no further cases of BSE have been detected on U.S. soil. However, the efficacy of current surveillance efforts might be illusionary. The Food Safety Inspection Service banned the inclusion of downer cattle in the human food chain. Cattle will no longer be marked as "inspected and passed" until confirmation has been received that the

¹¹⁶ Sheryl Gay Stolberg, "Mad Cow Case Heightens Debate on Food Labeling," *The New York Times*, 8 January 2004, A16. (Lexis-Nexis Universe).

¹¹⁷ Ibid.

¹¹⁸ Linda A. Detwiler and Burt Pritchett, *Actions to Prevent Bovine Spongiform Encephalopathy from Entering the United States*, ed. Brian K. Nunnally and Ira S. Krull in *Prions and Mad Cow Disease* (New York: Marcell Dekker, Inc., 2004), 127.

¹¹⁹ Ibid.

animal has tested negative for BSE. Specified risk material including the skull, brain, trigeminal ganglia, eyes, vertebral column, spinal cord, and dorsal root ganglia of cattle over 30 months of age and the small intestine of all cattle cannot enter the human food chain. Advanced Meat Recovery, a high pressure process in which muscle tissue is removed from bone, cannot be used to retrieve meat from the dorsal root ganglia, the spinal cord, vertebral column and the skull. Air-injection stunning, a practice used to immobilize cattle for slaughter, was banned, as this procedure can dislodge tissues of the brain and possibly taint the carcass. Finally, mechanically separated meat was banned from the human food supply. Ironically, evidence suggests that government agencies were aware of some of the preventative measures needed to arrest the entrance and spread of BSE in the U.S. before the discovery of a BSE-positive cow in 2003. In early 2002, the agency [USDA] issued what it called a 'thinking paper' on mad cow [disease] that included steps that could be taken to prevent the disease [BSE] from entering the U.S. or to stop its spread.¹²⁰ Several of the precautions ordered...were recommended in the report, but were adopted only after the infected cow was discovered.¹²¹ Scientists warned that BSE would appear in the U.S., but these warnings were ignored. The following statement from *The New York Times* illustrates the U.S.'s choice to ignore these warnings:

"Though some scientists had long warned that mad cow disease would eventually appear in the United States, cattle owners and meatpackers repeatedly resisted calls for a more substantial program to test for the disease [BSE] and the Agriculture Department went along with them. Congress came close three times to banning the sale of meat from downer cows...only to see the industry's allies block each of the bills

¹²⁰ "Mad-cow discovery stirs policy critics, U.S. slow to correct problems, they say," p.1.

¹²¹ Ibid.

at the last moment. And proposals for systems to track which farms produced sickened cattle...also languished for years here."¹²²

Despite these modest improvements, numerous flaws remain in the U.S. BSE surveillance system. Without a complete overhaul of the current U.S. BSE surveillance system, the U.S. human and animal food supply is not as safe as it could potentially be. The following recommendations will significantly improve the efficacy of the U.S. BSE surveillance system. First, mandatory testing of every cow that is slaughtered in the U.S., as well as testing of imported meat products, regardless of their age or country of origin is required. New tests and testing methods allow for the quick diagnosis and isolation of those animals that are BSE-positive. The U.S.'s testing regime should emulate that of Japan, which test every cow that is slaughtered, for BSE. The testing of only "higher risk" animals might create a false sense of security with regards to BSE. Dr. Jose Diez, director Western Region, Veterinary Services, made the following statement supporting the testing of all animals regardless of their age:

"Presently, 2 or 3 generations removed, [BSE] cases are being identified in animals less than 2 years of age. A few cases have been identified in animals less than one year of age. This phenomenon is consistent with what researchers have discovered about BSE in laboratory animals. As the disease is transferred down several generations, the incubation period becomes shorter."¹²³

Second, comprehensive training of inspectors is required so that they might better identify those animals that exhibit the characteristics of animals suffering from BSE.

This will require increased levels of cooperation between inspectors and slaughterhouse

¹²² Christopher Drew, Elizabeth Becker and Sandra Blakeslee, "Despite warnings, Industry Resisted Safeguards," *The New York Times*, 28 December 2003, Section 1; Column 3; National Desk; p.25. (Lexis-Nexis Universe).

¹²³ Diez, Jose. *Perplexed by the USDA*. Personal communication via email attachment from Dr. Max Thornsberry, 15 December 2004.

operators and owners. Third, there should be mandatory enforcement of severe penalties for farmers and cattle ranchers who deliberately attempt to dispose of animals that display signs of neurological disorders which might be symptomatic of BSE. Fourth, mandatory implementation of required BSE testing for all cows that die due to unknown reasons either on the farm, in transit, or at the slaughterhouse is necessary. This will eliminate the chance of an infected animal being introduced into the human or animal feed supply. Fifth, optimal surveillance demands an increase in meat inspectors, inspection frequency, and the implementation of random inspections to include the testing of apparently healthy animals. These measures can contribute to improved compliance with policies governing the BSE detection network. The FDA has about 770 food inspectors for its 57,000 plants, so, on average, a single FDA inspector has responsibility for 74 food plants.¹²⁴ Sixth, it is essential to overhaul existing government policies regarding ingredients in animal feed. For example:

"The U.S. government has banned putting beef parts in cattle feed, but it still allows beef carcasses in pig and chicken feed as a protein supplement. The stricter rule prevents ranchers and feedlots from illegally using pig and chicken feed that contains beef parts as a food source for cattle. Currently, the FDA allows cattle to be fed remnants of animals that include pigs, chickens, cats, dogs, and rodents. Its rationale: Experience shows mad cow [disease] is spread only when cattle eat beef parts. But laboratory studies suggest these animals may silently carry mad cow [disease]. A 2002 National Institutes of Health study, for instance, showed that mice injected with the

¹²⁴ Hearing on "Federal Food Safety Oversight: Does the Fragmented Structure Really Make Sense?," Federal Document Clearing House Congressional Testimony, 10 October 2001. (Lexis-Nexis Universe).

disease transmitted it when ground up into feed, even though they showed no signs of illness themselves."¹²⁵

The regulations enacted to protect cattle from BSE only apply to cattle and not to other vulnerable fauna (e.g. sheep, poultry, swine, and equine populations). These types of restrictions on feed must be enacted on all other animal feed manufacturing processes if we hope to stem the tide of emerging prion diseases. Policies governing feed ingredients for poultry, swine, equine populations and others must be developed and applied. Since prion diseases can infect ruminants, it might be possible, over time, for the prion to evolve and thus infect other classifications of animals. If infectious prion proteins contain replicable information, they can be expected to fight back in order to survive.¹²⁶

With the continued feeding of rendered bovine byproducts to vegetarian consumers such as poultry, swine and equine, the probability of pathogen emergence increases in these vulnerable populations. Seventh, the improvement of the current U.S. animal tracking system is vital. Such a system will enable farmers or governmental agencies to quickly determine the source of BSE infected animals; it will also allow trackers to know the history of each animal. Shortly after the discovery of BSE in Washington State, Dr. Ron DeHaven, the Agriculture Department's chief veterinarian, commented about the USDA's ability to locate the other cows that were imported simultaneously with the infected cow. He stated: "Investigators will probably find where the other...animals are within a matter of days."¹²⁷ Five weeks later, the lack of a reliable cattle tracking system in the U.S. became obvious when only 29 out of the 81 cows that were imported from Canada were

¹²⁵ "Tighter U.S. beef regulations still too lax for comfort," p. 1.

¹²⁶ Ridley and Baker, p.214.

¹²⁷ Emily Gersema, "Sick cow traced to Canada; link could save U.S. beef trade," *The Associated Press*, 27 December 2003, Washington Dateline. (Lexis-Nexis Universe).

located.¹²⁸ Another example of USDA's lack of ability to keep track of prohibited materials was described in an Inspector General report. This report found that USDA's APHIS (Animal Plant Health Inspection Service) couldn't adequately track shipments of banned products to ensure that they were disposed or re-exported.¹²⁹ Eighth, the creation of an international prion disease surveillance system is critical. The development of a surveillance system of this magnitude will require unification among trading countries and the political will to stop the entrance and proliferation of prion diseases. Such a system would require the testing of all animals known to be potential carriers of prion diseases, a majority-based decision as to which testing method best suits prion disease detection in a timely and cost efficient manner, and the implementation of such testing at the international level. In addition to the international cohesion that is needed to prevent prion disease outbreaks, the U.S. government needs to exercise greater autonomy in its dealings with the beef industry. An example of the U.S. government's penetration by industry groups is revealed in the following statement:

"Today the U.S. government can demand the nationwide recall of defective softball bats, sneakers, stuffed animals, and foam-rubber toy cows. But it cannot order a meatpacking company to remove contaminated, potentially lethal ground beef from fast food kitchens and supermarket shelves."¹³⁰

These recommendations will improve BSE surveillance efforts within the U.S. Without these necessary reforms, loopholes in policies will remain that will allow prion-laden animals and products to enter both the human and animal food chains. The

¹²⁸ "U.S., Voicing Confidence, Ends Search for More Mad Cow Cases," *The New York Times*, 10 February 2004, 20A. (Lexis-Nexis Universe).

¹²⁹ Hearing on "Federal Food Safety Oversight: Does the Fragmented Structure Really Make Sense?," p. 2.

¹³⁰ Scholsser, p. 196.

continued entrance of these products can accelerate the proliferation of prion disease in areas where the disease has emerged and can possibly aid in the evolution of new prion diseases in animal populations that are not currently known to be infected. The emergence of new prion diseases in agricultural stocks will likely have effects similar to those that BSE had on public health and economics. The spending of millions of dollars to improve current regulations, in order to reduce the possibility of the entrance and proliferation of prion disease, is justified by the billions of dollars that could be potentially lost due to BSE-related health concerns and lost export markets. Carol Tucker Foreman, a consumer advocate who ran the Agriculture Department's food-safety programs in the Carter administration, supports this idea by stating: "I think the damage to the American meat industry costs infinitely more than anything U.S. cattlemen would have had to pay to do this thing right."¹³¹ In addition to the threat to public health and economic damage, BSE has generated trade disputes and trade embargos between nations. The example given in this thesis briefly describes the tensions that developed between the U.S. and Canada as a result of the cattle trade ban. Price-Smith describes a similar situation in *The Health of Nations*:

"[BSE] has been the keystone of the growing discord between the United Kingdom and its European partners as British beef by-products have been banned by the rest of the European Community out of fear of contamination by the BSE prion that causes a lethal new variant of Creutzfeldt-Jacob disease in humans. This trade embargo has seriously strained Britain's relationship with Brussels, to the extent that Prime Minister John Major once declared "diplomatic war" on the rest of the European Union..."¹³²

¹³¹ "Despite warnings, Industry Resisted Safeguards," p.25.

¹³² Price-Smith, p. 108.

These examples illustrate how BSE-induced disruptions in the American and British cattle trade may culminate in trade tensions and threats of diplomatic war. The parties responsible for the continued trade in cattle, whether trading between the U.K. and Europe or the U.S. and Canada, must take all scenarios into consideration when determining which trade policies to enforce and how to enforce compliance. Hasty decisions can have dire long-term economic consequences; however, public health should be the focus of concern when developing a BSE surveillance system. The investment in a BSE surveillance system that prioritizes long term investments in public health over short term economic gain will benefit not only the citizens, but, will help to ensure the long term prosperity of the state. Regarding BSE, the USDA has gone to great lengths to assure the public that the U.S. beef supply is safe for human and animal consumption; however it should be noted that the USDA's primary purpose is to promote the U.S. beef industry and to expand the U.S. agriculture markets.¹³³ Consumers' lack of confidence in the USDA's efforts to effectively arrest the entrance and proliferation of BSE in the U.S. is justified by the reality that industry has penetrated too far for current surveillance efforts to be effective. Interest groups usually have one agenda: their own, and the continued enjoyment of benefits they currently possess. Changes in procedures or protocols can encroach on and limit producer's profits. While it is not possible to estimate quantitatively how often interest group activity promotes a potential agenda item and how often it seeks to block consideration of an issue or an alternative, it is clear that a

¹³³http://www.usda.gov/wps/portal/!ut/p/_s.7_0_A/7_0_1OB/.cmd/ad/.ar/sa.retrievecontent/.c/6_2_1UH/.ce/7_2_5JN/.p/5_2_4TR/.d/0/_th/J_2_9D/_s.7_0_A/7_0_1OB?PC_7_2_5JN_navid=MISSION_STATEMEN T&PC_7_2_5JN_navtype=RT&PC_7_2_5JN_parentnav=ABOUT_USDA#7_2_5JN (1 March 2005).

substantial portion of interest group effort is devoted to negative, blocking activities.¹³⁴ Interest groups often seek to preserve the prerogatives and benefits they are currently enjoying; blocking initiatives that they believe would reduce those benefits.¹³⁵ An example of this is the beef industry's opposition to increased regulation. Cattlemen and meat packers have fought calls for more frequent inspections, and tighter feeding and slaughtering rules.¹³⁶ Interest group pressure does have positive impact on the government's agenda, and does so with considerable frequency.¹³⁷ An example of this was the failure to enact a November, 2003 ban on the slaughter of downer animals. The recent [November, 2003] failure to enact a ban on the slaughter of downer animals highlighted the tight linkages between the Bush administration, congressional Republicans and the meat lobby.¹³⁸ Recently enacted legislation has banned the inclusion of downer animals from the human food supply shortly after the discovery of BSE in the U.S. This legislation was enacted, but with a caveat that allows the beef industry to recover profits from downer animals. Downer animals can still be used in the production of feed for other fauna including poultry, swine and equine. Kingdon addresses the actions of lobbies that do not promote legislation that limits an interest group's agenda. He states:

"Indeed, a central interest group activity is attaching one's own alternative to agenda items that others may have made prominent. Lobbies often don't begin the push for legislation or the push for agenda status. But even if they haven't started the ball

¹³⁴ Kingdon, p. 52.

¹³⁵ Ibid.

¹³⁶ "Lax rules and testing put public, cattle industry at risk," p. 1.

¹³⁷ Kingdon, p. 52.

¹³⁸ Eric Pianin and Guy Gugliotta, "Banning sale of 'Downer' Meat Represents a Change in Policy; Identical Measure Was Blocked in Congress Just Weeks Ago," 31 December 2003, A06. (Lexis-Nexis Universe).

rolling, once it is rolling they try to insure that their interests are protected in the legislation that emerges."¹³⁹

As previously stated, the infiltration of interest groups has limited the efficacy of BSE surveillance efforts in the U.S. If sweeping changes are not made to the current U.S. BSE surveillance efforts, more problems can be expected in the not too distant future. According to Kingdon, the opportune time to act is currently upon us, as BSE trade issues are prominent. He states: "...policy makers in government listen to academics most when their analyses and proposals are directly related to problems that are already occupying the officials' attention."¹⁴⁰ The methods of stopping the entrance of BSE into the U.S. are obvious; the implementations of needed changes in surveillance are not as easily initiated. The only way an improved U.S. BSE surveillance system will be realized is increased cooperation between governmental agencies, scientists, and business owners. Price-Smith states: "... the greatest requirements for stemming the global tide of infection are political will in concert with timely and adequate amounts of social and technical ingenuity."¹⁴¹ The synchronization of political will and scientific advancement will go to great lengths in reaching the goal of decreasing the chance entrance of BSE into the U.S. and arresting its proliferation within our borders.

¹³⁹ Kingdon, p. 53.

¹⁴⁰ Ibid., p.59.

¹⁴¹ Price-Smith, p.177.

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Appendices

Appendix A - Data

Table A-1
Response Data from Anonymous Participants
("nr" indicates no response)

| Questions | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|--------------------|------|----|------|------|------|------|------|------|----|------|------|------|------|
| Anonymous | 3 | 5 | 7 | 3 | 8 | 6 | 7 | 7 | nr | 6 | nr | 1 | 1 |
| | 8 | 10 | 1 | 10 | 1 | 1 | nr | 3 | nr | 6 | 10 | 10 | 5 |
| | 8 | 8 | 2 | 10 | 5 | 6 | 6 | 4 | nr | 3 | 4 | 7 | 2 |
| | 3 | 7 | 6 | 9 | 5 | 3 | 4 | 6 | 4 | 4 | 10 | 10 | 1 |
| | 7 | 8 | 8 | 9 | 6 | 6 | 8 | 4 | 6 | 5 | 6 | 9 | nr |
| | 4 | 4 | 8 | 8 | 7 | 6 | 9 | 8 | 8 | 8 | 3 | 5 | 9 |
| Mean | 5.5 | 7 | 5.33 | 8.16 | 5.33 | 4.66 | 6.8 | 5.33 | 6 | 5.33 | 6.6 | 7 | 3.6 |
| Standard Deviation | 2.42 | 2 | 3.07 | 2.63 | 2.42 | 2.16 | 1.92 | 1.96 | 2 | 1.75 | 3.28 | 3.52 | 3.43 |
| Variance | 5.9 | 4 | 9.46 | 6.96 | 5.86 | 4.66 | 3.7 | 3.86 | 4 | 3.06 | 10.8 | 12.4 | 11.8 |

Table A-2
Response Data from Government and Private Industry Participants
("nr" indicates no response)

| Questions | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---------------------------------|------|-------|------|------|------|------|------|------|------|------|------|------|------|
| Government and Private Industry | | | | | | | | | | | | | |
| | 10 | 10 | 7 | 1 | 4 | 5 | 10 | nr | 8 | 8 | 1 | 1 | nr |
| | 8 | 2 | 5 | 7 | 7 | 6 | 5 | 9 | 9 | 4 | 1 | 1 | 1 |
| | 9 | 9 | 5 | 4 | 8 | 10 | 9 | 9 | nr | 3 | 1 | 2 | 1 |
| | 5 | 5 | 5 | 4 | 4 | 4 | 6 | 8 | 5 | 5 | 5 | 4 | 3 |
| | 1 | 1 | 1 | 5 | 5 | 8 | 7 | 9 | 10 | 1 | 1 | 5 | 1 |
| | 2 | 4 | 8 | 5 | 5 | 8 | 7 | 3 | 9 | 5 | 1 | 2 | 1 |
| | 2 | 2 | 2 | 68 | 6 | nr | nr | 8 | 7 | nr | 2 | 7 | 2 |
| Mean | 5.28 | 4.71 | 4.71 | 4.85 | 5.57 | 6.83 | 7.33 | 7.66 | 8 | 4.33 | 1.71 | 3.14 | 1.50 |
| Standard Deviation | 3.72 | 3.54 | 2.49 | 2.26 | 1.51 | 2.22 | 1.86 | 2.32 | 1.78 | 2.33 | 1.49 | 2.26 | 0.83 |
| Variance | 13.9 | 12.57 | 6.23 | 5.14 | 2.28 | 4.96 | 3.46 | 5.46 | 3.20 | 5.46 | 2.23 | 5.14 | 0.70 |

Appendix A (Continued)

Table A-3
Response Data from Academic Participants
(“nr” indicates no response)

| Questions | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|--------------------|------|------|-------|------|-------|------|------|------|------|------|------|------|------|
| Academic | 4 | 1 | 6 | 2 | 4 | 7 | 7 | 8 | 4 | 3 | 1 | 3 | 1 |
| | 4 | 6 | nr | 7 | nr | 5 | 6 | 7 | 7 | 3 | 2 | 5 | 4 |
| | 3 | 2 | 2 | 10 | 3 | 6 | 5 | 5 | 9 | 9 | nr | 4 | 1 |
| | 2 | 3 | 5 | 9 | 7 | 7 | 5 | 3 | 5 | 5 | 1 | 3 | 1 |
| | 8 | 4 | 8 | 6 | 9 | 6 | 7 | 9 | 7 | 4 | 4 | 2 | 3 |
| | 2 | 1 | 9 | 10 | nr | 8 | 8 | 8 | 10 | nr | 10 | 1 | nr |
| | 9 | 7 | 1 | 10 | 1 | 1 | 1 | 1 | 1 | 3 | nr | 10 | 1 |
| Mean | 4.57 | 3.42 | 5.16 | 7.71 | 4.80 | 5.71 | 5.57 | 5.85 | 6.14 | 4.50 | 3.60 | 4.00 | 1.83 |
| Standard Deviation | 2.81 | 2.37 | 3.18 | 2.98 | 3.19 | 2.28 | 2.29 | 2.96 | 3.07 | 2.34 | 3.78 | 2.93 | 1.32 |
| Variance | 7.95 | 5.61 | 10.16 | 8.90 | 10.20 | 5.23 | 5.28 | 8.80 | 9.47 | 5.50 | 14.3 | 8.66 | 1.76 |

Table A-4
Average Values for All Participants

| Questions | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|--------------------|------|------|------|------|------|------|------|------|------|------|-------|-------|------|
| Mean | 5.10 | 4.95 | 5.05 | 6.85 | 5.27 | 5.73 | 6.50 | 6.26 | 6.81 | 4.72 | 3.70 | 4.60 | 2.23 |
| Standard Deviation | 2.93 | 3.03 | 2.75 | 2.92 | 2.24 | 2.28 | 2.09 | 2.55 | 2.50 | 2.08 | 3.38 | 3.21 | 2.13 |
| Variance | 8.62 | 9.20 | 7.60 | 8.55 | 5.03 | 5.20 | 4.38 | 6.53 | 6.29 | 4.33 | 11.47 | 10.35 | 4.56 |