

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MONTANA
BILLINGS DIVISION

RANCHERS CATTLEMEN ACTION LEGAL FUND)
UNITED STOCKGROWERS OF AMERICA,)

Plaintiff,)

Cause No. CV-05-
06-BLG-RFC

v.)

UNITED STATES DEPARTMENT)
OF AGRICULTURE,)
ANIMAL AND PLANT HEALTH INSPECTION)
SERVICE, et al.,)

Defendants.)

DECLARATION OF WILLIAM D. HUESTON, GUY H. LONERAGAN, AND
SRINAND SREEVATSAN

We, William D. Hueston, Guy H. Loneragan, and Srinand Sreevatsan, declare and state
the following:

1.1. I, William D. Hueston, currently serve as Director of the Center for Animal Health
and Food Safety at the University of Minnesota where I am a Professor within the
College of Veterinary Medicine and an Adjunct Professor in the School of Public Health.
The Center for Animal Health and Food Safety (www.cahfs.umn.edu) focuses on

protecting the global food supply through risk analysis (risk assessment, risk management and risk communication), surveillance, education and research.

1.2. I received my Doctor of Veterinary Medicine (DVM 1980), Master of Science in Veterinary Preventive Medicine (1980), and PhD (1985) in epidemiology from The Ohio State University. I have specialty board certification in Veterinary Preventive Medicine (1985) and Epidemiology (1987). I was elected as a distinguished practitioner in the National Academy of Practice in Veterinary Medicine in 1997. I completed my undergraduate degree with highest distinction from the University of Virginia in 1976.

1.3. I have worked on BSE for the past 16 years, beginning in 1989 when I led a risk assessment for BSE in the US for the US Department of Agriculture. I was stationed in the UK as a member of the BSE epidemiology unit in 1991. I have served on BSE international expert advisory groups for the World Health Organization and the World Animal Health Organization (OIE). I served for 6 years on the UK's Spongiform Encephalopathy Advisory Committee and for several years on the FDA's Transmissible Spongiform Encephalopathies Advisory Committee. I participated early on in the European Communities' BSE geographic-based risk assessment (GBR). I served as an external reviewer for the Canadian BSE risk assessments.

1.4. I have authored or co-authored numerous refereed scientific papers on BSE including a case-control study in the UK that demonstrated the risk associated with meat and bone meal in calf feeds; an evaluation of BSE in Northern Ireland; and the early risk

assessments for BSE in the US. I served as co-editor for the TSE review monograph published by the Council for Agricultural Science and Technology, and have reviewed BSE and TSE information for numerous organizations and agencies. I provided input for the Harvard/Tuskegee *Evaluation of the Potential for Bovine Spongiform Encephalopathy in the United States* (2003). Furthermore I have served as a scientific reviewer of BSE research proposals and referee for scientific manuscripts on BSE.

1.5. I served on the International Review Team that visited Canada after their first diagnosis of BSE and later served on the International Review Team invited to review the US situation after the December 2003 discovery in Mabton, Washington. The International Review Teams provided independent assessment of the investigation and prevention strategies implemented by the respective governments and made suggestions on risk assessment, risk management and risk communication in light of the current science and the experience of other countries in dealing with BSE.

1.6. I also have provided expertise to federal agencies, state agencies, industry, producer groups, consumer groups and international governments on BSE risk management and risk communication.

1.7. I make this declaration based on published research and reports as well as personal knowledge and experience working with BSE over the past 16 years. A copy of my CV is attached as Attachment A.

2.1. I, Guy H. Loneragan, currently serve as Assistant Professor of Beef Cattle Health and Management within the Division of Agriculture, College of Agriculture, Nursing, Science and Engineering at West Texas A&M University; I have held this position since January 1, 2002. I also serve as Adjunct Professor for the Department of Animal and Food Sciences and the International Center for Food Industry Excellence at Texas Tech University.

2.2. I received my Bachelor of Veterinary Science degree with First-Class Honors from the University of Sydney, Australia, in 1994. Subsequently, I attained Master of Science and Doctor of Philosophy degrees from the Department of Clinical Sciences at Colorado State University in 1998 and 2001, respectively. The didactic and research focus of my PhD was epidemiology with emphasis on production-related diseases of cattle.

2.3. I was an active participant of the International BSE Expert Forum and have been invited to speak both domestically and internationally on BSE. In addition, I provide industry organizations with the current scientific knowledge pertaining to BSE surveillance and control. I have a productive research program that is primarily focused on pre-harvest food safety aspects of beef production. I have authored or co-authored 24 scientific papers published in peer-reviewed journals (including those manuscripts that are *in press*).

2.4. I am a member of the International Symposium of Veterinary Epidemiology and Economics, Conference of Research Workers in Animal Diseases (chair of the

Epidemiology and Animal Health Economics section), American Association of Bovine Practitioners, Academy of Veterinary Consultants (member of the Standards of Practice Committee), International Association of Food Protection, and collaborator within the Food Safety Research and Response Network (chair of the Research Opportunity Subcommittee). A copy of my CV is included as Attachment B.

3.1. I, Srinand Sreevatsan, am currently serving as an Associate Professor in the Veterinary Population Medicine Department, College of Veterinary Medicine, University of Minnesota, St. Paul MN. Immediately prior to this position I served as an Assistant Professor in the Department of Veterinary Preventive Medicine, The Ohio State University for four years. I am trained in veterinary medicine, epidemiology and molecular microbiology.

3.2. I currently head an active, extramurally funded research program on prion diagnostics (funded by the Department of Army, National Prion Research Program) and Johne's disease (USDA-NRI and USDA-NRICAP). I have authored or co-authored 40 peer reviewed publications in highly reputed scientific journals including a recent review on transmissible spongiform encephalopathies. I have extensively presented at scientific meetings and have been an invited speaker in 3 national symposia. I have 3 discoveries that are licensed or patent pending. I have served as mentor for several graduate students and postdoctoral scientists. A copy of my CV is attached as Attachment C.

3.3. I serve as the bacterial pathogenesis section chair at the Conference of Research Workers in Animal Disease.

3.4. I am a member of the American Society for Microbiology and have served as an *ad hoc* reviewer for several microbiology and Veterinary Medicine journals published nationally and internationally. I have also served on a panel to review prion grant applications for the Department of Defense.

4. *Overview*

4.1. We have reviewed the Final Rule (Federal Register Publication: Bovine Spongiform Encephalopathy; Minimal Risk Regions and Importation of Commodities, APHIS Docket # 03- 080-3 (hereafter 'Final Rule') AR08043), Administrative Record (Cause CV-05-06-BLG-RFC), Declarations of Dr. Cox (28 January, 2005; 25 February, 2005; and 9 May, 2005), and the Plaintiff's Memorandum of Points and Authorities in Support of Plaintiff's Motion for Summary Judgment 9 May, 2005 (hereafter 'Memorandum').

4.2. Upon review of the available scientific data, it is our conclusion that the amended Final Rule permitting importation of young cattle that will be slaughtered by 30 months of age from minimal BSE risk regions provides no measurable increased risk to either animal health or public health. The basis of the arguments as set forth by Dr. Cox and the Plaintiff against importing Canadian cattle are not based on current science, are

extrapolations of results beyond what the data supports, or are inconsistent with the accumulated scientific wisdom and international experience regarding BSE in cattle.

4.3. The Final Rule and its use of qualitative risk assessment is appropriate and consistent with OIE guidelines. Based on the available data, classification of Canada as a *Minimal Risk Region* is consistent with the extensive scientific knowledge of transmission, pathogenesis, and epidemiology of BSE. While no action or decision in life is without risk, quantitative risk assessment is not necessary to demonstrate that the risk associated with importing cattle that will be slaughtered by 30 months of age results in negligible risk to either animal or public health in the USA.

5. Scientific understanding of BSE is extensive

5.1. Contrary to the Plaintiff's frequent allusion that BSE is a disease of which little is known, extensive scientific research has been conducted over the past 19 years. These studies provide an extensive understanding of the transmission, pathogenesis, and epidemiology of BSE in cattle. More importantly, the accumulated research and the collective experience of countries around the world have identified effective risk management strategies to halt the amplification of the causative agent of BSE and protect both human and animal health (World Health Organization, Understanding the BSE Threat, October, 2002, WHO/CDS/CSR/EPH/2002.6. Available at <http://www.who.int/csr/resources/publications/whocdscsreph20026/en/>).

5.2. Studies performed using BSE and other TSEs (e.g., scrapie) in non-bovine animal species (e.g., mice or sheep) cannot be directly extrapolated to BSE in cattle because of the significant interactions between the phenotype of the challenge agent, homology between the challenge prion and the host prion, and the genotype of the host.

5.3. The scientific method of conjecture and refutation involves collection and analysis of data to support or refute current thinking. The scientific outcomes of new research are presented in government reports, presentations at scientific meetings and refereed scientific publications. Scientific presentations and publications often include a discussion section in which the authors speculate about the potential implications of the new findings. Speculation and hypothesis generation outlined in the discussion do not represent new facts. Acceptance of such speculation as fact without supporting evidence is scientifically unsound. For example, Dr. Cox quotes directly from the speculative statement included in a paper by Bosque and colleagues, “exposure to prions might occur through the consumption of meat” (Prions in skeletal muscle. *Proc. Natl. Acad. Sci. U.S.A.* 2002;3812-3817). This study was performed using various Scrapie agents in mice. Direct extrapolation to suggest that BSE is present in beef is scientifically unsound and contrary to data collected from experiments actually using BSE in cattle. Consequently, the foundation of Dr. Cox’s argument that beef from young cattle may represent a “significant dietary exposure” is unfounded. In fact, Bosque continues, “several caveats must be considered when assessing the risk of humans developing disease from prion-tainted meat. First, the efficiency of prion accumulation in muscle may vary with either the host species or the prion strain involved.” It is clear Dr. Cox

and the Plaintiff failed to consider any caveats and their conclusions are contrary to current scientific knowledge.

5.4. The study of bovine spongiform encephalopathy (BSE) is especially challenging in that experimental exposure of humans to BSE is unethical. Therefore, epidemiologists and risk assessors focus on ‘natural experiments’ and statistical modeling. A natural experiment occurred in the United Kingdom with the emergence of BSE and subsequent human exposure through the food supply. The UK also provides extensive data on both BSE in cattle and vCJD in humans thanks to the extensive surveillance results for cattle collected by the UK veterinary services and for humans collected by the CJD surveillance unit in Edinburgh. Risk assessors and modelers have used these data to estimate the total size of the BSE epidemic, the level of exposure of the UK human population and the impact of specific interventions.

6. BSE is transmitted to cattle principally if not exclusively via contaminated feed

6.1. Accumulated experimental challenge studies and epidemiological research substantiate the critical role of feed-borne transmission in BSE epidemics. The rendering of BSE-affected cattle to create feed-grade animal protein products such as meat and bone meal (MBM) provided the mechanism by which the BSE epidemic was propagated. The rendering process itself is insufficient to destroy all of the BSE agent. Contaminated MBM was then used as a protein supplement in compounding cattle feeds. The recycling

of prion protein from BSE-infected cattle through rendering and into feed set the stage for the BSE epidemic in the UK.

6.2. Farms incorporating meat and bone meal in calf rations were significantly more likely to have BSE than those farms that did not use MBM (Wilesmith et al. Bovine spongiform encephalopathy: case-control studies of calf feeding practices and meat and bonemeal inclusion in proprietary concentrates. *Res. Vet. Sci.* 1992;325-31 AR12511). Due to the long incubation time following oral exposure to BSE and the potential increased susceptibility of calves early in their lives before they become true ruminants, most of the cases of BSE are considered to have resulted from contaminated feed exposure early in life and most likely within the first 12 months (Arnold and Wilesmith. Estimation of the age-dependent risk of infection of BSE of dairy cattle in Great Britain. *Prev. Vet. Med.* 2004;35-47; Anderson et al. Transmission dynamics and epidemiology of BSE in British cattle. *Nature.* 1996;779-788).

6.3. Likewise, extensive investigations suggest that all 4 known cases in Canada most likely occurred due to exposure to contaminated meat and bone meal incorporated into their feeds just prior to or immediately after the Canadian feed rules were adopted in 1997.

6.4. Data collected to evaluate the possibility of maternal transmission are inconclusive (Wilesmith et al. A cohort study to examine maternally-associated risk factors for bovine spongiform encephalopathy. *Vet. Rec.* 1997;239-243 AR12506). In addition, maternal

transmission appears biologically improbable as assays of reproductive tissues and organs of clinically-affected female cattle (including placental cotyledons, placental fluids, and uterine caruncle) show no detectable infectivity by parenteral inoculation of mice (Department for Environment, Food and Rural Affairs (DEFRA) available at <http://www.defra.gov.uk/animalh/bse/statistics/incidence.html>). Scientists agree that maternal transmission, if it occurs at all, is rare and by itself insufficient to sustain the existence of BSE in a national or regional cattle herd (Prince et al. Bovine spongiform encephalopathy. *Rev. Sci. Tech. Off. Int. Epiz.* 2003;37-60). In other words, if feed-borne transmission is blocked, then the number of new infections will dwindle and BSE will be eradicated.

6.5. BSE is not contagious and does not spread from animal to animal or by grazing pastures previously occupied by BSE-affected cattle (Anderson et al. Transmission dynamics and epidemiology of BSE in British cattle. *Nature.* 1996;382:779-788). Assays of salivary glands and urine from cattle orally challenged with BSE show no infectivity using the most sensitive bioassay available, intracerebral inoculation of cattle (Wells, et al., Pathogenesis of experimental bovine spongiform encephalopathy: preclinical infectivity in tonsil and observations on the distribution of lingual tonsil in slaughtered cattle. *Vet. Rec.* 2005;401-407). The disproportionate risk of BSE for dairy herds compared to beef herds resulted from the high use of protein concentrates (namely MBM) in dairy production while beef producers were more likely to feed only forage.

6.6. The BSE agent behaves differently in different animal species. BSE in mice or sheep behaves differently than BSE in cattle (Bosque et al., Prions in skeletal muscle. *Proc. Natl. Acad. Sci. U.S.A.* 2002;3812-3817; and Scott et al. Transgenic models of prion disease. *Arch. Virol. Suppl.* 2000;113-124). Also, the tissue distribution of BSE infectivity is different in each species. Therefore, routes of transmission demonstrated for sheep infected with BSE cannot be directly extrapolated to cattle.

6.7. Given the well-defined and limited route of transmission of BSE (through contaminated feed), prohibition of ruminant-derived meat and bone meal incorporation into ruminant feeds is effective at preventing the spread of BSE. While Plaintiff contends “it is unknown what other routes of transmission may be available” (Memorandum, 9 May, 2005 p15), no other plausible route of transmission has been proven in the extensive scientific literature.

7. Humans are substantially less susceptible to BSE than cattle

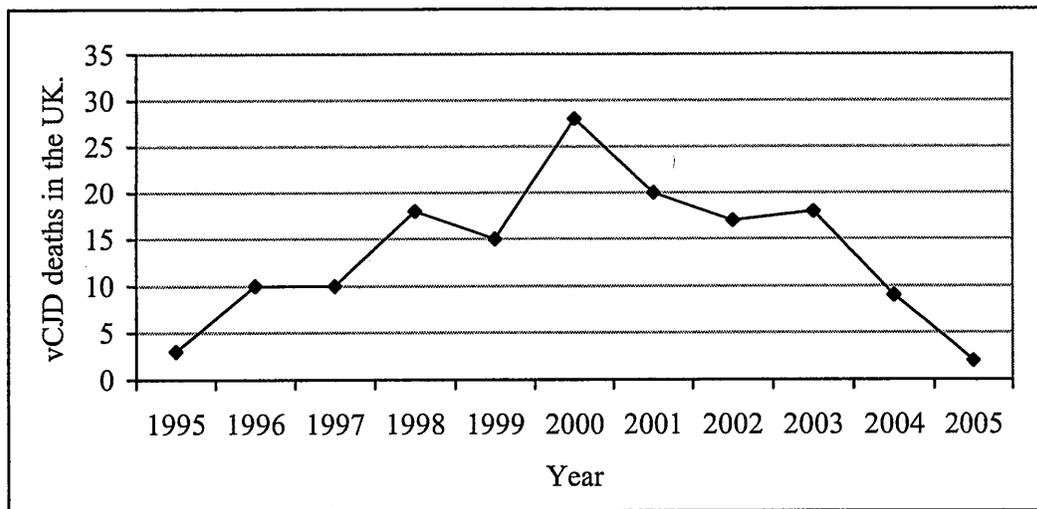
7.1. Human exposure trials cannot be undertaken to determine the dose of BSE necessary to cause variant Creutzfeldt-Jakob Disease (vCJD). Therefore, indirect methods such as comparison of surveillance data and epidemiological modeling must be employed to estimate the BSE susceptibility of humans and the ‘species barrier’ between cattle and humans.

7.2. The UK Creutzfeldt-Jakob Disease Surveillance Unit has identified a total of 155 confirmed and probable vCJD cases as of April 29, 2005 (Figure 1; The National Creutzfeldt-Jakob Disease Surveillance Unit, Edinburgh, UK, available at <http://www.cjd.ed.ac.uk/index.htm>). Beginning with 3 vCJD deaths in 1995, the number of vCJD deaths peaked in 2000 with 28 deaths and has decreased thereafter, with only 9 cases identified in 2004. Approximately a dozen cases of vCJD have been identified outside the UK, all linked to countries with BSE in the cattle population (eg, France, Italy, Japan, Netherlands).

7.3. Comparing the number of vCJD cases observed to the estimated amount of BSE infectivity that entered the human food supply provides one measure of human susceptibility. Data from the UK show a total of 155 confirmed and probable cases of vCJD as of 29 April, 2005. Total human exposure in the UK between 1980 and 2001 was estimated at 54 million cattle infectious doses¹ (Comer and Huntly. Exposure of the human population to BSE infectivity over the course of the BSE epidemic in Great Britain and the impact of changes to the Over Thirty Month Rule. *J. Risk. Res.* 2004;523-543). The small number of human vCJD cases in the face of massive exposure to BSE in the human food supply suggests that the species barrier is substantial, i.e., humans are much less susceptible to BSE than cattle. Dr. Cox (Declaration of Dr. Cox, 7 May, 2005, p11) and Plaintiff's (Memorandum 9 May, 2005, p2) assertions that humans are as susceptible as cattle are grossly wrong and inconsistent with the collective scientific data.

¹ A 'cattle infectious dose' represents the dose required to infect a bovine 50% of the time (Comer and Huntley, Exposure of the human population to BSE infectivity over the course of the BSE epidemic in Great Britain and the impact of changes to the Over Thirty Month Rule. *J. Risk. Res.* 2004;523-543).

Figure 1. Number of vCJD deaths in the UK for 1995 through 29 April, 2005.



Source of data: The National Creutzfeldt-Jakob Disease Surveillance Unit, Edinburgh, UK. Available at <http://www.cjd.ed.ac.uk/index.htm>

8. *BSE infectivity has a well-defined and limited distribution in cattle tissues*

8.1. Examination of naturally-occurring BSE cases and extensive well-controlled BSE challenge studies has clearly demonstrated that the primary site for BSE accumulation in cattle is the central nervous system (brain, spinal cord, trigeminal ganglia, dorsal root ganglia and eye). Smaller amounts of BSE infectivity accumulate in the distal ileum whereas only traces are present in some tonsil samples (Wells, et al., Pathogenesis of experimental bovine spongiform encephalopathy: preclinical infectivity in tonsil and observations on the distribution of lingual tonsil in slaughtered cattle. *Vet. Rec.* 2005;401-407). Importantly, BSE studies in cattle to date have not detected infectivity in any other tissue than those listed above. Plaintiff's assertion that BSE may be transmitted to cattle by consumption of blood is contrary to current science (Memorandum, 9 May, 2005 p19).

8.2. Researchers have examined naturally-occurring BSE cases as well as experimentally infected cattle to measure the distribution of BSE infectivity. Bioassay, inoculating tissue specimens directly into susceptible species, remains the most sensitive indicator of BSE infectivity. For example, in many studies cattle tissues have been injected into susceptible mouse strains and cattle. The most sensitive test available involves injecting tissue samples directly into the brain of an unexposed calf (intracerebral inoculation).

8.3. Experimental challenge studies provide details on the pathogenesis of BSE. BSE-exposed cattle were sacrificed at intervals between the time of exposure and the time of development of clinical signs indicative of BSE. BSE was first detectable in the distal ileum at 6 months after oral exposure. No infectivity was detected in brain or spinal cord until approximately 3 months prior to the onset of clinical signs (Wells et al. Preliminary observations on the pathogenesis of experimental bovine spongiform encephalopathy (BSE): an update. *Vet. Rec.* 1998;130-106 AR12502). Even with a large dose of raw brain from BSE-affected cattle, exposed calves did not develop clinical signs until 35 months or more after exposure. The data also demonstrate a pronounced time-dependent accumulation of infectivity that remains very low or undetectable until around the time of clinical disease (European Union, Scientific Steering Committee. Update of the Opinion on TSE Infectivity Distribution in Ruminant Tissues, November 2002 AR11921; Wells et al. Preliminary observations on the pathogenesis of experimental bovine spongiform encephalopathy (BSE): an update. *Vet. Rec.* 1998;130-106 AR12502).

8.4. Multiple experiments have found no evidence of BSE infectivity in bovine muscle meat. Assays of BSE-affected cattle tissues inoculated into cattle brains continue with results to date confirming infectivity is limited to those tissues identified by the mouse bioassay. Thus, there are no data to infer that beef (i.e., muscle meat) should be considered hazardous at any age. Consequently, Dr. Cox's assertion that "BSE in beef poses at least some risk to public health" (Declaration of Dr. Cox, 7 May, 2005 p11) is contrary to current scientific understanding developed from BSE studies using appropriate models. For clinical cases of BSE, the available data allows estimation of the distribution of BSE infectivity (Table 1).

Table 1. Distribution of tissue infectivity in clinical BSE cases.

Tissue	Weight g/animal	Percentage of Total Infectivity	
		Comer and Huntley	EU SSC ²
Brain	500	60.2	64.1
Spinal cord	200	24.1	25.6
Dorsal root ganglia	30	3.6	3.8
Trigeminal ganglia	20	2.4	2.6
Tonsil	50	0.0	-
Distal ileum	800	9.6	3.3

Source of data: Comer and Huntley. Exposure of the human population to BSE infectivity over the course of the BSE epidemic in Great Britain and the impact of changes to the Over Thirty Month Rule. Over Thirty Month Rule (OTMR) review paper. 2003. AR11655 available at: <http://www.food.gov.uk/multimedia/pdfs/otmcomer.pdf>; Comer and Huntley, Exposure of the human population to BSE infectivity over the course of the BSE epidemic in Great Britain and the impact of changes to the Over Thirty Month Rule. *J. Risk. Res.* 2004;523-543; and European Union, Scientific Steering Committee. Opinion of the Scientific Steering Committee on the Human Exposure Risk (HER) via Food with Respect to BSE, December, 1999 AR11707. Adapted from USDA:APHIS. Analysis of Risk—Update for the Final Rule: Bovine Spongiform Encephalopathy; Minimal Risk Regions and Importation of Commodities, December, 2004, AR08333.

² Infectivity in eyes (0.04% of total infectivity) included with estimate of brain.

9. Removal of Specified Risk Materials from cattle protects public health

9.1. The specified risk materials listed under the Final Rule (Federal Register Publication: Bovine Spongiform Encephalopathy; Minimal Risk Regions and Importation of Commodities (p461 AR08045) include all tissues demonstrated to accumulate BSE infectivity subsequent to either natural or experimental exposure of cattle to BSE. Plaintiff is incorrect in stating “it is no longer reasonable to presume that there is no risk of exposure to BSE in infectious agents beyond the tissues defined as SRMs” (Memorandum, 9 May, 2005 p21). The comprehensive UK pathogenesis studies support the list of SRM described in the Final Rule (p461 AR08045) in that only distal ileum and tonsils of cattle less than 30 months of age need be removed; the longer list described in the Final Rule (p461 AR08045) of tissues to be removed from cattle more than 30 months of age is also appropriate. Plaintiff’s suggestion that the removal of the distal ileum and tonsils of cattle less than 30 months of age is insufficient is, therefore, contrary to scientific evidence (Memorandum, 9 May, 2005 p20).

9.2. Dr. Cox raises the specter of subclinical and pre-clinical BSE as a potential public health threat but incorrectly suggests that SRM provisions “are designed to detect and remove contamination from clinically-positive cattle”. In fact, the SRM removal strategy has been designed to remove all bovine tissues that have been demonstrated to accumulate BSE infectivity through bioassay of either naturally-occurring BSE cases or cattle serially sacrificed beginning at 2 months after a large oral inoculation of raw BSE brain pool (Wells et al. Preliminary observations on the pathogenesis of experimental

bovine spongiform encephalopathy (BSE): an update. *Vet. Rec.* 1998;130-106
AR12502).

9.3. It is the consensus of public health officials around the world that removal of SRM from cattle combined with attention to preventing cross contamination during stunning and slaughter effectively protects public health by preventing human exposure to BSE infectivity through food. Moreover, removal of SRM has been endorsed by the World Health Organization as the primary public health protection (World Health Organization, Understanding the BSE Threat, October, 2002, WHO/CDS/CSR/EPH/2002.6. Available at: <http://www.who.int/csr/resources/publications/whocdscsreph20026/en/>).

9.4. The USDA's list of SRM is based on comprehensive scientific data and the accumulated wisdom of the international public health community. The Final Rule adequately protects USA consumers.

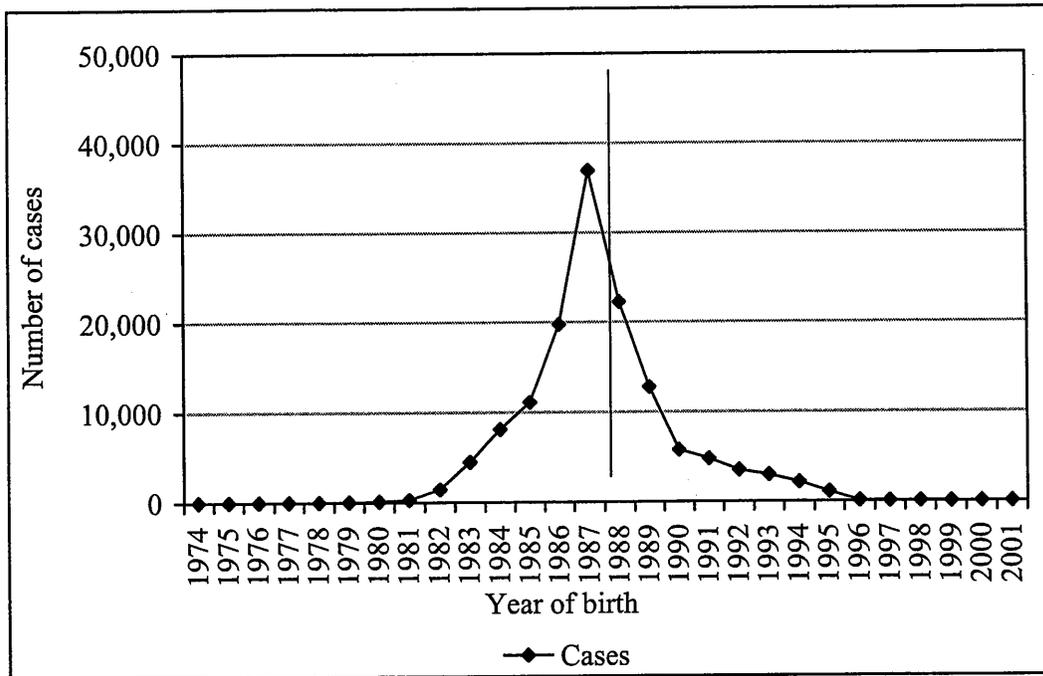
10. *Feed bans halt amplification of infective material, decrease the amount of exposure, and dramatically reduce the rate of new infections*

10.1. The overwhelming body of evidence indicates MBM-contaminated feed is the only vehicle by which cattle are infected with BSE in the field. Because the data demonstrate that cattle are not infected with BSE without exposure to contaminated feed, an effective prohibition of infective material in cattle feed will halt amplification of infectivity.

Compelling evidence from the UK and other EU countries support this as the effective strategy to protect animal health.

10.2. Implementation of a feed ban prohibiting inclusion of ruminant meat and bone meal (MBM) into ruminant feed in July of 1988 resulted in a precipitous and dramatic impact on the burgeoning UK BSE epidemic (Figure 2; Stevenson et al. Temporal aspects of the epidemic of bovine spongiform encephalopathy in Great Britain: individual animal-associated risk factors for the disease. *Vet. Rec.* 2000;349-354; Anderson et al. Transmission dynamics and epidemiology of BSE in British cattle. *Nature.* 1996;779-788). The number of identified cases in the birth cohort born in the first full year after the ban (1989; n = 12,742) was 65.5% lower than the number of cases identified in animals born in the last full year immediately prior to the ban (1987, n = 36,932; Department for Environment, Food and Rural Affairs (DEFRA) available at <http://www.defra.gov.uk/animalh/bse/statistics/incidence.html>). This downward trend continued in that the number of cases born in 1990 (n = 5,743) was 54.9% lower than the number of cases born in 1989 and 84% lower than the number born the last full year before the ban. While some animals born after the feed ban developed BSE because the ban was not absolute initially, the vast majority of cases detected in the UK, 76.0%, were born prior to the first full year after the feed ban. Moreover, as acceptance and enforcement of the feed ban have improved, so has its ability to protect animal health by reducing the proportion of the cattle population exposed to an infective dose of the causative agent.

Figure 2. Number of BSE cases in the UK by year of birth where known. Vertical line represents the year in which the feed ban was introduced.



Source of data: Department for Environment, Food and Rural Affairs (DEFRA) available at <http://www.defra.gov.uk/animalh/bse/statistics/incidence.html>

10.3. A salient observation from the UK epidemic is that no feed ban is absolute on the day it is implemented. Even so, the incomplete feed ban effectively halted amplification of infective material. This effect was profoundly apparent even though the feed ban was implemented during the time the catastrophic epidemic was in full swing and there was an overwhelming burden of circulating infectivity. Dr. Cox misrepresents the UK data by erring in his interpretation of a graphic depiction of UK cases in his declaration (Declaration of Dr. Cox, 7 May, 2005, p6). In citing his figure, Dr. Cox does not take into account the disparity between the age at exposure and age when disease is detected, i.e., incubation period. It is misleading to conclude “BSE cases persisted in the UK despite implementation of important countermeasures” (Declaration of Dr. Cox, 7 May,

2005, p4) based on his figure. To more accurately interpret the profoundly successful UK feed ban, one should refer to Figure 2 in this declaration as it more accurately depicts the precipitous decline in new BSE infections after implementation of the feed ban.

10.4. There is a pronounced dose-dependent impact of the exposure dose on the incubation period (Table 2). The existing body of data also indicates the vast majority of BSE-positive animals are infected within the first year of life (Arnold and Wilesmith. Estimation of the age-dependent risk of infection of BSE of dairy cattle in Great Britain. *Prev. Vet. Med.* 2004;35-47; Anderson et al. Transmission dynamics and epidemiology of BSE in British cattle. *Nature.* 1996;779-788). Consequently, the consistent trend for increasing mean age at the time of detection after implementation of feed bans provides additional sound evidence of their effectiveness. In other words, as the feed bans become more effective, the exposure dose becomes less and incubation period increases. It is accepted that in-field exposure is more variable than in a controlled experiment situation. However, a dose response is still demonstrably apparent. Because the circulating level of BSE infectivity will increase over time when MBM made from infected cows is incorporated into cattle feed, the period of greatest in-feed BSE infectivity within a country is intuitively immediately prior to implementation of a feed ban. During the period of greatest infectivity in the UK, population exposure was greatest (Figure 2) and incubation periods were shortest (Figure 3). Since implementation of the feed ban, the age of the youngest animals identified with BSE has steadily increased in the UK (Figure 3). No animal under 30 months of age has been confirmed with BSE in the UK since 1996 (Source of data: Department for Environment, Food and Rural Affairs (DEFRA))

available at <http://www.defra.gov.uk/animalh/bse/statistics/incidence.html>). This provides further evidence that feed bans are effective at protecting animal health.

Table 2. Descriptive statistics from *Infectious Dose* studies used to evaluate varying challenge doses on incubation period (months presented as a range where appropriate). The challenge material was brain pools obtained from cattle with clinical BSE. Cattle were orally dosed with 100 g on three occasions, 100 g once, 10 g of brain once, or 1 g of brain once in study 1. In the second study, cattle were orally dosed with 1 g, 0.1 g, 0.01 g, or 0.001 g of brain pool once. Study 1 was terminated after 110 months. Study 2 is ongoing; these results are 85 months post inoculation as of April, 2005.

Dose	Study	Number exposed	BSE Cases	Incubation period (range)
3 x 100 g	1	15	10	33 – 42
100 g	1	15	10	33 – 61
10 g	1	15	7	42 – 72
1 g	1	15	7	45 – 75
1 g	2	5	3	59 – 73
0.1 g	2	15	3	55 – 76
0.01 g	2	15	1	56
0.001 g	2	15	1	68

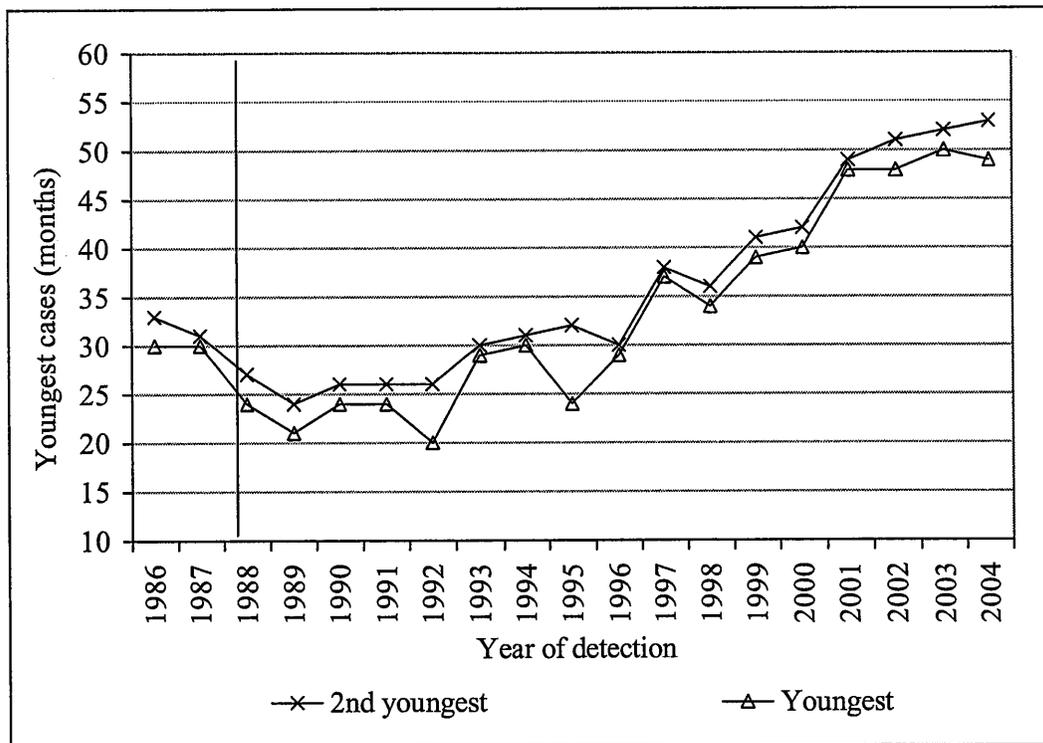
Source of Data: Dr. Danny Matthews, personal communication March, 2005.³

10.5. Data from the EU also demonstrate increasing age at the time of BSE detection over time (European Commission. Report on the monitoring and testing of ruminants for the presence of transmissible spongiform encephalopathy (TSE) in the EU in 2003. May 2004). This is apparent even in high-risk cattle as their mean age of detection has consistently increased. No animal under 30 months of age has been confirmed with BSE in the EU since 2001 (European Commission. Report on the monitoring and testing of ruminants for the presence of transmissible spongiform encephalopathy (TSE) in the EU in 2002. June 2003; European Commission. Report on the monitoring and testing of

³ Danny Matthews, PhD, TSE Programme Manager, Veterinary Laboratories Agency, Department for Environment, Food and Rural Affairs, UK.

ruminants for the presence of transmissible spongiform encephalopathy (TSE) in the EU in 2003. May 2004).

Figure 3. Graph depicting the age of youngest and second youngest BSE cases detected in the UK by the year of detection. Vertical line represents year in which feed ban instituted.⁴



Source of data: Department for Environment, Food and Rural Affairs (DEFRA) available at <http://www.defra.gov.uk/animalh/bse/statistics/incidence.html>

⁴ Age of detection does not indicate age at the time of initial exposure and infection. The preponderance of evidence suggests that infection occurs within the first few months of life (Stevenson et al. Temporal aspects of the epidemic of bovine spongiform encephalopathy in Great Britain: individual animal-associated risk factors for the disease. *Vet. Rec.* 2000;349-354; Anderson et al. Transmission dynamics and epidemiology of BSE in British cattle. *Nature.* 1996;779-788). Some of the data points may represent multiple animals.

10.6. The mean age of detection for the 4 indigenous Canadian cases was 82.3 months; no BSE case under 70 months of age has been detected (Table 3). These animals were almost certainly infected by 12 months of age and more likely during the first few months of life (Stevenson et al. Temporal aspects of the epidemic of bovine spongiform encephalopathy in Great Britain: individual animal-associated risk factors for the disease. *Vet. Rec.* 2000;349-354; Anderson et al. Transmission dynamics and epidemiology of BSE in British cattle. *Nature.* 1996;779-788). The evidence and the epidemiological investigations (Canadian Food Inspection Agency, available at <http://www.inspection.gc.ca/english/anima/heasan/disemala/bseesb/bseesbindexe.shtml>) conclude that these animals were most likely exposed to the BSE agent very early in life via feed produced prior to the ban. This implies a mean incubation period of approximately 6 years and is consistent with current epidemiological data from the EU.

10.7. The incubation period for the four Canadian BSE cases would have been on average approximately 6 years. Based on the extensive accumulated scientific knowledge of BSE and the BSE cases identified in Canada, the age at detection suggests the infectious dose early in life was very small (Table 2). A substantially larger dose is required to infect older animals. If the Canadian animals were exposed later in life to a dose sufficient to cause disease, it would imply that the Canadian feed ban was ineffective and in-feed infectivity amplified greatly after 1997. In that case, however, younger animals, born in 1999 and 2000, would have been exposed to the larger dose and also would have been detected with BSE. This has not happened and indicates the Canadian feed ban is adequately protecting animal health even though it was not absolute

precisely at the time of implementation. Identification of an animal infected soon after the ban does not imply failure; it seems likely that absolute removal of in-feed infectivity is not immediate in practical settings. Significant challenges are associated with implementation of a feed ban such as existing inventory on-farm of MBM-containing feed manufactured prior to the ban. As demonstrated in the UK, however, each year that the feed ban is in place, compliance improves and, therefore, population exposure (both the number of animals and amount of exposure dose) decreases.

10.8. The accumulated experimental and epidemiological scientific data unequivocally demonstrate that consumption of MBM-contaminated feed is the primary, if not only way by which cattle are infected with BSE. While it is accepted that feed bans have not been absolute on the day they are implemented, evidence supports consistent improvement in their enforcement and compliance. The data clearly demonstrate that the various feed bans around the world have reduced the BSE reproductive rate (R_0) to less than 1.0. That is, each case will lead to less than 1 additional case in birth cohorts born after the implementation of the feed ban and will ultimately lead to eradication of the disease. This observation is consistent with simulation models that mathematically describe the evolution of BSE in populations following introduction of infective material (Cohen et al. Evaluation of the Potential for Bovine Spongiform encephalopathy in the United States, Harvard Center for Risk Analysis, November, 2001 AR01776; Cohen et al. Evaluation of the Potential for Bovine Spongiform Encephalopathy in the United States, Harvard Center for Risk Analysis, October, 2003 AR03687; Cohen and Gray. Evaluation of the Potential Spread of BSE in Cattle and Possible Human Exposure Following Introduction

of Infectivity into the United States from Canada, Harvard Center for Risk Analysis, no date AR08423).

Table 3. Descriptive information of the 4 indigenous cases of BSE originating in Canada. All animals were mature cows and had clinical signs that have historically been associated with BSE e.g., downer, ataxia, loss of condition etc.

Case	Type	Birth	Presented	Age (months)	Location
1	beef	MAR97	JAN03	70	slaughterhouse (Alberta)
2	dairy	APR97	DEC03	80	slaughterhouse (Washington State)
3	dairy	OCT96	DEC04	98	Farm (Alberta)
4	beef	MAR98	JAN05	81	Farm (Alberta)

Source of data: Canadian Food Inspection Agency. Available at <http://www.inspection.gc.ca/english/anima/heasan/disemala/bseesb/bseesbindexe.shtml>

10.9. It is our opinion that the Canadian feed ban, albeit not absolute initially, effectively a) halted amplification of BSE infectivity; b) reduced the available in-feed BSE infective dose; c) reduced the number of cattle exposed to an infective dose; and d) dramatically reduced the likelihood of new BSE cases in cattle born after the implementation of the feed ban in 1997.

11. *Canadian surveillance strongly demonstrates BSE is rare*

11.1. The primary purpose of the targeted surveillance programs of both Canada and the USA is detection of BSE (USDA:APHIS. Bovine Spongiform Encephalopathy (BSE) Surveillance Plan, March, 2004 AR09473; Noel Murray, Personal communication 24 May, 2005⁵). A secondary purpose is to provide information about the burden of BSE within each country. BSE prevalence cannot be accurately estimated from the surveillance data due to the limitations of current diagnostic techniques. However, given the current understanding of the epidemiology of BSE, the number of BSE cases detected in the high-risk populations serves as a proxy for the burden of BSE within a geographic area.

11.2. Data from around the world unequivocally demonstrate that targeting high-risk animals for testing is the best strategy to detect BSE. The ratio of BSE surveillance yield (positive BSE cases as a percent of animals tested) in high-risk animals to the surveillance yield in healthy adult animals was 29.3 in 2002 and 19.9 in 2004 for the EU (European Commission. Report on the monitoring and testing of ruminants for the presence of transmissible spongiform encephalopathy (TSE) in the EU in 2002. June 2003; European Commission. Report on the monitoring and testing of ruminants for the presence of transmissible spongiform encephalopathy (TSE) in the EU in 2003. May 2004). The Japanese observed an even greater ratio of 43.6 (calculated from data

⁵ Noel Murray, BVSc (Hons), MACVSc (Epidemiology), Animal Health Policy Analyst, Canadian Food Inspection Agency, Ottawa, Ontario, Canada.

available at <http://www.mhlw.go.jp/houdou/0110/h1018-6.html>⁶). If the more conservative ratios from the EU are used, it must be concluded that detection of an animal with BSE is approximately 20 to 30 times more likely to be in the high-risk group than the healthy adult population. Since BSE has been demonstrated to be a rare event in Canada, it is wholly appropriate to target high-risk animals. Given limited resources, the surveillance program developed by Canada (which is very similar to that used in the USA) is the most sensitive and efficient strategy to detect BSE.

11.3. Dr. Cox finds fault in that Canada has not implemented “a random sampling program” (Declaration of Dr. Cox, 7 May, 2005 p22). A random sample of the population implies that samples will be collected from all categories of animals including healthy slaughter animals of all ages in addition to high-risk animals. Such a sampling program ignores the substantial body of evidence that overwhelmingly demonstrates that a random sample across the entire slaughter cattle population is an inefficient use of resources that would yield less information than aggressive testing of as many of the high-risk population as possible. In fact, testing a random sample of all cattle would yield fewer BSE cases detected than a similar sample drawn from the high-risk population. Given that the high-risk population comprises only about 1% of the adult cattle population, a random sample across all adult cattle would test primarily healthy slaughter cattle and miss almost all of the high-risk cattle. Expanding the testing to a random sample of all age groups would further reduce the power of the surveillance

⁶ Website translation by Yoichi Mizuta, DVM, MS, Chief veterinarian, Dairy Clinic - North Branch, Tochigi Prefecture Dairy Co-operative, Tochigi, Japan, 27 May, 2005.

system to detect BSE cases, e.g., the ability of surveillance to detect BSE cases if they do occur.

11.4. Canada has exceeded OIE recommendations⁷ for the past 10 years including 2005 (Table 4).

11.5. The current level of testing⁸ is orders of magnitude greater than the level recommended and is statistically robust and sufficiently powerful to detect the very low level of BSE in Canada (Cannon and Roe. Livestock disease surveys. A field manual for veterinarians. Bureau of Range Science, Department of Primary Industry. Australian Government Publishing Service. 1982.). The current surveillance program is designed to detect at least one BSE case if it occurs at 1 case per million in the adult population, recognizing that the preponderance of cases will be seen in the high-risk populations. Canada has an adult population of approximately 6 million animals (Canadian Food Inspection Agency, available at <http://www.inspection.gc.ca/english/anima/heasan/disemala/bseesb/bseesbindexe.shtml>) compared to the adult population in the USA of 45

⁷ The OIE sampling guidelines recommend testing of 336 cattle showing clinical signs consistent with BSE with adult population greater than 30 months of age of 7,000,000 animals (USDA:APHIS. Analysis of Risk-Update for the Final Rule: Bovine Spongiform Encephalopathy; Minimal Risk Regions and Importation of Commodities, December, 2004 AR08325; OIE Terrestrial Animal Health Code, Article 2.3.13.2 (3.8.4.2. AR10077).

⁸ Animals eligible for inclusion in the targeted Canadian surveillance program include 1) cattle with clinical signs consistent with BSE (for example, behavioral changes including excitability and anxiousness, and emaciation); and 2) cattle over 30 months of age from the so-called 4-D categories (a. Dead – animals found dead; b. Downers – animals that are non-ambulatory; c. Distressed or dying – animals presented for emergency slaughter; and d. Diseased - animals sent to slaughter and found to be sick at the ante-mortem inspection; Canadian Food Inspection Agency, available at <http://www.inspection.gc.ca/english/anima/heasan/disemala/bseesb/bseesbindexe.shtml>).

million animals. The data demonstrate that these BSE cases will in all likelihood, become part of the high-risk population. To detect at least 1 of these 6 hypothetical BSE cases in the high-risk population with 90% confidence, 25,496 samples need to be tested (Cannon and Roe. Livestock disease surveys. A field manual for veterinarians. Bureau of Range Science, Department of Primary Industry. Australian Government Publishing Service. 1982). In 2004, Canada tested 23,550 high-risk animals and as of 1 June, 28,569 high-risk animals⁹ have been tested this calendar year, 2005. Canada's surveillance program is of equivalent sensitivity to the USA's program when one considers the size of the high-risk populations. The number of animals comprising each countries high-risk population is significantly different (i.e., 450,000 in the USA versus 80,000 in Canada). These data indicate the Canadian surveillance program appropriately targets high-risk animals and is sufficiently sampling enough animals to strongly demonstrate BSE is rare in Canada.

11.6. Based on the documented epidemiological dynamics of BSE and the adequacy of Canadian surveillance program, BSE in Canada is extremely rare and most likely confined to a limited number of age-specific cohorts born around the time of the feed ban implementation in 1997.

⁹ Assuming the current level of sampling continues, approximately 70,000 high-risk animals will be tested in 2005 (i.e., an average of 190 samples per day for 365 days). This sample size is sufficient to detect BSE if it occurs at 1 animal per million adult cattle with statistical confidence in excess of 99.9%.

Table 4. Number of cattle tested as part of the Canadian and USA surveillance program.⁵ The OIE recommends testing 336 animals with a population of 7 million adult cattle and 433 with an adult population of 40,000,000. Canada has 6 million adult and 80,000 high-risk cattle whereas the USA has 45 million and 450,000 high-risk cattle. When the high-risk population is taken into account, the sample numbers represent equivalent sensitivity to detect BSE.

Year	Country	
	Canada	USA
1996	454	1,143
1997	712	2,713
1998	926	1,080
1999	895	1,302
2000	1,020	2,681
2001	1,575	5,272
2002	3,377*	19,990
2003	3,710	20,543
2004	23,550	176,468**
2005	28,569***	201,991****

* Excludes 2017 tests conducted on healthy cohorts of the May 2003 case.

** Includes 167,476 animals tested post June 1, 2004 as part of the USDA's Enhanced Surveillance Program.

*** As of June 1, 2005 (available at <http://www.inspection.gc.ca/english/animal/heasan/disemala/bseesb/200503canadae.shtml>)

**** As of May 31, 2005 (available at <http://www.aphis.usda.gov/lpa/issues/bse/surveillance/figure2f.html>, http://www.aphis.usda.gov/lpa/issues/bse/bse_2004_tests.html, http://www.aphis.usda.gov/lpa/issues/bse_testing/test_results.html)

12. Testing of cattle less than 30 months of age serves no scientific or public health purpose

12.1. The plaintiff proposes that “requiring Canadian cattle slaughtered in the U.S. or in Canada for export to the U.S. be tested for BSE could help mitigate the risks and adverse effects of the Proposed Rule.” (Memorandum, 9 May, 2005, p24) Much of their argument appears to be based on detection of BSE in a proportionally very small subset

of animals less than 30 months of age in other countries (Memorandum, 9 May, 2005, p23).

12.2. The frequency of BSE detection in cattle under 30 months of age needs to be put in context. Even in the UK during their period of greatest circulating infectivity and hence the highest exposure doses, when the incubation period would be expected to be shortest, only 1.4 out of every 1,000 BSE cases were less than 36 months of age and even fewer were less than 30 months of age. Moreover, of the greater than 186,000 cases in the UK, only 2 were less than 24 months of age. Furthermore, no animal less than 36 months of age and *a fortiori* less than 30 months of age, has been detected with BSE in the UK since 1996. Based on comprehensive surveillance data for the entire European community, BSE has not been confirmed in any bovine less than 30 months of age in 2002 or 2003 even though in excess of 3.4 million cattle in this age category were tested (European Commission. Report on the monitoring and testing of ruminants for the presence of transmissible spongiform encephalopathy (TSE) in the EU in 2002. June 2003; European Commission. Report on the monitoring and testing of ruminants for the presence of transmissible spongiform encephalopathy (TSE) in the EU in 2003. May 2004).^{10, 11} This observation was made even while the rate of BSE in European cattle born during the same time period as the 4 Canadian cases (i.e., 1996, 1997, and 1998)

¹⁰ 2003 data are based on animals less than 36 months of age (European Commission. Report on the monitoring and testing of ruminants for the presence of transmissible spongiform encephalopathy (TSE) in the EU in 2003. May 2004) and consequently includes animals less than 30 months of age.

¹¹ In 2001, 2 animals under 30 months of age were detected in Germany. These animals were 28 and 29 months of age and represent the most recent recorded confirmed cases of BSE in cattle less than 30 months of age. Both cases were in high-risk animals and as such, would not be eligible to enter the human food supply under the proposed rule.

was 3.49, 5.68, and 12.66 per 10,000 tests, respectively (European Commission. Report on the monitoring and testing of ruminants for the presence of transmissible spongiform encephalopathy (TSE) in the EU in 2002. June 2003; European Commission. Report on the monitoring and testing of ruminants for the presence of transmissible spongiform encephalopathy (TSE) in the EU in 2003. May 2004).

12.3. The Plaintiff also argues that detection of BSE in a 21- and a 23-month-old animal in Japan during 2003 supports testing of healthy slaughter animals under 30 months of age. The Plaintiff states that these “younger cases in Japan were detected after Japan had tested 3,159,408 cattle, of which only 11 diagnosed cases of BSE had been detected” (Memorandum, 9 May, 2005 p23) implying that in Japan, a country unlike the UK in that there is presumably a lower level of circulating infectivity, 2 of 13 BSE cases were less than 30 months of age. These cases warrant further discussion. They were detected and classified as positive using a novel Western Blot assay that has not been independently validated (OIE, Manual of Diagnostic Tests and Vaccines for Terrestrial Animals, 2.3.13, revised 23 July, 2004; Dr. Bruno Oesch, Personal communication 30 May, 2005¹²).

Additionally, it is the internationally accepted norm that animals identified with a screening test be confirmed using a gold standard test such as immunohistochemistry (as done in the USA and Canada) or the OIE Western Blot. Not only did these animals not display any clinical signs compatible with BSE but they were negative using histological and immunohistochemistry confirmatory tests. Moreover, no infectivity and, therefore, transmissibility has been detected using a sensitive mouse bioassay even though these

¹² Bruno Oesch, PhD, CEO and Head of Research and Development, Prionics AG, Schlieren, Switzerland.

studies are in excess of 400 days¹³ duration (Hideaki Karaki, Personal communication 30 May, 2005¹⁴). Since these animals were negative on confirmatory tests and for the presence of infectivity, one must logically conclude that they were in fact BSE negative (i.e., false positives on the screening test). Moreover, these animals would have been declared negative under the current OIE standards that are followed by the USA and Canadian surveillance programs. Consequently, the Plaintiff's statement that "neither of the under 30 month old cattle found with BSE in Japan would have been identified without Japan's policy of testing all animals at slaughter" (Memorandum, 9 May, 2005, p24) is without basis regardless of the support of Dr. Prusiner (Detecting Mad Cow Disease. *Scientific American*. 2004;86-93 AR012125).

12.4. Considering the lack of confirmation of the young Japanese BSE suspects and the results from the comprehensive EU surveillance, no animal under 30 months of age has been confirmed with BSE since 2001 worldwide despite millions of tests performed in multiple countries. In other words, no animal born in 1999 or later has been confirmed with BSE prior to 30 months of age anywhere in the world.

¹³ Transgenic mice offer a sensitive and relatively easily performed approach to confirm BSE infectivity (Buschmann et al. Detection of cattle-derived BSE prions using transgenic mice overexpressing bovine PrP^C. *Arch. Virol. Suppl.* 2000;75-86; Castilla et al. Early detection of PrPres in BSE-infected bovine PrP transgenic mice. *Arch. Virol. Suppl.* 2003;677-691). Transgenic mice expressing bovine PrP offer no species barrier and facilitate detection of infectivity and transmissibility. Average incubation to presence of PrP^{Sc} in brain stem is 130-150 days post exposure and to clinical manifestations is approximately 230 days (Scott et al. Transgenic models of prion disease. *Arch. Virol. Suppl.* 2000;113-124). Thus, mice negative at 400 days post inoculation provides substantive evidence that suspect animals were in fact negative for BSE.

¹⁴ Hideaki Karaki, DVM, PhD, Professor Emeritus of the University of Tokyo, Member of Science Council of Japan, Expert Member of Food Safety Commission.

12.5. Suggesting that testing clinically normal slaughter cattle under 30 months of age “could help mitigate the risks” of BSE is without scientific merit (Memorandum 9 May, 2005, p23). Testing for BSE does not enhance the safety of beef. Rather, testing is purely a surveillance tool (USDA:APHIS. Analysis of Risk–Update for the Final Rule: Bovine Spongiform Encephalopathy; Minimal Risk Regions and Importation of Commodities, December, 2004. AR08315). Removal of SRM is the only method to protect consumers from exposure to BSE if infectivity is present. Moreover, current tests only detect BSE-infected animals as early as 3 months prior to clinical signs. Therefore, if BSE infectivity is present in an exposed steer early in the incubation period, the screening tests will provide false negative results. The OIE realizes the negligible value of screening healthy cattle less than 30 months of age; it does not recommend including them in BSE surveillance programs.

12.6. Testing of clinically normal cattle less than 30 months of age is not consistent with current data and offers no scientific or food safety benefits.

13. Final Rule is consistent with OIE guidelines to prevent BSE spread

13.1. The OIE (World Animal Health Organization) summarizes current science to promulgate guidelines to effectively manage the risks inherent in the trade of animals and animal products between countries.

13.2. The OIE BSE guideline (Animal Health Code Chapter 2.3.13) sets forth recommendations for consideration by animal health authorities (veterinary administrations) in establishing trade restrictions in order “to manage the human and animal health risks associated with the presence of bovine spongiform encephalopathy (BSE) in cattle”. (http://www.oie.int/eng/normes/mcode/en_chapitre_2.3.13.htm)

13.3. The OIE BSE guidelines are revisited annually to incorporate new scientific findings and the accumulated experience of countries around the world as they deal with BSE prevention, control, and eradication.

13.4. Until the identification of BSE in a native cow in Canada in May, 2003, most, if not all, countries have implemented feed bans at some point after detecting their first BSE case. Canada implemented the feed bans more than 5 years before the first case was detected. Despite Plaintiff’s incorrect assertion that to be consistent with OIE guidelines, Canada should have had a feed ban in place for at least 8 years (Memorandum, 9 May, 2005 p15-16), it was scientifically sound for USDA:APHIS to allow imports 7.5 years after the feed ban in Canada went into effect.

13.5. The OIE designed the current risk mitigation steps in the context of feed bans implemented only after the detection of clinical BSE. Delaying the implementation of feed bans until after the detection of BSE means that the epidemic has achieved sufficient BSE infectivity in the feed supply to cause clinical BSE cases for approximately another 5-6 years. The recommendation “the ban on feeding ruminants with meat-and-bone meal

and greaves derived from ruminants has been effectively enforced for at least 8 years” was meant to address both the length of time necessary for ruminant feed containing meat-and-bone meal already in the system (at feed mills or stored on farm) to be utilized (~1 year) and for a decline of the number of cases due to the feed ban to be observable, e.g., the feed ban is effectively enforced. Because of the long incubation of BSE, any decline in new cases attributable to the feed ban would not be observed until 4-5 years after the implementation of the feed ban. Cattle exposed to a sufficient dose of BSE to initiate the infection “incubate” the disease for years before the disease progression is detectable by current diagnostic tests; therefore, a decline in the number of BSE cases detected will not be observed until years after the implementation of feed bans – in the case of the UK, about 4.5 years later (the UK feed ban went into effect in July 1988 and the number of cases confirmed per month peaked in January of 1993).

13.6. The proposed rule meets or exceeds the BSE guidelines listed in the OIE Animal Health Code (2004) for the movement of cattle regardless of the BSE status of Canada. The OIE guidelines focus on three key requirements for the movement of live cattle:

13.6.1. The feeding of ruminants with meat-and-bone meal and greaves derived from ruminants has been banned and the ban has been effectively enforced; and

13.6.2. Cattle selected for export:

13.6.2.1. Are identified by a permanent identification system enabling them to be traced back to the dam and herd of origin and are not exposed cattle (defined as the progeny of BSE suspect or confirmed females; or

reared with affected cattle during their first year of life which investigation showed consumed the same potentially contaminated feed during that period; or if the results of the investigation are inconclusive, all cattle born in the same herd as, and within 12 months of the birth of the affected cattle); and

13.6.2.2. Were born at least two years after the date from which the ban on the feeding of ruminants with meat-and-bone meal and greaves derived from ruminants was effectively enforced.

13.7. Revisions to the Animal Health Code passed during the 2005 General Session (http://www.oie.int/download/SC/2005/bse_2005.pdf) include:

13.7.1. A change in the country BSE status designation to focus on the effectiveness of risk management rather than the prevalence of the disease in the country of origin.

13.7.2. A change to recognize that deboned skeletal muscle meat from animals under 30 months of age is safe to both human and animal health and can be traded without regard BSE status of the country of origin:

When authorizing import or transit of the following commodities and any products made from these commodities and containing no other tissues from cattle, Veterinary Administrations should not require any BSE related conditions, regardless of the BSE risk status of the cattle population of the exporting country, zone or compartment:

...

g) deboned skeletal muscle meat (excluding mechanically separated meat) from cattle 30 months of age or less, which were not subjected to a stunning process,

prior to slaughter, with a device injecting compressed air or gas into the cranial cavity, or to a pithing process, and which were subject to ante- and post-mortem inspection and were not suspect or confirmed BSE cases; and which has been prepared in a manner to avoid contamination with... [specified risk materials] (OIE Chapter 2.3.13 Article 2.3.13.1 available at http://www.oie.int/download/SC/2005/bse_2005.pdf)

14. *No measurable increased risk to human health or animal health is created by the proposed rule*

14.1. Throughout their arguments, the plaintiff (Memorandum, 9 May, 2005) and Dr. Cox (Declaration of Dr. Cox, 7 May, 2005) fail to address or choose to ignore the accumulated scientific wisdom concerning the transmission, pathogenesis, epidemiology, and control of BSE in cattle populations. Moreover, they frequently allude that little is known about BSE scientifically. This is contrary to fact.

14.2. Dr. Cox contends that “extensive experience in Europe has shown that ... safeguards can take many years to become fully effective” (Declaration of Dr. Cox, 7 May, 2005 p2) and “recent countermeasures such as MBM feed bans ... do not promptly reduce risks”. The proactive prevention actions implemented Canada over the past 15 years, beginning with the import bans in 1990 and followed by the destruction of all remaining imported cattle from the UK in 1993 and the implementation of the feed ban in 1997, serve to substantially reduce the likelihood of exposure of the young cattle proposed to be imported. As of June 2003, only Canadian cattle born after December 2002 would be eligible for export to the US. These cattle would far less likely to have

received an infectious dose of BSE infectivity in their rations due to the feed ban that had been in effect for over 4 years. Actions taken by Canada over the last 15 years reduce the risk of importing young BSE-positive cattle into the USA.

14.3. Extensive scientific evidence categorically demonstrates that there is no measurable increased risk to human health or animal health created by the Final Rule (AR08043) allowing importation of cattle less than 30 months of age. This conclusion is consistent with the international consensus concerning the documented effectiveness of the safeguards described in the Final Rule (AR08043) in addition to the existing multiple interlocking and overlapping control strategies in place in both the USA and Canada.

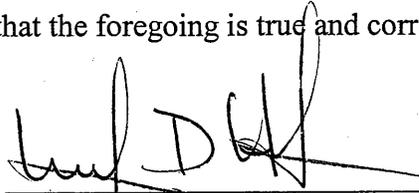
14.4. Dr. Cox raises the goal of “zero risk” as if that is a prerequisite for importation of cattle or cattle products into the USA (Declaration of Dr. Cox, 7 May, 2005). Anyone who argues that zero risk is attainable for any meat product, vegetable product, baked good or beverage, whether imported or domestically-produced, is deluding themselves. All foods carry risks. We know of no risk assessment of a known food safety hazard that concludes that “zero risk” is achievable. The Final Rule (AR08043) effectively manages risk to protect animal and public health using an OIE-based series of science-based criteria that an exporting country needs to meet or exceed if they are to be designated a minimal risk country. These stringent criteria include limitations on allowable trade in cattle and cattle products, controls on the slaughter and harvesting of meat, and the removal of all tissues demonstrated to accumulate BSE infectivity from both the human food supply and ruminant feed supply.

14.5. Refusal to allow importations of cattle less than 30 months of age is not based on current science. Experts from around the world were assembled by the World Health Organization, the Food and Agriculture Organization of the United Nations, and the OIE to review the available data. They came to the following logical and unequivocal conclusion:

“[A] great deal is now known about the origins of the BSE epidemic, the reasons for its spread, the tissues that are most dangerous to consume, and the likely reasons for the appearance of a related disease in humans. Most importantly, intense research, backed by practical experience, has defined a series of measures that countries can use to keep the causative agent out of the food chain and thus ensure the safety of the meat supply. When all appropriate measures to minimize human exposure are fully implemented and controlled, meat and meat-based products derived from cattle can be regarded as free from the BSE agent and thus free from any risk of causing vCJD in humans” (World Health Organization, Understanding the BSE Threat, October, 2002, WHO/CDS/CSR/EPH/2002.6. Available at: <http://www.who.int/csr/resources/publications/whocdscsreph20026/en/>).

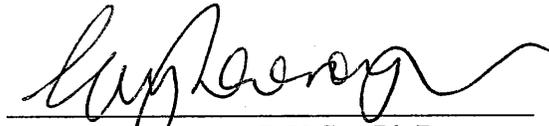
We declare under penalty of perjury that the foregoing is true and correct.

June 7, 2005
Date



William D. Hueston, D.V.M., Ph. D.,
Diplomate, A.C.V.P.M.

June 7, 2005
Date



Guy H. Loneragan, B.V.Sc., Ph.D.

June 7, 2005
Date



Srinand Sreevatsan, D.V.M., M.P.H., Ph.D.

ATTACHMENT A

Curriculum Vitae

- I. **Name:** William D. Hueston, DVM, MS, PhD
- II. **Place of Birth:** Wheeling, West Virginia
- III. **Date of Birth:** May 14, 1950
- IV. **Citizenship:** USA
- V. **Social Security:**
- VI. **Marital Status:** Married
- VII. **Address:** Center for Animal Health and Food Safety
University of Minnesota
136 Andrew Boss Laboratory
1354 Eckles Avenue
St. Paul, MN 55108

VIII. **Education:**

<u>School</u>	<u>Field</u>	<u>Degree</u>	<u>Year</u>
The Ohio State University	Epidemiology	PhD	1985
The Ohio State University	Preventive Medicine	MS	1980
The Ohio State University	Veterinary Medicine	DVM	1980
University of Virginia	Biology	BA	1976

Senior Executive Service Candidate Development Program, United States Department of Agriculture, July 1992 - August 1994. Received Senior Executive Service certification on September 19, 1994.

Fellowship in Food and Agricultural Policy (sponsored by the Kellogg Foundation), National Center for Food and Agricultural Policy, Resources for the Future, Washington, DC, January to March, 1990.

IX. **Board Certifications:**

Epidemiology Specialty, American College of Veterinary Preventive Medicine - 1987
American College of Veterinary Preventive Medicine - Diplomate - 1985

X. **Veterinary Positions:**

Director, Center for Animal Health and Food Safety, University of Minnesota 2001-present
Professor, College of Veterinary Medicine

Adjunct Professor of Epidemiology, School of Public Health
Director, Veterinary Public Health dual degree (DVM/MPH) program

Duties involve leadership and administration for multidisciplinary University Center comprising faculty from colleges of human and veterinary medicine, public health, agriculture and law. Center focuses on risk analysis, applied research, surveillance and expansion of education and graduate training opportunities in food safety, biosecurity, and public health. Created and directs combined DVM/MPH program for veterinary students and post-DVM fellowship in veterinary public health.

Director, Center for Government and Corporate Veterinary Medicine 1999-2001

Associate Dean and Professor 1996-2001
Virginia-Maryland Regional College of Veterinary Medicine

Professor, College of Agriculture and Natural Resources, University of Maryland
Professor, College of Veterinary Medicine, Virginia Tech

Duties involve leadership and administration for the University of Maryland campus of the Virginia-Maryland Regional College of Veterinary Medicine, including leadership for the Center for Government and Corporate Veterinary Medicine and the government/corporate track in the DVM curriculum; coordination of regional extension programs; management of departmental daily operations; direction of applied epidemiology residency program; teaching at undergraduate, professional, graduate and postgraduate levels; promotion of research and scholarly activity; representation of the College to international, national, state, local and private sectors; University service; applied epidemiological research and service.

Director, Operational Support Staff 1995-1996
USDA, APHIS, Veterinary Services, Riverdale, MD

Duties involved management and supervision of all national headquarters staff for the Veterinary Services of the US: Emergency Programs; Import-Export; Cattle Diseases; Swine, Horses, Poultry, Aquaculture and Miscellaneous Diseases. Budget of \$9 million with 105 staff. Leadership role in risk analyses; domestic and international negotiations concerning animal health; domestic disease control; and foreign animal disease exclusion. National spokesperson concerning bovine spongiform encephalopathy.

Director, Center for Animal Health Monitoring 1991-1994
Centers for Epidemiology and Animal Health, USDA, APHIS, Veterinary Services, Fort Collins, CO

Duties involved management of multidisciplinary team of 25 veterinary epidemiologists, statisticians, computer programmers, technical writers and support personnel including visiting scientists (Fulbright Fellow and faculty on sabbatical, graduate and professional students) with a budget of \$2.8 million. Overall responsibility for animal health monitoring and collation of disease reports within the United States. Directed and participated in risk analyses of emerging issues.

Visiting Scientist 1991
Epidemiology Unit, Central Veterinary Laboratory, Ministry of Agriculture, Fisheries and Food, United Kingdom

Duties involved epidemiology research on bovine spongiform encephalopathy.

Affiliate Faculty Member 1988-1995
Department of Environmental Health, Colorado State University, Fort Collins, CO

Duties involved graduate student advisement and guest lectures in epidemiology.

Chief Staff Veterinarian & Program Leader 1987-1991
National Animal Health Monitoring System, USDA, APHIS, Veterinary Services, Fort Collins, CO

Duties involved design and implementation of a national system for monitoring animal health in the United States. Analysis of data concerning regional and national animal health issues including risk analysis. Recruitment of professional and support staff, management of unit with \$2.8 million budget and 20 staff. Leadership responsibilities for animal health monitoring in the United States. Instructed veterinarians and animal health professions in epidemiology. Administered cooperative agreements and hosted visiting scientists and animal health regulatory officials from around the world.

Adjunct Assistant Professor 1988-1990
Department of Veterinary Preventive Medicine, The Ohio State University, Columbus, OH

Duties involved graduate student advisement and guest lectures.

Assistant Professor 1986-1987
Food Animal Health Research Program, Ohio Agricultural Research and Development Center, The Ohio State University, Wooster, OH

Duties involved epidemiologic consultation and participation in studies of animal disease control and prevention.

Assistant Professor 1985-1987
Department of Veterinary Preventive Medicine, The Ohio State University, Columbus, OH

Duties involved teaching of veterinary preventive medicine and epidemiology, research on occupational health risks of veterinarians, control and prevention of animal diseases including bovine and ovine mastitis, and service to animal owners in Ohio. Advised graduate students.

Clinical Epidemiologist 1984-1987
Department of Veterinary Field Services, The Ohio State University, Columbus, OH

Duties involved epidemiologic support for field service veterinarians in a mixed practice setting (equine, bovine, sheep and hogs). Advised faculty on research design, analysis of data and interpretation of results.

Adjunct Instructor 1982-1985
Department of Veterinary Preventive Medicine, The Ohio State University, Columbus, OH

Duties involved teaching veterinary students about bovine artificial insemination and the management and care of bulls.

Staff Veterinarian 1981-1983
Select Sires, Inc., Plain City, OH

Duties involved health management and disease control, prevention and treatment for a commercial artificial insemination cooperative. Worked with a population of more than 1,000 bulls scattered on multiple locations. Designed computerized herd health records systems and conducted clinical epidemiology studies.

Clinical Veterinarian - Dairy 1980-1981
Chestertown Animal Hospital, Chestertown, MD

Duties involved clinical veterinary practice for large and small animals. Conducted herd health management programs, treated sick animals and provided emergency care.

XI. Research, Teaching, Extension, Service:

A. Publications:

1. Articles in refereed journals

Kennedy S, Hueston W, Bender J. Animal pathogens and food safety. Minnesota Medicine, 86(11): 25-7, 2003.

Hueston WD. Science, politics and animal health policy: epidemiology in action. Preventive Veterinary Medicine. 60(1):3-12, 2003.

Colby MM, Johnson YJ, Tablante NL, Hueston WD: "Evaluation of Two Systems for Managing Emergency Poultry Diseases in Intensive Poultry Production Regions" International Journal of Poultry Science, 2 (3):229-233, 2003.

Rossmeisl JH Jr, Bright P, Tamarkin L, Simpson BW, Troy GC, Hueston W, Ward DL. Endostatin concentrations in healthy dogs and dogs with selected neoplasms. Journal of Veterinary Internal Medicine. 16(5):565-9, 2002.

Hueston WD and Taylor, JD: "Protecting US cattle The role of national biosecurity programs" The Veterinary Clinics Food Animal Practice, W.B. Saunders 18:177-196, 2002.

Black LS, Thatcher CD, Hueston WD. Outcomes assessment of the Center for Government and Corporate Veterinary Medicine at the Virginia-Maryland Regional College of Veterinary Medicine. Journal of Veterinary Medical Education. 28(2):62-8, 2001.

Travis, D and Hueston, WD: "Factors contributing to uncertainty in aquatic animal risk analysis." Proceedings of the OIE International Conference on Risk analysis in aquatic animal health, February 2000.

Sischo WM, Floyd JG, McKean JD, Hueston WD: "Survey of veterinary extension in the United States." Journal of the American Veterinary Medical Association, 215:1439-1443, 1999.

Tablante NL, Bruner PY, Odor EM, Salem M, Harter-Dennis JM, Hueston WD: "Risk factors associated with early respiratory disease complex in broiler chickens." Avian Diseases 43: 424-428, 1999.

Wilkins JR, III, Hueston WD, Crawford JM, Steele LL, Gerken DF: "Mixed Mode Survey of Female Veterinarians Yields High Response Rate." Occupational Medicine 47:458-462, 1997.

Denny GO, Hueston WD: "Epidemiology of bovine spongiform encephalopathy in Northern Ireland 1988 to 1995." The Veterinary Record, 140:302-306, 1997.

Ott SL, Wells SJ, Hueston WD: "Adding value to monitoring and surveillance data." Surveillance, 29:24-27, 1996.

Hueston W. DxMONITOR: compiling veterinary diagnostic laboratory results. Emerging Infectious Diseases. 1(1):36, 1995.

Miller LE, Honeycutt TL, Cowen P, Morrow WEM, Hueston WD: "Developing an information resources management strategy for regulatory veterinary medicine: A national imperative." Journal of the American Veterinary Medical Association, 205:1140-1144, 1994.

Miller LE, Cowen P, Honeycutt TL, Morrow WEM, Hueston WD: "A research feasibility assessment of regulatory information systems capacities for investigation of epidemiologic factors in pseudorabies." Journal of the American Veterinary Medical Association, 205:1133-1139, 1994.

Bleem AB, Crom RL, Francy DB, Hueston WD, Koprak C, Walker KD: "Risk factors and surveillance for bovine spongiform encephalopathy in the United States." Journal of the American Veterinary Medical Association, 204:644-651, 1994.

Hueston WD: "Assessment of national systems for the surveillance and monitoring of animal health." International Office of Epizootics (OIE): Scientific and Technical Review, 12(4):1187-1196, 1993.

Hueston WD, Walker KD: "Macroepidemiological contributions to quantitative risk assessment." International Office of Epizootics (OIE): Scientific and Technical Review, 12(4):1197-1201, 1993.

Henriques H, Hueston WD, Hoblet KH, Shulaw WP: "Field trials evaluating the safety and serologic reactions of reduced-dose *B. melitensis* Rev 1 vaccine in adult sheep." Preventive Veterinary Medicine, 13:205-215, 1992.

Wilesmith JW, Ryan JBM, Hueston WD: "Bovine Spongiform Encephalopathy: Case-control studies of calf feeding practices and meat and bone meal inclusion in proprietary concentrates." Research in Veterinary Science, 52:325-331, 1992.

Monke DR, Rohde RF, Hueston WD, Milburn RJ: "Estimation of the sensitivity and specificity of the agar gel immunodiffusion test for bovine leukemia virus: 1,296 cases (1982-1989)." Journal of the American Veterinary Medical Association, 200:2001-2004, 1992.

Hueston WD: "Characteristics of US veterinarians specializing in preventive medicine." Journal of the American Veterinary Medical Association, 200:28-32, 1992.

Denny GO, Wilesmith JW, Clements RA, Hueston WD: "Bovine Spongiform Encephalopathy in Northern Ireland: Epidemiological Observations 1988-1990." Veterinary Record, 130:113-116, 1992.

Wilesmith JW, Ryan JBM, Hueston WD, Hoinville LJ: "Bovine Spongiform Encephalopathy: Descriptive Epidemiological Features 1985-1990." Veterinary Record, 130:90-94, 1992.

Walker KD, Hueston WD, Hurd HS, Wilesmith JW: "Comparison of bovine spongiform encephalopathy risk factors in the United States and Great Britain." Journal of the American Veterinary Medical Association, 199:1554-1561, 1991.

Hoblet KH, Schnitkey GD, Arbaugh D, Hogan JS, Smith KL, Schoenberger PS, Todhunter DA, Hueston WD, Pritchard DE, Bowman GL, Heider LE, Brockett BL, Conrad HR: "Costs associated with selected preventive practices and with episodes of clinical mastitis in nine herds with low somatic cell counts." Journal of the American Veterinary Medical Association, 199:190-196, 1991.

Hueston WD: "The National Animal Health Monitoring System: Addressing Animal Health Information Needs in the U.S.A." Preventive Veterinary Medicine, 8:97-102, 1990.

Hueston WD, Hoblet KH, Miller GY, Eastridge ML: "Mastitis control services and utilization of milk somatic cell count data by veterinarians in Ohio." Journal of the American Veterinary Medical Association, 196:1956-1961, 1990.

Hueston WD, Heider LE, Harvey WR; Smith KL: "Determinants of high somatic cell count prevalence in dairy herds practicing teat dipping and dry cow therapy and with no evidence of Streptococcus agalactiae on repeated bulk tank milk examination." Preventive Veterinary Medicine, 9:131-142, 1990.

Rohde RF, Shulaw WP, Hueston WD, Bech-Nielsen S, Haibel GK, Hoffsis GF: "Isolation of Mycobacterium paratuberculosis from washed bovine ova after in vitro exposure." American Journal of Veterinary Research, 51:708-710, 1990.

Kohn CW, Jacobs RM, Knight D, Hueston WD, Gabel AA, Reed SM: "Microcytosis, hypoferrinemia, hypoferritinemia, and hypertransferrinemia in Standardbred foals from birth to 4 months of age." American Journal of Veterinary Research, 51:1198-1205, 1990.

Hueston WD, Boner GJ, Baertsche SL: "Intramammary Antibiotic Treatment at the End of Lactation for Prophylaxis and Therapy of Intramammary Infections in Ewes." Journal of the American Veterinary Medical Association, 194:1041-1044, 1989.

Moritz SA, Wilkins JR, Hueston WD: "Evaluation of Radiation Safety in 20 Central Ohio Veterinary Practices." American Journal of Public Health, 79 (7):895-896, 1989.

Hogan JS, Smith KL, Hoblet KH, Schoenberger PS, Todhunter DA, Hueston WD, Pritchard DE, Bowman GL, Heider LE, Brockett BL, Conrad HR: "Field Survey of Clinical Mastitis in Low Somatic Cell Count Herds." Journal of Dairy Science, 72: 1547-1556.

Hogan JS, Hoblet KH, Smith KL, Todhunter DA, Schoenberger PS, Hueston WD, Pritchard DE, Bowman GL, Heider LE, Brockett BL, Conrad HR: "Bacterial Counts in Bedding Materials Used in Nine Commercial Dairies." Journal of Dairy Science, 72: 250-258, 1989.

Moritz SA, Hueston WD, Wilkins JR: "Patterns of Ionizing Radiation Exposure Among Women Veterinarians." Journal of the American Veterinary Medical Association, 195(6):737, 1989.

Seitz SE, Heider LE, Hueston WD, Bech-Nielsen S, Rings M, Spangler L: "Bovine Fetal Infection with Mycobacterium paratuberculosis." Journal of the American Veterinary Medical Association, 194(10):1423-1426, 1989.

Kohn CW, Knight D, Hueston W, Jacobs R, Reed SM: "Colostrum and serum IgG, IgA, and IgM concentrations in Standardbred mares and their foals at parturition." Journal of the American Veterinary Medical Association, 195:64-68, 1989.

Hogan JS, Hoblet KH, Smith KL, Todhunter DA, Schoenberger PS, Hueston WD, Pritchard DE, Bowman GL, Heider LE, Brockett BL, Conrad HR: "Bacterial and Somatic Cell Counts in Bulk Tank Milk from Nine Well-Managed Herds." Journal of Food Protection, 51:930-935, 1988.

Rohde RF, Miller GY, Hueston WD: "How to Evaluate the Success and Economics of an Embryo Transfer Program." Veterinary Medicine, 1165-1171, November 1988.

Hueston WD, Monke DR, Milburn RJ: "Scrotal Circumference Measurements on Young Holstein Bulls." Journal of the American Veterinary Medical Association, 192:766-768, 1988.

Hueston WD: "Evaluating Risk Factors in Disease Outbreaks." Veterinary Clinics of North America: Food Animal Practice, 4(1):79-95, 1988.

Hueston WD: "Evaluation of Alternatives for Calculating Clinical Mastitis Prevalence and Incidence from Prospective Health Monitoring Schemes." Acta Veterinaria Scandinavia, 84:442-445, 1988.

Miller GY, Eastridge ML, Hueston WD, Hoblet KH: "Use of Dairy Herd Improvement Somatic Cell Information by Ohio Dairy Producers and Their Perceptions of Mastitis." Journal of Dairy Science, 71(8):2284-2291, 1988.

Lightner JK, Miller GY, Hueston WD, Dorn RC: "Estimation of the Costs of Mastitis, Using National Animal Health Monitoring System and Milk Somatic Cell Count Data." Journal of the American Veterinary Association, 192(10):1410-1413, 1988.

Hueston WD, Heider LE, Harvey WR, Smith KL: "The Use of Herd High Somatic Cell Prevalence in Epidemiologic Investigations of Mastitis Control Practices." Preventive Veterinary Medicine, 4:447-461, 1987.

Hueston WD, Hartwig NR, Judy JK: "Patterns of Nonclinical Intramammary Infection in a Ewe Flock." Journal of the American Veterinary Medical Association, 188:170-172, 1986.

Hueston WD, Hartwig NR, Judy JK: "The Detection of Bovine Intramammary Infection with California Mastitis Test." Journal of the American Veterinary Medical Association, 188:522-524, 1986.

Hueston WD, Heider LE: "Epidemiologic Considerations in Reporting Herd Somatic Cell Counts." Journal of Dairy Science, 69:1987-1995, 1986.

Bowman GL, Hueston WD, Boner GJ, Hurley JJ, Andreas JE: "*Serratia liquefaciens* Mastitis in a Dairy Herd." Journal of the American Veterinary Medical Association, 189:913-915, 1986.

Hoblet KH, Hueston WD, Angrick A: "Mastitis Microbiology Simplified." The Bovine Practitioner, 21:77-78, 1986.

Gardner HM, Hueston WD, Donovan EF: "Use of Mibolerone in Wolves and Three *Panthera* Species." Journal of the American Veterinary Medical Association, 187:1193-1194, 1985.

Rose RK, Hueston WD: "Wound Healing in Meadow Voles." Journal of Mammalogy, 59(1):186-188, 1978.

2. Books, chapter in books

Hueston WD: "Bovine Spongiform Encephalopathy" in Microbial Food Safety in Animal Agriculture: Current Topics, Mary E. Torrence and Richard E. Isaacson. Ames, Iowa State Press. 2003.

Hueston WD: "Reproductive Management Programs for Dairy Bulls" in Current Therapy in Theriogenology 2, D.A. Morrow, ed. Philadelphia, W.B. Saunders. 1986:395-400.

3. Published abstracts of professional papers presented

Walker KD, Francy B, Korpai C, Bleem AM, Carver DK, Hueston WD: "An epidemiologic update of bovine spongiform encephalopathy." Journal of the American Veterinary Medical Association, 204:71, 1994.

Steele L, Wilkins J, Crawford J, Gerken D, Hueston W: "Occupational Exposure to Reproductive Hazards among Pregnant Female Veterinarians." American Journal of Epidemiology, 130: 834-835, 1989.

Crawford J, Wilkins J, Steele L, Hueston W: "Infertility and Occupational Exposures among Female Veterinarians: A Nested Case-Control Study." American Journal of Epidemiology, 130: 835, 1989.

B. Presentations (1996-present):

FDA Science Forum, Washington, DC, April 2005. "Understanding the Evolving Science of BSE/TSE."

Cornell University BSE Department Seminar, Ithaca, NY, April 2005. "Mad Cows and crazy deer. The challenge of balancing science politics and formulating policy."

NIAA 2005 Annual Meeting Symposium "protecting the Global Food Supply: Growing Concerns for Emerging Zoonotic Diseases." St. Paul, MN, April 2005. "Cooperating to protect the global food supply."

Ohio State University U-Bio Security day, Columbus, OH, March 2005. "Veterinary Medicine and Public Health."

USDA Agricultural Outlook Forum, Arlington, VA, February 2005. "Balancing Science and Risk Management."

University of Florida Phi Zeta Lecture, Gainesville, FL, February 2005. "Saving the world from disease and pestilence: veterinarians protecting public and animal health from emerging diseases."

108th Annual Meeting of the Minnesota Veterinary Medical Association, St. Paul, MN, February 2005. "BSE Update: Public Health."

30th Annual Convention of the Minnesota Association of Veterinary Technicians, St. Paul, MN, February 2005. "BSE: Dealing with Danger and Fear in Veterinary Practice and Public Health."

AMI Foundation BSE Briefing, Washington, DC, January 2005. "The Science of Bovine Spongiform Encephalopathy: What We Know Today."

Governor's Homeland Security Symposium, St. Paul, MN, November 2004. "Agricultural Security, from farm to table."

Annual Meeting of the National Association of State Universities and Land-Grant Colleges, San Diego, CA, November 2004. "The Emerging Disease Challenge: Flexible Policy to Rapidly Adapt to New Scientific Findings."

10th Annual Emerging Infections in Clinical Practice and Emerging Health Threats, Minneapolis, MN, November 2004. "Protecting America's Food Supply: Adaptive Risk Management in a Dynamic System."

North Central Association of Food and Drug Officials, Bloomington, MN, October 2004. "Integrating Government, Industry and Producer Food Security Initiatives."

Animal Prion Diseases and the Americas, Ames, IA, October 2004. "BSE and its Impact on Food Safety and Public Health."

Iowa Cattlemen's Association Meeting, Ames, IA, October 2004. "BSE Issues, Comments and Answers...."

Wisconsin Environmental Health Association Annual Joint Education Conference, Baraboo, WI, September 2004. "Confronting the culture of fear: the expanding role of risk communication."

American Association of Bovine Practitioners 37th Annual Conference, Fort Worth, TX, September 2004. "The North American BSE Situation."

Australian Meat Industry Council Processor Conference, Gold Coast, Australia, August 2004. "BSE – The Way Forward."

91st Annual Meeting of the International Association for Food Protection, Phoenix, AZ, August 2004. "The Science Driving North American BSE Policy."

2004 AVMA Annual Convention, Philadelphia, PA, July 2004. "Public Health Medicine, MPH Program and Related Initiatives at the University of Minnesota."

Institute of Food Technologists Annual Meeting, Las Vegas, NV, July 2004. "The Practical Risks of Mad Cow Disease."

2004 Minnesota Dairy Health Conference, St. Paul, MN, May 2004. "Current Status of BSE...."

2004 Annual Meeting of the National Institute for Animal Agriculture, Salt Lake City, UT, April 2004. "Report on Measures Relating to BSE in the United States."

The Ohio State University Plenary Week, Columbus, OH, March 2004. "Veterinary Medicine and Public Health."

National Grain and Feed Association 108th Annual Convention, San Antonio, TX, March 2004. "Will Science Drive Future BSE Policy? – A World View."

Presentation to Congressional Research Service, Washington, DC, March 2004. "Bovine Spongiform Encephalopathy: Prevention and Control for the US."

Association of American Veterinary Medical Colleges Annual Meeting, Washington, DC, March 2004. "Responses to the "Agenda for Action" University of Minnesota."

108th Annual Meeting Minnesota Livestock Breeders' Association, St. Paul, MN, March 2004. "Stopping the Global Spread of Bovine Spongiform Encephalopathy (BSE)."

University of Minnesota's Great Conversations on the Road 2004, Naples, FL, March 2004.

2004 Ceres Forum, Washington, DC, March 2004. "The Report on Measures Relating to BSE in the US."

University of Minnesota's 2004 Great Conversations on the Road 2004, Seattle, WA, February 2004.

Minnesota Air Water and Waste Conference 2004, Bloomington, MN, February 2004. "Chronic Wasting Disease and Other Carcass Disposal Issues."

SIT Investment Associates' 22nd Annual Client Workshop, Carlsbad, CA, February 2004. "Mad Cow Disease and Food Safety."

Secretary's Advisory Committee Foreign Animal and Poultry Disease (SACFAPD), Riverdale, MD, February 2004. "Report on Measures Relating to Bovine Spongiform Encephalopathy (BSE) in the United States."

American Meat Institute Foundation's *BSE Briefing*, Washington, DC, February 2004. Scientific Status Report.

University of Minnesota's Great Conversations on the Road 2004, San Diego, CA, January 2004. "Is That Safe to Eat?"

University of Minnesota, Center for Animal Health and Food Safety, St. Paul MN, January 2004. BSE (Mad Cow) in the United States Teach-in.

University of Wisconsin-River Falls Food Microbiology Symposium, River Falls, WI, October 2003. "Emerging Diseases: Creating New Food Safety Demands."

Division of Environmental and Occupational Health, University of Minnesota School of Public Health; 3M Corporation; and Department of Occupational and Environmental Medicine, HealthPartners Institute of Medical Education; New Frontiers in Environmental Health and Medicine Symposium, St Paul MN, October 2003. "Risk Communication and Emerging Technologies."

Nebraska Environmental Health Association Region 4 Conference, Omaha, NE, September, 2003. "It is the best of times, It is the worst of times.... Environmental Health at the Crossroads."

American Association of Bovine Practitioners Special BSE Session, Columbus, OH, September 2003. "Deciphering the Implications of Bovine Spongiform Encephalopathy on Trade."

Career Transition for Veterinarians Symposium, Washington, DC, September 2003. "Risk Communication and Consulting."

TSE Workshop: TSEs Their Impact on Human and Animal Health, Environment and Economics: How Do We Respond?, St. Paul, MN, July 2003. "Overview of TSEs" as well as "BSE Update".

American Association of Industrial Veterinarians, Denver, CO, July 2003. "BSE in Canada: Implications for North America."

2003 Minnesota Dairy Health Conference, St. Paul, MN, May 2003. "Dairy Issues Food Safety/Bioterrorism."

American Feed Industry Association, Minneapolis, MN, May 2003. "Consumer Confidence Influences Demand for Animal Feeds."

Minnesota Environmental Health Association, Nisswa, MN, May 2003. "It is the best of times, it is the worst of times..... Environmental Health at the Crossroads."

University of Tennessee, College of Veterinary Medicine, Knoxville, TN, April 2003. "Transmissible Spongiform Encephalopathies (TSEs): A Lesson for Veterinarians."

American Association of Swine Veterinarians, Orlando, FL, March 2003. "Certification: is added value a reality?"

2003 Minnesota Pork Congress, Minneapolis, MN, January 2003. "Antimicrobials and Their Future in Our Production System."

Minnesota Elk Breeders Annual Conference, Mankato, MN, January 2003. "Media Communication."

Associated Recyclers of Wisconsin 2003 Winter Conference, Wisconsin Dells, WI, January 2003. "Disease Science... Animal Carcass Disposal in Landfills Related to CWD and Animal Disease."

General Mills 2nd Annual Technical Seminar Series 2002-2003, Golden Valley, MN, January 2003. "Hot topics in meat safety: BSE, bacterial contamination and antimicrobial resistance."

University of Minnesota St. Paul Campus Retired Faculty, St. Paul, MN, December 2002. "Human and Animal Health Links."

Henrici Society Meeting, St. Paul, MN, November 2002. "Antimicrobial Resistance."

Northeast Veterinary Medical Association, WI, November 2002. "Transmissible Spongiform Encephalopathies in Animals and Man."

Minnesota Veterinary Medical Association Governmental Affairs Committee Meeting, Roseville, MN, November 2002. "Judicious Use of Antibiotics in Animal and Human Medicine."

Minnesota Farm Bureau, Bloomington, MN, November 2002. "Bioterrorism and Food Safety."

Dean's Advisory Council Meeting, University of Minnesota College of Veterinary Medicine, St. Paul, MN, October 2002. "The rest of the story...about veterinary medicine."

Annual Internal Medicine Review, October 2002. "Mad Cows and Demented Deer: How Safe is our Food?"

53rd Annual North Central Avian Disease Conference, Minneapolis, MN, October 2002. "Impact of BSE on the Poultry Industry."

Graduate Research Symposium, St. Paul, MN, October 2002. "Impact of Homeland Security on the Research Agenda."

Minnesota Beef Industry Center Members Meeting, St. Paul, MN, October 2002. "Current Issues in Food Safety and Quality."

Food Microbiology Symposium, River Falls, WI, October 2002. "M. paratuberculosis."

College of Veterinary Medicine Veterinary Outreach Program, St. Paul, MN, October 2002. Chronic Wasting Disease.

USAHA/AAVLD Annual Meeting, St. Louis, Missouri, October 2002. "Risk Communication and CWD."

Minnesota Department of Agriculture Director's Meeting, September 2002. "The Center for Animal Health and Food Safety."

World Vet Tunisia 2002, Tunisia, September 2002. "Opportunities for Education of Industry and Veterinary Health Professionals."

Minnesota Deer Hunters Association, Grand Rapids, MN, July 2002. "CWD Round Table"

Pork Quality and Safety Summit, Des Moines, Iowa, June 2002. "Food Security: Risks for the Food Supply."

Food and Drug Administration Regional Meeting, Minneapolis, MN, June 2002. "Food Systems Biosecurity Preparedness and Response."

West Nile Virus Web Cast, May 2002.

Division of Epidemiology Seminar, Minneapolis, MN, April 2002. "BSE/vCJD: Epidemiology in the face of an emerging global zoonosis."

Fifth Annual Conference on New and Re-emerging Infectious Diseases, Champaign, IL, April 2002. "Making the World a Safer Place to Eat: Bridging the Production Agriculture Public Health Interface."

Pet Food Forum, Chicago, IL, April 2002. "BSE Risk and Prevention."

Dean's Advisory Council, St. Paul, MN, March 2002. "CAHFS: Making the World a Safer Place to Eat."

Alumni Forum, University of Minnesota, March 2002. "Biosecurity for Food Farm and Family."

International Conference on Emerging Infectious Diseases, Atlanta, GA, March 2002. "Surveillance of Livestock for Zoonotic Diseases and Veterinary Bio-Threat Agents."

Midwest Poultry Federation, St. Paul, MN, March 2002. "Bioterrorism and its Potential Impact on the Poultry Industry."

Midwest Association of Avian Veterinarians, St. Paul, MN, March 2002. "Terrorism and the Food Supply: Implications for the Poultry Industry."

Agriculture and Food Science Academy, St. Paul, MN, March 2002. "Protecting our Food System from Farm-to-Fork."

American Association of Cereal Chemists Institute of Food, Minneapolis, MN, March 2002. "BSE: Science, Politics, and Food Safety."

Roseville Rotary Club, Roseville, MN, March 2002. "Bioterrorism!"

2002 Food and Drug Administration Science Forum, Washington DC, February 2002. "BSE-International Perspective."

First Annual Nutrition Week, San Diego, CA, February 2002. "BSE: Key information for the informed nutritionist."

Minnesota Grain and Feed Association, Minneapolis, MN, February 2002. "Biosecurity in Agriculture: Risk assessment for managers."

Minnesota Veterinary Medical Association, Minneapolis, MN, February 2002. "The Veterinarian's Role on the Bioterrorism Team."

Minnesota Veterinary Medical Association, Minneapolis, MN, February 2002. "The Center for Animal Health and Food Safety: Working at the interface of science, politics and consumer perceptions."

University of Arizona Spring Seminar series, Tucson, Arizona, February 2002. "Animal Disease and Global Trade: The BSE story."

2002 International Life Science Institute Annual Meeting, Cancun, Mexico, January 2002, "Chronic Wasting Disease."

National Country Elevators Council, Indianapolis, IN, December 2001. "Bioterrorism."

National Grain and Feed Assn, Indianapolis, IN, December 2001. "Preventing BSE, FMD and Other Exotic Animal Diseases."

Council on Retired Veterinarians, Minnesota Veterinary Medical Association, December 2001. "The Veterinarian's Role on the Bioterrorism Team."

Just in Time Agro-Bioterrorism, November 2001.

Food Microbiology Research Conference XVII, Chicago, IL, November 2001. "The Epidemiology of TSEs."

Midwest Medical Directors Assn, Des Moines, IA, October 2001. "BSE/variant CJD: The Challenges of Zoonotic TSEs."

Pet Food Institute Annual Meeting, Chicago, IL, October 2001. "BSE Risk and Prevention."

Fall Conference - Oncology, St. Paul, MN, October 2001. "Animals and Bioterrorism."

American Public Health Association, Atlanta, GA, October 2001. "Communicating and Managing Risks of BSE."

Interstate Veterinary Medical Association, Inc., Annual Meeting, Sioux City, IA, October 2001. "Transmissible Spongiform Encephalopathies (TSE): Unique challenges for the US."

Lehman Conference, St. Paul, MN, September 2001. "BSE Will Affect the Swine Industry."

Animal Health Conference, American Farm Bureau Federation, May 2001. "BSE – When, Where and How?"

The Annual Meat Conference, April 2001. "Food Safety in Today's Marketplace: BSE: The US Situation."

GMA Spring Scientific and Regulatory Policy Conference, April 2001. "BSE Panel: Are We Doing Enough to Prevent a U.S. Outbreak?"

Virginia Tech Research Forum, Roanoke, VA, April 2001, "Mad Cow Hysteria"

Society For Veterinary Epidemiology and Preventive Medicine Annual Conference, March 2001. The Garth Davies Lecture: "Science, Politics and Animal Health Policy: Applied Veterinary Epidemiology in Action."

Agricultural Research Service Talk, February 2001, "Emerging Infectious Diseases BSE"

Food Safety and Inspection Service Talk, Washington D.C., February 2001, "Managing the Animal and Human Health Risks of BSE"

Agriculture and Natural Resources In-service Meeting Keedysville, January 2001. TSES

American Association of Veterinary Laboratory Diagnosticians Annual Meeting, October 2000. "Global Trade Issues and How Science and Politics Shape Animal Health Policies."

Technical Conference, National Association of Animal Breeders, September 2000. "Risk Analysis Concepts and Considerations."

International Symposium on 50 Years of PAHO Veterinary Public Health, Panama City, Panama, September 2000. "Veterinary Public Health in the Americas: Looking ahead to the next millennium."

International Society for Veterinary Epidemiology & Economics, Breckenridge, CO, August 2000. "Estimating the Overall Power of Complex Surveillance Systems." and "Determining Optimal Isolation Testing Protocols: Trichomonas exclusion in bulls to be used for semen production."

Maryland Cooperative Extension Annual Conference, Ocean City, MD, March 2000. "Extension Veterinary Medicine - a Regional Initiative."

Joint Institute for Food Safety and Applied Nutrition Seminar, Washington DC, March 2000. "Food Safety Risk Analysis at JIFSAN."

The National Consumers League, Analyzing the Threats to Children from Consumer Products: A Symposium on Risk Assessment and Risk Communication, Washington DC, January 2000. "Calculating Risks and Setting Priorities."

National Meeting on Poultry Health & Processing, Ocean City, MD, October 1999. "The Tristate Regional Poultry Health Program - Building Collaboration to Protect the Industry."

Mid-Atlantic Small Farm Conference, Maryland Cooperative Extension, Aberdeen, MD, October 1999. "Animal Disease Management."

Institute of Food Technologists, Chicago, IL, July 1999. "Bovine Spongiform Encephalopathy: Risk management in the face of uncertainty."

American Veterinary Medical Association Annual Convention, New Orleans, LA, July 1999. "Beyond BSE: Transmissible Spongiform Encephalopathies Emerge as Important Concerns in other Domestic and Wild Animals", "TSEs: Implementing Effective Disease Control and Prevention", and "Preparing to Testify."

Maryland Sheep & Wool Festival, Maryland Sheep Breeders Association, Columbia, MD, May 1999. "New and Emerging Sheep Diseases: What, Where, When, Why?"

Seminar/Workshop on Epidemiological Surveillance of Foodborne Diseases for PAHO Veterinary Public Health Program Staff. Pan American Health Organization, Washington, DC, April 1999. "Risk assessment as applied to foodborne diseases."

Exotic Pest & Disease Policy: Implications for California Agriculture, Environment, Local Communities and International Trade. University of California Davis, Davis, California, February 1999. "Bovine Spongiform Encephalopathy (BSE): Managing risk in the face of uncertainty."

Transmissible Spongiform Encephalopathies: Managing Risk in Mammalian Organs, Cells and Sera, Washington, DC, December 1998. "Report on JIFSAN Workshop on TSE Risks in Relation to Source Materials, Processing and End Product Use."

RW Johnson Pharmaceutical Research Institute, Raritan, NJ, November 1998. "Bovine Spongiform Encephalopathy (BSE): Managing risk in the face of uncertainty."

Maryland Veterinary Medical Association 113th Annual Meeting, Baltimore, MD, November 1998. "New and emerging diseases: what, where, when, why?" and "Transmissible Spongiform Encephalopathies: A case study of new and emerging disease concern."

Pharmaceutical Research and Manufacturers of America, 1998 Fall Biological and Biotechnology Committee Meeting, Washington, D. C., October 1998. "Update on TSEs."

The Economic Impact of Infectious Animal Diseases, Colorado State University, Ft. Collins, CO, August 1998. "Policy and Regulatory issues arising from infectious animal diseases."

Chesapeake Area Biological Safety Association, Biosafety Symposium, Laurel, MD, June 1998. "Risk Analysis for Transmissible Spongiform Encephalopathies."

International Workshop on TSE Risks in Relation to Source Materials, Processing, and End-Product Use, College Park, MD, June 1998. "Evaluating TSE risk: sourcing, processing, and end product use."

Striper 2000: Research Advances on Striped Bass and Its Hybrids, University of Maryland, June 1998. "Risk analysis for pathogen introduction into Maryland Striped Bass via live Fish, Fish Eggs or Fish Product Importation."

Carroll County (MD) Agribusiness Breakfast, Westminster, MD, April 1998. "The Threat of World Animal Disease Outbreaks to U.S. Agriculture."

International Life Science Institute (ILSI) Annual Meeting, St. Petersburg, FL, January 1998. "Transmissible Spongiform Encephalopathies: Real or Perceived Threat?"

Virginia-Maryland Regional College of Veterinary Medicine, Blacksburg, VA, November 1997. Lecture Series on New Horizon's in Veterinary Medicine "Mad Cow Hysteria or Legitimate Public Health Threat? BSE and other Transmissible Spongiform Encephalopathies."

National Meeting on Poultry Health & Processing, Ocean City, MD, October 1997. "Regionalization and International Trade."

Department of Agriculture, Office of Risk Assessment and Cost-Benefit Analysis, Washington, DC, October 1997. Risk Assessment Forum on Animal Health, Public Health and the Environment "Current Issues in Production Food Safety."

Thirtieth Annual Conference of the American Association of Bovine Practitioners with the Annual Conference of the Society for Theriogenology, Montreal, Quebec, September 1997. "Current Thinking Regarding BSE."

Protecting the Public Against Food-Borne Pathogens sponsored by the Georgetown Center for Food and Nutrition Policy and the American Association of Veterinary Medical Colleges, Washington, DC, September 1997. "Links in the Food Chain and the HACCP Concept."

Annual Meeting of the Mid-Atlantic Poultry Health Council, Harrisonburg, VA, September 1997. "Regional Poultry Health Initiative."

International Society for Veterinary Epidemiology and Economics, Paris, France, July 1997. "New Fields in Epidemiology: Risk Analysis."

American Registry of Professional Animal Scientists - DC Chapter, Beltsville, MD, May 1997. "History and Status of Bovine Spongiform Encephalopathy."

Virginia-Maryland Regional College of Veterinary Medicine, Blacksburg, VA, April 1997. Forum on Agriculture Consumer Topics (FACT) "Mad Cow Hysteria or Legitimate Public Health Threat? BSE and other Transmissible Spongiform Encephalopathies."

College of Agriculture and Natural Resources, College Park, MD, April 1997. Administrative Support Staff Conference "Role of the Administrative Support Team."

Conference on Emerging Foodborne Pathogens: Implications and Control, Alexandria, VA, March 1997. "Animal Disease Surveillance and Health Monitoring Programs."

Maryland Nutrition Conference for Feed Manufacturers, Baltimore, MD, March 1997. "Bovine spongiform encephalopathy: managing risk in the face of uncertainty."

American College of Veterinary Pathologists, Orlando, FL, March 1997. "Bovine Spongiform Encephalopathy (Mad Cow Disease) in Europe: Implications for Human and Animal Health."

Mid-Atlantic Poultry Health Council, St. Michaels, MD, February 1997. "Documentation of Poultry Health and other Export Considerations."

Ohio Veterinary Medical Association, Columbus, OH, February 1997. "Oprah's on the Line: Successful Risk Communication"; "The next emerging disease issues..."; "Biosecurity and Sanitation: The Lost Jewels of Disease Prevention"; "BSE and CJD."

Michigan Veterinary Conference, Lansing, MI, January 1997. "Bovine Spongiform Encephalopathy (BSE): Risk Assessment and the Politics of Prevention."

Colorado State University 56th Annual Conference for Veterinarians, Ft. Collins, CO, January 1997. "Mad Cow Disease: Its Global Perspective and Effect on the USA."

Maryland Veterinary Medical Association. Ellicott City, Maryland, November 1996. "Update on bovine spongiform encephalopathy."

National Meeting on Poultry Health and Processing, Ocean City, MD, October 1996. "Poultry Health Monitoring Systems in the U.S. - What do we know?"

United States Animal Health Association, Little Rock, AR, October, 1996. "BSE: Risk Assessment and the Politics of Prevention" and "Bovine Spongiform Encephalopathy (BSE): What is the Problem?"

Risk Analysis and Animal Health (an international training course), Switzerland, August 1996. "Structures needed in veterinary services for risk analysis" and "Interpretation of risk analysis."

American Veterinary Medical Association, Louisville, KY, July 1996. "Emerging and Foreign Animal Disease incursions and Your Role as a Private Practitioner as the First Line of Defense."

National Assembly of Chief Livestock Health Officials, Louisville, KY, July 1996. "BSE Update."

American College of Veterinary Preventive Medicine, Louisville, KY, July 1996. Founder's Lecture: "BSE: Risk Assessment and the Politics of Prevention."

C. Selected Presentations (1992-1995)

Michigan Veterinary Medical Association, January, 1995.

United States Animal Health Association, October, 1994.

Canadian Veterinary Medical Association, July, 1994.

Colorado State University Annual Conference, January, 1994.

Iowa State University Swine Conference, November, 1993.

Standing Veterinary Committee, Council for the European Communities, Brussels, Belgium, October, 1993.

Central Veterinary Laboratory, Ministry of Agriculture, Fisheries and Foods, Great Britain, July, 1993.

Food Animal Sections, College of Veterinary Medicine, Colorado State University, June, 1993.

American College of Veterinary Internal Medicine, May, 1993.

American Sheep Industry Association, May, 1993.

American Veterinary Medical Association, August, 1992.

Ohio Veterinary Medical Association, February, 1992.

College of Veterinary Medicine, Ohio State University, February, 1992.

Michigan Veterinary Conference, January, 1992.

D. Other creative and scholarly activities:

1. Contracts, grants, and gifts

National Center for Food Protection and Defense; Co-Investigator; \$15,000,000 ; Department of Homeland Security; 2004.

Geographic Distribution and Risk Factors Influencing Avian Pneumovirus Spread in Minnesota Turkey Flocks; Principal Investigator; \$ 75,000 Rapid Agricultural Response, 2004.

A Model System for Rapid Risk Communication Addressing Emerging Food Safety Issues; Co-Investigator; \$ 51,000 Rapid Agricultural Response, 2003.

Cooperative Agreement to celebrate 50 years of Veterinary Public Health in the Americas; Principal Investigator \$25,000; Pan American Health Organization (WHO); 2000.

Cooperative Agreement to establish a Risk Assessment Clearinghouse; Principal Investigator; \$125-250,000 annually; U.S. Public Health Service, Food and Drug Administration; 1988-2001.

Cooperative Agreement for Provision of Animal Welfare Information Services; Principal Investigator \$30-45,000 annually; USDA National Agricultural Library; 1998-2001.

Cooperative Agreement to Establish a Joint Institute for Food Safety and Applied Nutrition; Co-Investigator; \$6,500,000; U.S. Public Health Service; 1997-2001.

Risk Analysis for Pathogen Introduction Into Maryland Striped Bass via Live Fish, Fish Eggs, or Fish Product Importation; Principal Investigator; \$45,000; Maryland Agricultural Experiment Station; 1997-1998.

Disorders of Reproduction Among Female Veterinarians; Principal Investigator; \$29,910; National Institute of Occupational Safety and Health; 1987-1989.

The Cost-effectiveness of Bovine Dry Treatment; Principal Investigator; \$3,250; Bristol Laboratories; 1987-1988.

Transmission of M. paratuberculosis Through Embryo Transfer; Principal Investigator; \$7,898; USDA Section 1433 Formula Funds; 1987-1988.

Plasmid Profiling of Coagulase-negative Staphylococci Present in Bovine Intramammary Infections; Co-Principal Investigator; \$807; Sheep and Goat Health Research Awards, The Ohio State University; 1987-1988.

Antibiotic Sensitivity Patterns of Coagulase Positive Staphylococci Isolated from Ohio Dairy Herds; Principal Investigator; \$4,000; Bristol Laboratories; 1986-1987.

An Ohio Plan to Control Environmental Mastitis; Co-investigator; \$126,000 Ohio 21 Program; 1986-1987; K.L. Smith, Principal Investigator.

The Health Status of Female Veterinarians; Principal Investigator; \$15,000; The Ohio State University Seed Grant Program; 1986-1987.

Epidemiologic Investigation of Tracheitis in Lambs; Co-investigator; \$2,000; Ohio Sheep Improvement Association; 1986; G.J. Boner, Principal Investigator.

The Role of Coagulase Negative Staphylococci in Bovine Mastitis; Principal Investigator; \$5,780; USDA Section 1433 Formula Funds; 1986.

Infections Associated with Eartagging and Eartag Retention Time, A Comparative Field Trial; Co-investigator; \$500; Fearing Manufacturing Company; 1985; Bristol Veterinary Products; 1985-1986, S. Baertsche, Principal Investigator.

The Efficacy of Dry Treatment in Ewes, A Field Trial; Principal Investigator; \$7,500; Bristol Veterinary Products; 1985-1986.

Computerized Biochemical/Hematologic Alcoholism Screening; Co-investigator; \$1,000; The Nationwide Insurance Company; 1984-1985; J. Hostetler, Principal Investigator.

A Large Scale Field Trial of Precon-PH in Feedlot Lambs; Co-investigator; \$3,925 A.H.Robins Company; 1984-1985, G.J. Boner, Principal Investigator.

The Effect of Pre-Lambing Treatment of Na-Sulfamethazine on Bovine Mastitis; Co-investigator; \$1,942, The Ohio State University Graduate School; 1979-1980; N.R. Hartwig, Principal Investigator.

2. Editorships

Hueston WD, Voss J (eds.) "Transmissible Spongiform Encephalopathies in the United States" Council of Agricultural Science and Technology, 2000.

Minnesota Journal of Law, Science and Technology, 2004.

3. Reviewer, Scientific Journals

2002, Update on Mad Cow Disease: Implications for Human Health American Council on Science and Health.

1999, Journal of Veterinary Medical Education.

1999, Veterinary Record.

1998, International Journal of Epidemiology.

1997, Compendium on Continuing Education for the Practicing Veterinarian.

1996-1998, Office International des Epizooties (OIE). Scientific and Technical Review.

1995-1996, U.S. Department of Health and Human Services, Public Health Service. Emerging Infectious Diseases.

1987-1989, Journal of the American Veterinary Medical Association.

1987, Compendium on Continuing Education for the Practicing Veterinarian.

E. Instruction:

1. Courses taught:

University of Minnesota

*Leadership Skills for Public Health Professional (PubH 7200), Course Leader	2005
Avian Influenza: Emerging Infectious Disease (PubH 7200), Lecturer	2005
*Public Health Issues, Veterinary Medicine Opportunities (CVM 6560), Course Leader	2005
Advanced Public Health Rotation (CVM 6501), Lecturer	2005
*Veterinary Public Health Policy (CVM 6518), Course Leader	2005
Pre-harvest Food Safety (CVM 8195), Lecturer	2004

College of Veterinary Medicine Sophomore Professional Skills, Lecturer	2004-present
College of Veterinary Medicine Freshmen Professional Skills, Lecturer	2004-present
Surviving the Challenges of Vet School (CVM 6011), Lecturer	2004
*Global Food System – Beef (PubH 7210-101), Course Leader	2004
*Food System Biosecurity: Public & Environmental Health Problem Solving to Enhance Preparedness and Response in the Changing Food System (PubH 7211), Course Leader	2004
*Emerging Issues in Infectious Diseases: Transmissible Spongiform Encephalopathies (PubH 7200-109), Course Leader	2004
Public Health Practice Seminar (PubH 5299), Course Leader	2004
*Global Food Systems – Poultry (PubH 7100-108) (PubH 7210-102), Course Leader	2003-2004
*Global Food Systems – Cereal (PubH 7100-107), Course Leader	2003
*Principles of Risk Communication (PubH 7214), Course Leader	2003-present
Animal Production Systems (AnSc 4609), Lecturer	2003
Infectious Disease Control (Biosecurity) and Development of Treatment Protocols for Dairy Farms (CVM 6818), Lecturer	2003-present
Law, Health and the Life Sciences: JDP Proseminar (Law 6875), Lecturer	2003
Perspectives: Interrelationships of People and Animals in Society Today (UC 4301, CVM 6050), Lecturer	2002-present
Public Health Practice: Introductory Seminar (PubH 5299), Lecturer	2002-2003
Public Health-Veterinary and Community Medicine (CVM 6030), Lecturer	2002
Integrative Medicine I, II, III and IV (CVM 6012), Lecturer	2002-2003
Food Science Graduate Seminar (FScN 8310), Lecturer	2002
*Global Systems Dairy (PubH 7100-107), Course Leader	2002, 2005
Food: Safety , Risk and Technology (FScN 1102), Lecturer	2002-present
Microbiology (MicB 6205), Lecturer	2002
Nutrition Health/Disease Relationships (PubH 5933), Lecturer	2002-present
Public Health Rotation (CVM 6500), Lecturer	2002-present
*Global Food Systems Pork (PubH 7100-106), Course Leader	2002, 2005
*Food System Biosecurity Preparedness and Response (PubH 7100-105), Course Leader	2002
Seminar in Molecular Veterinary Biosciences (MVB 8550), Lecturer	2002

Introduction to Veterinary Medicine (CVM 1000), Lecturer	2002-present
<i>* New courses designed and initiated by WD Hueston</i>	
University of Maryland:	
Anatomy of Domestic Animals (ANSC 211), Lecturer	2000
*Animal Disease Surveillance and Health Monitoring (VMED 688D), Course leader	1999
*Science, Politics & Animal Health Policy (VMED 688E), Course leader	1999-2001
Introduction to Agriculture and Natural Resources (ANSC 105)	1999-2000
*Clinical Epidemiology (NFSC 678), Course Leader	1998-2000
*Veterinary Medicine: Options and Opportunities (ANSC 398), Coordinator	1998-2000
*Epidemiology Rounds (VMED 698B), Coordinator	1998
Our Environment: What Does Science have to do with it? (HONR 278E), Lecturer	1998-1999
Epidemiology and Public Health (Microbiology 420), Lecturer	1997-1998
Introduction to Diseases of Animals (ANSC 412), Lecturer	1997, 1999, 2000
Animal Sciences Seminar (ANSC 698), Lecturer	1996
<i>*New courses designed and initiated by WD Hueston</i>	
Virginia Tech:	
*Advanced Veterinary Public Health (VM9094), Course Leader	2001
*International Veterinary Medicine (VM8984), Course Leader	2001
*Public Policy (VM8984), Course Leader	2000
Epidemiology (VM8084), Lecturer	1999-2000
* Data Management for Epidemiologists (VM8564), Course Leader	2003
The Profession of Veterinary Medicine (VM 8004), Lecturer	1997, 1998, 2000
<i>*New courses designed and initiated by WD Hueston</i>	
The Ohio State University:	
Applied Preventive Medicine (VPM 700.08), Team member	1982-1987
Prevention of Communicable Diseases (VPM 794.03), Lecturer	1983, 1986, 1987
Principles of Epidemiology (VM 510), Team member	1986-1987
Ruminant Medicine (VM 632), Team member	1986-1987
Veterinary Epidemiology (VPM 780), Coordinator	1986-1987

Disease Control in Dairy Cattle (VPM 794.09), Lecturer and Laboratory instructor	1986-1987
Seminar in Veterinary Preventive Medicine (VPM 850), Coordinator	1986-1987
*Understanding and Reviewing Research Publications (VPM 694) Co-coordinator	1987
<i>*New courses designed and initiated by WD Hueston</i>	

2. Other teaching activities

Summer Fellowship Program in Science, Technology and Public Policy: Implications for Veterinary Medicine, University of Maryland, June 2003.

Academic Health Center Emergency Response Committee, University of Minnesota, April, 2003.

Miracle of Birth Rotation, University of Minnesota, August, 2002.

Mini Veterinary School, University of Minnesota, 2002-2003.

Mini Medical School, University of Minnesota. "What now? Dealing with Mad Cow....." 2002-2004.

Medicine Grand Rounds, Minneapolis, MN, March 2002. "Mad Cows and Demented Deer: How safe is our food?"

University Forums, University of Minnesota, December 2001.

Numerous epidemiology, risk analysis, and animal health courses for government agencies, international organizations and industry, 1986 - present.

3. Supervision of student research

Academic Advisor (DVM/MPH Degree):

Current - Stacy Tinkler (University of Minnesota)

Current - Luther Groth (University of Minnesota)

Current - Courtney Ikuta (University of Minnesota)

Current - Meghan Cheyne (University of Minnesota)

Current - Amanda Denisen (University of Minnesota)

Current - Mary Jo Wagner (University of Minnesota)

Current - Marc Knobbe (Kansas State University)

Current - Heather Herrington (University of Minnesota)

Current - Daniel Kovich (University of Minnesota)

Current - Kara Nelsen (University of Minnesota)

Current - Allison Newman (University of Minnesota)

Current - Michelle Scanlan (University of Minnesota)

Current - Jeff Stueve (University of Minnesota)

Current – Jonna Swanson (University of Minnesota)
Current – Jennifer Wicklund (University of Minnesota)
Current – Katja Lin (University of Minnesota)
Current – Theresa DeBlieck (University of Minnesota)
Current – Sue Goetz (University of Minnesota)
Current – Diane Murphy (University of Minnesota)
Current – Stacey Schwabenlander (University of Minnesota)
Current – Molly Shepard (University of Minnesota)
Current – Heather Swan (University of Minnesota)
Current – Jennifer Wilson (University of Minnesota)
Current – Margaret Carl (University of Minnesota)
Current – Sarah Crowe (University of Minnesota)
Current – Rachel Dayton (University of Minnesota)
Current – Rebecca Ripple (University of Minnesota)
Current – Keith Bogatch (University of Minnesota)
Current – Stacie Seymour (University of Minnesota)
Current – Morgan Hennessey (University of Minnesota)

Academic Advisor (Executive MPH Degree):

Current – Barbara Ault, DVM
Current – Louisa Cammidge, DVM
Current – Chris Crnich, DVM
Current – Kathy Dantzler-Olson, DVM
Current – Paul Dorr, DVM
Current – Susan McClanahan, DVM
Current – James Meronek, DVM
Current – Harry Moore, DVM
Current – Deidre Qual, DVM
Current – Laura Rand, DVM
Current – Melissa Resnick, DVM
Current – Margaret Siroli, DVM
Current – Elizabeth Tangwall, DVM
Current – Bruce Towne, DVM

Research Adviser (MPH Degree):

Current – Lee Nelson, DVM (University of Minnesota)

Current – Heather Case, DVM (University of Minnesota)
Current – Kristina McElroy, DVM (University of Minnesota)
Current – Amanda Denisen (University of Minnesota)
Current - Doug Jensen (University of Minnesota)
2004 – Nikki Neeser, DVM (University of Minnesota)

Graduate Adviser (MS Degree):

2000 - Dominic Travis, DVM (University of Maryland, College Park)
1988 - Henrique Henriques, DVM (Ohio State University)

Member Graduate Advisement Committee (MS Degree):

2004 – Mark Engle (University of Minnesota)
2002 – Michelle Colby, DVM (University of Maryland, College Park)
1994 - Larry Miller, DVM (North Carolina State University)
1990 - Brian Trout, BA (Colorado State University)
1989 - Susan Seitz, BS (Ohio State University)
1988 - Ronald Rohde, DVM (Ohio State University)
1987 - Jean Lightner, DVM (Ohio State University)
1987 - Sheryl Moritz, BS (Ohio State University)

Member, Graduate Advisement Committee (PhD Degree)

Present - Steven Fuchs (University of Minnesota)
2002 - Jean Whichard, BA, DVM (Virginia Tech)
2000 - Yunus Abdul, B.V.Sc., M.V.Sc. (University of Maryland, College Park)
1998 - Kun Yao, B.V.Sc., MS (University of Maryland, College Park)
1994 - Dave Dargatz, DVM, MS (Colorado State University)
1989 - Sue Lance, DVM (Generals only; Ohio State University)

F. Service:

1. Professional, public

- a. Organization memberships:
 - American Association of Bovine Practitioners
 - American College of Veterinary Preventive Medicine
 - American Veterinary Medical Association
 - Minnesota Veterinary Medical Association
 - Council on Agricultural Science and Technology
 - National Academies of Practice
 - National Institute of Animal Agriculture

United States Animal Health Association

b. Offices held in professional organizations

Chair, Veterinary Public Health Task Force, Association of American Veterinary Medical Colleges, 2004-present.

Board Member, National Institute Animal Agriculture, 2001 – present.

Chair, Veterinary Public Health Committee, Virginia Veterinary Medical Association, 1998-1999.

Member, Informatics Committee, American Veterinary Medical Association, 1996-1997.

Executive Board Member, American College of Veterinary Preventive Medicine, 1993-1996.

Chairman, Continuing Education Committee, Epidemiology Specialty American College of Veterinary Preventive Medicine, 1988-1990

Vice Chairman, Committee on Animal Disease Surveillance and Animal Health Information Systems, United States Animal Health Association, 1988-1990.

Chairman, Information Management Committee, American Association of Bovine Practitioners, 1989-1994.

c. Ad hoc activities for government agencies and international organizations (unpaid):

Member, Minnesota Department of Health Food Safety Plan, February 2002 - Present.

Member, Minneapolis Food Safety Task Force, 2002 - Present.

Member, International Workshop on Animal Disposal Alternatives, Technology and Epidemiology Committee, 2001 – Present.

Member, International Review Panel for US Response to BSE, 2004.

Member, International Review Panel for Canada's Response to BSE, 2003.

Member, Working Group to Review UK BSE statues, European Food Safety Agency, 2003-2004.

Member, Minnesota Somatic Cell Count Committee, 2002-2003.

Member, National Academies of Science, Workshop on Emerging Animal Diseases: Global Markets, Global Safety, January 2002.

Member, Department of Natural Resources Division of Wildlife Colorado Blue Ribbon Panel, April 2002.

Member, Minnesota Department of Health Antibiotic Use in Animal Agriculture Task Force, April 2002.

Member, National Academies of Science, Committee on Diagnosis and Control of Johnes Disease, 2001 – 2003.

Working Group Member, Joint World Health Organization, FAO/OIE Technical Consultation on BSE, Public Health, Animal Health and Trade, Paris, France, June 2001.

Member, Safeguarding American Agriculture Review, National Association of State Departments of Agriculture, 2000-2001.

Member, Transmissible Spongiform Encephalopathy Advisory Committee, Department of Health and Human Services, Public Health Service, Food and Drug Administration, United States of America, March 1997 to 1999.

Member, Spongiform Encephalopathy Advisory Committee, Ministry of Health and Ministry of Agriculture, Fisheries and Food, United Kingdom, January 1994 to 1999.

Consultant, DG 24, European Commission, Assessing the Geographical Risk of Bovine Spongiform Encephalopathy, 1999.

Independent Reviewer, Veterinary Research Fellowships, Ministry of Agricultural Fisheries and Food, United Kingdom, September 1998.

Consultant for the Office International des Epizooties, Ad hoc Group on the Categorization of Diseases, Paris, January, 1994 to 1996.

Consultant, World Health Organization, Public Health Issues Related to Human and Animal Transmissible Spongiform Encephalopathies, May, 1995.

Reviewer, Transmissible Spongiform Encephalopathy Research, Ministry of Agriculture, Fisheries and Food, United Kingdom, February, 1995.

Consultant, Office International des Epizooties, Ad hoc Group on Bovine Spongiform Encephalopathy, September, 1994.

Consultant for the Food and Agriculture Organization of the United Nations, on the need for information systems to strengthen veterinary services in developing countries, Rome, November, 1993.

Consultant, Standing Veterinary Committee, Council for the European Communities, expert consultation on the status of Bovine Spongiform Encephalopathy, Brussels, Belgium, October, 1993.

Consultant in Epidemiology, Inter-American Institute for Cooperation in Agriculture, San Jose, Costa Rica, 1989.

Proposal Reviewer, USDA Competitive Grants, 1989.

Proposal Reviewer, University Seed Grants Program, The Ohio State University, 1987.

Consultant in Food Animal Epidemiology to Veterinary Services, Animal and Plant Health Inspection Service, United States Department of Agriculture, 1986-1987.

Consultant in Food Animal Production to Program Training Division of Meat and Poultry Inspection Program, Food Safety and Inspection Service, United States Department of Agriculture, 1983-1985.

Reviewer for Agency for International Development Grant Applications, USA, 1984

Consultant in Bovine Medicine to National Board of Veterinary Medical Examiners and Professional Examination Service, 1981.

d. Consultations for organizations and private industry (sampling of 1996-present)

American Proteins Corporation	Burger King
Cargill/Excel	Schwab Capital Markets, Inc.
Cytotherapeutics	American Feed Industry Association
Datascope	Proliant, Inc.
National Cattleman's Beef Association	General Mills
Pharmacia-Upjohn	Kraft
World Bank	Land O'Lakes

e. Risk Communication and Media Contacts (sampling of 2001 – present)

<i>Print – Newspapers</i>	<i>Print – Industry Journals</i>
Palm Beach Report	Dairy Profit Weekly
Minneapolis Star Tribune	Health Scout
St. Paul Pioneer Press	Feedstuffs
USA Today	Environmental and Engineering Daily
Washington Post	Agri-News
Associated Press – DC Bureau	Food Service News
Newshouse News Service	
St. Petersburg Times	
Baltimore Sun	
Minnesota Daily	
Omaha World Herald	
Wall Street Journal	
Reuters	
United Press International	
<i>Television</i>	<i>Radio</i>
KARE-11 News	KFAI Radio News
CNN News	Minnesota Public Radio
Ivanhoe Broadcasting News	KUOM Radio
CBS	National Public Radio

Kiplinger Report
MSNBC
KSTP News
KMSP News
Twin Cities Public TV
PBS
Canadian Broadcasting Corporation

Dallas Morning News
Rutherford Talk Show (Canada)
CBC Radio
WCCO
BBC
Japan Broadcasting

Professional Organizations (Media Contact)
International Food Information Council (IFIC)
National Milk Producers Association

2. University

University of Minnesota

College of Veterinary Medicine

Dean's Cabinet, 2001 – present.
Administrative Council, 2001 – present.
Member, Raptor Center Associate Director Search Committee, 2001.

School of Public Health

Member, School of Public Health, Epidemiology Search Committee, 2001 –2003.
Member, Recruitment Committee, 2004.

College of Agricultural, Food and Environmental Sciences

Member, Animal Science, Beef and Extension Search Committee, 2001 – 2002.
Co-chair, Animal Science Meat Lab Task Force, 2002 – 2003.

Virginia-Maryland Regional College of Veterinary Medicine:

Executive Board, 1996-2001.
Chair, Search Committee, Assistant/Associate Directors, Center for Government and Corporate Veterinary Medicine, 1999.
Member, Dean of College of Veterinary Medicine Review Committee, 1997.
Member, Epidemiologist Search Committee, 1997.

University of Maryland, College Park:

Chair, Departmental Chair Search Committee, Nutrition and Food Sciences, 1999.
Chair, Education Subcommittee, Animal Care and Use Committee, 1998-2001.
Animal Care and Use Committee, 1997-2001.
Member, JIFSAN Director Search Committee, 1997-1998.

The Ohio State University:

Member, Departmental Chair Search Committee Department of Veterinary Preventive Medicine, 1987.
Chairman, Manuscript Review Committee, Department of Veterinary Preventive Medicine, 1986-1987.
Coordinator, The Ohio State University Sheep and Goat Research Group, 1985-1987.

Associate Director, Herd Milk Quality Laboratory, Department of Veterinary Preventive Medicine, 1985-1987.

Chairman, Computer Committee, Dept. of Veterinary Preventive Medicine, 1985-1987.

Member, College Computer Committee, College of Veterinary Medicine, 1985-1987.

Other Universities:

External consultant on Veterinary Public Health program: University of Saskatchewan and

University of Georgia (2004-present).

State External reviewer for faculty promotion and tenure: Colorado State University, Iowa

State University, University of Minnesota, The Ohio State University, Pennsylvania State University, University of Pennsylvania, University of Tennessee, and Washington

State University (1990-present).

3. Awards and honors

Charles N. Hewitt Creative Teaching Award, School of Public Health, University of Minnesota, 2005.

American College of Veterinary Preventive Medicine, Distinguished Diplomate Award, 2004.

Distinguished Alumni, The Ohio State University, 2003.

Special Recognition Award (CWD), Minnesota Department of Natural Resources, 2003.

Service Award, Minnesota Veterinary Medical Association, 2002.

Team Service Award (CWD), Minnesota Department of Natural Resources, 2002.

Service Award, Maryland Veterinary Medical Association, 2001.

Distinguished Service Award, Virginia-Maryland Regional College of Veterinary Medicine, 2001.

2000 Distinguished Veterinarian: For standards of excellence and dedicated service to the profession of veterinary medicine, Virginia Veterinary Medical Association, 2000.

Regional Distinguished Team Award for "Science on the Cutting Edge", National Honorary Extension Fraternity, 1999.

Certificate of Appreciation, US Food and Drug Administration, Center for Biologics Evaluation and Research, 1999.

Honorary Diplomate, The American Veterinary Epidemiology Society, 1998.

National Academy of Practice, Distinguished Practitioner in Veterinary Medicine, 1997.

Certificate of Appreciation for contributions toward maintaining access of U.S. poultry in the Russian market and creating a more cooperative relationship with the Russian poultry industry, presented by Secretary of Agriculture, Dan Glickman, March, 1997.

Outstanding Performance Cash Awards, USDA:APHIS, Veterinary Services, 1991, 1994, and 1995.

Certificate of Appreciation, USDA:FSIS, Animal Production Food Safety, 1995

Certificate of Appreciation, U.S. Department of Agriculture, APHIS Veterinary Science Service, 1995.

Certificate of Merit, U.S. Department of Agriculture, 1994.

Mayor's Award for improving the quality of life for persons with disabilities, Group Award to Multiple Sclerosis peer counselors, 1993.

Dr. Daniel E. Salmon Award for exemplary achievement in Federal Veterinary Medicine, USDA, and Cash Award from the National Association of Federal Veterinarians, 1992.

President's Award, American College of Veterinary Preventive Medicine, 1991.

Who's Who in Veterinary Science and Medicine, 1991-1992 Edition.

Certificate of Appreciation, American College of Veterinary Preventive Medicine, 1990.

Meritorious Service Award, Ohio Veterinary Medical Association, 1985.

Graduate Student Alumni Research Award, \$500, Graduate School, Ohio State University, 1985.

Phi Zeta, Veterinary Honor Society, 1979.

Phi Beta Kappa, National Honor Society, 1976.

4. Other

Volunteer, Greenbelt National Park, 1996 - 2001.

Peer Counselor, National Multiple Sclerosis Society, 1993 - 1995.

Active Sponsor, 4-H Catch-a-Lamb Program, 1992 - 1994.

Volunteer, Phantom Canyon Preserve, The Nature Conservancy, 1990.

ATTACHMENT B

GUY HEATON LONERAGAN

Assistant Professor of Beef Cattle Health and Management
Epidemiologist – Feedlot Research Group
Division of Agriculture, West Texas A&M University
WTAMU Box 60998, Canyon 79016-0001
806.651.2287, 806.651.2504 (facsimile), gloneragan@mail.wtamu.edu

EDUCATION

<u><i>Degree description</i></u>	<u><i>Degree</i></u>	<u><i>Institution</i></u>	<u><i>Year</i></u>
Veterinary degree	B.V.Sc. (Hons I)	University of Sydney, Australia	1994
Masters of science	M.S.	Colorado State University, USA	1998
Epidemiology	Ph.D.	Colorado State University, USA	2001

PROFESSIONAL ACTIVITIES

- Jan. 2002 – present Assistant Professor in Beef Cattle Health and Management
Division of Agriculture – Feedlot Research Group
West Texas A&M University, Canyon TX.
- Sept. 2002 – present Adjunct Professor
Department of Animal and Food Sciences
Texas Tech University, Lubbock TX.
- Feb. 2004 – present Adjunct Professor
International Center for Food Industry Excellence
Texas Tech University, Lubbock TX.
- Jan. 1999 – Dec. 2001 Graduate Research Assistant.
Department of Clinical Sciences, Colorado State University, Fort Collins, CO.
Advisors: Drs. David A. Dargatz, Franklyn B. Garry, Daniel H. Gould, Paul S. Morley.
Dissertation title: Acute interstitial pneumonia, bovine respiratory disease complex and potential pneumotoxicity in feedlot cattle.

- Oct. 1998 – Dec. 2001 Research Associate
Centers for Epidemiology and Animal Health (USDA:
Animal Plant Health Inspection Service, Veterinary
Services), Fort Collins, CO.
Supervisors: Drs. David A. Dargatz, Nora E. Wineland
Activities: Development, implementation, troubleshooting,
analysis, interpretation, and report generation for NAHMS
Feedlot '99 study.
- Jan. 1998 – Dec. 1999 Emergency Food Animal Ambulatory Clinician
Department of Clinical Sciences, Colorado State
University, Fort Collins, CO.
Supervisor: Dr. Page Dinsmore
- Jul. 1996 – Dec. 1998 Graduate Research Associate.
Department of Clinical Sciences, Colorado State
University, Fort. Collins, CO.
Advisors: Drs. Robert J. Callan, Franklyn B. Garry, Daniel
H. Gould, Donald Johnson.
Thesis title: Evaluation of the effects of sulfur intake on
cattle.
- Jul. 1995 – Jun. 1996 Food Animal Medicine and Surgery Intern
Department of Clinical Sciences, Colorado State
University, Fort Collins, CO.
Supervisor: Dr. Frankly B. Garry

FUNDED RESEARCH

- 2004 USDA Cooperative Research, Education and Extension Service
Title: Feedlot production practices and their impact on pre- and
post-harvest antimicrobial susceptibility patterns of enteric bacteria
Amount: \$1,465,767
Investigators: **Guy H. Loneragan**, Mindy M. Brashears, Randall S. Singer,
Daniel U. Thomson, Michael J. Engler
- 2004 Nutrition Physiology Corp., Indianapolis, IN
Title: Influence of direct-fed microbials on feedlot performance by yearling
beef steers.
Amount: \$78,300
Investigators: Michael S. Brown, **Guy H. Loneragan**

- 2004 National Cattlemen's Beef Association, Denver, CO
Title: Validation of Sampling Methods to Determine the Prevalence of *E. coli* O157:H7 in Beef Feedlot Cattle. 1
Amount: \$21,875
Investigators: **Guy H. Loneragan**, Mindy M. Brashears
- 2004 National Cattlemen's Beef Association, Denver, CO
Title: Validation of Sampling Methods to Determine the Prevalence of *E. coli* O157:H7 in Beef Feedlot Cattle. 2
Amount: \$31,778
Investigators: **Guy H. Loneragan**, Mindy M. Brashears
- 2004 Texas Beef Council, Austin, TX
Title: Validation of Sampling Methods to Determine the Prevalence of *E. coli* O157:H7 in Beef Feedlot Cattle
Amount: \$19,375
Investigators: **Guy H. Loneragan**, Mindy M. Brashears
- 2004 National Cattlemen's Beef Association, Denver, CO
Title: Impact of feeding neomycin on the emergence of antimicrobial drug resistance in *E. coli* O157, *Salmonella* spp. and commensal organisms in cattle.
Amount: \$67,450
Investigators: Mindy M. Brashears, **Guy H. Loneragan**
- 2004 Alltech Biotechnology Inc., Nicholasville, KY
Title: Effect of Mannan Oligosaccharide (Bio-Mos) on horse herd health.
Amount: \$13,008
Investigators: Lance A. Baker, **Guy H. Loneragan**, John Haliburton, John L. Pipkin
- 2003 United States Department of Agriculture; Food Safety Inspection Service, Washington, DC
Title: Impact on Hide Interventions and Cleaning on the Microbial Quality of Beef Carcasses in Small and Very Small Processing Plants.
Amount: \$25,000
Investigators: Mindy M. Brashears, **Guy H. Loneragan**
- 2003 West Texas A&M University, Canyon, TX
Title: A comparison of Antigen Capture ELISA versus Immunohistochemistry for the Detection of Cattle Persistently Infected with Bovine Viral Diarrhea Virus.
Amount: \$500
Investigators: Daniel C. Renfro, **Guy H. Loneragan**

- 2003 Nutrition Physiology Corp., Indianapolis, IN
Title: Reduction of Salmonella and *E. coli* O157:H7 in beef cattle in commercial feedlots.
Amount: \$60,000
Investigators: Mindy M. Brashears, **Guy H. Loneragan**
- 2003 Nutrition Physiology Corp., Indianapolis, IN
Title: Reduction of Salmonella and *E. coli* O157 in Beef Feedlot Cattle and Hides Using Direct-Fed Microbials in a Commercial Feedlot Setting.
Amount: \$72,000
Investigators: Mindy M. Brashears, **Guy H. Loneragan**, Paul Defoor
- 2003 National Cattlemen's Beef Association, Denver, CO
Title: Reduction of *E. coli* O157:H7 in Beef Feedlot Cattle using Varying Doses of a Direct-Fed Microbials 1.
Amount: \$77,000
Investigators: Mindy M. Brashears, **Guy H. Loneragan**, Mike Galyean, Spring Younts-Dahl.
- 2003 American Meat Institute Foundation, Chicago, IL
Title: Reduction of *E. coli* O157:H7 in Beef Feedlot Cattle using Varying Doses of a Direct-Fed Microbials 2.
Amount: \$77,000
Investigators: Mindy M. Brashears, **Guy H. Loneragan**, Mike Galyean, Spring Younts-Dahl.
- 2003 Nutrition Physiology Corp., Indianapolis, IN
Title: Effects of live cultures of *Lactobacillus acidophilus* on performance, carcass characteristics, and shedding of *E. coli* O157:H7 in finishing beef steers.
Amount: \$60,000
Investigators: Mindy M. Brashears, Mike Galyean, **Guy H. Loneragan**, Daniel Rivera.
- 2003 ContiBeef, LLC., Boulder, CO
Title: Confidential.
Amount: \$52,523
Investigators: **Guy H. Loneragan**, Mindy M. Brashears.
- 2003 Elanco Animal Health, Greenfield, IN.
Title: Unrestricted research grant.
Amount: \$4,900.
Investigator: **Guy H. Loneragan**

- 2002 Texas Cattle Feeders Association, Amarillo, TX.
Title: Critical-step validation for pre-harvest microbial food safety strategies.
Amount: \$16,960.
Investigators: **Guy H. Loneragan**, Mindy M. Brashears, Ronald D. Warner, Mike L. Galyean.
- 2002 Texas Cattle Feeders Association, Amarillo, TX.
Title: Prevalence and effects of feedlot cattle persistently infected with bovine viral diarrhea virus.
Amount: \$15,895.
Investigators: **Guy H. Loneragan**, Donald L. Montgomery, Perry A. Harms, Daniel U. Thomson.
- 2002 Houston Livestock Show and Rodeo, Houston, TX
Title: Critical-step validation for pre-harvest microbial food safety strategies.
Amount: \$4,000.
Investigators: **Guy H. Loneragan**, Mindy M. Brashears.
- 2002 Elanco Animal Health, Greenfield, IN.
Title: Unrestricted research grant.
Amount: \$4,900.
Investigator: **Guy H. Loneragan**
- 1999 Elanco Animal Health, Greenfield, IN.
Title: Association of feedlot-AIP with blood and lung 3-methyleneindolenine.
Amount: \$10,000.
Investigators: **Guy H. Loneragan**, Daniel H. Gould
- 1999 American Association of Bovine Practitioners Research Assistantship.
Title: The pattern and magnitude of rumen and blood concentrations of the pneumotoxic-precursor, 3-Methylindole, in feedlot steers.
Amount: \$9,961.
Investigators: **Guy H. Loneragan**
- 1999 Colorado Agriculture Experiment Station, Fort Collins, CO
Title: Evaluation of the association of naturally-occurring acute interstitial pneumonia in feedlot cattle with the 3-methylindole metabolite, 3-methyleneindolenine.
Amount: \$24,992.
Investigators: Daniel H. Gould, Frankly B. Garry, **Guy H. Loneragan**

- 1999 Colorado Agriculture Experiment Station, Fort Collins, CO
Title: Time dependent changes in the pattern and magnitude of 3-methylindole production in feedlot cattle.
Amount: \$23,243.
Investigators: Paul S. Morley, Daniel H. Gould, **Guy H. Loneragan**
- 1996 Meat Research Corporation, Sydney, Australia
Title: Evaluation of the effects of sulfur intake on cattle.
Amount: \$6,000
Investigators: Daniel H. Gould, Franklyn B. Garry, **Guy H. Loneragan**.

PROFESSIONAL ACTIVITIES

Committees/Working Groups

- 2004 – present Secretary, S-295 Multi-State Food Safety Project.
- 2004 – present Acting Chair, Funding Opportunities Subcommittee, Food Safety Research and Response Network.
- 2003 – present National Cattlemen's Beef Association *E. coli* O157 Pre-Harvest Best Production Practices Working Group.
- 2004 – present National Cattlemen's Beef Association Bovine Viral Diarrhea Virus Working Group.
- 2004 – 2005 National Cattlemen's Beef Association International BSE Expert Forum.
- 2002 – 2004 West Nile Virus Advisory Board for the Amarillo Health Authority.
- 2004 – present Standards of Practice Committee, Academy of Veterinary Consultants
- 2003 – present Laboratory Animal Care and Use Committee, West Texas A&M University

Ad Hoc Reviewer

- 2005 United State Department of Agriculture: National Research Initiative Competitive Grants Program. Small Business Innovation Research.
- 2005 United State Department of Agriculture: National Research Initiative

- Competitive Grants Program. Epidemiological Approaches to Food Safety program.
- 2004 United State Department of Agriculture: National Research Initiative Competitive Grants Program. Animal Protection program.
- 2004 United State Department of Agriculture: National Research Initiative Competitive Grants Program. Epidemiological Approaches to Food Safety program.
- 2004 Beef Cattle Research Council. Canadian Cattlemen's Association.
- 2003 United State Department of Agriculture: National Research Initiative Competitive Grants Program. Animal Health and Well-Being program.
- 2003 United State Department of Agriculture: National Research Initiative Competitive Grants Program. Food Safety - Pre-harvest program.
- 2002 United State Department of Agriculture: National Research Initiative Competitive Grants Program. Animal Health and Well-Being program.
- 2002 Beef Cattle Research Council. Canadian Cattlemen's Association.
- 2001 United State Department of Agriculture: National Research Initiative Competitive Grants Program. Animal Health and Well-Being program.

REFERRED PUBLICATIONS

- 2005 Larson, R. L., B. W. Brodersen, D. M. Grotelueschen, B. D. Hunsaker, W. Burdett, K. V. Brock, R. W. Fulton, D. R. Goehl, R. W. Sprowls, J. A. Kennedy, **G. H. Loneragan**, D. A. Dargatz. Considerations for Bovine Viral Diarrhea (BVD) Testing. *Bov Pract. In Press.*
- 2005 Echeverry, A., **G. H. Loneragan**, M. M. Brashears, B. A. Wagner. Effect of intensity of fecal-pat sampling on estimates of Escherichia coli O157 prevalence. *Am J Vet Res. In Press.*
- 2005 Harris, K., M.F. Miller, **G.H. Loneragan**, and M.M. Brashears. Reduction of *E. coli* O157 and *Salmonella* spp in beef trim with organic acids and acidified sodium chlorite in a simulated processing environment. *J Food Prot. In review.*

- 2005 **Loneragan, G. H.**, M. M. Brashears. Pre-harvest interventions for the control *E. coli* O157 in feedlot cattle. *J Meat Sci. In Press*
- 2005 **Loneragan, G. H.**, M. M. Brashears. Use of retention-pond water for dust abatement and impact on performance parameters and carriage of *E. coli* O157 and *Salmonella* by feedlot steers. *J Am Vet Med Assoc* 226(8):1378-1383.
- 2005 **Loneragan G. H.**, D. H. Gould, J. J. Wagner, F. B. Garry, M. A. Thoren. The magnitude and patterns of hydrogen sulfide production, blood thiamine concentration, and mean pulmonary arterial pressure in feedlot steers consuming water of different sulfate concentrations. *Bov Pract* 39(1):16-22.
- 2005 Woolums, A. R., **G. H. Loneragan**, L. L. Hawkins. Management Practices and Morbidity in U.S. Feedlots. *Bov Pract. In Press.*
- 2005 Woolums, A. R., **G. H. Loneragan**, L. L. Hawkins. Descriptive Epidemiology of Acute Interstitial Pneumonia in U.S. Feedlots. *Bov Pract. In Press.*
- 2005 Younts-Dahl, S. M., Gary D. Osborn, M. L. Galyean, J. Daniel Rivera, **G. H. Loneragan**, M. M. Brashears. Reduction of *Escherichia coli* O157 in finishing beef cattle by various doses of lactobacillus acidophilus in direct-fed microbials. *J Food Prot* 68(1):6-10.
- 2005 **Loneragan, G. H.**, D. U. Thomson, D. L. Montgomery, G. L. Mason. Prevalence, outcome, and animal-health consequences of feedlot cattle persistently infected with bovine viral diarrhea virus. *J Am Vet Med Assoc.* 226(4):595-601.
- 2004 Larson, R. L., D. Grotelueschen, K. Brock, B. Hunsaker, R. Smith, R. Sprowls, S. MacGregor, **G. H. Loneragan**, D. A. Dargatz. Bovine Viral Diarrhea (BVD): Review for Beef Cattle Veterinarians. *Bovine Pract.* 38:93-102.
- 2004 Younts-Dahl, S. M., M. L. Galyean, **G. H. Loneragan**, N. Elam, M. M. Brashears. Prevalence of *E. coli* O157 in Beef Feedlot Cattle and on Hides at Harvest after Supplementation with *Lactobacillus* and *Propionibacterium*-based Direct-Fed Microbials. *J Food Prot.* 67(5):889-893.
- 2003 Riley D. G., J. T. Gray, **G. H. Loneragan**, K. S. Barling. *Escherichia coli* O157 prevalence in fecal samples of cattle from a southeastern beef cow-

- calf herd. *J Food Prot.* 66(10):1778-1782.
- 2003 Brashears M. M., M. L. Galyean, **G. H. Loneragan**, J. E. Mann, and K. Killinger-Mann. Prevalence of *Escherichia coli* O157 and performance by beef feedlot cattle given *Lactobacillus* direct-fed microbials. *J Food Prot.* 66(5):748-754.
- 2002 **Loneragan G. H.**, P. S. Morley, J. J. Wagner, G. L. Mason, G. S. Yost, M. A. Thoren, T. E. Wittum, T. M. Bray. Effect of feeding aspirin and supplemental vitamin E on plasma concentrations of 3-methylindole, and 3-methyleneindolenine concentrations in blood and pulmonary tissues, lung lesions, and growth performance in feedlot cattle. *Am J Vet Res.* 63(12):1641-1647.
- 2002 **Loneragan G. H.**, P. S. Morley, J. J. Wagner, G. S. Mason, G. S. Yost, M. A. Thoren. Time dependant changes in the pattern and magnitude of plasma 3-methylindole and blood 3-methyleneindolenine-adduct concentrations in feedlot cattle. *Am J Vet Res* 63(4):591-597.
- 2001 **Loneragan G. H.**, J. J. Wagner, D. H. Gould, F. B. Garry and M. A. Thoren. Effects of water sulfate concentration on performance, water intake, and carcass characteristics of feedlot steers. *J Anim Sci* 79(12):2941-2948.
- 2001 **Loneragan G. H.**, D. A. Dargatz, P. S. Morley, M. A. Smith. Trends in cattle mortalities in U.S. feedlots. *J Am Vet Med Assoc* 291(8):1122-1127.
- 2001 **Loneragan G. H.**, D. H. Gould, G. L. Mason, F. B. Garry, G. S. Yost, D. G. Miles, B. W. Hoffman, L. J. Mills. Involvement of microbial respiratory pathogens in acute interstitial pneumonia in feedlot cattle. *Am J Vet Res* 62(10):1519-1524.
- 2001 **Loneragan G. H.**, D. H. Gould, G. L. Mason, F. B. Garry, G. S. Yost, D. L. Lanza, D. G. Miles, B. W. Hoffman, L. J. Mills. Association with 3-methyleneindolenine, a toxic metabolite of 3-methylindole, with acute interstitial pneumonia in feedlot cattle. *Am J Vet Res* 62(10):1525-1530.
- 2001 Woolums A. R., McAllister T. A., **Loneragan G. H.**, Gould D. H. Etiology of acute interstitial pneumonia in feedlot cattle: noninfectious causes. *Compend Contin Educ Pract Vet* 23:S86-S93.
- 2001 Woolums A. R., **Loneragan G. H.**, Gould D. H., McAllister T. A. Infectious causes and control of acute interstitial pneumonia in feedlot cattle. *Compend Contin Educ Pract Vet* 23:S110-S114.

- 1998 **Loneragan G. H.**, Gould D. H., Callan R. J., Sigurdson C. J., Hamar D. W. Association of excess sulfur intake and increase in hydrogen sulfide concentrations in the ruminal gas cap of weaned beef calves with polioencephalomalacia. *J Am Vet Med Assoc* 213(11):1599-1604.
- 1997 McAllister M. M., Gould D. H., Raisbeck M. F., Cummings B. A., **Loneragan G. H.** Evaluation of ruminal sulfide concentrations and seasonal outbreaks of polioencephalomalacia in beef cattle in a feedlot. *J Am Vet Med Assoc* 211(10):1275-1279.

BOOK CHAPTER CONTRIBUTIONS

- 2002 Sweeten J. M., Faries F. C., **Loneragan G. H.**, and Reagor J. C. Livestock drinking water quality. In: Encyclopedia of water Science. Stewart B. A. and Howell T.(eds). Marcel Dekker, Inc., New York, NY.
- 2001 **Loneragan G. H.**, and Gould D. H. Polioencephalomalacia (cerebrocortical necrosis). In: Large animal internal medicine. 3rd edition. B. P. Smith (ed). p920-926. Mosby, Saint Louis, MO
- 2001 **Loneragan G. H.**, and Gould D. H. Polioencephalomalacia in ruminants. In: Field guide to large animal internal medicine. 1st edition. B. P. Smith (ed). p270-271. Mosby, Saint Louis, MO

GOVERNMENT PUBLICATIONS WITH SIGNIFICANT INPUT

USDA:NAHMS Publications

Feedlot '99 study descriptive reports:

- 2000 Part I: Baseline reference of feedlot management practices, 1999 (May, 2000).
- 2000 Changes in the U.S. feedlot industry:1994 - 1999 (September, 2000).
- 2000 Part II: Baseline reference of feedlot health and health management, 1999 (December, 2000).

- 2000 Part III: Health management and biosecurity in U. S. feedlots, 1999 (December, 2000).

Feedlot '99 study Info Sheets:

- 2001 *Escherichia coli* O157 in United States Feedlots (October, 2001).
- 2001 Respiratory disease treatment costs in U.S. feedlots. (June, 2001)
- 2000 Highlights of NAHMS Feedlot '99: Part I. (May, 2000)
- 2000 Implant usage in U.S. feedlots (May, 2000)
- 2000 Highlights of NAHMS Feedlot '99: Changes in the feedlot industry. (September, 2000)
- 2000 Highlights of NAHMS Feedlot '99: Part II. (December, 2000)
- 2000 Attitudes towards pre-arrival processing in U.S. feedlots. (December, 2000)
- 2000 Injection practices in U.S. feedlots (December, 2000)
- 2000 Prevention of respiratory disease in U.S. feedlots (December, 2000)
- 2000 Highlights of NAHMS Feedlot '99: Part III. (December, 2000)
- 2000 Water quality on U.S. feedlots. (December, 2000)

Beef 97 study Info Sheets:

- 2000 Serum copper concentration of U.S. beef cattle (February, 2000).
- 2000 Serum copper concentration of U.S. beef cattle (February, 2000).

INVITED PRESENTATIONS

- 2005 **Loneragan, G. H.** Science and Epidemiology of BSE in North America. International Food Safety & Quality Conference, July 20. Hosted as part of The Institute of Food Technology Annual Meeting and Food Expo, July 16-20, New Orleans, LA.

- 2005 **Loneragan, G. H.** BSE surveillance in USA, 2004-2005. Risk Management in Bovine Spongiform Encephalopathy (BSE). June 22. Mexico City, Mexico.
- 2005 **Loneragan, G. H.** and Brashears, M. M. Epidemiology of Food-Safety Pathogens Carried by Beef Cattle. Food Safety: from the Surface Up. A National Food Safety Conference, February 23-25, Myrtle Beach, SC.
- 2005 **Loneragan, G. H.** Pre-Harvest Management of *E. coli* O157: Successes and Challenges. Beef Industry Issues Forum, National Cattlemen's Beef Association Annual Convention, February 2-5, San Antonio, TX.
- 2004 Booker, C. W. and **Loneragan, G. H.** Practical Epidemiology and Statistics. The Fuss About Pre-Harvest Food Safety: *E. coli* O157. 37th Annual Conference of the American Association of Bovine Practitioners, September 23-25, Fort Worth, TX.
- 2004 Booker, C. W. and **Loneragan, G. H.** Applied Epidemiology with Case Examples. The Fuss About Pre-Harvest Food Safety: *E. coli* O157. 37th Annual Conference of the American Association of Bovine Practitioners, September 23-25, Fort Worth, TX.
- 2004 **Loneragan, G. H.** The Fuss About Pre-Harvest Food Safety: *E. coli* O157. 37th Annual Conference of the American Association of Bovine Practitioners, September 23-25, Fort Worth, TX.
- 2004 Booker, C. W., Wildman, B., **Loneragan, G. H.** Applied Epidemiology in Bovine Practice. Pre-convention Seminar for the 37th Annual Conference of the American Association of Bovine Practitioners, September 22, Fort Worth, TX.
- 2004 **Loneragan, G. H.** A Drift in Mortalities? Academy of Veterinary Consultants Summer Meeting, August 4-6, Colorado Springs, CO.
- 2004 **Loneragan, G. H.** *E. coli* O157 Management in the Feedlot: Is it Needed or Even Possible? Texas Cattle Feeders Association Managers' Animal Health and Welfare Seminar, August 4, Amarillo, TX.
- 2004 **Loneragan, G. H.** Why We Benefit from Pre-Harvest Control of *E. coli* O157: What Producers Can Do to Help. American Meat Institute Foundation Best Practices for Beef Processing, April 7, Kansas City, MO.
- 2004 **Loneragan, G. H.**, D. U. Thomson. Effects of BVDV on health and production in feedlot cattle. 76th Annual Western Veterinary Conference,

- February 15-19, Las Vegas, NE.
- 2004 **Loneragan, G. H.** Complexities and perplexities of acute interstitial pneumonia in feedlot cattle. Annual Western Veterinary Conference, February 15-19, Las Vegas, NE.
- 2004 **Loneragan, G. H.** Antimicrobial drug resistance: does beef pose a risk? To be presented at the 76th Annual Western Veterinary Conference, February 15-19, Las Vegas, NE.
- 2004 **Loneragan, G. H.** Current epidemiology and the future of pre-harvest control of *E. coli* O157. 76th Annual Western Veterinary Conference, February 15-19, Las Vegas, NE.
- 2004 **Loneragan, G. H.** Epidemiology and the practicing veterinarian: when yes sometimes means no and vice versa. 76th Annual Western Veterinary Conference, February 15-19, Las Vegas, NE.
- 2004 **Loneragan, G. H.** Current Processing Strategies for Feedlot Cattle. 120th Midwest Veterinary Conference, February 26-29, Columbus, OH.
- 2004 **Loneragan, G. H.** Epidemiology and Pre-Harvest Control of *E. coli* O157. 120th Midwest Veterinary Conference, February 26-29, Columbus, OH.
- 2004 **Loneragan, G. H.** Diagnostic tests in Veterinary Practice. 120th Midwest Veterinary Conference, February 26-29, Columbus, OH.
- 2004 **Loneragan, G. H.** Acute Interstitial Pneumonia in Feedlot Cattle. 120th Midwest Veterinary Conference, February 26-29, Columbus, OH.
- 2004 **Loneragan, G. H., D. U. Thomson.** BVDV in Feedlot Cattle. 120th Midwest Veterinary Conference, February 26-29, Columbus, OH.
- 2003 **Loneragan, G. H., M. M. Brashears.** Overview of Pre-Harvest Strategies and Update on Direct Fed Microbial Research. The 2003 Meat Industry Research Conference, October 27-28, Chicago, IL.
- 2003 **Loneragan, G. H.** BVDV Impact on Feedlot Mortality and Morbidity. The 36th Annual Conference of the American Association of Bovine Practitioners Convention, September 18-20, Columbus, OH.
- 2003 **Loneragan, G. H.** BVDV and morbidity in feedlot cattle. Academy of Veterinary Consultants Winter Meeting, December 4-6, Denver, CO.

- 2003 **Loneragan, G. H.**, D. U. Thomson. Epidemiology of BVDV in Feedlots. The 121st Iowa Veterinary Medical Association Annual Meeting, September 11-12, Ames, IA.
- 2003 **Loneragan, G. H.** Acute Interstitial Pneumonia in Feedlot Cattle. The 121st Iowa Veterinary Medical Association Annual Meeting, September 11-12, Ames, IA.
- 2003 **Loneragan, G. H.** Interpretation of Diagnostic Tests. The 121st Iowa Veterinary Medical Association Annual Meeting, September 11-12, Ames, IA.
- 2003 **Loneragan, G. H.** Pre-harvest epidemiology as a guide to control of food-borne pathogens. 2003 Joint Meeting of the American Dairy Science Association and American Society of Animal Science, June 22-26, Phoenix, AZ.
- 2003 **Loneragan, G. H.** Principles of epidemiology II. Accuracy, precision, and *P* values. Academy of Veterinary Consultants Spring Meeting, April 5-6, Amarillo, TX.
- 2003 **Loneragan, G. H.**, M. M. Brashears, D. U. Thompson. Ecology and Feedlot Epidemiology of *E. coli* O157:H7. Presented to the Plains Nutrition Council. San Antonio, TX. April 3-4.
- 2003 **Loneragan, G. H.** Update on *E. coli* O157 pre-harvest: What does research tell us about effective pre-harvest interventions? National Cattlemen's Beef Association, Cattle Industry Annual Convention & Trade Show. Feeder Council Meeting, January 29-February 1, Nashville, TN.
- 2003 **Loneragan, G. H.** The challenge of pre-harvest control of *Escherichia coli* O157. National Cattlemen's Beef Association Beef Industry *E. coli* Summit, January 7-8, San Antonio, TX.
- 2002 **Loneragan, G. H.** On the issue of declining numbers of bovine veterinarians. Seminar 25. 35th Annual Conference of the American Association of Bovine Practitioners Convention, September 26-28, Madison, WI.
- 2002 **Loneragan, G. H.** What is AIP? Academy of Veterinary Consultants Summer Meeting, August 1-3, Colorado Springs, CO.

- 2002 **Loneragan, G. H.** Epidemiological characteristics of AIP in feedlot cattle. Academy of Veterinary Consultants Summer Meeting, August 1-3, Colorado Springs, CO.
- 2002 **Loneragan, G. H.** Principals of epidemiology. Academy of Veterinary Consultants Summer Meeting, August 1-3, Colorado Springs, CO.
- 2001 **Loneragan, G. H.,** Gould D. H.. Rumen generated toxins: hydrogen sulfide and 3-methylindole. American College of Veterinary Internal Medicine, 19th Annual Veterinary Medical Forum, May 23-26, Denver, CO.
- 2000 **Loneragan, G. H.,** D. H. Gould. Acute Interstitial Pneumonia in Feedlot Cattle. 33rd Annual Conference of the American Association of Bovine Practitioners Convention, September 21-23, Rapid City, SD.
- 1999 **Loneragan, G. H.,** D. H. Gould. Acute interstitial pneumonia in feedlot cattle. Academy of Veterinary Consultants winter meeting, December 2-3, Denver, CO.

ABSTRACTS AND PAPERS PUBLISHED IN PROCEEDINGS

- 2005 Chichester, L. M., **Loneragan, G. H.,** Brashears, M. M., Stephens, T. P., Kunze, D. J., Platt, T. M., Proffit, L. L., Ware, D. Prevalence and Enumeration of *E. coli* O157 in Beef Steers Receiving Various Strains of Direct-Fed Microbials. 92nd Annual Meeting of the International Association for Food Protection, August 14-17, Baltimore, MD.
- 2005 Stephens, T. P., **Loneragan, G. H.,** Branham, L. A., Pitchiah, S. Brashears, M. M. Enumeration of *Escherichia coli* O157 in Cattle Feces Using Immunomagnetic Separation and Most Probable Number. 92nd Annual Meeting of the International Association for Food Protection, August 14-17, Baltimore, MD.
- 2005 Stephens, T. P., **Loneragan, G. H.,** Thompson, T. W., Sridhara, A., Branham, L. A., Pitchiah, S. Brashears, M. M. Distribution of *Escherichia coli* O157 and Salmonella spp. on Hide Surfaces, the Oral Cavity, and Feces of Feedlot Cattle. 92nd Annual Meeting of the International Association for Food Protection, August 14-17, Baltimore, MD.
- 2005 Stephens, T. P., **Loneragan, G. H.,** Sridhara, A., Branham, L. A., Pitchiah, S. Brashears, M. M. Comparison of Immunomagnetic Separation (IMS) and a Commercial Enzyme-Linked Immunosorbent Assay (ELISA) for the Detection of *Escherichia coli* O157 on Hides of Feedlot Cattle. 92nd

Annual Meeting of the International Association for Food Protection,
August 14-17, Baltimore, MD.

- 2005 Lorenz, C., B. Reeves, **G. H. Loneragan**, N. Ghosh. Assessment of health behaviors in Texas panhandle students. 2005 Annual Meeting of the Texas Chapter of the American College of Sports Medicine, March 3-4, Dallas, TX.
- 2005 Lorenz, C. R., Reeves, B., **Loneragan, G. H.**, Ghosh N. Health Behaviors in Texas Panhandle Students. Tri-Beta Conference.
- 2004 **Loneragan, G. H.**, Brashears, M. M. Use of retention-pond water for dust abatement in a feedlot and impact on carriage of *E. coli* O157 and *Salmonella*. 85th Annual Meeting of the Conference of Research Workers in Animal Diseases, November 14-16, Chicago, IL.
- 2004 Kunze, D. J., **Loneragan, G. H.**, Brashears, M. M., Singer, R. S., Scott, H. S., Platt, T., Chichester, L. Evaluation of antimicrobial drug susceptibility in enteric bacteria of cattle in response to administration of injectable antimicrobials. 85th Annual Meeting of the Conference of Research Workers in Animal Diseases, November 14-16, Chicago, IL.
- 2004 Booker, C. W., **G. H. Loneragan**, P. T. Guichon, G. K. Jim, O. C. Schunicht, B. K. Wildman, T. J. Pittman, R. K. Fenton, E. D. Janzen, T. Perrett. Practical application of epidemiology in veterinary herd health/production medicine. The 37th Annual Conference of the American Association of Bovine Practitioners Convention, September 22-25, Ft. Worth, TX.
- 2004 **Loneragan, G. H.** A Drift in Mortalities? Academy of Veterinary Consultants Summer Meeting, August 4-6, Colorado Springs, CO.
- 2004 Younts-Dahl, S. M., J. D. Rivera, P. Defoor, M. L. Galyean, **G. H. Loneragan**, M. M. Brashears. Prevalence of *E. coli* O157 among finishing beef cattle supplemented with a *Lactobacillus*-based direct-fed microbial. 91st Annual Meeting of the International Association for Food Protection, August 8-11, Phoenix, AZ.
- 2004 Younts-Dahl, S. M., J. J. Cranston, J. D. Rivera, M. L. Galyean, **G. H. Loneragan**, M. M. Brashears. Effects of Feeding Whole Cottonseed on the Prevalence of *Escherichia coli* O157 among Finishing Beef Steers. 91st Annual Meeting of the International Association for Food Protection, August 8-11, Phoenix, AZ.

- 2004 Fluckey, W. M., M. M. Brashears, **G. H. Loneragan**. The potential for cross-contamination traced by PFGE and the antibiotic susceptibility patterns of enteric bacteria recovered from feedlot cattle and their in plant carcasses. 91st Annual Meeting of the International Association for Food Protection, August 8-11, Phoenix, AZ.
- 2004 Echeverry, A., **G. H. Loneragan**, M. M. Brashears, B. W. Wagner. Non-uniform distribution of *E. coli* O157:H7 in feces and underestimation of carriage by feedlot cattle. 91st Annual Meeting of the International Association for Food Protection, August 8-11, Phoenix, AZ.
- 2004 Echeverry, A., **G. H. Loneragan**, M. M. Brashears. Survival of *Escherichia coli* O157:H7 in manure under different storage conditions. 91st Annual Meeting of the International Association for Food Protection, August 8-11, Phoenix, AZ.
- 2004 Younts-Dahl, S. M., G. Osborn, M. L. Galyean, J. D. Rivera, **G. H. Loneragan**, M. M. Brashears. Reduction of *E. coli* O157 in finishing beef cattle by various doses of *Lactobacillus acidophilus* in direct-fed microbials. 91st Annual Meeting of the International Association for Food Protection, August 8-11, Phoenix, AZ.
- 2004 Renfro, Daniel C., R. S. Swingle, D. U. Thomson, M. Branine, **G. H. Loneragan**. The effect of castration on animal health, growth performance, and carcass characteristics of intact male calves entering the feedlot. Plains Nutrition Council. San Antonio, TX. April 14-15.
- 2003 **Loneragan, G. H.** BVDV and morbidity in feedlot cattle. Academy of Veterinary Consultants Winter Meeting, December 4-6, Denver, CO.
- 2003 **Loneragan, G. H.**, M.M. Brashears, D. R. Ware, S. Younts-Dahl, M. L. Galyean. Direct-fed microbials and pre-harvest risk reduction of *E. coli* O157. The 10th International Symposium for Veterinary Epidemiology and Economics, November 17-21, Santiago, Chile.
- 2003 **Loneragan, G. H.**, D. U. Thomson, D. L. Montgomery, G. L. Mason. Bovine viral diarrhea virus in feedlot cattle. The 10th International Symposium for Veterinary Epidemiology and Economics, November 17-21, Santiago, Chile.
- 2003 **Loneragan, G. H.**, M. M. Brashears, A. Echeverry, B. A. Wagner. Potential non-uniform distribution of *E. coli* O157 in feces and underestimation of prevalence. 84th Annual Meeting of the Conference of Research Workers in Animal Diseases, November 9-11, Chicago, IL.

- 2003 Fluckey, W. M., M. M. Brashears, **G. H. Loneragan**. The prevalence and antimicrobial susceptibility of enteric bacteria isolated from feedlot cattle and their carcass. 84th Annual Meeting of the Conference of Research Workers in Animal Diseases, November 9-11, Chicago, IL.
- 2003 Younts-Dahl, S. M., M. L. Galyean, **G. H. Loneragan**, and M. M. Brashears. Distribution of fecal shedding of *E. coli* O157 across pens of finishing beef cattle. 84th Annual Meeting of the Conference of Research Workers in Animal Diseases, November 9-11, Chicago, IL.
- 2003 **Loneragan, G. H.** BVDV Impact on Feedlot Mortality and Morbidity. The 36th Annual Conference of the American Association of Bovine Practitioners Convention, September 18-20, Columbus, OH.
- 2003 Fluckey, W. M., **G. H. Loneragan**, and M. M. Brashears. Antibiotic Susceptibility and Cross Contamination of Enteric Bacteria Isolated from Feedlot Cattle and Their Carcasses. 90th Annual Meeting of the International Association for Food Protection, August 9-13, New Orleans, LA.
- 2003 **Loneragan, G. H.**, M. M. Brashears, and G. Dewell. Potential for Underestimation of *E. coli* O157:H7 Prevalence in Beef Feedlot Cattle. 90th Annual Meeting of the International Association for Food Protection, August 9-13, New Orleans, LA.
- 2003 Younts-Dahl, S, M. M. Brashears, M. L. Galyean, **G. H. Loneragan**, and N. Elam. Prevalence of *E. coli* O157 among finishing beef cattle supplemented with live cultures of *Lactobacillus* and *Propionibacterium*. 90th Annual Meeting of the International Association for Food Protection, August 9-13, New Orleans, LA.
- 2003 Younts-Dahl, S, M. M. Brashears, M. L. Galyean, and **G. H. Loneragan**. Supplementing feedlot cattle diets with whole cottonseed to decrease the prevalence of *E. coli* O157:H7. 90th Annual Meeting of the International Association for Food Protection, August 9-13, New Orleans, LA.
- 2003 **Loneragan, G. H.** and M. M. Brashears. Epidemiological Characteristics of *E. coli* O157 in cattle. 53rd Annual Southwest Conference on Diseases in Nature Transmissible to Man. June 25-27. Amarillo, TX.
- 2003 **Loneragan, G. H.** Principles of epidemiology II. Accuracy, precision, and *P* values. Academy of Veterinary Consultants Spring Meeting, April 5-6, Amarillo, TX.

- 2003 **Loneragan, G. H.**, M. M. Brashears, D. U. Thompson. Ecology and Feedlot Epidemiology of *E. coli* O157:H7. Plains Nutrition Council. San Antonio, TX. April 3-4.
- 2002 **Loneragan G. H.**, Thomson D. U., Montgomery D. L., Harms P. A., Mason G. L, Van Campen H. Epidemiological investigations of feedlot cattle persistently infected with BVDV. 83rd Annual Meeting of the Conference of Research Workers in Animal Diseases, November 10-12, St. Louis, MO.
- 2002 **Loneragan G. H.**, Dargatz D. A., Morley, P. S., Smith M. A. Trends in cattle mortalities in U.S. feedlots. 83rd Annual Meeting of the Conference of Research Workers in Animal Diseases, November 10-12, St. Louis, MO.
- 2002 **Loneragan G. H.**, Dargatz D. A., Wagner B. A., Wineland N. E. Treatment for bovine respiratory disease in U.S. feedlots. 35th Annual Conference of the American Association of Bovine Practitioners Convention, September 26-28, Madison, WI.
- 2002 **Loneragan G. H.** Epidemiological characteristics of AIP in feedlot cattle. Academy of Veterinary Consultants Summer Meeting, August 1-3, Colorado Springs, CO.
- 2002 **Loneragan G. H.** Principals of epidemiology. Academy of Veterinary Consultants Summer Meeting, August 1-3, Colorado Springs, CO.
- 2001 **Loneragan G. H.**, Morley, P. S., Mason G. L, Yost G. S. Patterns of plasma 3-methylindole and blood 3-methyleneindolenine in feedlot cattle. 82nd Annual Meeting of the Conference of Research Workers in Animal Diseases, November 11-13, St. Louis, MO.
- 2001 **Loneragan G. H.**, Mason G. L, Gould D. H., Yost G. S., Lanza D. L., Garry F. B. Acute interstitial pneumonia of feedlot cattle. 82nd Annual Meeting of the Conference of Research Workers in Animal Diseases, November 11-13, St. Louis, MO.
- 2001 **Loneragan G. H.**, Morley P. S., Wagner J. J., Gould D. H., Mason G. L., Yost G. S. Plasma 3-methylindole and blood 3-methyleneindolenine in feedlot cattle. 34th Annual Conference of the American Association of Bovine Practitioners Convention, September 21-23, Vancouver, BC.

- 2001 Dargatz D. A., Wagner B. A., **Loneragan G. H.**, Garber L. P., Hill G. W., Wineland N. E. Animal health, management, and foodborne pathogens in beef feedlots: results of the NAHMS Feedlot '99 study. 34th Annual Conference of the American Association of Bovine Practitioners Convention, September 21-23, Vancouver, BC.
- 2001 Morley P. S., **Loneragan G. H.**, Bingham H. R., Wittum T. E., Bray T. M., Gould D. H. The role of 3mi in bovine respiratory disease. American College of Veterinary Internal Medicine, 19th Annual Veterinary Medical Forum, May 23-26, Denver, CO.
- 2001 **Loneragan G. H.**, Gould D. H., Mason G. L. Acute Interstitial Pneumonia in Feedlot Cattle. 62nd Annual Conference for Veterinarians, January 4-6, Ft. Collins, Colorado.
- 2000 **Loneragan G. H.**, P. S. Morley, D. H. Gould, F. B. Garry. Epidemiology of acute interstitial pneumonia, fatal fibrinous pneumonia and digestive causes of death in a western U.S. feedlot. 9th Symposium of the International Society for Veterinary Epidemiology and Economics. August 6-11, Breckenridge, CO.
- 2000 Dargatz D. A. , **G. H. Loneragan**, B. A. Wagner, L. P. Garber, G. W. Hill, J. M.. Rodriguez, N. E. Wineland. Health and Management of Cattle in Feedlots in the United States. 9th Symposium of the International Society for Veterinary Epidemiology and Economics. August 6-11, Breckenridge, CO.
- 2000 Mason G. L. , D. H. Gould, **G. H. Loneragan**, G. S. Yost. Field-based study of pulmonary injury in acute interstitial pneumonia in fed cattle. *Vet Pathol.* September, 37(5):530, Orlando, FL.
- 1998 **Loneragan G. H.**, Gould D. H., F. B. Garry. Investigations of naturally occurring bovine PEM associated with an excess total sulfur intake. 90th Annual Conference of the American Association of Animal Science, Denver, Colorado, July 28- 31.
- 1998 **Loneragan G. H.**, Wagner J. J., Gould D. H., Goodall R. Effect of molybdenum supplementation on the ruminal gas cap H₂S levels and copper status of feedlot steers. 90th Annual Conference of the American Association of Animal Science, Denver, Colorado, July 28- 31.

- 1998 Gould D. H., **G. H. Loneragan**, C. J. Sigurdson, R. J. Callan, D. W. Hamar
Pathologic Ruminal H₂S Production in Herd-mates of Calves with Sulfate-
Associated Polioencephalomalacia (PEM). American Association of
Veterinary Laboratory Diagnosticians.
- 1997 Gould D. H., **Loneragan G. H.** Ruminal gases and their relationship to
polioencephalomalacia and respiratory disease. 58th Annual Conference
for Veterinarians, Ft. Collins, Colorado, January 4-6.
- 1997 **Loneragan G. H.**, Gould D. H., Wagner J. J., Garry F. B., Thoren M. A.
The effect of varying water sulfate content on H₂S generation and health
of feedlot cattle. 89th Annual Conference of the American Association of
Animal Science, Nashville, Tennessee, July 29- August 1.
- 1997 Wagner J. J., **Loneragan G. H.**, Gould D. H., Thoren M. A. The effect of
varying water sulfate concentration on feedlot performance and water
intake of steers. 89th Annual Conference of the American Association of
Animal Science, Nashville, Tennessee, July 29- August 1.
- 1997 **Loneragan G. H.**, Gould D. H., Wagner J. J., Garry F. B., Thoren M. A.
The effect of varying water sulfate content on H₂S generation and health
of feedlot cattle. 30th Annual Conference of the American Association of
Bovine Practitioners, Montreal, Canada, Sept 18-21.
- 1997 McAllister M. M., Raisbeck M. F., Gould D. H., **Loneragan G. H.**,
Cummings B. C. An outbreak of polioencephalomalacia in a beef feedlot:
Association with high ruminal sulfide and normal blood thiamine
concentrations. American Association of Veterinary Laboratory
Diagnosticians; Louisville, Kentucky, October 17-24.
- 1997 **Loneragan G. H.**, Gould D. H., Wagner J. J., Garry F. B., Thoren M. A.
The effect of varying water sulfate content on H₂S generation and health
of feedlot cattle. 89th Annual Conference of the American Association of
Animal Science, Nashville, Tennessee, July 29- August 1.
- 1997 **Loneragan G. H.**, Gould D. H., Wagner J. J., Garry F. B., Thoren M. A.
The effect of varying water sulfate content on H₂S generation and health
of feedlot cattle. 30th Annual Conference of the American Association of
Bovine Practitioners, Montreal, Canada, Sept 18-21.

ATTACHMENT C

Srinand Sreevatsan
Associate Professor
Veterinary Population Medicine
College of Veterinary Medicine
University of Minnesota
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St. Paul, MN 55108
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Email: sreev001@umn.edu or srinands@hotmail.com

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
University of Agricultural Sciences, Bangalore, India	B.V.Sc	1981-1986	Veterinary Sciences
University of Agricultural Sciences, Bangalore, India	M.V.Sc.	1986-1989	Veterinary Medicine
University of Minnesota, Minneapolis, MN	M.P.H	1989-1991	Epidemiology
University of Minnesota, St. Paul, MN	Ph.D.	1991-1996	Veterinary Medicine
Baylor College of Medicine, Houston, TX	Research Associate	1996-1997	Molecular epidemiology of tuberculosis. Antimicrobial agent resistance mechanisms in tuberculosis.

RESEARCH AND PROFESSIONAL EXPERIENCE:

FEBRUARY 2005

Associate Professor
Veterinary Population Medicine
University of Minnesota, St. Paul, MN

APRIL 2001 to March 2005

Assistant Professor
Food Animal Health Research Program, OARDC
Veterinary Preventive Medicine
The Ohio State University
Wooster, OH

- Molecular epidemiology and vaccine strategies for Johne's disease in Cattle
- Molecular epidemiology and population genetic frameworks of *Mannheimia hemolytica*
- Prion disease diagnostics

FEBRUARY 1997 – MARCH 2001

Director, Development and Validations
ClinCyte/Center for Innovative Technologies
San Diego

- Molecular diagnostics of infectious diseases

- Molecular analysis of drug resistance in bacterial and viral pathogens
- Rapid and accurate identification of antimycobacterial agent resistance using state-of-the-art molecular method

• JUL 1995 - JANUARY 1997

Research Associate
Baylor College of Medicine, Houston.
Preceptor: Dr. J. M. Musser

- Molecular epidemiology of *Mycobacterium tuberculosis*
- Molecular mechanisms of antimicrobial agent resistance in Mycobacteria
- Rapid and unambiguous identification of Mycobacteria
- Molecular methods for rapid identification of antimycobacterial agent resistance
- Population genetic frameworks in *M. tuberculosis* complex organisms
- Automated DNA sequencing and nucleotide sequence analysis
- Pathogenesis of severe invasive disease caused by group A streptococci
- Trained and taught 3 technicians, 5 undergraduate students, and one high school student in laboratory techniques and principles of antimycobacterial agent resistance.

JUN 1991 - JUN 1995

Graduate Research Assistant
Department of Clinical and Population Sciences
University of Minnesota, St. Paul, MN.
Ph.D. in Veterinary Medicine.
Minor: Epidemiology

Thesis title: Evaluation of antibody responses in cattle to various *Pasteurella haemolytica* immunogens following vaccination.

SEP 1989 - JUN 1991

School of Public Health, Division of Epidemiology,
University of Minnesota, Minneapolis.
M.P.H. in Epidemiology

Thesis title: AIDS attitudes, behaviors, and beliefs among young Minneapolis adults: Population AIDS Risk Study (PARS).

Experience (Graduate School):

- Statistical basis for experimental design.
- Statistical analysis of Complex data [Meta-analysis, Minnesota Heart Health Program].
- Immunodiagnosics (serology) [*Salmonella* and *Pasteurella haemolytica*]
- Subunit vaccine designs [*P. haemolytica*].
- Experimental animal study designs to evaluate various analytes.

DEC 1986 - DEC 1988

Graduate Student. Junior fellow for the Indian Council
of Agricultural Sciences
University of Agricultural Sciences, Bangalore, India.
Specialty: Canine dermatology.

Thesis title: Studies on non-specific dermatitis in canines with special reference to plasma levels of beta-carotene, vitamin A, and zinc compared to dermatohistopathologic patterns.

DEC 1986 - AUG 1989

Practiced clinical veterinary medicine in India.

DISTINCTIONS:

- Was placed first in India in the entrance examination of Indian Council of Agricultural Research junior fellowship.
- Awardee of the J.N.Tata scholarship for the year 1986.
- Awardee of the University of Agricultural Sciences gold medal for standing first in M.V.Sc.
- Awardee of Soumyanayakamma gold medal for highest GPA in M.V.Sc.
- Awardee of the Karnataka State Youth award for the best student of the year 1989.

DISCOVERIES LICENSED

1. J. M. Musser and **S. Srinand**. 1996. A polymorphic locus in *oxyR* is specific for *Mycobacterium bovis*. Technology licensed through the Baylor College of Medicine.
2. Raj R. Barathur, **S. Sreevatsan**, and J. B. Bookout. 1999. Pathogen Detection Assay. 1999. Intellectual Property of ClinCyte, LLC. Patent pending.
3. **S. Sreevatsan** and K. Takemura. 2004. Development of high affinity aptamers that bind to 23-89 residues of the prion protein. Invention disclosed through the Ohio State University Techpartners.

SERVICE:

1. Ad Hoc reviewer for USDA-NRI (Food Safety) (2004)
2. Ad Hoc reviewer for Journal of Clinical Microbiology (2004)
3. Ad Hoc reviewer for FEMSIM (2004)
4. Ad hoc reviewer for Journal of Veterinary Diagnostic Investigation (2002)
5. Ad hoc reviewer for Internal USDA/Hatch grants (2002)
6. Ad hoc reviewer for the OARDC/research enhancement grants program (2002, 2003)
7. Ad hoc reviewer for Animal Health Research Reviews (2003)
8. Ad hoc reviewer for Archives of Virology (2002)
9. Ad hoc reviewer/referee for the OARDC Annual meetings' poster session (2002, 2003)
10. Ad hoc reviewer for Antimicrobial Agents and Chemotherapy (2003, 2004)
11. Ad hoc reviewer for American Journal of Veterinary Research (2003, 2004, 2005)
12. Ad hoc reviewer for FEMS Microbiology Letters (2003, 2004)
13. Referee for undergraduate Independent Study Presentations organized by the Ohio Beta-Beta-Beta honor society (April 2003)

14. Ad hoc reviewer for FEMS Medical Microbiology and Immunology (2004)
15. Ad hoc reviewer for Wellcome trust international grants program (2004)
16. Ad hoc reviewer for Journal of Bacteriology (2004)
17. Ad hoc reviewer for Journal of Clinical Microbiology (2004)
18. Ad hoc reviewer for Experimental Biology and Medicine (2004, 2005)
19. Ad hoc reviewer for Trends in Parasitology (2005)

Review Panel(s):

November/December 2003. Department of Defense (Department of Army).
Antemortem Diagnostics for transmissible spongiform encephalopathies:
Congressionally Directed Medical Research Program.

Teaching:

Molecular Epidemiology of Infectious Disease. VPM 700. Graduate level Course offered in Spring of 2003.

Veterinary Epidemiology and Public Health. VM 646. Professional Students (2nd year Vet Students). Course offered in Fall 2003.

Developed a Journal Club for Graduate students. 2003. This meets once every month to critically discuss manuscripts related molecular genetics and pathobiology of infectious disease.

Graduate Student Advisees:

Ms. Alifiya S. Motiwala – Ph.D. Candidate (Feb 2005)

Ms. Norma E. Ramirez – Ph.D. Candidate (March 2005)

Dr. Xiaochun Zhu – Ph.D. Student

Dr. Harish Janagama – MS Student (March 2005); Current Ph.D. Student

Post doctoral Advisees:

Dr. Ahmet Ozbek – 2002-2003

Dr. Kaori Takemura – 2002- 2004

Dr. Paul Hyman – 2004-2005

Dr. Ping Wang – 2004 – Present

MANUSCRIPTS PUBLISHED IN PEER-REVIEWED JOURNALS:

1. Takemura, K, P. Wang, S. Chen, W. Surewicz, A. Kanthasamy, and **S. Sreevatsan**. DNA aptamers selected against recombinant prion proteins (PrP^C) bind mammalian PrP^C and not PrP^{Sc} and show sequence and structure specificity in binding. *J. Biol. Chem.* Submitted. 2005
2. N. E. Ramirez and **S. Sreevatsan**. Development of a sensitive detection system for *Cryptosporidium* in environmental samples. *Applied Environ. Microbiol.* 2005 (Submitted).

3. A. S. Motiwala, M. Strother, N. E. Theus, R. W. Stich, B. Byrum, W. P. Shulaw, and S. Sreevatsan. Rapid detection and strain typing of *Mycobacterium avium* subsp. *paratuberculosis* from broth enriched cultures. *J. Clin. Microbiol.* **43**(5):2111-2117. 2005
4. K. Takemura, M. Khadre, D. Joseph, A. Yousef, and S. Sreevatsan. An overview of transmissible spongiform encephalopathies. *Animal Health Research Reviews.* **5**(2): 103-124. 2004.
5. A. H. Ghadiali, S. A. Naser, E. J. B. Manning, and S. Sreevatsan. Short sequence repeats analysis of *Mycobacterium avium* subspecies *paratuberculosis* isolates from Crohn's disease patients exhibit genetic similarity to extant clones of bovine or caprine origin. *J. Clin. Microbiol.* **42**(11):5345-5348. 2004.
6. N. E. Ramirez, L. A. Ward, and S. Sreevatsan. A review of the biology and epidemiology of cryptosporidiosis in humans and animals. *Microbes and Infection.* **6**: 773-785. 2004.
7. J. T. LeJeune, S. T. Abedon, K. Takemura, N. P. Christie, and S. Sreevatsan. Human *Escherichia coli* O157:H7 genetic marker in isolates of bovine origin. *Emerging Infect. Dis.* **10**(8): 1482-1485. 2004.
8. A. S. Motiwala, A. Amonsin, M. Strother, E. J. B. Manning, V. Kapur, and S. Sreevatsan. Molecular Epidemiology of *Mycobacterium avium subsp. paratuberculosis* Recovered from Wild Life Species. *J. Clin. Microbiol.* **42**(4):1703-1712. 2004.
9. A. Amonsin, L. L. Li, Q. Zhang, A. S. Motiwala, S. Sreevatsan, and V. Kapur. A Multi-Locus Short Sequence Repeat Sequencing Approach for *Mycobacterium avium subsp. paratuberculosis* strain differentiation. *J. Clin. Microbiol.* **42**(4): 1698-1702. 2004.
10. A. Özbek, F. C. Michel, Jr., M. Strother, A. S. Motiwala, B. Byrum, W. Shulaw, C. G. Thornton, and S. Sreevatsan. Evaluation of Two Recovery Methods for detection of *Mycobacterium avium* subsp. *paratuberculosis* by PCR: Direct Dilution-Centrifugation and C₁₈-Carboxypropylbetaine Processing. *FEMS Microbiol. Letters* **229**:145-151. 2003.
11. A. S. Motiwala, M. Strother, A. Amonsin, B. Byrum, S. A. Naser, J. R. Stabel, W. P. Shulaw, J. P. Bannantine, V. Kapur, and S. Sreevatsan. Molecular Epidemiology of *Mycobacterium avium subspecies paratuberculosis*: Evidence for limited strain diversity, strain sharing, and identification of unique targets for diagnosis. *J. Clin. Microbiol.* **41**(5):2015-2026. 2003.

12. S. Jeyaseelan, S. Sreevatsan, and S. K. Maheswaran. Role of *Mannheimia haemolytica* Leukotoxin in the Pathogenesis of Bovine Pneumonic Pasteurellosis. *Animal Health Research Reviews*. 3(2); 69–82. 2002.
13. R. Barathur, J. B. Bookout, S. Sreevatsan, J. Gordon, M. Werner, G. Thor; M. Worthington. New disc-based technologies for diagnostic and research applications. *Psychiatric Genetics* 12(4):193-206. 2002.
14. R. Hesslink Jr., D. Armstrong 3rd, M. V. Nagendran, S. Sreevatsan, and R. Barathur. Cetylated fatty acids improve knee function in patients with osteoarthritis. *J Rheumatol*. 29(8):1708-12. 2002.
15. M. Hasoksuz, S. Sreevatsan, A. Hoet, and L. J. Saif. Molecular analysis of the S1 subunit of the spike glycoproteins of respiratory and enteric coronavirus isolates. *Virus Research*. 84:101-109. 2002.
16. S. Sreevatsan, J. B. Bookout, F. M. Ringpis, V. S. Perumaalla, T. A. Ficht, L. G. Adams, S. D. Hagius, P. H. Elzer, B. J. Bricker, G. K. Kumar, M. Rajasekhar, S. Isloor, and R. R. Barathur. A multiplex approach to molecular detection of *Brucella abortus* and/or *Mycobacterium bovis* infection in cattle. *J. Clin. Microbiol*. 38:2602-2610. 2000.
17. S. Sreevatsan, J. B. Bookout, F. M. Ringpis, S. L. Mogazeh, B. N. Kreiswirth, R. R. Pottathil, and R. R. Barathur. Comparative evaluation of Cleavase Fragment Length Polymorphism with PCR-SSCP and PCR-RFLP to detect antimicrobial agent resistance in *Mycobacterium tuberculosis*. *Molecular Diagnosis*. 3:81-91.1998.
18. S. Sreevatsan, J. B. Bookout, F. M. Ringpis, M. R. Pottathil, D. J. Marshall, M. Arruda, C. Murvine, L. Fors, R. M. Pottathil, and R. R. Barathur. Algorithmic approach to high throughput molecular screening for interferon resistant genotypes in hepatitis C patients. *J. Clin. Microbiol*. 36:1895-1901. 1998.
19. F. M. Tatum, R.E. Briggs, S. Sreevatsan, E. S. Zehr, S. L. Hsuan, L. O. Whiteley, T. R. Ames, and S. K. Maheswaran. Construction of an isogenic leukotoxin deletion mutant of *Pasteurella haemolytica* serotype 1: characterization and virulence. *Microb. Pathog*. 24:37-46. 1998.
20. J. Bender, R. A. Robinson, and S. Sreevatsan. Feeding *Salmonella* contaminated meat and bone meal to lactating dairy cattle: a pilot study. *J. Dairy Sci*. 80:3064-3067. 1998.
21. N. E. Kurepina, S. Sreevatsan, B. B. Plikaytis, P. J. Bifani, N. D. Connel, R. J. Donnely, D. van Soolingen, J. M. Musser, and B. N. Kreiswirth. Characterization of the phylogenetic distribution and chromosomal insertion sites of five IS6110 elements in *Mycobacterium tuberculosis*: non-random integration in the *dnaA-dnaN* region. *Tubercle and Lung Disease*.79:31-42. 1998.

22. Y. Yuan, D. C. Crane, J. M. Musser, S. Sreevatsan, and C. E. Barry. MMAS-1, the branch point between *cis*- and *trans*-cyclopropane-containing oxygenated mycolates in *Mycobacterium tuberculosis*. *J. Biol. Chem.* 272: 10041-10049. 1997.
23. S. Sreevatsan, K. E. Stockbauer, X. Pan, B. N. Kreiswirth, S. L. Mogazeh, W. R. Jacobs, Jr., A. Telenti, and J. M. Musser. Ethambutol resistance in *Mycobacterium tuberculosis*. critical role of *embB* mutations. *Antimicrob. Agents Chemother.* 41: 1677-1681. 1997.
24. S. Lukomski, S. Sreevatsan, W. Reichardt, M. Woischnik, A. Podbielski, and J. M. Musser. Inactivation of *Streptococcus pyogenes* extracellular cysteine protease significantly decreases mouse lethality of serotype M3 and M49 strains. *J. Clin. Invest.* 99:1-7. 1997.
25. S. Sreevatsan, X. Pan, Y. Zhang, V. Deretic, and J. M. Musser. Analysis of the *oxyR-ahpC* region in isoniazid-resistant and -susceptible *Mycobacterium tuberculosis* complex organisms recovered from diseased humans and animals in diverse localities. *Antimicrob. Agents Chemother.* 41:600-606. 1997.
26. S. Sreevatsan, X. Pan, Y. Zhang, B. N. Kreiswirth, and J. M. Musser. Mutations associated with pyrazinamide resistance in *pncA* of *Mycobacterium tuberculosis* complex organisms. *Antimicrob. Agents Chemother.* 41:636-640. 1997.
27. A. Telenti, W. Philipp, S. Sreevatsan, C. Bernasconi, K. E. Stockbauer, B. Wieles, J. M. Musser, and W. R. Jacobs, Jr. The *emb* operon, a gene cluster of *Mycobacterium tuberculosis* involved in the resistance to ethambutol. *Nature Medicine.* 3:567-570. 1997.
28. S. Sreevatsan, X. Pan, K. E. Stockbauer, B. N. Kreiswirth, T. S. Whittam, and J. M. Musser. Restricted gene polymorphisms indicate a pandemic spread of tuberculosis in humans. *Proc. Natl. Acad. Sci. USA.* 94:9869-9874. 1997.
29. C. Xu, B. N. Kreiswirth, S. Sreevatsan, J. M. Musser, and K. Drlica. Fluoroquinolone resistance associated with specific gyrase mutations in clinical isolates of multidrug-resistant *Mycobacterium tuberculosis*. *J. Infect. Dis.* 174: 1127-1130. 1996.
30. S. D. Charles, S. Sreevatsan, R. F. Bey, V. Sivanandan, D. A. Halvorson, and K. V. Nagaraja. A dot immunobinding assay (dot-ELISA) for the rapid serodiagnosis of *Salmonella enteritides* infection in chickens. *J. Vet. Diagn. Invest.* 8: 310-314. 1996.
31. S. Sreevatsan, P. Escalante, X. Pan, D. A. Gillies, S. Siddiqui, C. N. Khalaf, B. N. Kreiswirth, P. Bifani, G. L. Adams, T. Ficht, S. Perumaalla, M. D. Cave, J. D. A. van Embden, and J. M. Musser. Identification of a polymorphic nucleotide in *oxyR* specific for *Mycobacterium bovis*. *J. Clin. Microbiol.* 34: 2007-2010. 1996.
32. S. Sreevatsan, X. Pan, K. E. Stockbauer, D. L. Williams, B. N. Kreiswirth, and J. M. Musser. Characterization of *strA* and *rrs* mutations in streptomycin-resistant

Mycobacterium tuberculosis isolates from diverse geographic localities. *Antimicrob. Agents Chemother.* 40: 1024-1026. 1996.

33. R. L. Schnepfer, S. Sreevatsan, S. K. Maheswaran, and G. F. Jones. Respiratory morbidity in veal calves following vaccination with pasteurella vaccines. *Vet. Med.* 91:72-76. 1996.
34. S. Sreevatsan, T. R. Ames, R. E. Werdin, H. S. Yoo, S. K. Maheswaran. Evaluation of three subunit vaccines against experimental pneumonic pasteurellosis. *Vaccine* 14(2):147-154. 1996.
35. H. S. Yoo, M. S. Rutherford, S. K. Maheswaran, S. Sreevatsan, and T. R. Ames. Induction of nitric oxide production by bovine alveolar macrophages in response to *Pasteurella haemolytica* A1. *Microb. Pathog.* 20: 361-375. 1996.
36. S. Sreevatsan, S. L. Hsuan, H. S. Yoo, S. K. Maheswaran, T. R. Ames, and R. E. Werdin. Comparative evaluation of antibodies induced by commercial *Pasteurella haemolytica* vaccines using solid phase immunoassays. *Vet. Microbiol.* 49: 181-195. 1996.
37. S. Sreevatsan, S. K. Maheswaran, T. R. Ames, R. E. Werdin, S. L. Hsuan. Evaluation of efficacy of three commercial vaccines against experimental bovine pneumonic pasteurellosis. *Vet. Microbiol.* 52: 81-89. 1996.
38. S. Sreevatsan, R. A. Robinson, J. C. Collins, and K. V. Nagaraja. Serologic studies on experimental *Salmonella choleraesuis* var *kunzendorf* infection in pigs. *Am. J. Vet. Res.* 56: 1163-1168. 1995.
39. S. Sreevatsan, T. R. Ames, S. K. Maheswaran, and V. L. King. Efficacy of various vaccines against pneumonic pasteurellosis in cattle: a meta analysis. *Prev. Vet. Med.* 25:7-17. 1995.
40. H. S. Yoo, S. K. Maheswaran, T. R. Ames, S. Sreevatsan, and M. Suresh. Association of tumor necrosis factor α and interleukin- 1β with lung injury in experimental pneumonic pasteurellosis. *Vet. Immunol. Immunopathol.* 49:15-28. 1995.

ABSTRACT AND POSTER PRESENTATIONS (Recent):

1. R. A. Robinson, K. E. Ferris, D. A. Miller, and S. Sreevatsan. Descriptive epidemiology of *Salmonella* isolations 1981-1991. Proceedings of *World Buiatrics Congress* St. Paul, MN. Supplement, pp 15-19. 1992.
2. S. Sreevatsan, K. V. Nagaraja, S. M. Goyal, and R. A. Robinson. Development and standardization of an LPS-ELISA for the detection of carrier status in *Salmonella*

choleraesuis infected swine. Proceedings of 73rd CRWAD meeting Chicago, IL. Abstract No. 253. 1992.

3. **S. Sreevatsan**, C. A. Ballard, H. S. Yoo, S. K. Maheswaran, T. R. Ames, and R. R. Simonson. Evaluation of solid phase immunoassays to measure antibodies to *Pasteurella haemolytica* A1 antigens in vaccinated cattle. Proceedings of 74th CRWAD meeting Chicago, IL. Abstract No. P126. 1993.
4. T. R. Ames, **S. Sreevatsan**, R. E. Werdin, G. F. Jones, and S. K. Maheswaran. Immune responses of calves to different *Pasteurella haemolytica* A1 vaccines. Proceedings of H. A. P. International conference, Edinburgh, Scotland. Abstract No. T41. 1994.
5. J. Bender, R. A. Robinson, and **S. Sreevatsan**. Feeding *Salmonella* contaminated meat and bone meal to lactating dairy cattle. Proceedings of USAHA, Grand Rapids, MI. Abstract No. 11. 1994.
6. **S. Sreevatsan**, R. A. Robinson, J. C. Collins, and K. V. Nagaraja. Serological studies on experimental *Salmonella choleraesuis* var *kunzendorf* infection in pigs. Proceedings of USAHA, Grand Rapids, MI. Abstract No. 23. 1994.
7. T. R. Ames, **S. Sreevatsan**, and S. K. Maheswaran. Making the antibiotic choice for treating bovine respiratory disease. In Press. Proceedings of the American Association of Bovine Practitioners from the 27th annual meeting. Pittsburgh, PA. 1994.
8. H. S. Yoo, S. K. Maheswaran, M. Suresh, **S. Sreevatsan**, and T. R. Ames. Association of tumor necrosis factor and interleukin-1 with lung injury in experimental pneumonic pasteurellosis. Proceedings of 75th CRWAD meeting, Chicago, IL. Abstract No. 213. 1994.
9. H. S. Yoo, **S. Sreevatsan**, T. Ames, and S. K. Maheswaran. Induction of Nitric oxide production by bovine alveolar macrophages in response to *Pasteurella haemolytica*. Proceedings of 75th CRWAD meeting, Chicago, IL. Abstract No. 214. 1994.
10. **S. Sreevatsan**, T. R. Ames, H. S. Yoo, S. K. Maheswaran, and R. E. Werdin. Evaluation of two experimental subunit vaccines against pneumonic pasteurellosis in cattle. Proceedings of 75th CRWAD meeting, Chicago, IL. Abstract No. 218. 1994.
11. **S. Sreevatsan**, T. R. Ames, H. S. Yoo, and S. K. Maheswaran. Serologic evaluation of commercial vaccines against pneumonic pasteurellosis in cattle. Proceedings of 75th CRWAD meeting, Chicago, IL. Abstract No. P105. 1994.
12. **S. Sreevatsan**, T. R. Ames, S. K. Maheswaran, and V. L. King. Efficacy of various vaccines against pneumonic pasteurellosis in cattle. Proceedings of 75th CRWAD meeting, Chicago, IL. Abstract No. P108. 1994.

13. H. S. Yoo, M. S. Rutherford, S. K. Maheswaran, **S. Sreevatsan**, and T. R. Ames. Nitric oxide production from bovine alveolar macrophages activated with *Pasteurella haemolytica* LPS. Proceedings of the fourth international veterinary immunology symposium. 1995.
14. **S. Sreevatsan**, The international working group, and J. M. Musser. Molecular population genetics of *katG* codon 463 and *gyrA* codon 95 polymorphisms in the *Mycobacterium tuberculosis* complex (MTC). 96th ASM General meeting, New Orleans, Louisiana. 1996. Abstr. No. U119.
15. **S. Sreevatsan**, X. Pan, Y. Zhang, B. N. Kreiswirth, and J. M. Musser. 1997. Mutations associated with pyrazinamide resistance in *pncA* of *Mycobacterium tuberculosis* complex organisms. Abstract submitted to the 97th ASM General Meeting, Miami, Florida.
16. **S. Sreevatsan**, K. Stockbauer, X. Pan, A. Telenti, and J. M. Musser. 1997. Association between mutations in *embCAB* locus and ethambutol resistance in *Mycobacterium tuberculosis*. Abstract submitted to the 97th ASM General Meeting, Miami, Florida.
17. S. Lukomski, **S. Sreevatsan**, W. Reichardt, M. Woischnik, A. Podbielski, and J. M. Musser. 1997. Inactivation of *Streptococcus pyogenes* extracellular cysteine protease significantly decreases mouse lethality of serotype M3 and M49 strains. Abstract submitted to the 97th ASM General Meeting, Miami, Florida.
18. **S. Sreevatsan**, J. B. Bookout, F. M. Ringpis, V. S. Perumaalla, T. A. Ficht, L. G. Adams, S. D. Hagius, P. H. Elzer, B. J. Bricker, G. K. Kumar, M. Rajasekhar, S. Isloor, and R. R. Barathur. 2000. A multiplex approach to molecular detection of *Brucella abortus* and/or *Mycobacterium bovis* infection in cattle. 100th ASM General Meeting, Los Angeles, California.
19. **S. Sreevatsan** and Frederick C. Michel, Jr. 2002. Prion Diseases (Spongiform Encephalopathies): An Overview. Plenary Session. 2002 International Composting Symposium. Columbus, OH.
20. A. S. Motiwala, M. Strother, B. Byrum, J. R. Stabel, W. Shulaw, S. Naser, and **S. Sreevatsan**. 2002. A Molecular Approach to Detect and Fingerprint *Mycobacterium paratuberculosis*. 102nd ASM General Meeting, Salt Lake City, Utah. Abstract No. U-5.
21. A. Ozbek, M. Strother, A. S. Motiwala, B. Byrum, W. Shulaw, F. C. Michel, Jr., and **S. Sreevatsan**. Comparative Evaluation of Two Recovery Methods to Diagnose *Mycobacterium avium* subspecies *paratuberculosis* by Direct Fecal PCR. 2002. 41st Annual North Central Conference of Veterinary Laboratory Diagnosticians. Reynoldsburg, Ohio. Oral Presentation June 10th 2002; 3:45 p.m.
22. A. Hoet, **S. Sreevatsan**, and L. J. Saif. Molecular analysis of the 5' end of the spike gene bovine torovirus strains. Presented at the 2002 American Society for Virology, Kentucky.

23. A. S. Motiwala, M. Strother, N. E. Theus, B. Byrum, R. W. Stich, W. P. Shulaw, and S. **Sreevatsan**. Target and signal amplification of *Mycobacterium avium subsp. paratuberculosis*-specific sequences from early broth cultures. Presented at the 83rd Conference of Research Workers in Animal Disease. Nov 2002. St. Louis, MO. Abstract No. 114
24. A. Ozbek, A.S. Motiwala, A. Amonsin, V. Kapur, J. Bannantine, S. A. Naser, and S. **Sreevatsan**. A comparative analysis of 55 short gene segments identified by genome sequencing for *Mycobacterium avium subsp. paratuberculosis* specificity. Presented at the 83rd Conference of Research Workers in Animal Disease. Nov 2002. St. Louis, MO. Abstract No. 115
25. K. Takemura and S. **Sreevatsan**. DNA aptamers selected against recombinant prion protein. Presented at 83rd Conference of Research Workers in Animal Disease. Nov 2002. St. Louis, MO. Abstract No. 80.
26. A. S. Motiwala, M. Strother, E. J. B. Manning, A. Amonsin, V. Kapur, and S. **Sreevatsan**. Restricted diversity within *Mycobacterium avium subsp. paratuberculosis* isolated from exotic animal species from diverse geographic locations. Presented at the 103rd General Meeting of the American Society for Microbiology, May 2003. Washington D.C. Abstract No. U039.
27. N. E. Ramirez, L. Xiao, L. A. Ward, and S. **Sreevatsan**. Derivation of *Cryptosporidium hominis* clones in the gnotobiotic pig model. 84th Conference of Research workers in Animal Disease. November 9th – 11th, 2003. Chicago, IL. Abstract 134. **Awarded the 2nd best Presentation in Parasitology Division.**
28. K. Takemura and S. **Sreevatsan**. Characterization of DNA aptamers selected against recombinant prion protein. 84th Conference of Research workers in Animal Disease. November 9th – 11th, 2003. Chicago, IL. Abstract 25.
29. A. S. Motiwala, S. A. Naser, and S. **Sreevatsan**. Short sequence repeats analysis of *Mycobacterium avium* subspecies *paratuberculosis* isolates from Crohn's disease patients exhibit genetic similarity to extant clones of bovine or caprine origin.. 84th Conference of Research workers in Animal Disease. November 9th – 11th, 2003. Chicago, IL. Abstract 18P.
30. X. Zhu and S. **Sreevatsan**. Analysis of macrophage-induced gene expression profiles of *Mycobacterium avium subsp. paratuberculosis* isolated from a Crohn's Disease patient by selective capture of transcribed sequences (SCOTS). 85th Conference of Research workers in Animal Disease. November 14th – 16th, 2004. Chicago, IL. Abstract P13.
31. H. Janagama, K. Takemura, D. Joseph, Q. Wang, L. J. Saif, and S. **Sreevatsan**. Development of a DNA aptamer against porcine enteric sapovirus. 85th Conference of Research workers in Animal Disease. November 14th – 16th, 2004. Chicago, IL. Abstract P40.

32. A. H. Ghadiali, M. Strother, N. E. Theus, R. W. Stich, B. Byrum, W. P. Shulaw, and S. Sreevatsan. Molecular epidemiology of *Mycobacterium avium* subsp. *paratuberculosis* in Ohio Dairy Farms. 85th Conference of Research workers in Animal Disease. November 14th – 16th, 2004. Chicago, IL. Abstract 99.
33. C. Thomas, A. Hoet, S. Sreevatsan, T. Wittum, R. Briggs, G. Duff, and L. J. Saif. Bovine coronavirus transmission and herd protection in feedlot cattle. 85th Conference of Research workers in Animal Disease. November 14th – 16th, 2004. Chicago, IL. Abstract 59.
34. K. Takemura, P. Wang, S. G. Chen, A. Kanthasamy, and S. Sreevatsan. PrP binding characteristics of aptamers derived from DNA sequences that were co-purified with PrP^{Sc} – specific anti-nuclear antibody. Proceedings of Animal prion diseases and The Americas. October 14th-16th, 2004. Ames, IA. Poster #35.

INVITED LECTURES.

1. Sreevatsan, S. Molecular identification and genotyping of *Mycobacterium avium* subsp. *paratuberculosis*. Midwest Veterinary Conference: 119th Annual Meeting of the Ohio Veterinary Medical Association. Great Columbus Convention Center. Feb 20th - 23rd, 2003. Session C222 (Feb 23rd). **Talk 455.**
2. Sreevatsan, S. Molecular Studies on Infectious Agents. Presented to the Tri-Beta Honor Society at Shawnee State University, Shawnee, OH. **February 27th, 2003.**
3. Sreevatsan, S. Restricted molecular diversity among *Mycobacterium avium* subspecies *paratuberculosis*: A challenge to study strain variation and molecular epidemiology. Meeting of the **Johne's Diseases Working Group, Cincinnati, OH. April 3, 2003.**
4. Sreevatsan, S. Selection of high affinity ligands to detect and differentiate sheep scrapie isoforms. **Case Western Reserve University, Department of Pathology. May 12th 2003.**
5. Sreevatsan, S. Restricted molecular diversity among *Mycobacterium avium* subspecies *paratuberculosis*. Presented to the students and faculty at the SEOUL NATIONAL UNIVERSITY, Seoul, South Korea. **June 2003.**
6. Sreevatsan, S. Selection of high affinity ligands to detect and differentiate prion proteins. Presented to the students and faculty at the SEOUL NATIONAL UNIVERSITY, Seoul, South Korea. **June 2003.**
7. Sreevatsan, S. Molecular studies on infectious agents. Presented to veterinarians and diagnosticians at the Seoul National Animal Disease Diagnostic Laboratory, Seoul, South Korea. **June 2003.**
8. A. Özbek, F. C. Michel, Jr., M. Strother, A. S. Motiwala, B. Byrum, W. Shulaw, C. G. Thornton, and S. Sreevatsan (Presenter). Evaluation of Two Recovery Methods for

detection of *Mycobacterium avium* subsp. *paratuberculosis* by PCR: Direct Dilution-Centrifugation and C₁₈-Carboxypropylbetaine Processing. Presented at the 46th Annual Conference of the American Association of Veterinary Laboratory Diagnosticians. MICROBIOLOGY SCIENTIFIC SESSION entitled "Special Session: Fecal Detection Methods for *Mycobacterium paratuberculosis*". San Diego, CA. **October 11-13th, 2003.**