EMERGENCY PREPAREDNESS: WHAT IS THE NATURE OF YOUR EMERGENCY

Terry Whiting
Office of the Chief Veterinarian
Manitoba Agriculture, Food and Rural Initiatives
545 University Crescent, Winnipeg, Manitoba R3T 5S6
E-mail: twhiting@gov.mb.ca

ABSTRACT

Any outbreak of an Office International des épizooties List A disease, such as classical swine fever or foot and mouth disease has severe consequences for animal welfare as export markets for live animals are immediately closed. In export dependent regions, slaughter facilities may also close or be trapped within eradication zones increasing the farm gate live animal surplus. Time sensitive livestock such as isowean and weaned piglets may be critically affected. Governments of European countries have anticipated welfare slaughter as part of their disease eradication preparedness. The concept of welfare slaughter and the resource implications has not been included in current disease emergency planning documents in Canada. National and regional leadership committed to addressing this issue is urgently required.

INTRODUCTION

In western industrialized countries where stamping-out of Foreign Animal Disease (FAD) has been recently applied, there has been heightened public debate over the extreme costs required to achieve eradication and the ethical issues inherent in the process (ICCPFMD, 2001). The 2001 foot and mouth disease (FMD) epizootic in the United Kingdom gave rise to 3 major forums for public discussion of the disease eradication response in particular and agricultural practices related to producing human food of animal origin in general (Anderson, 2002; Follett, 2002; Curry, 2002).

In considering lessons provided by other countries' FAD eradication experiences, and current livestock marketing practices, the introduction of a FAD into a Canadian export dependent livestock sector (cattle or swine) would result in 3 separate crisis:

1. A small scale crisis related to the control of animals on infected and high-risk farms (stamping-out effort) for which CFIA has the legislative mandate and fiscal resources to address. A recent example is the 2004 Avian Influenza outbreak in British Columbia.
2. An on-farm crisis would develop related to welfare problems consequential to animal movement restrictions put in place by both the stamping-out response and the US border closure, and lastly;
3. A large generalized on-farm financial crisis related to the loss of export market access which in part would be manifested as an acute fall in livestock value (example slaughter cows in Canada subsequent to BSE).

The animal welfare crisis is closely interconnected with the stamping-out effort as the stamping-out and animal welfare operational responses occur concurrently and compete for the same human and carcass disposal resources. In Ontario and Manitoba, the most critical animal welfare problem would be an immediate (within 96 hours) inability to provide housing for thousands of isowean pigs (Bargen and Whiting, 2002). This crisis could also result if a single US state such as Iowa closed its borders to live animal movement. In the scenario of a localized outbreak in an important US market the CFIA emergency (eradication) plans are not triggered as the job of the Agency would be to maintain Canada disease free. Being disease free is of little relevance if your only live animal market is closed. Unlike recent experience with avian influenza in British Columbia, with an introduction of classic swine fever (CSF) or foot-and-mouth disease (FMD) into Canada or a significant trading region in the USA, the agri-emergency and media attention would center on the animal welfare emergency not the disease eradication effort.

DISEASE ERADICATION: DESCRIBING INCURSIONS

In describing the consequences of FAD epizootics, financial impacts are often classified as direct costs or indirect costs. Costs are direct if emergency responders must pay out the cost to achieve the disease control goal such as mandatory cease movement verification and enforcement, compensation for animals ordered destroyed and costs of carcass disposal. Indirect costs are losses incurred by individuals and sectors of the industry consequential to the disease occurrence such as down time on empty farms and loss of export market for meat products and live animals.

Payment of indirect losses (costs) is not essential to the success of the disease eradication goal. A major part of contingency planning is, therefore, anticipating the type and magnitude of direct costs and identifying the corresponding resources required for effective response and impact mitigation.

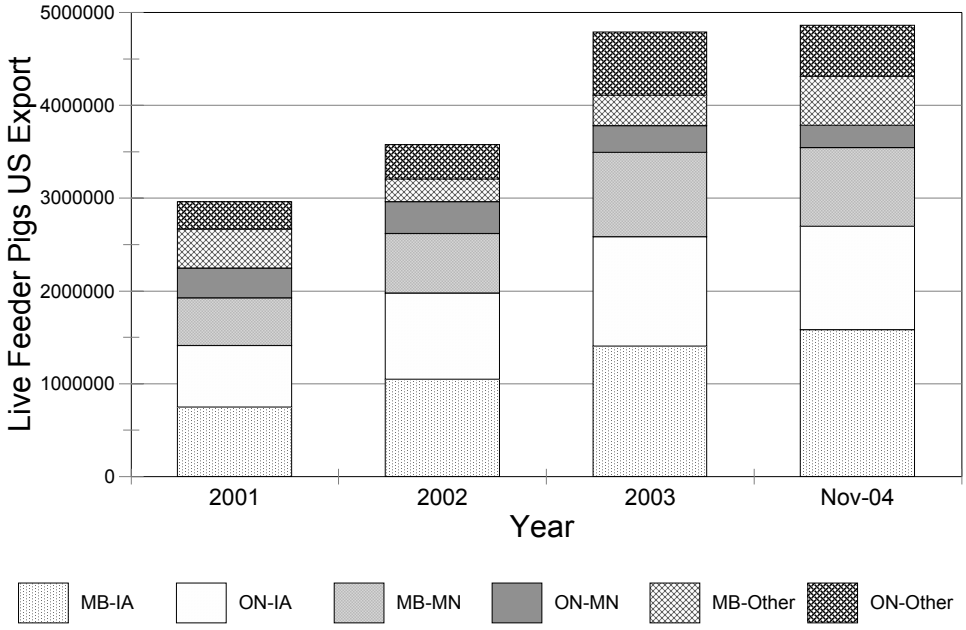
Animal movement restrictions severely disrupt the production systems affected. Animals located in quarantine zones most often cannot be salvaged as food and are strategically killed to relieve overcrowding or otherwise deteriorating animal husbandry conditions which occur on farms placed under movement restriction (EC, 1980; EC, 1985; Seracon, 2002). “Welfare slaughter” is a term used in FAD eradication efforts to describe non-infected animals killed during the operational response. Analysis of previous events indicates the magnitude of welfare slaughter subsequent to an FAD incursion is magnified under certain conditions; a) if the pre-incursion animal production industry is focused on export, b) the incursion is prolonged, c) the affects are in a wide geographic area or d) the incursion involves intensified livestock production (Saatkamp et al., 2000; PC, 2002). Welfare slaughter will also be magnified where a time sensitive livestock commodity such as isowean piglets is affected (Bargen and Whiting, 2002). Welfare slaughter is a direct cost of FAD eradication (Meuwissen et al., 1999; Dijkhuizen et al., 1999; Staatkamp et al., 2000, Sugiura et al., 2001; Wrathall and Mitchell, 2001; Bourn, 2002; Seracon, 2002).

Canadian experts indicated that a FMD incursion into Canada, under the best possible scenario, would result in a prolonged US border closure (Seracon, 2002). In May 2003 Canada identified its first indigenous case of BSE and the US border was closed (Kuehn, 2003). The US identified a dairy cow identified as an individual imported from Canada in December 2003 (Nolen, 2004). An international review panel indicated in January 2004 that Canada and the USA were at equivalent risk for BSE (Kihm et al 2004). It is expected that the border will open for conditional movement of live ruminants on March 7th 2005 (Anonymous, 2005). This re-opening of the US border to Canadian live cattle is quite rapid when compared to similar previous rulemaking in the United States. Classical swine fever was identified on August 8th 2000 in East Anglia and resulted in the infection of 16 farms with the last restricted area lifted in December 2000 (Wrathall and Mitchell, 2001; Sharp et al., 2001). The final rule for the US to recognize East Anglia free of CSF was on October 16th 2003 (USDA, 2003), three full years after the disease was eradicated.

Canada as compared to other industrialized countries is heavily dependent on export of live cattle and swine as well as beef and pork. For the year 2001 the Canadian ratio of meat produced compared to meat consumed domestically was 1.29 for beef and 1.59 for pork (Seracon, 2002). Similar ratios for The US were 0.97 for beef and 1.03 for pork and Australia 3.18 for beef and 1.05 for pork. Feeder pigs are a significant live animal export commodity (Figure 1).

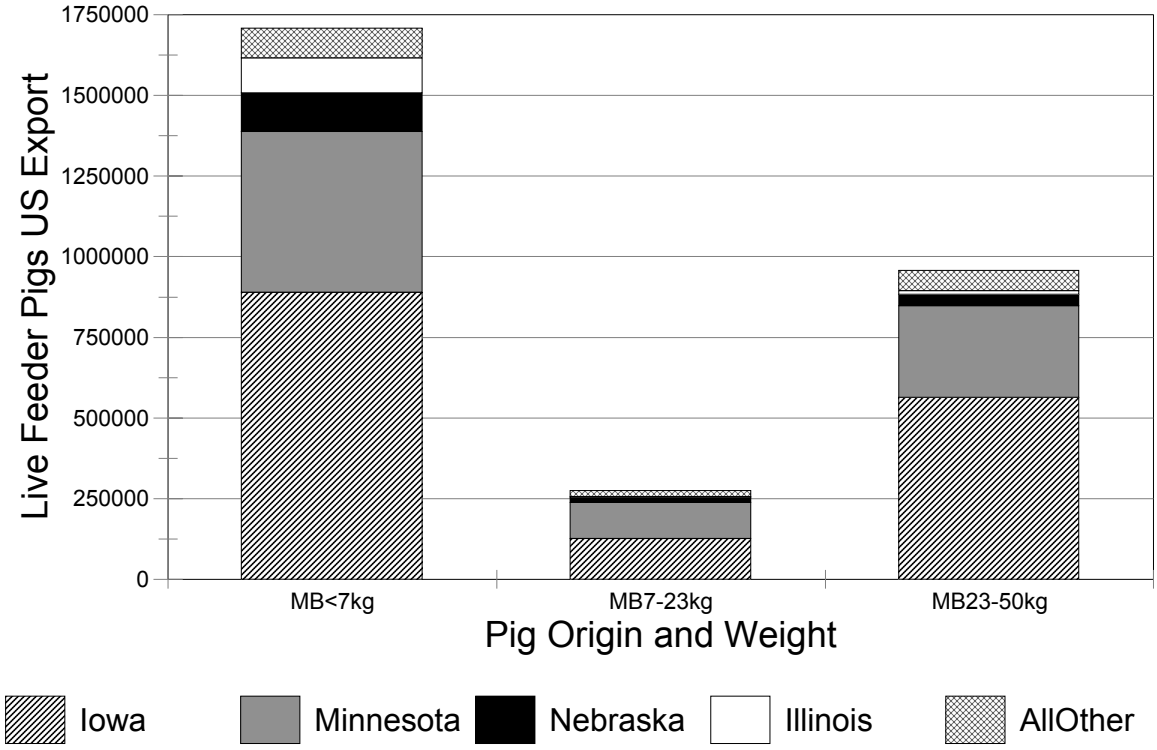
Figure 1. Live swine non-breeding, less than 50 kg exported to the USA from Manitoba and Ontario through November of 2004.

States receiving large numbers of feeder pigs from both Manitoba and Ontario are Iowa (IA) and Minnesota (MN). During this time period the average cash value for exported feeder pigs was strong (2001-$50.53, 2002-$45.37, 2003-$42.08, 2004-$42.93). There appears to be some slowing in export of feeders from Canada largely by reduced growth in Ontario feeder export market in 2004. Manitoba and Ontario combined account for about 96% of feeder pig exports to the USA.



Partly in response to concerns with border action Stats Canada changed their swine export reporting structure for 2004 to separate feeder pigs previously reported as less than 50 kg into 3 weight cohorts. In previous years all live swine exported less than 50 kg were lumped together in official reports. This weight range of pigs contains both isoweans (4-5 kg) at around 19 days of age and feeder pigs (24-25 kg) at around 60 days of age. These two types of pigs represent very different stages in the production system. Early data for 2004 indicated that the majority of export pigs less than 50 kg are isoweans (Figure 2).

Figure 2. Live Swine Export – Feeder Pigs Jan-Nov 2004 Manitoba Only.
In 2004, Stats Canada started reporting export live swine as 3 weight classes which were previously reported as one group - non-breeding<50kg. In the first 11 months of 2004 Manitoba had exported 3.2 million feeder pigs greatly in excess of the 2.637 million exported in the whole of 2003.



WELFARE ASSURANCE: SCOPE

The proportional cost of animal welfare assurance in comparison to the disease control efforts has been accounted for in financial analysis of previous FAD incursions. However, complete accurate documentation of the financial impacts of FAD incursions is difficult to establish even in retrospect (Saatkamp et al. 2000). In recent incursions of FAD into OIE member countries with stamping-out as the national policy, the scale of welfare slaughter was one half to ten times the cost of eradicating the disease on infected farms (Saatkamp et al., 2000; Dijkhuizen et al., 1999; Sugiura et al., 2001; Wrathall and Mitchell, 2001; Bourn, 2002).

Even in the case of a very moderate size FAD incursion, welfare slaughter operations will exceed the cost for disease control. In Europe for incursions of CSF, if 8 or more herds are infected on the day of identifying the first case, the costs of welfare slaughter are expected to exceed the cost of stamping-out (Saatkamp et al., 2000). In Canada, considering current trading patterns in live animals and animal products, it is estimated that in a small FMD outbreak with 50 infected herds; in the eradication effort 4,200,000 animals would be killed under welfare slaughter programs, while only 10,000 infected animals would be killed (Seracon, 2002). The financial expenditure to control disease would be less than 1% of the overall cost/loss of the incursion.

THE FAERS SYSTEM

The Canadian Food and Agriculture Emergency Response System (FAERS) was developed largely in response to the January 1998 Ontario-Québec ice storm. It is an attempt to describe a foundation for developing contingency plans to potential agriculture disasters; while, assuring such plans are coherent with the *Emergency Preparedness Act, Emergencies Act,* National Support Plan, and the Federal Policy for Emergencies (CFIA, 1999). Provincial departments of agriculture and other agri-food sector stakeholders, Agriculture and Agri-Food Canada (AAFC), and the CFIA have jointly established the FAERS to facilitate federal-provincial-industry collaboration.

For the purpose of FAERS, *"*an emergency" (agri-food emergency) is defined as "an abnormal situation requiring prompt action beyond normal procedures in order to prevent injury or damage to people, plants, livestock, property, or the environment" (CFIA, 1999). The FAERS is an *all-hazards* crisis management system designed to link the federal, provincial and private sectors to better manage and coordinate response to agriculture and food emergencies. Contamination of the human food supply is included in the manual, as a food borne hazard would constitute a true emergency (human health and welfare threat).

There are five types of Agri-Food crisis situations described in the FAERS manual based on whom the lead agency would be. A FAD incursion is a "mandated emergency" under the FAERS system where the jurisdictional responsibility is clearly with the CFIA as the lead agency. The CFIA component of FAD eradication as described by disease eradication plans (CFIA, 1997; CFIA, 2001) however does not follow the FAERS management principals of a comprehensive bottom-up contingency planning and response system. The CFIA disease eradication strategy documents describe in detail how infected animals and premises will be dealt with. These strategy documents do not consider the consequential impacts of disease presence on the agricultural trade of a region and therefore are not comprehensive crisis management approaches.

In Canada, animal welfare concerns related to a FAD response currently represent a non-mandated disaster (no federal agency has the lead), as the CFIA does not have the legislative responsibility, nor contingency plans in areas other than infected herd eradication. Under the FAERS model, in non-mandated agriculture emergencies, AAFC and the CFIA will jointly determine which of the two organizations will take the lead and which will provide a support

function. In general, AAFC is expected to take the lead when the emergency support primarily relates to providing financial compensation to farmers which is a major function of welfare slaughter/market support programs (CFIA, 1999).

THE FADES PLAN

Many provinces are reviewing the Foreign Animal Disease Eradication Support Plans (FADES). These federal-provincial agreements are essentially designed to recruit provincial resources to assist the CFIA in the stamping out of infected herds. These plans have worked well in supply managed commodities where there is little export in live animals or product. In swine production regions which are export dependent the nature and predominant activity of the FAD emergency response will be focused on how to deal with critical overcrowding on uninfected farms, not in stamping out disease.

An additional problem is the current FADES plans may appear to the producers to be comprehensive emergency response plans (and give producers a false sense of security) when in fact they are provincial agreements to support the federal disease eradication effort (Anonymous, 2004).

There is no provision within the FADES initiative to discuss animal welfare slaughter or other consequential effects of dealing with regional animal health crisis (Geale, 2002). During the activation of a FADES plan there will be concurrent demands on provincial and industry resources related to administration of disease control efforts and maintaining animal welfare.

Recent modeling suggests that in a Canadian FMD incursion resulting in the infection of 50 herds, 400 animals would have to be killed under welfare slaughter provisions for each infected animal killed for disease control (Seracon, 2002). Therefore, if a Canadian emergency response to CSF or FMD were to develop as currently proscribed, only part of the management would be planned for, funded and have line responsibilities clearly defined under FADES; that is, the CFIA has committed to deal with the infected and high-risk animals. The current CFIA-FAD infection control commitment could represent less than 1% of the impact of a FMD incursion (Seracon, 2002). The welfare slaughter and consequential market effects of the incursion would be in theory, managed according to the FAERS principal i.e. local authority, municipality/province has first responder obligations.

PREDICTING THE FUTURE

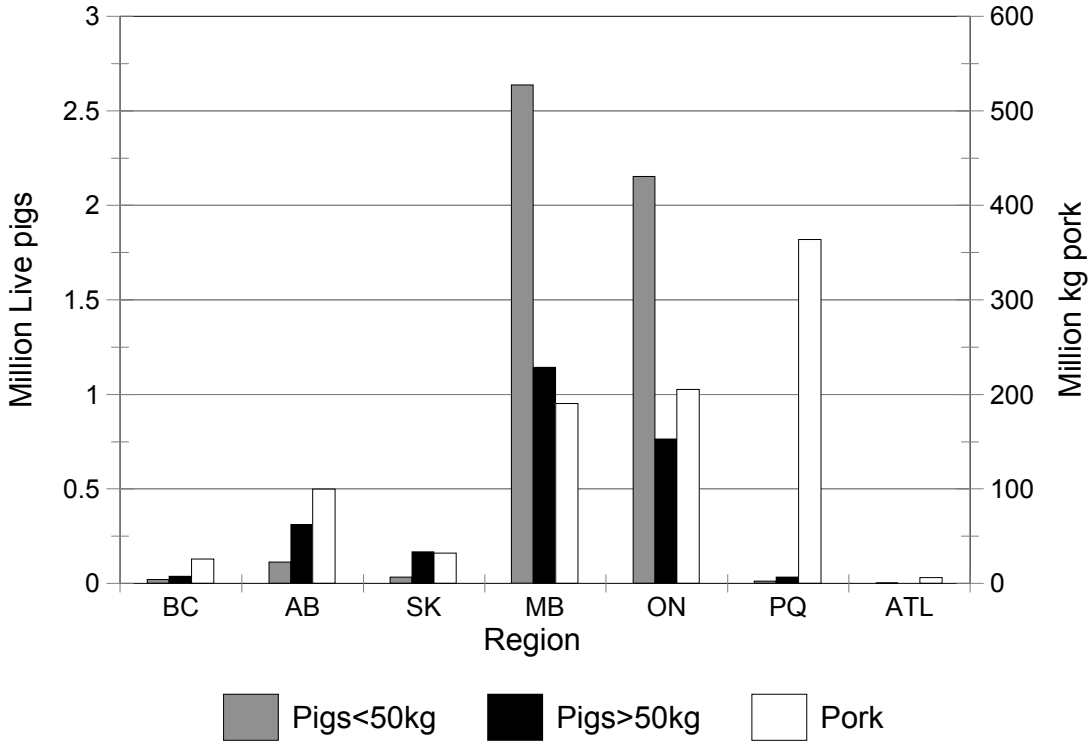
The 1997-98 CSF epizootic in the Netherlands was largely responsible for triggering a re-structuring (compulsory reduction) of the pork production sector in that country. This re-structuring was marked by a significant change in public attitude towards the livestock sector in general and pig production in particular. Livestock farming has fundamentally changed in the Netherlands from a “right” to a licensed activity (Brinkhorst, 2000). It is the explicit intent of the government sponsored re-structuring to decrease the size of the Dutch pork industry.

At present it is unclear how government support of the operational demands of CSF-FMD response and recovery assistance to farmers subsequent to a FAD would be valued and delivered in Canada. For the export dependent beef and pork sectors the lesson provided by Taiwan in failing to eradicate the 1997 FMD incursion is that overall FAD contingency planning should include the worst case scenario of not eradicating the disease and collapse of the industry (Yanc et al., 1999).

Under a real FAD crisis it will be impossible to immediately eradicate FAD from a region and concurrently demonstrate the region is disease free. A significant time period of border closure is inevitable. If costs are federally-provincially shared in response and recovery some regions will be severely affected on a per capita basis. Live pigs and pork products, as an example, vary greatly in their dependence on export markets with the regions of Canada (Figure 3).

Figure 3. Canadian regional volumes of export in pork and live pigs in the year 2003.

Region is indicated on the X-axis. Open bar is pork export in million kg (right axis) Solid bars are live pigs exported in million animals (left axis). Québec (PQ) has a mature pork production chain with predominantly finished product exported where Manitoba (MB) and Ontario (ON) are large exporters of pork products and live pigs. British Columbia (BC) and the Atlantic Region provinces (Atl.) have relatively small export volumes (StatsCan 2004). Regions would differ significantly on a per capita basis in the financial impact of a FAD incursion into Canada or the USA. Pork may be diverted to other international markets as opportunity may arise however; live swine production is contingent on dedicated facilities in the USA. Manitoba and Ontario have similar export volumes of pigs and pork. Manitoba contains only 3.7% of the Canadian population (taxpayers) while Ontario contains 38%, based on the 2001 Census.



CONCLUSIONS

Based on lessons provided by other countries' FAD eradication experiences, introduction of FMD or CSF into Canada would result in 3 separate types of crisis situation.

1. A crisis related to stamping-out disease on infected farms.
2. Animal welfare impacts of disruption to export market access.
3. Fiscal impacts of export market disruption.

The CFIA has the responsibility to deal with infected farms. The federal agricultural minister through AAFC and provincial partnering has traditionally delivered income support to farmers in times of unforeseen financial disaster and would be the apparent lead agency on rural economic stabilization and recovery. Currently there is insufficient Canadian operational infrastructure to rapidly respond to animal welfare concerns inherent in a FAD incursion into North America. There is currently no obvious leadership, legislative framework or pre-authorized funding to meet direct costs that government and industry would incur to assure an effective animal welfare component of FAD response.

Animal welfare assurance is part of the FAD emergency response and manifests as a direct cost. Lack of preparedness to concurrently assure animal welfare and eradicate infected livestock may result in failure to eradicate the FAD. Current national FAD disease eradication strategies only deal with infected farms. It is a gross error to misconstrue these disease eradication plans as effective and comprehensive agri-emergency management programs for CSF and FMD.

There could be a very substantial livestock crisis/disaster in Canada without ever having FAD identified here. Animal disease or other crisis in the USA could trigger international border closure in a time sensitive production system. This situation would not constitute a mandated emergency under the current FAERS agreement and no immediate mandated federal response (CFIA 1999). A FAD limited to a single US State such as Iowa and a single species such as swine would have significant repercussions in live animal markets and farm animal welfare in Canada. Iowa draws feeder pigs from all over the Continental United States in addition to Canada (Shields and Mathews 2003).

Individuals are often unable or unwilling to imagine the potential devastation that could be caused by low frequency catastrophic events and will not take measures to protect against the potential loss (Skees and Barnett 1999). In the insurance field this behaviour is referred to as "cognitive failure" (Meuwissen et al. 2003, Skees and Barnett 1999). Our collective current level of preparedness to respond to the risk to animal welfare posed by the threat of a FAD incursion is similar in nature to "cognitive failure" displayed by individuals in similar circumstances.

I would suggest the important lesson provided from the British and Dutch experiences is that if livestock production systems exist based on public goodwill. That goodwill is predicated on the belief held by the public that farmers are responsible and the national veterinary infrastructure is competent and prepared. If this country were to experience a FMD or CSF incursion there would be massive animal welfare issues generated. In the media coverage of

the event and the industry call for free disaster relief, the average citizen would be able to understand the structural issues which should have been identified and avoided as part of responsible emergency preparedness. The response to this reality in the United Kingdom and the Netherlands has been for the public to irrevocably withdraw its support for livestock production.

LITERATURE CITED

Anderson, I. (2002) Foot and mouth disease 2001: lessons to be learned inquiry. HC 888 Crown Copyright 2002. 187 pp.

Anonymous. 2004. Canada and the Province of Ontario's Foreign Animal Disease Emergency Response Plan. 97pp Available from Lou D'Onofrio, Issues and Emergency Management Coordinator, Ministry of Agriculture and Food, 1 Stone Road West, 2nd Floor N.W. Guelph, Ontario N1G 4Y2.

Anonymous. 2005. Federal Register: Rules and Regulations. January 4, 2005 (Volume 70, Number 2)] [Page 459-553] Part III Department of Agriculture, Animal and Plant Health Inspection Service 9 CFR Parts 93, 94, 95, and 96 Bovine Spongiform Encephalopathy; Minimal-Risk Regions and Importation of Commodities; Final Rule and Notice. Available from the Federal Register Online via GPO Access [wais.access.gpo.gov] [DOCID:fr04ja05-17].

Bargen, L.L. and Whiting, T.L. 2002. Time to critical overcrowding of Manitoba swine barns in the event of restriction on animal movement. Can Vet J. 34:855-862.

Bourn, J. 2002. The outbreak of foot and mouth disease, report by the comptroller and auditor general. HC 939 Session 2001-2002: 21 June 2002, 133 pp. The Stationary Office. London. Available at www.nao.gov.uk.

Brinkhorst, L.J. 2000. Introduction at the international European Pig Producers Conference, Slagharen 18 May 2000. Available from www.minlnv.nl/actueel/speech/2000/speech036.htm Accessed on 22/03/2004.

CFIA. 1997. Canadian Food Inspection Agency, Foreign Animal Disease Unit, Animal Health Section. Classic Swine CFIA (1997) Fever Strategy (Draft). Canadian Food Inspection Agency. Feb. 1997. Canadian Food Inspection Agency, Disease Control Section, Nepean, Ontario.

CFIA. 1999. Canadian Food Inspection Agency. Food and Agriculture Emergency Response System (FAERS). FAERS Manual January 1999. 19 pp. Available from www.inspection.gc.ca/english/anima/heasan/fad/faerse.shtml. Accessed on 22/03/2004.

CFIA. 2001. Canadian Food Inspection Agency, Foreign Animal Disease Unit, Animal Health Section. Foot-And-Mouth Disease Strategy (Draft). May 2001. Available at: www.inspection.gc.ca/english/anima/heasan/fad/fmd/fmdtoce.shtml Accessed 22/03/2004.

Curry, D. 2002. Report of the Policy Commission on the Future of Farming and Food, January 2002, 152 pp. Available at www.cabinet-office.gov.uk/farming/. Accessed on 22/03/2004.

Dijkhuizen, A.A. 1999. The 1997-1998 outbreak of classical swine fever in the Netherlands. Prev Vet Med 42:135-137.

EC. 1980. European Union, Council Directive 80/217/EEC of 22 January 1980 introducing Community measures for the control of classical swine fever (with amendments from: 08/07/1993 last updated: 07/08/2000).

EC. 1985. European Union, Council Directive 85/511/EEC of 18 November 1985 introducing Community measures for the control of foot- and-mouth disease (with amendments).

Follett, B. 2002. Infectious diseases in livestock. London: The Royal Society, 2002.160 pp. Available on the Royal Society Website www.royalsoc.ac.uk/policy/. Accessed on 22/03/2004.

Geale, D.W. 2002. FMD-Post UK 2001:CFIA's 2002 initiatives. Proceedings of the 54th Annual Convention of the Canadian Veterinary Medical Association, July 17-20, 2002. Halifax NS. pp.89-194.

Kihm, U., Heuston, W., Matthews, D., and MacDarmid, S.C. 2004. Report on measures relating to bovine spongiform encephalopathy (BSE) in the United States. 11 pp Available from www.aphis.usda.gov/lpa/issues/bse/US_BSE_Report.pdf. Accessed on 22/03/2004.

Kuehn, B.M. 2003. Canada wraps up BSE investigation. J Am Vet Med Assoc. 223(7):919-921.

ICCPFMD. 2001. Final Report. International Conference on Control and Prevention of Foot and Mouth Disease, Brussels 12-13 December 2001 Available at europa.eu.int/comm/food/animal/diseases/resources/fmd_conf_%20final_rep_12-2001.pdf Accessed on 22/03/2004.

Meuwissen, M.P., Horst, S.H., Huirne, R.B., and Dijkhuizen, A.A. 1999. A model to estimate the financial consequences of classical swine fever outbreaks: principles and outcomes. Prev Vet Med 42:249-270.

Meuwissen, M.P.M., Van Asseldonk, M.A.P.M., and Huirne, R.B.M. 2003. Alternate risk financing instruments for swine epidemics. Agric. Systems 75:305-322.

Nolen, R.S. 2004. Washington State dairy cow nation's first case of BSE. J Am Vet Med Assoc. 224(3): 345-346.

PC. 2002. Productivity Commission, Impact of a foot and mouth disease outbreak on Australia, Research Report, AusInfo, Canberra. 174 pp.

Saatkamp, H.W., Berentsen, P.B., and Horst, H.S. 2000. Economic aspects of the control of classical swine fever outbreaks in the European Union. Vet Microbiol 73:221-237.

Seracon Management Consulting Inc. 2002. Economic impacts of a potential outbreak of foot and mouth disease in Canada. 53 pp. Available from: Canadian Animal Health Coalition 2543b Chicoutimi Dr., NW Calgary, Alberta.

Sharpe, K., Gibbens, J., Morris, H., and Drew, T. 2001. Epidemiology of the 2000 CSF outbreak in East Anglia: preliminary findings. Vet Rec 148(3):91.

Shields, D.A., and Mathews, K.H. 2003. Interstate Livestock Movements. Economic research Service, United States Department of Agriculture. Outlook Report No LDPM10801 21pp Available from www.ers.usda.gov/publications/ldp/jun03/ldpm10801/ Accessed 03/31/2004.

Skees, J.R. and Barnett, B.J. 1999. Conceptual and practical considerations for sharing catastrophic/systemic risks. Rev Agric Econ 21:424-411.

StatsCan. 2004. Statistics Canada, Agriculture and Agri-Food Canada, Trade and Evaluation Analysis Division, International Markets Bureau, Market and Industry Services Branch, 930 Carling Avenue, Ottawa K1A 0C5.

Sugiura, K., Ogura, H., Ito, K., Ishikawa, K., Hoshino, K., and Sakamoto, K. 2001. Eradication of foot and mouth disease in Japan. Rev Sci Tech Off Int Epiz 20(3):701-713.

USDA. 2003. Change in Disease Status of East Anglia with regard to classical swine fever. 9 CFR Part 94. Federal Register Vol 68, No. 200 Thursday October 16, 2003/Rules and Regulations pp. 59527-59531.

Wrathall, A. and Mitchell, T. 2001. Report of the Chief Veterinary Officer Animal Health 2000, Chapter B1. Publications, Area 609, 1a Page Street London SW1P 4PQ.

Yanc, P.C., Chu, R.M., Chung, W.B., and Sung, H.T. 1999. Epidemiological characteristics and financial costs of the 1997 foot-and-mouth disease epidemic in Taiwan. Vet Rec 145:731-734.

ACKNOWLEDGEMENT

Parts of this paper were previously published as Whiting, T.L. 2003. Foreign animal disease outbreaks, the animal welfare implications for Canada: Risks apparent from international experience. Can Vet J. 44:805-815.