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Books on Risk Issues

- I have been working in the risk studies field for almost twenty years, primarily as a university-based researcher, but including consulting with Health Canada and for industry, especially the chemical industry.

- In 1994, I published Risk and Responsibility, with lengthy case studies in pesticides and EMF (electric and magnetic fields) risk.
Books on Risk Issues (continued...)

- Contains case studies of risk communication failures: mad cow disease in the U.K., dioxins, "hamburger disease" (E. coli), silicon breast implants, bovine growth hormone, genetically-engineering food crops, PCBs
- Second edition with 3 new case studies, December 2004: BSE in North America, Canada and the Kyoto Protocol, Introduction to Genomics Risks

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Published 2001

"Professional risk managers in governments and industry often completely misunderstand the nature of the reactions of the public to risks. Such misunderstandings are the initial steps which can, sometime later, help to cause the organizations they work for to stumble unwittingly into the labyrinth of risk controversy. Then the chamber of risks can turn into a chamber of horrors for business and governments."
Case Study

A Failure to Exercise Proper Precaution: BSE in North America

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Introduction
What is at stake?

- There are THREE different types of risk involved:
  
  - One: the animal-health risk (you don’t want an epidemic in your herd, as happened in the UK and France);
  
  - Two: The human-health risk - the risk of contracting nvCJD by eating beef infected with BSE. This is a concern only in countries where there are large numbers of beef cattle with BSE (especially U.K.);
  
  - Three: The economic risk, to a beef-exporting country such as Canada, of even a single case of BSE
• How should these risks be managed?

• One: stop recycling infected protein in ruminant food. We managed the first risk poorly, in a half-hearted manner (because we always think we have to follow the U.S. lead in such matters);

• Two: how much infected meat is likely to get into the human food supply? We managed this well, by risk estimation (answer: not enough to worry about);

• Three: What would be the economic impact of one, or just a few, cases of BSE in the Canadian herd? We failed completely to manage, or even to recognize, this risk, to our great cost.
• Between 1997 and 2004, Canada's own established policy on beef imports from abroad was clear and simple: If you have had a single indigenous case of BSE in your national herd within the last seven years, you are a country "not known to be free of BSE" and therefore your cattle and beef products cannot be exported to Canada;

• There are 24 such countries, now including both Canada and the US;

• The U.S. prohibition list includes 10 other countries with suspected cases.
• In 2004 OIE adopted new rules, allowing countries to designate themselves as “at minimal risk” if they have no more than one indigenous case of BSE per million cattle in their herds;

• For Canada the damage had already been done;

• For countries like Japan, this new policy makes no difference, and beef imports from North America will continue to be banned.
What was the result for Canada?

- A five billion dollar impact from the first sick cow alone! A report entitled “Economic Implications of BSE in Canada,” tallied the costs at November 2003 as $3.3 billion in direct economic costs and $1.8 in secondary impacts (transportation sector, animal-feed and veterinary medicine sector, etc.);

- As of now, after 4 cases, the cost is estimated to be $8 billion;

- The personal and family costs to farm families, especially in the West (Alberta has 70% of the former industry) have been devastating; many farmers are technically bankrupt and the distress hot-lines are overloaded with calls.

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The basic formula: \( R = P \times C \) [Risk equals Probability times Consequences].

Probability is: How likely is it to happen?

Consequences: If it does happen, how bad will it be? (injuries, deaths, economic losses, etc.)
## Standard Risk Ranking Matrix

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Consequence</th>
<th>Catastrophic</th>
<th>Critical</th>
<th>Marginal</th>
<th>Negligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequent</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>II</td>
<td>I</td>
</tr>
<tr>
<td>Probable</td>
<td>I</td>
<td>I</td>
<td>II</td>
<td>III</td>
<td>III</td>
</tr>
<tr>
<td>Occasional</td>
<td>I</td>
<td>II</td>
<td>III</td>
<td>III</td>
<td>III</td>
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<tr>
<td>Remote</td>
<td>II</td>
<td>III</td>
<td>III</td>
<td>IV</td>
<td>IV</td>
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<tr>
<td>Improbable</td>
<td>III</td>
<td>III</td>
<td>IV</td>
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<tr>
<td>Incredible</td>
<td>IV</td>
<td>IV</td>
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</tr>
</tbody>
</table>

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Quantitative Risk Estimation

- **CFIA’s estimation:**
  - “quantitative risk estimate of the likelihood of at least 1 infection of BSE occurring in Canada prior to 1997 is very low (7.3 x 10^-3) [i.e., a bit more than 7 chances in a thousand];
  - “therefore the likelihood of BSE becoming established is negligible;
  - “risk is further reduced by the mitigating measures that have been in place since 1997”;
  - Not completed until early 2003, far too late to be useful to risk management policy.
Converting quantitative to qualitative

- Moderate risk = less than 1:100 but greater than 1:1,000 (e.g., smoking 10 cigarettes a day, parachuting);
- Low risk = less than 1:1,000 but greater than 1:10,000 (e.g., influenza, road accident);
- Very Low risk = less than 1:10,000 but greater than 1:100,000 (e.g., leukemia, playing soccer, accident at work, murder);
- Minimal risk = less than 1:100,000 but greater than 1:1,000,000 (e.g., railway accident, horse riding, fishing);
- Negligible risk = less than 1:1,000,000 (e.g., hit by lightning or radiation leak from nuclear power station);
- From Kenneth Calman, UK chief medical officer of health (1996).
“The impact of the introduction and establishment of BSE in Canada would be extreme, based on the animal and human health impacts, impact on industry and the cost of eradication as exemplified in other countries.... The occurrence of BSE in Canada would affect many sectors of the cattle industry, including farmers, meat processing, rendering, transportation and distribution, and retail, among others. It could result in a substantial decline in the consumption of beef and beef products due to a perception of risk to human health and safety” (CFIA scientific paper, published 2 months before May 2003).
Catastrophic Risk for Canadian Farmers

- Why did Canadian farmers face catastrophic risk, while their U. S. counterparts did not?
- The answer lies in the difference between domestic and export markets for beef.
- The U. S. consumes 90% of what it produces and exported (before 2004) only 10%;
- In the same period, Canadian beef farmers were, before May 2003, exporting 75% of what they produced, two-thirds of it to the U. S.;
- This shows clearly why the risk assessment has to *integrate* all relevant factors (economic as well as human and animal health).
### Standard Risk Ranking Matrix

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</tr>
</thead>
<tbody>
<tr>
<td>Moderate</td>
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<tr>
<td>Low</td>
<td></td>
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<td></td>
<td>BSE: Class II (or I)</td>
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<tr>
<td>Very Low</td>
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<tr>
<td>Minimal</td>
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<tr>
<td>Negligible</td>
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</table>

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Our risk-management practices have been insufficiently precautionary.

Above all, Canadian beef farmers should have been told clearly that they were facing catastrophic risk, in which case the prudent course of action would have been to restrict the increase in the Canadian herd until the risk had diminished (as it will with time).
The so-called “ruminant feed ban” (1997) is and remains full of holes:

- There was no recall of infected feed when the ban went into effect;
- Ruminant blood is fed to calves (banned in the US in Jan. 2004, still OK in Canada);
- Ruminant material can be fed to pigs and chickens, which in turn can be fed back to cows;
- Cross-contamination is possible in feed mills;
- Feed mill auditing in US shows compliance failures in bag labelling – no public data for Canada.
A truly precautionary approach for Canada, as of 1997, would have required:

- Early completion (by 1998) of the quantitative risk estimation, showing a potentially catastrophic level of risk for Canadian beef farmers;

- On animal feed: We should have had, starting in 1997, a complete ban on using any ruminant material in any animal feed (prions are virtually indestructable, and we have to stop recycling them);
• Proper disease surveillance policies: The European authorities who examined US & Canadian practices stated clearly that our surveillance was pathetically inadequate, and that both countries have certainly had more cases than have been found;

• Both US and Canadian regulatory officials have abused the term “science” in this context, incorrectly describing what were policy choices as allegedly superior scientific analyses;
Testing Policy:

- Both the US and Canada have consistently opposed adequate levels of testing for BSE in slaughtered animals, on the same grounds as their surveillance policy, despite the clear evidence, from both Japan and Europe, where enhanced rapid-testing regimes are in place, that more testing finds more cases (and thus provides better evidence of the effectiveness over time of risk management policies).
My contention here is that
1. There is clear evidence in the BSE case that, despite the nominal commitment to the “precautionary approach” by our national government, we have not implemented such an approach in important areas of policy and regulation;
2. The damages to the Canadian economy and the farm sector from BSE are extremely high;
3. There is a very significant price to be paid for ignoring proper precaution in practice.

PDF file: http://www.leiss.ca/articles/126

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