

Investigating Changes in Canadian Consumers' Food Safety Concerns, 2003 and 2005

Michele Veeman, Yu Li & Wiktor Adamowicz
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Background: Survey data on Canadian's Food Safety Concerns were collected in early 2003 and late 2005

Each was part of a larger study

- The 2003 study assessed Canadians reactions to agricultural biotechnology;
- the 2005 study focused on “plant molecular farming” (PMF)---potential applications of modern agricultural biotechnology for possible production of:
 - pharmaceutical drugs,
 - industrial products,
 - other novel proteins for consumer uses including functional foods

Survey Development:

- Initial focus group discussions
- Survey development and pre-testing
- On line survey administered to samples (n=882) and (n=1574) drawn from representative panels of adult Canadians in January 2003 and October 2006 respectively.
- Sample demographics are generally representative of the adult Canadian population

Example: 2005 Survey Content

- Introduction & warm up task (voting on public expenditure allocations)
- Information on modern agriculture [GM, PMF, PMF definitions & examples, risks & benefits]
- Risk ranking exercises (focus of this talk)
- Choice experiment (not discussed here)
- Risk-benefit rankings & attitude statements
- Socio-economic & demographic information

The risk ranking questions:

In 2003 and 2005 the survey questionnaire included a similarly worded set of 8 questions regarding food risks and 7 questions regarding risks from agriculture. The 2005 survey added 3 more questions on respondents' views of the risks of particular types of plant molecular farming

Food risk ranking questions:

- “Below is a list of possible **food safety** issues. For each, please indicate how much of a health risk you feel this is to you personally”
- Choices were: “High risk”, “Moderate risk”, “Slight risk”, “Almost no risk” and “Don’t know/Unsure.”

The 8 common food risk ranking issues (random ordered presentation) :

- bacterial contamination;
- pesticide residuals;
- use of hormones;
- use of antibiotics;
- food additives;
- fat & cholesterol in food,
- BSE (mad cow disease);
- GM/GE crops to increase crop production;

Another three questions were added to this set in 2005

- Drugs (medicines) made from plant molecular farming through GM/GE;
- GM/GE crops to increase nutritional qualities of foods;
- GM/GE crops to produce industrial products like plastics, fuel or industrial enzymes.

Environmental risk ranking questions refer to:

- “Possible environmental safety issues that might result from modern agriculture”.
- Similar risk rank categories: “High risk”, “Moderate risk”, “Slight risk”, “Almost no risk” and “Don’t know/Unsure”
- Similar randomized presentation

Environmental risk ranking issues include:

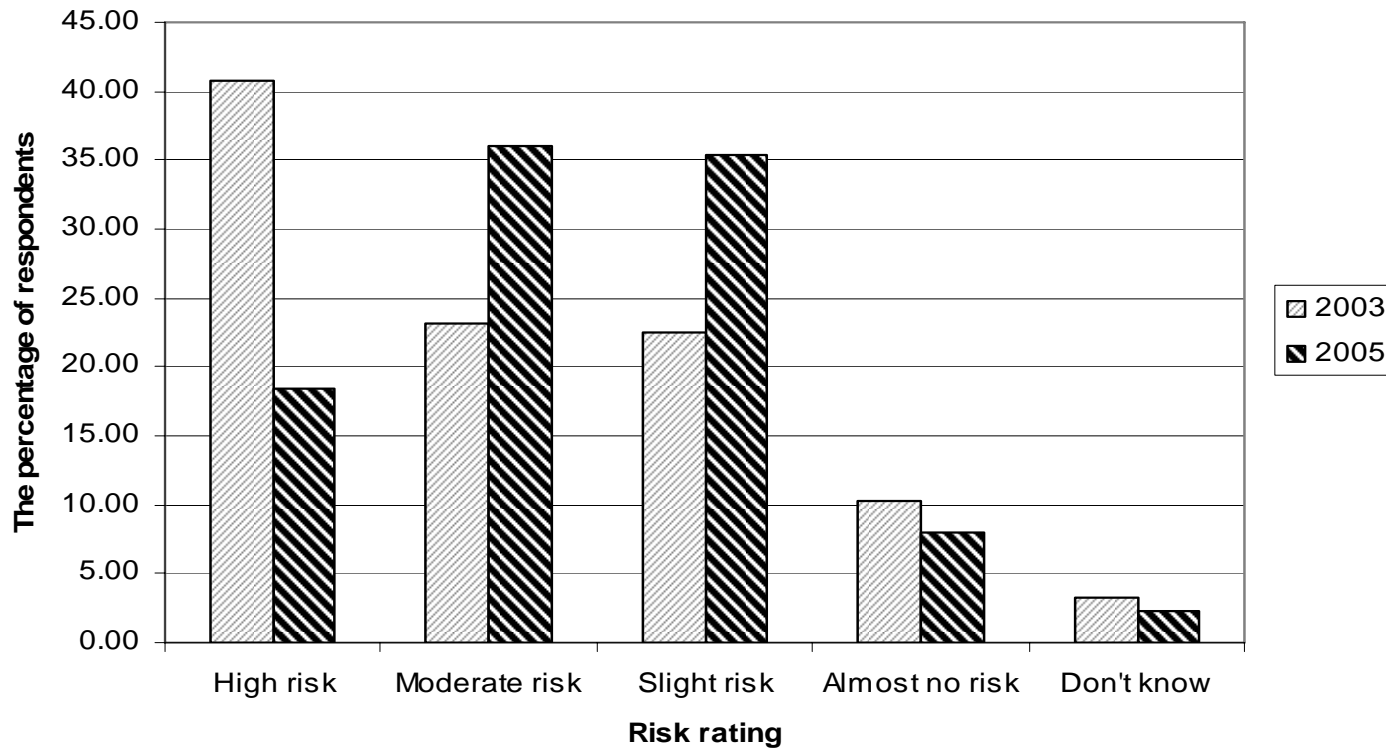
- water pollution by chemical run-offs from agriculture,
- agricultural waste disposal (animal manure disposal),
- soil erosion from agricultural activity,
- use of herbicides and pesticides,
- adverse effects of agriculture on biodiversity.
- GM/GE crops to increase crop production
- The 3 PMF issues (for drugs, food, industrial products) were added in the 2005 survey.

Analysis of risk perceptions:

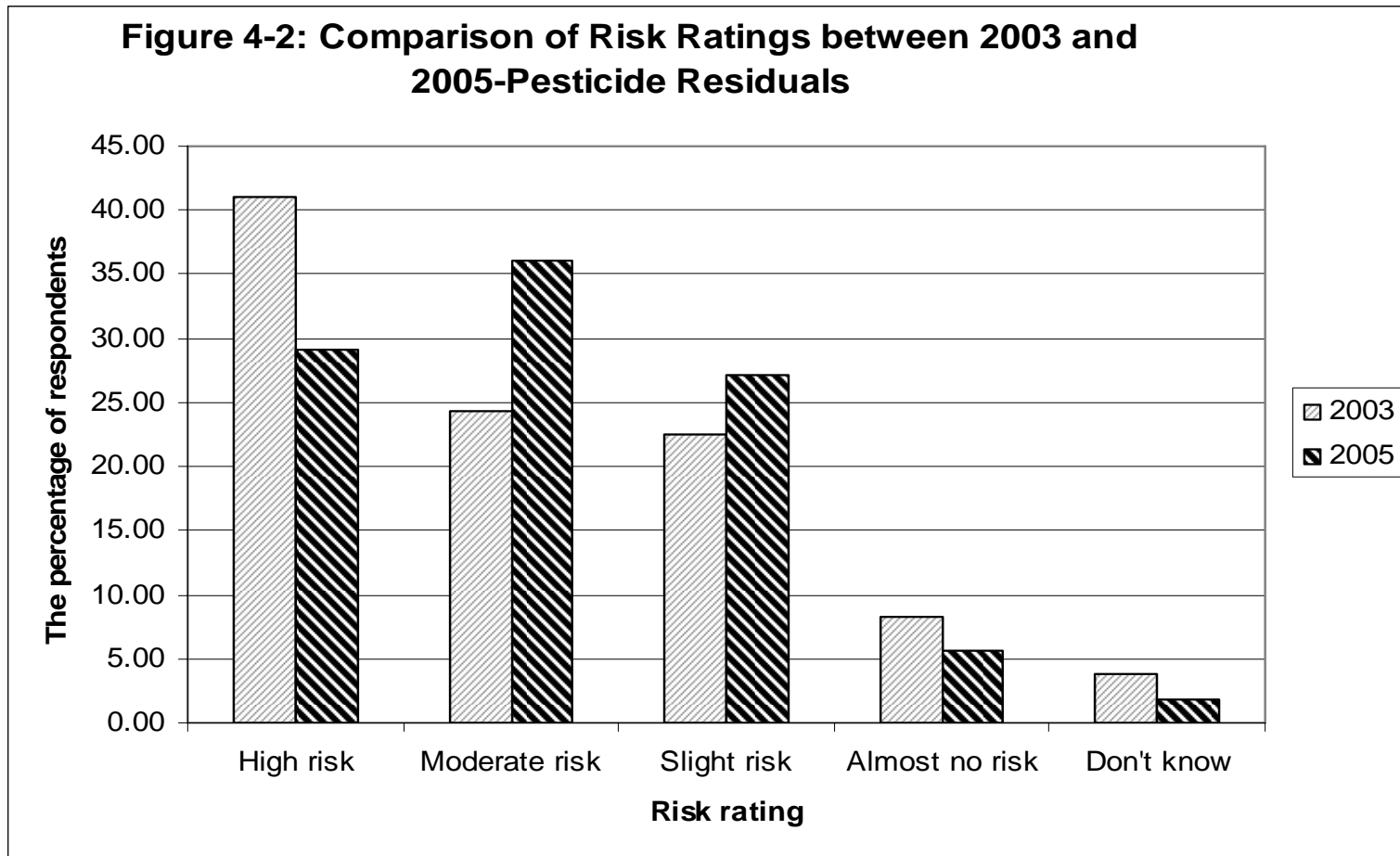
Comparisons of relative risk rankings and statistical tests of changes over time in models explaining the ratings showed that these had changed significantly over time

Comparisons of relative food risk rankings: Some ratings changed appreciably

**Figure 4-1: Comparison of Risk Ratings between 2003 and 2005-
Bacteria Contamination**

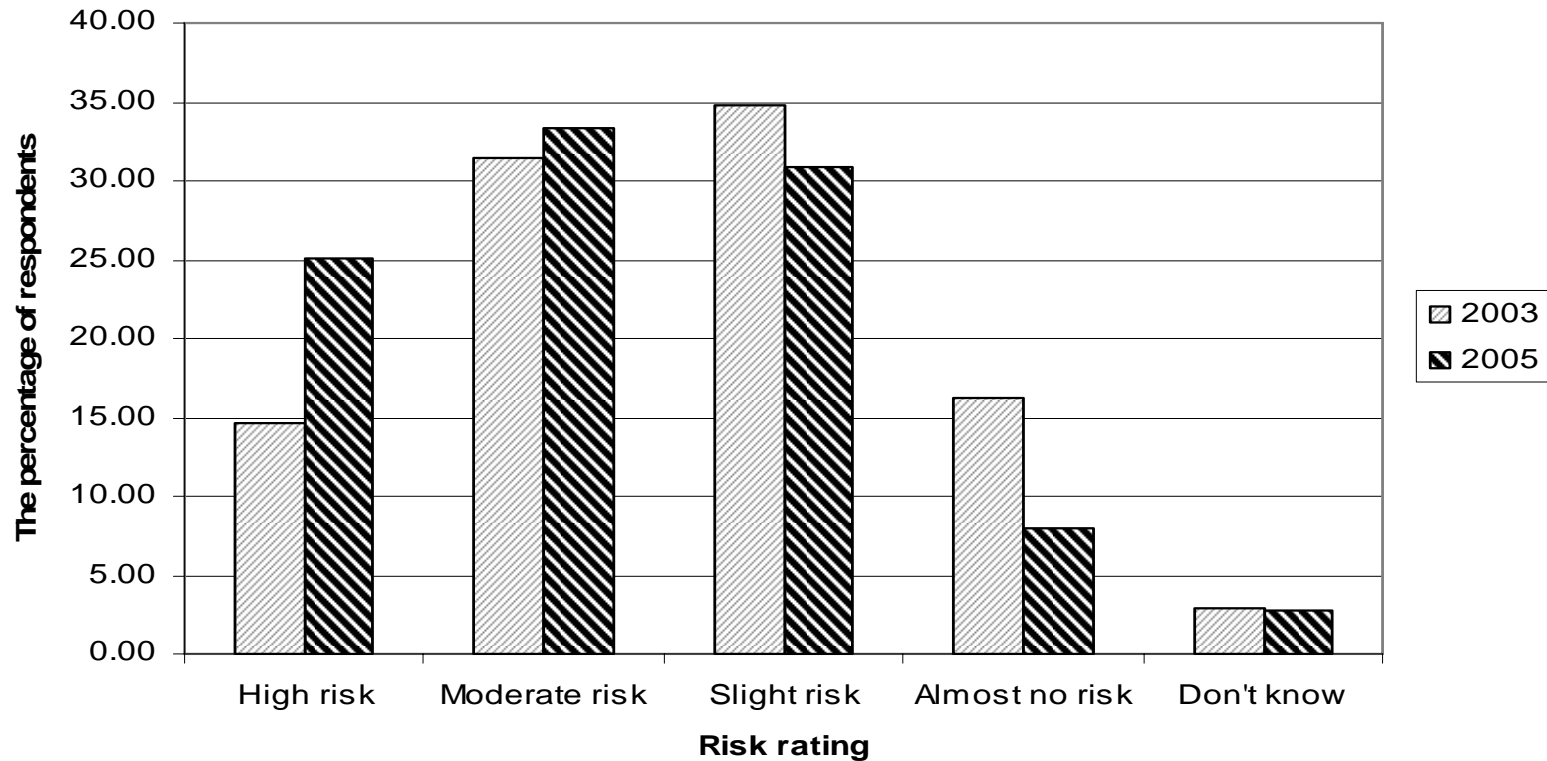


Comparisons of relative food risk rankings: Some ratings changed appreciably



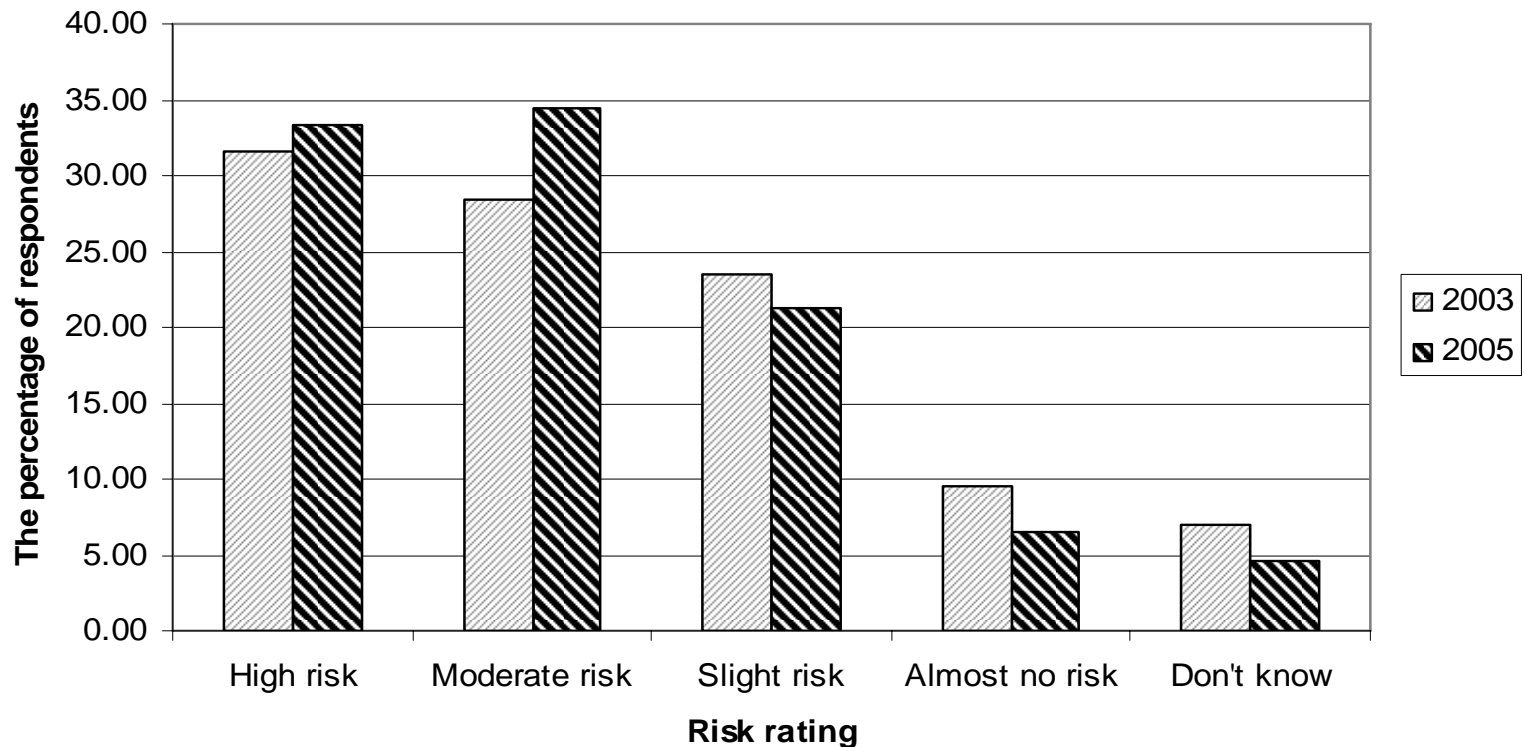
Comparisons of relative food risk rankings: Some changed moderately

**Figure 4-6: Comparison of Risk Ratings between 2003 and 2005-
Food Additives**



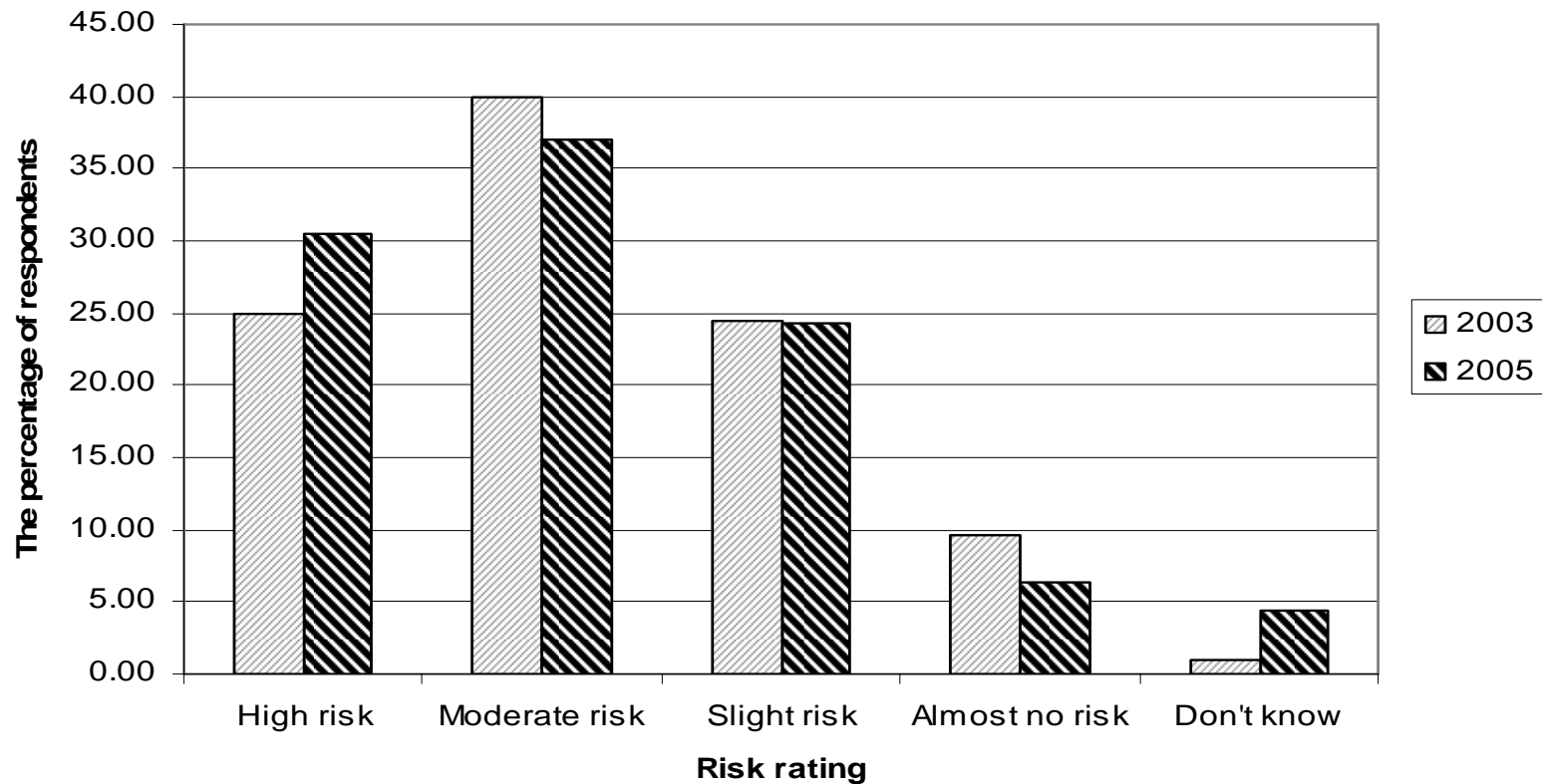
Comparisons of relative food risk rankings: Some changed less

Figure 4-3: Comparison of Risk Ratings between 2003 and 2005-Use of Hormones



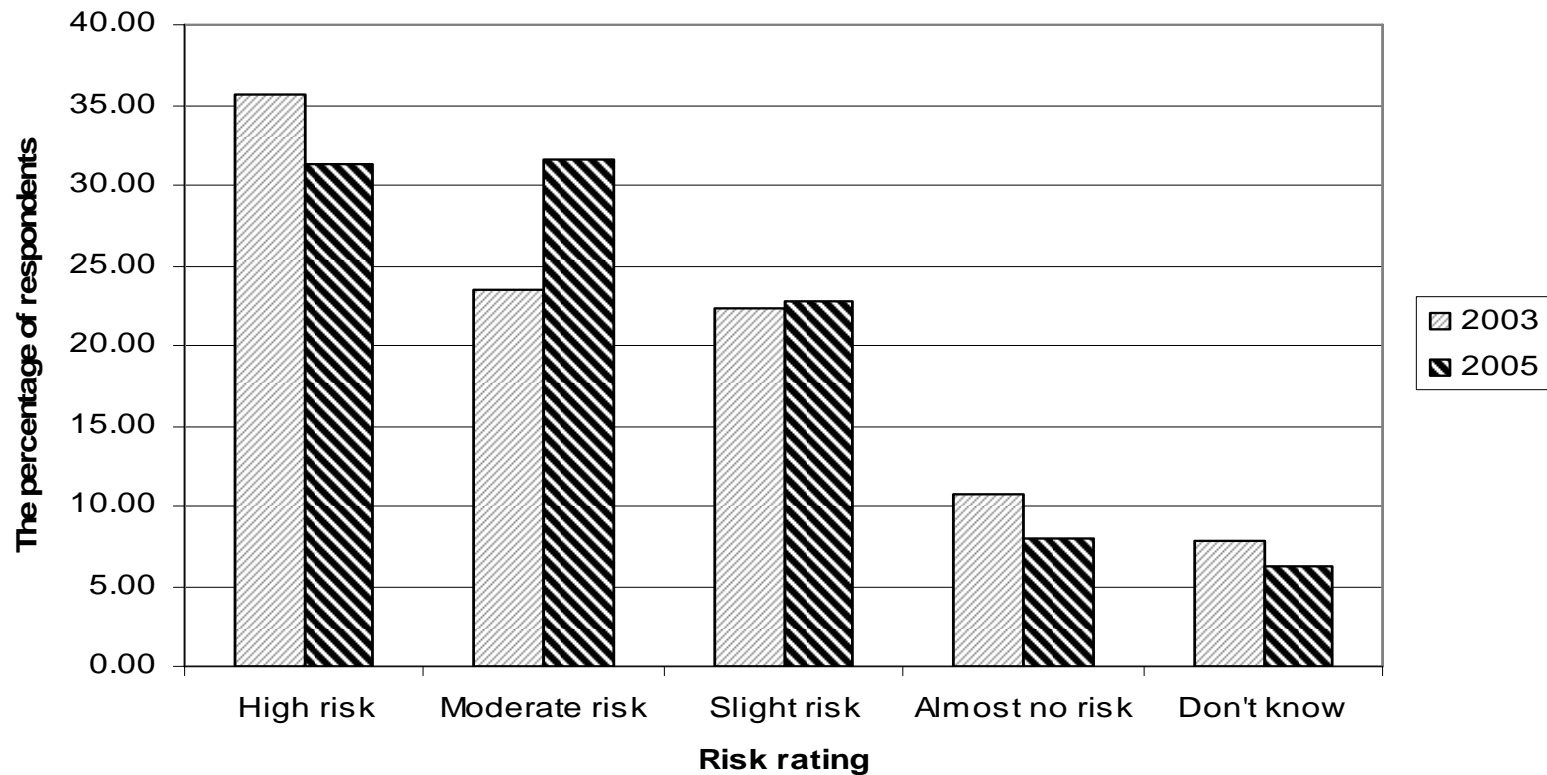
Comparisons of relative food risk rankings: Some changed less

**Figure 4-8: Comparison of Risk Ratings between 2003 and 2005-
Fat and Cholesterol**



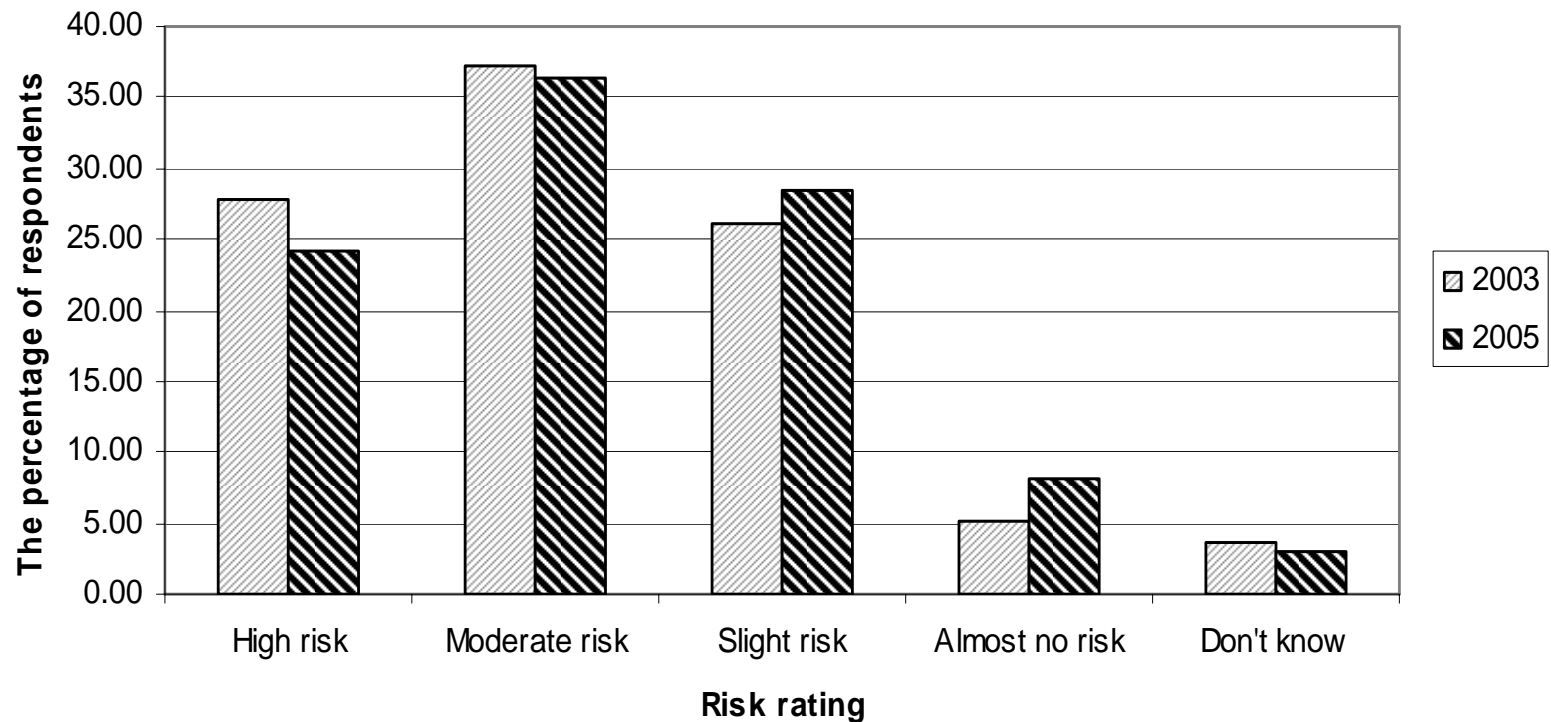
Comparisons of relative food risk rankings: Some changed less

**Figure 4-4: Comparison of Risk Ratings between 2003 and 2005-
Use of Antibiotics**



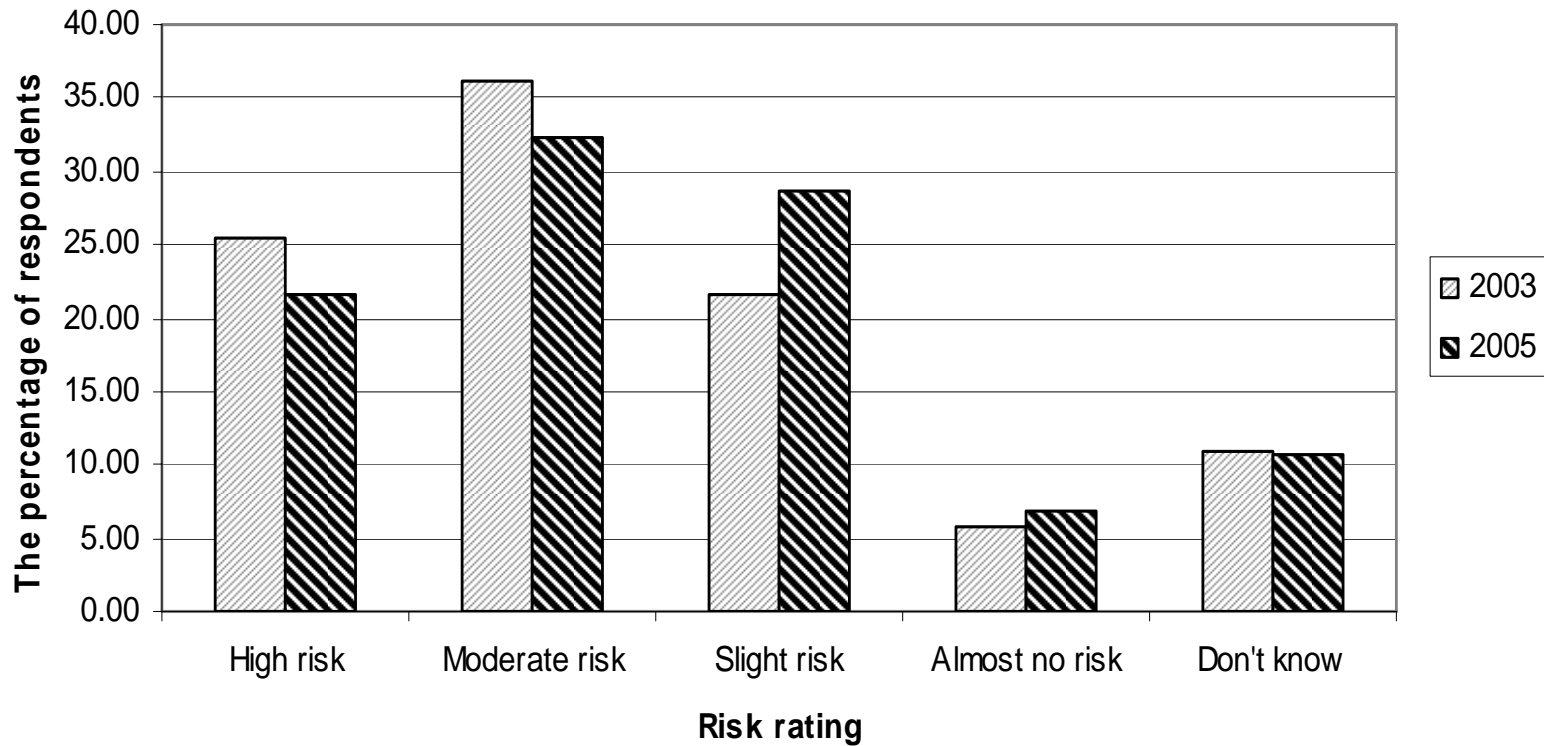
Overall, environmental risk rankings changed too, but generally less than for the food safety ratings, eg:

Figure 4-10: Comparison of Risk Ratings between 2003 and 2005-Soil Erosion



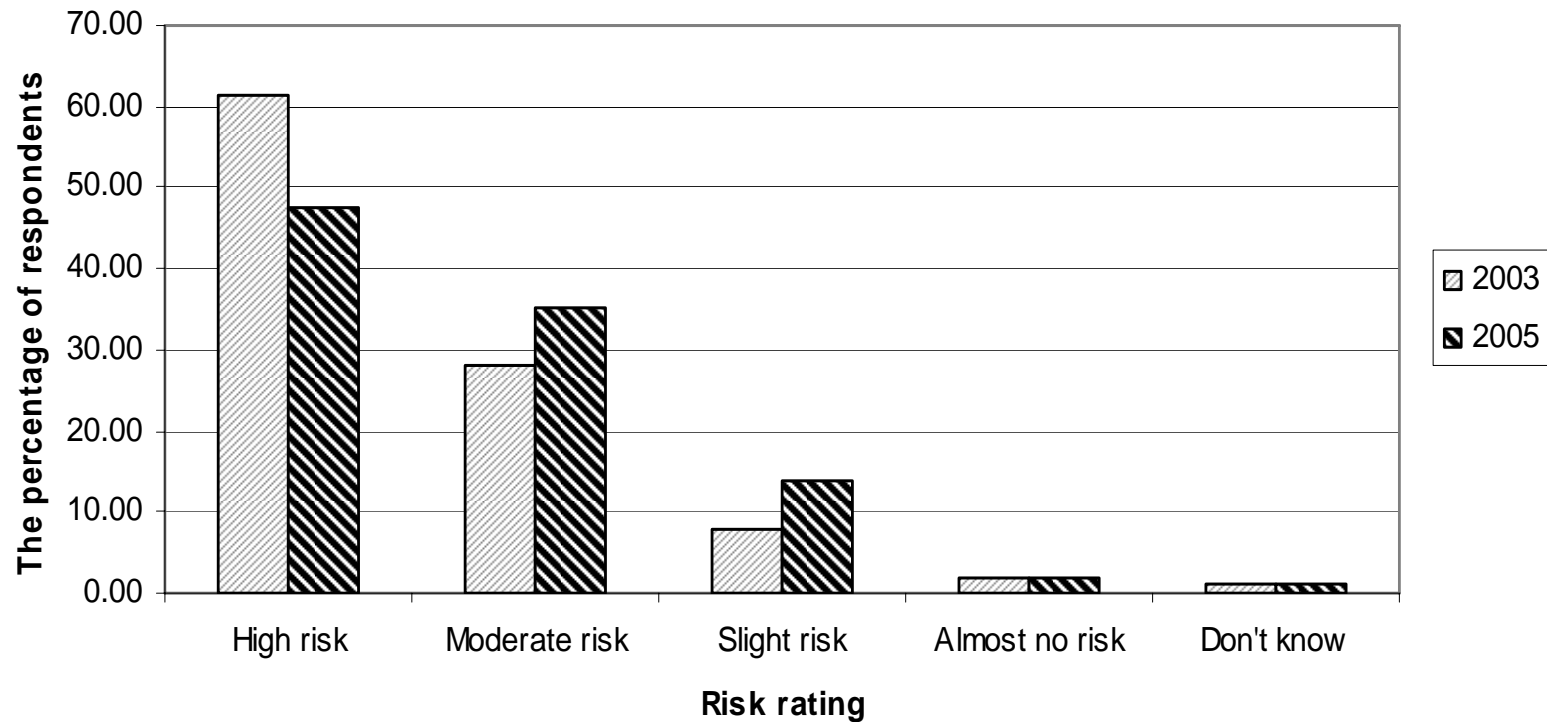
Agricultural risk ratings were generally less in 2005 than 2003

**Figure 4-13: Comparison of Risk Ratings between 2003 and 2005-
Adverse Effects on Biodiversity**



The most changed environmental risk ranking was for water pollution

Figure 4-9: Comparison of Risk Ratings between 2003 and 2005-Water Pollution



Statistical analysis: risk ratings

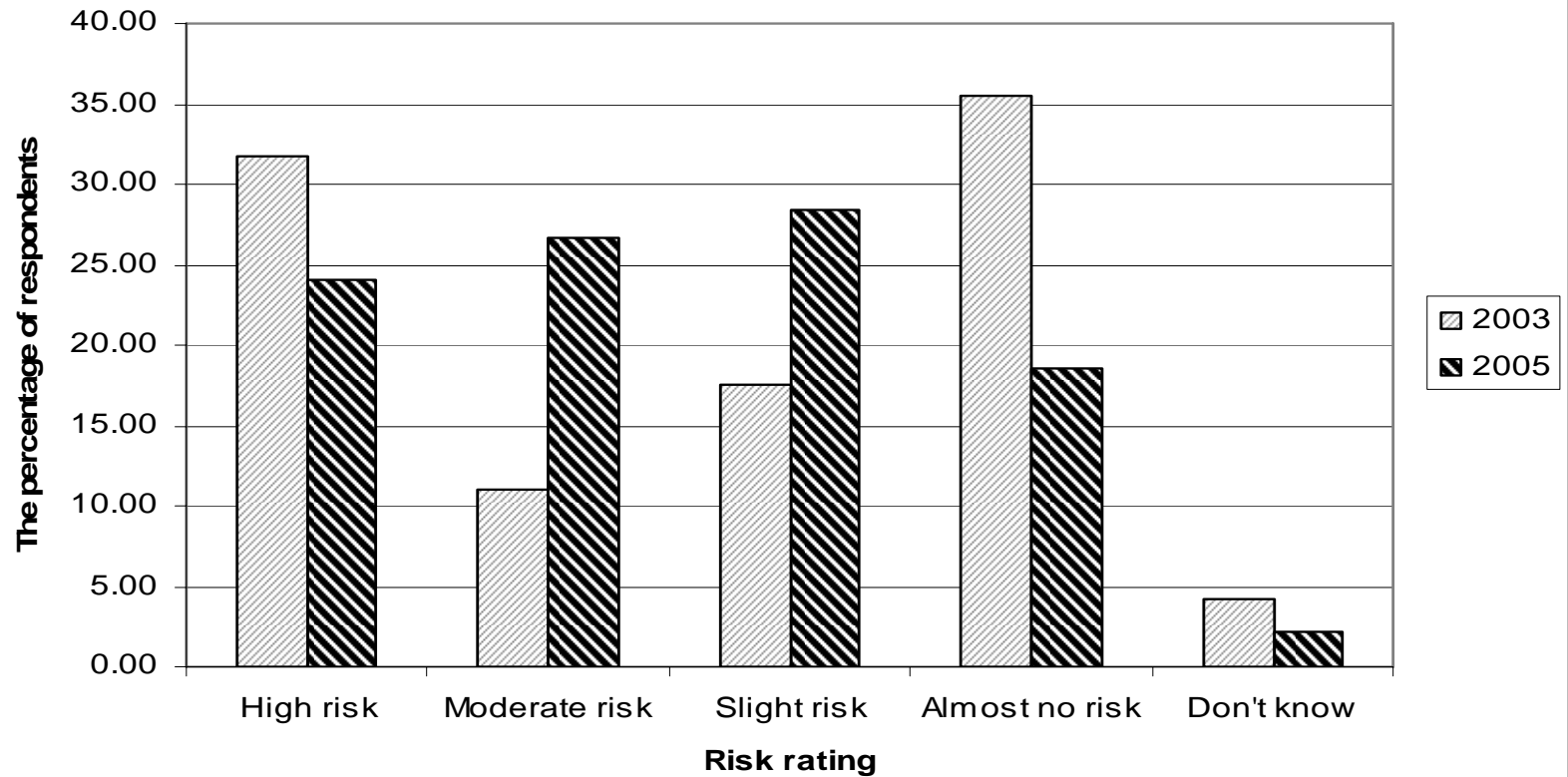
- We also tested ordered probit models to assess the influence of demographic factors and a measure of trust on respondents' concern ratings for both sets of data
- Gender, children in the household, income, residence in Quebec, and the trust proxy variable significantly influenced the probabilities of respondents' food risk rating choices for the various risk issues in each data set
- Quebec residents, females, those with lower incomes and lower trust in the food system were more likely to choose higher risk ratings than other respondents

Some other interesting results and possible explanations

- Concern about BSE seems to become more nuanced between January 2003 (before the first Canadian BSE cow) and October 2005 (after Canadian 3 cows were confirmed to have BSE), as shown in the following slide.

Comparisons of relative food risk rankings: Some ratings changed appreciably

**Figure 4-5: Comparison of Risk Ratings between 2003 and 2005-
BSE(mad cow disease)**



Possible explanations of changes in BSE risk ratings

1. Prior to the first event, the issue was relatively unknown in Canada and may have been viewed as “dreadful”
2. After the first event the issue received much media coverage which stressed the control measures being taken & economic impact on the sector
3. No human deaths
4. Risk communication may have been effective

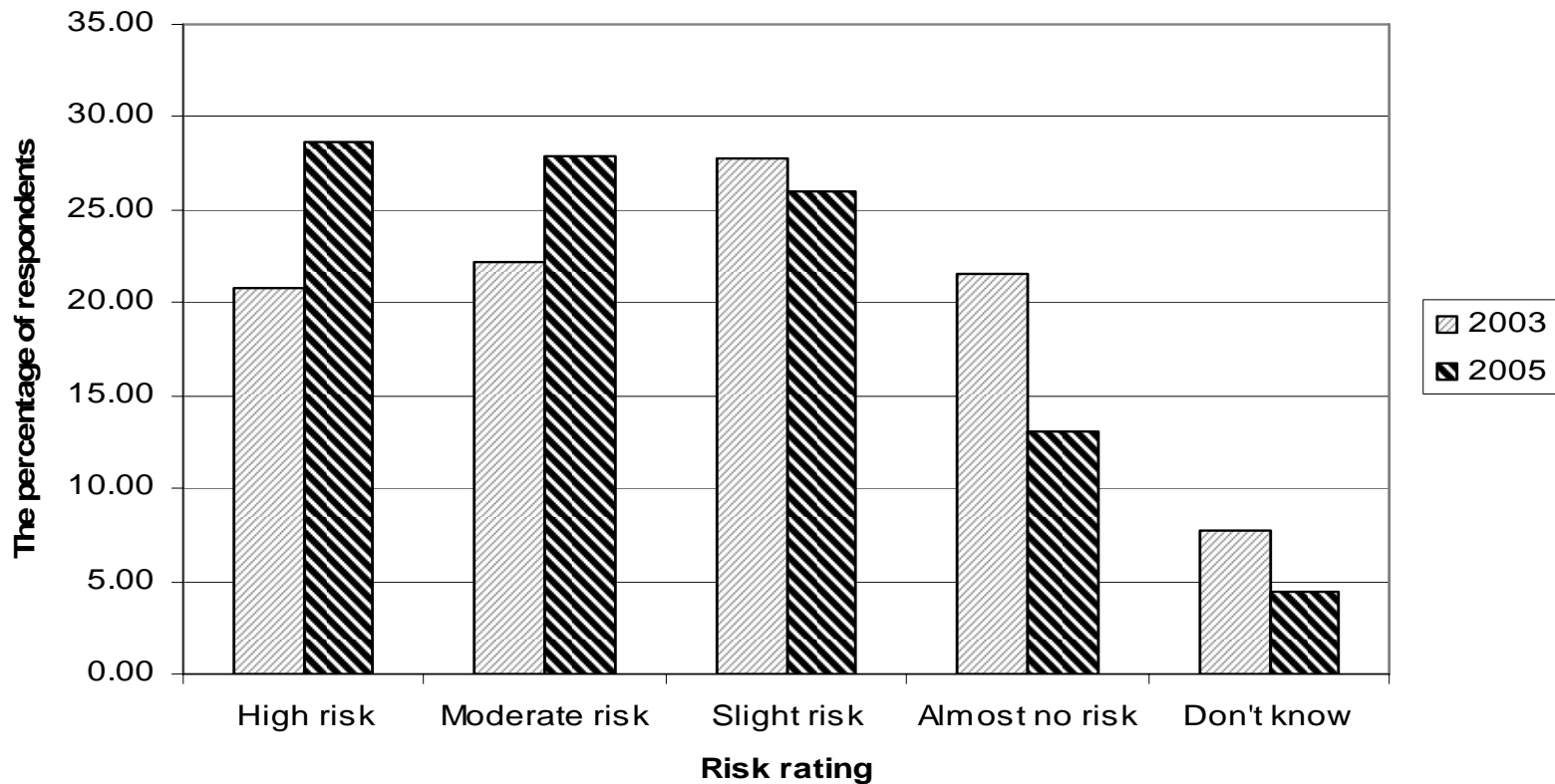
The concern about GM/GE in agriculture is also of interest:

Comparison of 2003 and 2005 ratings for the single common question indicates changes in both food risk and environmental risk assessments:

- Food risk concern grew;
- Environmental risk concern changed, but in a less clear manner

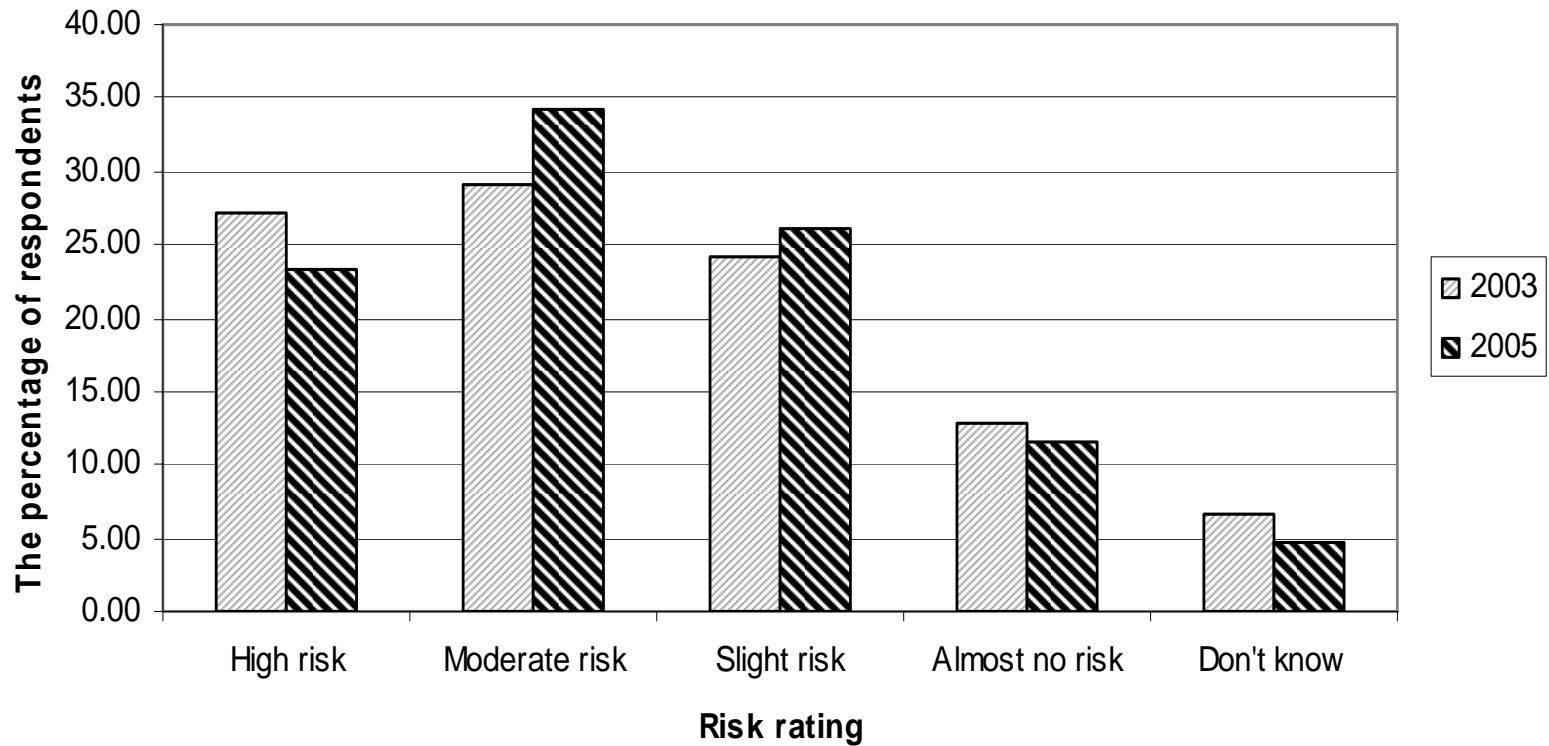
The concern about GM/GE as a food risk increased:

**Figure 4-7: Comparison of Risk Ratings between 2003 and 2005-
Use of GM/GE (in crop production)**



The concern about GM/GE as an environmental risk also changed

**Figure 4-11: Comparison of Risk Ratings between 2003 and 2005-
GM/GE(on environment)**

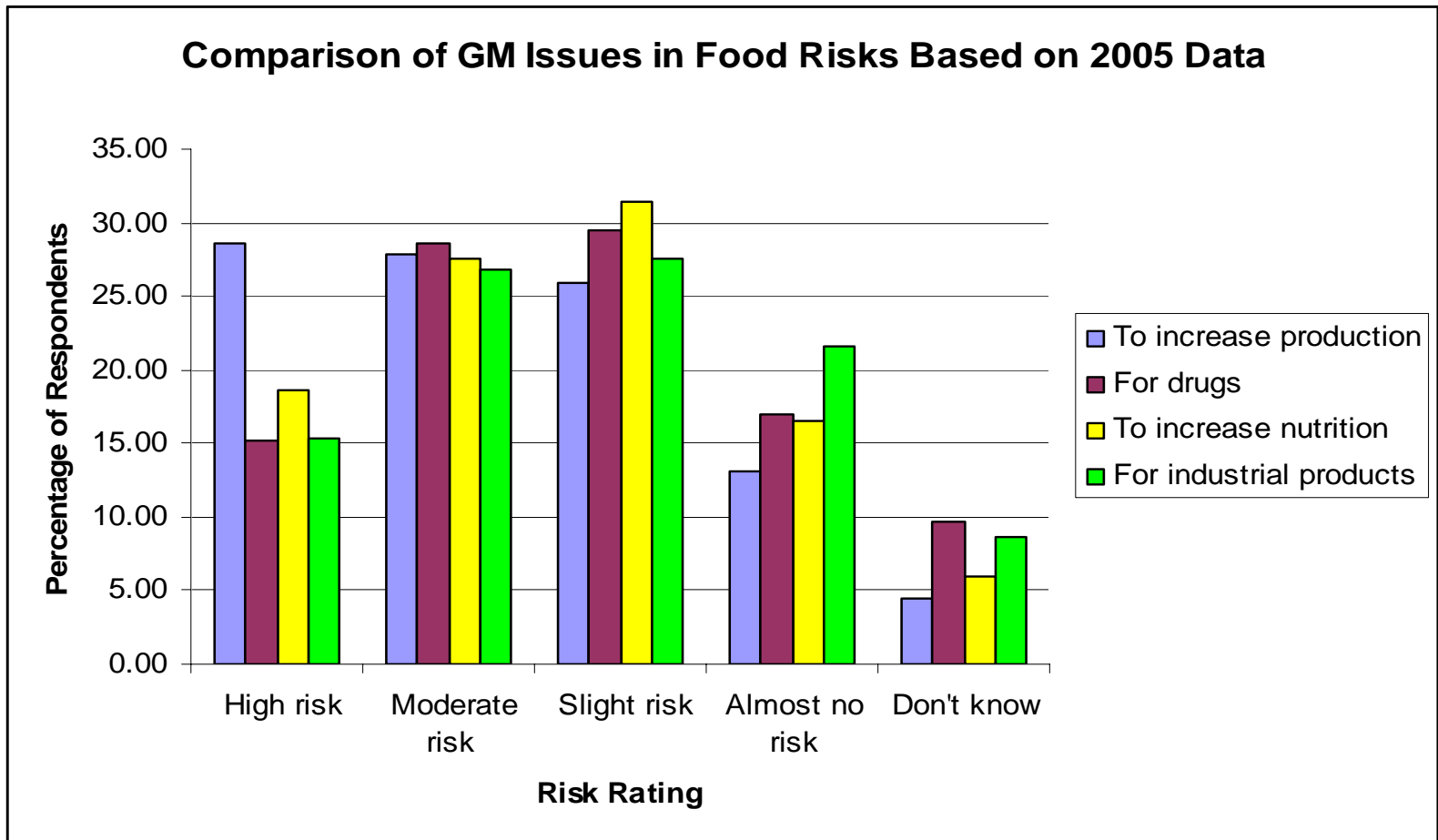


Interesting ratings for GM/GE & PMF activities (only available for PMF in 2005)

Four GM/GE questions in 2005:

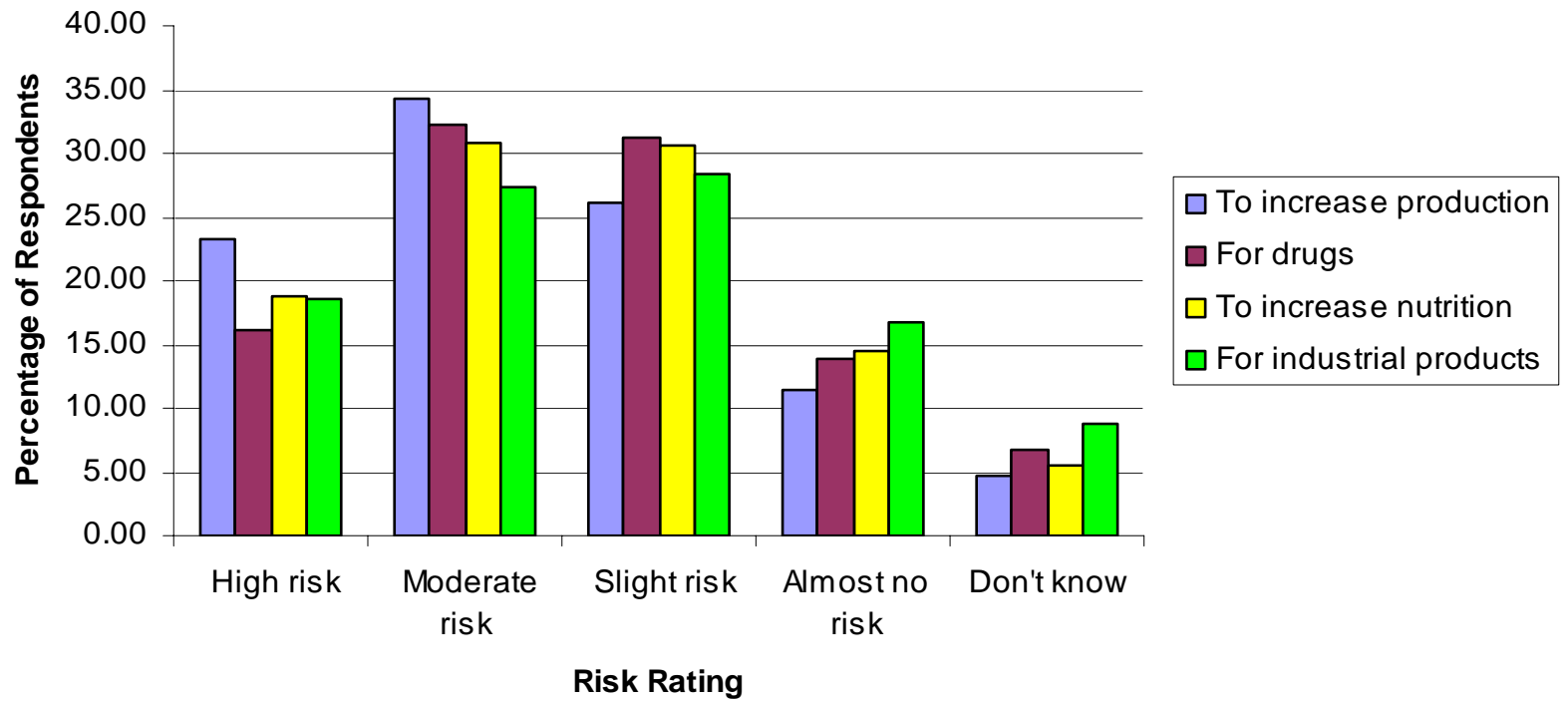
- GM/GE crops to increase crop production
- GM/GE crops to increase nutritional qualities of foods;
- GM/GE crops to produce industrial products like plastics, fuel or industrial enzymes.
- Drugs (medicines) made from plant molecular farming through GM/GE;

Food risk ratings of GM/GE & PMF activities, November 2005



Environmental risk ratings of GM/GE & PMF activities, November 2005

Comparison of GM Issues in Environmental Risks Based on 2005 Data



Comments on GM/GE risk rating comparisons

- Use of GM/GE crops to increase crop production was the 5th “high risk” food issue overall & risk from this is rated higher than the three PMF issues
- This order of risk rankings for GM/GE & PMF issues is consistent with risk communication & social psychology literature that indicates the influence of “utility” (ie personal or social worth) on qualitative (perceived) risk assessments—the higher the utility, the lower is qualitative risk

Apparently increasing concern about GM/GE unless this is seen to have major personal or social benefits

- However, there is rather less concern by Canadians of those GM/GE products & applications that provide health benefits, more nutritious food and industrial products.
- These risk assessments are consistent with the hypothesis that innovations and situations providing little personal or socially accepted benefit are viewed as more risky & less socially acceptable than innovations and activities that do involve socially accepted benefits

Summing up:

- Women express more concern for the cited food risk & environmental issues.
- Quebec residents are much more likely to rate these as high risks
- Education, income and age can also be significant risk perception predictors but their effects tend to be relatively small

Overall:

- Hormone, antibiotic and pesticide use in agriculture are appreciable food risk concerns, as is bacterial contamination;
- GM/GE is increasing somewhat as a food risk concern (cf of 2003 & 2005 data).
- Chemical runoffs from agriculture are viewed as the riskiest of the queried environmental issue associated with agriculture

Finally:

- Those with trust in different information sources have different perceptions of risk. Relatively few respondents trust information from the Canadian government and from farmer associations. Nonetheless “trust in government” tends to be a significant predictor of several risk class probabilities

Acknowledgements

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