

Irish Consumers' Willingness to Pay for Safe Beef





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Authors:

Cathal Cowan B.Agr.Sc. M.Agr.Sc. Econ. M.Sc.
Nicola Riordan B.Sc. (Food Business) M.Sc.
**The National Food Centre, Dunsinea,
Castleknock, Dublin 15**

and

Mary Mc Carthy B.Sc. (Food Business) MBA (Marketing)

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SUMMARY

Five hundred Irish consumers were asked about their willingness to pay for safe beef. Their concerns for the safety of food, their level of knowledge of safe food practices and awareness of food poisoning agents were also ascertained. The main results and conclusions were:

1. Consumers were willing to pay 4% extra for safer beef, 4.5% for reduced levels of *E. coli* O157:H7 in minced beef and 8% for improved institutional structures which ensure beef safety.
2. Socio-demographic, attitudinal and behaviour factors were found to influence willingness to pay. In general, those who were willing to pay higher amounts belonged to the higher social classes (ABC1), were employed or retired and frequently purchased either round steak or round steak minced. Those who were only willing to pay lower amounts were unemployed, less frequent purchasers of beef, were unaware of food safety initiatives or had suffered from food poisoning in the past year (having been sick once, they did not expect it to happen a second time).
3. Sixty-four percent of the sample expressed concern for the safety of food. Concerns cited included degree of freshness of food, BSE/CJD, antibiotic residues, hygiene standards and bacteria.
4. Consumers identified potential causes of food poisoning as poor cooking practices, poor hygiene, food spoilage and incorrect food storage.
5. Consumers' knowledge of safe food practices in food preparation and cooking and of food spoilage pathogens was generally good. However, it was lower for food storage practices. Specific groups of the population, including males and those with less education, had less knowledge of food safety. These groups should be the focus of attention for educational programmes on food safety.
6. Awareness by consumers of *Salmonella* was very high and of *E.coli* O157:H7 also relatively high. However, there is a low level of awareness of *Campylobacter*. This is a cause of concern as *Campylobacter* is the most common cause of food poisoning. These findings illustrate the need for educational programs from the Food Safety Authority of Ireland.



INTRODUCTION

There has been an increase in food poisoning in Ireland, particularly in the number of cases of *E. coli* O157:H7 poisoning, in recent years. Consumers are seeking reassurance from the Government and the food industry about the safety of food. The safety of beef in particular has been at the centre of the debate. A nation-wide survey of consumers, conducted in Ireland in August 1999, examined Irish consumers' willingness to pay for safer beef. Further to this, information was gathered about consumers' food safety concerns, their level of knowledge of safe food practices and their awareness of food pathogens.

OBJECTIVES

The purpose of this research was to:

- establish Irish consumers' willingness to pay for safer beef;
- evaluate consumers' food safety concerns and
- examine the current level of knowledge of safe food practices (in food preparation, cooking and storage) and to measure awareness of food pathogens.



METHODS

Willingness to pay was addressed under three headings:

Are Irish consumers willing to pay extra

1. for safer beef (round steak)?
2. for beef (round steak minced) with reduced levels of *E. coli* O157:H7?
3. for improved institutional structures that ensure the safety of beef ?

Food safety, as a product attribute, is difficult to value. Thus the contingent valuation (CV) method was employed to estimate how much extra consumers were willing to pay for safer beef. The CV method uses a hypothetical scenario to describe a non-market good and asks respondents if they would be willing to pay extra for the non-market good described. The first two scenarios were specific to two different cuts of beef; the third asked consumers to value all beef and all possible safety procedures. The scenarios presented to consumers are shown below. They were told the examples were made up for the study and did not represent real life situations.

Scenario 1. Imagine that you walk into a store to buy a piece of round steak. There are two types that you can choose from, round steak X and round steak Y. Both are identical in terms of size and appearance. However, round steak X has been thoroughly tested to ensure its safety and the likelihood of becoming ill after consuming is halved. Round steak Y is identical to what you normally buy in your store and costs you £2.67/lb (€7.47/kg).

Scenario 2. You wish to buy some round minced steak and you have two alternatives; you are told that they both are identical in terms of size and appearance but that they have different histories. The label on round minced steak X informs you that it has come from an animal which has been reared on a farm which has systems and tests in place to reduce the possibility of the presence of *E.coli* O157 in the mince. Further testing is then conducted in laboratories before it is sold, to ensure it is safe. The probability of becoming ill after consuming this mince is 1 in 100,000. Round minced steak Y is identical to what you would normally buy in any store and the probability of



becoming ill after consuming it is 1 in 50,000, which is twice as likely as round minced steak X.

Scenario 3. Imagine there was a new scheme put in place in Ireland to ensure the safety of Irish beef. This scheme would be controlled and monitored by an independent agency.

Once the scenarios were presented, the consumers were given a bid amount and asked if they would be willing to pay that amount extra. The bid amounts used in the consumer survey for each of the three scenarios are presented in Table 1. A model (bivariate probit) was used to relate bid responses to consumers' characteristics, such as socio-demographic, attitude and behavioural variables. This helped describe the influences these variables had on the responses and their significance.

A national stratified random sample of 510 beef consumers was drawn for the survey. The recruitment criteria for respondents were:

- the respondent was the main purchaser of food in the household
- the respondent purchased either round steak or round steak minced more than once a month.

These criteria ensured respondents selected were familiar with beef prices so as to facilitate understanding of the scenarios. This enabled the collection of more accurate willing to pay values. Quotas were also set on age and social status based on a national sample of main grocery shoppers in Ireland.

Data collected was primarily on the extra amount beef consumers were willing to pay and why they were willing to pay extra. Additional information was collected about consumers' concerns, beef purchasing patterns and their current level of knowledge of safe food practices using standard questionnaire techniques. This additional information on concerns was also collected from a similarly selected sample of 50 non-beef consumers.



Table 1: Bid amounts used in the consumer survey for each of the three willingness to pay scenarios.

Safer beef scenario (pence)			Reduced levels of <i>E.coli</i> O157 scenario (pence)			Improved institutional structures scenario (percentage)		
Starting bid	Higher bid	Lower bid	Starting bid	Higher bid	Lower bid	Starting bid	Higher bid	Lower bid
5	10	3	7	14	4	5	10	3
10	20	5	9	18	5	8	16	4
15	30	8	12	24	6	11	22	6
18	36	9	21	42	11	14	28	7
23	46	12	28	54	14	20	40	10
25	50	13	39	78	19	27	54	14
54	108	27	45	90	23	31	62	16
58	116	29	65	130	33	38	76	19
61	122	31	71	142	36	40	80	20
95	190	48	93	186	47	46	92	23

Pence = Irish pence



FINDINGS

Each scenario was analysed using separate models (univariate probit and bivariate probit models). Table 2 presents the distribution of the responses for the three scenarios.

Comparing the three distributions of the *yes* and *no* responses, a larger proportion of *yes* responses than *no* responses occurred in both the safer beef scenario and reduced levels of *E. coli* O157:H7 scenario. The distribution in the improved institutional structures scenario was approximately evenly distributed between *yes* and *no*. Safer beef and better quality were the most frequently cited reasons for paying extra. Safer beef encompasses such features as less hormones, less bacteria and feeling of reassurance. The main reason for not paying extra was the belief that the Government or the food industry should incur the extra cost. These respondents are called protest bidders as they are not giving a true valuation of willingness to pay and were excluded from the analysis. Extra cost, due to the bid amount offered being too high or an inability to afford to pay anything extra, was also expressed as a reason for not paying extra.

Table 2: Distribution of willingness to pay responses for the three scenarios.

Safer beef (n=476)				Reduced levels of <i>E.coli</i> O157:H7 (n=491)				Improved institutional structures (n=469)			
<i>Willingness to pay - First response</i>											
Yes (Y)		No (N)		Yes		No		Yes		No	
322		154		271		220		231		238	
<i>Follow-up response</i>											
Y/Y	Y/N	N/Y	N/N	Y/Y	Y/N	N/Y	N/N	Y/Y	Y/N	N/Y	N/N
197	125	48	106	142	129	63	157	79	152	52	186



Willingness to pay for safer beef

Respondents were willing to pay 4% extra for safer beef. The predetermined bid amount had a highly significant negative effect on the response, thus the higher the bid amount the less likely the respondent would say yes. Those who were unemployed were less likely to accept the bid offered than other employment groups. Employed respondents were more likely to say yes to the bid offered than housewives or retired persons. Those aged between 45 and 64 were more likely to accept the bid they were offered compared to those aged 65 or over. The more frequently respondents purchased round steak the more likely they were to accept the bids they were offered.

Beef with reduced levels of *E. coli* O157:H7

Respondents were willing to pay 4.5% extra for reduced levels of *E. coli* O157:H7 in beef. Similar to the safer beef scenario, the bid amount had a significant negative relationship with the replies. The unemployed were again less likely to accept the bid amounts they were offered compared to other employment groups. Those in the higher social class, ABC1, were more likely to accept the bid amount offered than those in the C2DE class. The more frequently the respondent purchased round steak minced, which was the beef cut used in this scenario, the more likely they would accept the bid amounts offered to them.

The reason why consumers were willing to pay slightly more for reduced levels of *E. coli* O157:H7 compared to the safer beef described in the first scenario, may be on account of the cuts of beef used in the two scenarios. For the safer beef scenario, round steak was used and for the reduced levels of *E. coli* O157:H7 scenario, round steak minced was used. Round steak minced is more susceptible to food pathogens than round steak and this may be why respondents are willing to pay a little extra.

Improved institutional structures

The mean willingness to pay value for the improved institutional structures scenario was 8% extra. This, as expected, was higher than for the first two



scenarios, which were beef cut specific, while this scenario incorporated all aspects of safety and all beef cuts.

The higher the bid amount the more likely was a response negative. Respondents aged between 25 and 64 were more likely to accept the bid they were offered compared to those aged 65 plus.

A surprising finding was that 47% of the total sample were not aware of any institutional structure, whether an organisation or a scheme, involved in ensuring the safety of Irish beef. Those who were aware were more likely to accept the bids offered. Respondents who had suffered from food poisoning in the last year were less likely to pay extra than those who did not (having been sick once, they did not expect it to happen a second time).

The Government, under the Operational Programme for Industry, Food Sub-programme 1994-1999, made a significant contribution (£16m/€20.3m) to food safety and quality enhancement (Department of Agriculture and Food, 1998). The implementation of a National Beef Assurance Scheme (NBAS) began in 1998 and there has been considerable expenditure.

Food safety concerns

Sixty-four percent of the sample expressed concerns about the safety of food in general; 36% were unconcerned. More females than males were concerned about food safety and married persons were also more concerned than single persons. Respondents who expressed concern were asked to name three of their concerns. Table 3 identifies the concerns consumers had about the safety of food.

The top three concerns for respondents who purchased beef were freshness of food, BSE/CJD and antibiotic residues. The non-purchasers cited BSE/CJD, genetically modified organisms (GMOs), antibiotic residues and hormones/growth promoters more frequently than those who purchased beef.



Table 3: Food safety concerns of Irish beef consumers.

Concern	Beef purchasers	Non purchasers
Freshness	14	4
BSE/CJD	10	19
Antibiotic residues	9	11
Hygiene standards	8	6
Bacteria	7	3
<i>E.coli</i> O157:H7	7	4
Hormones/growth promoters	7	9
Good quality	6	4
Food poisoning	6	3
GMOs	6	13
Preservatives & additives	4	3
Appearance of meat	3	4
All other factors	13	17

Knowledge of causes of food poisoning

Six percent of consumers reported suffering from food poisoning in the past year. Potential causes of food poisoning were grouped into four categories – poor storage, poor cooking practices, poor hygiene and food pathogens. Results are presented in Table 4.

Poor cooking practices (26%) included cooking of inadequately thawed food, under cooked food and inadequate reheating. Poor hygiene (22%) was cited



Table 4: Irish consumers' views on causes of food poisoning.

Cause of food poisoning	%
Poor storage	33
Poor cooking practices	26
Poor hygiene	22
Food pathogens	19

in relation to both personal hygiene and hygiene in catering establishments. *Salmonella* and *E.coli* O157:H7 were the food pathogens cited (19%). Finally, poor storage included storing refrozen food, cross-contamination, out-of-date food and poor temperature control during storage. Poultry and eggs were the foods considered most likely to cause food poisoning. Beefburgers and minced beef were also frequently mentioned. Pork, fish and shellfish were the next most frequently mentioned foods. Beef cuts were mentioned but less frequently than any of the above.

Statements were used to ascertain respondents' current level of knowledge of safe food preparation, cooking and storage. The vast majority (92%) believed it was unsafe to prepare raw and cooked foods on the same surface, thus exhibiting good knowledge of safe food preparation. Eighty-eight percent of the sample felt that just because a minced beef burger was brown on the outside did not necessarily mean the burger was safe to eat. Only 5% felt it was safe to eat. This exhibited a good knowledge of safe cooking practices among Irish consumers.

Knowledge of safe food storage was less satisfactory. Fifty-nine percent of the sample believed over-filling a fridge adversely affects the temperature. Twenty percent believed it did not. The survey identified males, single persons, those aged under 35 and those with low levels of education as less likely to know the correct safe food storage practices. This finding suggests that many consumers do not fully understand the dangers of food poisoning



and do not recognise the importance of safe food storage in preventing food poisoning.

Awareness of food pathogens

Awareness of *Salmonella* was very high (97%). Seventy-six percent were aware of *E.coli* O157:H7. Less than half the sample was aware of both *Listeria monocytogenes* (44%) and *Clostridium botulinum* (32%). Awareness of *Campylobacter* was minuscule (8%). Table 5 presents the foods the 500 respondents associated with these five pathogens.

Table 5: Foods associated with particular food poisoning bacteria - % of consumers.

Food	Salmonella	<i>E coli</i> O157:H7	Listeria mono-cytogenes	Clostridium botulinum	Campylo-bacter
Eggs	70	-	-	-	-
Chicken	60	-	-	-	14
Poultry	12	-	-	-	-
Beef	-	39	-	11	-
Beefburgers	-	24	-	-	-
Meat in general	-	22	-	17	-
Unpasteurised cheese	-	-	20	12	-
Milk	-	-	15	-	18
Tap water	-	-	12	-	-
Fish	-	-	-	-	18

Note: Totals do not add to 100% as more than one food was named by some respondents for each pathogen.



Salmonella was associated with eggs and chicken. *E. coli* O157:H7 was mostly associated with beef, especially beefburgers.

The food vehicle associated with *Listeria monocytogenes* was unpasteurised cheese, followed by milk and tap water. *Clostridium botulinum* was mostly associated with meat. *Clostridium botulinum* is in fact mostly associated with canned food as it grows in anaerobic conditions while other pathogens cannot. *Campylobacter* was associated with milk and fish and 14% associated it with chicken.

The low level of awareness of *Campylobacter* is a cause of concern, considering it is the most common cause of food poisoning and chicken is the most common avenue of infection. Considering the amount of coverage different food scares have received in recent times in the media, the level of awareness of food spoilage pathogens was lower than expected, with the exception of *Salmonella*.



CONCLUSIONS AND RECOMMENDATIONS TO INDUSTRY

Irish beef consumers have concerns about the safety of the beef they purchase. However, Irish consumers were willing to pay less for safer beef compared to consumers elsewhere. Italian consumers were willing to pay between 20 and 30% extra. French consumers were willing to pay between 14 and 22% extra. This is substantially higher than the Irish willingness to pay of 4-8%. There are two possible explanations for this. Firstly, the Irish survey was a longer time after the 1996 BSE crisis and concern about beef safety had since declined. Consumption in Ireland had recovered and increased from 12.6 kg/person in 1996 to 17.3kg/person in 1998. Secondly, direct comparisons are problematic as different methods were used: the units of measurement and demographic characteristics of consumers surveyed differed and influenced the results.

The additional price the meat industry may be able to charge for safer beef products or improved institutional structures is 4-8%. To do this, beef processors and/or retailers must have a clear product offering in terms of additional safety. They must also have systems and tests in place which do not cost more than the additional amount consumers are willing to pay.

In terms of structures, it is evident from this survey that even though large investments have been made under the Food Sub-Programme 1994-1999, these food safety measures have not been effectively communicated to the public. Thus it is imperative if a new scheme was put in place to ensure the safety of Irish beef, as described in Scenario 3, its assurances must be clearly communicated to the public to warrant the extra amount consumers were willing to pay. The latest BSE crisis in 2001 accentuates this need for consumer reassurance.

The results indicate that there are many consumers with poor awareness of food poisoning bacteria and the foods they are associated with. The need for more consumer educational programmes from the Food Safety Authority of Ireland is evident.



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The National Food Centre

RESEARCH & TRAINING FOR THE FOOD INDUSTRY

Dunsinea, Castleknock, Dublin 15, Ireland.

Telephone: (+353 1) 805 9500

Fax: (+353 1) 805 9550