young people and food safety

Scottish Consumer Council
Making all consumers matter
About the Scottish Consumer Council

The Scottish Consumer Council (SCC) was set up by government in 1975. Our purpose is to promote the interests of consumers in Scotland, with particular regard to those people who experience disadvantage in society. While producers of goods and services are usually well-organised and articulate when protecting their own interests, individual consumers very often are not. The people whose interests we represent are consumers of all kinds: they may be patients, tenants, parents, solicitors' clients, public transport users, or simply shoppers in a supermarket.

Consumers benefit from efficient and effective services in the public and private sectors. Service-providers benefit from discriminating consumers. A balanced partnership between the two is essential and the SCC seeks to develop this partnership by:

- carrying out research into consumer issues and concerns;
- informing key policy and decision-makers about consumer concerns and issues;
- influencing key policy and decision-making processes;
- informing and raising awareness among consumers.

The SCC assesses the consumer perspective in any situation by analysing the position of consumers against a set of consumer principles. These are:

ACCESS
Can consumers actually get the goods or services they need or want?

CHOICE
Can consumers affect the way the goods and services are provided through their own choice?

INFORMATION
Do consumers have the information they need, presented in the way they want, to make informed choices?

REDRESS
If something goes wrong, can it be put right?

SAFETY
Are standards as high as they can reasonably be?

FAIRNESS
Are consumers subject to arbitrary discrimination for reasons unconnected with their characteristics as consumers?

REPRESENTATION
If consumers cannot affect what is provided through their own choices, are there other effective means for their views to be represented?

We can often make our publications available in braille or large print, on audio tape or computer disk. Please contact us for details.

Acknowledgements

We would like to thank:

- the teachers who agreed to take part in our survey and the pupils who filled in the questionnaire;
- the Environmental Health Officers who assisted in disseminating the questionnaire;
- the individuals who commented on the draft and the results, especially Colin Houston, Rod House, David Evans, Crawford Morgan and Ian Young;
- also thanks go to the SCC staff, especially Kirsty Aird for desk-top publishing the report, and the FRET Committee of the SCC.
In recent years there have been a number of food safety incidents that have received high levels of media attention, and consumers in Scotland have witnessed many food-related problems. These have included the crisis surrounding Bovine Spongiform Encephalopathy (BSE) and new variant Creutzfeldt-Jakob disease (nvCJD). There has also been concern over salmonella poisoning from bacteria linked to eggs and poultry and E.coli 0157 infection from cooked meat and dairy products. In Belgium there have been problems associated with dioxin contamination in pork, poultry and dairy products. As a result, public confidence in food standards and safety has been eroded.

The SCC believes concern from consumers is justified. In 1996 notified cases of food poisoning peaked at 5396 cases in Scotland. This had risen from 2438 in 1986 (see Figure 1), and represents an increase of 45% in 10 years.

![Figure 1](ISD Graph of food poisoning incidents in Scotland)
While there has been a reduction in notified cases of food poisoning in Scotland since the peak year of 1996, the figures for 2000 still provide cause for concern, consisting of 3309 notified cases for the year. Furthermore, it is recognised that notified cases underestimate the true extent of the problem\textsuperscript{2}.

The Food Standards Agency (FSA) was formed in April 2000 to improve the quality and safety of food and consumers’ confidence in it. The FSA has recognised that food safety is a problem and in September 2000 announced targets to cut food poisoning levels by 20\% by 2006, and in particular to reduce salmonella in retail chicken by 50\% over the next five years\textsuperscript{3}.

In 1996 the largest outbreak of E.coli 0157 infection occurred in North Lanarkshire. This affected 496 people and was associated with 21 deaths. The Government response to the E.coli 0157 outbreak included setting up the Pennington Group\textsuperscript{4} whose findings stressed a need for greater awareness of food safety by those handling food, including consumers. The Pennington Group noted “we are concerned that undue responsibility should not be placed on the consumer for ensuring the safety of food consumed”, but went on to suggest “Nonetheless, the point of consumption of food has to be recognised as the last line of defence against contamination and infection and consumers have an important role to play in food safety”.

The Pennington Group argued that there is a need for greater awareness of the potential for foodborne infection and preventative measures among those handling food in commercial operations and in the home. The Pennington Group noted that the approach should be founded on “good, basic awareness of the need for appropriate personal hygiene, food preparation and storage”.
Importantly, this included the role of parents and guardians in instructing children in personal hygiene measures. The Group also suggested that “Additional measures could include, for example, giving appropriate emphasis to food safety in teaching in schools, in out of school classes and in other courses” and went onto recommend “Food hygiene training should be provided wherever possible within the primary and secondary school curriculum”.
(Recommendation 17)

Aims

In light of food poisoning trends over the past few years and the acknowledgement of the Pennington Group of the important role that consumers have in food safety, the aim of this research was to examine the knowledge about basic food safety and hygiene principles among a subgroup of the school population in Scotland.

A second objective was to collate information to provide baseline data, which could be used in the future to determine progress in this important area.

The SCC opted to target 13 and 14 year olds as a subsection of the school population. There were a number of reasons for choosing to focus on this age group – they are likely to have been taught home economics at school; they are likely to undertake some cooking at home; they are generally split into classes of mixed ability pupils and, in practical terms, they are not undergoing any major exams.
Methodology

A questionnaire survey was devised and disseminated to second year school pupils across Scotland. The questions related to a range of food safety and hygiene issues.

The research took the form of a questionnaire survey administered to second year pupils in schools throughout Scotland. Local authority Environmental Health Officers visited schools and disseminated the questionnaires on our behalf. See Figure 2 which shows the location of the participating schools.

Figure 2
Map showing the location of participating schools
The response rate to the questionnaire was high, with 108 schools (65%) out of 166 initially approached taking part in the research. The respondents represent a good cross-section of the population of Scotland and the results are based on 2210 completed and useable questionnaires.

A slightly higher number of responses were received from girls (54%) than boys (46%) and the majority of respondents (91%) were aged 13 or 14 years.

Importantly, just under 80% of the pupils surveyed said they cook at home, with 40% of these cooking at least once a day. See Table 1 which summarises the frequency of cooking at home.

Table 1  Frequency of cooking at home

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once a day or more often</td>
<td>622</td>
<td>38.6</td>
</tr>
<tr>
<td>Less than once a day and more than once a week</td>
<td>407</td>
<td>25.2</td>
</tr>
<tr>
<td>Once a week</td>
<td>330</td>
<td>20.5</td>
</tr>
<tr>
<td>Less than once a week</td>
<td>253</td>
<td>15.7</td>
</tr>
</tbody>
</table>

n=1612
In order to determine pupils’ knowledge of basic food hygiene principles a range of questions relating to food safety and hygiene were asked. These questions are based on common government guidance and established measures that can be taken to ensure safe food production. These include all the stages of food preparation including personal hygiene, preparation, cooking, cooling and storage of food.

The findings from the survey show respondents demonstrate a good knowledge of food safety and hygiene principles on some issues, however, knowledge falls off significantly on other issues that are less clear cut. The results have been grouped into areas of good knowledge, reasonable knowledge and poor knowledge.

**Good Knowledge**

- **Basic hygiene**
  The question that received the greatest number of correct responses related the importance for the need to “wash hands thoroughly before preparing food, after going to the toilet or handling pets”. The question stated “After wiping Johnny’s nose Julie washed her hands with soap and water, before slicing apples”. Pupils were asked to indicate if the food mentioned in the statement is safe to eat or unsafe to eat and could make you ill. See Table 2, which summarises the results for food safety after washing hands. The food in this scenario is considered safe to eat, as good hygiene rules were observed, and almost all of the respondents (98%) answered correctly. Only 2% answered unsafe and less than 1% of the pupils answered don’t know.
Table 2  Food safety after washing hands

<table>
<thead>
<tr>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe</td>
<td>2153</td>
</tr>
<tr>
<td>Unsafe</td>
<td>46</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>9</td>
</tr>
</tbody>
</table>

n=2208

Other areas of good knowledge include where to store eggs; how to properly cook hamburgers and when to determine the 'use by' date of milk. Four out of five respondents answered these questions correctly.

Egg Storage
Guidance suggests the need to store eggs in the fridge. The questionnaire asked where eggs should be stored. The results are summarised at Figure 3. Of the three options given, the majority of respondents (89%) provided the best practice answer, that is, in the fridge. Nine percent answered outside the fridge, and 2% said they don’t know.

Undercooked food
Bacteria such as salmonella, campylobacter and E. coli may be present in animals without any adverse affect to the animal and these bacteria may be transferred to food. Contaminated food usually looks, tastes and smells completely normal. To minimise the risk to health, guidance suggests that meat and poultry products, (particularly burgers, sausages and poultry) be cooked thoroughly to reduce the risk of transferring bacteria. It also advises against eating food that contains uncooked eggs.

A statement was given “Jane prepared hamburgers for lunch. She removed them from the pan when they were getting crusty on the outside and were slightly
“pink in the centre” and pupils were asked to indicate whether the food mentioned in the statement is safe to eat, unsafe to eat and could make you ill or to indicate they did not know the correct option. The results are summarised at Figure 4. The food in this scenario is considered unsafe to eat, as undercooked meat can cause illness.

Encouragingly, the majority of respondents (87%) answered correctly, that the food is unsafe to eat. However, 8% answered safe and 5% answered don't know. The high number of correct responses may reflect the experience of this age group, as standardised hamburgers from fast food outlets may be a commonly consumed food.

Use by dates
A further area where respondents demonstrated a good knowledge of the best response related to ‘use by’ dates. Government regulations in the form of the ‘use by’ date tell consumers when a product should be eaten by, after which the quality and the safety of the product will decrease. In relation to ‘use by’ dates, the questionnaire asked pupils what to do with milk that has passed its ‘use by’ date and gives four options for action. See Table 3. The majority of respondents (83%) answered correctly to ‘bin it’. Fourteen percent of respondents answered ‘drink it if it smells okay’, 2% responded ‘drink it anyway’ and 1% answered don't know.

<table>
<thead>
<tr>
<th>Action for milk past ‘use by’ date</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drink it anyway</td>
<td>42</td>
<td>1.9</td>
</tr>
<tr>
<td>Drink it if it smells okay</td>
<td>307</td>
<td>14.0</td>
</tr>
<tr>
<td>‘Bin’ it</td>
<td>1824</td>
<td>83.1</td>
</tr>
<tr>
<td>Don’t know</td>
<td>22</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2195</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
Reasonable Knowledge

There is a reasonable knowledge about other food safety and hygiene principles. For example between 64% and 76% know how to reheat food safely; how to defrost a chicken safely and how to safely pack a shopping bag to avoid cross-contamination.

Reheating food

The guidance relating to cooking food notes “Cook food thoroughly, following the instructions on the pack. If you re-heat food, make sure it is piping hot”. To examine pupils' knowledge, the questionnaire asked pupils how often it is safe to reheat food once it is cooked. See Table 4 which summarises the results on safely reheating food. It is considered safe to reheat food once, and the majority of respondents (76%) answered correctly. Eight percent of respondents answered it is not safe to reheat food at all. In food safety terms this would be erring on the side of caution, and it appears to indicate a lack of knowledge of best practice. Eight percent of respondents indicated that it is safe to reheat food twice, and 3% of respondents indicated it is safe to heat food as often as you like. Both of these could prove harmful. Five percent of respondents answered don't know.

Table 4   Safely reheating food

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken in one bag, bread and mushrooms in the other</td>
<td>1674</td>
<td>76.1</td>
</tr>
<tr>
<td>Bread in one bag, chicken and mushrooms in the other</td>
<td>353</td>
<td>16.1</td>
</tr>
<tr>
<td>Mushrooms in one bag, bread and chicken in the other</td>
<td>101</td>
<td>4.6</td>
</tr>
<tr>
<td>Don't Know</td>
<td>71</td>
<td>3.2</td>
</tr>
</tbody>
</table>

n=2199
Defrosting food
Guidance suggests the need to defrost frozen meats and poultry fully (in the fridge or microwave) or according to manufacturers’ instructions, before cooking to kill off harmful bacteria. The SCC was interested in finding out whether respondents know how to do this, and the questionnaire asked how to defrost a chicken. See Figure 5. A range of options was given for respondents to choose. What these results indicate is the larger number of pupils (64%) identified the safest way of defrosting the chicken, that is by covering it and putting it on a plate to defrost in the fridge. However, more than a quarter chose potentially harmful methods of thawing and a significant number didn't know which option to choose.

Packing food and cross-contamination
Uncooked food and cooked food should be prepared and stored separately. This is to avoid raw food touching or dripping onto cooked food as harmful bacteria (known as pathogens) can be passed this way. Raw food is particularly likely to contain pathogens and should always be kept separate from high risk food. High risk foods are usually considered as those which support the multiplication of harmful bacteria and are intended for consumption without further treatment, such as cooking, which would destroy the bacteria.

To test pupils’ knowledge about cross-contamination a scenario relating to shopping was presented in the questionnaire. It states “You have been to the shops and bought some bread, mushrooms and raw chicken. You have two bags”. It asks, to be safe, what would you pack together? See Table 5 on safe shopping. The correct answer to avoid cross-contamination is to pack chicken in one bag and bread and mushrooms in the other. The majority of respondents (76%) answered correctly. However, almost a quarter (24%) of pupils indicated an incorrect response or stated don’t know.
Poor Knowledge

There are poor levels of knowledge about certain food safety and hygiene principles. These include the recommended temperature of a fridge; avoiding cross-contamination in, for example, how to store raw meat and fish safely; cooking eggs safely; cooling food before storing and identifying groups of people who may be particularly susceptible to food poisoning. The results indicate that between 12% and 49% of pupils answered correctly.

At-risk

The question that received the fewest correct answers was identifying people at risk from foodborne illness. It is advised that special care should be taken for certain groups in society who may be more at risk of foodborne illness than the general population. The questionnaire asked pupils to name two groups of people that might be at risk from food poisoning and gave elderly people as an example. See Table 6. Correct answers also include babies and young children, people who are already ill and pregnant women. Almost 40% of the pupils were able to identify babies; however, just over one in ten could identify other 'at risk' groups.

Table 5  Safe shopping

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken in one bag, bread and mushrooms in the other</td>
<td>1674</td>
<td>76.1</td>
</tr>
<tr>
<td>Bread in one bag, chicken and mushrooms in the other</td>
<td>353</td>
<td>16.1</td>
</tr>
<tr>
<td>Mushrooms in one bag, bread and chicken in the other</td>
<td>101</td>
<td>4.6</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>71</td>
<td>3.2</td>
</tr>
</tbody>
</table>

n=2199
Table 6  At risk groups from food poisoning

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Babies</td>
<td>1044</td>
<td>39.3</td>
</tr>
<tr>
<td>Pregnant women</td>
<td>321</td>
<td>12.1</td>
</tr>
<tr>
<td>Sick people</td>
<td>358</td>
<td>13.5</td>
</tr>
<tr>
<td>Other</td>
<td>933</td>
<td>35.1</td>
</tr>
</tbody>
</table>

Note: 2656  Note that more than one response is possible

Temperature Control

Food hygiene advice suggests the need to “keep the coldest part of your fridge below 5°C”. The need to be aware of the temperature of the fridge is important because the common food poisoning organisms are generally considered to be unable to multiply at temperatures below 5°C. The questionnaire asked pupils to indicate, from a range of options, what temperature they thought food should be stored at in the fridge. See Figure 6. Just under half the respondents (49%) answered correctly, that is between 1°C and 5°C. The next highest response, from 22% of pupils was don’t know. Overall, more than 50% of pupils could not provide the correct answer to this question.

Storing food and cross-contamination

The questionnaire asked respondents to examine a picture of a fridge with an open door and seven basic food items (raw meat, raw fish, cooked meat, milk, a dessert with cream, vegetables and cheese). This is represented at Figure 7. Pupils were asked to draw arrows from each food item to where they thought it should be safely stored in the fridge. The results for raw meat and raw fish are analysed relative to their position to other food items in the fridge. Due to the potential for cross-contamination, especially with cooked or ready-to-eat foods which require no further cooking, raw meat and fish are recommended to be
stored at the bottom of the fridge. This is also the coolest part of the fridge where bacteria increase most slowly. Just over a third of pupils (36%) suggested safe storage positions for food in the fridge, while just under two thirds (64%) of respondents suggested storing food in the fridge in a position that is considered unsafe.

Undercooked food - eggs
To minimise the risk to health, guidance advises against eating food that contains uncooked eggs. A statement suggested “Jodie was short of time and the children were hungry. She needed something quick and easy so she made them soft boiled eggs”. Pupils were asked to indicate whether the food mentioned in the statement is safe to eat, unsafe to eat and could make you ill or to indicate they did not know the correct option. See Table 7.
The food in this scenario is considered unsafe to eat, as undercooked or uncooked eggs can cause illness. It is significant that just over one in three pupils answered correctly. This indicates that even though there have been publicity campaigns about the dangers of eating raw or soft-boiled eggs, it still appears to be accepted practice.

Table 7  Safe cooking - soft boiled eggs

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe</td>
<td>1050</td>
<td>47.7</td>
</tr>
<tr>
<td>Unsafe</td>
<td>770</td>
<td>35.0</td>
</tr>
<tr>
<td>Don't Know</td>
<td>379</td>
<td>17.2</td>
</tr>
</tbody>
</table>

Cooling food
Guidance has emphasised the need to maintain the correct temperature for food and the need to keep food out of the 'danger zone', that is between 5°C and 63°C. It suggests the need to “keep hot food hot, and cold food cold - don't leave them standing around. Take chilled and frozen food home quickly - then put them in your fridge or freezer at once”. The SCC wanted to find out whether pupils know how to deal with food once it has been heated. A statement suggested “Jack cooked a pot of chilli that morning. He left the chilli to cool on the worktop for 2 hours. He then put the pot of chilli in the fridge for tonight's dinner”. Pupils were asked to indicate whether the food is safe, unsafe or to answer don't know. See Table 8.

Table 8  Cooling food

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe</td>
<td>587</td>
<td>26.7</td>
</tr>
<tr>
<td>Unsafe</td>
<td>987</td>
<td>44.8</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>628</td>
<td>28.5</td>
</tr>
</tbody>
</table>
The food in this scenario is considered safe to eat as it is important to let food cool down before putting it into the fridge. Hot food should never be placed directly into a fridge as it can raise the temperature and it can also encourage condensation and therefore contamination. Twenty-seven percent of respondents answered according to best practice, that is, the food is safe to eat. A significant number of respondents (45%) indicated that this practice is unsafe, contrary to good practice and a significant proportion of pupils (29%) answered don't know.

Significantly, when this question was shown to Environmental Health Officers for comment there was debate about the exact time it would take to cool the food down and would depend on factors such as the amount of chilli cooked, the conditions of the kitchen and so on. This demonstrates the complexity of this issue and the need for clarity and guidance for the public and it is perhaps understandable that less than 27% of pupils could identify the correct answer.
Food safety index

A food safety index was developed to examine the aggregate score of pupils and the proportion of correct answers. A number of factors were examined to determine whether they influenced the score.

The SCC was interested in the proportion of correct and incorrect answers given by respondents to the questionnaire as a whole. A food safety index was developed to examine the aggregate score of pupils who responded to the food safety questionnaire.

A score was allocated to each question that relates to food safety. Respondents score one point for a correct answer and zero for an incorrect answer. The exception is the fridge question which is accorded a value of four points for a 'safe' fridge and zero otherwise. The total possible mark, which we have called the food safety index, is 20 and respondents can score between 0 and 20 depending on their knowledge of food safety and hygiene. The higher the score, the better the understanding of safety issues. See Figure 8 which shows the distribution of the food safety index.

![Figure 8](image-url)
The mean value attained by 2210 pupils is 11.8. One pupil answered all of the questions correctly, scoring a value of 20, and one pupil answered no questions correctly, scoring a value of 0.

The majority of pupils (65%) could correctly answer more than half of the questions relating to food safety and hygiene. However, only fourteen percent of pupils could answer more than three-quarters of the questions correctly.

A number of factors were examined to determine whether they influenced the results of the food safety score. The factors examined include age; gender; whether respondents undertake cooking in the home environment; their geographical location - that is whether in a rural or non-rural location; by local authority; whether the school is funded by the local authority or independently; and by a measure of deprivation (in this case free school meals). It was found that there is a statistical relationship between both gender and age and pupils knowledge of food safety.

Whether pupils cook at home and deprivation also had an impact on scores, however, the differences were not great.

It was also found that there was no statistically significant difference in knowledge of food safety and hygiene between schools in rural and non-rural locations; between pupils in different local authority areas; and between independent and state schools.
While these results might initially suggest that there is a need to focus initiatives on younger pupils, boys and those attending schools with a high proportion of free school meal eligibility this would be overly simplistic as the differences between these groups and others are not great. The overall analysis of the research points to a number of key findings:

- The need for better knowledge of food safety and hygiene for all pupils;

- The need to raise the average food safety score which was found to be 11.8 out of a possible score of 20;

- The need to encourage and make improvements to the positive aspects of teaching and learning that are taking place;

- The need for clarity and a better understanding in some of the more complex food safety and hygiene issues.
Based on the research carried out for this summary report the SCC make the following recommendations:

1. The Food Standards Agency needs to determine what are the most significant of the top ten messages in relation to food safety and hygiene. It is then necessary to determine what are the most appropriate methods of informing the public and whether there should be a focus on individual messages or collective messages.

2. The Food Standards Agency needs to make food safety and hygiene messages clear and relevant and understandable to pupils, parents and guardians, and teachers. To do this, appropriate materials and resources need to be provided in schools. Out of school clubs and organisations, which inform young people about food safety issues, should also have access to appropriate material.

3. The Scottish Executive and the Food Standards Agency should use this study as baseline data and repeat the research with an adult group. This will have a number of benefits. It will allow a comparison between the knowledge of adults in relation to pupils to determine the level of knowledge among the general population of Scotland as a whole. This will enable the monitoring of change through time, and the impact or effectiveness of future initiatives to improve knowledge of food safety and hygiene can be tracked through time. It will also enable a focusing of the most significant food safety and hygiene messages and whether there are merits in prioritising these.

Additionally, head teachers can use this study as a Scotland-wide benchmark with which to review the performance of pupils in their school and to monitor change in pupils' knowledge over time.
4. Agencies concerned with public health, including the Scottish Executive, the Food Standards Agency and the Health Education Board for Scotland, need to place greater emphasis on enabling parents and guardians to get across food safety and hygiene messages at home. To do this, parents and guardians need to be made aware of the importance of the issue and what good practice involves. The Food Standards Agency has an important role in determining the adequacy of the current knowledge among consumers and working to improve this knowledge.

5. The Food Standards Agency needs to review the clarity of food labels and decide whether there are clear public health benefits by requiring that key food safety and hygiene messages form part of the food label.
References

1 Source - Information & Statistics Division (ISD), Common Services Agency for NHS, Edinburgh. Form ISD(D)3
2 Food Standards Agency (2000) Foodborne Disease: Developing a Strategy to Deliver the Agency's Targets, Paper FSA 00/05/02, Agenda Item 4, October, Unpublished.
4 The Pennington Group (1997) Report on the Circumstances Leading to the 1996 Outbreak of Infection with E.coli 0157 in Central Scotland, the Implications for Food Safety and Lessons to be Learned, April, the Stationary Office, Edinburgh.