Summary report

Helping consumers reduce food waste – a retail survey

A survey across UK retailers of a range of factors believed to influence household food waste for a selection of products.
WRAP helps individuals, businesses and local authorities to reduce waste and recycle more, making better use of resources and helping to tackle climate change.


Written by: Brook Lyndhurst and ESA

Front cover photography: Shopping aisle (Fotolia)

WRAP and Brook Lyndhurst believe the content of this report to be correct as at the date of writing. However, factors such as prices, levels of recycled content and regulatory requirements are subject to change and users of the report should check with their suppliers to confirm the current situation. In addition, care should be taken in using any of the cost information provided as it is based upon numerous project-specific assumptions (such as scale, location, tender context, etc.). The report does not claim to be exhaustive, nor does it claim to cover all relevant products and specifications available on the market. While steps have been taken to ensure accuracy, WRAP cannot accept responsibility or be held liable to any person for any loss or damage arising out of or in connection with this information being inaccurate, incomplete or misleading. It is the responsibility of the potential user of a material or product to consult with the supplier or manufacturer and ascertain whether a particular product will satisfy their specific requirements. The listing or featuring of a particular product or company does not constitute an endorsement by WRAP and WRAP cannot guarantee the performance of individual products or materials. This material is copyrighted. It may be reproduced free of charge subject to the material being accurate and not used in a misleading context. The source of the material must be identified and the copyright status acknowledged. This material must not be used to endorse or used to suggest WRAP's endorsement of a commercial product or service. For more detail, please refer to WRAP's Terms & Conditions on its web site: www.wrap.org.uk
Executive summary

Previous research carried out by WRAP has shown that consumers’ knowledge and understanding about how to store and use their food is likely to contribute considerably to food waste. Similarly, the size of packs available to consumers can influence whether or not they are left with surplus food. WRAP had identified that there were examples of inconsistency in the information given to consumers on certain food products, or insufficient guidance on, for example, optimal storage. Similarly, that there were examples of good practice and new innovations that would help consumers get more out of the food bought. However, there was a lack of quantitative data on the type and consistency of information and packaging functionality given to consumers, across key foods and retailers.

This report summarises key findings from a large data collection exercise conducted for WRAP by ESA and Brook Lyndhurst. The research reviewed pack labels, size and functionality on approximately 10,000 separate products from 19 product categories. The data collected through this research constitutes an important resource for WRAP and the food industry to identify good practice that could be implemented more widely and to identify areas where inconsistency or lack of clarity could be addressed to improve consumer understanding and confidence enabling the purchase of appropriate amounts of food and ensuring that more of what is bought is used.

In some cases, there may well be genuine reasons why guidance given to consumers differs between products that are, from a consumer perspective, similar. These could relate to differences in product formulation, use of preservatives, differences in packaging materials and design and so on. However, in many cases, differences may have arisen for historical reasons or as a result of decisions taken in isolation by individuals or organisations. It is hoped that this report will encourage a review of the products and information given to consumers, and WRAP will be working with retailers, food manufacturers and brands, trade associations, Government and the Food Standards Agency to help develop clear recommendations and guidance for industry.

The project involved collecting a range of data on key product types (listed below) thought to be representative of their category. Categories were chosen to reflect those where food wastage is highest. The product types were:

1. Medium-sliced white bread.
2. Plain white rolls.
3. World breads (plain white pittas, plain tortilla wraps, plain, garlic or garlic and herb naans).
4. Standard tomato/original or tomato and herb pasta sauce.
5. Sliced ham.
6. Unsmoked back bacon.
7. Whole, skinless chicken breast fillets.
8. Fresh, raw mainstream potatoes.
10. Fresh, raw carrots.
11. Bagged salad; iceberg/mixed salad.
12. Standard long-grain rice; dry and microwaveable variants.
13. Dry fusili pasta.
17. Mature cheddar cheese.

Full definitions of each product type are found in Appendix 1 and the number of products from each product type for which data was collected is detailed in Appendix 2. To be succinct within the report, the product types are abbreviated; this is indicated by the bold type in the list above.
The key findings are as follows:

Pack size

- The research suggests that restricted availability of smaller pack sizes is only an issue for a limited number of products and in fact there is a reasonably good range for most products reviewed across all of the stores surveyed. The only products for which consumers appear to have a more limited choice of pack sizes were: pasta sauce, bread¹, bread rolls, ham and bacon.
- While a fairly wide range of pack sizes of bagged salad are available, WRAP research² suggests that there is a need for smaller sizes on the market, with a third of respondents stating that salad packs were too large.
- Smaller pack sizes are more expensive (per kg) for particular products; namely bread, pasta sauces, bacon and ham, which may result in some households buying larger packs than needed, being seen as better value for money.

Promotions

- During the period in which this research was carried out, a number of product categories stood out as being particularly subject to in-store promotions; namely yoghurts, bread, bread rolls, bacon, ready meals and chilled pasta sauces.
- By far the greatest numbers of promotions were associated with yoghurts – 47% of all products recorded were associated with some type of in-store offer. Moreover, 427 of the 1,190 items checked in this category (36%) were tied to multi-buy deals, offering consumers a discount if they purchased more than one pack of the same product category.
- 36% of ham packs were linked to an offer of some kind. Around two fifths (19%) of packs were in multi-buy deals that offered discounts for buying more of the same product type.

Storage

- The vast majority of the sample (96%) displayed some form of storage instructions on the packaging, though there was variation in the content of the guidance given on some packs.
- There is inconsistency across bread products in terms of where packs should be stored – e.g. in a cool, dark place or in the fridge. Carrot packs also show inconsistency in this area, while advice on how to store opened packs of pasta (e.g. in an airtight container, away from strong odours etc) also varied.
- There is also inconsistency in a number of product categories (especially yoghurts and cheese) regarding the recommended fridge temperature guidance.
- A number of products also show inconsistency when it comes to advice on how long packs could be stored after opening. Key categories include world breads, meats (chicken, ham and bacon), pasta sauces and cheese.
- In-line with WRAP research and advice³, the majority of pre-packed apples were found to display the advice to keep them refrigerated.
- Packs often fail to provide advice that could help consumers keep contents fresh for longer. It is rare for packs of bacon, ham and cheese to carry advice on storing the product in an airtight container after opening, for example.

Freezing

- Products that could be frozen (either in the original packaging or after transferring to a suitable container), frequently fail to inform consumers of this on their packaging. This is particularly true of pasta sauces, milk, bread rolls and store-baked bread. Freezing instructions are also rare on yoghurts and cheese, although guidance on these products should draw attention to likely changes in texture or appearance.
- The proportion of packs giving defrosting guidance (and the level of detail given) was very varied across most of the products surveyed.
- Most packs giving freezing guidance advise consumers to freeze on the day of purchase, despite the fact that the contents could be frozen up to the date given on the pack⁴ (or indeed after, in the case of products carrying a best before date, accepting some potential loss of quality).

---

¹ Note, the fieldwork was conducted before the new pack sizes were launched by Warburtons and Allied Bakeries
² Research into consumer behaviour in relation to food dates and portion sizes, WRAP, July 2008
³ Helping consumers reduce fruit and vegetable waste, WRAP, April 2008
Packs also vary in the guidance they offer to consumers about how long a given product can be frozen for before deteriorating in quality. Again, bread, ready meals and bacon provide good examples of this.

Date marks

- Although very few products carry 'sell-by' dates, a large number of supermarket own-brand products and some branded products carry 'display until' dates alongside either the 'best before' or 'use by' date. This is particularly prevalent when it comes to milk, potatoes and carrots. A quarter of potato packs and 19% of the 'uncut' carrots only bore a 'display until' date. The inconsistent use of 'display until' dates raises questions about how necessary they may be for retailers. Most branded products don't carry 'display until' dates, and with some supermarket own brands not using them either, it may be that relatively minor tweaks to stock control systems could dispense with this type of date altogether.

- Packs of some products effectively convert the 'best before' date into a 'use by' date. Some packs (such as mayonnaise, cheese, world bread, frozen chicken and frozen ready meals), which had a 'best before' date stated that, once opened, the product should be 'consumed within 'x' days and by date shown'. The latter part of this guidance could confuse consumers as they could open the pack on the 'best before' date and feel they had to use it all that day.

- Some product categories contain products that have a mix of 'best before' or 'use by' dates. This is particularly true for cheese, yoghurts, world breads and bacon. It is recognised that variations in the date mark and shelf-life between apparently 'similar' products result from different product formulations which could affect the likelihood of pathogens growing.

Cooking

- Only two fifths of the products reviewed in this research carried some sort of cooking guidance though 100% of dried pasta and rice packs had cooking instructions.

- A significant percentage of products in a few product categories fail to offer portion sizing advice. Key products include potatoes, carrots, microwavable rice and pasta.

- There is inconsistency in the portion sizing advice offered on products of the same type within several product categories. Key examples include ready meals, pasta sauce, dried pasta and bagged salad.

- Very few products provided advice on storing, re-heating and freezing leftovers.

Packaging

- Very few products reviewed in this research were sold in re-closable packaging. Product categories in which a small number of packs were re-closable, and where this might be rolled out further include world breads, bread rolls, ham, cheese and chicken.

- There was a similar story when it came to packs that split into smaller segments. Examples of categories offering split packs included bread rolls and larger packs of bacon. Some chicken packs included individually wrapped chicken breasts, making the pack very suitable for freezing.

In-store advice and tools

- Researchers found very little in-store guidance to consumers on ways of avoiding food waste, at the time the fieldwork was undertaken.

- The availability of tools that may help consumers reduce food waste was mixed, with widespread availability of re-closable food/freezer bags, but lower availability of other tools such as fridge thermometers. Where they were available they tended not to be sold alongside the food products for which they might be used, nor was there any evidence of signposting from the food products to these tools.

Key recommendations – retailers and brands

- Ensure the storage guidance given to consumers on-pack (and at point of sale for free-flow products like fruit and vegetables and rolls) is clear and optimal to ensure consumers are storing their food correctly. Where possible, improving consistency of storage guidance given across ‘similar’ products should be considered. Storage guidance elements that could have the greatest impact are:
  1. where the product should be stored at home e.g. in the fridge or in a cool, dark place;
  2. usage guidance e.g. ‘use within x days after opening’ and ‘wrap tightly after opening’;

---

http://www.eatwell.gov.uk/keepingfoodsafestoring/#!cat507058
3. whether the product can be frozen either by including the snowflake logo and/or guidance such as ‘freezable’; and
4. defrosting guidance.

- Cooking instructions were provided on all packs of pasta, pasta sauce, rice, chicken and ready meals, 86% of bacon packs, 82% of potato packs and 81% of carrot packs. Ensure cooking instructions are provided where appropriate and are clear to help consumers portion and cook the right amount and can safely store and reheat any leftovers. It might be more appropriate to provide cooking instructions online and/or at point of sale rather than on-pack. Cooking instructions that could have the greatest impact are:
  1. portioning e.g. on potatoes, carrots and pasta;
  2. cooking guidance e.g. carrots, potatoes and bacon; and
  3. storing and re-heating leftovers e.g. on chicken fillets, pasta.

- Phase out all remaining instances of ‘sell by’ dates and take this term out of consumer-facing literature about what date marks mean. Work with WRAP to investigate the impact on consumer understanding and behaviour (and store waste and stock rotation) of using non-consumer meaningful ‘display until’ dates for stock control. Where possible, limit use of different dates (‘use by’, ‘best before’) on ‘similar’ products unless there are microbiological reasons for a different date mark being used.

- Work with WRAP to consider moving away from “freeze on the day of purchase”, where appropriate, to indicate to consumers that foods can be safely frozen up to the date mark (as communicated by the FSA).

- Stock ‘tools’ that will help consumers reduce food waste in-home such as fridge thermometers, portioning guides and air tight storage containers. Where possible, these should be sold alongside relevant items or signposted from the food aisles to where they are sold in store.

- Consider moving towards promotional strategies that encourage the purchase of food that can be consumed or frozen prior to the end of shelf-life, particularly for products such as yoghurts and sliced ham (most of which are not labelled as freezable). Where such strategies are employed, provide advice on how these products can be stored / frozen to extend their life. This will maximise the benefits for consumers, in terms of value for money and less waste.

Key recommendations - WRAP

- Continue to undertake a more thorough analysis of promotional strategies.
- Complete the research to develop the evidence base around how the application and understanding of date labels and storage guidance might be improved in order to reduce household food waste. As part of this work, work with the food industry to investigate alternatives to ‘freeze on the day of purchase’ labelling.
- Explore consumer perceptions of price gradients, since many consumers may believe that smaller packs are sold at a premium for products where this is not in fact the case, such as chicken.
- Develop consumer-facing messaging demonstrating the benefits of packaging in helping to prevent household food waste e.g. re-closable packaging and portioned freezable packs and promote through the Love Food Hate Waste website. The aim would be to drive behaviour change around how consumers shop (choosing ‘smart’ packaging) and how they use packaging at home.
- Repeat the retailer survey in early 2010/11 to review changes to the retail environment and consider expanding the survey to include relevant drinks.
Contents

1.0 Introduction ................................................................................................................................. 7
  1.1 What data were collected? ........................................................................................................ 7
  1.2 Where were the data collected? ............................................................................................ 9
  1.3 How were the data collected? .................................................................................................. 9
    1.3.1 Wave 1, 15 stores (4 – 10 March 2009) ........................................................................... 10
    1.3.2 Wave 2, 48 stores + 5 online (18 – 25 March 2009) ....................................................... 10
  1.4 Definitions .............................................................................................................................. 10
  
2.0 Pack size ..................................................................................................................................... 11
  2.1 Availability of a range of pack sizes .................................................................................... 11
    2.1.1 Products for which consumers may have a limited choice of pack sizes available ...... 11
    2.1.2 Products for which restricted pack sizes are less of an issue ....................................... 14
  2.2 Price gradients for packs of different sizes ........................................................................ 16
    2.2.1 Pack size .......................................................................................................................... 11
        2.2.2 Yoghurt flavours ............................................................................................................ 17
  
3.0 Promotions ................................................................................................................................. 19
  
4.0 Storage ...................................................................................................................................... 21
  4.1 Storage guidance .................................................................................................................... 21
    4.1.1 Where to store the product ............................................................................................ 21
    4.1.2 How to store the product ............................................................................................. 22
    4.1.3 How long to store the product once opened .................................................................. 22
    4.2 Freezing guidance ............................................................................................................. 24
    4.2.1 What can be frozen ......................................................................................................... 26
    4.2.2 Use of the snowflake logo ............................................................................................. 27
    4.2.3 When to freeze and how long to keep it frozen ............................................................. 28
    4.2.4 Defrosting guidance ..................................................................................................... 29
  
5.0 Date marks .................................................................................................................................. 30
  5.1 Use of dates ............................................................................................................................. 31
    5.1.1 Stock control dates ......................................................................................................... 31
    5.1.2 Blurring the boundaries between ‘best before’ and ‘use by’ ........................................... 32
    5.1.3 Different types of dates used on products of the same type ........................................ 32
    5.1.4 ‘Best before’ dates on eggs ............................................................................................ 33
  
6.0 Cooking ..................................................................................................................................... 34
  6.1 Cooking instructions .............................................................................................................. 34
  6.2 Advice on leftovers ............................................................................................................... 34
  6.3 Portion size information ....................................................................................................... 34
    6.3.1 Lack of portion sizing information ............................................................................... 35
    6.3.2 Inconsistent guidance on portion sizes ................................................................. 35
  
7.0 Packaging .................................................................................................................................. 37
  7.1 Re-closable packs ................................................................................................................... 37
    7.1.1 Re-closing the pack or using airtight or re-closable containers ................................. 38
    7.2 Splitting packs into smaller sections .............................................................................. 38
  
8.0 Store level data .......................................................................................................................... 40
  
9.0 Conclusions ............................................................................................................................... 40
  
Appendix 1 - Product categories ...................................................................................................... 45
Appendix 2 - Number of products by product category ................................................................. 48
Appendix 3 - Detail relating to the stores visited through the research ........................................ 49
1.0 Introduction

WRAP’s research estimates that 8.3 million tonnes per year of food and drink waste is generated by households in the UK, most of which (5.3 million tonnes) is avoidable. Previous research carried out by WRAP has shown that consumers’ knowledge and understanding about how to store and use their food is likely to contribute considerably to food waste. Similarly, the size of packs available to consumers can influence whether or not they are left with surplus food. WRAP had identified that there were examples of inconsistency in the information given to consumers on certain food products, or insufficient guidance on, for example, optimal storage. Similarly, that there were examples of good practice and new innovations that would help consumers get more out of the food bought. However, there was a lack of quantitative data on the type and consistency of information and packaging functionality given to consumers, across key foods and retailers.

This report summarises key findings from a large data collection exercise conducted for WRAP by ESA and Brook Lyndhurst. The research reviewed pack labels, size and functionality on approximately 10,000 separate products from 19 product categories. The data collected through this research constitutes an important resource for WRAP and the food industry to identify good practice that could be implemented more widely and to identify areas where inconsistency or lack of clarity could be addressed to improve consumer understanding and confidence enabling the purchase of appropriate amounts of food and ensuring that more of what is bought is used.

In some cases, there may well be genuine reasons why guidance given to consumers differs between products that are, from a consumer perspective, similar. These could relate to differences in product formulation, use of preservatives, differences in packaging materials and design and so on. However, in many cases, differences may have arisen for historical reasons or as a result of decisions taken in isolation by individuals or organisations. It is hoped that this report will encourage a review of the products and information given to consumers, and WRAP will be working with retailers, food manufacturers and brands, trade associations, Government and the Food Standards Agency to help develop clear recommendations and guidance for industry.

1.1 What data were collected?

The project involved collecting a range of data on key product types (listed below) thought to be representative of their category. Categories were chosen to reflect those where food wastage is highest. The product types were:

1. Medium-sliced white bread.
2. Plain white rolls.
3. World breads (plain white pittas, plain tortilla wraps, plain, garlic or garlic and herb naans).
4. Standard tomato/original or tomato and herb pasta sauce.
5. Sliced ham.
6. Unsmoked back bacon.
7. Whole, skinless chicken breast fillets.
8. Fresh, raw mainstream potatoes.
10. Fresh, raw carrots.
11. Bagged salad; iceberg/mixed salad.
12. Standard long-grain rice; dry and microwaveable variants.
13. Dry fusili pasta.
17. Mature cheddar cheese.

---

5 Household Food and Drink Waste in the UK, WRAP, November 2009
6 Food and drink thrown away that was, at some point prior to disposal, edible (e.g. slice of bread, apples, meat).
Full definitions of each product type are found in Appendix 1 and the number of products from each product type for which data was collected is detailed in Appendix 2. To be succinct within the report, the product types are abbreviated; this is indicated by the bold type in the list above.

The selection of these products was based on data collected for 'The Food We Waste' report that included details of which food types are most commonly discarded, and in what state (e.g. whole, unopened, opened but uncooked, leftover etc). New research on what is poured down the drain, and updated figures on what is fed to pets and home composted has provided a more complete picture of what is thrown away annually. 'The Food We Waste' report, published in May 2008, has therefore been updated and 'Household Food and Drink Waste in the UK' was published in November 2009. The weight of food and drink waste by food group, based on the 2009 data, split by avoidability is shown in Figure 1 and shows that the 19 products surveyed through this research continue to be representative of those foods most commonly wasted at the household level.

Figure 1 Weight of food and drink waste by food group, split by avoidability

![Graph showing weight of food and drink waste by food group, split by avoidability.](source)

The key data collected for analysis were as follows:

- pack size (including number of units in a pack, where relevant);
- price (in order to assess price per weight or volume);
- storage instructions (both presence of, and detail);
- freezing and defrosting instructions (both presence of, and detail);
- date marks displayed on the packaging;
- the presence of cooking instructions, recipes and tips;
- portion size information (both presence of, and detail);
- packaging and pack features;
- recycling logos used; and

---

7 The Food We Waste, WRAP, July 2008
any point of sale information.

In addition, in order to be able to fully analyse these data, the following contextual information (where relevant) was recorded:
- retailer;
- store type;
- store location (geographical);
- whether branded or own brand;
- if own brand, whether ‘premium’, ‘standard’ or ‘value’;
- brand/sub brand;
- variant (e.g. standard tomato/original or tomato and herb pasta sauce);
- in store location (i.e. whether chilled, ambient, frozen or from the deli counter); and
- flavour.

1.2 Where were the data collected?

The data collection process involved visits to four examples of each of the following store fascias:
- Aldi;
- Asda supermarket;
- Asda Wal-Mart Supercentre;
- Lidl;
- M&S department stores;
- M&S Simply Food;
- Morrisons;
- Sainsbury’s Local;
- Sainsbury’s supermarket;
- Tesco Express;
- Tesco Extra;
- Tesco Metro;
- Tesco supermarket;
- The Co-operative (convenience store);
- The Co-operative (supermarket); and
- Waitrose.

The four examples of each store fascia were located as follows:
- two in England (one north, one south);
- one in Wales; and
- one in Scotland.

Data were also collected from five online stores:
- Asda;
- Tesco;
- Sainsbury’s;
- Waitrose; and
- Ocado.

Further details on the number of each different store type visited can be found in Appendix 3.

1.3 How were the data collected?

After an initial scoping phase to finalise the methodology and the reporting framework (which included a pilot store visit on 24 February 2009\(^8\)) the data was collected in two waves:

\(^8\) Data from this visit was included in the final data set.
1.3.1 Wave 1, 15 stores (4 – 10 March 2009)

Researchers visited one of each of the store fascia’s sites (detailed in section 2.2) and purchased samples of every item in each product category. Photos were taken of all products, both to enable data verification, and to provide visual examples of particularly interesting / relevant findings. All data were recorded and sent to a central data collection point. At the end of this wave, all data were collated into a central excel database, from which a ‘product catalogue’ for each store fascia was developed for use in Wave 2. Some examples of products were purchased to obtain photographs.

1.3.2 Wave 2, 48 stores + 5 online (18 – 25 March 2009)

Researchers visited all remaining store fascias, recording the availability of products already catalogued in Wave 1 for the same store fascia, along with any in-store information for those products (i.e. information such as price, promotions or point of sale information that may be different from store to store). Any additional products not captured in Wave 1 were purchased and photographed and the data were added to those collected in Wave 1. Data capture from the online retailers also took place during Wave 2 and, again, new products not captured in Wave 1 were purchased and recorded where required.

Data on all products identified in Wave 2 (both repeat data on products catalogued in Wave 1 and ‘new’ products purchased in Wave 2) were then collated in a central excel database along with the data from Wave 1. After a period of data cleaning, the full dataset was analysed using SPSS software. Each product category was analysed separately, providing topline results for each data heading, plus cross-tabulations as follows (where relevant):
- by variant;
- by branded / own brand;
- by own brand range (i.e. premium vs standard vs value);
- by in-store location (i.e. chilled vs ambient vs frozen vs deli counter);
- by nation;
- by store format (i.e. supermarket vs “metro” / convenience store vs online); and
- by retailer.

All relevant data is summarised in this report.

1.4 Definitions

**Product type** – this definition applies to the food items studied through this research. It is recognised that while the intention was to identify products within a fairly narrow range e.g. medium sliced white bread, for some products the definition can still mask significant differences in recipe/formulation that mean the labelling is very varied e.g. pasta sauce was collected from both the ambient and chilled aisles.

**Pack size/ weight** – this is used fairly interchangeably within the report.
2.0 Pack size

This section deals with two key issues in relation to pack size:
- the availability of a range of pack sizes; and
- price gradients between packs of different sizes.

2.1 Availability of a range of pack sizes

Research undertaken for WRAP\(^9\) suggested that many consumers – and smaller households in particular – sometimes struggled to buy packs of a size that met their needs. Around a third of respondents had had issues with pack sizes for ham, bagged salad, pasta sauce and bread. Of those that had found pack sizes to be an issue, the vast majority complained that packs were too large for their needs (with some directly complaining that this led to food waste, though this was not always made explicit). Pasta sauce provided a notable exception, with some consumers complaining that packs are sometimes too small.

This research suggests that restricted availability of smaller pack sizes is in fact only an issue for a small number of products. Analysis suggests that there is a reasonably good range for most products across all of the stores surveyed as a whole; including smaller format stores. The results also suggest, however, that for some products, smaller pack sizes are more expensive (per kg) disincentivising consumers to buy a smaller pack, which may be more suitable for their needs. For example, small packs of pasta sauce (up to 200g) cost an average of £8.08 per kg, compared with £4.33 per kg for packs of between 201g and 300g. It is worth noting that there are many other factors that influence price, other than pack weight, e.g. positioning and branding.

It is worth noting that the most ‘problematic’ products in terms of the range of pack sizes available were similar to those highlighted in the research stated above i.e. ham, bagged salad, pasta sauce and bread. This is discussed further in the following section.

2.1.1 Products for which consumers may have a limited choice of pack sizes available

At first glance, many packs of ham come in reasonably small sizes, with half (50%) ranging between 100g and 150g and another 13% of packs weighing up to 100g. The pack weight varies according to the number of slices as well as the thickness of the slices so there are additional variables associated with perceived product quality and personal preference hidden within these pack size ranges. Unfortunately, data on the number of slices per pack were not available for all the packs reviewed in this research e.g. researchers were not asked to record/analyse the number of slices within packs of ‘wafer thin’ ham where this wasn’t stated on the pack. Analysis of the price per kg of different pack sizes showed that the smallest pack (up to 100g and 101-150g) were substantially more expensive than those weighing 151g or more (Figure 2).

\(^9\) Research into consumer behaviour in relation to food dates and portion sizes, WRAP, July 2008
Almost half of the packs of **bacon** reviewed fell in the 201g to 250g bracket. Although there was a reasonable, if not vast, range of alternative pack sizes available outside this band\(^{10}\), there were very few (2%) packs weighing less than 150g. The particularly large packs (75% of those weighing 301 to 500g, and all of those weighing over 500g) tended to be split into smaller sections (Figure 3). As with ham, in general, larger packs of bacon represented better value than the smaller packs; packs weighing 151-200g (base 92) cost on average £14.16 per kg while packs weighing 201-250g (base 248) cost on average £9.55 per kg and those weighing 301-500g (base 57) cost on average £7.07 per kg.

Around two thirds (64%) of **pasta sauce** packs were between 301g and 500g in weight, split almost equally between 301g-400g packs (33%) and 401g-500g packs (31%). Just under one in five (18%) were smaller (up to 200g) and these tended to be branded products (Figure 4).

\(^{10}\) 18% were between 151g and 200g; 14% were between 251g and 300g; 11% were between 301g and 500g; and 7% were over 500g.
Most packs of bread (71%) were sold as 800g loaves, the remainder were sold as 400g loaves (28%). These smaller 400g loaves have smaller slices (i.e. with less surface area) than the 800g packs. This could mean consumers are buying the 800g loaves, in order to get the slice profile they prefer, even though this size of pack is too big for them. In April 2009 the specified quantities that applied to some 30 types of pre-packaged food and other pre-packaged products in the UK were disapplied\(^\text{11}\). Specified quantities for bread were deregulated as part of this, enabling loaves to be sold in any quantity, in addition to the traditional sizes (400g or a multiple of 400g) in which they are currently sold, which presents an exciting opportunity to explore new pack sizes\(^\text{12}\).

Almost 90% of avoidable of sliced bread, rolls, baguettes etc. that are wasted are not used in time equating to 480,000 tonnes\(^\text{13}\). The largest proportion of bread rolls (41%) are sold in packs of six, while a further 19% are sold in packs of twelve. 29% of the rolls surveyed were from the in-store bakery; giving consumers the option to self-select the number of rolls they want, though products from the in-store bakery tend to have a shorter in-home life compared to pre-packed variants.

For bagged salad, the data show there is a fairly wide range of pack weights available (Table 1), WRAP research\(^\text{14}\) suggested that 34% of householders have an issue with salad pack sizes being too large and evidence from WRAP\(^\text{15}\) that around 37,000 tonnes of bagged salads are thrown away each year, suggests that even the smallest packs available may not be small enough and that single portion bags may be required to cut down on salad waste. The fact that the storage guidance on half of all packs included the advice to consume the salad within 24 hours of opening would also suggest that smaller packs might be required, given that many consumers would find it difficult to consume entire bags in just one day.


\(^{12}\) This research was undertaken before the launch of the new Warburtons’ 600g loaf or Kingsmill’s Little Big Loaf (525g).

\(^{13}\) Household Food and Drink Waste in the UK, WRAP, November 2009

\(^{14}\) Research into consumer behaviour in relation to food dates and portion sizes, WRAP, July 2008

\(^{15}\) Household Food and Drink Waste in the UK, WRAP, November 2009
Table 1 Proportion of packs of bagged salad found by weight (base 141)

<table>
<thead>
<tr>
<th>Pack weight</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 100g</td>
<td>14%</td>
</tr>
<tr>
<td>101-150g</td>
<td>10%</td>
</tr>
<tr>
<td>151-200g</td>
<td>37%</td>
</tr>
<tr>
<td>201-250g</td>
<td>18%</td>
</tr>
<tr>
<td>251-300g</td>
<td>19%</td>
</tr>
</tbody>
</table>

It is worth noting that just three packs of salad (all the same product collected from three different store locations) were sold in two split packs (i.e. small 80g bags sold together, example given in Figure 5) to allow consumers to keep salad fresh by keeping one of the packs sealed.

Figure 5 Two small 80g salad bags sold together

2.1.2 Products for which restricted pack sizes are less of an issue

Pack size seemed less of an issue for all of the other product categories reviewed. In some cases, this was because a particular product will keep long enough to allow householders to consume the contents of a pack in two or more sittings. In others, there was a genuinely broad range of pack sizes available and/or the option to buy them loose.

The availability of loose apples (which accounted for almost a third of our sample, or 30%) ensures that consumers have plenty of choice in deciding how many to buy. That said, many of the remaining options consisted of packs of six (34%) or seven (24%) apples, with only 6% of packs containing four apples, suggesting that if consumers restrict themselves to buying pre-packed produce, their choice may be more limited. However, WRAP research 16 has shown that storing apples in the fridge can maintain their quality and extend their in-home life, making it easier for consumers to eat the whole pack and avoid wasting any.

Potatoes are similar to apples in that, while the size range for pre-packed options are fairly limited (over two thirds – 67% - weighed 2.5kg), the availability of loose options in many stores provides consumers with fairly high levels of flexibility. It should be noted though that the research did not capture the number of stores offering loose potatoes 17, so it is difficult to know exactly how far this flexibility extends. Considering only the pre-packed potatoes, the data shows that the smaller packs tended to be more expensive (per kg); packs weighing 1.5kg or

16 Helping consumers reduce fruit and vegetable waste, WRAP, April 2008
17 At the time of the fieldwork, researchers reported that the majority of loose potatoes sold were ‘baking’ potatoes or ‘new’ potatoes, which were out of scope (see Appendix 2).
2kg (base 30) cost on average £1.06 per kg and those weighing 2.5kg (base 103) cost on average £0.61 per kg while those weighing 5kg (base 17) cost on average £0.45 per kg.

**Carrots** too are available loose (they were available in 30 of the 69 stores visited), giving consumers choice in the number purchased at any one time. Unlike apples and potatoes, carrots are also available in a fairly wide range of pre-packed options. The most common pack size (451g to 550g) accounted for only a quarter (24%) of the sample, with the remainder spread across packs ranging from under 250g to more than 1kg.

A wide range of pack sizes was also available when it came to **cheese**. A fifth (21%) of the cheese reviewed was in packs of 151g to 200g, another quarter (24%) was in packs of 201g to 250g and another quarter (27%) was in much larger packs of between 351g and 400g. The research shows that the very smallest pack sizes (up to 150g) are more likely to be available in the smaller ‘convenience’ stores than larger superstores (8% of packs found in convenience stores weighed up to 150g compared to just 2% of all packs found in larger superstores though 25% of packs found in larger superstores weighed between 151-200g compared to just 8% of all packs found in convenience stores).

Another product available in a fairly broad range of sizes is **milk**. One in seven (14%) of the packs reviewed held just a pint of milk (568ml), while around a fifth (21%) held two pints (1.14 litres). A similar proportion of the total sample was made up of 4 pint packs (2.27 litres) and 2 litre packs (little less than 4 pints) (23 and 22% respectively). Larger packs of 6 pints (3.4 litres) made up 12% of the milk samples.

Although more than half (55%) of the **mayonnaise** packs reviewed ranged between 301g and 500g19, there were packs available in both smaller sizes (8% up to 200g and 11% weighing between 201g and 300g) and larger options (19% weighed over 600g). The data suggest that online stores tend to stock more, smaller items and fewer packs in the ‘middle’ weights (e.g. between 301g and 500g).

While almost two in five (38%) of the chilled and frozen **ready meals** reviewed weighed between 301g and 400g, there did appear to be a fairly good degree of choice in other sizes. Almost a quarter (23%) weighed 300g or less (17% weighing between 201g and 300g), while some larger packs (7%) weighed more than a kilogram. Looking just at the frozen varieties, the majority (71%) weighed between 301-400g but the ranges were much less distinct for chilled varieties (Figure 6).

![Figure 6](image)

**Figure 6** Weight of ready meal packs reviewed, by in-store location (base 488)

The relatively small number of the smallest size chilled and frozen ready meal packs (weighing up to 200g) did come at a premium, however; £9.07 per kg compared with between £2.64 (1kg packs) and £5.10 (301-400g packs reviewed ranged between 301g and 500g).

18 Note that the size of some mayonnaise packs was expressed in millilitres rather than grams. In order to consider all packs on a like for like basis, pack sizes by volume were converted to grams using a conversion factor of 1ml to 0.95g.

19 23% fell between 301g and 400g; 32% between 401g and 500g.
It should also be noted that ready meal pack size choices were far more limited when it came to value options. Almost two thirds (65%) of value chilled and frozen ready meals weighed between 201g and 300g, with 22% weighing more than one kilogram. Only 11% of value ready meals fell in between these two extremes, and only 1% weighed up to 200g.

**Chicken** packs ranged from 233g (18% of the sample weighed up to 300g) to over 800g (18% of the sample – although these larger packs tended to be frozen\(^{20}\)). The only real restriction was in terms of single fillets. No packs contained a single fillet, although they were individually wrapped in some larger packs, making them very suitable for freezing at home.

When it comes to dried **pasta** and dried **rice**, pack sizes may be less relevant in terms of food waste, since the product itself will last for long periods even once the pack is opened. The only exception to this is microwaveable rice, which, perhaps unsurprisingly, tended to be sold in much smaller packs of either 250g to 300g (80%) or 400g (20%).

Similarly, while more than two thirds (68%) of the packs of **eggs** reviewed during the research contained six eggs, larger packs were available. Most of the remainder contained either 10 eggs (5%), 12 eggs (15%) or 15 eggs (5%). Only five packs (1%) contained just four eggs.

### 2.2 Price gradients for packs of different sizes

Across most products the data show a tendency for larger packs to be cheaper by weight or volume, while smaller products are often included in premium ranges. This may result in some households buying larger packs than needed, being seen as better value for money.

A number of products showed particularly pronounced price gradients between the smallest (and most expensive) and the larger (and relatively cheaper) packs. The following summarises this information by weight, but it is worth noting that there are many other factors that influence price e.g. positioning and branding.

Although there were really only two pack weights available when it came to **bread**, smaller 400g loaves were considerably more expensive (£2.03/kg) than their 800g counterparts (£1.32/kg).

The price of the smallest packs of **pasta sauces** (£8.08/kg for packs of up to 200g) was almost double that for intermediate size options (between £2.10/kg for packs of between 501g and 600g and £4.38/kg for packs of between 301g and 400g).

Meat products also tend to be comparatively more expensive for smaller packs than for larger ones. **Bacon**, for example, showed a clear difference between smaller packs of between 151g and 200g (£14.16/kg) and larger packs (ranging between £7.07/kg for packs between 301g and 500g and £9.55/kg for packs between 201g and 250g). The very smallest packs of bacon, weighing up to 150g per pack, were comparably cheaper at £9.00/kg, but there were only 10 products in this category, making this a less reliable indicator.

There was a similar story when it came to **ham**, with the two smallest weight bands costing considerably more than larger packs. Ham weighing up to 100g cost an average of £20.78/kg and packs between 101g and 150g were even more expensive at £26.57/kg. This dropped to £9.48/kg for packs weighing between 151g and 200g and £5.25/kg for the very largest (over 300g).

Given this tendency for smaller packs of meat to be more expensive, the results for **chicken** are perhaps counterintuitive, with a relatively gentle and unpronounced price gradient between the smallest and largest packs (Figure 7). It would be interesting to explore whether consumers are aware of this, and if they were whether this would affect the pack sizes purchased.

---

\(^{20}\) 59% of all frozen packs weighed over 800g compared to just 12% of all refrigerated packs.
2.3 Yoghurt flavours

The data collected for yoghurts reveals that a large number of different flavour combinations are available to consumers. Forty-four per cent of the yoghurt packs reviewed were sold in packs of four and 19% sold in packs of six. Thirty-seven per cent were sold in single pots (33% were suitable for a single serving while 4% were the larger size designed for more than one person/serving). This research recorded 33 different combinations of flavours in multipacks with at least two pots per flavour, and a further 32 combinations in multipacks where every pot was different (Table 2). This choice may mean that consumers are able to pick and choose the options that best suit them, avoiding waste generated through unwanted flavour options. Equally though, despite the choice, the numbers of flavours in a single pack may actually make it more likely that consumers purchase a pack containing flavours they are less fond of, particularly since not every combination will be available in every store. This issue may be further exacerbated by the very high proportion of yoghurts on special offer (47%), which could encourage consumers to purchase more than they need.

---

22 Given the requirement to collect data on all available packs of multi-flavour multipacks (i.e. an example of every combination of flavours or each type, as opposed to one flavour of single packs or one flavour of single flavour multipacks) a larger proportion of the multipacks available to consumers were reviewed than single yoghurts. This means that this data does not provide a direct comparison of the availability of single yoghurts and multipacks. It does, however, show that multipacks of yoghurts were more likely to be sold in quantities of four rather than six.
<table>
<thead>
<tr>
<th>Flavours of yoghurt multi-packs (base 529)</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 raspberry, 2 strawberry</td>
<td>77</td>
<td>15%</td>
</tr>
<tr>
<td>2 peach, 2 strawberry</td>
<td>76</td>
<td>14%</td>
</tr>
<tr>
<td>2 cherry, 2 raspberry and cranberry, 2 strawberry</td>
<td>36</td>
<td>7%</td>
</tr>
<tr>
<td>2 apricot and mango, 2 mango and passion fruit</td>
<td>29</td>
<td>5%</td>
</tr>
<tr>
<td>2 mango, 2 peach and passion fruit</td>
<td>28</td>
<td>5%</td>
</tr>
<tr>
<td>2 orange and chocolate, 2 vanilla and chocolate, 2 vanilla chocolate with black cherry</td>
<td>26</td>
<td>5%</td>
</tr>
<tr>
<td>2 blueberry, 2 fruit of the forest</td>
<td>25</td>
<td>5%</td>
</tr>
<tr>
<td>2 toffee, 2 vanilla</td>
<td>25</td>
<td>5%</td>
</tr>
<tr>
<td>3 raspberry and blackcurrant, 3 strawberry</td>
<td>25</td>
<td>5%</td>
</tr>
<tr>
<td>2 black cherry, 2 raspberry, 2 strawberry</td>
<td>24</td>
<td>5%</td>
</tr>
<tr>
<td>2 apricot, 2 mandarin, 2 peach and pineapple</td>
<td>22</td>
<td>4%</td>
</tr>
<tr>
<td>2 blackberry, 2 cherry</td>
<td>20</td>
<td>4%</td>
</tr>
<tr>
<td>2 exotic fruits, 2 pineapple</td>
<td>19</td>
<td>4%</td>
</tr>
<tr>
<td>3 smooth peach, 3 smooth strawberry</td>
<td>12</td>
<td>2%</td>
</tr>
<tr>
<td>Apricot and nectarine, blackberry and blackcurrant, fruits of the forest, pear and mango, 2 strawberry</td>
<td>10</td>
<td>2%</td>
</tr>
<tr>
<td>3 black cherry, 3 strawberry</td>
<td>9</td>
<td>2%</td>
</tr>
<tr>
<td>1 raspberry, 1 red cherry, 2 strawberry</td>
<td>7</td>
<td>1%</td>
</tr>
<tr>
<td>2 apricot, 2 orange, 2 pineapple</td>
<td>7</td>
<td>1%</td>
</tr>
<tr>
<td>3 raspberry, 3 strawberry</td>
<td>7</td>
<td>1%</td>
</tr>
<tr>
<td>2 blackcurrant, 2 gooseberry, 2 rhubarb</td>
<td>6</td>
<td>1%</td>
</tr>
<tr>
<td>3 smooth cherry, 3 smooth raspberry</td>
<td>6</td>
<td>1%</td>
</tr>
<tr>
<td>2 brazil nut, 2 roasted hazelnut</td>
<td>5</td>
<td>1%</td>
</tr>
<tr>
<td>1 apricot, 1 peach, 2 strawberry</td>
<td>4</td>
<td>1%</td>
</tr>
<tr>
<td>2 apple and blackberry, 2 rhubarb, 2 strawberry</td>
<td>4</td>
<td>1%</td>
</tr>
<tr>
<td>2 peach and mango, 2 pineapple and longan</td>
<td>4</td>
<td>1%</td>
</tr>
<tr>
<td>3 red raspberry and blackcurrant, 3 strawberry</td>
<td>4</td>
<td>1%</td>
</tr>
<tr>
<td>2 blueberry, 2 raspberry</td>
<td>3</td>
<td>1%</td>
</tr>
</tbody>
</table>
3.0 Promotions

Previous WRAP research has revealed that a significant percentage of consumers (around 30%) believe that buying food on promotion leads to more food being wasted\(^{22}\). However there is no data to determine a cause and effect relationship between buying specific foods on offer and the likelihood of them being thrown away, or to quantify the amount of food waste that might arise for this reason.

This research therefore recorded how often a promotion – such as buy one, get one free offer – was associated with a particular product (Table 3). The resulting data suggest that promotions are more commonly associated with some products than others, though it should be noted that these data only represent a snapshot of a point in time and may not necessarily be representative of a more general picture. WRAP is currently undertaking a more thorough analysis of promotional strategies.

By far the greatest numbers of promotions were associated with **yoghurts** – 47% of all products recorded were associated with some type of in-store offer. Moreover, 427 of the 1,190 items checked in this category (36%) were tied to multi-buy deals, offering consumers a discount if they purchased more than one pack of the same product category. It is worth highlighting that branded packs were more likely to be on special offer than supermarket own brand packs (57% compared with 27%), and that of the own brand packs premium yoghurts (51%) were more likely to be on special offer than standard (25%) or value (8%) own brand packs.

**Ham** too was frequently subject to promotions, with 36% of packs linked to an offer of some kind. Around two fifths (19%) of packs were in multi-buy deals that offered discounts for buying more of the same product type, while 13% offered discounts if bought with a different type of product. One in twenty were subject to single item discounting.

Other products commonly associated with promotions were **bread** (16% linked with an offer of some sort), **bread rolls** (23% on offer), **bacon** (24% on offer) and **ready meals** (17% on offer). A larger proportion of frozen ready meals were on offer (25% compared with 15% of chilled meals), although these may be less significant in food waste terms because of the period of time they keep for.

The other product category of note was **pasta sauce**. Although a very small number of products in this category were associated with in-store promotions (just 12 out of 325 packs), the majority of these were chilled (rather than ambient) varieties. However, as 11 of the 12 packs on offer were subject to single item discounts, this is not likely to drive waste.

---

\(^{22}\) Food Behaviour Consumer Research: Quantitative Phase, WRAP, June 2007

*We don’t waste food, WRAP, March 2007*
### Table 3 Proportion of each product category on special offer (base 9,960)

<table>
<thead>
<tr>
<th>Product category</th>
<th>Total % on special offer</th>
<th>Single item offers</th>
<th>Multiple item offers - same product type</th>
<th>Multiple item offers - different product type</th>
<th>Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yoghurts</td>
<td>47%</td>
<td>12%</td>
<td>36%</td>
<td>-</td>
<td>1190</td>
</tr>
<tr>
<td>Ham</td>
<td>36%</td>
<td>5%</td>
<td>19%</td>
<td>13%</td>
<td>554</td>
</tr>
<tr>
<td>Bacon</td>
<td>24%</td>
<td>11%</td>
<td>9%</td>
<td>4%</td>
<td>521</td>
</tr>
<tr>
<td>Bread rolls</td>
<td>22%</td>
<td>5%</td>
<td>14%</td>
<td>4%</td>
<td>620</td>
</tr>
<tr>
<td>Ready meals</td>
<td>17%</td>
<td>4%</td>
<td>6%</td>
<td>7%</td>
<td>438</td>
</tr>
<tr>
<td>Bread</td>
<td>17%</td>
<td>7%</td>
<td>7%</td>
<td>2%</td>
<td>847</td>
</tr>
<tr>
<td>Potatoes</td>
<td>15%</td>
<td>5%</td>
<td>9%</td>
<td>1%</td>
<td>159</td>
</tr>
<tr>
<td>Pasta sauce</td>
<td>13%</td>
<td>6%</td>
<td>5%</td>
<td>2%</td>
<td>947</td>
</tr>
<tr>
<td>Rice</td>
<td>13%</td>
<td>7%</td>
<td>5%</td>
<td>1%</td>
<td>593</td>
</tr>
<tr>
<td>Cheese</td>
<td>13%</td>
<td>7%</td>
<td>3%</td>
<td>3%</td>
<td>699</td>
</tr>
<tr>
<td>Chicken</td>
<td>11%</td>
<td>5%</td>
<td>4%</td>
<td>2%</td>
<td>322</td>
</tr>
<tr>
<td>World breads</td>
<td>11%</td>
<td>5%</td>
<td>5%</td>
<td>1%</td>
<td>709</td>
</tr>
<tr>
<td>Bagged salad</td>
<td>10%</td>
<td>6%</td>
<td>4%</td>
<td>-</td>
<td>141</td>
</tr>
<tr>
<td>Carrots</td>
<td>10%</td>
<td>7%</td>
<td>2%</td>
<td>1%</td>
<td>404</td>
</tr>
<tr>
<td>Apples</td>
<td>8%</td>
<td>3%</td>
<td>5%</td>
<td>-</td>
<td>101</td>
</tr>
<tr>
<td>Mayonnaise</td>
<td>7%</td>
<td>6%</td>
<td>1%</td>
<td>-</td>
<td>475</td>
</tr>
<tr>
<td>Milk</td>
<td>6%</td>
<td>3%</td>
<td>3%</td>
<td>-</td>
<td>411</td>
</tr>
<tr>
<td>Eggs</td>
<td>4%</td>
<td>3%</td>
<td>0%</td>
<td>-</td>
<td>505</td>
</tr>
<tr>
<td>Pasta</td>
<td>4%</td>
<td>3%</td>
<td>0%</td>
<td>-</td>
<td>324</td>
</tr>
</tbody>
</table>

* Single item promotions are simple price reductions on one item; multiple item promotions are special offers that offer price reductions when purchasing more than one item (e.g. buy 2 for £4 etc) or give additional volume free (e.g. buy one get one free). 'Different product type' multiple item offers are those that can include products different to the item on offer (e.g. any 2 packs of sliced meats for £3).
4.0 Storage

This section deals with two key issues in relation to storage guidance:
- the presence of, and content of, storage guidance on-pack; and
- the presence of, and content of, freezing and defrosting guidance (including logos) on-pack.

4.1 Storage guidance

The vast majority of the products reviewed (96%) displayed some form of storage instructions on the packaging. However, a number of products showed considerable variation in the storage guidance displayed on different packs. Inconsistency tended to be either around where to store the product, how to store the product or the amount of time a product could be stored for.

4.1.1 Where to store the product

More than two fifths (43%) of the bread packs reviewed instructed consumers to avoid refrigerating the product, while 16% suggested that, in warm or humid conditions the bread should be refrigerated (it is worth noting that no bread rolls suggested they should be refrigerated). As a result, it is possible that having read that a particular loaf should be refrigerated, a householder might conclude that this rule applies to all bread. It is worth highlighting the fact that while the vast majority of bread did display storage instructions, store baked bread was far less likely to do so (only 55% of packs did).

A quarter of world bread packs (a mix of ambient and chilled varieties) recommended refrigeration (rising to 54% for tortilla packs), creating considerable scope for uncertainty among consumers about the right approach.

Although 91% of carrot packs recommended that the product should be refrigerated, one in ten suggested storing carrots in a cool, dry or dark place. Furthermore, only a small proportion of packs (10%) included the advice to store in the packaging.

A lack of consistency was also evident for packs of microwaveable rice shown in Table 4.

<table>
<thead>
<tr>
<th>Storage information</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store in a cool, dry place</td>
<td>92</td>
<td>83%</td>
</tr>
<tr>
<td>Once opened refrigerate unheated rice</td>
<td>49</td>
<td>44%</td>
</tr>
<tr>
<td>Once opened keep refrigerated</td>
<td>39</td>
<td>35%</td>
</tr>
<tr>
<td>Once opened store in an airtight container</td>
<td>15</td>
<td>14%</td>
</tr>
<tr>
<td>Store at room temperature</td>
<td>1</td>
<td>1%</td>
</tr>
</tbody>
</table>

The majority of pre-packed apples displayed the advice to keep them refrigerated (all packs were sold at ambient). This is in keeping with previous WRAP research, which showed that a high percentage of packaged fruit and vegetable products provided information to the consumer on how to store the products in the home. The same research showed, however, that free-flow (loose) products were virtually devoid of storage information (% products with information ranged from 6-19% with an average of 7%). Although researchers were asked to note down relevant point of sale information across the store, including for free-flow fresh produce, the data on this is not thought to be robust so it is not possible to update the proportion of free-flow produce giving storage guidance. It is worth noting that this research was undertaken before the Co-op introduced printed fresh produce bags in-store to give consumers storage guidance for loose products.

---

23 Helping consumers reduce fruit and vegetable waste, WRAP, April 2008
24 http://www.co-operative.coop/food/ethics/Environmental-impact/food-waste/
4.1.2 How to store the product

A number of product categories, most notably yoghurt and cheese, showed substantial variation in the fridge temperature guidance given in the storage instructions. On yoghurts, for example, around a third of packs showed temperature guidance, but the fridge temperature range given varied from 2-5°C (14% of packs) to ‘below 6°C’ (14% of packs). Smaller proportions of packs also showed the advice to ‘store below 5°C’, ‘store at 0-5°C’, ‘store below 8°C’ or ‘store at 1-5°C’.

The guidance also varied on packs of cheese, with a temperature range of 2-5°C given on 22% of packs, and 0-5°C on a further 5% of packs. There was slightly less variation on the advice on packs of ham and bacon, although some confusion may be caused by the fact that in both cases some packs showed the advice to ‘refrigerate below 5°C’ while on others the advice was to ‘refrigerate at 0-5°C’. With regards to chicken, most of the refrigeration guidance advises consumers to store chicken within the recommended fridge temperature range of 2-5°C. However, a large proportion (51%) of chicken packs suggested chicken packs should be stored at much lower temperatures of between -2°C and 4°C. Article 5 (4) c of 543/08 of the Poultrymeat Marketing Standards states that pre-packaged poultry should be marketed with the recommended storage temperatures. An Annex (1234/07 annex VIv B II.2) sets out that ‘fresh poultrymeat ... is to be kept at a temperature not below −2°C and not higher than 4°C at any time’. The Poultrymeat Marketing Standards apply from the farm to the point of sale but is not intended to influence consumer guidance, it would therefore seem sensible to label the products with the lower limit at 0°C, as consumers shouldn’t be expected to try and get their fridges to operate below 0°C.

There was also some variation in the advice on packs of pasta – around half showed the advice to store in a sealed / airtight container, while on 35% the advice to store away from strong odours was given. On a further 12%, guidance to store away from strong light or direct sunlight was displayed. While none of these pieces of advice contradict one another, the fact that relatively low proportions displayed each piece of information shows a relatively inconsistent approach across the product category.

One product category for which storage instructions were generally much more consistent was eggs, where all packs displayed the advice to keep chilled or refrigerated (in a very small number of cases [4%), however, an alternative of storing in a ‘cool, dry place’ was also suggested).

4.1.3 How long to store the product once opened

The Codex Alimentarius defines shelf-life as the period during which a food product maintains its microbiological safety and suitability at a specified storage temperature and, where appropriate, specified storage and handling conditions.

It is recognised that food businesses set shelf-life based on an understanding of the characteristics of their own products and the conditions under which their products are manufactured, stored and used by the intended consumer. This means that in some cases, variations in shelf-life between apparently ‘similar’ products result from different influences which could affect the likelihood of pathogens growing.

In some cases, there may well be genuine reasons why guidance given to consumers differs between products that are, from a consumer perspective, similar. These could relate to differences in product formulation, use of preservatives, differences in packaging materials and design and so on. However, in many cases, differences may have arisen for historical reasons or as a result of decisions taken in isolation by individuals or organisations. It is hoped that this report will encourage a review of the products and information given to consumers, and WRAP will be working with retailers, food manufacturers and brands, trade associations, Government and the Food Standards Agency to help develop clear recommendations and guidance for industry.

The shelf-life of the products reviewed was not assessed due to the variability in store depending on stock rotation, and number of batches on shelf.

World breads showed considerable variation in the guidance offered about how long packs could be stored after opening. Almost three in ten packs in this category (28%) recommended that, once opened, the contents should

---

be consumed within 24 hours. A fifth (22%) suggested the product should be eaten within 48 hours of opening, while 18% recommended consumption within three days.

This inconsistency was replicated across the different types of bread within this category. More than half of the tortilla packs reviewed recommended consumption within three days of opening, but one in ten (10%) reduced this window to 48 hours and 16% recommended use within 24 hours. A fifth (20%) of pitta packs instructed consumers to eat the pack contents within 24 hours of opening, while 36% said the contents should be eaten within 48 hours (although only 1% extended this as far as three days). Finally, 39% of naan packs reviewed advised consumption within 24 hours of opening, compared with 22% that suggested 48 hours was appropriate and 5% that recommended consumers should eat the contents within three days.

Inconsistent storage advice was perhaps most surprising when it came to meat products reviewed. A third (36%) of the chicken packs covered by this research recommended use ‘immediately’ after opening and 30% suggested pack contents should be consumed within 24 hours. A sizeable minority (12%), however, advised that chicken would be safe to consume within 48 hours. This inconsistency – on a product that many consumers are extremely wary of when it comes to food safety – could well add to confusion around chicken storage.

Ham too showed some inconsistency in how long consumers were advised to keep packs once they had been opened. Four out of five packs (79%) recommended ham should be eaten within two days of opening, but a substantial minority (15%) suggested that pack contents would be safe to eat three days after opening.

Bacon packs showed even greater inconsistency, with 31% recommending use within two days of opening, 28% within three days of opening and 15% suggesting pack contents should be eaten within four days of opening.

The lack of consistency was also evident for packs of microwaveable rice, with 52% of packs suggesting that it should be used within three days of opening, 23% suggesting this should be within two days and 6% within 24 hours.

There was a similar situation with pasta sauces – although the majority of ambient pasta sauce packs recommended contents should be consumed within three days of opening, other packs gave very different advice, as shown in Table 5 below. For chilled packs, the majority recommended the contents should be consumed within 24 hours, with a smaller proportion recommending 2 or 3 days.

### Table 5 Variations in guidance on how long packs of pasta sauce should be kept after opening (base 939)

<table>
<thead>
<tr>
<th></th>
<th>Chilled</th>
<th>Ambient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once opened consume within three days</td>
<td>11%</td>
<td>81%</td>
</tr>
<tr>
<td>Once opened consume within two weeks/a couple of weeks</td>
<td>-</td>
<td>5%</td>
</tr>
<tr>
<td>Once opened, consume within 24 hours</td>
<td>36%</td>
<td>0%</td>
</tr>
<tr>
<td>Once opened, consume within two days</td>
<td>11%</td>
<td>3%</td>
</tr>
<tr>
<td>Once opened, consume within five days</td>
<td>-</td>
<td>3%</td>
</tr>
<tr>
<td>Once opened, consume within seven days</td>
<td>-</td>
<td>2%</td>
</tr>
<tr>
<td>Once opened, consume within two to three days</td>
<td>-</td>
<td>2%</td>
</tr>
<tr>
<td>No guidance on how long it should be kept after opening</td>
<td>42%&lt;sup&gt;26&lt;/sup&gt;</td>
<td>4%</td>
</tr>
<tr>
<td>Base</td>
<td>90</td>
<td>849</td>
</tr>
</tbody>
</table>

Packs of cheese also showed considerable variation, with some labels recommending use within three days of opening (23%), others extending this as far as five days (7%) or even seven days (26%).

The window of opportunity on packs of mayonnaise was even greater. Almost half (48%) of those packs reviewed in this research recommended use within one month of opening, but a similar proportion (49%) suggested that mayonnaise would still be acceptable to eat after three months.

---

<sup>26</sup> The high level of chilled packs found without guidance on ‘how long it should be kept for after opening’ reflects the large proportion of 1-2 person serving pot sizes found, which would be assumed to be consumed in one sitting. Guidance on these was simply ‘keep refrigerated’. 
Guidance on milk packs was also inconsistent, with 68% advising consumers to use the product within three days, 19% within seven days and 9% within two days. Leaving 4% of packs with no guidance on the length of time after opening in which the milk should be consumed.

A further finding to note is that a small number of packs of dried pasta (2%) showed the advice to use within three months of opening. No other packs of pasta displayed any advice regarding time limits for consumption.

4.2 Freezing guidance

Across the sample, the proportion of products (generally agreed to be suitable for freezing) giving freezing guidance varied with products such as chilled ready meals and chicken always giving freezing guidance while others such as bakery items only mostly advising that the product could be frozen. The type of guidance given (e.g. when it should be frozen and how long it could be frozen) also varied significantly. There was also very limited guidance on how the product should be defrosted and some inconsistency within this where it was given. A summary is shown in Table 6 and discussed below.
### Table 6 Summary of freezing guidance found

<table>
<thead>
<tr>
<th></th>
<th>Refrigerated ready meal</th>
<th>Chicken</th>
<th>World bread</th>
<th>Bacon</th>
<th>Mainstream sliced bread</th>
<th>Bread rolls</th>
<th>Cooking sauce</th>
<th>Milk</th>
<th>Cheddar cheese</th>
<th>Sliced ham</th>
<th>Yoghurts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base</strong></td>
<td>#</td>
<td>338</td>
<td>276</td>
<td>709</td>
<td>521</td>
<td>847</td>
<td>620</td>
<td>947</td>
<td>411</td>
<td>554</td>
<td>1190</td>
</tr>
<tr>
<td><strong>Presence of freezing instructions - Yes</strong></td>
<td>% 100</td>
<td>100</td>
<td>94</td>
<td>90</td>
<td>89</td>
<td>62</td>
<td>32</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td><strong>Presence of freezing instructions - No</strong></td>
<td>% 0</td>
<td>0</td>
<td>6</td>
<td>10</td>
<td>11</td>
<td>38</td>
<td>68</td>
<td>76</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Nature of freezing instructions if given:**

| Suitable for freezing/freezeable | % 2 | 24 | 5 | 0.3 |   |   |   |   |   |   |   |
| Use of snowflake logo | % 95 | 92 | 60 | 50 | 71 | 44 | 6 | 4 |   |   |   |
| Do not freeze | % 2 | 3 | 12 | 22 |   |   |   |   |   |   |   |
| Freeze on day of purchase | % 99 | 76 | 76 | 96 | 79 | 87 | 26 | 100 |   |   |   |
| Freeze immediately/as soon as possible after purchase | % 6 | 18 | 5 |   |   |   |   |   | 73 | 63 |   |
| Freeze in suitable container | % 90 | 76 | 77 | 85 | 28 | 43 | 26 | 37 |   |   |   |
| Use within one month | % 8 | 6 | 7 | 43 |   |   |   |   |   |   |   |
| Use within three months | % 8 | 6 | 7 | 43 |   |   |   |   |   |   |   |
4.2.1 What can be frozen

Just over a third (38%) of the packs of **bread rolls** reviewed in this research did not display any freezing instructions. However, this figure is skewed by bread rolls baked in-store (rather than factory-baked/pre-packed), which, as they have limited labelling and don’t have the all-over printed packaging, contain very little information. Unsurprisingly, none of the bread rolls baked in-store displayed freezing instructions. Looking just at factory-baked bread rolls, the proportion not displaying freezing instructions fell to 13%.

Around one in ten packs of **bread** (11%) displayed no freezing instructions, but again this was skewed by store-baked products, 72% of which provided no advice on freezing, compared with just 2% of factory-baked loaves.

A much smaller proportion of **world breads** displayed no freezing information (6%), possibly because these packs tend to only be factory-baked. Pitta bread accounted for most of the packs without freezing instructions – 21% of pitta packs reviewed failed to provide this type of advice, compared with 4% of tortilla packs and none of the naan packs examined. One example of good practice that could be replicated elsewhere, however, was the 30 packs of tortilla (all of the same brand) that showed the advice to ‘eat me now or freeze me for later’ (Figure 8).

![Figure 8 Example of good practice freezing instructions, tortilla pack](image)

It is worth noting, as a positive, that all **ready meals** and all packs of **chicken** bore some sort of freezing guidance. However, on 20% of packs of fresh chicken the freezing advice was printed on the reverse of the label – something that would be an issue where consumers want to find this information out prior to purchasing or opening the pack.

Only two of the 545 packs of **ham** reviewed had any sort of freezing instructions. In both cases, only the word ‘freezable’ was displayed, alongside the ‘freezable’ logo. In contrast, 90% of the packs of **bacon** covered by the research displayed freezing instructions. Most of the bacon packs that did not provide guidance on freezing were branded packs – 25% of all branded packs displayed no freezing instructions.

The following discussion refers to products which can be frozen, but require effort (and confidence) on the part of the consumer.

Only a third (32%) of **pasta sauces** displayed freezing information. This may well be because most ambient varieties are packed in glass jars and may need to be decanted prior to freezing; a far greater proportion of chilled sauces provided guidance on freezing (88%), while only a quarter of ambient products did (26%). The need to decant pasta sauce prior to freezing, is highlighted in the advice shown on all those that displayed freezing instructions – i.e. to ‘freeze in a suitable container’ (Figure 9).
Consumers sometimes express surprise or doubt about whether or not milk can be frozen. Only around a quarter (24%) of milk packs reviewed in this research made it clear that the product could be frozen (all own-label packs). Some of the consumer doubt over freezing milk can be attributed to concerns that the packaging may split in the freezer. Sixty-three per cent of those packs that displayed freezing instructions included the advice to ‘freeze in a suitable container’, which may go some way towards helping consumers to overcome such concerns particularly if additional guidance regarding what would be a suitable container was also given e.g. on-line. Thirty-six of the 411 milk packs reviewed displayed the advice, “not suitable for home freezing”.

Two other product categories – yoghurt and cheese - are a little more ambiguous, since freezing, while not unsafe, can change the texture or appearance of the product. No yoghurts provided freezing instructions, and 22% of the packs reviewed actually warned against freezing. This may well be because yoghurt can separate when defrosted, but does not acknowledge the scope for eating yoghurt from frozen – as an alternative to ice cream, for example. Packs of cheese were similar, in that none suggested freezing as a storage option, while a small number (around 3%) warned against freezing. Again, freezing advice could to be couched as tips – grate before freezing, for example – but might nonetheless help consumers think about what to do with surplus food.

4.2.2 Use of the snowflake logo

The ‘snowflake’ logo, often placed on the front of packaging is used in many product categories to indicate to consumers that the product can be frozen. The logo was found on 95% of ready meals, 92% of packs of chicken and 71% of packs of bread. Other product categories such as bread rolls (44%), bacon (50%) and world bread (60%) showed lower usage of this logo. While just 6% of pasta sauces showed the ‘snowflake’ logo, this represented 66% of chilled sauces. One particular product area where the logo could be rolled out more widely is milk, of which just 4% of packs showed the logo (Figure 10), although this recommendation does assume that consumers understand what the snowflake logo means and look for it on pack27.

Figure 10 Freezing advice on a milk pack

---

27 When the snowflake logo was shown to 600 research participants as part of another piece of WRAP research into consumer use of the freezer, only half (54%) recognised it as meaning the item is suitable for freezing (WRAP, Understanding consumer use of the freezer, July 2010).
4.2.3 When to freeze and how long to keep it frozen

The data collected over the course of this research also reveal inconsistencies in the on-pack advice given to consumers when it comes to freezing food. Inconsistent advice on freezing appears to be more prevalent in relation to specific product categories. Two aspects of freezing advice seemed particularly variable:

- freezing instructions often advise consumers to freeze packs on the day of purchase, when in fact, they will be safe to freeze at any point before the date on the label (as long as it is used within one or two days after its been defrosted)\(^{28}\); and
- on-pack guidance can vary considerably in terms of how long a product can be frozen for before deteriorating in quality and how long it will keep for once defrosted.

Freezing advice on bread packs may be an issue on both levels. First, almost four fifths (79%) of the packs reviewed advised consumers to freeze on the day of purchase, 18% recommended that bread be frozen ‘as soon as possible after purchase’. Second, while 43% of packs suggested that frozen packs should be eaten within three months, 28% reduced this to just one month.

Advice on packs of bread rolls appeared to be similar, with an even greater proportion of packs (87%) advising consumers to freeze on the day of purchase and a further 5% suggesting rolls should be frozen ‘as soon as possible after purchase’. Almost half of the packs reviewed (43%) suggested that frozen packs should be consumed ‘within one month’ [of being frozen]. A further 5% of bread roll packs recommended that contents be eaten within 24 hours of defrosting (Figure 11).

Figure 11 Freezing guidance on bread roll pack

World breads too displayed similar variation. Three quarters of packs (76%) recommended that consumers freeze the product on the day of purchase, and another 6% suggested the pack should be frozen ‘immediately’. When it came to how long the product should be frozen for, 77% of packs suggested their contents should be consumed within one month [of being frozen], while a small minority (6%) suggested eating within three months.

Almost all chilled ready meals (99%) instructed consumers to freeze them on the day of purchase. Nine out of ten (90%) also recommended that the product be consumed within one month of freezing, but a minority of 8% extended this to within three months of freezing.

While the advice on most packs of bacon (85%) that had freezing instructions was to use within a month of freezing, on a small proportion (7%) of packs the guidance was that it could be frozen for three months.

\(^{28}\) http://www.eatwell.gov.uk/keepingfoodsafe/storing/#cat507058
4.2.4 Defrosting guidance

Table 7 provides a summary of the defrosting guidance found. There are several points of interest:

- A high proportion of all the products advise against re-freezing the product after it has thawed. FSA guidance is that ‘if you defrost raw meat or fish and then cook it thoroughly, you can freeze it again, but remember never reheat foods more than once’ [29].
- Very few packs contained detailed instructions about where to defrost the product; just under half of milk and chicken packs (47% and 41% respectively) advise the consumer to defrost in the fridge. The proportion is higher (63%) for frozen chicken and 22% of frozen chicken packs specifically advise not to defrost ‘in a warm kitchen’, the remainder give limited or no guidance.
- Similarly low proportions of packs advise that the product should be defrosted thoroughly or fully before use. Again, the largest proportion providing this advice is again on frozen chicken packs (63%) with half of bacon packs also giving this advice.
- The length of time suggested to defrost the product varies, although the most common advice is for a minimum of 12 hours. A fifth of bacon packs suggest between 6-8 hours, just 2 hours for bread (though the majority gave no advice) and as long as 24 hours for 13% of packs of frozen chicken.
- A similarly large range is found regarding how long the product can be kept for after defrosting before it should be consumed. The most common advice is within 24 hours though 13% of frozen chicken packs suggest it should be eaten immediately, 12% of refrigerated chicken packs suggest within 12 hours and almost half of milk packs within three days.

Perhaps most striking, however, is that on the whole most packs provided no guidance on defrosting. It may be that a lack of guidance on defrosting is one of the barriers to more consumers using their freezer as a way of preventing wasting the food they buy.

<table>
<thead>
<tr>
<th>Instruction</th>
<th>Milk</th>
<th>Bacon</th>
<th>Chicken (frozen chicken)</th>
<th>Bread (bread rolls)</th>
<th>Ready meals (frozen ready meals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once thawed do not refreeze</td>
<td>85%</td>
<td>71%</td>
<td>62% (80%)</td>
<td>16% (18%)</td>
<td>49% (66%)</td>
</tr>
<tr>
<td>Defrost in the refrigerator</td>
<td>47%</td>
<td>27%</td>
<td>41% (63%)</td>
<td></td>
<td>2%</td>
</tr>
<tr>
<td>Defrost in a cool, dry place</td>
<td></td>
<td></td>
<td></td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Never defrost in a warm kitchen</td>
<td></td>
<td></td>
<td></td>
<td>(22%)</td>
<td></td>
</tr>
<tr>
<td>Keep cool after defrosting</td>
<td></td>
<td></td>
<td></td>
<td>(9%)</td>
<td></td>
</tr>
<tr>
<td>Defrost fully before use/cooking</td>
<td>37%</td>
<td>50%</td>
<td>23% (63%)</td>
<td>13% (21%)</td>
<td>21%</td>
</tr>
<tr>
<td>Defrost for 2 hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7%</td>
</tr>
<tr>
<td>Defrost for a minimum of 6-8 hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>21%</td>
</tr>
<tr>
<td>Defrost for a minimum of 12 hours</td>
<td>16%</td>
<td></td>
<td>34% (69%)</td>
<td></td>
<td>2%</td>
</tr>
<tr>
<td>Defrost for a minimum of 24 hours</td>
<td></td>
<td></td>
<td></td>
<td>1% (13%)</td>
<td></td>
</tr>
<tr>
<td>Defrost overnight</td>
<td></td>
<td></td>
<td></td>
<td>(20%)</td>
<td></td>
</tr>
<tr>
<td>Once defrosted use immediately</td>
<td></td>
<td></td>
<td></td>
<td>(13%)</td>
<td></td>
</tr>
<tr>
<td>Use within 12 hours of defrosting</td>
<td></td>
<td></td>
<td></td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>Use within 24 hours of defrosting</td>
<td>16%</td>
<td></td>
<td>9% (20%)</td>
<td>(5%)</td>
<td>10%</td>
</tr>
<tr>
<td>Use within 3 days of defrosting</td>
<td>47%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.0 Date marks

Food law requires most pre-packed food to carry one of two types of date marks; a ‘minimum durability’ (‘best before’) date or a ‘use by’ date. The date mark is an indication by the manufacturer of the length of time a food can be kept under specified storage conditions. The aim of date mark labelling is to help consumers make safe and optimum use of food.

WRAP research\(^{30}\) shows that at least 450,000 tonnes of food is thrown away because it has passed a ‘best before’ date, but if stored correctly food should be perfectly safe to eat up to and after this date – ‘best before’ is a guide of food quality and not safety. In addition, at least 380,000 tonnes of food is thrown away because it has passed a ‘use by’ date, but this waste could have been avoided through checking the date and either cooking or freezing before the end of the ‘use by’ date. Food mustn’t be eaten after the ‘use by’ date. 255,000 tonnes of food is thrown away before it has even reached its ‘use by’ or ‘best before’ date, and much of this could have been avoided if the food had been stored correctly, and through consumers having confidence in date labels (for example food can be eaten up to the end of the ‘use by’ date quite safely, and beyond the ‘best before’ date - for as long as the quality of the food remains acceptable).

A literature review undertaken for WRAP (unpublished) has identified several pieces of research which suggests that there is confusion and misunderstanding around the meaning of food date labels. Different reports, however, present different conclusions on the level of consumer understanding of date labels. The key sources suggest that approximately half of consumers correctly understand the meaning of ‘use by’ and ‘best before’ dates.

This retailer survey has highlighted a number of areas in which product labelling may be contributing to this confusion (Table 8). However, it is important to state that the responsibility for applying date marks lies with food businesses and they are better placed to understand the properties of their products and come to a reasoned decision on both the type of date mark required and the appropriate shelf-life of any specific product. This means that in some cases, variations in the date mark and shelf-life between apparently ‘similar’ products result from different product formulations which could affect the likelihood of pathogens growing.

\(^{30}\) The Food We Waste in Scotland, WRAP, September 2009 (additional unpublished analysis).
Table 8 Date marks used (base 9,957)

<table>
<thead>
<tr>
<th></th>
<th>Use by - all</th>
<th>Use by, display until</th>
<th>Best before - all</th>
<th>Best before, display until</th>
<th>Display until only</th>
<th>Other</th>
<th>No date shown</th>
<th>Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken (fresh)</td>
<td>100%</td>
<td>43% 57%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>276</td>
</tr>
<tr>
<td>Milk</td>
<td>100%</td>
<td>43% 57%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>411</td>
</tr>
<tr>
<td>Bagged salad</td>
<td>100%</td>
<td>38% 62%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>141</td>
</tr>
<tr>
<td>Pasta sauce (chilled)</td>
<td>100%</td>
<td>31% 69%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>90</td>
</tr>
<tr>
<td>Ready meals (chilled)</td>
<td>100%</td>
<td>24% 76%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>339</td>
</tr>
<tr>
<td>Ham</td>
<td>100%</td>
<td>22% 78%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>552</td>
</tr>
<tr>
<td>Carrots (prepared)</td>
<td>100%</td>
<td>13% 87%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>113</td>
</tr>
<tr>
<td>Bacon</td>
<td>92%</td>
<td>32% 60%</td>
<td>8%</td>
<td>8%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>521</td>
</tr>
<tr>
<td>Yoghurts</td>
<td>77%</td>
<td>48% 29%</td>
<td>23%</td>
<td>23%</td>
<td>19%</td>
<td>-</td>
<td>-</td>
<td>1190</td>
</tr>
<tr>
<td>Cheese</td>
<td>25%</td>
<td>4% 21%</td>
<td>74%</td>
<td>59%</td>
<td>15%</td>
<td>-</td>
<td>1%</td>
<td>699</td>
</tr>
<tr>
<td>World bread</td>
<td>13%</td>
<td>5% 9%</td>
<td>86%</td>
<td>82%</td>
<td>4%</td>
<td>-</td>
<td>1%</td>
<td>709</td>
</tr>
<tr>
<td>Mayonnaise</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>100%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>475</td>
</tr>
<tr>
<td>Chicken (frozen)</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>67%</td>
<td>43%</td>
<td>-</td>
<td>-</td>
<td>46</td>
</tr>
<tr>
<td>Bread</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>59%</td>
<td>41%</td>
<td>-</td>
<td>-</td>
<td>846</td>
</tr>
<tr>
<td>Eggs</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>1%</td>
<td>99%</td>
<td>-</td>
<td>-</td>
<td>505</td>
</tr>
<tr>
<td>Rice</td>
<td>-</td>
<td>-</td>
<td>99%</td>
<td>99%</td>
<td>-</td>
<td>1%</td>
<td>-</td>
<td>593</td>
</tr>
<tr>
<td>Ready meals (frozen)</td>
<td>-</td>
<td>-</td>
<td>99%</td>
<td>80%</td>
<td>19%</td>
<td>-</td>
<td>1%</td>
<td>99</td>
</tr>
<tr>
<td>Pasta sauce (ambient)</td>
<td>-</td>
<td>-</td>
<td>96%</td>
<td>96%</td>
<td>-</td>
<td>-</td>
<td>4%</td>
<td>857</td>
</tr>
<tr>
<td>Bread rolls</td>
<td>-</td>
<td>-</td>
<td>94%</td>
<td>59%</td>
<td>35%</td>
<td>1%</td>
<td>-</td>
<td>620</td>
</tr>
<tr>
<td>Pasta</td>
<td>-</td>
<td>-</td>
<td>93%</td>
<td>93%</td>
<td>-</td>
<td>6%</td>
<td>-</td>
<td>324</td>
</tr>
<tr>
<td>Carrots (uncut)</td>
<td>-</td>
<td>-</td>
<td>66%</td>
<td>66%</td>
<td>19%</td>
<td>-</td>
<td>15%</td>
<td>291</td>
</tr>
<tr>
<td>Potatoes</td>
<td>-</td>
<td>-</td>
<td>67%</td>
<td>67%</td>
<td>25%</td>
<td>-</td>
<td>8%</td>
<td>159</td>
</tr>
<tr>
<td>Apples</td>
<td>-</td>
<td>-</td>
<td>46%</td>
<td>46%</td>
<td>12%</td>
<td>1%</td>
<td>42%</td>
<td>101</td>
</tr>
</tbody>
</table>

5.1 Use of dates

5.1.1 Stock control dates

In previous research\(^{34}\), on almost three quarters of the occasions on which respondents were presented with a product, they said they used an on-pack date to decide whether or not it was ok to consume, making their understanding of the different date types important in order that food isn't wasted unnecessarily.

'Sell by' and 'display until' dates are used by retailers for stock control purposes and, therefore, fall earlier, or on the same day as, the 'best before' or 'use by' date, raising the possibility that consumers referring to these dates may discard food when it is actually still edible. The same WRAP research mentioned above also suggested that some people may be reluctant to eat food that they perceive to be anything other than at its best. In some cases, these consumers may be interpreting 'sell by' and 'display until' dates almost as 'advance' 'best before' dates – an early indication that food quality may be deteriorating.

\(^{31}\) Includes "eat by"

\(^{32}\) Includes "best before end" and "best before end of"

\(^{33}\) Includes "sell by", "date sold" and "date shown but no type"

\(^{34}\) Research into consumer behaviour in relation to food dates and portion sizes, WRAP, July 2008
This research uncovered very few products carrying 'sell by' dates (just 3 cheese packs\textsuperscript{35}), despite this date mark often being used as a catch-all phrase for date marks in general. This finding would suggest that the complete phasing out of this date mark is a realistic goal.

The use of 'display until' dates is more widespread (but inconsistent) on supermarket own brand products and some branded products. It should be highlighted that on some product categories – notably pasta, rice, ambient pasta sauces and mayonnaise – no 'display until' dates were shown.

The inconsistent use of 'display until' dates raises questions about how necessary they may be for retailers. Most branded products don't carry 'display until' dates, and with some supermarket own brands not using them either, it may be that relatively minor changes to stock control systems could dispense with this type of date altogether. Certain product categories emerge from the research as being particularly likely to carry a 'display until' date e.g. eggs\textsuperscript{36}, prepared carrots and chilled ready meals.

Two thirds (67\%) of potato packs, for example, carry both a 'best before' and a 'display until' date. However, a quarter of potato packs only carry a 'display until' date (e.g. they do not have a 'best before' date). For those consumers that like to rely on a food date as an indication of when to eat the product, this may leave them with no alternative than to use the 'display until' date, discarding packs before they deteriorate in quality sufficiently to make them inedible or unpleasant. There is a similar situation with packs of carrots – 14\% of the packs reviewed (and 19\% of the 'uncut' carrots) only bore a 'display until' date.

5.1.2 Blurring the boundaries between 'best before' and 'use by'

Some packs, which had a 'best before' date stated that, once opened, the product should be 'consumed within 'x' days and by date shown'. The latter part of this guidance could confuse consumers as they could open the pack on the 'best before' date and feel they had to use it all that day. This was found on the following proportion of packs (with 'best before' dates): Mayonnaise (16\% of packs advised consumers to not exceed the 'best before' date), cheese (7\%), world bread (8\%), frozen chicken (28\%) and frozen ready meals (11\%).

5.1.3 Different types of dates used on products of the same type

The data show that some packs in a particular product category might carry one type of date (e.g. 'best before'), while others carry another (e.g. 'use by'). This type of inconsistency is likely to be a contributing factor to consumer confusion about dates in general but, as noted above, may result from different product formulations which could affect the likelihood of pathogens growing.

A quarter of the cheese packs reviewed, for example, showed either a 'use by' date or a 'use by' alongside a 'display until' date, while most of the remainder (74\%) showed either a 'best before' date or a 'best before' alongside a 'display until' date. 'The Food We Waste' found that 37\% of avoidable cheese waste consisted of food discarded because it had passed its date, suggesting that confusion about different dates on this product may be contributing to food waste.

Yoghurts, too, carry a mix of 'best before' dates (23\% of packs) and 'use by' dates (77\% of packs), potentially worsening consumer confusion about a product that many are already nervous of\textsuperscript{37}.

Almost one in ten packs (8\%) of bacon carried a 'best before' date, with the remainder carrying a 'use by' date.

World breads are equally mixed. Despite most consumers being comfortable judging when bread becomes unsafe to eat (e.g. when it is mouldy or stale), 14\% of the packs reviewed in this research carried 'use by' dates rather than 'best before' (and this was found on both ambient and chilled varieties) (Table 9).

\textsuperscript{35} Two packs of Mull of Kyntyre and one pack of Leek Valley cheese.

\textsuperscript{36} Display until dates are not required on packs of eggs, however, there is an obligation to ensure eggs are sold to the consumer within 21 days of lay, so retailers may prefer to have such additional stock control dates on their packs:http://www.defra.gov.uk/animalhealth/Forms/library/EMR1.pdf

\textsuperscript{37} Consumers in focus groups and hall tests often express greater levels of concern about taking risks with dairy products.
Table 9 Date mark used on packs of world bread by in-store location (base 709)

<table>
<thead>
<tr>
<th></th>
<th>Chilled</th>
<th>Ambient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best before</td>
<td>8%</td>
<td>88%</td>
</tr>
<tr>
<td>Best before/display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use by</td>
<td>25%</td>
<td>3%</td>
</tr>
<tr>
<td>Use by/display until</td>
<td>68%</td>
<td>4%</td>
</tr>
</tbody>
</table>

5.1.4 ‘Best before’ dates on eggs

In accordance with the legislation\(^{38}\), all the egg packs surveyed carried a ‘best before’ date. The FSA guidance is that eggs should not be eaten after the best before date (i.e. treat the ‘best before’ date as a ‘use by’ date)\(^{39}\), which could therefore cause confusion for consumers that are already unsure what the difference is between the ‘best before’ and ‘use by’ date and is something that WRAP, Defra and the FSA with the Egg Marketing Inspectorate, egg industry and retailers are investigating.

\(^{38}\) [Link](http://www.defra.gov.uk/animalhealth/Forms/library/EMR1.pdf)

\(^{39}\) [Link](http://www.eatwell.gov.uk/foodlabels/labellingterms/bestbefore/?lang=en)

[Link](http://www.eatwell.gov.uk/healthydiet/nutritionessentials/eggsandpulses/eggs/?lang=en)
Helping consumers reduce food waste – a retail survey

6.0 Cooking

Cooking accounts for food waste in two principal ways. Either householders cook too much, generating excess food which is then discarded, or they cook food that is spoiled (e.g. over or undercooked). Pack labels have the potential to help target these problems in three ways:

1. packaging can carry basic cooking instructions to advise on, for example, cooking potatoes for the right amount of time, or how best to cook bacon;
2. labels can include advice on how to re-heat leftovers and provide inspiration or recipe ideas for how to use leftovers in new meals (though this may well be better provided online or at point of sale, given space constraints); and
3. packs can provide advice on how much to cook (portion sizing).

6.1 Cooking instructions

Two fifths (42%) of the products reviewed, carried some sort of cooking guidance. Instructions (and recipes) were particularly common on packs of rice, pasta and potatoes (100%, 100% and 82% of packs respectively displayed cooking instructions of some sort), while products like eggs displayed no cooking advice. It was noticeable that for some product categories, such as carrots and bacon, while most packs did display cooking instructions, this varied from retailer to retailer, with products sold in some retailers being less likely to display such guidance than others.

6.2 Advice on leftovers

The simple finding from the data assembled through this project was that there is very little on-pack guidance available to consumers on what to do with leftovers. The one exception was the advice displayed on a small number of packs of chicken (Figure 12).

Figure 12 Example of good practice for tips on storing leftovers, chicken pack

Whilst acknowledging the problems posed by a lack of space on many packs, it is possible that tips on handling leftovers could help consumers to reduce their food waste considerably. This may be especially true when it comes to products such as rice and pasta that are particularly likely to be thrown away because consumers are faced with a surplus after cooking and don’t know what to do with it. Data from WRAP shows that 48,000 tonnes of rice and 31,000 tonnes of pasta are thrown away because the consumer has cooked, served or prepared too much.

6.3 Portion size information

The data collected over the course of this project highlighted two aspects of on-pack portion guidance that are relevant to food waste. The first was simply the absence of any on-pack guidance about how much of a product constitutes a reasonable adult portion. The second was considerable variation, within product categories, on how big a single portion might be.

---

40 NB the research was carried out prior to when Sainsbury’s Love Your Leftover campaign commenced.

41 Household Food and Drink Waste in the UK, WRAP, November 2009
6.3.1 Lack of portion sizing information

A number of product categories stood out because on-pack portion sizing was particularly rare. There was no portion sizing guidance, for example, on packs of potatoes, other than within more general recipe information. Similarly, only one retailer stocked packs of carrots that provided any portion size guidance ('80g = 1 portion').

Only 57% of pasta packs carried portioning guidance, which is significant considering that, according to 'The Food We Waste', half (50%) of avoidable pasta waste (by weight) is discarded after being left uneaten on plates (this is on top of the 18.5% discarded after being cooked but not served, as mentioned in section 6.2). Supermarket's own brands tended to perform better when it came to on-pack portion guidance for pasta, with 86% carrying some sort of advice, compared with 21% of branded products.

Rice packs were more likely to carry portion advice - 82% carried guidance of some sort – although this figure masks a split between conventional dried rice (90% of packs provided portion guidance though it was quite varied in terms of quantity recommended) and microwaveable rice (only 49% of packs gave advice on portioning, though these were all consistent at 125g per person). In addition, only a fifth of packs (21%) included portion measurement lines on the side to help householders measure out quantities easily, although another fifth (22%) were ‘boil in the bag’ packs that essentially decide the portion size on the consumer’s behalf.

Another product category in which a large number of packs failed to provide guidance on portioning was pasta sauces. Just under half (49%) of the packs reviewed gave any advice on portion sizes, with supermarket own-brand packs less likely to do so (33% did) than branded products (56% did).

Two fifths (39%) of ready meals carried portion size information, with smaller packs less likely to provide this type of advice than larger ones – possibly because consumers are likely to automatically assume smaller packs are for one person. In contrast with pasta sauces, it was the own-brand ready meals that were more likely to carry portioning advice - 50% did so - compared with only 2% of branded products.

6.3.2 Inconsistent guidance on portion sizes

Almost two thirds (61%) of ready meals that did carry portion advice said they were suitable for one person, suggesting that inappropriate pack sizes may be less of a problem for smaller households when it comes to this type of product. That said, the actual weight of these ‘single portion’ packs ranged between under 250g and 500g, which is a wide range even taking possible differences in pack ingredients etc. into account. This could lead to a consumer buying a single portion pack but finding themselves with too much food (or less worryingly from a food waste perspective but frustratingly for the consumer, too little).

Pasta sauce packs also displayed considerable variation in the amount of product classified as a single portion. One in 20 packs carrying some sort of portion information defined a single portion as being between 181g and 200g, while at the other end of the scale, 16% of packs classed a single portion as under 100g. Since pasta sauce is generally mixed with another product (e.g. pasta), it may be that variations in what is considered a single portion just translate into meals with more or less sauce, rather than more of an entire meal being cooked.

Another product category displaying variation in on-pack definitions of a single portion was rice. Although 52% of packs of conventional rice (excluding microwaveable rice) classified a single portion as 62.5g, and 32% as 75g, other portion sizes suggested were 50g (9% of packs) and 100g (7% of packs). Similar issues were found with packs of pasta, where 36% of packs defined a single portion as 75g, on 35% of packs this was given as 75 – 100g, and on 28% of packs as 100g.

The final product showing substantial variation in the classification of a single portion was bagged salad. One in twenty packs (6%) of salad that carried portion size guidance defined a single portion as 40g of salad with 5% suggesting 50g. At the other end of the scale, 12% suggested 100g and 8% suggested that 125g constitutes a single portion. Although only contributing 37,000 tonnes of waste per year, the cost of leafy salads that are wasted £170 million tonnes annually. This reflects the relatively high cost per kilogram of bagged salads, relative to other salad ingredients. It may be that ‘single portion’ packs need to be made smaller, as suggested earlier in this report.

---

42 Household Food and Drink Waste in the UK, WRAP, November 2009
One concern that this raises is over whether pack sizes are driven by portion sizes (i.e. producers develop pack sizes based on multiples of recommended portion sizes) or, more worryingly from a food waste perspective, vice versa. If it is the case that portion size guidance is developed simply to fit with pre-determined pack sizes, it is perhaps likely that much of the guidance displayed on packs may be inappropriate. Quite aside from food waste issues, this type of inconsistency may have implications for consumers understanding of healthy eating, and what a recommended portion should be.
7.0 Packaging

Packaging offers considerable scope to cut down on food waste by, for example, helping consumers to store opened packs correctly (through re-closable packs), cook the right amount (through portioning guides or lines on-pack, noted above) or only open the amount they need (through packs that split into smaller sections). This section briefly looks at what the data can tell us about the degree to which packaging is helping consumers to waste less food.

7.1 Re-closable packs

Very few products reviewed in this research came in re-closable packs but Figure 13 shows some examples that were. In the world breads category, only 8% of packs were re-closable. One in five packs (20%) of bread rolls were sold in re-closable packs and 11% of ham packs were re-closable (but no ham packs gave the advice to 'wrap tightly'). A larger proportion (26%) of cheese packs were re-closable and an even greater percentage (36%) of rice packs were re-closable.

Figure 13 Examples of re-closable packs
7.1.1 Re-closing the pack or using airtight or re-closable containers

Very few packs recommended that contents be stored in an airtight or sealed container. Only 10% of bread packs, for example, advised consumers to reseal the pack to retain freshness and only 7% recommended opened packs should be stored in an airtight container. There was even less advice on storing opened packs of bacon and ham – not a single pack reviewed in either category recommended that opened packs be tightly wrapped in film or sealed in a different container to maintain freshness. The situation with cheese was slightly better, but advice was still limited to a small minority of packs – guidance on 6% recommended cheese be stored in an airtight container once opened, while 5% advised consumers to wrap the product tightly.

7.2 Splitting packs into smaller sections

As noted in the introduction to this chapter, one way of helping consumers prolong the life of the products they buy is to split packs into different sections (or join small packs together), allowing householders more flexibility in only using what they need and freezing what they don’t want to use straight away. The data collected over the course of this research suggest that divisible packs of this nature are still fairly rare.

There were some examples of packs that split into smaller sections in the bread rolls category, though they were a tiny minority (2%) of the packs reviewed (Figure 14). A rather larger proportion (16%) of bacon packs were split into separate sections. Although this feature was restricted to larger packs of over 300g, it does mean that some sections could be frozen while others are used, making larger, ‘better value’ packs less likely to result in food waste. There was a similar story when it came to chicken - the 8% of packs that were split into individually wrapped fillets were all relatively large (750g and above) (Figure 15). Finally, as already highlighted in section 2.1, three packs of bagged salad were found that were effectively a 160g bag split into two smaller bags.
Figure 14 Example of a bread roll pack split into separate sections

Figure 15 Example of a re-closable pack of chicken, with individually wrapped portions
8.0 Store level data

Supermarkets offer a potential channel for communicating with consumers about how to reduce food waste. This research therefore recorded any incidences of relevant in-store communication. The overarching finding from this exercise was that there is almost no point-of-sale information that might help prevent food waste e.g. guidance about how to store the product at home or about freezing and defrosting. There may therefore be considerable potential to encourage supermarkets to make better use of this avenue by, for example, accompanying in-store promotions with advice on freezing surplus food.

Data was also collected on the availability of a range of tools that may help to reduce food waste (Table 10). While re-closable food bags / freezer bags were found in most stores, and re-closable storage containers in around half the stores visited, there was much lower availability of other tools such as spaghetti measures, fridge thermometers, cool bags, lunch bags with gel packs or plastic clips for keeping food fresh.

Table 10 Tools found in the stores that were visited (base 69)

<table>
<thead>
<tr>
<th>Tools</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re-closable food/freezer bags</td>
<td>55</td>
<td>80%</td>
</tr>
<tr>
<td>Re-closable storage containers</td>
<td>33</td>
<td>48%</td>
</tr>
<tr>
<td>Cool bags</td>
<td>26</td>
<td>38%</td>
</tr>
<tr>
<td>Plastic clips for keeping food fresh</td>
<td>23</td>
<td>33%</td>
</tr>
<tr>
<td>Fridge thermometers</td>
<td>17</td>
<td>25%</td>
</tr>
<tr>
<td>Spaghetti measures</td>
<td>15</td>
<td>22%</td>
</tr>
<tr>
<td>Lunch bags with gel packs</td>
<td>15</td>
<td>22%</td>
</tr>
</tbody>
</table>

Where these tools were available, in most stores they were found in non-food aisles – i.e. not near to products with which they might be used (Table 11).

Table 11 Tools by in-store location (base 69)

<table>
<thead>
<tr>
<th>Tools</th>
<th>Non food area</th>
<th>Food area</th>
<th>Till</th>
<th>Online</th>
<th>Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re-closable food/freezer bags</td>
<td>39</td>
<td>15</td>
<td>1</td>
<td>1</td>
<td>55</td>
</tr>
<tr>
<td>Re-closable storage containers</td>
<td>29</td>
<td>6</td>
<td>-</td>
<td>1</td>
<td>33</td>
</tr>
<tr>
<td>Cool bags</td>
<td>18</td>
<td>7</td>
<td>9</td>
<td>-</td>
<td>26</td>
</tr>
<tr>
<td>Plastic clips for keeping food fresh</td>
<td>21</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>23</td>
</tr>
<tr>
<td>Fridge thermometers</td>
<td>16</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>17</td>
</tr>
<tr>
<td>Spaghetti measures</td>
<td>12</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>Lunch bags with gel packs</td>
<td>14</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>15</td>
</tr>
</tbody>
</table>

It is worth pointing out, however, that the fact that the data collection took place during February and March may have had some effect on the availability of some tools – in particular cool bags. Had the exercise taken place during the summer months, for example, the figures for these tools may have been somewhat higher.
9.0 Conclusions

The data collected through this research constitutes an important resource for WRAP and the food industry to identify good practice that could be implemented more widely, and areas where inconsistency or lack of clarity could be addressed to improve consumer understanding and confidence, and enabling the purchase of appropriate amounts of food, and ensuring that more of what is bought is used. In summary, the key areas for further action are proposed as follows:

Pack size

The research suggests that restricted availability of smaller pack sizes is only an issue for a limited number of products and in fact there is a reasonably good range for most products reviewed across all of the stores surveyed. That said, there are opportunities in a number of product categories for the development of smaller pack sizes.

An increase in the proportion of smaller loaves, for example, could help reduce the quantity of standard bread wasted each year (660,000 tonnes per year, of which 540,000 tonnes is avoidable [costing £640 million annually] and 480,000 tonnes is not used in time43) particularly if the slice sizes on smaller packs were similar to those in standard 800g packs. It should be noted that this research was undertaken before the launch of the new Warburtons 600g loaf or Kingsmill’s Little Big Loaf (525g).

Similarly, it may be worth further exploration of the benefits that increased availability of smaller packs of bread rolls, ham and bacon may bring, perhaps along with initiatives to increase the proportion of packs that are re-closable and number that provide clear freezing and defrosting advice.

An increase in the proportion of smaller pasta sauce packs available to consumers may also bring tangible benefits, particularly given the fact that storage instructions on the majority of packs of pasta sauce advise consumers to consume it within two or three days. This could be combined with more packs providing freezing and defrosting advice taking into account the requirement to decant product from the glass jar into a suitable container.

Another product category that warrants some attention on pack size is bagged salad – while a fairly wide range of pack sizes are available to consumers, there is evidence to suggest that the smallest sizes are not small enough.

Across most products the data show a tendency for larger packs to be cheaper by weight or volume, while smaller products are often included in premium ranges. This may result in some households buying larger packs than needed, being seen as better value for money. However, results for chicken did not match this trend having a relatively gentle and unpronounced price gradient between the smallest and largest packs. It would be interesting to explore whether consumers are aware of this and if, they were, whether this would affect the pack sizes purchased.

There is also evidence to show that for some of the products mentioned here, namely bread, pasta sauces, bacon and ham, where smaller sizes are available to consumers, tend to be more expensive (which could affect consumer choice). It may be worth exploring consumer perceptions of price gradients, however, since many consumers may believe that smaller packs come at a premium for products where this is not always in fact the case, as was found for chicken.

Promotions

During the period in which this research was carried out, a number of product categories stood out as being particularly subject to in-store promotions; namely yoghurts, bread, bread rolls, bacon, ready meals and chilled pasta sauces.

By far the greatest numbers of promotions were associated with yoghurts – 47% of all products recorded were associated with some type of in-store offer. Moreover, 427 of the 1,190 items checked in this category (36%) were tied to multi-buy deals, offering consumers a discount if they purchased more than one pack of the same product category.

43 Household Food and Drink Waste in the UK, WRAP, November 2009
Thirty-six per cent of ham packs were linked to an offer of some kind. Around two fifths (19%) of packs were in multi-buy deals that offered discounts for buying more of the same product type. It should be pointed out, however, that the data only represent a snapshot of a point in time and may not necessarily be representative of a more general picture. Giving recipe ideas and meal inspiration alongside clear storage, freezing and defrosting advice can ensure consumers don’t end up wasting food they buy on promotion.

WRAP is currently undertaking a more thorough analysis of promotional strategies including the impact of new mechanics such as ‘buy one get one free later’.

Storage

There seemed to be only limited issues regarding a lack of storage instructions on products reviewed with the vast majority (96% of the total sample) displaying some form of instructions on the packaging.

For a number of product categories, work by retailers and producers to harmonize the wording on storage guidance is needed to improve consistency, so as not to risk confusing consumers about the best way to store products. In the case of bread and carrots, there is a lack of consistency about where products should be stored (i.e. in the fridge or not), while for other products, such as world breads, meats (chicken, ham and bacon), pasta sauces and cheese, there is inconsistency in advice on how long packs could be stored after opening.

There is also potential for more advice to appear on packs that could help consumers keep contents fresh for longer. Messages on packs of bread, bacon, ham and cheese advising consumers to store the product in an airtight container, or to wrap tightly, for example, could help to reduce the incidence of such products being thrown away.

Freezing

There is scope for improvements to the labelling of some products to make consumers more aware that they can be frozen. This is particularly true of pasta sauces, milk, bread rolls and store-baked bread. Freezing instructions could also be included on more packs of yoghurts and cheese, although guidance on these products would need to provide advice on likely changes in texture or appearance.

The freezing guidance on many products advises consumers to ‘freeze on day of purchase’, whereas in fact products can be frozen at any time up to the ‘use by’ or ‘best before’ date (accepting some potential loss in quality). Changes to this wording, for example, to ‘freeze up to date shown’ or ‘freeze before [date]’ may help to raise awareness of this fact in conjunction with improving consumer understanding of date labels; and coupled with the development of more consistent defrosting/cooking guidance. As another alternative, this research has found that ‘freeze as soon as possible’ is already used on some packs.

For a number of product categories, work by retailers and producers to harmonize the wording on storage guidance is needed to improve consistency, so as not to risk confusing consumers about the best way to store products. For example, there is some variation in guidance about how long packs can be frozen for before deteriorating in quality. Bread and ready meals, provide good examples of where action on this may be valuable.

Moves to harmonize freezing instructions could also involve greater use of the ‘snowflake’ logo, along with in-store promotion of the logo and clear freezing and defrosting guidance so that consumers become more aware of the logo and more confident about using their freezer more to prevent food waste.

Date marks

The research suggests that very few products now carry ‘sell-by’ dates. This creates the opportunity to remove this date (where it does exist) leaving just three key date types for consumers to understand (‘use by’, ‘best before’ and ‘display until’).

The evidence suggests that moves could also be made to remove ‘display until’ dates from products. While a large number of supermarket own brand products carried ‘display until’ dates only a limited number of branded products did so, implying that stock control is feasible without them. It should be highlighted that on some product categories – notably pasta, rice, ambient pasta sauces and mayonnaise – no ‘display until’ dates were shown (including on own-label products).
A quarter of potato packs and 19% of ‘uncut’ carrot packs only carried a ‘display until’ date (e.g. they do not also have a ‘best before’ date). For those consumers that like to rely on a food date as an indication of when to eat the product, this may leave them with no alternative than to use the ‘display until’ date, discarding packs long before they deteriorate in quality sufficiently to make them inedible or unpleasant.

Packs of some products effectively convert the ‘best before’ date into a ‘use by’ date. Some packs (such as mayonnaise, cheese, world bread, frozen chicken and frozen ready meals), which had a ‘best before’ date stated that, once opened, the product should be ‘consumed within ‘x’ days and by date shown’. The latter part of this guidance could confuse consumers as they could open the pack on the ‘best before’ date and feel they had to use it all that day.

There is also some work to be done to harmonize the types of dates used in some product categories. This is particularly true for cheese, yoghurts, world breads and bacon, which carried a mix of ‘best before’ and ‘use by’ dates. It is recognised that variations in the date mark and shelf-life between apparently ‘similar’ products result from different product formulations which could affect the likelihood of pathogens growing.

Cooking

The low proportion of products carrying cooking instructions (only two fifths of the products reviewed in this research did so) is of some concern given that a proportion of food waste is caused by a lack of consumer knowledge/confidence around cooking. Key exceptions to this were packs of rice and pasta, which all included some form of cooking guidance.

In particular, there is scope for work to be done to inform consumers, particularly online or at point of sale, about how to store, re-heat and freeze leftovers as this was virtually non-existent across all product categories.

Another area for attention is on the significant proportion of products in some categories that failed to offer portion sizing advice. While all packs of pasta, for example, showed cooking instructions, few carried portion size guidance. One option may be to work with producers and retailers to increase the proportion of rice and pasta packs that use portion size marker lines on the packaging. Other products warranting attention with regards to a lack of portion size guidance include potatoes, carrots and, to a lesser extent, microwavable rice.

The inconsistency in the portion size recommended on products of the same type within several product categories highlights the potential for further work to establish clearer standard recommended portion sizes on products such as ready meals, pasta sauce and bagged salad.

It was striking that very few products provided advice on storing, freezing and re-heating leftovers. Again, while it is important to be aware of space constraints on-pack, this is one area with much scope for improvement. One solution may be to signpost to the retailer or brand website for more detailed guidance and recipe ideas.

Packaging

The research has highlighted some clear opportunities to work with producers and retailers on packaging design that may help to reduce food waste. While a quarter of packs of cheese are re-closable, for example, there is much scope to increase this percentage, and to roll out similar formats for other product categories such as bread rolls, world breads and ham.

Similarly, while some examples of packs split into smaller portions/individual portions were found in the bacon and chicken product categories, this only amounted to a very small proportion of products. It seems, therefore, that there are substantial opportunities to roll out this kind of innovation on a much wider scale.

While these opportunities are plentiful, they also require substantial investment. In the absence of the potential for such investment, improvements in storage guidance – in particular with regards to the use of airtight containers to store opened packs – may provide a next best option.

In-store advice

A particularly striking finding of this research was the lack of in-store guidance to consumers on how they can prevent food waste found at the time the fieldwork was carried out. Furthermore, with the exception of re-closable food/freezer bags, there was only limited availability of tools to help consumers reduce their food waste.
Where they were available, they tended not to be sold alongside food products for which they were intended, nor was there any signposting to these tools from any food products.

There is a very powerful opportunity, therefore, for retailers to help their customers through the promotion of these tools, and of tips on things such as storage, recipe ideas, use of leftovers and freezing – particularly alongside products that are on special offer. One benefit of this approach would be that it may avoid the need to have to print this information on packs where space is limited. In addition, while the levels of messaging directed at consumers in supermarkets is already very high and further messages may be difficult to accommodate, they could also help to improve customer loyalty i.e. if they were able to get more out of the food they buy such moves could help customers save money.

Next steps

The findings will be taken forward as part of the work WRAP and the FSA have already started with the food industry. This will focus on reducing areas of inconsistency and increasing the amount of information, tools and advice that will help consumers reduce food waste on-pack, in-store and online. The intention is to repeat this study in the later half of 2010 to monitor change.
Appendix 1 – Product categories

For each product category, researchers were asked to collect data according to the following specification:

**Apples**
- Examples of all available packs of Braeburn apples. If unavailable, then all available Gala apples. If unavailable again then all available Pink Lady apples.
- All information relating to loose apples (price, promo, dates etc.) including any information given on the produce bags (researchers were told not to purchase them as standard, but told that if necessary they should purchase 2 loose apples of the same type as selected for the packs, e.g. Braeburn).
- **NOT** organic apples.

**Bacon**
- An example of every available pack of unsmoked back bacon.
- 100g of any unsmoked back bacon available from the deli counter.
- **NOT** organic bacon.

**Bread rolls**
- One example of every packet of plain white rolls.
- One white roll (any) from the in-store bakery.
- **NOT** seeded rolls.

**Bread**
- An example of all available medium-sliced white bread. If these were unavailable then they were told to pick thick OR thin sliced white bread.
- From the in-store bakery, an example of all available sizes of a ‘standard’ white loaf (i.e. **NOT** bloomers, crusty etc.) - sliced where available.
- **NOT** brown bread.

**Carrots**
- An example of all available packs of fresh carrots available, including organic varieties AND pre-prepared carrots.
- Loose carrots (price, promo, dates etc.) including any information given on the produce bags (not purchased as standard, however if necessary purchase 2 loose carrots).
- **NOT** tinned or frozen carrots, or any packs of mixed vegetables containing carrots.

**Cheese**
- An example of all mature cheddar available.
- 100g of ANY mature cheddar at the deli counter where available.
- **NOT** grated/sliced cheese or soft cheese (e.g. Philadelphia, Dairylea etc.).

**Chicken**
- An example of every available pack of whole skinless chicken breast fillets (**NOT** mini or diced chicken fillets).
- All available sizes i.e. small (1-2 fillets), medium (3-4 fillets) and large (5-8 fillets) chicken fillets if available.
- Chilled and frozen versions.
- **NOT** organic chicken.

**Pasta sauce**
- One example of all available standard tomato/original or tomato and herb pasta sauce. Where both variants are available for the same brand, tomato/original sauce should be used.
- If no tomato/original or tomato/herb sauce available for that brand, then Bolognese sauce e.g. Dolmio sell neither tomato/original nor tomato/herb sauce but do sell a Bolognese sauce.
- Chilled and ambient versions.
- All pack formats and sizes available e.g. Jar, pouch, plastic tub etc.
NOT pesto, or any other flavours of sauce (e.g. mushroom, onion & garlic etc.).

Eggs
- An example of all hen eggs available (e.g. free-range, barn, organic etc.).
- Where a range of sizes were available for a particular brand, medium size eggs - if unavailable then an alternative size (only one egg size of each type/brand).
- An example of all pack sizes available across the egg brands e.g. 4 medium eggs, 6 medium eggs, 10 medium eggs, etc.

Ham
- All products labelled as just ‘Ham’ or ‘Cooked Ham’ in all available sizes.
- An example of all products labelled as ‘Wiltshire (Cured) Ham’ in all available sizes.
- The deli counter - 100g of Wiltshire (Cured) ham where available.
- NOT breaded ham, honey roast ham or any other variant.

Mayonnaise
- An example of all standard mayonnaise available (all pack formats and sizes available).
- NOT organic, ‘light’ or flavoured versions.

Milk
- An example of all available standard semi-skimmed milk.
- NOT soya, goat’s milk, or organic milk.

Pasta
- An example of all available packs of dry fusilli/pasta twists.
- NOT wholewheat/organic versions, or any chilled pasta.

Potatoes
- An example of all bags of mainstream potatoes (often called ‘white potatoes’ or just ‘potatoes’).
- All available bags of King Edward potatoes. If unavailable, then all bags of Maris Piper potatoes. If unavailable again then all bags of Vivaldi potatoes.
- Any organic options available under these categories.
- Information relating to loose potatoes (price, promotion, dates etc.) including any information given on the free, fresh produce bags. They were asked not to purchase them as standard, but told that if necessary they should purchase 2 loose potatoes.
- NOT new potatoes, baking potatoes or pre-prepared potatoes (e.g. microwaveable packets of flavoured potatoes).

Ready meals
- An example of all available cottage pie meals.
- If cottage pie unavailable then shepherd’s pie. If unavailable again, then cumberland pie.
- Chilled and frozen versions, plus deli counter versions if available.

Rice
- An example of all available packs of standard long-grain white rice, including microwaveable pouches.

Salad
- An example of all available bags of salad labelled “iceberg” or “mixed salad”.

World bread
- All plain white pittas.
- All plain tortilla wraps.
- All plain, garlic, or garlic and herb naan breads.
Yoghurts

- An example of all standard yoghurts (including Muller Light, but not including Muller Corners, children’s yoghurts, fromage frais, greek yoghurt, pro-biotics, Activia or Muller Rice).
- Just one flavour of each type from **single yoghurts**.
- From **multipacks**:
  - Single flavour packs – just one flavour of each type.
  - Multi flavour packs – example of all packs available.
Appendix 2 – Number of products by product category

Table A1 The number of products for which data was collected for each product category.

<table>
<thead>
<tr>
<th>Product category</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yoghurts</td>
<td>1190</td>
</tr>
<tr>
<td>Ham</td>
<td>554</td>
</tr>
<tr>
<td>Bacon</td>
<td>521</td>
</tr>
<tr>
<td>Bread rolls</td>
<td>620</td>
</tr>
<tr>
<td>Ready meals</td>
<td>438</td>
</tr>
<tr>
<td>Bread</td>
<td>847</td>
</tr>
<tr>
<td>Potatoes</td>
<td>159</td>
</tr>
<tr>
<td>Pasta sauce</td>
<td>947</td>
</tr>
<tr>
<td>Rice</td>
<td>593</td>
</tr>
<tr>
<td>Cheese</td>
<td>699</td>
</tr>
<tr>
<td>Chicken</td>
<td>322</td>
</tr>
<tr>
<td>World breads</td>
<td>709</td>
</tr>
<tr>
<td>Bagged salad</td>
<td>141</td>
</tr>
<tr>
<td>Carrots</td>
<td>404</td>
</tr>
<tr>
<td>Apples</td>
<td>101</td>
</tr>
<tr>
<td>Mayonnaise</td>
<td>475</td>
</tr>
<tr>
<td>Milk</td>
<td>411</td>
</tr>
<tr>
<td>Eggs</td>
<td>505</td>
</tr>
<tr>
<td>Pasta</td>
<td>324</td>
</tr>
</tbody>
</table>
Appendix 3 – Detail relating to the stores visited through the research

Table A2 Number of stores of each retailer visited (Base: 69).

<table>
<thead>
<tr>
<th>Retailer</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tesco</td>
<td>17</td>
</tr>
<tr>
<td>Asda</td>
<td>9</td>
</tr>
<tr>
<td>Sainsbury’s</td>
<td>9</td>
</tr>
<tr>
<td>M&amp;S</td>
<td>8</td>
</tr>
<tr>
<td>The Co-op</td>
<td>8</td>
</tr>
<tr>
<td>Waitrose</td>
<td>5</td>
</tr>
<tr>
<td>Aldi</td>
<td>4</td>
</tr>
<tr>
<td>Lidl</td>
<td>4</td>
</tr>
<tr>
<td>Morrisons</td>
<td>4</td>
</tr>
<tr>
<td>Ocado</td>
<td>1</td>
</tr>
</tbody>
</table>

In order to facilitate the analysis of a range of factors across different types of stores, three distinct store typologies were developed: supermarket, convenience store and online. The stores were categorised as follows:

Table A3 Store typologies used in the research.

<table>
<thead>
<tr>
<th>Supermarket</th>
<th>“Metro”/ convenience store</th>
<th>Online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waitrose</td>
<td>M&amp;S Department Store</td>
<td>Asda - Online</td>
</tr>
<tr>
<td>Aldi</td>
<td>M&amp;S Simply Food</td>
<td>Tesco - Online</td>
</tr>
<tr>
<td>Lidl</td>
<td>Tesco Metro</td>
<td>Sainsbury’s - Online</td>
</tr>
<tr>
<td>Tesco Extra</td>
<td>Tesco Express</td>
<td>Ocado - Online</td>
</tr>
<tr>
<td>Tesco Supermarket</td>
<td>Sainsbury’s Local</td>
<td>Waitrose - Online</td>
</tr>
<tr>
<td>Sainsbury’s Supermarket</td>
<td>The Co-operative (Convenience Store)</td>
<td></td>
</tr>
<tr>
<td>Morrisons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASDA Wal-Mart Supercentre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asda Supermarket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Co-operative (Supermarket)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Through the course of the research, the following number of stores of each type were visited:

Table A4 Number of stores of each type visited (Base: 69).

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supermarket</td>
<td>40</td>
</tr>
<tr>
<td>&quot;Metro”/ convenience store</td>
<td>24</td>
</tr>
<tr>
<td>Online</td>
<td>5</td>
</tr>
</tbody>
</table>