



# **Not checking use-by dates and consuming foods past the use-by dates**

**Date: October 2023**

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**DOI: <https://doi.org/10.46756/sci.fsa.rvw614>**

# Introduction

Kitchen Life 2 (KL2) is a study that used motion-sensitive cameras in household and business kitchens to observe real-life behaviour (preparing food, cooking, and cleaning). This observational data was supplemented with data from surveys, interviews, and food diaries. The COM-B behavioural framework was used to understand the influences on behaviour. The resulting analysis provides fresh insight for risk assessment, policy development, and behavioural intervention design in relation to food safety and food waste behaviours in household and business settings.

KL2, which was commissioned by the FSA in February 2021 and completed in June 2023, was delivered by Basis Social, with support from Leeds University Business School. This unique and innovative research project won the Analysis in Government 'Innovative Methods' award in 2022.

## Aims and Objectives

The aims of the study were to identify:

- the key behaviours relating to food safety that occur in household and business kitchens
- where, when, how often, and with whom food safety behaviours occur, and the key factors that influence these behaviours

KL2 had two main objectives:

- to provide highly detailed, real-life data for risk assessment at the FSA
- to inform future behavioural interventions research

## Method

Overall, 101 kitchens participated in KL2, with 70 households and 31 food business operators (FBOs) taking part across England, Wales, and Northern Ireland.

After a literature review and a pilot, the main fieldwork design involved installing motion sensitive cameras to film participants in their kitchen over 5-7 days, with 3 days of footage analysed from this period.

The footage was coded, with labels applied to describe the behaviour (e.g., washing hands with soap), person (e.g., chef), and context (e.g., sink, utensils). In addition, fridge and freezer thermometers were used to monitor the temperature of the appliances during the fieldwork period. Photographs were also taken of the interior of

a fridge and, for households only, a food diary and shopping receipts were kept, to verify ingredients cooked.

After the filming period, survey, interviews, and observational methods were used to understand influences on food safety behaviours. The fieldwork took place over 5 waves between June 2021 and October 2022.

Behaviours were analysed using the COM-B behavioural model. The model enabled the research team to systematically explore the barriers and enablers of various food safety behaviours in relation to capability, opportunity, and motivation.

Experts in food safety policy, behavioural sciences, and communications were then involved in a workshop to discuss findings and consider behaviours to target for future interventions.

Further methodological details about this study are available in the [Technical Report](#), and a raw dataset can be downloaded via the [FSA's Data Catalogue](#).

## Research Reports

This is one of 7 chapters detailing the findings from this study. Each report focuses on a behaviour of interest to the FSA, exploring the behaviour in detail, using COM-B analysis to identify the factors influencing the behaviour, and discussing the behaviours that would need to change to achieve the desired practice. Each report also contains a case study, which explores a real scenario captured during the KL2 study, to illustrate the behaviour.

The other 6 chapters can be found here:

- [Not washing hands with soap after touching meat, fish and poultry](#)
- [Reusing a chopping board after preparing meat, fish and poultry](#)
- [Reusing a tea towel or cloth for multiple purposes](#)
- [Storing chilled foods at incorrect temperatures](#)
- [Not reheating leftovers until steaming hot throughout](#)
- [The creation of food waste](#)

Key insights across all 7 reports are available via the main [Kitchen Life 2 webpage](#).

Further details about why these behaviours were selected as the focus for KL2 reports is provided in the [Technical Report](#).

## Summary

Eating food past the use-by date presents a significant risk of foodborne illnesses to consumers<sup>1</sup>.

While it was challenging to observe whether use-by dates were checked by participants in the Kitchen Life 2 (KL2) study, the use of interviews and survey data, in combination with observations, indicates adherence to use-by dates were limited in households and, to a lesser extent, food business operators (FBOs).

In the survey, most household participants (53 out of 70) claimed to eat foods past the use-by date with 'occasional consumption' being the most common self-reported behaviour. In terms of adherence to use-by dates, 6 participants said they 'always' ate food they bought by the use-by date and 7 said they 'always' froze food prior to the use-by date.

For FBOs, survey data was not collected concerning adherence to use-by dates. In interviews<sup>2</sup>, FBOs generally claimed to use or manage food in advance of a use-by date and therefore regarded consuming<sup>3</sup> food past a use-by date less of a relevant issue. However, while infrequent, in interviews FBOs also mentioned that they would occasionally serve foods to customers, including meat, that had past the use-by date, provided a chef had judged it as safe to eat.

Not checking and/or consuming foods past the use-by date were driven by a wide variety of factors.

In households, these were:

- **Poor understanding** that use-by dates alone indicate food is no longer safe to eat. Some participants thought that best-before labels also indicated this. This enabled the consumption of food past a use-by date (psychological capability).
- **overcrowding in the fridge making** it hard to see food items, and the **label legibility**, both of which were barriers to checking use-by dates (physical

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<sup>1</sup> Best before and use-by dates, FSA, 2021, <https://www.food.gov.uk/safety-hygiene/best-before-and-use-by-dates>

<sup>2</sup>FBOs were asked other questions about use-by dates (for example, how they check the freshness of food), but not this specific question due to a priority of other topics.

<sup>3</sup> In the case of FBOs, 'consuming food' refers to food that is served by FBO staff for customers to consume, unless otherwise stated.

opportunity).

These were reinforced by the following contextual factors<sup>4</sup>:

- **beliefs about the risks of foodborne illness** resulting from eating food past the use-by date, which could be a barrier or enabler to the consumption of food past a use-by date (reflective motivation).
- **social norms and values concerning food waste**, such as wasting money or the environmental impact, which enabled the consumption of foods past the use-by date (social opportunity).
- **affective processes** triggered through the smell, appearance, and taste of spoiled foods, that were often used in preference to use-by dates, and which could enable the consumption of food past a use-by date (automatic motivation).

Most FBOs said they checked use-by dates, but a variety of other factors influenced whether foods were consumed past the use-by date. These were:

- **social opportunity** and a **culture of deference to chefs**, who had the main say on whether foods were safe to consume, which could enable the consumption of food past a use-by date (social opportunity).
- mixed **understanding of the difference between use-by and best before dates** (psychological capability).

This was reinforced by the following contextual factors<sup>5</sup>:

- **beliefs about the effectiveness of different methods**, such as smell, look and taste, to judge whether food is safe to eat, which could enable the consumption of food past a use-by date (reflective motivation).
- **affective processes** triggered through the smell, appearance, and taste of spoiled foods, together with trusting a '**chef's intuition**', which could enable the consumption of food past a use-by date (automatic motivation).

**Behaviours to target for potential interventions:**

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<sup>4</sup> These factors are not in a hierarchy of importance.

<sup>5</sup> These factors are not in a hierarchy of importance.

For households and FBOs, the desired behaviour was **to use, cook or freeze all foods in advance of their use-by date.**

For households, interventions could also focus on meal planning (e.g. batch cooking and freezing foods), as this is in line with FSA guidance and some KL2 participants preferred to do this rather than waste food or eat food past the use-by date.

Interventions could also focus on not using sensorial cues (such as sight or smell) to judge if food is safe to eat, as this was a common practice. This was often based on the belief that sensorial cues are better than the use-by date and beliefs around the likelihood of getting ill.

# Background

Use-by dates on food are an important food safety control and labels are mandated on packaged perishable foods such as meat products and ready-to-eat salads. [FSA consumer advice](#) highlights that eating foods past the use-by dates presents a significant risk of foodborne illnesses to consumers.

The [literature review](#) conducted as part of the Kitchen Life 2 (KL2) project explored a range of research on consumer attitudes and behaviours on use-by dates. The research highlights a wide variability of attitudes, ranging from ambivalence to uncertainty to cynicism, and subsequently little, if any, consistent adherence to use-by dates<sup>6</sup>. Research has also identified that consumers may be confused by the meaning of the best-before and use-by dates<sup>7</sup>.

In terms of reported behaviours, the FSA's [Food and You 2](#) Wave 1 survey highlights that most respondents reported that they never ate smoked fish (85%), milk (67%), cooked meats (64%), cheese (52%), or bagged salads (49%) past the use-by date. However, research suggests that in addition to or instead of use-by dates, consumers tend to rely on smell, touch, and visuals to assess freshness of foods<sup>8</sup>.

There was limited research on the beliefs and attitudes to use-by dates by FBOs identified in the literature review.

In terms of the KL2 study, the behaviours 'not checking use-by dates' and 'consuming food past the use-by date' were identified as a priority and high risk by the FSA risk assessment team at the start of the study and consequently selected as behaviours to explore in depth. Additionally, limited research on FBO practices around use-by dates made it an area of particular interest for the FSA.

This chapter uses the KL2 data to understand whether participants checked and/or consumed foods past use-by dates, and the factors affecting this. It identifies behaviours that could be the focus of future interventions research.

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<sup>6</sup> Wills WJ, Meah A, Dickinson AM and Short F. 'I don't think I ever had food poisoning'. A practice-based approach to understanding foodborne disease that originates in the home' *Appetite* 2015: volume 85, pages 118–125

<sup>7</sup> Evans EW and Redmond EC. 'Older adult consumer knowledge, attitudes, and self-reported storage practices of ready-to-eat food products and risks associated with listeriosis' *Journal of Food Protection* 2016: volume 79(2), pages 263–272

<sup>8</sup> Wills WJ, Meah A, Dickinson AM and Short F. 'I don't think I ever had food poisoning'. A practice-based approach to understanding foodborne disease that originates in the home' *Appetite* 2015: volume 85, pages 118–125

## Related behaviours

The FSA was also interested in the relationship between behaviours on use-by dates and food waste. Prior research has identified that concerns about food waste and food insecurity can influence adherence to use-by dates<sup>9</sup>, and [FSA research](#) indicates that over a quarter of adults across England, Wales and Northern Ireland reported that they had eaten food past the use-by date in the past month because they could not afford to buy more food (December 2022). In this context, an objective of the FSA is to promote behaviours that encourage the consumption, cooking and/or freezing of foods prior to the use-by date, thereby minimising food waste while ensuring food is safe to eat. For further details of food waste in KL2, see the ['The creation of food waste'](#) chapter.

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<sup>9</sup> Antonise-Kamp L, Friesema IH, van der Vossen-Wijmenga WP and Beaujean DJ. 'Evaluation of the impact of a hygiene warning label on the packaging of poultry' Food Control 2018: volume 92, pages 86–91



# FSA guidance on use-by dates

[FSA guidance for households](#) on use-by dates includes:

- never eat food after the use-by date, even if it looks and smells ok.
- it is safe to eat food until midnight on the use-by date shown on a product, but not after, unless the food has been cooked or frozen.
- food can be cooked until midnight on the use-by date listed on the product and then cooled and kept in the fridge.
- food can be frozen before the use-by date, but it needs to be cooked within 24 hours of defrosting.
- consumers must follow the storage instructions on the product, with specific reference to chilling foods.

The guidance also highlights the difference between a best-before date (which concerns food quality) and a use-by date (which concerns food safety).

[FSA guidance for FBOs<sup>10</sup>](#) (not including label guidance for businesses producing packaged foods) includes:

- food with a use-by date needs to be chilled.
- food cannot be supplied or served after its use-by date.
- high-risk ready-to-eat food should be kept for a maximum of 3 days in total (the day it is cooked or opened plus 2 days) unless there is evidence that it is safe to keep it for longer.
- keep track of when food should be used by or thrown away.

Additionally, [FSA guidance for FBOs in relation to chilled foods](#) advises to freeze the food before the use-by date has passed, clearly noting the date it is frozen, and change the 'use-by' date to a 'best-before' date.

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<sup>10</sup> Separate guidance is available to [FBOs in Northern Ireland](#)

# Kitchen Life 2: Findings for households

## Quantitative observations from filming

It was challenging to analyse the adherence to use-by dates in the study, as it was not possible to confirm through observation whether participants read the use-by date label, and whether foods were consumed past the use-by date. Consequently, the incidence of not checking and/or consuming food past the use-by date may be underreported in observational data. Self-reported survey and interview data, together with observations, have been used in the analysis below.

There were no statistically significant correlations between checking/adherence to use-by dates, the time of day, day of week or demographic variables.

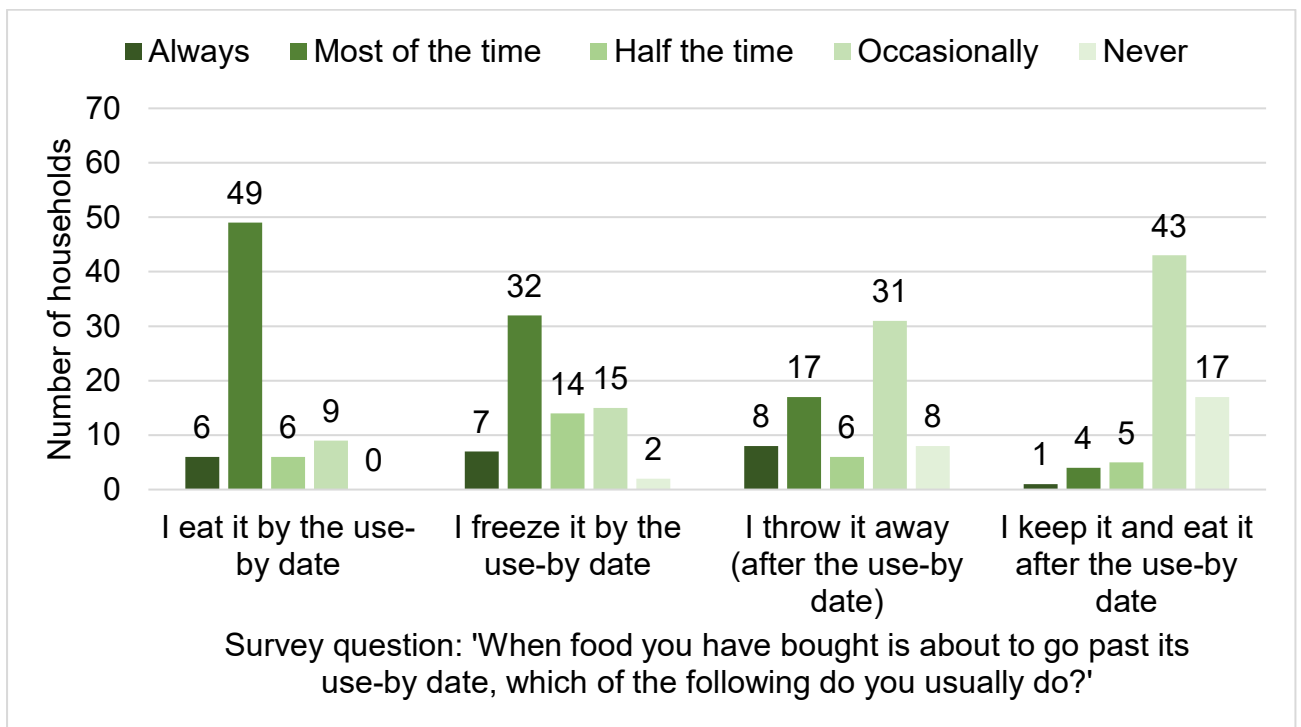
## Self-reported behaviours

Self-reported behaviours were explored in the survey concerning behaviours around food that is about to go past its use-by date.

In terms of adherence to use-by dates, 6 participants (out of 70) said they 'always' ate food they bought by the use-by date and 7 said they 'always' froze food prior to the use-by date. Additionally, 49 participants claimed to eat foods by the use-by date 'most of the time'.

In terms of consuming foods past the use-by date, 43 participants claimed to do this 'occasionally', and 8 participants said they 'always' disposed of food past the use-by date. Findings are shown in figure 1.

**Figure 1. Households self-reported behaviours concerning food that is about to go past its use-by date (base=70)**



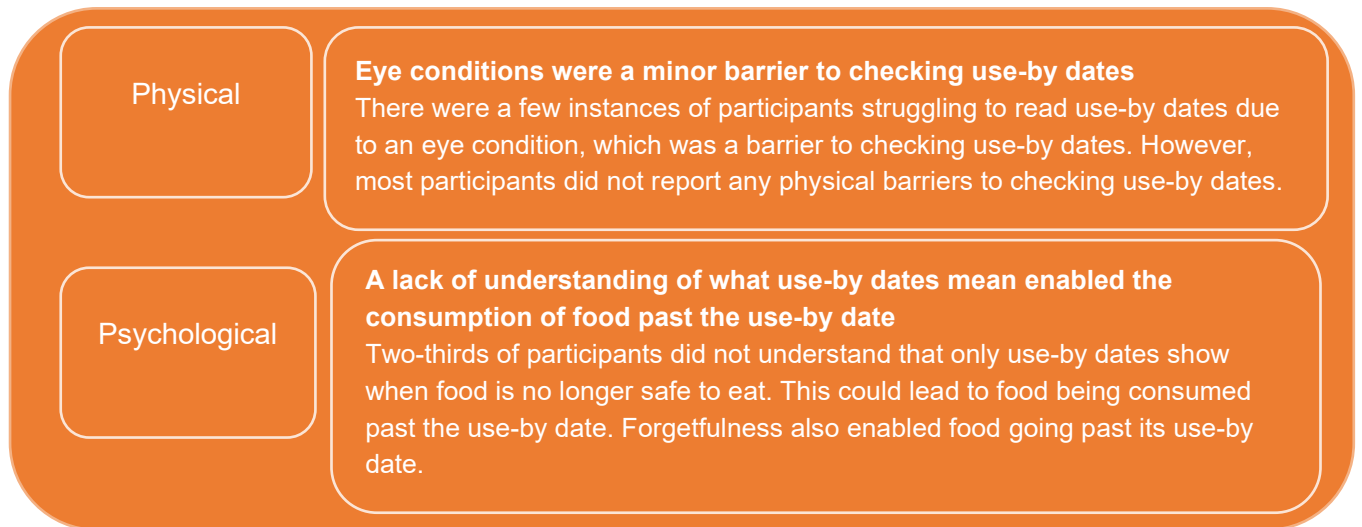
## Factors influencing not checking and consuming foods past the use-by date in households

### Summary

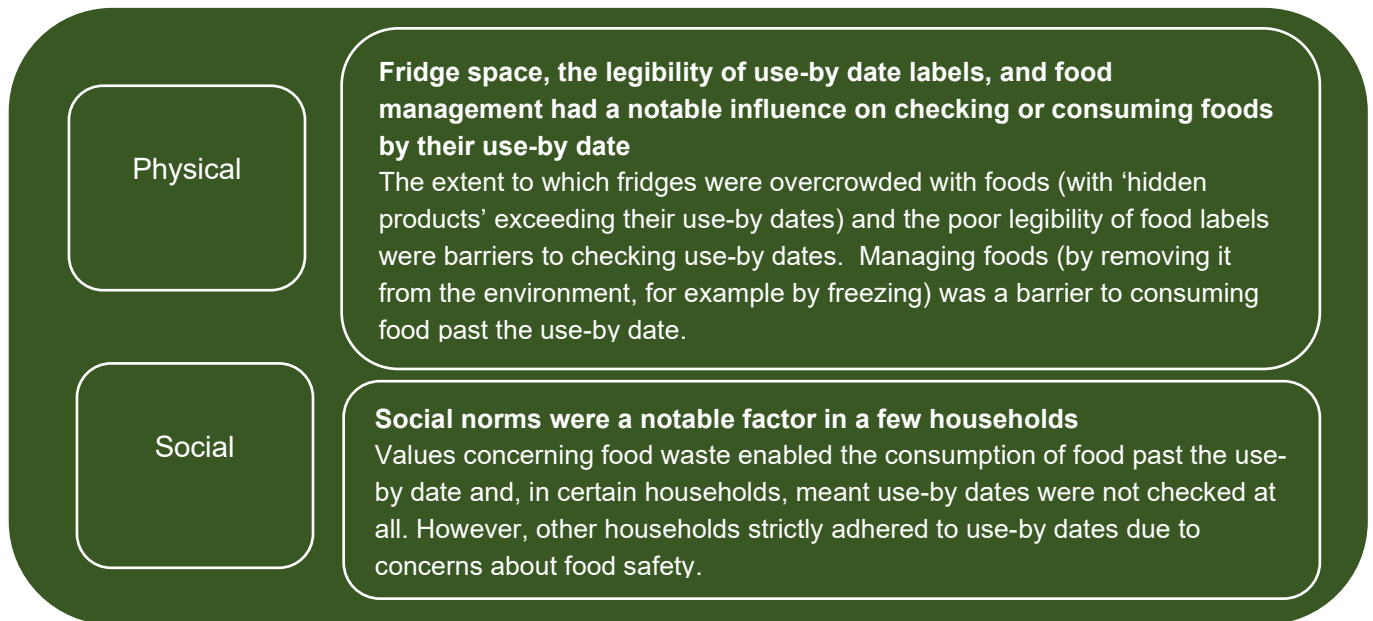
A wide variety of factors influenced behaviours on use-by dates. In terms of not checking use-by dates, the ability to read the date (including label legibility), plus social norms around food waste (for example, reducing food waste due to costs, or environmental impacts) were key drivers. In terms of consuming foods past the use-by date, a lack of understanding of what use-by dates mean and overcrowding in the fridge made it difficult to see the stored food. Beliefs about the consequences of foodborne illness from consuming foods past the use-by date and a reliance on emotions triggered by sensorial cues all enabled the behaviour. A summary of COM-B factors is given in figure 2.

**Figure 2. Summary of COM-B factors influencing not checking and/or consuming foods past use-by dates in households**

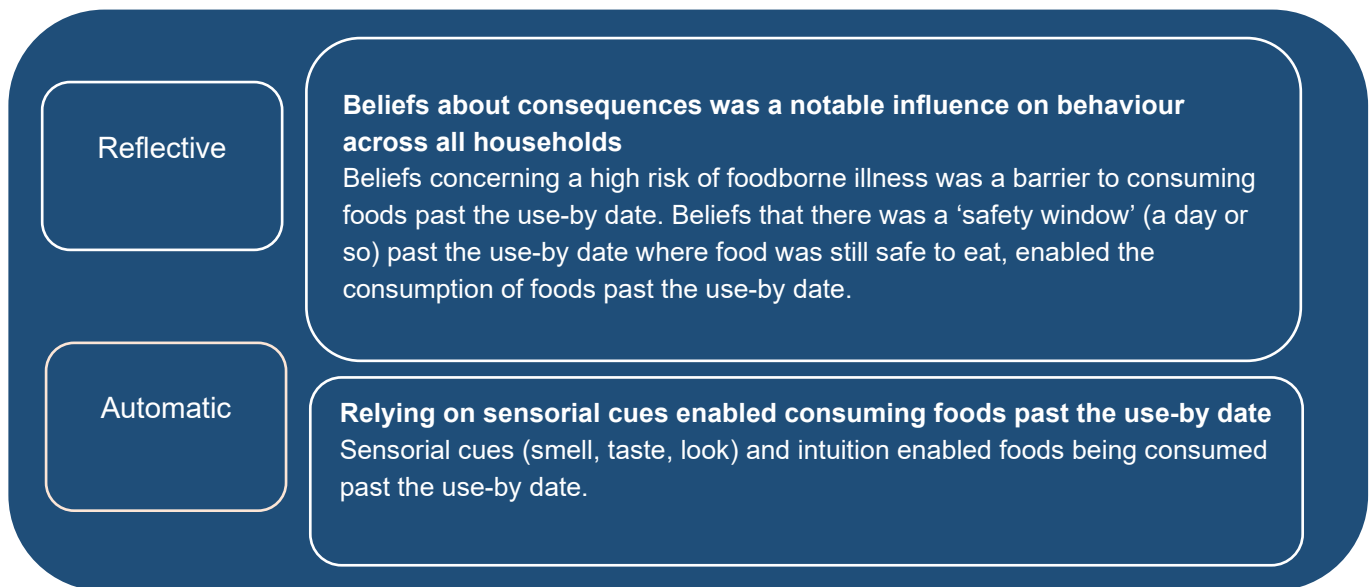
**Capability**



**Opportunity**



## Motivation



## Detailed findings

### Physical capability

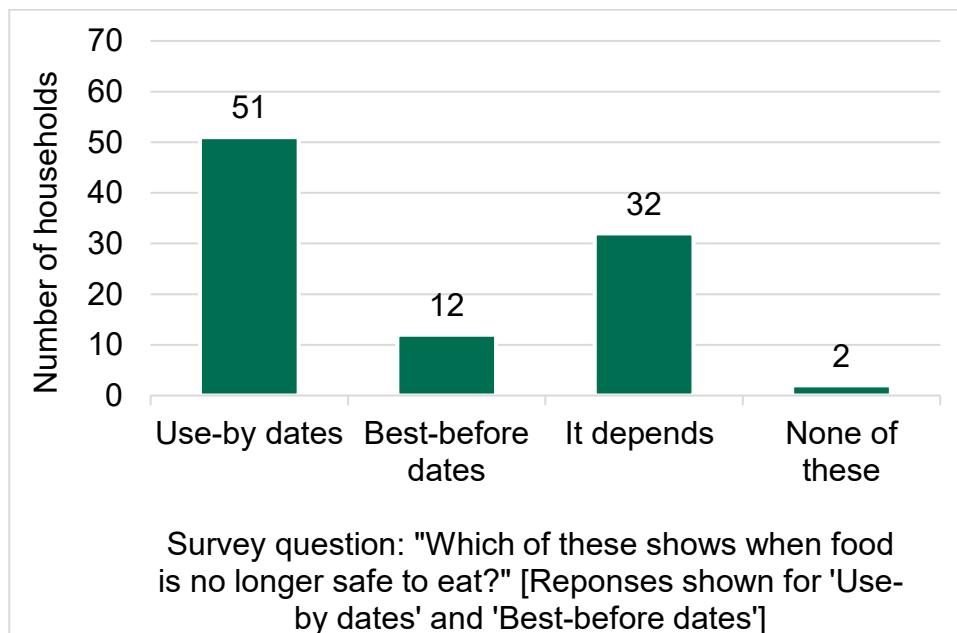
Generally, household participants in the study were able to locate and read use-by dates. While not common, some (generally older) participants mentioned that use-by dates were hard to read due to eyesight conditions, which could prevent the ability to check the use-by date.

### Psychological capability

The understanding of use-by dates was mixed across household participants. In the survey, participants were asked which options indicated that food was no longer safe to eat. Participants could choose more than one option.

Overall, three-quarters of household participants (51) understood that use-by dates indicated that food was no longer safe to eat. However, almost half of participants (32) said 'it depends', including 18 of those who had also selected use-by dates. Just under a fifth of participants (12) selected best-before dates, including 7 who had selected use-by dates. Figure 3 shows the findings.

**Figure 3. Self-reported household understanding of which food labels show when food is no longer safe to eat (base=70)**



In total, 25 participants correctly identified that only use-by dates show when food is no longer safe to eat, suggesting a lack of knowledge was a factor potentially enabling the consumption of food past the use-by date.

In addition to knowledge, participants mentioned that their inability to remember when specific foods had been bought, and their forgetfulness to check use-by dates, was an enabler of the consuming foods past the use-by date,

### **Physical opportunity**

There were 3 physical opportunity factors that influenced whether participants either did or did not check or consume foods past a use-by date.

The first factor concerned fridges and had 2 aspects:

- foods not being visibly obvious in the fridge, due to fridge overcrowding – this potentially acted as an enabler to consuming foods past the use-by date.
- limited fridge space prompted participants to shop regularly and buy food that was cooked within a day or two, as there was no place to store it – this practice was more common in shared households and acted as a barrier to consuming foods past use-by dates.

The second factor concerned how foods were managed, before their use-by date. Specifically, several participants managed foods by freezing or batch cooking, to ensure they did not exceed use-by dates (batch cooking was also influenced by

convenience). Managing foods (physically using the food) before they went past their use-by dates acted as a barrier to consuming foods past their use-by dates. The planning involved in this process is also an example of reflective motivation.

The third factor concerned the use-by date label position and font size. This was a minor issue and was raised mainly by older participants (linked to their visual capability). A lack of a standardised location of the date was stated as a concern in this context that could be a barrier to checking use-by dates.

‘You expect the date to be on the lid, but it’s not! Or it’s incredibly small and faint. But on veg and meat, it’s usually clear.’

Male, 60+, White, socio-economic group ABC1, lives alone

### **Social opportunity**

In a few households, social norms played a very significant role both as an enabler of and barrier to the consumption of foods past use-by dates. For example, there were individuals in households with very strong views on food waste, which encouraged the consumption of out-of-date foods (see the [‘The creation of food waste’](#) chapter for further information on this topic). Additionally, a small number of households with concerns about food waste claimed not to check use-by dates, again enabling the consumption on foods past their use-by dates. In contrast, there were also individuals with firm views about strictly adhering to use-by dates for food safety reasons, a barrier to consuming food past their use-by dates. In both instances, it was common for these views and values to shape behaviours for the entire household.

‘It’s gotten better but my wife used to have a real thing about use-by dates... I don’t really know where it came from, she’d just always been very particular about not eating any food that is off, on the verge of being off, or anything less than perfect.’

Male, 26–40, White, socio-economic group ABC1, Lives with family, including children

There were also generational differences, typically expressed by older participants citing their experience growing up, on whether use-by dates were meaningful – given they were not used a few decades ago, and ‘people were perfectly well’ by smelling and tasting food. These factors discouraged checking use-by dates and enabled consuming food past the use-by date.

## Reflective motivation

Participants were broadly split into different two groups, each with opposing beliefs about the consequences of consuming foods after the use-by date. The first were participants who believed there was a significant risk of foodborne illness from consuming foods after the use-by date and perceived use-by dates as an instruction to be followed. For these participants, perceptions were shaped by risks to children (due to their 'weak immunity'), risks of specific food groups (especially raw meats and to a lesser extent dairy) and general risk of foodborne illness from 'food going bad'.

'I'm always sort of quite careful and conscious of dates on things like raw meat, so I would make sure I use them up by the day or before or if it's really getting close, so I have sometimes frozen raw meat.'

Female, 41–60, White, socio-economic group C2DE, lives with partner

While participants who perceived higher risks claimed to adhere to use-by dates often (in the survey), in interviews only a few people said they always did this. For example, participants who were concerned about feeding their children with food past the use-by date, would often eat it themselves as their 'immunity was stronger'.

A second, larger group perceived the use-by date as a guide, and believed there was a 'safety window' (generally a day or so) where the consequences of eating foods past use-by dates were negligible. For these participants, risk perceptions were shaped by a variety of beliefs. These included:

- food businesses set use-by dates early 'to protect themselves', and consequently the date was inaccurate and the risks of foodborne illness are minor.
- there was a low likelihood of the risk of foodborne illness from eating food a day or so after the use-by date.
- the health and safety culture in the UK meant that the 'risks were overstated'.
- Use-by dates were 'really only for meat' and other food groups were less risky.

'I'm thinking that because it says use-by the 9th, it doesn't necessarily mean it's totally accurate... And I think the people who put these dates on are erring on the side of caution.'



Female, 60+, White, socio-economic group C2DE, lives alone

'You're not going to die if you eat it a day after.'

Female, under 25, White, socio-economic group ABC1, multi-occupancy household

Consuming foods past use-by dates was more common among participants with these beliefs, who said they used 'common sense' to judge whether food was safe to eat. Recent news items on whether use-by dates should be scrapped on milk also reinforced these beliefs, enabling consumption of food in general past its use-by date.

'I recently read that Morrisons is going to remove their use-by dates, they want people to use their noses... So they are doing what I've always been doing.'

Female, 41–60, Black, socio-economic group ABC1, lives with partner

### **Automatic motivation**

In interviews, almost all participants noted that they used emotional responses (mainly disgust), triggered by sensorial cues, to consider if they would eat food past the use-by date instead of relying on the use-by date. They also used these cues to assess if food is safe to eat, despite knowing that it had passed its use-by date. Sensual cues were:

- smell (especially for meat, fish and dairy products).
- look and texture (for meats, cheese, milk and bagged salads).
- taste (for milk and cream).

The idea that 'you can just tell' if something is not right to eat based on emotion, senses and 'gut feel' was very common. Sensorial cues were often seen as instinctively better than reading a use-by date, though greater caution was applied across different food groups.

'If it looks ok and smells ok I'll probably ignore [the use-by date] most of the time. Creams and milk, yoghurt, if it has gone past the sell-by date, I'll be more wary. It tends to go off quite quickly

once it's been opened. If meat has started to change colour that is when it is not ok to eat.'

Male, 26–40, White, socio-economic group ABC1, lives alone

## Case study

### Not checking and consuming foods past use-by dates in households

**Name:** Lily

**Age group:** 18–25

**Household composition:** multi-occupancy

Lily is a student living in shared accommodation with 5 female flatmates. She is a vegetarian, and the house contains a mix of people who eat and don't eat meat (including a vegan).

Living in a shared household means it can be hard to keep it tidy. Lily does most of the kitchen cleaning, and her housemates are less concerned about 'a bit of mess'. For Lily, keeping a clean kitchen is less about hygiene and more about things feeling orderly and nice.

'I always clean the kitchen as soon as I get up every morning. I'll get up, tidy anything that I have left in my room and then go down to clean the kitchen. Just because I can't make breakfast in a messy kitchen.'

Lily tends to do a few shops a week as there's not a huge amount of space in the fridge. However, she does have certain staples that are always on hand, including cheese, yoghurts, and bagged salads. She is also on a tight budget and doesn't like to waste food.

As Lily does not eat meat, she feels the risk of food poisoning from eating foods past the use-by date is low. She considers risk in relation to different food groups, rather than what the label says, and uses her senses to judge whether food is good to eat. She believes cheese is essentially 'mouldy milk' so, providing it looks fine, it is safe to consume a few days after the use-by date. She uses sight and smell to check whether her meat-alternative products have gone bad. Bagged salad is mainly checked by sight, especially looking out for leaves losing their colour or 'becoming slimy'. Lily also smells the bag of salad to check it is alright to consume.

## Analysis of Lily's behaviour

The influences on Lily's behaviour primarily relate to reflective and automatic motivation. While Lily checks use-by dates and understands that it is unsafe to consume foods past a use-by date (psychological capability), she sees the labels as more of a guide (reflective motivation), which enables consumption of foods past the use-by date. Additionally, as Lily doesn't eat meat, she sees few risks from the food she eats, which also enable the behaviour (reflective motivation). Rather Lily uses the smell and look of food to judge whether food is safe to eat (automatic motivation) enabling the consumption of food past the use-by date. Lily is also trying to prevent food waste, and manage a tight budget (reflective motivation), which enable the consumption of food past the use-by date.

## Identifying behaviours for interventions (households)

In reviewing the KL2 findings, the most notable influences on not checking and/or consuming foods past use-by dates concerned low levels of understanding of the use-by date, together with beliefs about how meaningful use-by dates are in practice. There was perceived to be a relatively low risk associated with consuming foods within a window of 1-2 days past the use-by date. One of the key observations was that, in addition to checking use-by date, sensorial cues, such as the look, smell and taste of foods, were commonly used to check foods were 'safe' to consume.

After KL2 fieldwork was completed, a workshop was held with experts in food safety and the behavioural sciences to discuss the COM-B influences on each of the KL2 priority behaviours, including not checking and/or consuming foods past use-by dates. In the workshop, experts discussed the findings from KL2 to explore the 'problem behaviours' that occurred in kitchens and then considered the 'desired practice'; that is, the behaviour that households and FBOs should do to improve food safety. In this case, the desired practice is for individuals in households **to use, cook or freeze all foods in advance of their use-by date.**

Once the 'desired practice' was established, the workshop then explored the specific behaviours to target, to encourage the desired practice. Each of these specific behaviours is explored in more detail below. It should be noted that the workshop was not designed to explore behavioural interventions, as this was outside of the scope of KL2. These specific target behaviours could be used in future research, for the development of behavioural interventions.

## **Specific behaviours to target to achieve the desired practice:**

### **1) Meal planning**

- KL2 found that people avoided eating food past its use-by date by managing foods e.g. batch cooking and freezing on or before the use-by date. This is in line with recommended practice. Consequently, interventions to enable people to plan meals better was seen as a priority area to focus on.

### **2) Not using smell and or sight to judge whether food is safe to eat.**

- In the KL2 study, using sensorial cues to judge whether a food was safe to eat was a common practice. These behaviours were informed by beliefs around likelihood of getting ill from the food and a range of myths around senses being a better guide to judge whether food was safe to eat, instead of the use-by date. As a result, this should be a focus on future behavioural interventions research.

## **Further recommendation: Improving understanding of use-by dates**

A key part of the FSA's role is to provide guidance to businesses and consumers on food safety practices. KL2 has identified areas where the FSA's guidance could be improved, or where awareness of the guidance may be beneficial.

Findings from the KL2 study indicate that most households do not understand that only use-by dates indicate when a food is no longer safe to consume, and they were commonly confused with other labels. To support consumers with their understanding of use-by dates, attendees of the workshop discussed the potential to simplify labelling systems (for example, removing best-before dates, and relying solely on use-by dates) so that the focus on food safety would be clearer.

Improving consumer understanding of use-by dates is an important finding from this research. However, it should be noted that improving understanding alone is unlikely to improve the behaviour and for this reason, the FSA should consider improving understanding in addition to the behaviours outlined above.

# Kitchen Life 2: Findings for FBOs

In this section, 'consuming food' refers to food that is served by FBO staff for customers to consume, unless otherwise stated.

## Quantitative observations from filming

As with households, it was challenging to analyse the adherence to use-by dates by FBOs in the study, as it was not possible to confirm through observation whether participants read the use-by date label, and therefore if foods were consumed past the use-by date. Consequently, the incidence of not checking and/or consuming food past the use-by date may be underreported in observational data. Self-reported interview data, together with observations, have been used in the analysis below.

No survey questions were asked of FBOs concerning whether they checked use-by dates or disposed of food past a use-by date<sup>11</sup>. However, in interviews FBOs said most food was consumed or frozen in advance of use-by dates. There were no statistically significant correlations between the checking of/adhering to use-by dates and the time of day, day of week or firmographic variables.

## Factors influencing not checking and consuming food past the use-by dates in FBOs

### Summary

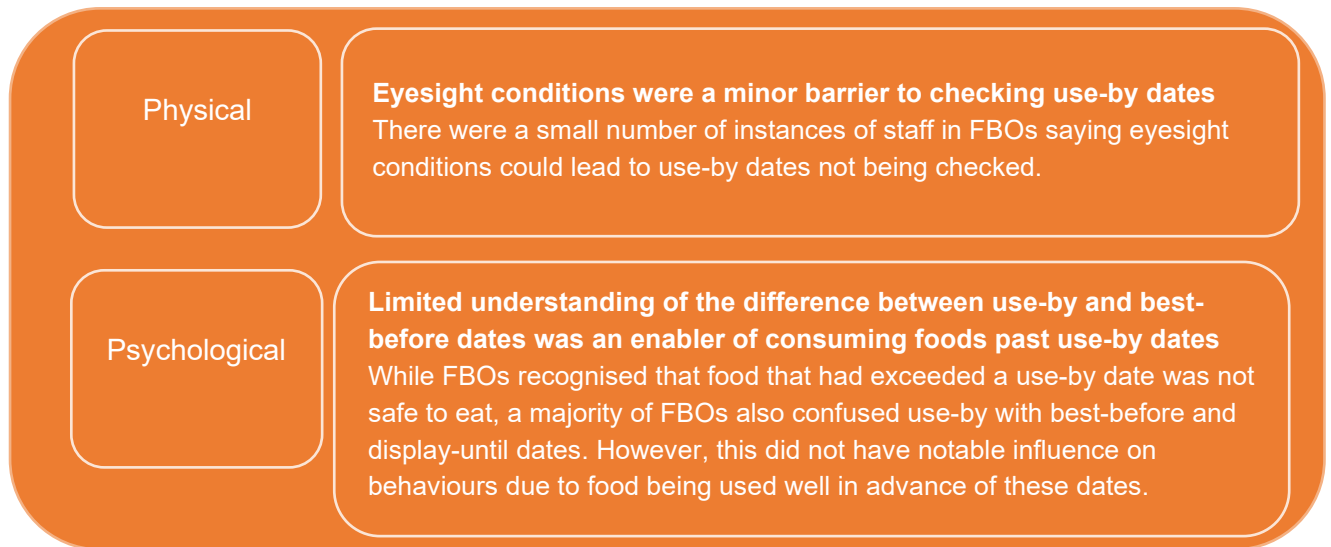
There were a wide variety of factors that influenced behaviours on use-by dates in FBOs. Not checking use-by dates mainly influenced by food being used in advance of the date. In terms of consuming foods past the use-by date, this was driven by beliefs about how the taste and smell of foods are effective ways to judge whether food had spoiled, and enabled by a culture of deference to chefs. A summary of COM-B factors is given in figure 4.

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<sup>11</sup> FBOs were asked other questions about use-by dates (for example, how they check the freshness of food), but not this specific question due to a priority of other topics.

**Figure 4. Summary of COM-B factors influencing not checking and consuming foods past use-by dates in FBOs**

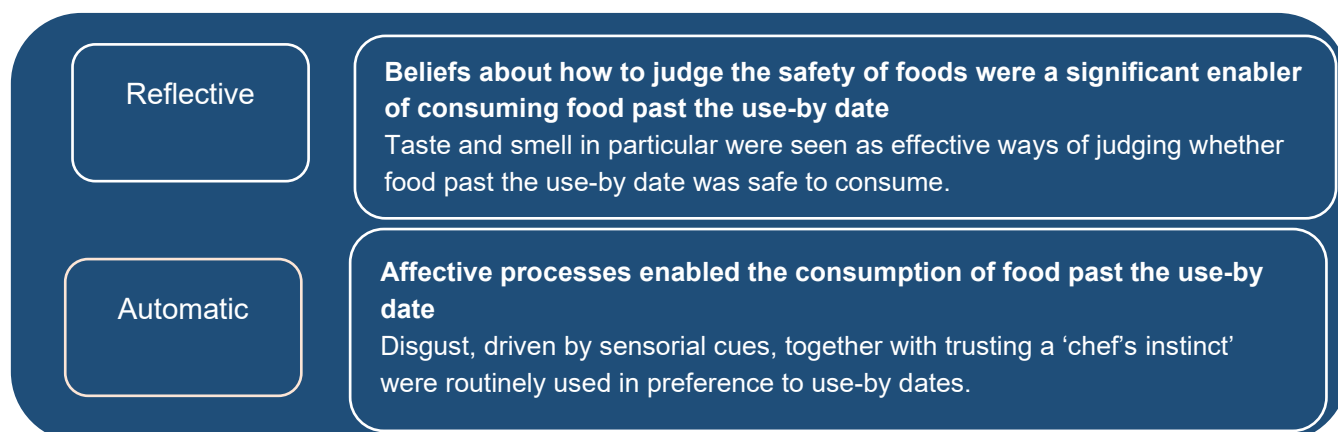
**Capability**



**Opportunity**



## Motivation



## Detailed findings

### Physical capability

There were a small number of incidences of staff in FBOs saying they found it difficult to read use-by dates due to an eyesight condition, this could mean occasionally use-by dates would not be checked (although this was explicitly mentioned by participants).

### Psychological capability

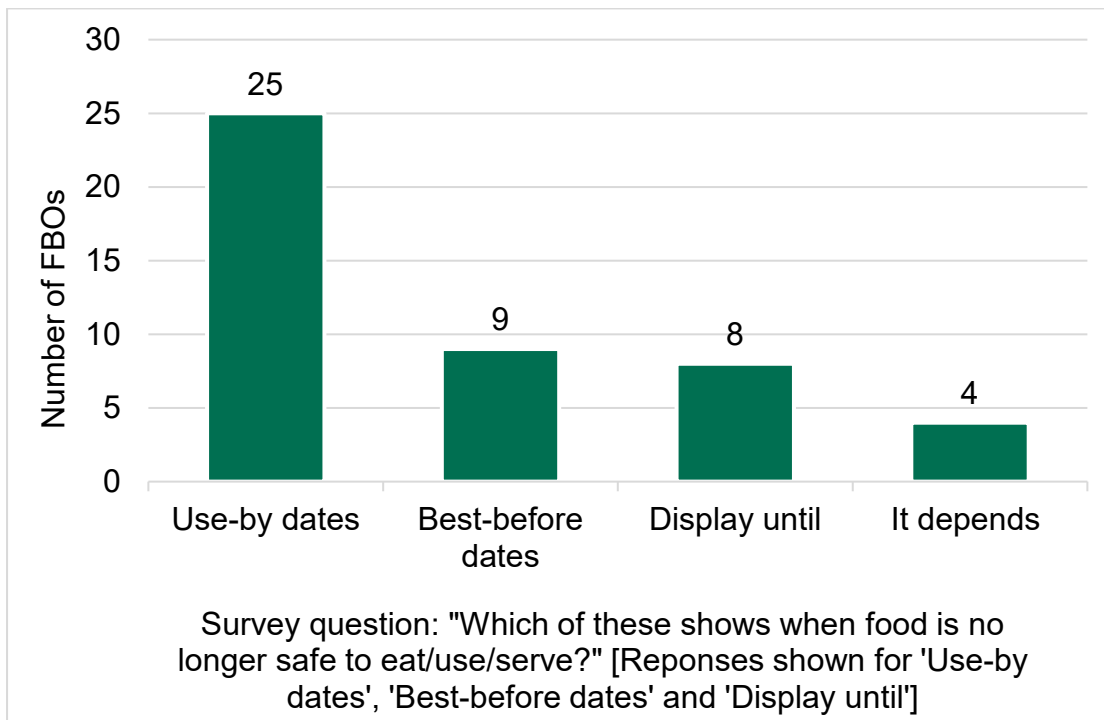
Psychological capability was a potential enabler of consuming food past the use-by date.

From the survey, most FBOs (25 out of 30) understood that exceeding a use-by date meant that food was no longer safe to eat, and in interviews FBOs also noted there was a risk of food poisoning if foods were served after the use-by date. However, in the survey, there was also confusion between 'Use-by' versus 'Best-before' and 'Display until' dates. Around a third of the sample also believed that these labels also related to food safety (see figure 5)<sup>12</sup> - with only 12 FBOs correctly identifying that only use-by dates relate to food safety. Findings indicate that 25 participants selected 'use-by dates' as the correct answer, but 13 of these respondents also falsely selected another option from the list provided.

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<sup>12</sup> Participants could select more than one option.

**Figure 5: Understanding which food labels indicate food is no longer safe to eat, serve or use in FBOs (30 FBOs responded to the survey)**



There was no clear evidence that this confusion between use-by and other date labels influenced behaviours around consuming foods past the use-by date, mainly as most FBOs prepared foods in advance of these dates, outside of the filming period.

### **Physical opportunity**

Physical opportunity factors acted as a notable barrier to the consumption of foods past use-by dates.

For most FBOs, the high turnover of fresh and perishable foods meant that exceeding use-by dates was not viewed as a concern. Businesses claimed to be proficient at managing foods, for profitability reasons, with produce either consumed or frozen in advance of a use-by date.

‘We use everything pretty much immediately. We always use it and we get delivery almost every day. So, it’s very hard for me to have any [foods past a use-by date] as we will use foods that very day.’

School catering, fewer than 5 staff, FHRs rating 4–5



In smaller FBOs, such as cafés and delis, a lack of physical storage space was cited as a factor driving the consumption of perishable foods before a use-by date.

‘We have got a special system here because we haven’t got much storage. We get 3 deliveries on 3 times a week, Monday, Wednesday, Friday. We don’t keep much food in stock, and everything is used within 2 or 3 days.’

Cafe, fewer than 5 staff, FHRS rating 4–5

### **Social opportunity**

Social opportunity enabled the consumption of foods past use-by dates.

Chefs were typically the single biggest influence on culture in a kitchen (more so than management). From interviews, the faith placed in the experience of chefs was a very important factor influencing when foods were consumed past a use-by date. Food would only be consumed after a use-by date on the advice of the chef, and in turn this shaped more relaxed attitudes to use-by dates in the kitchen that enabled consumption of food past its use-by date. However, explicit conversations about use-by dates were not observed during filming.

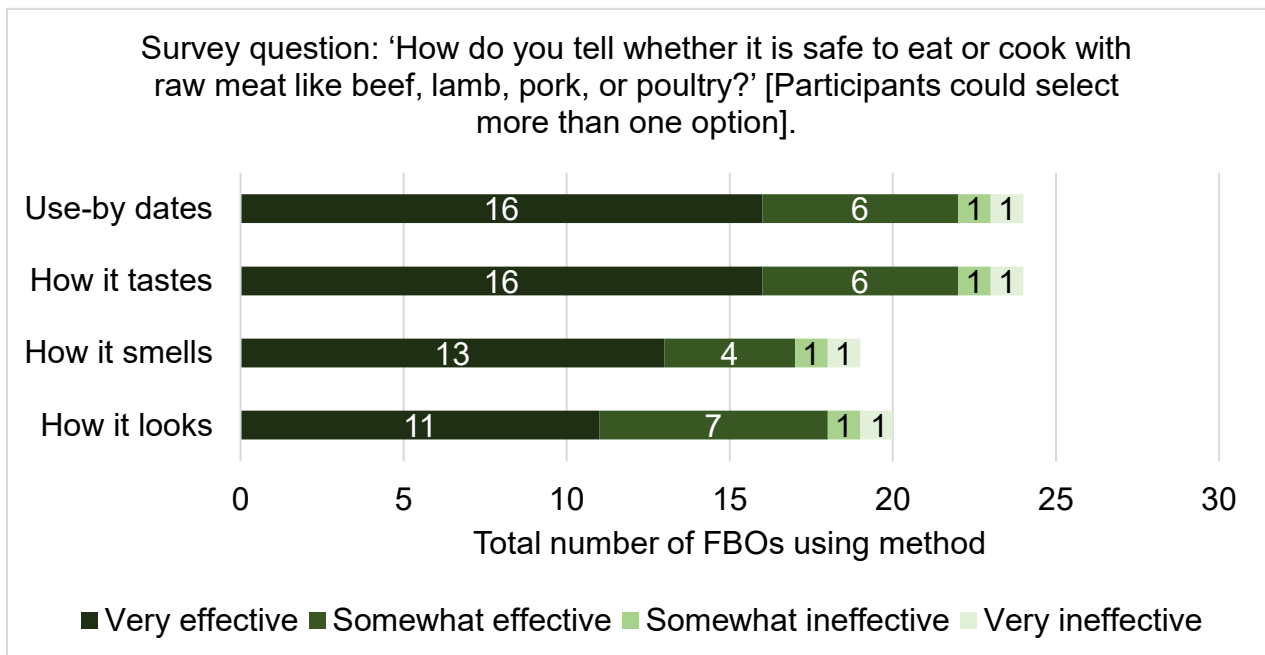
Related to this, from interviews, ‘a wasteful culture’ was frowned upon in most FBOs. While this generally meant food was only bought, defrosted, and cooked in relation to what was needed, it also provided an incentive to use food past the use-by date.

### **Reflective motivation**

Reflective motivation enabled the consumption of food past the use-by date. FBOs used a range of different methods to judge whether food was safe to consume past a use-by date, with varying beliefs about their effectiveness.

In the survey, FBO staff were asked how they determine whether it is safe to eat or cook with raw meat like beef, lamb, pork, or poultry. While use-by dates were commonly used (by 24 FBOs out of 28 who cooked these foods) and believed to be effective, how food tasted was also commonly used (24) and believed to be a comparably effective method. The look (20) and smell (19) of foods were also used by a significant proportion of FBOs (see figure 6).

**Figure 6. The use and perceived effectiveness of different methods to judge whether raw meat is safe to eat or cook (base=28<sup>13</sup>)**



In this context during interviews, while fresh meat was seen as the food most likely to present a risk of foodborne illness, several FBO participants mentioned they would use meat 1–2 days beyond the use-by dates if it smelled fine – as smell was believed to be a more effective method. Most FBOs used a combination of methods to judge whether food was safe to eat past a use-by date, with a few FBOs saying that they only adhered to the use-by date.

'I always say look at it, watch it, smell it and taste it. If it's gone bad it would be quite risky to cook, but you should be able to tell by looking at it if it's gone bad. You can also taste a wee bit, and you'll know very quickly if it's off.'

Deli owner, fewer than 5 staff, FHRS rating 4–5

In addition to meats, other categories of food were seen to carry different levels of risk by FBO staff. Levels of risk were related to different beliefs about the consequences of foodborne illness. In turn this influenced whether foods would be used past a use-by date to varying degrees.

<sup>13</sup> 2 FBOs stated they did not cook raw meat and were excluded from the analysis.

‘Eggs? Absolutely have no problem with eggs. Meat and chicken, if it still smells ok, a day or two later. Packaged ham. I mean, that could be anything. If it smells okay, its fine.’

Caterer, fewer than 5 staff, FHRS rating 4–5

### **Automatic motivation**

Automatic motivation also enabled the consumption of food past the use-by date. Specifically, sensorial cues (taste, smell, look) triggered affective responses, especially disgust, but also a ‘feeling’ about food, which was described as a ‘chef’s intuition’. This ‘gut feel’ meant that a chef could ‘tell with their eyes closed’ whether food was safe to eat. The chef’s intuition was very influential in whether foods were consumed past the use-by date (linked to social opportunity).

‘I can just tell when something isn’t right. And there are times where I thought oh, I’m not sure about this and started cooking. And then I know it’s definitely not right.’

Restaurant, fewer than 5 staff, FHRS rating 4–5

## **Case study**

### **Not checking and consuming foods past use-by dates in FBOs**

**Name:** Amit

**Role:** Manager

**Type of business:** Restaurant serving European foods

**Number of staff:** 5–10

**FHRS rating:** 4–5

Amit is the manager of a restaurant that serves European food. Everything is cooked from scratch. They have a loyal customer base from the local community and have been trading for over 20 years. They have 6 staff comprising of 3 experienced chefs and 3 ‘younger kids from the college who come to learn from them’. Despite the restaurant being very busy, Amit describes the atmosphere as relaxing.

Amit says that food hygiene is of fundamental importance to the restaurant. They once got a low FHRS rating due to an issue with food storage and the rating

'almost put them out of business'. The experience made a very big impact on him and highlighted the importance of food safety, which he discusses in terms of cross-contamination from raw meats and allergen control. He is proud they are now a 5-FHRS rated restaurant.

Despite the importance placed on food hygiene, Amit believes that use-by dates are 'somewhat ineffective' and likes to take a 'common sense' approach to whether food is safe to consume. He also mentions that he does not like wasting food. Specifically, because they prepare and cook all their food from scratch, Amit believes the chefs will 'just know' whether something is safe or not. Amit notes the smell and texture of how the food should feel as the main ways to judge food safety. He also believes that washing and rewrapping chicken increases its shelf life.

'Say, for example, you would have your big box of chicken... the use-by date would be Wednesday. If you leave that in the packet, that's fine. You need to use it by Wednesday. But if you take it out of the packet, if you wash it through, if you separate them, you cling film them, that'd be fine for Thursday or Friday. It's not a problem.'

Amit sees these practices as sensible and perfectly safe. He has never had an issue with food poisoning at the restaurant.

### **Analysis of Amit's behaviour**

The influences on Amit's behaviour therefore primarily relate to reflective and automatic motivation and were enabled through social opportunity factors. While Amit is very conscious of food hygiene risks from raw foods, he does not believe that use-by dates are effective (reflective motivation). Rather, Amit mainly relies on sensorial cues and the chefs' intuitive expertise to judge whether food past a use-by date is safe to eat (automatic motivation). This enables the consumption of foods past their use-by date. Additionally, he believes that how they wash and then store the meat promotes its shelf life (reflective motivation). This enables the consumption of foods past their use-by date. Finally, the same chefs have been in the business since it was set up, and are seen as experts, while other staff are students and unlikely to challenge various food management, preparation, and cooking practices (social opportunity). This also enables the consumption of foods past their use-by dates.

## Identifying behaviours for interventions (FBOs)

In reviewing the KL2 findings, the most notable influences on not checking and/or consuming foods past use-by dates was the influence of chefs in the kitchen enabled by beliefs about how meaningful use-by dates are in practice. Most foods were reported to be consumed or managed before the use-by date. However, in small number of incidences, for foods that had exceeded the use-by date, chefs relied on the look, smell, and taste of foods to determine whether foods were 'safe' to serve to customers.

After KL2 fieldwork was completed, a workshop was held with experts in food safety and the behavioural sciences to discuss the COM-B influences on each of the KL2 priority behaviours, including not checking and/or consuming foods past use-by dates. In the workshop, experts discussed the findings from KL2 to explore the 'problem behaviours' that occurred in kitchens and then considered the 'desired practice'; that is, the behaviour that households and FBOs should do to improve food safety. In this case, the desired practice is for staff in FBOs **to use, cook or freeze all foods in advance of their use-by date**. These behaviours should be used in future research, for the development of behavioural interventions.

# Conclusion

This chapter provided in-depth analysis on not checking and/or consuming foods past the use-by date and the factors that influence this behaviour, including illustrative case studies of these factors in practice. The findings presented in this report allow the FSA to better understand this behaviour, and the risks involved.

Understanding the specific influences on these behaviours enables future work on designing effective interventions to enable behaviour change. Future research should focus on designing interventions which can enable the positive target behaviours outlined in this report. Following on from the use of COM-B to understand behaviours, The Behaviour Change Wheel<sup>14</sup> can be used to identify effective interventions and behaviour change techniques.

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<sup>14</sup> Michie, S., van Stralen, M.M. & West, R. The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Sci* 6, 42 (2011). <https://doi.org/10.1186/1748-5908-6-42>