FOOD SAFETY AT UWE: AN ONLINE SURVEY ASSESSING DOMESTIC FOOD HYGIENE KNOWLEDGE AND PRACTICES AMONG STUDENTS AT THE UNIVERSITY OF THE WEST OF ENGLAND

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Abstract

A survey of students at the University of the West of England provides quantitative data enabling a critical assessment of food hygiene knowledge, attitudes and practices, reflecting mixed results. Main areas of malpractice which depict food hygiene risks include unreliable techniques used to verify when food was adequately cooked, meat-washing practices, defrosting methods, cross-contamination concerns related to chopping board usage and inadequate understanding of the role of use-by dates.

Chi-squared testing and logistic regression enables identification of determinants of practice: Female gender identities are associated with a greater adherence to use within label instructions for cooked meat, smoked fish and cheese. Ethnicity and international status appeared significant determinants of practice influencing cleaning practices, meat-washing practices, adoption of verification techniques to ensure food was adequately cooked, cross-contamination risk and the understanding of use-by dates. Housing tenure and number of kitchen users was not associated with any statistically significant differences in food hygiene standards.

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1. INTRODUCTION AND LITERATURE REVIEW

1.1. Food Hygiene Risk

Food Hygiene and Health

Foodborne diseases pose a significant health risk worldwide: The World Health Organisation's (2015) report estimates 600 million cases of foodborne illnesses and 420,000 deaths occur globally every year. In the UK, more than 2.4 million foodborne disease cases are recorded annually contributing to 15,500 hospital admissions and an estimated 160 deaths (FSA, 2022a).

Beyond the social cost of pain and suffering associated with foodborne illnesses, economic losses are significant: Lost workforce earnings, medical expenses and business disturbances are estimated to cost the UK £9.1 billion per year (FSA, 2020), although two thirds of this figure is derived from unattributed cases and involve a significant level of speculation.

Food safety as a discipline endeavours to address this risk by ensuring end-product food is considered fit for safe human consumption (Burton-Hughes, 2019). It encompasses multiple aspects including food management systems and related HACCP procedures in regard to commercial premises, the reliability of ingredient suppliers and adequate facilities (including sufficient ventilation, lighting, pest control and the physical state of the premises) (Burton-Hughes, 2019; WHO, 2022a).

Food hygiene refers to a sub-category of the overarching umbrella of food safety (Burton-Hughes, 2019). As a concept it seeks to ensure food safety by providing for the 'conditions and measures necessary for the production, processing, storage and distribution of food designed to ensure a safe, sound, wholesome

product fit for human consumption' (WHO, 1999). Subsequently, significant efforts are made nationally and globally to improve food safety standards through training and regulatory enforcement in the commercial sphere and health promotion in the domestic sphere in order to address these significant costs (FSA, 2022a; WHO, 2022b).

Measuring Foodborne Illness Risk

Estimating the true incidence of foodborne infections and diseases has long been considered a significant challenge. Difficulties broadly result from an under-diagnosis of infections and under-testing for pathogens once patients present to healthcare providers (Public Health England, 2020).

According to a series of studies conducted by Tam et al., 2012, designed to examine the incidence of infectious intestinal diseases (IIDs) and compare findings to historical results, it is estimated that for every 147 cases in the community, ten patients will present to the GP for consultation and only one will be reported to national surveillance systems. While these studies record all IID cases, including those which do not result from food poisoning such as irritable bowel syndrome and Crohn's disease, these conditions are broadly considered to be chronic and long-term in comparison to food poisoning and are therefore more likely than foodborne IID to be reported, meaning the true scale of under-reporting may be even larger. The multi-faceted nature of the studies involved (including particularly those which do not rely upon a presentation of symptoms, such as a telephone survey and a randomised prospective cohort study) alongside the high sample sizes put weight behind the conclusion that under-reporting and under-testing is a significant issue in assessing foodborne risk.

When compared to its original study in 1993-96, it was found the proportion of people with IID presenting to General Practice had fallen by 50%, while reporting and stool testing for those presenting to GPs had improved (Tam et al., 2012). Given the methodology in the original study was identical to the follow-up study, the assertion that under-reporting among the public has become more widespread rather than improving is an accurate one, despite improvements in reporting infrastructure.

Taking this under-reporting into account, Tam et al. (2012) concludes the incidence rate of IID in England had increased from 1993-96 to 2008-09. Despite varying results of IID incidence being recorded depending on the methodology – with self-reported telephone survey data notably higher than the prospective cohort study – the fact that the more conservative cohort study data reflects rising IID incidence rates adds confidence to this trend.

Risk in Domestic Settings

If significant uncertainty surrounds measurements of foodborne illness and disease incidence rates on a national scale, even greater uncertainty applies when estimating incidence within domestic settings. Redmond and Griffith (2002) estimate between 12% and 20% of foodborne diseases originate in the home in England and Wales, however the true figure is expected to be higher given the study fails to appropriately reflect the reality that domestic cases are less likely to be reported or identified. A systematic review conducted by Day et al. (2018) report a more significant spread of estimates: Based on 19 studies which met the set inclusion criteria, between 12% and 48% of foodborne illnesses were estimated to have originated in the home.

The crux of the challenge in estimating this figure lies in the sporadic nature of cases originating from domestic settings. In comparison to larger outbreaks which more frequently complement cases at commercial facilities, single sporadic cases are less frequently reported than outbreaks resulting in an exaggerated under-reporting effect in domestic cases (Redmond and Curnin, 2018; Day et al. 2018).

Most studies exploring this relative risk rely primarily on national surveillance data which, given the focus on controlling outbreaks, are not intended to focus on domestic cases. For example, Public Health England data focus on recording only cases where a tangible risk of outbreaks may arise: Typically, collective gatherings such as dinner parties (Redmond and Curnin, 2018). Subsequently, the results of such studies are rightly considered to be 'seriously flawed' (Redmond and Curnin, 2018) with sporadic cases incredibly difficult to measure.

1.2. Existing Research

Domestic Hygiene Practices

In order to explore underlying reasons for domestic cases of foodborne illnesses and diseases, considerable research succeeds in identifying gaps in food safety knowledge, behaviours or practices within the home alongside factors which influence poor and good practice. This in turn informs policymakers and regulatory frameworks alongside public health campaigns designed to address poor practice (FSA, 2022b). Notably, the Food Standards Agency conduct a biennial survey entitled 'Food and You' seeking to collect information on behaviour, attitudes and knowledge of food safety (FSA, 2019), with a similar project undertaken in the US by the Food and Drug Administration (2021). These

have historically been cross-sectional surveys focusing on entire adult populations.

Research specifically focused upon the food safety practices of UK students had, until recently, been considerably scarce, despite convincing hypotheses indicating food safety practices may vary from national levels: For one, research suggests adults considered to be part of ‘Generation Z’ were ‘less worried’ about food safety in comparison to older groups (FSA, 2022b). While this could be reflective of greater confidence resulting from improvements to food safety knowledge in comparison to past generations rather than being reflective of a laissez-fair attitude toward domestic hygiene standards, existing studies conducted internationally (Chuang et al., 2021; Green and Knechtges, 2015) commonly identify poor practice among student populations indicating that the latter may be a more fitting explanation.

For example, Chuang et al. (2021) found evidence of knowledge gaps relating to the washing of poultry with running water, which can spread salmonella and campylobacter among students in Indiana, USA. Green and Knechtges (2015)’s online survey confirm the suspicion that young adults with limited experience of independent cooking often demonstrate poorer knowledge of food safety practices than the general populace. While such studies provide indications of lower standards they remain simply indications with no significant survey specifically targeted at UK students until recently (FSA, 2023a).

Determinants of Practice

Beyond studies focused on assessing food hygiene practices, investigations seeking to identify and evaluate impeding and facilitating factors which determine good and bad hygiene practices play a beneficial role. Such approaches allow an

understanding of the root causes of poor practices and enable more targeted interventions and regulatory measures to be developed for specific target audiences. Historical studies have uncovered significant differences between demographic groups as outlined below.

Gender:

The Food and You survey (FSA, 2019) highlight some distinct differences in survey responses between men and women. One tool of analysis, labelled the Index of Recommended Practice (IRP), a quantitative measure designed to code and summarise the extent to which individuals and groups adhere to good food hygiene and safety practices as designed by the FSA, reflected that across all topics which had implications for food hygiene and safety, women outperformed men (69 compared with 64) in the latest wave of the study. This disparity is consistently reflected in all five waves of the study from 2010 to 2018 (FSA, 2019), indicating women in the UK broadly adopt higher standards of food hygiene practices. The significant sample size of the studies, its use of robust sampling techniques designed to represent a diverse cross-section of the population and its impartiality as an independent extension of the UK government enable conclusions drawn from FSA ‘Food and You’ studies to be considered trustworthy.

Differences between genders for the majority of topics were insignificant, however some significant differences included women being more likely to:

- Wash their hands before starting to prepare or cook food (86% and 77% respectively)
- Wash their hands after handling raw meat or fish (90% and 80% respectively)

- Always cook food until it was steaming hot (84% and 70% respectively)
- Never eat sausages if it was pink or had pink or red juices (83% and 76% respectively)
- Never eat pork chops if it was pink or had pink or red juices (77% and 68% respectively)
- Defrost meat or fish by leaving it in the fridge (56% and 44% respectively)
- Always use different chopping boards for raw meat and other foods (50% and 39% respectively)

(FSA, 2019)

These findings which support the notion women tend to outperform men on food hygiene standards are replicated across literature (Sanlier and Konaklioglu, 2012; Mullen et al., 2015).

Ethnicity:

In regard to differences between ethnic groups, the Food and You survey's IRP found those of white ethnic backgrounds had a higher IRP in the latest wave of the study compared to those of other ethnic groups (68 compared with 62) (FSA, 2019). Crucial differences associated to a greater extent with individuals of non-white ethnic backgrounds including the washing of raw meat and poultry, which can risk contamination by spreading campylobacter and other dangerous bacteria and an attitude of 'always avoid throwing away food': A behaviour adopted particularly by mixed race and Asian respondents.

While these only examine quantitative data, a separate report conducted by the FSA (2015) sought to examine the role of ethnic groups as its core focus and did so using focus groups rather than quantitative surveys to supplement existing findings. It replicated the above findings, concluding that while those of non-white

ethnic backgrounds were more likely to wash meat and poultry, this practice was sometimes rooted in religious significance was attributed to this, particularly for Muslims in ensuring there was no blood left on the meat. Other times, it was a deeply engrained cultural perception on cleaning bacteria from chicken to ensure high standards of cleanliness. Furthermore, the study found such groups less likely to adhere to use-by dates: An unsurprising finding given prior indications of attitudes toward avoiding food waste. While these findings confirm distinct cultural disparities between ethnic groups within the UK in regard to food hygiene standards and perceptions, little research has been conducted to examine the extent to which these transfer to student populations.

1.3. Justification of Study

Supporting Existing Research

In light of the scarcity of research focused on students in the UK, the Food Standards Agency conducted a survey of 2,921 undergraduate university students across the UK seeking to examine food safety knowledge and behaviours in addition to perceptions of food-related challenges (FSA, 2023a). The survey highlighted several significant gaps in food safety knowledge including not always washing hands before eating (61% of respondents) preparing and cooking food (49%) or handling raw meat and fish (33%), not covering meat in the fridge (37%) not always cooking food until it is steaming, hot and cooked all the way through (39%), washing raw chicken (54%) and eating food past its use-by date, most notably cheese (38%) and milk (37%).

One limitation of the survey was the recruitment bias resulting from most participants studying at universities located in the north of England (FSA, 2023a).

Therefore, extending this research to southern universities such as UWE allows a more complete picture of the food hygiene standards nationally. However, the real value arises from the opportunity to add a greater depth of understanding in food hygiene knowledge and practices across the UK by undercovering geographical variances whereby trends unique to South-West England, and indeed UWE, can be identified and explored. Further depth can be gained from examining whether demographic relationships exist regarding the international status of students, subject of study and gender.

Additionally, the study was heavily focused upon an assessment of food safety and hygiene knowledge and practices rather than identifying any facilitating or impeding factors contributing to good and poor practice. This encourages scope for additional research to consider the underlying determinants for good practice among UK students. An appreciation of such factors are vital in informing policy and health campaigns alongside broader strategies designed to boost the food safety practices of university students.

Identifying Emerging Trends

Alongside these conclusions, several emerging trends in recent years provide cause to re-evaluate current food hygiene practices among students:

i. Environmental Concern and Sustainability:

Growing concern for environmental challenges, climate change and threats to sustainable living have been widely established throughout the past decade (ONS, 2021; YouGov, 2023). Such value-shifts result in significant behavioural trends which in turn influence behaviours relating to food hygiene practices.

For example, reducing food waste has long been identified as a partial solution to pressing environmental challenges, including climate change, in order to decrease water and energy usage alongside reducing methane gas production resulting from decaying food (WWF, 2023). While personal financial pressures are broadly identified as the most significant factor driving food waste reduction behaviours (Stancu et al., 2016; Brook Lyndhurst, 2007; Graham-Rowe et al., 2014; Neff et al., 2015) social and environmental values also influence such behaviours (Barone et al., 2019; Melbye et al., 2016), playing a significant role in the intent of over 50% of people by some measures (Quested et al., 2011).

Complimentary research suggests younger groups may place an even greater weight to environmental factors than other age groups with 39% of 16-24 year olds citing climate change as their main motivation for tackling food waste compared with 15% for over 65s (DBEIS, 2020). Intent to reduce food waste could be hypothesised to at times be in tension with food safety standards where use-by dates and packaging instructions are adhered to less strictly in order to extend the usable shelf life of food items and avoid waste. Such attitudes have already resulted in several supermarkets ditching use-by dates for highly perishable foods including milk and yoghurt (Espiner, 2023; White, 2023). Subsequently, risk of foodborne illnesses may be rising where attempts to prioritise sustainability compete with safe food standards. Further research exploring adherence to use-by dates and packaging instructions could provide further insight into this evolving trend.

Such changes in environmental attitudes have also influenced diet: 18% of 16-24 year olds identify as vegetarian or vegan, compared to 9% of 25-39 year olds and 8% of 40-59 year olds (YouGov, 2022a), with 34% of 18-24 year olds expressing their willingness in theory to limit meat consumption (YouGov, 2022b). It could be

argued such trends are likely to result in the reduction of foodborne illnesses relating to improper meat handling, such as salmonella and campylobacter. These recent trends highlight further the relevance of further study focusing on the food hygiene standards of students.

ii. Cost of Living Crisis

It is worth further noting that the FSA survey (2023a) was conducted in February 2022. This therefore precedes the significant rise in cost of living which has emerged since early 2022, with the UK consumer price index (CPI) tracking price levels have surged to their fastest growth rate for 30 years (ONS, 2023a), peaking at 9.6% in October 2022 – an event colloquially referred to as a cost of living crisis. In particular, a sharp peak in oil, gas and electricity prices have resulted in annual average energy bills more than tripling from April 2021 to January 2023 (BBC, 2023). Specifically, UK student living costs have increased by 14% since the survey while maximum maintenance loans for students in England have only increased by 2.3% (Brown, 2022). Subsequently, the average student's maintenance loan falls short of covering living costs by £439 each month (Brown, 2022). There is reason to believe this pressure can influence food-related practices, particularly surrounding the heating and cooking of food, in attempts to reduce energy costs, for example by failing to heat food all the way through. Extending the FSA's (2023a) research therefore may be placed to capture changes resulting from the cost-of-living crisis.

Such events place significant financial pressure on individuals who may in turn alter typical behaviour patterns in order to reduce costs: 46% of adults in Great Britain have reduced their fuel usage due to recent rising costs (ONS, 2023b) while 60% of renters report difficulties in affording their energy bills (ONS, 2022).

Owing to the recency of these crises, research focused on changes in domestic food handling practices among students with intent to reduce energy costs is largely absent. Attempts to identify changes such as adopting a more lenient adherence to use-by dates or cooking food for time periods less than manufacturers' recommendations to ensure food safety may shed light on such changes and expose any emerging threats to food safety standards in the home.

1.4. Aims and Objectives

Aim

The aim of this study is to assess food hygiene practices in domestic settings among students at the University of the West of England (UWE) and to identify facilitating and impeding factors which determine good practice.

Research Question

To what extent do students at the University of the West of England (UWE) demonstrate positive food hygiene knowledge and practices within their homes and which factors determine or contribute to these behaviours?

Research Objectives

This aim will be achieved through the following two objectives:

1. To assess the food hygiene knowledge and practices of students at UWE.
2. To identify determinants of good and bad practices among students at UWE.

2. METHODOLOGY

2.1. Research Strategy

The research will be conducted using an online questionnaire. The questionnaire will seek to assess the food safety practices among students currently studying at UWE, including behaviour related to the cooking, preparing and storing of food in shared kitchens. It will adopt the 'KAP Theory' of human behaviour which argues that human behaviour is comprised of three elements: Knowledge, attitudes and behaviour adoption (practice) (Yemane and Tamene, 2022; Zanin et al., 2017).

KAP surveys are described as 'a representative study of a specific population to collect information on what is known, believed and done in relation to a particular topic' (WHO, 2008). Accordingly, such surveys seek to reflect the understanding and practices underpinning a topic and therefore meet the research requirements put forward. In this case, the specific population relates to students at the University of West England, while the particular topic relates to food safety in domestic settings.

This method is commonly used in assessing health-related practices and behaviour, in part because it informs an in-depth understanding as to the extent to which knowledge and attitudes translate into good and poor practice (WHO, 2008). Surveys structured in this way help to identify gaps in knowledge and specific cultural attitudes and beliefs which influence practice (WHO, 2008). Additionally, by quantifying the extent to which these factors influence practice, these findings can then inform policy by indicating the most crucial barriers to address in driving up practice (WHO, 2008).

The questions for the questionnaire will fundamentally reflect those used in the FSA's (2023a) student survey to allow comparisons to be drawn. While the

survey sought to cover a range of topics including food safety knowledge, attitudes, practices, food security, diet and other experiences related to food, modifications will be made in order to narrow this scope to focus on food hygiene. Further changes will be made where questions used in the FSA's (2023a) study are not relevant. Additional questions may be added to capture additional hypothesised trends in food safety knowledge and practices as well as to identifying facilitating and impeding factors contributing to good practice.

This is a predominantly quantitative approach, however a small number of questions will be open-ended, designed to allow students to expand on answers given. This allows greater scope for alternative facilitating factors and impeding barriers to good practice to be identified. Demographic questions will be included in order to identify potential recruitment bias and inform the identification of potential facilitating and impeding factors influencing good and poor practice. Additional questions including subject of study, housing status, food allergies and diet will be included to identify factors influential to food hygiene practices.

Quantitative approaches are broadly able to generate numerical data which can be analysed statistically. It is suitable for trends, correlations and causal relationships to be identified. Additionally, when compared to qualitative studies, it is better able to capture data from a larger group of people due to limited resources, enabling more reliable conclusions to be drawn. However, while quantitative approaches have significant advantages, it is more difficult to capture underlying reasons behind why certain responses are recorded, requiring detailed and skilled interpretation by the researcher or an admission of the limited scope of such research. It may also not be possible to perfectly replicate responses to a quantitative manner: Questioned focusing on attitudes or experiences are difficult to map numerically. Additionally, low sample sizes can considerably call into question the study power to detect trends and subsequently

its reliability. Nonetheless, a quantitative approach is a powerful tool for generating data and testing hypotheses and remained well suited to a cross-sectional study examining food hygiene knowledge, attitudes and practices of students.

2.2. Data Collection

Participants will be recruited primarily through personal canvassing on campus, inviting individuals to participate via a random sampling technique. Social media recruitment techniques and word-of-mouth methods both expose the study to recruitment bias: The former, because it is more likely to attract individuals of a particular nature, that being those willing to devote time to other people, those of a greater academic inclination and those who have a natural interest in food hygiene topics. The latter, because each individual's social group invariably reflect particular biases or trends which may skew the random sampling methodology in use in recruitment. By using personal canvassing techniques, individuals are selected by the researcher at random and do not elect to necessarily come forward, negating the risk of bias on the part of the respondent.

The use of random sampling in turn eliminates the risk of bias on the part of the researcher: While all approaches to recruitment are open to the risk of bias, random sampling reduces the risk of recruitment bias as respondents are not drawn from any particular sub-set of the population. Recruits will be sought from several places across campus to avoid particular faculties being over-represented.

A crucial focus for recruitment strategies are to ensure the sample population broadly reflects similar demographic characteristics as the population of the university at large. While using random sampling prevents any significant controls

being implemented by the researcher, such as choosing individuals on the grounds of their ethnicity or gender, an acknowledgement and awareness of where samples are mis-represented to an extent can aid interpretation of results.

Additionally, recall bias remains a risk related to surveys: Food safety practices tend to form a mundane and repetitive part of daily routines, making recall difficult at times. This can cast doubt over the validity over responses provided and therefore the conclusions drawn from the findings. In order to control for this, where applicable specific time frames have been included in questions. For example, to assess the extent to which use-by dates are adhered to, respondents are asked to recall if they had consumed a food past its use-by date within the past month. But distilling the question down to a unique binary response, the accuracy of recall can be improved. However, without in-person interviews, many of the control methods for recall bias are not applicable for online questionnaires and this study remains at some risk of difficulties in recall influencing conclusions drawn from its findings.

A target sample size of 50 would be aimed for. This number was decided in consideration of a balance between the statistical power required to draw reliable conclusions from a representative sample of the population and the resources available in order to achieve this.

Students will be disregarded from the results if they are under 18 years old or not studying at UWE at the time of the survey, as these participants lay outside of the population being researched. Students will be asked to provide sensitive information about demographic topics, however will not be asked to provide any information which could be used to identify them, such as name, address, date of birth or email address.

2.3. Framework for Data Analysis

The questionnaire will broadly reflect the themes of knowledge, attitudes and practices. Additionally, to support the analysis stage of this study, the survey will be structured according to seven primary themes which, in turn may adopt several topics. While recorded distinctly, these themes are not to be considered completely separate themes: Responses for one theme may be understood or interpreted in light of answers from another theme. The seven themes are:

1. **Cleanliness:** Incorporating topics of handwashing and cleaning habits.
2. **Cooking:** Incorporating techniques used to verify when food is ready to consume, practices surrounding the reheating of food and attitudes toward the safety of consuming undercooked meats.
3. **Chilling:** Focusing on defrosting practices.
4. **Cross Contamination:** Incorporating topics such as chopping board usage, washing meat as a practice and adequate space for food preparation and storage.
5. **Food Fitness:** Incorporating topics such as assessing when food was safe to consume or cook with, adherence to use-by dates and use within label instructions, and lastly attitudes and practices surrounding leftovers.
6. **Information Sources:** Focused on which sources of information respondents trusted for food safety advice, alongside knowledge and use of the food hygiene rating system.
7. **Cost of Living Crisis:** Focused on responses to the cost of living crisis in regard to changes to food hygiene practices.

The results from the survey will undergo descriptive statistical analysis including chi-squared testing to identify gaps in knowledge, attitudes and practice. Particular gaps will be identified and results will be compared and contrasted with

those found by the FSA (2023a) and, where applicable, results from the FSA's adult 'Food and You' survey (2019). Analysis will be conducted using SPSS.

Additionally, similar techniques alongside binary and multinomial logistic regression will be used to identify facilitating and impeding factors which determine food hygiene practices related to additional factors including gender, ethnicity and international status. These findings will be interpreted using odds ratios and P-values to determine the reliability and power of the findings.

3. RESULTS

3.1. Respondent Characteristics

This section endeavours to present the findings of the survey. Results have been intentionally organised to directly address both of the research questions outlined in the literature review in turn, following a brief overview of the characteristics of respondents.

There were 60 total survey responses. 16 participants were considered ineligible and excluded following the first two filter questions: Four because they were not students at UWE and 12 because they had no access to a kitchen during term time. Of the remaining 44, nine respondents did not finish and were excluded from the survey, resulting in 35 completed surveys for analysis.

The sample taken is intended to reflect the entire UWE population of students. It is therefore crucial to examine the characteristics of survey respondents in order to assess the extent to which the sample taken is representative of the broader population and therefore the validity of drawing inferential conclusions for UWE as a whole.

Characteristic	**Response Rate** *Unanswered and 'prefer not to say' responses have been omitted in calculating percentages to aid comparison with UWE demographic data and FSA survey data, but numbers of responses are provided.*	
Mode of Study	Undergraduate	48.6% (17)
	Postgraduate	51.4% (18)
Gender Identity	Male	44.1% (15)
	Female	52.9% (18)
	Non-binary / Other	2.9% (1)
	Unanswered	(1)
Ethnic Identity	Asian	42.4% (14)
	Black	27.3% (9)
	White / Caucasian	24.2% (8)
	Multiple Ethnic Groups / Other	6.1% (2)

	Prefer not to say / Unanswered	(2)
International Status	Home Student	38.2% (13)
	International Student (including EU)	61.8% (21)
	Prefer not to say / Blank	(1)
Housing Type	Halls of residence (without catering)	17.6% (6)
	Halls of residence (with catering)	5.9% (2)
	Private rental	70.6% (24)
	At parental/guardian home	5.9% (2)
	Prefer not to say / Blank	(1)
Diet	Vegetarian	6.3% (2)
	Pescatarian	3.1% (1)
	Vegan	6.3% (2)
	Flexitarian	3.1% (1)
	Omnivore (including Halal)	71.9% (23)
	Other	9.4% (3)
	Prefer not to say / Blank	(3)
Allergies and Intolerances	Yes[a]	9.6% (3)
	No[b]	90.3% (28)
	Prefer not to say / Blank	(3)
College of Study	College of Arts, Technology and Environment	40.6% (13)
	College of Business and Law	34.4% (11)
	College of Health, Science and Society	25.0% (8)
	Prefer not to say / Blank	(3)
Kitchen Users	Only me	5.7% (2)
	Two	34.3% (12)
	Three to Four	25.7% (9)
	Five to Six	31.4% (11)
	Seven to Eight	0% (0)
	Nine or More	2.9% (1)

[a]Recorded allergies and intolerances were Prawn and Eggplant (1 response), Dairy (1), Lactose Intolerance (1).

[b]One respondent recorded yes but specified the intolerance as a ‘halal’ diet. This was reassigned as ‘no’ as a halal diet is not considered an allergy or intolerance.

These respondent characteristics can be compared to the latest demographic data available for UWE, based on the 2021/22 academic year (UWE, 2023). When non-binary responses are excluded, gender identity is near-perfectly matched with the population (55% female to 45% male). BAME groups are significantly over-represented in the sample when compared to the population which is made up of 16.7% Asian and 7.8% Black. White groups are underrepresented as they comprise 67.9% of the population. However, mixed and other representations (6.9%) are broadly comparable to the sample. International students and postgraduates are both over-represented as they comprise only 21% and 34.1% of the wider population. These differences must be borne alongside broader conclusions made about UWE: For example, trends identified with BAME groups, international students and postgraduates may be exaggerated in the sample when compared to the population.

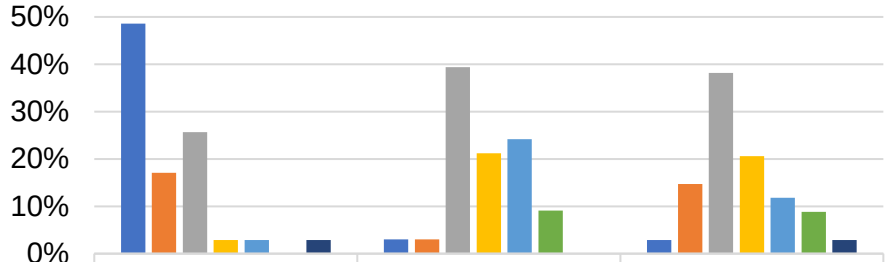
While ensuring the sample accurately reflects the characteristics of the population remains a primary concern, comparing our characteristic data with those of the FSA (2023a) sheds greater light on the reasons underlying deviations in these findings with those of the FSA. In comparison to this survey's respondents, when excluding those who prefer not to say, those from the FSA are more likely to be flexitarian (18%), vegetarian (10%) and pescatarian (5%), but less likely to be omnivorous (50%) or vegan (5%). While ethnicity data was not collected by the FSA (2023a), 70% did consider themselves English, Scottish, Welsh, Northern Irish or British which, when compared to the high level of international students in this survey, is likely to represent a significant disparity in ethnicity or cultural background. Lastly, the sample includes a greater proportion of students privately renting (compared to a figure of 33% in the FSA survey) and a smaller proportion of students in all other types of private rental.

3.2. RQ One: Food Hygiene Standards at UWE

The results of the survey have been broken down in accordance with the seven themes outlined in section 2.3, starting on the following page. Unless otherwise stated, the analysis for each question excludes unanswered and missing responses alongside ‘prefer not to say’ responses for the purposes of calculating accurate figures.

(1) Cleanliness

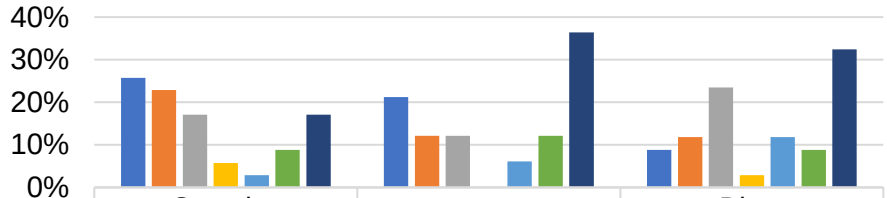
How often do respondents clean the kitchen?



	Light Clean	Deep Clean	Replace Tea Towels
Most days	48.6%	3.0%	2.9%
2-3 times per week	17.1%	3.0%	14.7%
Once per week	25.7%	39.4%	38.2%
2-3 times per month	2.9%	21.2%	20.6%
Once per month	2.9%	24.2%	11.8%
Less than once per month	0.0%	9.1%	8.8%
Never	2.9%	0.0%	2.9%

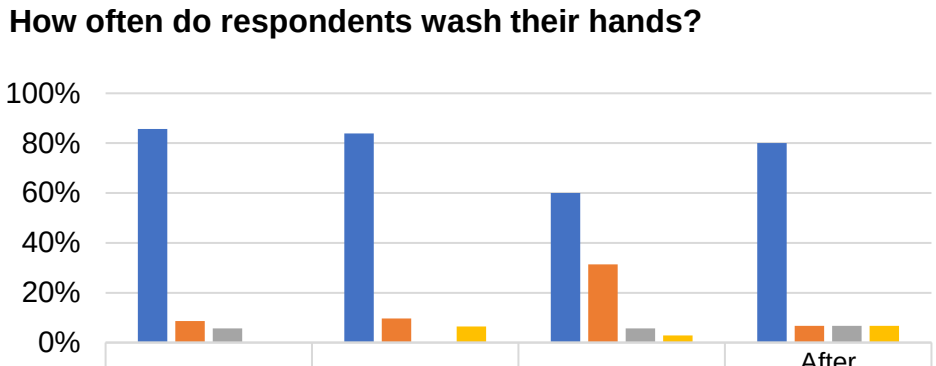
Figure 1: Matrix-style Question: 'How often are the following cleaning activities carried out?'.

How often did respondents report issues with kitchen sink uncleanliness?



	Contains dirty dishes	Contains old food	Dirty, grimy or greasy
Most days	25.7%	21.2%	8.8%
2-3 times per week	22.9%	12.1%	11.8%
Once per week	17.1%	12.1%	23.5%
2-3 times per month	5.7%	0.0%	2.9%
Once per month	2.9%	6.1%	11.8%
Less than once per month	8.8%	12.1%	8.8%
Never	17.1%	36.4%	32.4%

Figure 2: Matrix-style Question: 'How often, if at all, do you experience the following issues with your kitchen sink?'.



	Before preparing / cooking food	After handling raw meat / fish	Before eating	After handling frozen chicken products
Always	85.7%	83.9%	60.0%	80.0%
Most of the time	8.6%	9.7%	31.4%	6.7%
About half the time	5.7%	0.0%	5.7%	6.7%
Occasionally	0.0%	6.5%	2.9%	6.7%

Figure 3: Matrix-style Question: 'When you are at your term-time residence how often, if at all, do you wash your hands at the following times?'.

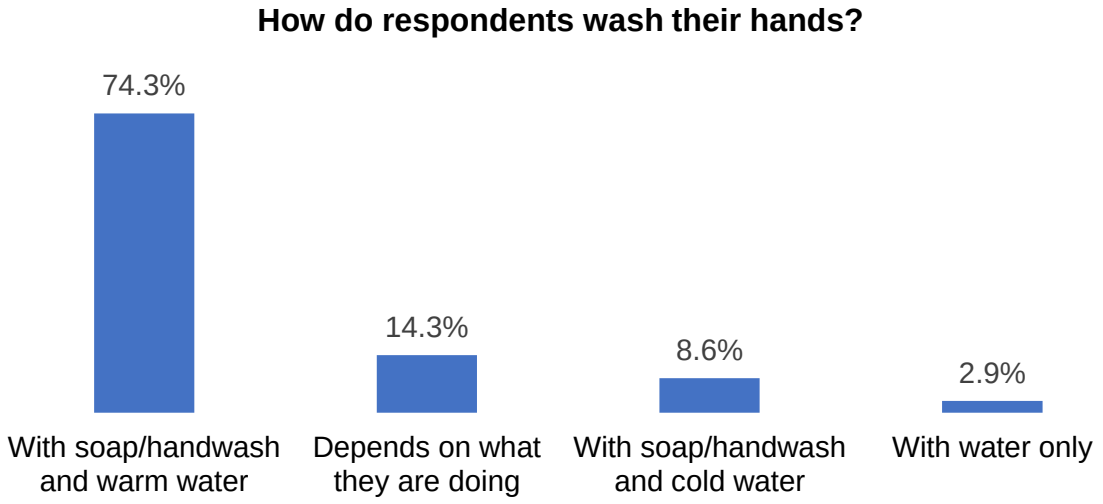


Figure 4: Exclusive Multiple-choice Question: 'When you are at your term-time residence, how do you usually wash your hands?'. 'Other' offered respondents the opportunity to specify. The only such response was: 'Before touching food, I wash with soap/hand wash and cold water. In other occasions, I usually wash with cold water.' This was reassigned to 'Depends on what they are doing'.

(2) Cooking

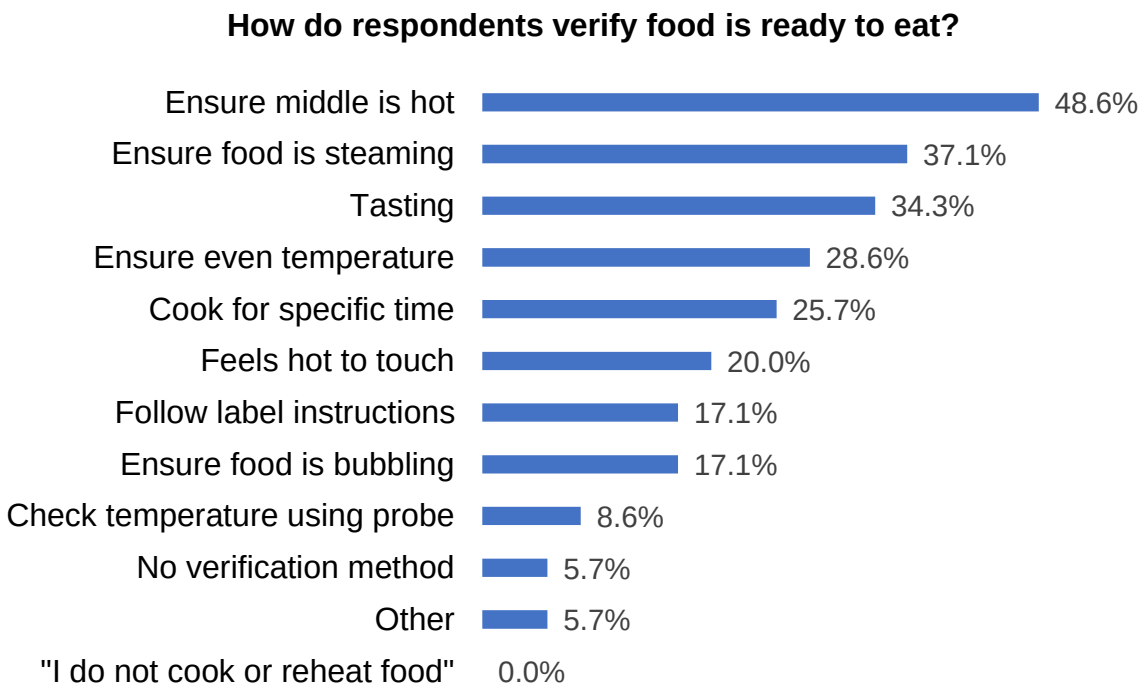


Figure 5: Multiple-choice Question: 'When cooking or reheating food, how do you know when it is ready to eat? Please select all that apply'. 'I don't check' and 'I don't cook or reheat food' were both exclusive responses. 'Other' offered respondents the opportunity to specify. The only such response was: 'i use my instinct based on previous instructions and directions'.

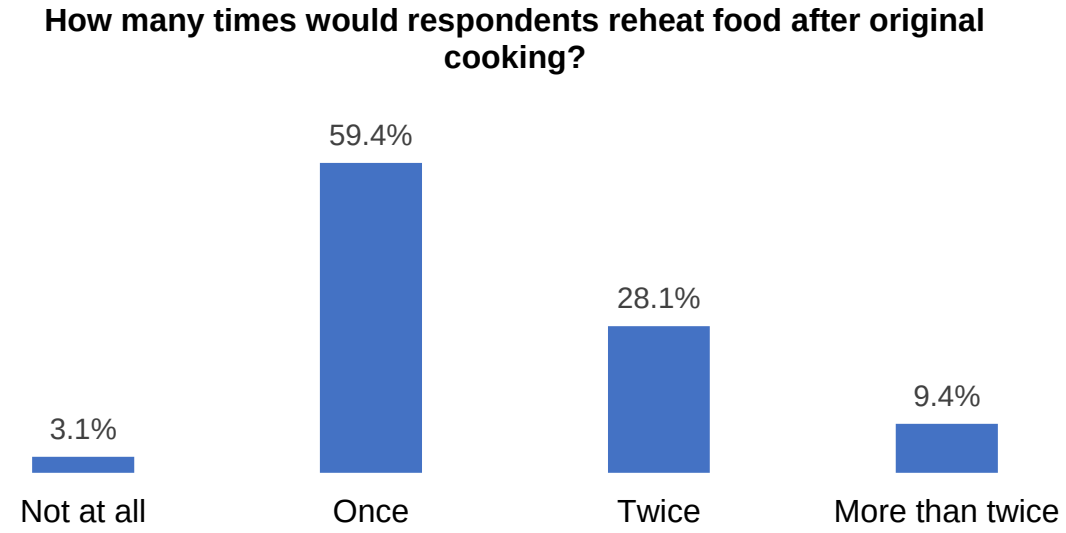
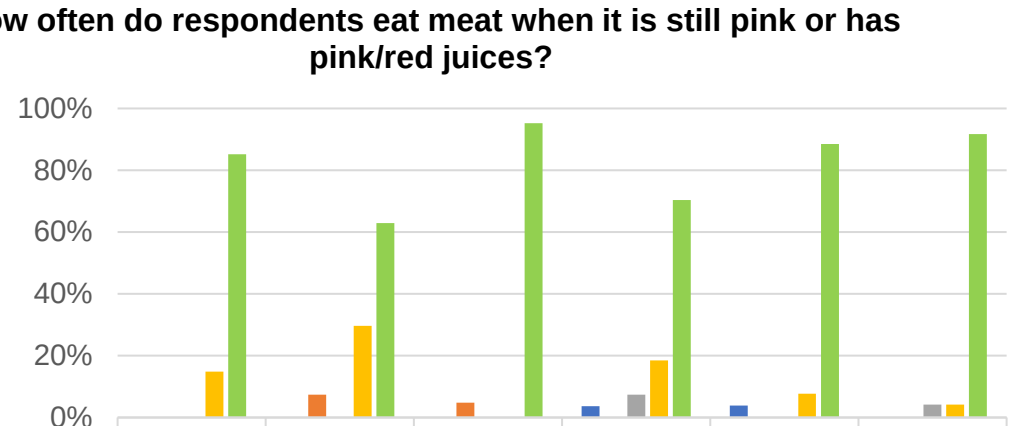


Figure 6: Exclusive Multiple-choice Question: 'How many times would you consider reheating food after it was cooked for the first time?'. 'I don't know' responses have been excluded for the purposes of calculating accurate percentage figures.



	Chicken / Turkey	Red Meat	Duck	Beef Burgers	Sausages	Cuts of Pork
Always	0.0%	0.0%	0.0%	3.7%	3.8%	0.0%
Most of the time	0.0%	7.4%	4.8%	0.0%	0.0%	0.0%
Half of the time	0.0%	0.0%	0.0%	7.4%	0.0%	4.2%
Occasionally	14.8%	29.6%	0.0%	18.5%	7.7%	4.2%
Never	85.2%	63.0%	95.2%	70.4%	88.5%	91.7%

Figure 7: Matrix-style Question: 'How often, if at all, do you eat the following when the meat is pink or has pink or red juices?'. Question not asked to those who self-identified as 'Vegan', 'Vegetarian' or 'Pescatarian'. Unanswered and missing responses alongside 'I don't eat that type of meat' and 'Don't know' have been excluded for the purposes of calculating accurate percentage figures above.

(3) Chilling

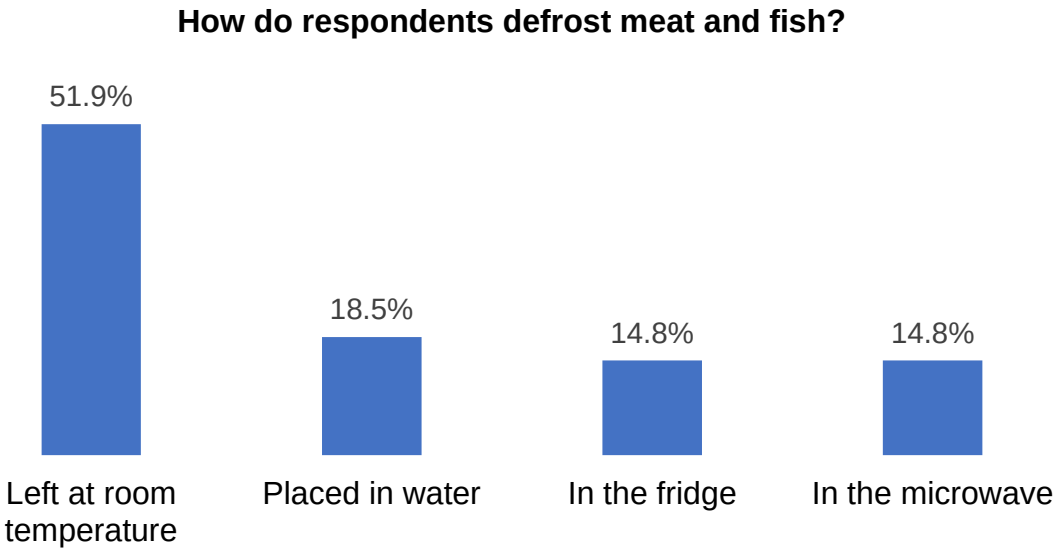


Figure 8: Exclusive Multiple-choice Question: 'Typically, how do you defrost frozen meat or fish?'. 'Other' offered respondents the opportunity to specify. No such responses were recorded. 'I never defrost meat or fish' and 'Don't know' responses have been excluded for the purposes of calculating accurate percentage figures.

(4) Cross Contamination

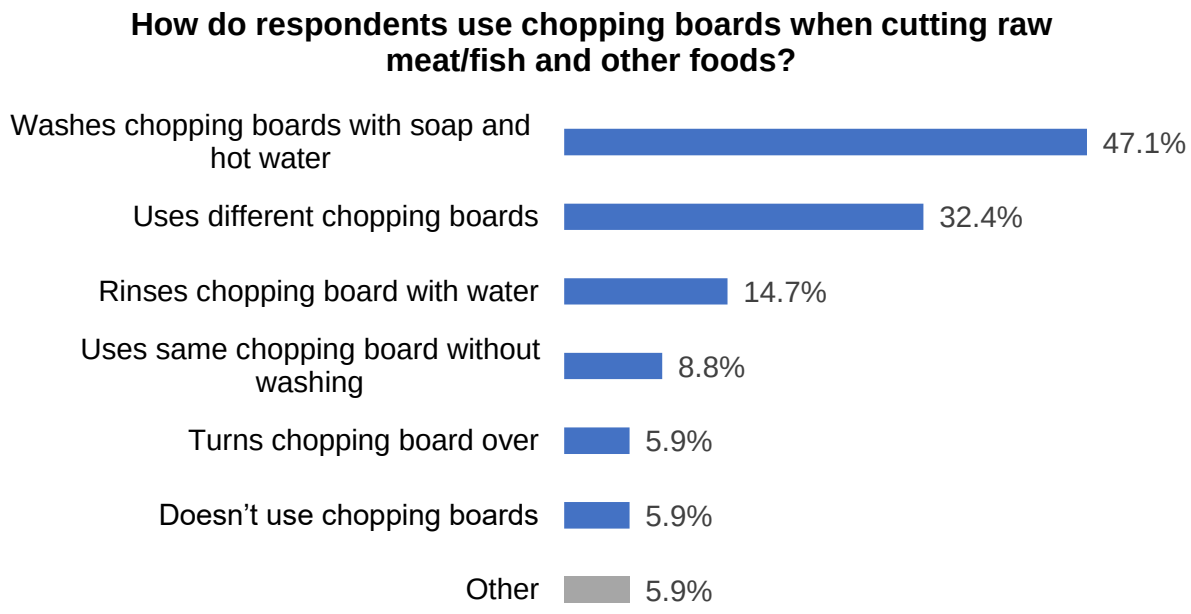


Figure 9: Multiple-choice Question: 'Typically, how do you use chopping boards when preparing a meal with raw meat or fish? Please select all that apply'. Question not asked to those who self-identified as 'Vegan' or 'Vegetarian'. 'I don't cook with raw meat/fish' was an exclusive response. Such responses were excluded for the purposes of calculating accurate percentage figures above. 'Other' offered respondents the opportunity to specify. Such responses include: 'Where possible, I will prepare all non meat items first, then do the meat last on the same board without washing it'. Other responses were reassigned to other categories as appropriate.

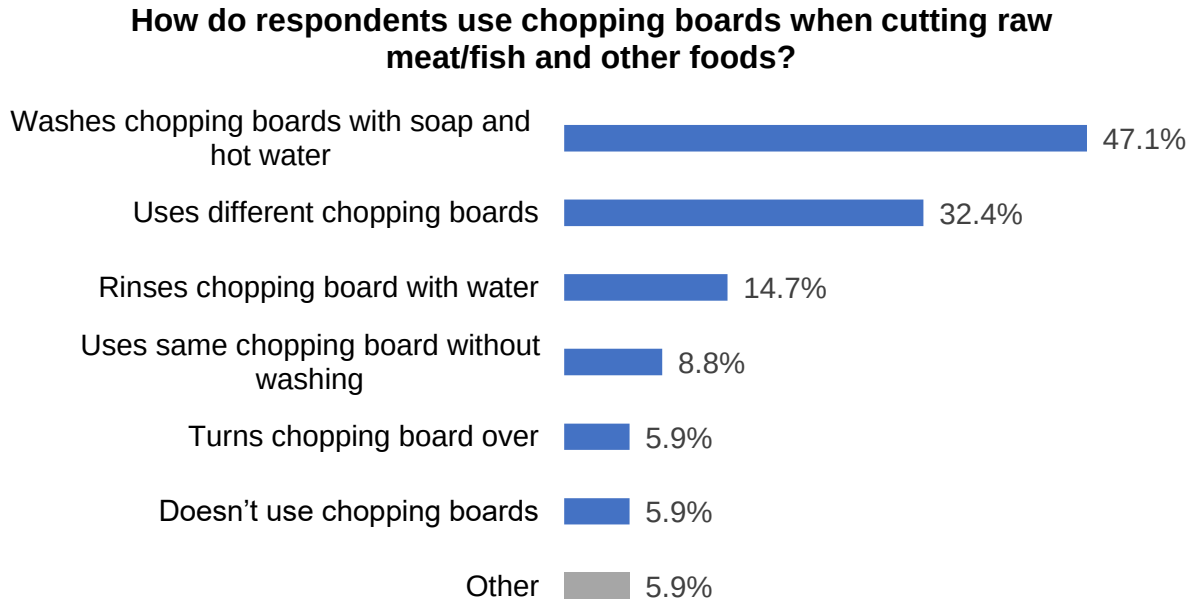


Figure 10: Multiple-choice Question: 'Typically, how do you use chopping boards when preparing a meal with raw meat or fish? Please select all that apply'. Question not asked to those who self-identified as 'Vegan' or 'Vegetarian'. 'I don't cook with raw meat/fish' was an exclusive response. Such responses were excluded for the purposes of calculating accurate percentage figures above. 'Other' offered respondents the opportunity to specify. Such responses include: 'Where possible, I will prepare all non meat items first, then do the meat last on the same board without washing it'. Other responses were reassigned to other categories as appropriate.

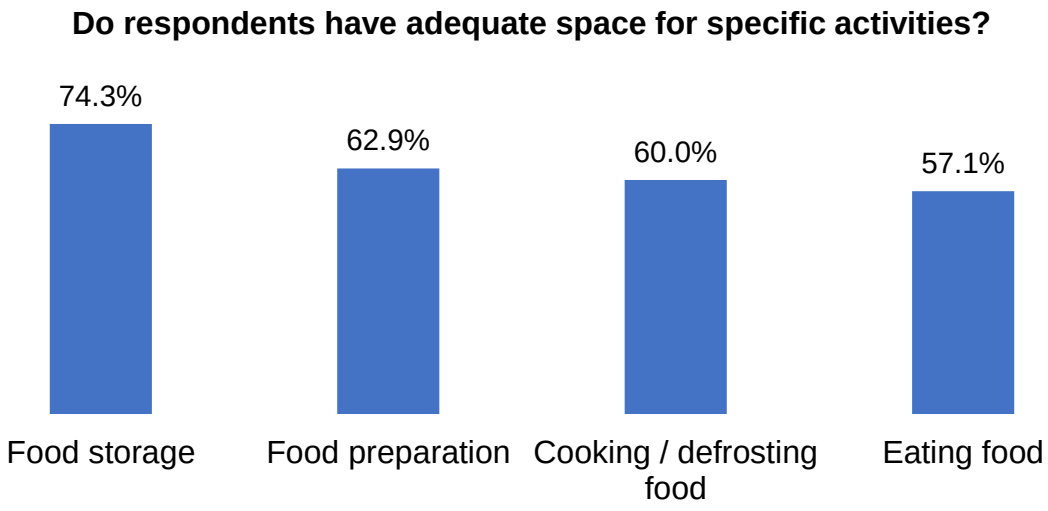
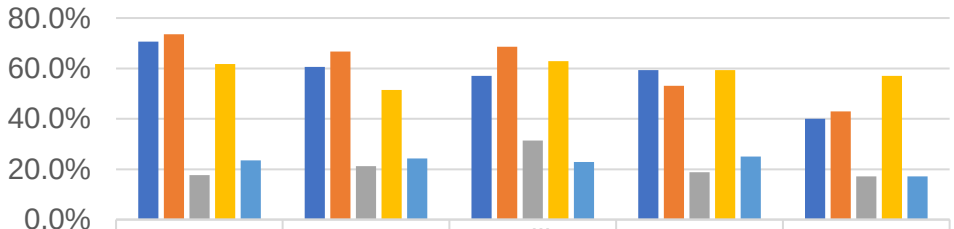


Figure 11: Matrix-style Question: 'In your kitchen area, do you tend to agree or disagree that there is enough space for the following activities?'. Response options for each activity: 'Agree', 'Neither agree nor disagree' and 'Disagree'. Response rates for 'agree' are presented above for each activity.

(5) Food Fitness



	Raw Meat	Raw Fish	Milk and Yoghurt	Cheese	Egg
How it looks	70.6%	60.6%	57.1%	59.4%	40.0%
How it smells	73.5%	66.7%	68.6%	53.1%	42.9%
How it tastes	17.6%	21.2%	31.4%	18.8%	17.1%
Use by date	61.8%	51.5%	62.9%	59.4%	57.1%
Label instructions*	23.5%	24.2%	22.9%	25.0%	17.1%

*Figure 12: Matrix-style Question: 'Before eating or cooking, how do you tell whether it is safe to eat or cook with the following food types? Please select all that apply'. Food items were omitted to specific respondents based on their prior answers regarding diet. 'I don't eat /cook this type of food' and have been excluded for the purposes of calculating accurate percentage figures above. *Label instructions refers to the following response: 'Following the instructions on the packaging (e.g. eat within 3 days of opening)'.*

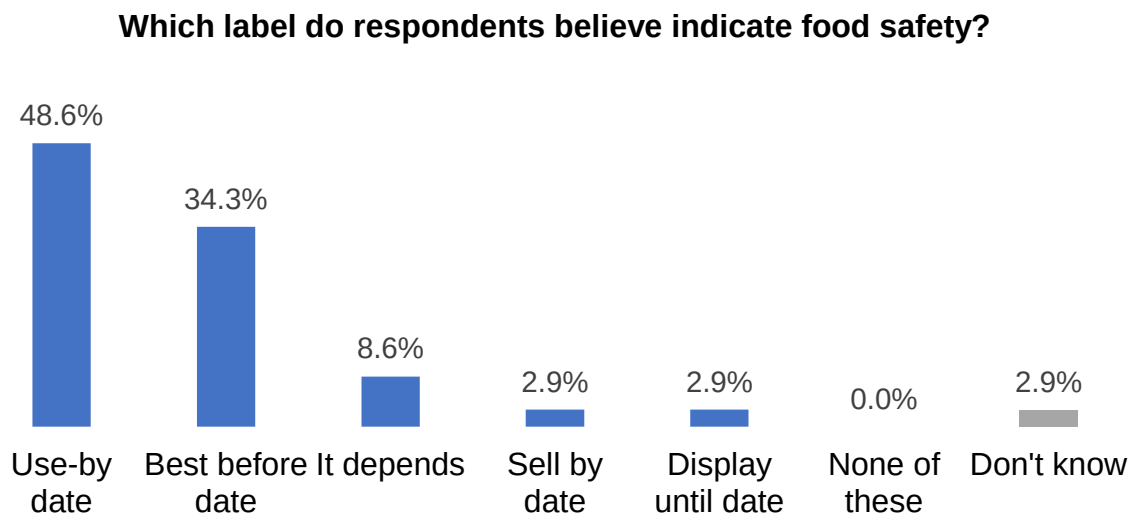


Figure 13: Multiple-choice Question: 'Which of these shows when food is no longer safe to eat? Please select all that apply'. 'It depends', 'None of these' and 'Don't know' where all exclusive responses. 'It depends' offered respondents the opportunity to specify. Such responses included: (1) 'If I have gone past the use by date but have frozen the product then I will use it past the use by date; (2) 'If it feels unsafe or is obviously rotten dont eat it, otherwise its fine'; and (3) E.g. if eggs placed in fridge, I still use it a few days post expiry date'.

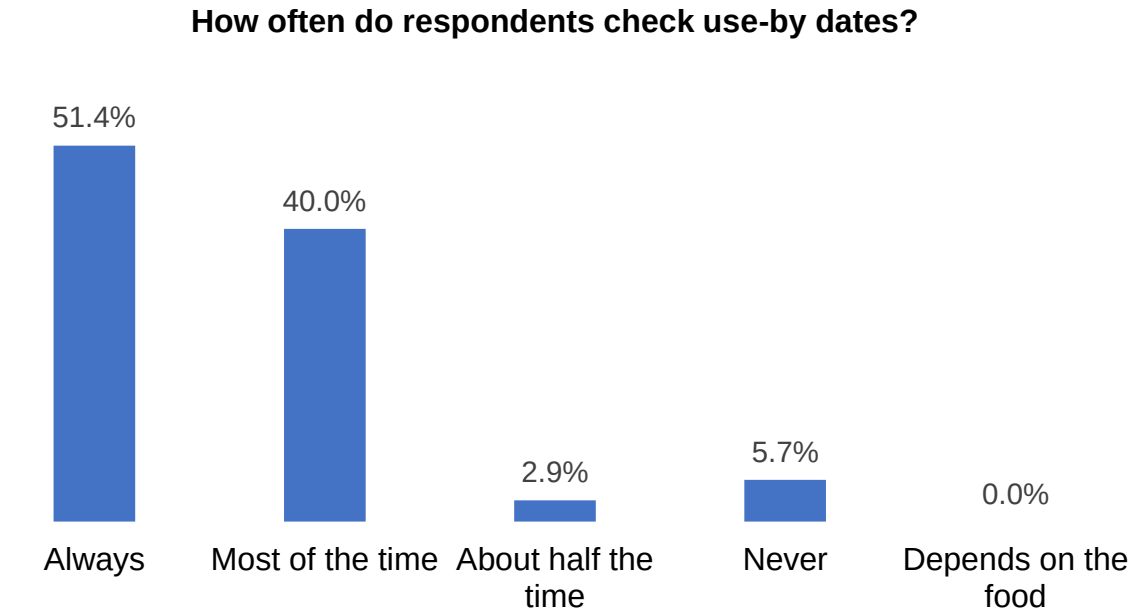


Figure 14: Exclusive Multiple-choice Question: 'How often, if at all, do you check use by dates when you are about to cook or prepare food?'. Unanswered and missing responses alongside 'I don't know' responses have been excluded for the purposes of calculating accurate percentage figures above.

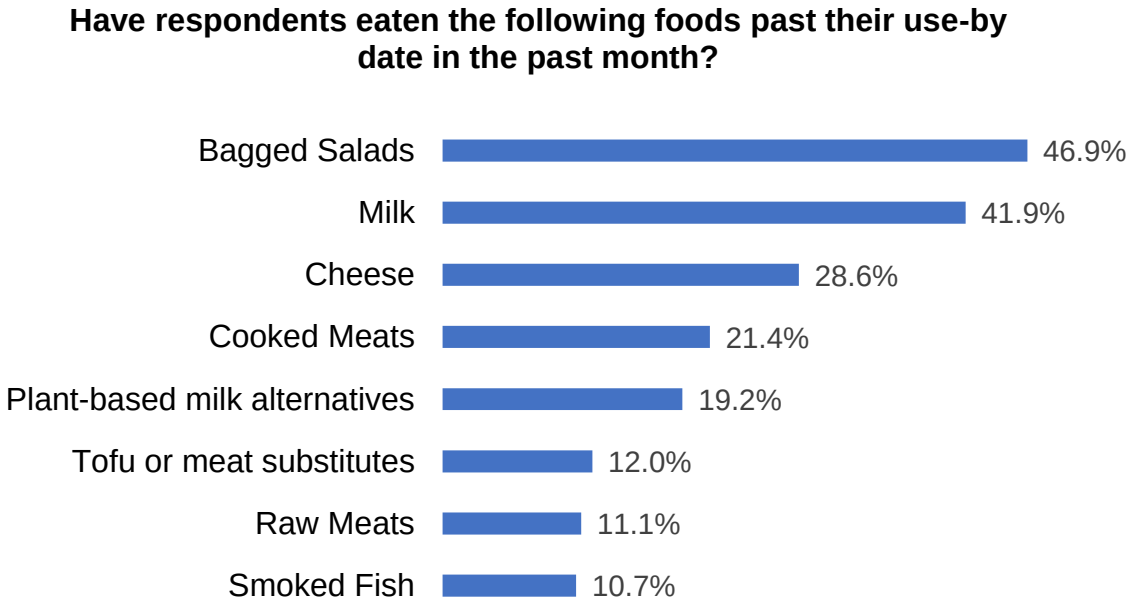
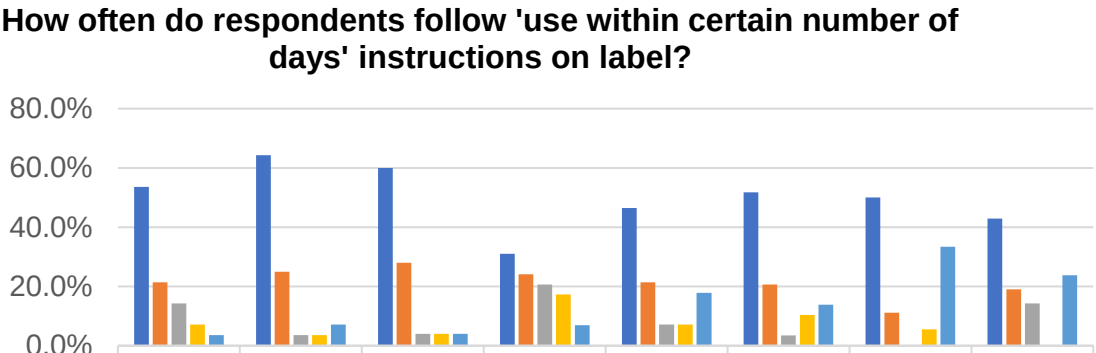


Figure 15: Matrix-style Question: 'In the last month, have you eaten any of the following foods that have gone past its use-by date?'. Response options for each food: 'Yes, at least once', 'No, not in the past month', 'I never have', 'Don't know' and 'I don't eat this type of food'. Response rates for ''Yes, at least once' are presented above for each activity. Food items were omitted to specific respondents based on their prior answers regarding diet. 'I don't eat this type of food' and 'Don't know' have been excluded for the purposes of calculating accurate percentage figures above.



	Cooked meats	Raw meats	Smoked fish	Bagged salads	Cheese	Milk	Tofu or meat substitutes	Plant-based milk alternatives
Always	53.6%	64.3%	60.0%	31.0%	46.4%	51.7%	50.0%	42.9%
Most of the time	21.4%	25.0%	28.0%	24.1%	21.4%	20.7%	11.1%	19.0%
Half of the time	14.3%	3.6%	4.0%	20.7%	7.1%	3.4%	0.0%	14.3%
Occasionally	7.1%	3.6%	4.0%	17.2%	7.1%	10.3%	5.6%	0.0%
Never	3.6%	7.1%	4.0%	6.9%	17.9%	13.8%	33.3%	23.8%

Figure 16: Matrix-style Question: 'Some foods have an instruction to eat the food within a few days of opening on the label (e.g., "consume within 3 days of opening"). How often, if at all, do you follow instructions on food packaging which tells you how long food should be stored once opened? Please select one answer for each food'. Food items were omitted to specific respondents based on their prior answers regarding diet. 'I don't eat this type of food' and 'Don't know' have been excluded for the purposes of calculating accurate percentage figures above.

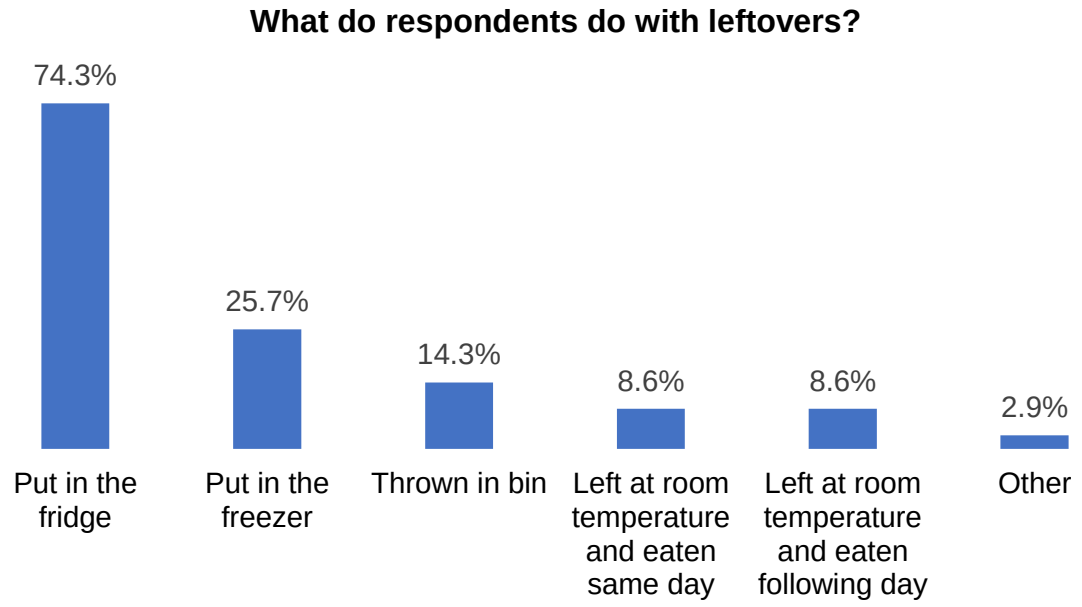


Figure 17: Multiple-choice Question: 'Generally, what do you do with any leftovers following a meal? Please select all that apply'. 'I never have or keep leftovers' was an exclusive response. 'Other' offered respondents the opportunity to specify. The only such response was: 'i feed the birds in open area not close to the residential'. 'I never have or keep leftovers' have been excluded for the purposes of calculating accurate percentage figures above.

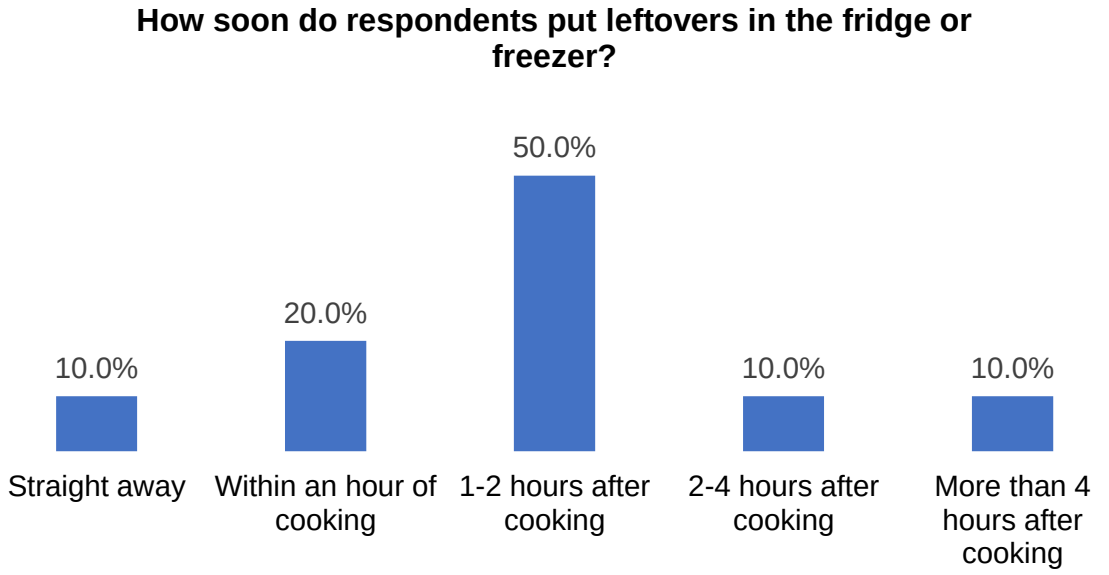


Figure 18: Exclusive Multiple-choice Question: 'Typically, how soon after cooking do you put any leftovers in the fridge or freezer?'. Question not asked to those who noted in the prior question that they 'Never have or keep leftovers' or 'I leave them at room temperature and eat them the next day'. 'I don't know' responses have been excluded for the purposes of calculating accurate percentage figures above.

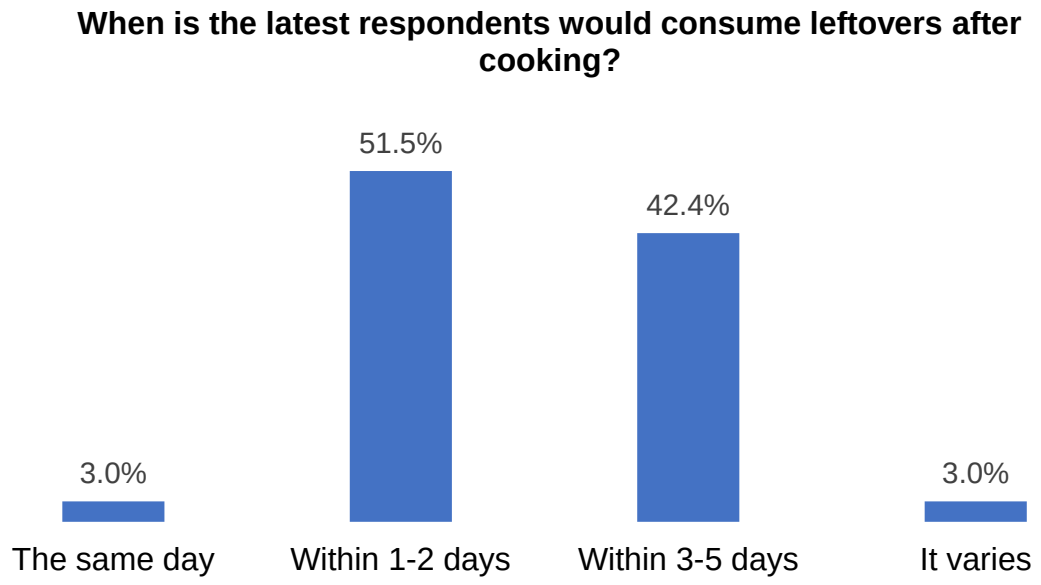


Figure 19: Exclusive Multiple-choice Question: 'How many times would you consider reheating food after it was cooked for the first time?'. Question not asked to those who noted in the prior question that they 'Never have or keep leftovers'. It varies' offered respondents the opportunity to specify. The only such response was: '1 day- if the food contains dairy or any other products that sour easily. otherwise 1-2 days'. 'Don't know' responses have been excluded for the purposes of calculating accurate percentage figures above.

(6) Authoritative Information

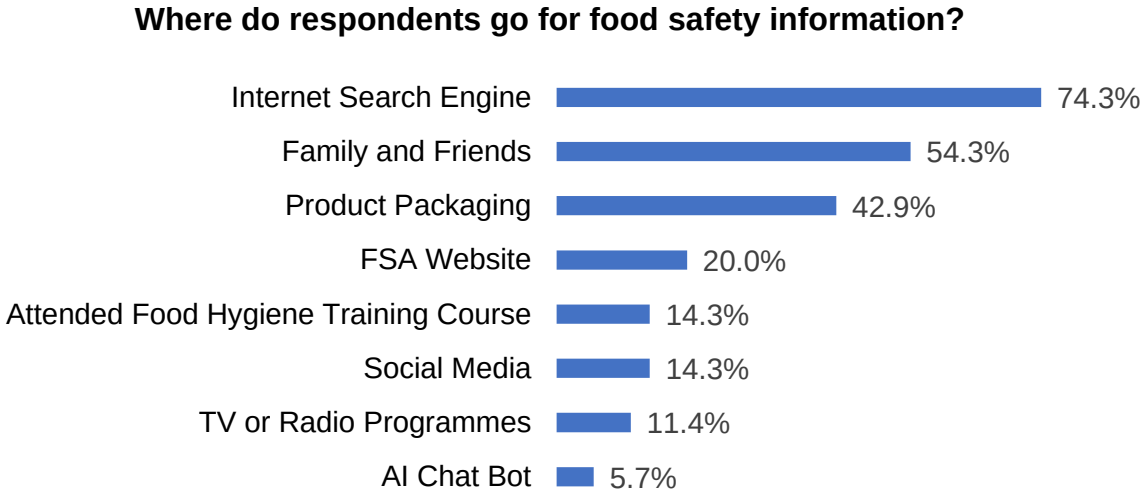


Figure 20: Multiple-choice Question: 'If you needed information about how to prepare and cook food safely (i.e. to prevent you getting ill), where would you go for information? Please select all that apply'. 'I don't need information on food safety', 'I don't cook or prepare food' and 'Don't know' were all exclusive responses. 'Other' offered respondents the opportunity to specify. No such responses were recorded.

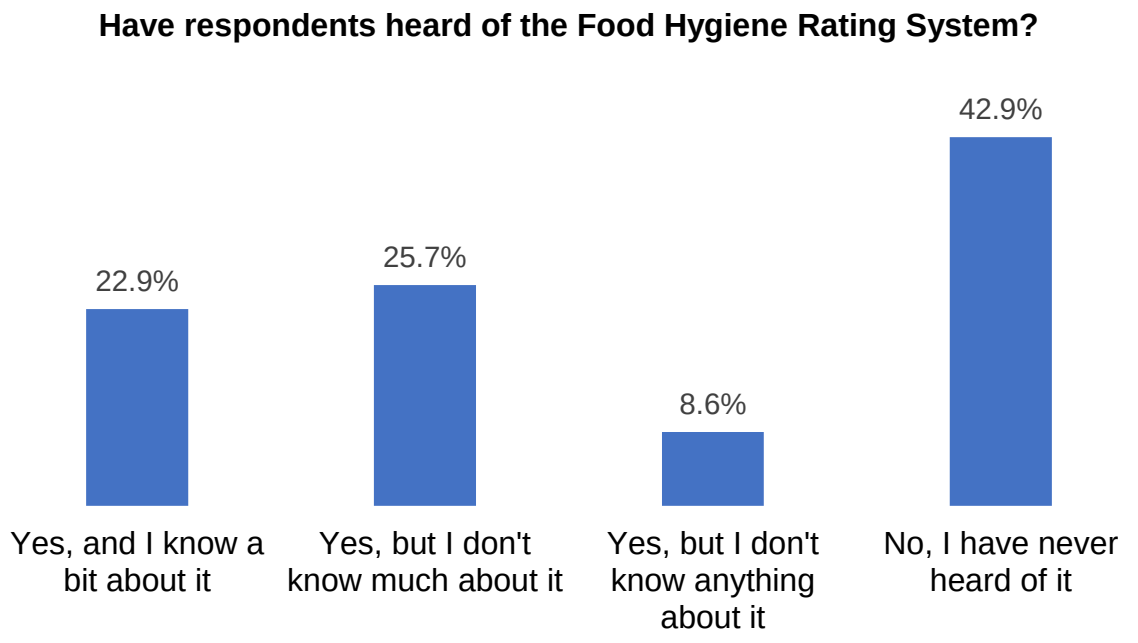


Figure 21: Exclusive Multiple-choice Question: 'Have you heard of the Food Hygiene Rating Scheme?'.

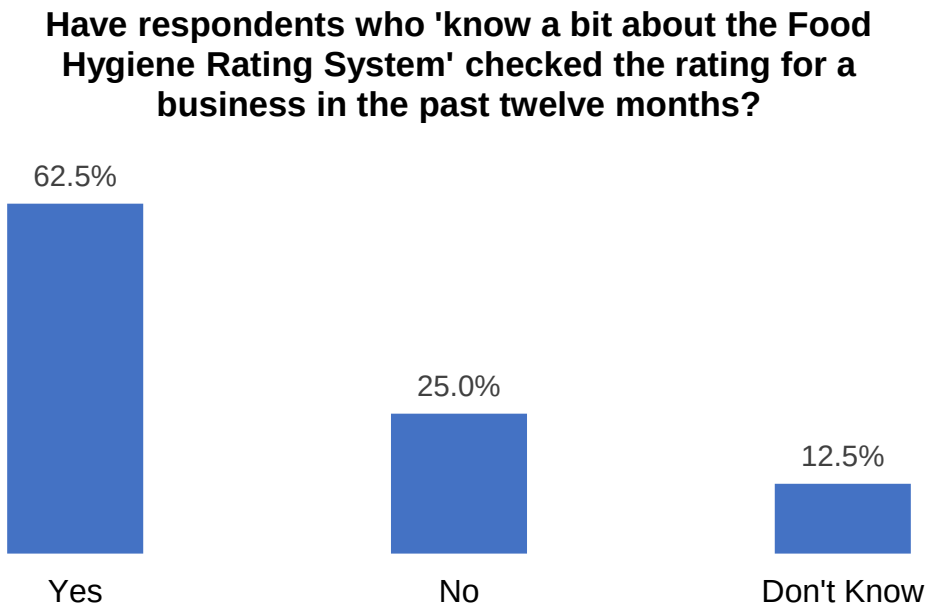


Figure 22: Exclusive Multiple-choice Question: 'In the last 12 months, have you checked the hygiene rating of a food business?'. Question only asked to those who responded to the prior question: 'Yes, and I know a bit about it'. Unanswered and missing responses have been excluded for the purposes of calculating accurate percentage figures above.

(7) Cost of Living Crisis

How has the recent cost of living crisis impacted respondents' food purchasing or handling practices?

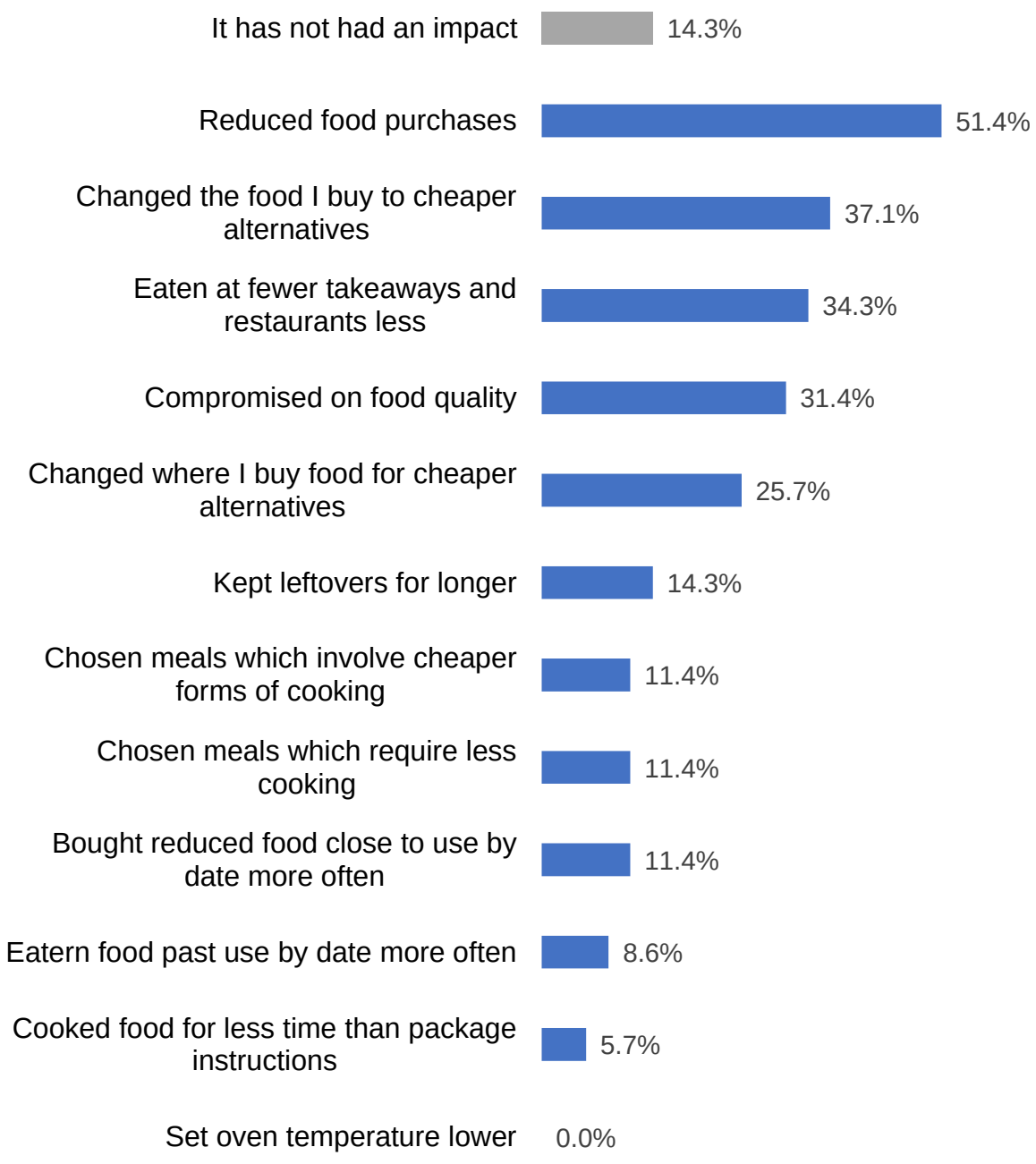


Figure 23: Multiple-choice Question: 'How has the recent cost of living crisis affected your food purchasing and handling practices, if at all? Please select all that apply'. 'It has not impacted on my food purchasing and handling practices' was an exclusive response. 'Other' offered respondents the opportunity to specify. No such responses were recorded.

3.3. RQ Two: Determinants of Practice

The second research question endeavours to identify determinants of food hygiene practices by analysing the differences in responses between characteristic groups. By conducting a chi-squared analysis, potential associations between demographic factors and food safety practices may be hypothesised.

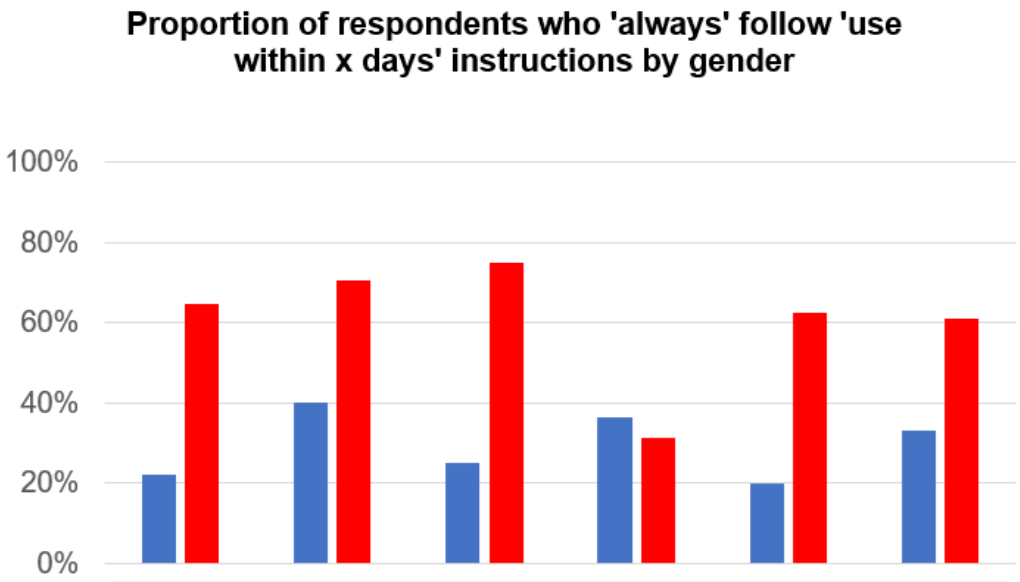
The null hypothesis for each test is to assume no association between the characteristic and food hygiene practices. The alternative hypothesis suggests there is an association. The chi-squared analysis allows us to determine whether statistically significant associations exist while binary and multinomial logistic regression may provide further insight into the nature of these relationships.

A significance level of $p < 0.05$ will be used to determine statistical significance. Results below this threshold are considered unlikely to have occurred due to random chance. However, where differences exist and the significance is close to this threshold, or where similar questions result in a mixture of statistically significant and not statistically significant results, these findings may also be presented.

In some cases, specific characteristic categories may be excluded from analysis. When working with comparatively small sample sizes, categories representing particularly small numbers can have a disproportionately inflationary impact on p-values, leading to misleading conclusions. By removing these responses, more reliable results can be developed.

(1) Gender

In order to mitigate against the outweighed impact of smaller categories, we have excluded the single non-binary respondent and the single missing response respondent from our analysis. Results from a broad examination of gender-based differences across survey responses reveal that disparities between the gender are notably minimal, at least when seeking statistically significant findings ($P < 0.05$). The primary consistent distinction arising from survey results was that females exhibited a greater propensity to 'always' follow the 'use within' instructions provided on food packaging.



	Cooked Meat	Raw Meat	Smoked Fish	Bagged Salads	Cheese	Milk
Males	22.2%	40.0%	25.0%	36.4%	20.0%	33.3%
Females	64.7%	70.6%	75.0%	31.3%	62.5%	61.1%
Chi-Squared P-Value	0.039	0.118	0.019	0.782	0.034	0.173

Figure 24: 'I don't eat that type of food and 'Don't know' responses have been excluded for the purposes of calculating accurate percentage figures above.

This disparity held true across all food categories with the exception of bagged salad where gender responses were broadly comparable. Statistically significant

differences were identified for three specific food items: Cooked meat ($p = 0.039$), smoked fish ($p = 0.019$) and cheese ($p = 0.034$).

No other disparities were found between the genders that proved to be both consistent and statistically significant. While women were notably more likely to have reported responding to the cost of living crisis by ‘compromising on the quality of food’, with 44.4% of women responding in this way compared to 13.3%, the statistical significance of this remained just above the threshold ($p = 0.053$). In a similar thread, women were more likely to have reported choosing meals which require less cooking time in order to reduce energy costs and choosing meals which involve cheaper forms of cooking, yet both findings were not statistically significant (both had p figures of 0.097).

(2) Ethnicity and International Status

Both ethnicity and international status are grouped together into the same heading due to the potential risk of confluence: It is observed that a significant proportion of Asian individuals fall into the international status category, while the vast majority of White individuals are classified as national students. This alignment enables both international status and ethnicity to be seen to play a significant role in determining various food hygiene practices. Consequently, it becomes vital to exercise caution and conduct further analysis to determine which of these factors is the true determinant or has the strongest effect. This approach ensures a richer examination of the factors determining food hygiene practices.

For analyses focusing on ethnicity, in order to ensure reliable chi-squared significance results, we have excluded the two respondents of multiple ethnic groups and the single ‘prefer not to say’ respondent from our analysis. In order to

obtain insight into how specific ethnic backgrounds influence food hygiene practices, some analyses focused on one ethnic group while grouping other ethnicities into an ‘other’ category. In such cases, those part of multiple ethnic groups are included in the ‘other’ category. These exclusions are unnecessary for the international status category as no responses sat outside the binary ‘national’ or ‘international’ answers.

Cleanliness:

One significant difference between ethnic groups lies in the frequency of deep cleaning.

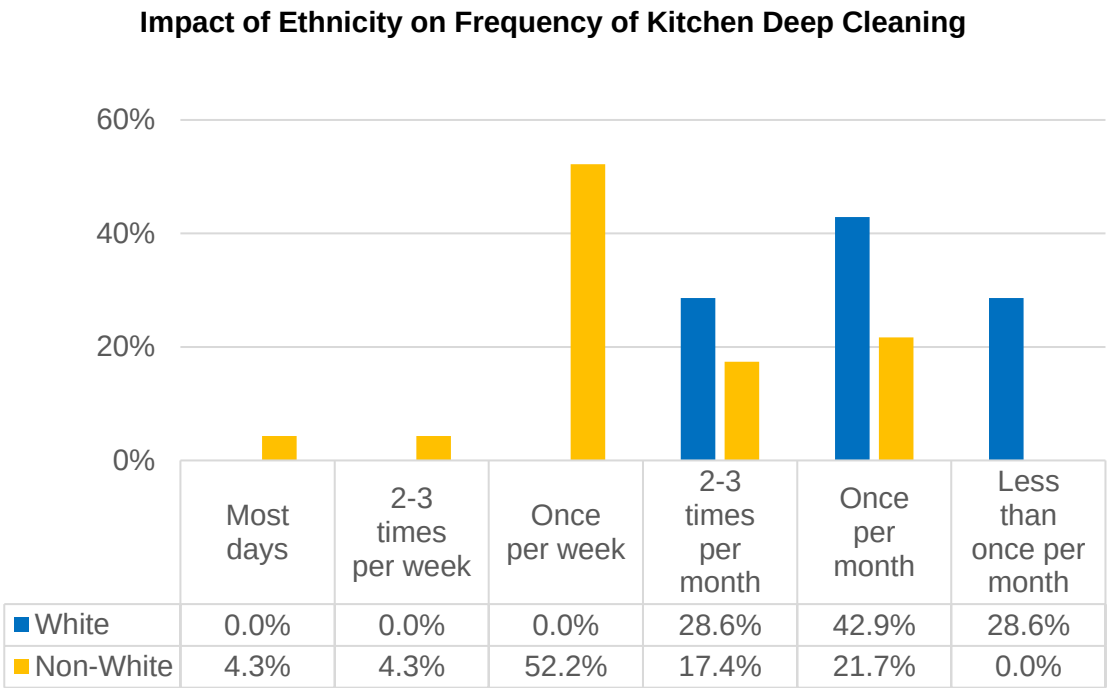


Figure 25: Figure depicting the impact of ethnicity on the frequency of deep cleaning the kitchen.

It was observed that individuals from white ethnic backgrounds tended to perform deep cleaning less frequently compared to their counterparts from other ethnic groups. A significant majority of non-white respondents reported engaging in

deep cleaning activities at least once per week – a practice not reported by any of the white respondents. This returned a chi-squared p-value of 0.034, allowing us to reject the null hypothesis and consider this a statistically significant disparity. No material difference existed between ethnicities regarding light cleaning or the replacement of tea towels.

Cross Contamination:

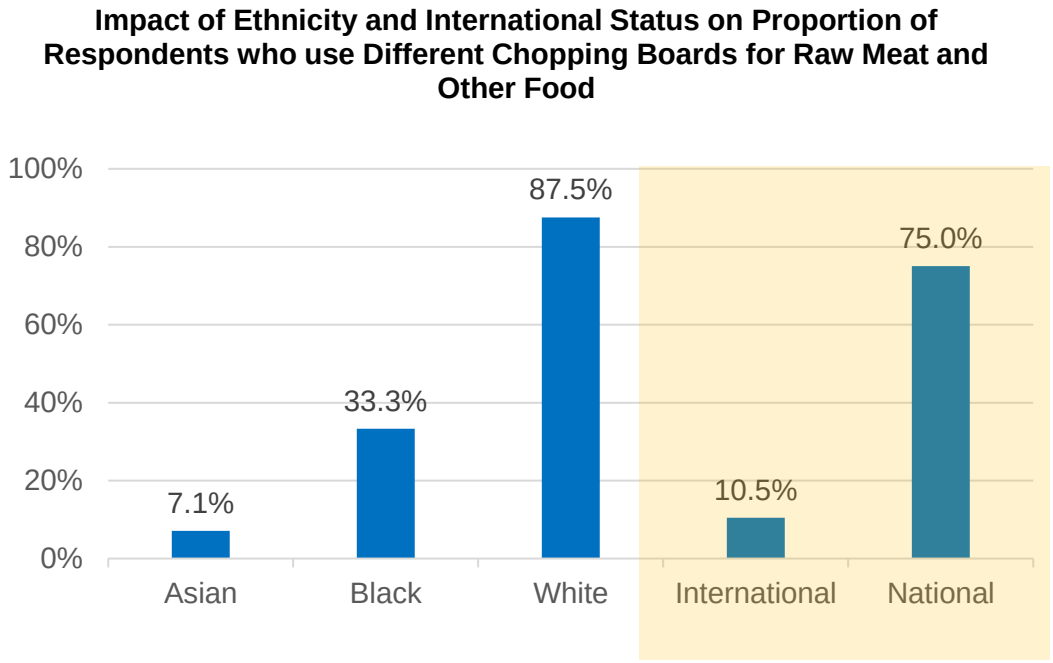


Figure 26: Figure depicting the impact of ethnicity and international status on the proportion of residents who use different chopping boards for raw meat and other foods.

Another significant finding centred on the use of chopping boards: The vast majority of individuals from white ethnic backgrounds and national students used different chopping boards for raw meat and other foods – a practice adopted by only one Asian respondent and two international students. Those of Black ethnic backgrounds were mixed on the practice. The chi-squared p-value returned a

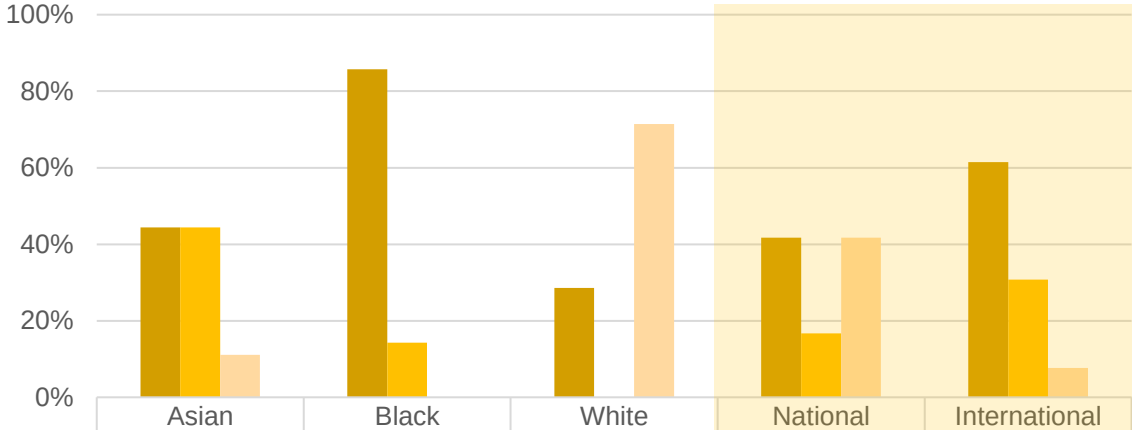
figure of <0.001 for both ethnicity and international status indicating both could be considered statistically significant determinants.

In order to compare these groups, a follow-up statistical test was conduct: A binary logistic regression. This is a method used to analyse and compare the relationship between one or more predictor variables and a binary outcome variable. This can be helpful to identify potential confounding factors to isolate the effects on the outcome. The results from this analysis are below:

Predictor Variable	Statistical Significance	Odds Ratio
International Status	0.040	0.110
Non-Whites	0.036	0.065

While ethnicity appears to have a slightly greater significance value, in reality the difference between the groups are negligible making conclusions about the significance of the determining factor difficult. However, the model suggests those deriving from a Non-White ethnic background represent a 6.5% chance of adopting the practice of using different chopping boards for raw meat and other foods, while international students have an 11% chance, indicating the magnitude of ethnicity is larger than that of international status.

Impact of ethnicity and international status on practice of washing chicken



	Asian	Black	White	National	International
Always or mostly	44.4%	85.7%	29%	41.7%	61.5%
Half the time or occasionally	44.4%	14.3%	0.0%	16.7%	30.8%
Never	11.1%	0.0%	71.4%	41.70%	7.70%

Figure 27: Figure depicting the impact of ethnicity and international status on the practice of washing chicken.

Another distinct trend observed included individuals of Black ethnic backgrounds alongside international students exhibiting the highest likelihood of consistently washing chicken before cooking, followed by those of Asian backgrounds. Conversely, those from White backgrounds and national students were least likely to engage in this practice. This divergence was statistically significant with a p value of 0.001 when examining ethnicity and 0.004 when examining international status.

A post-analysis multinomial logistic regression revealed ethnicity had a greater bearing on predicting the likelihood an individual would wash chicken compared to international status, though both are statistically significant.

Predictor Variable	Statistical Significance
International Status	0.016
Ethnicity	0.002

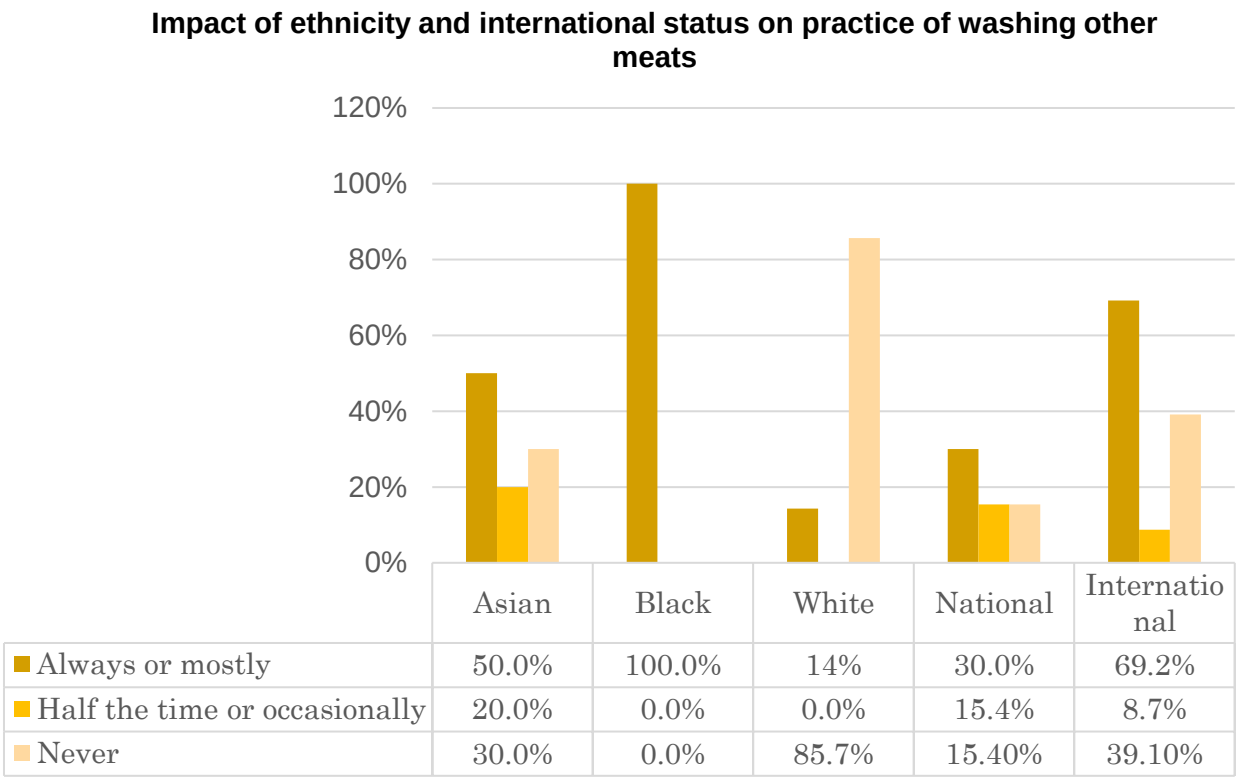


Figure 28: Figure depicting the impact of ethnicity and international status on the practice of washing meats other than chicken.

A similar trend was found for washing other meats including lamb, beef or pork. In line with practices involving washing chicken, those from Black ethnic background were much more likely to wash other meats, followed by Asian individuals and lastly, White individuals, the vast majority of whom had never washed other meats. While this reflected a P-value of 0.034, a P-value of 0.023 was identified between international status and this practice.

Another post-analysis multinomial logistic regression identified ethnicity to be the dominant determinant factor here after providing a significance value of 0.068 for international status but 0.034 for ethnicity, indicating the impact of international status is not statistically significant while the impact of ethnicity is for this practice.

Predictor Variable	Statistical Significance
International Status	0.068
Ethnicity	0.034

No material impact was found to be of statistical significance regarding the impact of ethnicity and international status upon washing raw fish and seafood.

Cooking:

An analysis of practices designed to ensure food had been safely cooked and is ‘ready to eat’ revealed a notable contrast between those from white ethnic backgrounds and others. White ethnic groups tended to employ a more extensive range of verification checks with only one two types of verification practices utilised by those from non-white ethnic backgrounds more. The practices representing the most statistically significant difference between ethnic groups were following the label instructions ($p = 0.011$) and ensuring an even temperature throughout ($p = 0.015$). Other checks particularly close to the

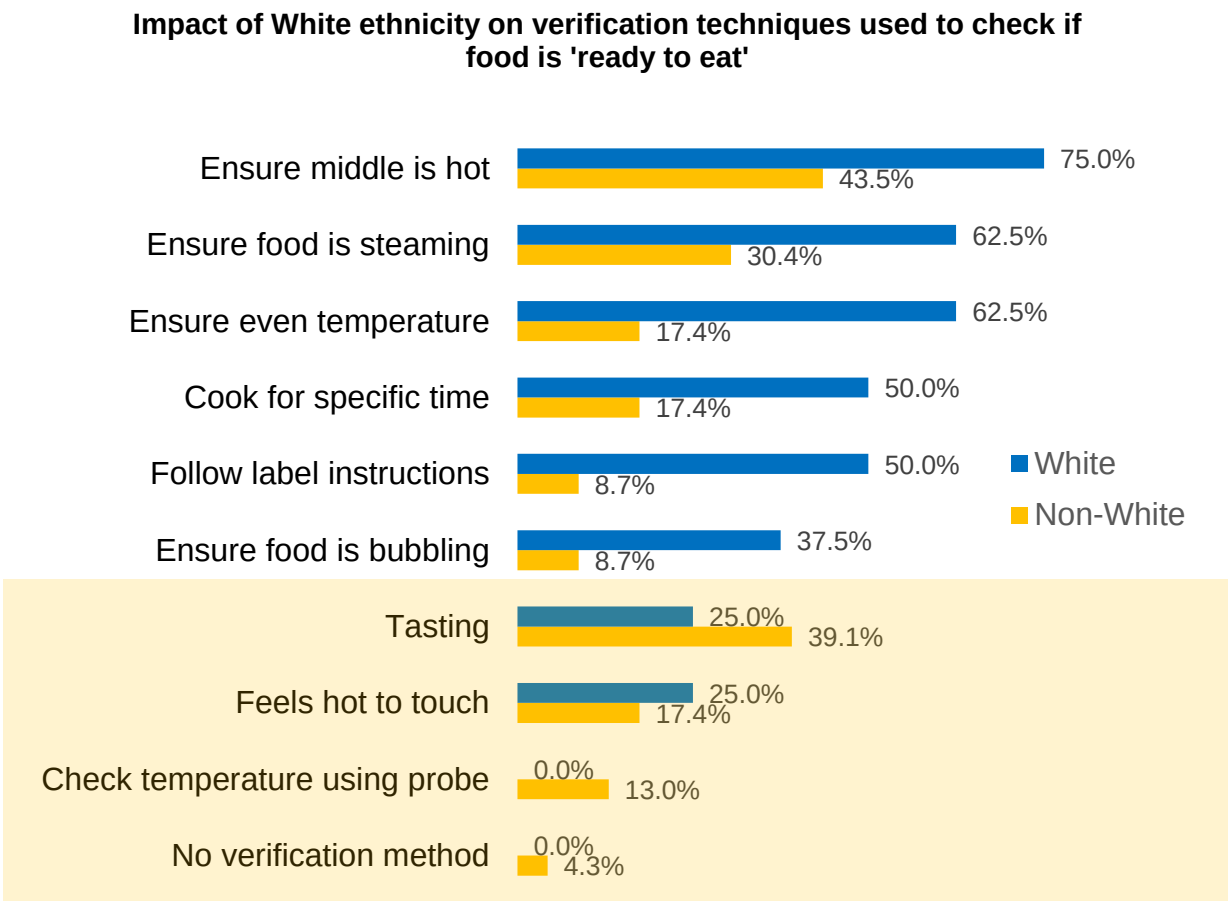
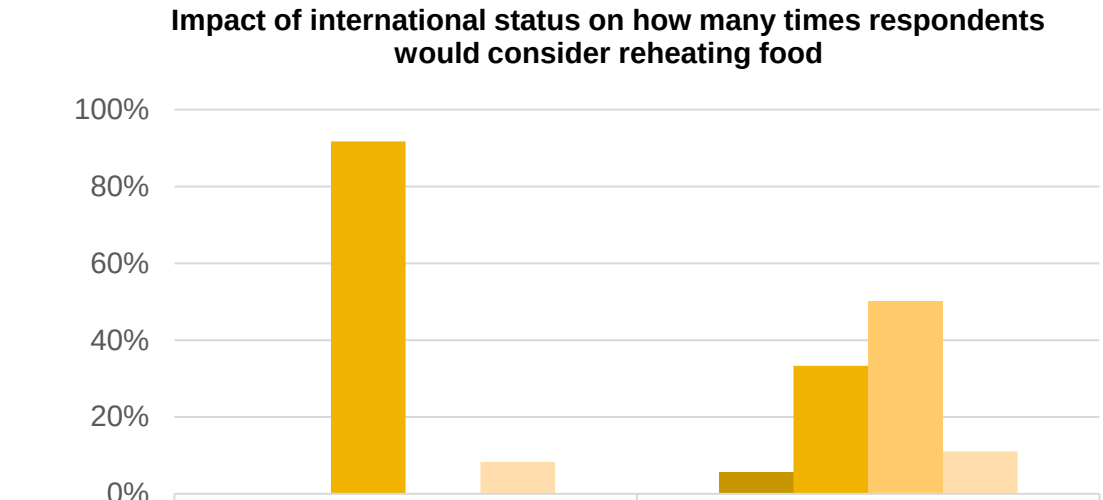


Figure 29: Figure depicting the impact of ethnicity on verification techniques used to check if food is 'ready to consume'.

threshold included ensuring food is bubbling ($p = 0.056$) and cooking for a specific period of time ($p = 0.069$).

While similar trends emerged when examining international status and verification techniques used to ensure food is 'ready to eat', the significance figures broadly reflected weaker associations than those of white ethnicity, with the only statistically significant association being ensuring the middle is hot ($p = 0.008$) which was associated with national students at a far greater rate than internationals.



	National	International
Not at all	0.0%	5.6%
Once	91.7%	33.3%
Twice	0.0%	50.0%
More than twice	8.3%	11.1%

Figure 30: Figure depicting the impact of international status on the number of times respondents would consider reheating food.

International status has a close association with the number of times respondents would consider reheating food with the majority of international students readily reheating food twice or more, while almost all national students would limit this practice to once. A p-value of 0.011 reflects the statistical significance of this finding.

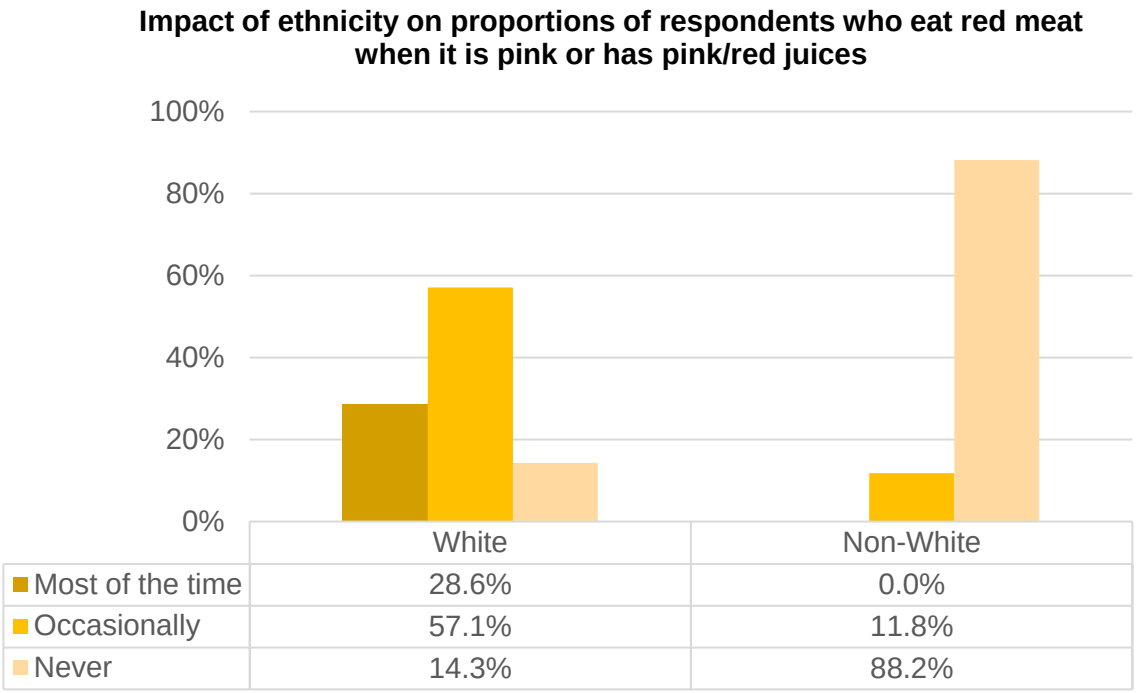


Figure 31: Figure depicting the impact of ethnicity on the proportion of respondents who eat red meat when it is pink or has pink/red juices.

Another distinct contrast concerned the consumption of red meat: Individuals of white ethnic groups were more inclined to consume red meat when it retained a pink colour or had pink or red juices, both consistently and occasionally (representing 85.7% of White respondents). Conversely, those from Non-White ethnic backgrounds overwhelmingly abstained from this practice with 88.2% indicating they had never consumed red meat in this state. This disparity is highlighted by a statistically significant p-value of 0.001.

International status also seemed to reflect a statistically significant impact with a p-value of 0.046. A multinomial logistic regression confirmed ethnicity to be the most significant underlying factor influencing the consumption of red meat:

Predictor Variable	Statistical Significance
International Status	0.308
Whites	0.030

Food Fitness:

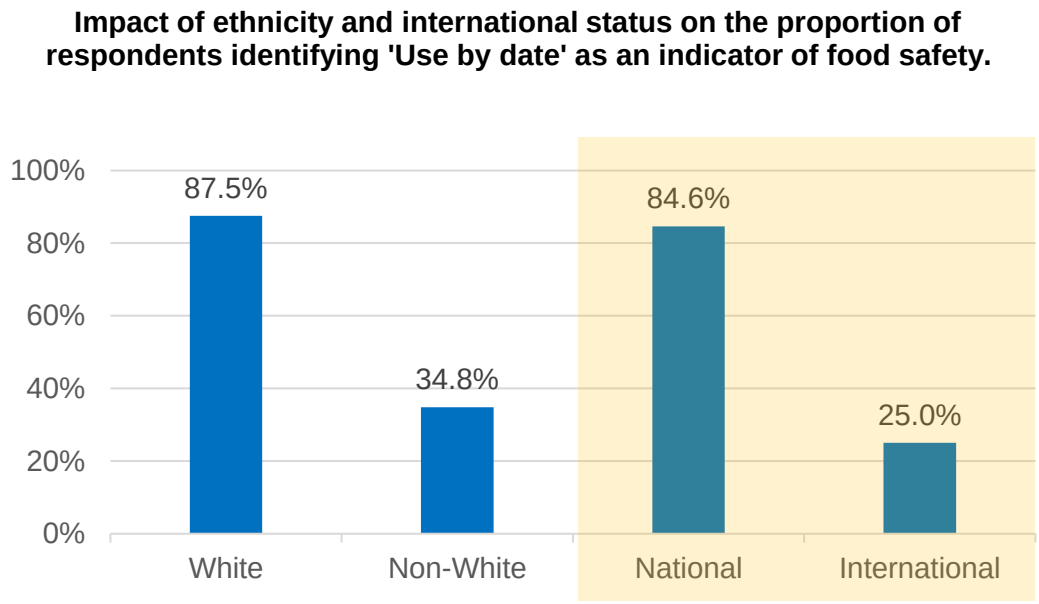


Figure 32: Figure depicting the impact of ethnicity and international status on the proportion of respondents who identify 'use by dates' as indicators of food safety.

Analysis shows a distinct association between White ethnicity and international status in identifying use by labels as an indicator of food safety. While a significant majority of White and national individuals identified use by dates as indicating food safety, only 34.8% of those from Non-White ethnic backgrounds and 25% of international students could do so. This resulted in a p value of 0.010 for White ethnicity and <0.001 for international status, enabling a rejection of the null hypothesis for both.

A binary logistic regression was then conducted to determine which factor played a greater role in influencing use by date perceptions. The model suggests international status was the underlying determinant driving this effect with a statistical significance of 0.020. It also reflects it the magnitude of its impact was greater projected a likelihood that 9.9% of international students would identify use by dates as an indicator of food safety, compared to 26% of those not of white ethnic origins.

Predictor Variable	Statistical Significance	Odds Ratio
International Status	0.020	0.099
Non-Whites	0.308	0.260

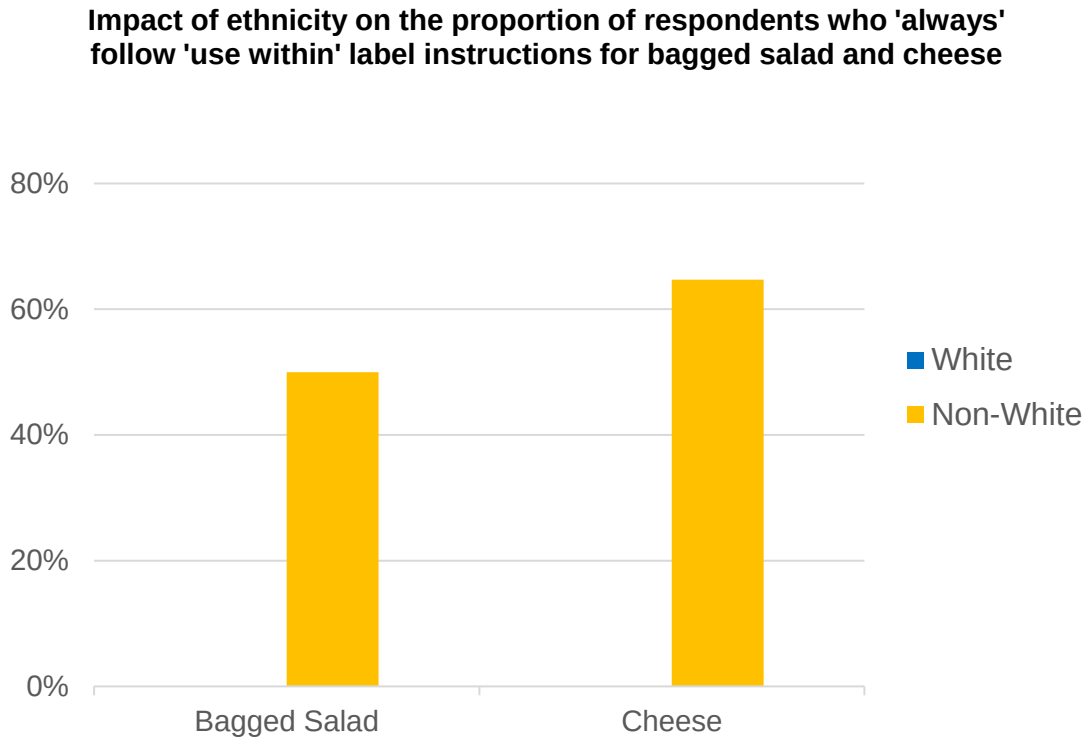


Figure 33: Figure depicting the impact of ethnicity on the proportion of respondents who 'always' follow 'use within' label instructions for bagged salad and cheese.

The proportion of individuals who identified themselves as 'always' following package instructions which indicate the number of days the product must be used within differs across White and Non-White ethnicities significantly depending on the food. For raw meat, cooked meat, smoked fished, milk, tofu and meat substitutes, and plant-based alternatives, there was little statistically significant difference. However, for bagged salad and cheese, individuals from White backgrounds were much less likely to follow such instructions, while those from Non-White backgrounds remained adherent. This resulted in p values for bagged salad and cheese of 0.019 and 0.004, respectively, indicating the statistical significance of this finding.

(3) Other Characteristics

Of the other characteristics included in the survey, type of housing and number of other kitchen users returned no statistically significant disparities. Diet and allergies were both overwhelmingly dominated by one response resulting in insufficient numbers in order to provide trustworthy results.

4. DISCUSSION

The aim of this dissertation is to assess current food hygiene standards across a sample of students at the University of West England and identify potential factors which determine positive and negative hygiene practices. The findings reported in section three illustrate a range of food hygiene practices which both align and differ from those found nationally alongside several key associations which inform food hygiene practices among students. This section seeks to interpret and critically analyse these findings within the framework of the two research questions. Following this, further thought will be given to limitations in the study more broadly and practical implications that could arise from these findings.

4.1. RQ One: Food Hygiene Standards at UWE

In assessing and interpreting the food hygiene standards of students at UWE, food hygiene information and guidance issued by the Food Standards Agency (FSA) will be used as the benchmark for good standards for each of the seven themes identified. The FSA has long been identified as a reputable source of food safety information, acting independently from government and private enterprises, led by science and evidence (FSA, 2023b).

(1) Cleanliness

Hand Washing:

The FSA identifies handwashing as a vital control measure to avoid contaminating food with dirt, debris and harmful bacteria, including between raw

and ready-to-eat foods. The recommendation is to always wash hands with warm water and soap before preparing, cooking and eating food as well as after handling raw meat, including frozen meat products (FSA, 2019).

The findings reveal a positive commitment to hand hygiene among students at UWE: A significant majority (86%) reported always washing their hands prior to preparing or cooking food, with similar levels doing so after handling raw meat (84%) and frozen chicken products (80%). These figures are notably higher than responses collected from the national students survey (FSA, 2023a), reported at 51%, 39% and 40% respectively, indicating students at UWE broadly reflect higher levels of cleanliness than students nationally. These figures also reflect well when compared to the national adults survey which found 82% reporting that they always washed their hands before preparing or cooking food and 85% reporting so after handling raw meat or fish.

While 60% of respondents reported always washing their hands before eating, a figure notably above the national average (39%), this still suggests 40% of students at UWE do not fully comply with FSA recommendations. While positive commitments to handwashing are observed in general, the importance of continued efforts to promote handwashing across university students remains crucial to prevent foodborne illnesses.

Additionally, 83% of students reported usually washing their hands with soap and either warm or cold water. The Centre for Disease Control and Prevention (2023) note that either method is suitable to rid hands of harmful bacteria. While an additional 14% responded that their handwashing method depends on what they are doing, only 3% noted not using soap suggesting a very high proportion of students adopting safe handwashing techniques.

Cleaning:

Beyond handwashing practices, the findings of this survey explores broader cleaning practices adopted by students which are integral for preventing dirt and debris build up alongside cross-contamination of worktops, utensils and equipment. The results indicate an overall positive reflection of adherence to FSA standards: A substantial two-thirds of respondents (66%) carried out a light clean at least several times per week while more than 90% engaged in deep cleaning practices at least once per month. These figures highlight a broadly consistent approach toward cleanliness practices among students at UWE.

However, it is worth highlighting the number of respondents conducting a deep clean at least once per month drops to 71.5% when only White individuals are included. While doing so would not be reflective of the population of UWE, the current sample significantly over-represents Non-White ethnicities indicating that if an ethnic association were confirmed, 90% would likely be an over-estimate of those who conduct deep cleaning every month or more frequently.

Additionally, despite the positive cleaning practices displayed by students at UWE, prevalent challenges still exist: For example, the FSA recommends replacing or washing tea towels at least once per week: A threshold only 56% of students met, just shy of the national average for students of 61%. An additional almost a quarter (23.5%) of respondents indicate only replacing or washing tea towels once per month or less: A figure far beyond the recommended limits. Over-used tea towels are likely to harbour significant amounts bacteria, dirt and debris which can be spread onto worktops, clean dishes or cutlery, while the risk of mould becomes significantly more tangible.

Additionally, 66% of participants reported their sink as being filled with dirty dishes, pots or pans at least once a week or more often. Furthermore, 45%

reported the presence of leftover food in the sink while 44% described their sink as dirty, grimy or greasy under similar timeframes. While these figures represent an improved picture than the national students survey which reported higher figures for identical issues (70%, 60% and 56% respectively), they nonetheless highlight common challenges that many students face in maintaining domestic cleanliness.

Surprisingly, there were no significant differences noted in such responses based on the type of housing or the number of people respondents shared the kitchen with. This indicates the challenges associated with dirty and unhygienic sinks may be influenced by individual behaviour and kitchen practices rather than inadequate space. Further analyses exploring associations between respondent perceptions of adequate space as reflected in figure X, with the presence of unhygienic sink environments showed no significant association. This further suggests inadequate space, facilities and housing type are poor indicators of unhygienic sink cleanliness in comparison to individual behaviour and lifestyles. Without further evidence into these lifestyles, further research is needed to confirm whether individual behaviour may influence unhygienic sink environments.

(2) Cooking

Verifying Food is Ready to Eat:

One striking observation revolves around how students verify if something is ready-to-eat. While the FSA emphasise the importance of ensuring food is cooked thoroughly, our findings indicate only 49% of UWE students consistently check the middle of their food is hot when cooking or reheating and only 37% look for visible signs of steaming. Alarmingly, 34% of respondents rely on taste

as a measure of readiness which, as recognised by the FSA (2023a) is not a reliable indicator of safety.

In contrast to the national student survey, 61% of students always ensure their food is both steaming hot and cooked all the way through. It is however worth noting that there is a significant disparity identified in respondent responses between those from White and those from Non-White ethnic groups. Among White individuals, which represent 68% of the UWE student body, 75% reported ensuring the middle is hot and 62.5% confirm the food is steaming. As the survey sample is over-represented by those from Non-White backgrounds, it is plausible to argue the broader UWE population aligns more closely with our survey findings and may exhibit food safety practices in line with FSA recommendations to a greater extent.

Reheating Food:

Another finding centred on reheating food: The FSA recommend not reheating food more than once to avoid the risk associated with bacteria growing to dangerous levels while the food is between 5°c and 63°c (FSA, 2019). Despite this, 37.5% of respondents were willing to reheat food twice or more, a notable contrast to the national adult survey where only 8% expressed such willingness. This discrepancy suggests students are generally more inclined to reheat food multiple times, potentially identifying a unique food safety risk within this demographic. However, again it is crucial to highlight that international students, who are disproportionately represented in our survey, exhibit a much greater propensity (61%) to reheat leftovers more than once compared to national students (8%). Given this it is reasonable to suggest the true proportion of UWE

students willing to reheat food multiple times aligns more closely with the adult national figure, indicating a lower risk in this regard.

Adequate Meat Cooking:

Lastly, our survey examined students' willingness to consumer undercooked foods for a range of high-risk meats. Our findings demonstrate that UWE students are generally more cautious than their counterparts in the national student survey. A higher percentage of UWE respondents indicated that they never consume meat that is still pink or has running pink juices, including chicken and turkey (85%), duck (95%), sausages (88.5%), pork (92%) and beef burgers (70%). This is in comparison to the national student survey of 80%, 60%, 77%, 72% and 55%. While the proportion of respondents who never consume red meat are lower (63%), the FSA (2019) confirms it is safe to eat read meat undercooked.

(3) Chilling

Examining practices related to the chilling and defrosting of meat and fish revealed a concerning trend regarding safe techniques among students at UWE. The FSA provide clear guidance on safe defrosting methods, emphasising the importance of avoiding leaving meat and fish at room temperature or within sitting water to defrost: Such practices often require food to be placed outside of temperature control for an unacceptably long time to ensure the middle is defrosted, risking the potential for harmful bacterial growth.

The survey indicates 52% of UWE students usually resort to leaving food at room temperature for defrosting with a further 18.5% placing meat and fish in water, a

combined figure of 70.5% adopting unsafe defrosting practices. These figures are cause for concern given it falls significantly short of the 34% of students recorded in the national survey who usually defrost at room temperature and 41% in the adult's national survey. Given the disparity between the national adult and student surveys, it is not reasonable to concede this practice to be associated to a greater extent with students than adults. Rather, students at UWE are more likely to be associated with poor hygiene practices in chilling meat and fish despite being students, indicating the need for targeted interventions in boosting food hygiene awareness across the student populace.

(4) Cross Contamination

Chopping Boards:

The FSA offer clear guidelines regarding the crucial issue of chopping boards, recommending the use of different chopping boards for raw and ready-to-eat foods or, alternatively, washing them thoroughly with soap and hot water between uses in order to avoid the risk of cross-contamination.

In examining the practices of UWE students, notable levels of bad practice can be observed: While 57% adopt at least one safe practice and no unsafe practices, 26% identified that they regularly use an unsafe practice relating to chopping boards, such as rinsing it with water but no soap, using the same chopping board without washing or turning over the chopping board, which risks transferring harmful bacteria onto worktop surfaces. In addressing this concern, not only are educational campaigns beneficial, but providing signs in university hall kitchens and adequate numbers of chopping boards may go some way to improving this.

Washing Meat:

The FSA identifies washing meat as a practice of significant concern across the UK due to the risk of splashing water transferring harmful bacteria from the surface of meat to worktop surfaces. The survey reveals this problem extends to UWE with 77% of students reporting to wash chicken before cooking occasionally or more often, alongside a further 60% for lamb, beef or pork and 79% for fish and seafood. In comparison, 54% of students and 50% of adults in their respective surveys reported washing chicken at least occasionally, indicating the risk relating to UWE students is considerably higher.

Part of the explanation for this lies in the ethnic distinctions in this practice with 71% of White respondents reporting never having washed chicken while 86% of Black respondents reported always washing chicken before cooking. This distinction extends to washing lamb, beef and pork too. Given White respondents are under-represented in this survey, the figures provided are likely to be an over-estimate of the true figure of students from UWE adopting meat-washing practices. However, a significant and growing proportion of UWE students are from a Black ethnic background and therefore remains a prevalent issue. However, educational campaigns may struggle to alter behaviour in cases where a particular practice forms a rooted part of cultural customs. Therefore, culturally sensitive approaches which acknowledge such traditions must be designed when developing an intervention.

Adequate Space:

When probed about whether there was adequate space for food storage and food preparation, roughly a quarter (26%) and one third (37%) noted they did not have adequate space for each activity, respectively. Both of these may draw

concern due to the risk of cross-contamination: Inadequate storage space can lead to cluttered fridges, frustrating efforts to separate raw from ready-to-eat food while food preparation in cramped conditions makes it more difficult to prepare raw and ready-to-eat foods in different areas or with difficult equipment.

Surprisingly, there were no recordable differences noted in responses based on the type of housing or the number of people respondents shared the kitchen with. This indicates the challenges associated with inadequate space may be influenced by individual behaviour and kitchen practices alongside the facilities available. However, analysing proxies for respondents who could be considered to be tidier, such as those who frequently conduct light and deep cleaning, do not result in any significant associations with agreeing there is enough space for food storage or preparation. Further research may therefore be needed to confirm whether individual behaviour may influence the space deemed adequate by respondents. Despite this, it could be argued providing greater fridge and freezer space, alongside counter and worktop space for students would improve these findings further. However, the effectiveness of university policy to improve this would be limited with 70.6% of respondents in private rental, where kitchen facilities remain outside the influence of university authorities.

(5) Food Fitness

Food Fitness Testing & Use by Dates:

Five questions sought to explore student perceptions toward use-by dates from different angles: The clearest depiction of adherence was observed in the finding that 91% of respondents reporting that they check use-by dates always or most of the time, including 51% who always do this. This broadly reflects findings found in the student survey where 45% were identified as always checking use-

by dates (FSA, 2023a). While encouraging, this finding is tempered with somewhat contradictory findings elsewhere.

In assessing whether or not food was safe to eat or cook with from a range of potential options, most respondents relied on smell as the most important factor for raw meat (73.5%), raw fish (67%) and milk and yoghurt (69%). The exception was cheese, for which respondents relied on how the food looked and the use by date (both 59%), and eggs, for which respondents relied on the use by date (57%).

While an organoleptic inspection of foodstuffs can provide an indication as to whether food is unsafe to eat, the FSA highlight relying in these senses are not always accurate and adhering to the use-by date is the most reliable indicator. For all five food groups, use by dates were relied on by between 51.5% and 62.9% indicating a significant proportion of people rely on unreliable indicators. While this is significantly higher than adult survey responses by the FSA (2019) where the proportion of people relying on use by dates ranges between 21% and 29%, a significant proportion of students are therefore relying on unreliable indicators of food fitness at UWE.

This somewhat contradictory picture may be partially explained when examining respondents' understanding of the purpose of use-by-dates. In practice, only 49% of respondents could identify use-by-dates as being an indicator of food safety while, perhaps indicative to a greater extent of respondent unclarity, 34% identified best before date as an indicator of food safety rather than food quality. This may suggest that while use-by-dates are used by a significant number of respondents, the confusion over its purpose and role has demoted its significance as a primary factor in determining the fitness of food.

This in turn is reflected in the proportion of students who have reported eating foods past their use-by-date in the past month. Significant numbers had eaten bagged salad past its use-by-date in the past month (47%) alongside milk (42%). While these are broadly comparable with findings from the student survey (FSA, 2023a) which record figures of 51% and 37% respectively, UWE students are less likely to have eaten other foods past their use by dates including cheese (29%), cooked meats (21%), plant-based milk alternatives (19%) or tofu or meat substitutes (12%). Comparative figures for the national survey were 38%, 32%, 37% and 32%. This suggests that while significant proportions of students do eat bagged salads and milk beyond their use-by-date regularly, the frequency declines rapidly for higher-risk foods including raw meat, cooked meat and smoked fish, for which they appear to be more compliant to use-by-dates than the student body nationally.

These figures conclude a somewhat contradictory picture of UWE student perceptions toward use-by-dates and food fitness: While students at UWE cannot be considered to ignore use-by-dates, confusion over its purpose may have led to relying on other, less reliable indicators of food fitness and being more relaxed in eating certain foods past their use-by dates, while simultaneously practising greater compliance on higher-risk foods.

Of particular note are perceptions toward milk and yoghurt, for which use-by-dates are relied upon as a measure of fitness prior to consuming or cooking to a greater extent than any other food group queried (63%). While not the primary indicator of fitness, which lies with smell at 69% of respondents, this may be indicative of a reliance upon such measures in regard to food safety which, in turn, could be used to oppose ongoing efforts and campaigns to remove use-by-dates from milk in order to reduce food waste. This finding could additionally be used in discussions regarding such policies focused on addressing

misconceptions and promoting evidence-based food safety practices, mitigating or avoiding entirely the unintended consequences of removing safety indicators from food.

Lastly, foodstuffs often include a ‘use within’ label instruction, indicating the number of days food may be consumed within since opening. While the proportion of students responding that they never follow such labels were fairly low, with the exception of tofu and meat substitutes (33%) and plant-based milk alternatives (24%), the proportion of students who did not respond that they always do so were high. Roughly half did not always adhere to instructions on cheese (54%), tofu or meat substitutes (50%), bagged salads (49%), milk (48%) and cooked meat (46%), while four in ten did not always adhere to instructions on smoked fish (40%) and raw meat (36%). While these were notably lower than the national student survey (FSA, 2023a), it still indicates a significant proportion not adhering to use within instructions, posing a high level of risk of consuming spoiled and potentially harmful food which do not display signs of spoilage which may be picked up through organoleptic inspections.

Leftovers:

The FSA recommend ensuring that leftovers are cooled and refrigerated or frozen within two hours to avoid a sustained period of time outside of temperature control, within which the growth rate of harmful bacteria may jeopardise the safety of food (FSA, 2023c). Fittingly, 80% of survey respondents place food in the fridge or freezer within this time frame with 10% doing so between two and four hours and a further 10% doing so more than four hours after cooking. This represents a fairly high figure of compliance.

However, of those who keep leftovers, only 54.5% consume this food within two days, complying with the FSA recommendations to consume leftovers within two days. This leaves a significant proportion (42%) who consume leftovers beyond the recommended threshold, a figure considerably higher than the 27% of adults surveyed by the FSA (2023?). This deviation from recommendations raises concerns about the potential risks associated with consuming leftovers that have been stored for extended periods. Addressing this practice is crucial to ensuring high standards of food safety. While educational initiatives can play a pivotal role, this will only be successful if it taps into cultural norms and includes clear explanations as to the risks involved.

(6) Information Sources

Trusted Sources:

When asked which sources of information respondents trusted and used to obtain information about food safety, the majority noted internet searches (74%) as their primary source indicating UWE students used internet-based sources to a greater extent than the nation at large: 28% of adults surveyed by the FSA (2019) used this method, although this rises to 45% when focusing on those aged between 16 and 24.

These figures suggest a clear trend among younger individuals, including students, toward relying on the internet as a primary source of information about food safety. This growing reliance may raise concerns about the quality and reliability of the sources consulted. It may be recognised that the internet encompasses a wide spectrum of information, ranging from reputable sources such as the Food Standards Agency to less reliable or unverified content. While younger individuals in theory have much easier access to a wider source of

reputable information, the challenge lies in discerning trustworthy information from potentially misleading or inaccurate sources.

Conversely, the reliance of UWE students on friends and family (54%) and product packaging (43%) closely mirrors national survey figures, indicating consistency in these traditional information sources. However, it is important to acknowledge that, much like internet-based sources, the reliability of information from personal networks can vary widely while product packaging may provide limited insights into broader food safety topics.

In navigating these challenges, initiatives which educate students on how to evaluate the reliability of online sources and encourage the use of reputable resources such as the FSA's official website, may be an invaluable approach to safeguard the quality of food safety knowledge among students at UWE.

Food Hygiene Rating System:

The surprising finding that 43% of respondents at UWE had never heard of the food hygiene rating schemes raises the need for further exploration. This figure contrasts those found in the national adults survey where 87% of respondents were aware of the scheme. While an initial assessment could relate this disparity to the substantial representation of international students in the survey (at 62%), it is essential to recognise that even among national students, a substantial 38.5% had never heard of the scheme, and a further 46% having heard of the scheme but not knowing much about it.

This finding challenges conventional expectations as younger age groups have historically exhibited higher levels of awareness of the food hygiene rating scheme: According to the national adults survey, 96% of individuals aged 16-24 were aware of the scheme, reflecting a consistent trend where awareness

decreases with age. However, the findings from this survey deviate from this pattern, suggesting a notable issue with awareness among UWE students.

In practical terms, the lack of awareness about the food hygiene rating scheme may not necessarily pose an immediate risk: A lack of awareness of the scheme does not in and of itself result in poor hygiene practices. However, this finding may reflect a more laissez-faire attitude toward food safety in general which, while not immediately threatening, may benefit from greater attention.

Among those who possess some knowledge of the food hygiene rating scheme, a substantial 62.5% have indicated they have checked the rating for a business in the past twelve months. This would suggest that awareness and concern for food hygiene scores become more prominent when individuals are familiar with the scheme. Therefore, attempts to raise awareness of the scheme among students may drive up a concern for food hygiene standards more generally and may be an area for further local interventions.

(7) Cost of Living Crisis

The impact of the cost of living crisis on food-related behaviours among students at UWE reflects a complex interplay between economic factors and food safety considerations. The most prevalent response was the reduction in the amount of food purchased, as noted by 51% of respondents. While this change doesn't directly implicate food hygiene concerns, it raises broader concerns for the nutritional adequacy of individuals' diets. Reduced food intake can potentially lead to inadequate nutrition, impacting individuals' overall health and wellbeing.

A significant number of students (37%) reported switching to cheaper alternatives when purchasing food. Similarly, 34% noted eating at restaurants and takeaways less frequently, while 31% compromised on food quality. Reflecting trends

observed in the national student survey (FSA, 2019), these shifts are likely to be consequences of economic considerations.

Furthermore, behaviours which pose a more tangible risk for food hygiene were less common among respondents: Only a small proportion reported keeping leftovers for longer (14%), consuming food past their use-by date more often (9%) or cooking food for less time than package instructions recommend (6%). These low figures reflect that most student responses to the cost of living crisis do not risk food hygiene standards in domestic settings.

Surprisingly, there was no significant difference in responses to the cost of living crisis based on whether individuals were responsible for paying energy bills or not. This finding contradicted an initial hypothesis in the literature review, which considered the possibility that financial responsibility for energy bills might have led to targeted efforts to reduce energy costs, potentially affecting food relating behaviours to a greater extent. However, the data does not support this hypothesis, indicating that the impact of the cost of living crisis upon food-related behaviours is not aggravated by personal responsibility for energy bills.

4.2. RQ Two: Determinants of Practice

The second research question sought to examine whether any factors could be identified which could be seen as impeding or facilitating determinants influencing food hygiene standards across students at UWE. In this section, gender, ethnicity and international status will be explored as potential determinants with the latter two being explored in one section owing to their close statistical associations.

(1) Gender

The only statistically significant difference that arose from analyses examining correlations between gender and survey responses were that women were markedly more likely to always follow ‘use within’ label instructions for cooked meat, smoked fish and cheese. The foods considered exceptions to this were raw meat and milk, both of which retained significant gender differences but males displayed a higher level of adherence compared to other food types, and bagged salads, for which female adherence dropped significantly to 31% down from an average of 61% across all six food types queried.

While this disparity was not recorded by the FSA surveys for either adults or students, it fits a broader identified trend of women displaying more caution regarding food safety. While not statistically significant results, each of the findings highlighted by the FSA (2019) were reproduced by this survey including higher levels of handwashing after cooking and preparing food and before eating food, cleaner cross-contamination practices including using different chopping boards between preparing raw meat and other foods, and a greater reluctance to eat undercooked meats with the exception of beef burgers and pork chops. This adds weight to the notion that gender differences identified by the FSA (2019) at an adult-level can broadly be expected to be replicated down to the student level. Gender identity can therefore be seen as a determining factor influencing food hygiene standards in these areas.

(2) Ethnicity and International Status

Replicated FSA Findings: Washing Chicken and Use-by Dates:

When examining findings between ethnic groups and international status against the backdrop of the FSA findings on adults, some intriguing trends emerge: The

practice of washing chicken and other meats is strongly replicated in this study with an incredibly low likelihood that these results have emerged by chance (0.2% for washing chicken and 3.4% for washing other meats). While there is a significant association between these practices and international status, the notably lower p-values for ethnicity indicate that this is likely to arise from close associations between ethnic group and international status itself.

This reaffirms the impact culture can have upon food hygiene practices: Findings from the FSA (2015) highlight the role generational knowledge can have on domestic food practices, both positive and negative. These are reaffirmed in this study's findings as these practices have been inherited by students living independently from their families from which they have adopted these practices.

Attempts to confirm the other crucial finding from the FSA (2015) among students have also been replicated, albeit to a weaker extent: Those from Asian and Black ethnic groups are more likely to have eaten food past its use by date in the past month with the exception of bagged salads and cheese. However, when asked whether individuals check use-by dates before cooking or preparing food, the majority of those from each ethnic group were recorded as responding 'Always' or 'Most of the time' with no significant differences between each.

Social desirability bias cannot be ruled out in explaining this disparity: While the latter question is more open-ended, focused on internal attitudes and exposed to flexibility, the former question has a binary nature which reflects historical events. It may be the case that those from Asian and Black ethnic groups responded to the former question in a way that they perceived as more socially acceptable. Alternatively, it may simply reflect different attitudes in checking use-by dates in comparison to adhering to them, in that all ethnic groups may check use-by dates to a similar extent but those from White groups may adhere to them more strictly.

Regardless of the explanation, in regard to food hygiene and risk, those from White ethnic backgrounds are less likely to consume food beyond their use-by date at which point consumption entails a risk. This appears to reflect an attitude established by the FSA (2015) focus groups highlighting a strong avoidance of food wastage among those from non-White groups. Such culturally embedded attitudes would inevitably lead to greater lenience toward consuming food past their use-by dates. While not a statistically significant finding, evidence for this attitude in practice is further found in those from non-White backgrounds being more willing to reheat leftovers more than once (45.5%, compared to 25% for those from White backgrounds).

A critical exception to this finding that non-White groups are more likely to consume food beyond their use-by dates emerge in regard to cheese and bagged salads, both of which those from White backgrounds demonstrate much more lenient attitudes in adherence. This is further supported by figure X, demonstrating those from White ethnic backgrounds are much less likely to always follow use within label instructions for both food types. Therefore, it can be said that adherence to use-by dates ultimately vary between food types with different ethnic groups demonstrating different levels of caution and lenience depending on the food.

Furthermore, it is important not to overlook the impact of education and independent living experiences on food hygiene practices among students. University is a crucial transition period toward independent living during which students are exposed to various educational materials and public health campaigns alongside interactions with peers from different ethnic groups. The process of adapting to a new environment may lead to shifts in attitudes and perspectives. Without further research specifically focused on tracking changes

throughout the university period, the extent to which culturally embedded food hygiene practices change remains to be seen.

New Trends associated with Ethnicity:

In addition to the findings of the FSA being reproduced to an extent, several new trends can be observed from the survey's findings. Deep cleaning was conducted by those from non-White ethnic backgrounds to a much greater extent than White individuals. While not picked up in the FSA's adults survey (2019), attitudes toward cleanliness among non-White groups emerged in their minorities study (FSA, 2015), where cleanliness in the kitchen was not only seen as important for safety, but an 'expression of love' (FSA, 2015) with shame being associated with unclean cooking practices.

While this underlying attitude may in part have resulted in unhygienic practices including the washing of meat, it also can be understood to have resulted in higher standards of general cleanliness. This is supported further by the higher proportion of Black and Asian respondents in this survey who conduct a light clean, albeit a statistically significant difference between White groups is not observed.

Furthermore, individuals from White backgrounds and national students were found to use different chopping boards for raw meat and other foods to a much greater extent than their demographic counterparts. While the low proportion of students from non-White backgrounds and international students may be cause for concern, notable proportions of such groups wash the chopping board with soap and hot water between uses which is also seen as an acceptable hygiene practice to prevent cross-contamination (FSA, 2019).

However, a significant proportion from Asian backgrounds (42%) are observed to adopt unhygienic practices regarding chopping boards, including rinsing it with water and not soap (14%), turning the chopping board over (14%) and using the same board for raw meat and other food without washing (14%). In comparison, only 11% of those from Black backgrounds and 0% of those from White backgrounds adopt any unhygienic chopping board practices. Similarly risky practices are adopted by international students (38%) to a greater extent than national students (15%).

This raises significant concern among sub-groups of UWE students, notably those from Asian communities and international students. Without further research, it is difficult to determine which of these groups are the driving factor in determining these practices. Nonetheless, education initiatives and campaigns could be used to highlight the importance of avoiding cross-contamination across campus, with signage put up in kitchen halls to clarify good and bad practices.

Additionally, verification techniques used to check if food is ready to eat demonstrate significant disparities between ethnic groups: Broadly, individuals from White backgrounds are more likely to employ a broader range of techniques and more reliable techniques, while those from non-White backgrounds rely on such techniques to a weaker extent. These findings highlight significant risks for UWE students from non-White backgrounds as significant proportions do not ensure food is bubbling (91%), ensure food is steaming (70%) or ensure the middle is hot (56.5%).

Additionally, individuals from non-White backgrounds rely on tasting to a much greater extent than those from White backgrounds (39% compared with 25%), a technique noted by the FSA as unreliable (FSA, 2019). This underscores the importance for tailored intervention strategies to highlight the need to ensure food

is adequately cooked, what adequate temperatures are and methods to use to ensure it has been done so.

The final trend among ethnic groups identified includes the observation that those from White ethnic backgrounds are more willing to consume red meat when it is pink or has pink/red juices. While not significant in regard to hygiene standards given red meat can be consumed with pink juices as long as it has been adequately cooked and sealed on the outside, this observation reflects cultural differences between ethnic groups. This cultural variation highlights the importance of considering cultural contexts and beliefs when examining food behaviours and preferences including the need for culturally sensitive approach to food safety education.

New Trends associated with International Status:

Despite close associations with ethnic groups, several trends have been identified to a greater extent with international status than ethnicity. One such trend includes reheating food, with 61% of internationals willing to do so more than once. This may reflect several truths: It could reflect cultural differences pertaining to different local and national identities or it may reflect inadequate food hygiene knowledge. It may be expected that international students engage in cultural exchange and adaptation, leading to amended practices over time. Without further research, limited conclusions can be made other than the importance of strong and clear food hygiene campaigns targeted at international students.

Similar concerns arise when examining the proportion of international students who are able to identify the role of use-by dates, with only 25% of international students correctly associating it as an indicator of food safety. This is likely to be

reflective of a lack of familiarity with local food labelling rules: While use-by dates are regularly used throughout the UK, this is not the case in other countries which may use different terminology. Such misunderstandings are fairly easy to improve through simple campaign and education initiatives. However, this will only be effective if international students readily check use-by dates. Given 86% of international students say they do so ‘always’ or ‘most of the time’, such an intervention would likely be successful.

(3) Limitations

The study presented has several limitations which warrant critical consideration when interpreting its findings.

One of the most notable limitations is its relatively small sample size, consisting of only 35 eligible respondents. This limitation severely impacts the study’s statistical power, reducing its ability to detect meaningful differences and conclude statistically significant results. A lack of statistical power can often result in type 2 errors, where legitimate associations in reality are missed in the study. However, to broaden the confidence intervals to consider associations when P-values exceed 0.05 would open conclusions up to the risk of type 1 errors. Therefore, the 0.05 threshold was retained and only statistically significant differenced analysed to ensure such errors did not emerge.

Secondly, the study aimed to reflect the demographics of the UWE population, but inherent biases in selection were observed. Certain demographic groups, such as those deriving from Black and Asian backgrounds, international students and postgraduate students, were over-represented in this sample when compared to the population at large. This overrepresentation can influence conclusions made in the first research question regarding the hygiene standards

of UWE overall. Where applicable, clarification notes have been included in the discussion to highlight where significant disparities exist between particular respondent characteristic groups to the extent that conclusions inferred to the population as a whole ought be treated with a significant level of caution.

Thirdly, the majority of students were recruited through a random sampling procedure focused on the group-work floor of the campus library alongside, to a lesser extent, the canteen. Smaller numbers were invited through word of mouth and group chats. While these recruitment methods were practical, they may have attracted specific types of students who frequent these locations which may not be an accurate reflection of UWE students more broadly. However, according to the data collected, the sample of students comprised a broad mix of different subjects and faculties, providing confidence that subject-based biases were not present. Additionally, random selection was employed avoiding risks associated with self-selection bias where those with a particular interest or passion for food hygiene would have been more likely to respond.

Fourthly, while some questions of the study asked about current attitudes, perspectives and knowledge toward food hygiene topics, many probed about historical events including whether students had consumed food past its use-by date within the past month. This introduces the chance of recall bias, particularly for daily routine behaviours which are regular and indistinctive. This can lead to inaccuracies in responses. Where possible ‘don’t know’ have been included in responses in order to allow respondents the opportunity to omit answers they are uncertain about, helping the alleviate this bias to an extent.

Lastly, due to the small sample size, some groupings including ethnicity and international status produced the risk of identifying a confounding determinant rather than the genuine cause of positive or negative food hygiene associations in the second research question. Attempts were made to disentangle these

factors using statistical techniques, including binary and multinomial logistic regression. However, in some cases, both factors remained statistically significant making it challenging to determined which is the driving factor behind observed trends. However, given many culturally rooted topics can be inherently associated with both ethnicity and international status, clarifying which of the two factors drive these causes may be outside the scope and role of a cross-sectional quantitative study, instead requiring a more detailed qualitative study to pick these apart.

Therefore, while this study provides valuable insights into certain trends and behaviours, several limitations may necessitate caution when generalising the findings to a larger and more diverse student population. Future research with larger and more representative samples is welcomed to enhance the validity and robustness of the results.

5. CONCLUSION

This dissertation has sought to shed light on the food hygiene knowledge and practices of students at the University of the West of England (UWE) as well as to identify determining factors influencing food hygiene standards. Though an empirical investigation encompassing survey responses and statistical analyses, valuable insights into these questions have been uncovered.

Cleanliness standards were encouraging with handwashing taking place at frequencies greater than the national adult and student surveys complimented with positive techniques. However, issues relating to tea towels not being replaced and sinks being filled with dirty dishes, pots and pans indicate areas for targeted intervention.

Cooking standards highlighted significant concerns, particularly in the verification of food readiness. Students at UWE lag behind national survey respondents in this regard while a notable divide between White and non-White students has been observed. Reheating habits and a willingness to consume undercooked meat are also issues of concern despite some outperformance in comparison to national surveys.

Chilling practices exposed inadequate defrosting techniques with many students opting for room temperature or water-based methods, indicating a more significant problem compared to national surveys.

Cross-contamination risks are evident, particularly concerning chopping board practices. Washing meat, while a concern, may be influenced by cultural and ethnic differences requiring cultural sensitivity in addressing.

Food fitness assessments presented a mixed picture with low reliance on use-by dates for assessing food safety but better performance compared to adults

nationally. Poor understanding of the role of use-by dates and a significant proportion consuming food paste their use-by dates on a regular basis are noteworthy issues. Compliance with ‘use-within’ instructions is suboptimal but again suggested better standards than national surveys. While there are areas of improvement, UWE students fare relatively well in this regard.

Information sources of UWE students reflect a trend toward internet reliance for information, which may necessitate educational efforts to discern reliable sources. While a low awareness of the Food Hygiene Rating Scheme raises concerns, these do not directly hinder domestic food hygiene practices.

The cost of living has an observable, but predictable impact on various food-related behaviours, with broadly comparable trends seen in the national students survey replicated in this survey. While findings have not uncovered notable issues relating to food hygiene, it raises some concern over nutritional quality and intake.

Three primary determinants of practice were identified:

Gender differences were broad and consistent, spanning several topics which demonstrates a more cautious approach to food safety, including handwashing, cleaner cross-contamination practices and a greater reluctance to eat undercooked meats. However, statistically significant findings were limited to women appearing to demonstrate greater adherence to use within label instructions for cooked meat, smoked fish and cheese.

Ethnicity and international status both appeared to be statistically significant determinants of food hygiene practices. Those from white ethnic backgrounds were found to be less likely to wash chicken and other meats, less likely to have eaten cooked meat, raw meat, milk and yoghurt past their use-by dates in the past month, less likely to conduct deep cleaning on a weekly basis, more likely to

use a broader and more reliable range of verification techniques to ensure food had been adequately cooked and more willing to consume red meat when it is still pink. Specifically, those from Asian backgrounds and those considered international students were observed to adopt unhygienic practices regarding chopping boards. International students were more willing to reheat food more than once and less likely to identify the role of use-by dates.

Primary limitations included the small sample size, overrepresentation of Black, Asian, International and Postgraduate students, the risk of recruitment bias in finding survey respondents, the risk of recall bias and difficulties differentiating confounding factors, particularly in the case of ethnicity and international status.

The insights garnered from this study exist to serve several purposes. Firstly, they can be instrumental in guiding and informing targeted interventions and campaign measures specifically tailored to address the identified areas of concern among UWE students. Secondly, this research contributes to the broader body of literature on student hygiene standards more nationally and the driving forces behind them, shedding light on the unique challenges faced by the student population. As UWE and other institutions strive to enhance the wellbeing and safety of their student communities, this study offers valuable guidance for addressing food hygiene issues effectively.

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7. APPENDICES

(1) Ethical Approval Letter

University of the West of England
BRISTOL

Faculty of Health & Applied Sciences
Department of Health and Social Sciences
Frenchay Campus
Coldharbour Lane
Bristol BS16 0QY

Date

RE: MSc Environmental Health

Title of Project:

Thank you for submitting your ethics application. As your project was considered to be low risk, your application has been reviewed, by myself, as your supervisor and has been granted ethical approval to proceed.

Please note that any information sheets and consent forms must include the UWE logo. Further guidance is available on the UWE website at:
http://www1.uwe.ac.uk/aboutus/departmentsandservices/professionalservices/marketingandcommunications/resources.aspx

The following conditions apply to all research given ethical approval by UWE:

1. You must notify your supervisor if you wish to make significant amendments to the original application: these include changes to the study protocol which have an ethical dimension.
2. You must notify your supervisor if there are any serious events or developments in the research that have an ethical dimension.

The University is required to monitor and audit the ethical conduct of research conducted by academic staff, students and researchers. Your project may therefore be selected for audit by the University Research Ethics Committee.

Best wishes

Supervisor
Dissertation Module (UZVRTM-45-M)

(2) RISK ASSESSMENT

University of the West of England

GENERAL RISK ASSESSMENT FORM

Ref:

Describe the activity being assessed: Research conducted in completion of a dissertation for an Environmental Health (MSc) degree.	**Assessed by:** Benjamin Lansdowne
Who might be harmed: No group has been identified as being at risk of harm.	**Date of Assessment:** 26th January 2023
How many exposed to risk: N/A	**Review date(s):**

Endorsed by:

Hazards Identified (*state the potential harm*)	Existing Control Measures	S	L	Risk Level	Additional Control Measures	S	L	Risk Level	By whom and by when	Date completed
No tangible risks were identified due to the survey being wholly anonymous and no identifiable information being sought from students.										

RISK MATRIX: (To generate the risk level).

Likelihood (L) → / Severity (S) →	Minor injury – No first aid treatment required 1	Minor injury – Requires First Aid Treatment 2	Injury - requires GP treatment or Hospital attendance 3	Major Injury 4	Fatality 5
Very likely 5	5	10	15	20	25
Likely 4	4	8	12	16	20
Possible 3	3	6	9	12	15
Unlikely 2	2	4	6	8	10
Extremely unlikely 1	1	2	3	4	5

(3) SURVEY

Food Safety Practices among students at UWE

Start of Block: Introduction & Consent

Welcome & Consent

Welcome

You are invited to take part in an online questionnaire forming part of a masters' dissertation project. Before you decide whether to take part, please read the following information and if you have any queries, please contact Benjamin Lansdowne at benjamin2.lansdowne@live.uwe.ac.uk.

Participant Information

This questionnaire forms part of a research project aiming to assess the food hygiene knowledge, attitudes and practices of students studying at the University of the West of England (UWE) and to identify facilitating and impeding factors which determine good practice. The results of our study will be analysed for the purposes of this research.

All the information we receive from you will be anonymised, meaning any information that could be used to identify you will be removed. All information will be privately secured and kept safe. You do not have to take part in this research. If you do take part, you are able to withdraw your results from the survey without giving a reason, up until the point that the data is anonymised. If you want to withdraw consent prior to this point, please contact Benjamin Lansdowne at the email address provided above.

The survey should take 15-20 minutes to complete. You can complete the survey on a desktop, laptop, smartphone or tablet.

Consent If you are happy to take part in this research project, please affirm the following statements by ticking the checkbox below. I have read and understood the information provided to participants above. I agree that my personal information will be analysed and inform the dissertation research. I understand that my

participation is voluntary and that I am free to withdraw at any time until the data has been anonymised, without giving a reason.

- ○ I agree and wish to participate

End of Block: Introduction & Consent

Start of Block: Qualification Questions

QA
Thank you for agreeing to take part in this survey. We will ask you a series of questions about yourself and your knowledge and behaviours regarding food hygiene at home. As this research focuses on the experiences of students at university, please consider your term-time residence when completing the survey. This does not have to be student-owned accommodation. If you are unsure of how you would respond to a question, please select the closest answer.

In order to confirm your eligibility, please answer the following two questions. If you are not eligible, you will be directed to the end of the survey.

Are you / were you an undergraduate or postgraduate student at the University of West England (UWE) during the 2022-23 academic year?

- ○ Undergraduate
- ○ Postgraduate
- ○ I was not a student at UWE

QB
Do you / did you have access to a kitchen or food preparation area in your term-time

accommodation during the 2022-23 academic year?

- ○ Yes
- ○ No

End of Block: Qualification Questions

Start of Block: Demographics

Q1
Thank you for your answers. You appear eligible for the survey. We would like to start by asking a few questions about you.

Which of the following describes how you think of yourself?

- ○ Male
- ○ Female
- ○ Non-binary / Other
  _____
- ○ Prefer not to say

Q2 Which one of the following best describes your ethnic group or background?

- ○ Arab
- ○ Asian
- ○ Black
- ○ Hispanic or Latino
- ○ White / Caucasion
- ○ Multiple Ethnic Groups / Other (please specify)

_____

- ○ Prefer not to say

Q3 What subject do you study?

_____

Q4 Are you a national or international student?

- ○ National Student
- ○ International Student (including EU)
- ○ Prefer not to say

Q5 What type of housing do you usually live in during term-time?

- ○ Halls of residence without catering
- ○ Halls of residence with catering provided
- ○ Private rental (this includes renting an HMO, house, flat or lodging)
- ○ Own property
- ○ At parental/guardian home
- ○ Other (please specify)

_____

Q6
Do you consider yourself to be any of the following?
Hover over the answers for more information.

- ○ Vegetarian
- ○ Pescatarian
- ○ Vegan
- ○ Flexitarian
- ○ Omnivore
- ○ Other (please specify)

_____

Q7 Do you suffer from any allergies or intolerances after consuming certain foods? If yes, please specify the type of problem(s) and the food(s) associated.

More Info function myFunction() {alert("This may include symptoms such as difficulty

breathing and swallowing, skin rashes, itching and swelling on the face or in the mouth, nausea, vomiting, abdominal pain, bloating or diarrhoea.");}

- ○ Yes (please specify)
  _____
- ○ No
- ○ Don't know
- ○ Prefer not to say

End of Block: Demographics

Start of Block: Food Hygiene: Kitchen Facilities

Q8
Thank you for your responses. For the remainder of the survey, we will ask you some questions about your knowledge and practices regarding food hygiene at home. Remember to answer these questions with your current or latest term-time residence in mind.

How many people in total (including yourself) use your kitchen area?

- ○ Only me
- ○ Two
- ○ Three to Four
- ○ Five to Six
- ○ Seven to Eight
- ○ Nine or more

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Q9 In your kitchen area, do you tend to agree or disagree that there is enough space for the following activities?

	Agree	Neither agree nor disagree	Disagree
Food preparation	○	○	○
Food storage	○	○	○
Eating food	○	○	○
Cooking or defrosting food	○	○	○

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Q10 Typically, where in the fridge do you store your food? Select all that apply.

- ☐ On an allocated shelf
- ☐ In an allocated drawer
- ☐ In the door of the fridge
- ☐ ⊗ Wherever there is space
- ☐ ⊗ I store different types of food in specific areas of the fridge (please specify) _____
- ☐ Other (please specify) _____

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Q11 Do you ever do any of the following activities in your bedroom or a non-kitchen area?

- ☐ Store non-perishable food (for example, pasta)
- ☐ Store food at room temperature which should be kept in a fridge (for example, milk, yoghurt)
- ☐ Store food at room temperature which should be frozen
- ☐ Store clean cutlery, crockery, pots or pans
- ☐ Store dirty cutlery, crockery or pans
- ☐ Cook food
- ☐ Eat food
- ☐ Prepare food
- ☐ Defrost or cool food
- ☐ Wash dirty cutlery, crockery or pans
- ☐ ⊗ None of the above

End of Block: Food Hygiene: Kitchen Facilities

Start of Block: Food Hygiene: Cleaning

Q12 How often are the following cleaning activities carried out?

	Most days	2-3 times per week	Once per week	2-3 times per month	Once per month	Less than once per month	Never
Light cleaning (e.g. surfaces wiped down)	○	○	○	○	○	○	○
Deep cleaning (e.g. floors mopped, microwave and fridge cleaned)	○	○	○	○	○	○	○
Replacing tea towels	○	○	○	○	○	○	○

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Q13 How often, if at all, do you experience the following issues with your kitchen sink?

	Most days	2-3 times per week	Once per week	2-3 times per month	Once per month	Less than once per month	Never	Don't know/other
Sink filled with dirty dishes, pots or pans	○	○	○	○	○	○	○	○
Old food left in sink or sink trap	○	○	○	○	○	○	○	○
Sink is dirty, grimy or greasy	○	○	○	○	○	○	○	○

End of Block: Food Hygiene: Cleaning

Start of Block: Food Hygiene: Preparation

Q14 Do you ever cook a meal from scratch? For example, using unprocessed ingredients without the use of ready-made sauces, spice mixes or processed meat?

○ Yes

○ No

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Q15 Typically, how do you use chopping boards when preparing a meal with raw meat or fish? Please select all that apply.

- ☐ I use a different chopping board for raw meat/fish and other food
- ☐ I wash the chopping board with soap and hot water between preparing raw meat/fish and other food
- ☐ I rinse the chopping board with water (not soap) between preparing raw meat/fish and other food
- ☐ I turn the chopping board over between preparing raw meat/fish and other food
- ☐ I use the same chopping board for preparing raw meat/fish and other food (without washing the board)
- ☐ I don't use chopping boards
- ☐ ⊗ I don't cook with raw meat/fish
- ☐ Other (please specify) _____

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Q16 How often, if at all, do you do the following when preparing to cook a meal from scratch?

	Always	Most of the time	About half the time	Occasionally	Never	Don't Know	I don't cook this type of meat/fish
Wash raw Chicken	○	○	○	○	○	○	○
Wash raw Lamb, Beef or Pork	○	○	○	○	○	○	○
Wash raw Fish and Seafood	○	○	○	○	○	○	○

End of Block: Food Hygiene: Preparation

Start of Block: Food Hygiene: Cooking

Q17 When cooking or reheating food, how do you know when it is ready to eat? Please select all that apply.

- ☐ I can see steam coming from it
- ☐ I taste it
- ☐ I check the middle is hot
- ☐ I check it's an even temperature throughout
- ☐ I put my hand over it/touch it
- ☐ I use a thermometer/probe
- ☐ I use a timer to ensure it has been cooked for a certain amount of time
- ☐ I can see it's bubbling
- ☐ I follow the instructions on the label
- ☐ Other (please specify) _____
- ☐ ⊗ I don't check
- ☐ ⊗ I don't cook or reheat food

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Q18 How many times would you consider reheating food after it was cooked for the first time?

- ○ Not at all
- ○ Once
- ○ Twice
- ○ More than twice
- ○ Depends on the food type
- ○ Don't know

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Q19 How often, if at all, do you do the following?

	Always	Most of the time	About half the time	Occasionally	Never	I don't eat that type of meat	Don't know
Eat chicken or turkey when the meat is pink or has pink or red juices?	○	○	○	○	○	○	○
Eat red meat when it is pink or has pink or red juices?	○	○	○	○	○	○	○
Eat duck when it is pink or has pink or red juices?	○	○	○	○	○	○	○
Eat beef burgers when the meat is pink or has pink or red juices?	○	○	○	○	○	○	○
Eat sausages when the meat is pink or has pink or red juices?	○	○	○	○	○	○	○

Eat whole cuts of pork or pork chops when the meat is pink or has pink or red juices?	○	○	○	○	○	○	○

End of Block: Food Hygiene: Cooking

Start of Block: Food Hygiene: Defrosting

Q20 Typically, how do you defrost frozen meat or fish?

- ○ Place the meat or fish in water
- ○ Leave the meat or fish at room temperature (e.g. on the worktop on a plate)
- ○ Place the meat or fish in the fridge
- ○ Defrost the meat or fish in the microwave oven
- ○ Other (please specify)
  _____
- ○ I never defrost meat or fish
- ○ Don’t know

End of Block: Food Hygiene: Defrosting

Start of Block: Food Hygiene: Leftovers

Q21 Generally, what do you do with any leftovers following a meal? Please select all that apply.

- ☐ I throw them away in the bin/food waste bin
- ☐ I leave them at room temperature and eat them later the same day
- ☐ I leave them at room temperature and eat them the next day
- ☐ I put them in the fridge
- ☐ I put them in the freezer
- ☐ Other (please specify) _____
- ☐ ⊗ I never have or keep leftovers

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Q22 Typically, how soon after cooking do you put any leftovers in the fridge or freezer?

- ○ Straight away
- ○ Within 1 hour of cooking
- ○ 1-2 hours after cooking
- ○ 2-4 hours after cooking
- ○ More than 4 hours after cooking
- ○ Don’t know

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Q23 When is the latest you would consume any leftovers stored in the fridge?

- ○ The same day
- ○ Within 1-2 days
- ○ Within 3-5 days
- ○ More than 5 days later
- ○ It varies (please specify)
  _____
- ○ Don’t know

End of Block: Food Hygiene: Leftovers

Start of Block: Food Hygiene: Use-by dates

Q24 Which of these shows when food is no longer safe to eat? Please select all that apply.

- ☐ Use by date
- ☐ Best before date
- ☐ Sell by date
- ☐ Display until date
- ☐ ⊗ It depends (please specify)
  _____
- ☐ ⊗ None of these
- ☐ ⊗ Don't know

Page Break

Q25 How often, if at all, do you check use by dates when you are about to cook or prepare food?

- ○ Always
- ○ Most of the time
- ○ About half the time
- ○ Occasionally
- ○ Never
- ○ It depends on the food type
- ○ Don’t know

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Q26 In the last month, have you eaten any of the following foods that have gone past its use-by date?

	Yes, at least once	No, not in the past month	I never have	Don't know / can't remember	I don't eat this type of food
Cooked Meats	○	○	○	○	○
Raw meats (for example, chicken, mince)	○	○	○	○	○
Smoked Fish	○	○	○	○	○
Bagged salads	○	○	○	○	○
Cheese	○	○	○	○	○
Milk	○	○	○	○	○
Tofu or meat substitutes (including Quorn, Beyond Burger etc.)	○	○	○	○	○
Plant-based milk alternatives (including soy milk, oat milk, almost milk etc.)	○	○	○	○	○

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Q27
Some foods have an instruction to eat the food within a few days of opening on the label (e.g., “consume within 3 days of opening”).

How often, if at all, do you follow instructions on food packaging which tells you how long food should be stored once opened? Please select one answer for each food.

	Always	Most of the time	About half the time	Occasionally	Never	Don't know	I don't eat this type of food
Cooked meats	○	○	○	○	○	○	○
Raw meats (for example, chicken, mince)	○	○	○	○	○	○	○
Smoked Fish	○	○	○	○	○	○	○
Bagged salads	○	○	○	○	○	○	○
Cheese	○	○	○	○	○	○	○
Milk	○	○	○	○	○	○	○
Tofu or meat substitutes (including Quorn, Beyond Burger etc.)	○	○	○	○	○	○	○
Plant-based milk alternatives (including soy milk, oat milk, almost milk etc.)	○	○	○	○	○	○	○

End of Block: Food Hygiene: Use-by dates

Start of Block: Food Hygiene: Raw Meat Storage

Q28 How, if at all, do you store raw meat and poultry in the fridge? Please select all that apply.

- ☐ Away from cooked foods
- ☐ Covered with cling film / foil
- ☐ In a sealed container
- ☐ In its original packaging
- ☐ On a plate
- ☐ ⊗ I don’t buy or store meat or poultry
- ☐ ⊗ I don’t store raw meat/poultry in the fridge
- ☐ ⊗ I don’t have a fridge

End of Block: Food Hygiene: Raw Meat Storage

Start of Block: Food Hygiene: Food Fitness

Q29 Before eating or cooking, how do you tell whether it is safe to eat or cook with the following food types? Please select all that apply.

	How it looks	How it smells	How it tastes	Use by date	Following the instructions on the packaging (e.g. eat within 3 days of opening)	I don't eat / cook this type of food
Raw meat including beef, lamb, pork or poultry	☐	☐	☐	☐	☐	☐
Raw Fish	☐	☐	☐	☐	☐	☐
Milk and Yoghurt	☐	☐	☐	☐	☐	☐
Cheese	☐	☐	☐	☐	☐	☐
Eggs	☐	☐	☐	☐	☐	☐

End of Block: Food Hygiene: Food Fitness

Start of Block: Food Hygiene: Personal Cleanliness

Q30 When you are at your term-time residence how often, if at all, do you…

	Always	Most of the time	About half the time	Occasionally	Never
Wash your hands before starting to prepare or cook food?	○	○	○	○	○
Wash your hands immediately after handling raw meat, poultry or fish?	○	○	○	○	○
Wash your hands before eating?	○	○	○	○	○
Wash your hands immediately after handling frozen chicken products (such as chicken nuggets, goujons, burgers, kievs etc.)?	○	○	○	○	○

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Q31 When you are at your term-time residence, how do you usually wash your hands?

- ○ With water only
- ○ With soap/handwash and warm water
- ○ With soap/handwash and cold water
- ○ With hand sanitising wipes or gel
- ○ It depends on what I am doing
- ○ I never wash my hands
- ○ Other (please specify)

_____

End of Block: Food Hygiene: Personal Cleanliness

Start of Block: Food Hygiene: Other

Q32 If you needed information about how to prepare and cook food safely (i.e. to prevent you getting ill), where would you go for information? Please select all that

apply.

- ☐ Family and friends
- ☐ TV or radio programmes
- ☐ Food Standards Agency website
- ☐ Recipes – in books, magazines or online
- ☐ Internet search engine
- ☐ Social media
- ☐ Product packaging
- ☐ From a food hygiene / safety course or training previously attended
- ☐ Chat GPT or another AI chat bot
- ☐ Other (please specify) _____

- ☐ ⊗ I don’t need information on food safety
- ☐ ⊗ I don’t cook or prepare food
- ☐ ⊗ Don’t know

End of Block: Food Hygiene: Other

Start of Block: Food Hygiene Schemes

Q33 Have you heard of the Food Hygiene Rating Scheme?

- ○ Yes, I've heard of it and know a bit about it
- ○ Yes, I've heard of it but don't know much about it
- ○ Yes, I've heard of it but don't know anything about it
- ○ No, I've never heard of it

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Q34 In the last 12 months, have you checked the hygiene rating of a food business?

- ○ Yes
- ○ No
- ○ Don't know / Can't remember

End of Block: Food Hygiene Schemes

Start of Block: Cost of Living

Q35 How has the recent cost of living crisis affected your food purchasing and handling practices, if at all? Please select all that apply.

- ☐ ⊗ It has not impacted on my food purchasing and handling practices
- ☐ I have reduced the amount of food I buy
- ☐ I have compromised on the quality of food
- ☐ I have eaten fewer takeaways / eaten out less
- ☐ I have changed where I buy food for cheaper alternatives
- ☐ I have changed the food I buy to cheaper alternatives
- ☐ I have kept leftovers for longer before eating
- ☐ I have eaten food past it's use by date more often
- ☐ I have bought reduced food close to its use by date more often
- ☐ I have chosen meals which require less cooking to reduce energy costs
- ☐ I have chosen meals which involve cheaper forms of cooking (such as the microwave rather than an oven)
- ☐ I have cooked food for less time than instructed by the packaging in order to reduce energy costs
- ☐ I have set the temperature of the oven lower than package instructions to reduce energy costs
- ☐ Other (please specify) _____

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Q36 Are you responsible for paying the energy bills at your residence?

- ○ Yes
- ○ No, it is covered by my landlord / university accommodation provider
- ○ Don't know

End of Block: Cost of Living