Knowledge of Antimicrobial Resistance (AMR) amongst Food Handlers

Maes o ddiddordeb ymchwil: Antimicrobial resistance
Cwblhau arfaethedig: 24 Tachwedd 2023
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Knowledge of AMR amongst food handlers: Executive Summary

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Background and methodology

- a commitment was made in the 2019-2024 UK wide AMR National Action Plan (NAP) to explore and track perceptions of antimicrobial resistance (AMR) bacteria in food, amongst food handlers
- Opinium were commissioned by the Food Standards Agency (FSA) to conduct quantitative research to understand awareness and knowledge of antimicrobial resistance (AMR) amongst food handlers in the United Kingdom (UK)
- a series of questions were run in a 5 minute online survey, broadly matching similar consumers surveys carried out in 2016, 2019 and 2021
- the sample comprised 500 UK workers who handle food, or touch surfaces likely to be in contact with food, who completed the survey between the 28th June and 8th July 2022.

Main findings

- over four in five (82%) UK food handlers had heard of the term antimicrobial resistance (AMR).
- when compared to consumers (as measured in other FSA sources) food handlers displayed greater levels of awareness of AMR, however consumers were significantly more knowledgeable when identifying correct sources of, and ways to protect against the spread of, AMR.

- food handlers more commonly identified meat, poultry and seafood as sources of AMR, over salad and fruits, and one in ten (10%) thought that no food types were potential sources of AMR.
- around three in ten (29%) food handlers incorrectly believed that washing chicken prior to cooking can protect against the spread of AMR.
- age and gender were both found to have an effect on levels of awareness and knowledge of AMR. Whilst men and younger respondents were more likely to report being aware of the term, women and older respondents displayed higher levels of knowledge, in terms of correctly categorising statements about AMR and when identifying correct sources of, and ways to protect against the spread of, AMR.

Knowledge of AMR amongst food handlers: Background and methodology

Background and objectives

Tackling antimicrobial resistance (AMR) is a national strategic priority for the UK Government which has led to the development of a 20-year Vision for AMR and the 5-year (2019-2024) AMR National Action Plan (NAP). The NAP lays out how the UK will address the AMR challenge and includes a specific section on the importance of better food safety to limit contamination of food and spread of AMR. This section emphasises the need to strengthen the evidence base for AMR and food safety through research, surveillance and promoting good practice across the food chain. The FSA is playing its part by continuing to fill evidence gaps on the role that food plays in AMR through the commissioning of research and surveillance.

The food safety section of the NAP (specifically 2.5.2) makes references to the UK promoting good hygienic practices across the food chain including a commitment to "assess and track the perceptions and understanding of food handlers and consumers about AMR bacteria in food and what can be done to protect people through food hygiene at home".

As consumer views have been addressed in previous FSA research, FSA commissioned a bespoke survey to explore food handlers awareness, perception and understanding of AMR.

Methodology

In Spring 2022, the FSA commissioned Opinium (who specialise in food industry insights and market research) to conduct quantitative research to understand UK food handlers' awareness and knowledge of AMR. A series of questions, broadly matching consumer surveys run in 2016, 2019 and 2021, were included in a 5 min online survey.

Utilising Opinium's panel of food service operators, a sample of 500 UK workers, who, as part of their job, handle food or touch surfaces likely to be in contact with food, took part in the survey between 28th June and 8th July 2022. The sample was made up of:

- 56% (282) males and 44% (218) females.
- 41% (205) aged 18-34, 44% (220) aged 35-54 and 15% (75) aged 55+.
- 92% (461) working in food businesses in England, (40% or 198 in London), 6% (30) in Scotland, and around 1% (3) in both Wales and Northern Ireland.

Respondents were grouped according to their primary job role as 'managerial' (36% - owner/proprietors, managers, catering managers, and kitchen managers) and 'kitchen staff' (chef,

kitchen manager, kitchen assistant, kitchen porter, kitchen staff). Over a third (36%, 180) of the sample work in managerial food service positions and over a quarter (27%, 135) as kitchen staff. Sub-group analysis is reported where notable.

The most common types of establishments worked in included restaurant / casual dining / pub (15%, 75), high street / food to go / quick service restaurants (14%, 70), education (14%, 70) and healthcare (12%, 60).

Full demographic breakdowns for the region, job role and establishment type can be found in annex B.

Limitations and reporting notes

It was not possible to reach a representative sample, given the lack of an adequate sampling frame. As such, those working in the hospitality and leisure industries were specifically targeted. Due to low base sizes, some demographic sub-group analysis were not possible, notably comparisons between those working in FBOs in England, Scotland, Wales and Northern Ireland.

It should be noted that levels of awareness and knowledge are self-reported and therefore subject to social desirability bias. Where appropriate, this report compares results to the most recent FSA AMR Consumer Research, conducted a year prior to the food handlers survey. It is likely that the food handlers cohort may be subject to stronger social desirability bias due to their occupation. This should be borne in mind when considering differences between the 2 groups.

The survey data is not weighted and unless stated otherwise, all reported differences are significant to the 95% level (meaning there is a less than 5% likelihood that the difference occurred by chance). Independent samples test of proportions was used to test differences within the food handlers sample, amongst independent groups (for example, male vs female), and between the food handlers sample and the 2021 consumers sample.

Knowledge of AMR amongst food handlers: Main findings

Awareness of terminology

Around a fifth of food handlers (18%, 89) surveyed, reported that they had not heard of ‘antimicrobial resistance’ (AMR). Most (82%, 411) were aware of the term, with 52%, (258) reporting that they knew at least a little about it, and over a quarter (27%, 137) stating that they knew a lot about AMR. A small proportion (3%, 16) reported having heard the term but knowing nothing about it. Previous research has shown much lower levels of awareness amongst consumers (for example, 26% in 2021).

Amongst food handlers, gender appears to be an influencing factor on awareness of AMR and men were significantly more likely than women to report having heard of AMR (91% vs 70%) and to report they know at least a little bit about it (72% vs 49%). Clear gender differences are not noted in the consumer research.

Age also appears to be an influencing factor on levels of AMR awareness amongst food handlers. Younger respondents were significantly more likely to have heard of AMR than older respondents. Around a half (55%) of 55+ year old’s had heard of the term, whilst over four in five (83%) 35-54 year olds and over nine in ten (92%) 18-34 year olds had also heard of AMR.

The influencing factor of age on awareness of AMR is also seen in consumer awareness research although to a lesser extent. Amongst consumers, younger respondents were more likely to have heard of AMR than older respondents, with around a third (32%) of 16-34 year old's having heard of the term, compared to a quarter (25%) of 35-54 year olds and 22% of 55+ year old's.

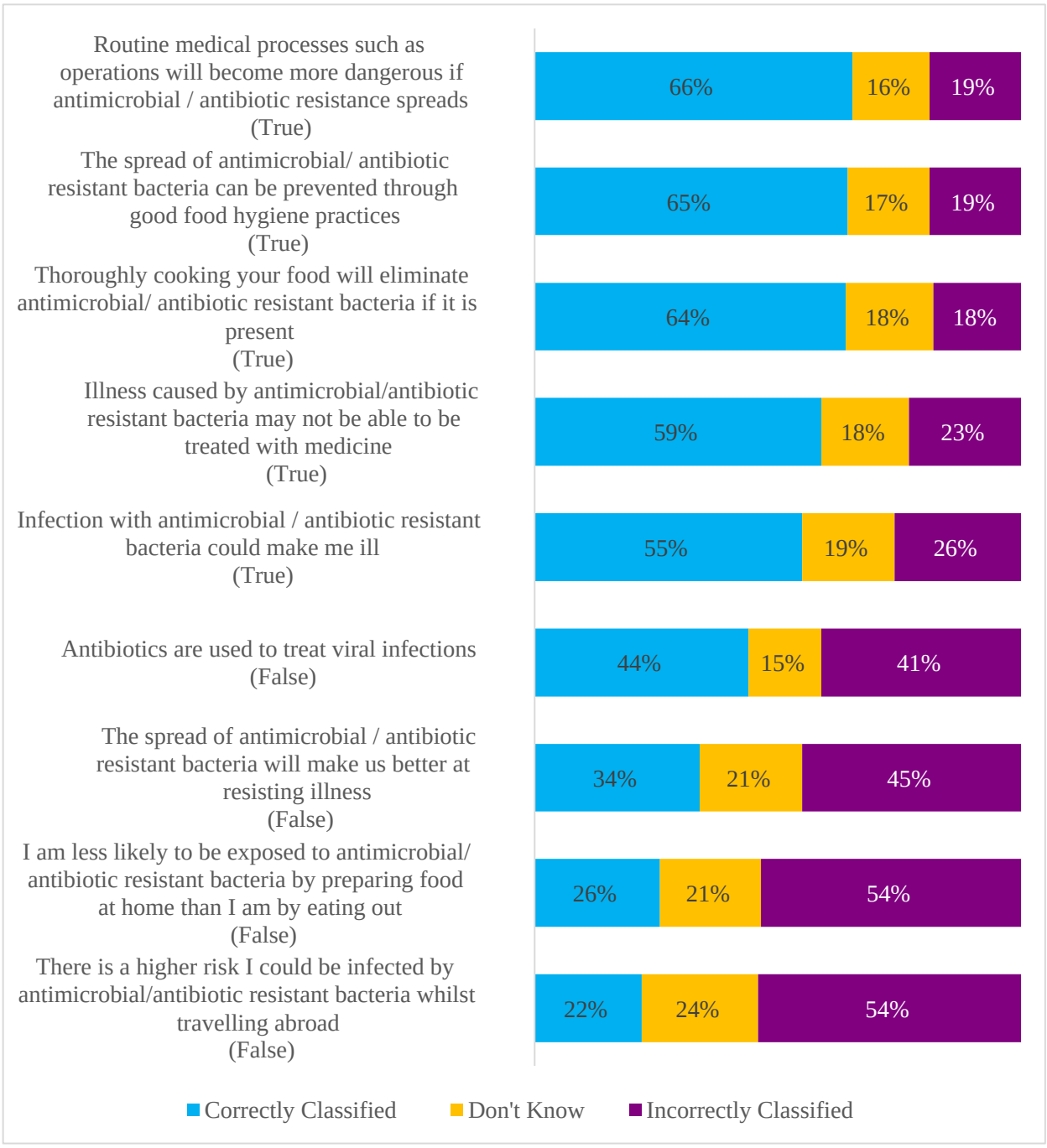
Knowledge of AMR

Respondents were shown a list of eight statements about AMR, and one statement about antibiotics, of which some were true and some false. Respondents were asked to state whether they thought these statements were true or false (Figure 1).

On average, almost half of the respondents (48%) correctly identified each statement as being either true or false. Those statements with the lowest amount of correct classification (with less than 50% of respondents correctly classifying), were:

- 'I am less likely to be exposed to antimicrobial/ antibiotic resistant bacteria by preparing food at home than I am by eating out' (26% correctly classifying as false, 54% incorrectly classifying as true)
- 'There is a higher risk I could be infected by antimicrobial/antibiotic resistant bacteria whilst travelling abroad' (22% correctly classifying as false, 54% incorrectly classifying as true)
- 'The spread of antimicrobial/antibiotic resistant bacteria will make us better at resisting illness' (34% correctly classifying as false, 45% incorrectly classifying as true)
- 'Antibiotics are used to treat viral infections' (44% correctly classifying as false, 41% incorrectly classifying as true)

Figure 1: Proportion of respondents classifying statements correctly, incorrectly or responding as 'don't know'



Age and gender appeared to have an impact on AMR knowledge, with women and older respondents classifying more statements correctly.

Respondents were more likely to correctly identify the true statements than the false statements. An average of three in five (62%) correctly classified the true statements (17% responded don't know) compared to 31% for false statements (20% responded don't know)

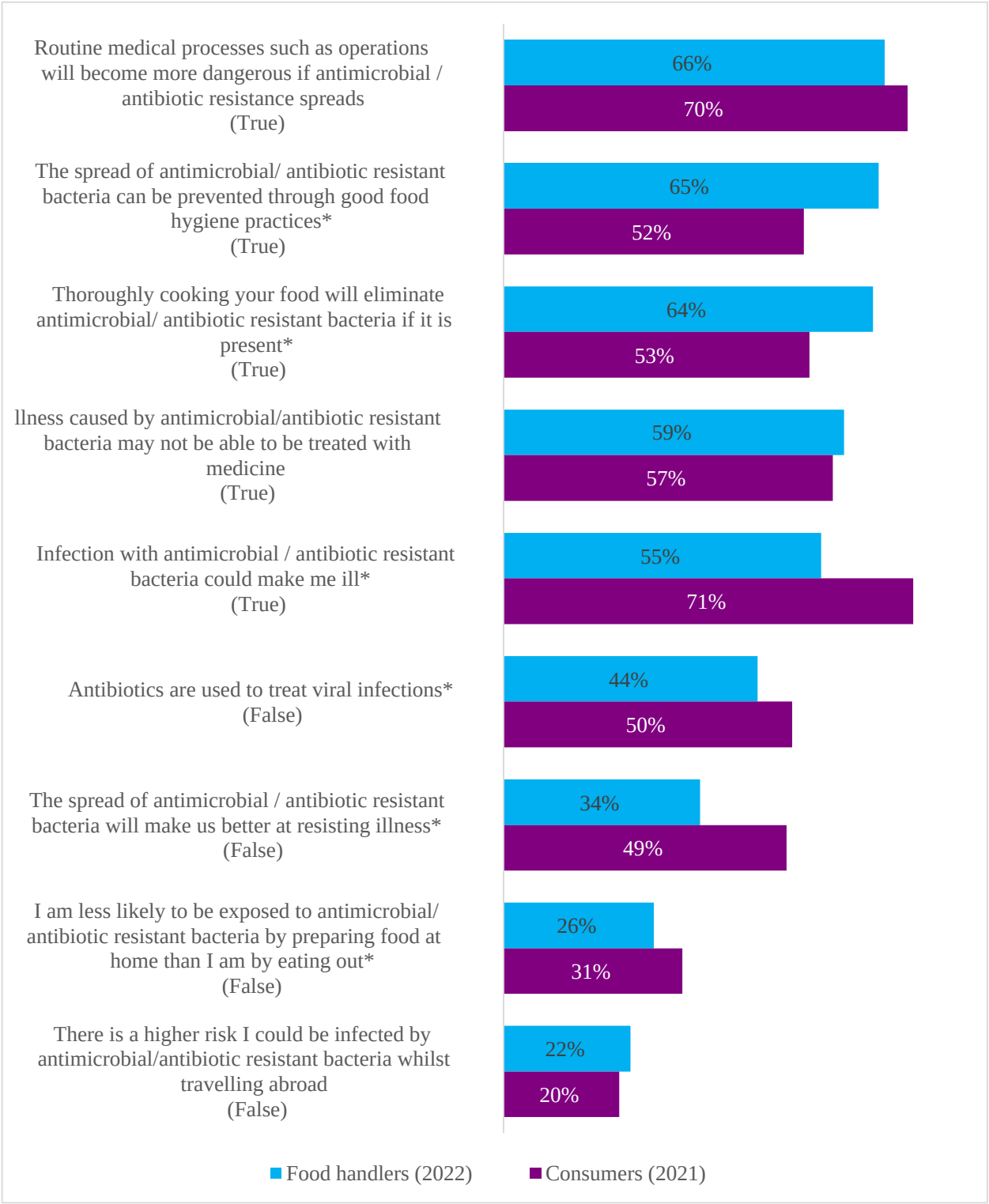
When compared to data from the consumer survey (see figure 3), food handlers were more likely than consumers to correctly identify the following statements as true:

- 'the spread of antimicrobial/antibiotic resistant bacteria can be prevented through good food hygiene practices' (food handlers, 65%; consumers 52%); and
- 'thoroughly cooking your food will eliminate antimicrobial/antibiotic resistant bacteria if it is present' (food handlers, 64%; consumers 53%).

However, consumers were more likely than food handlers to correctly identify ‘infection with antimicrobial resistant bacteria could make me ill’ (food handlers, 55%; consumers 71%) as true. Additionally, consumers were significantly more likely than food handlers to correctly identify the following statements as false:

- ‘antibiotics are used to treat viral infections’ (food handlers, 44%; consumers 50%),
- ‘the spread of antimicrobial/antibiotic resistant bacteria will make us better at resisting illness’ (food handlers, 34%; consumers 49%), and
- ‘I am less likely to be exposed to antimicrobial/antibiotic resistant bacteria by preparing food at home than I am by eating out’ (food handlers, 26%; consumers 31%) as false. (Figure 2).

Figure 2: Proportion of food handlers and consumers classifying statements correctly



Base: Food Handlers in 2022 (500), consumers in 2021 (2,555). *Indicates a significant difference between waves.

Understanding of AMR bacteria spread

Respondents were provided with a list of different food preparation/handling activities and asked which ones they thought could protect against the spread of AMR. With the exception of one ('washing chicken prior to cooking'), all listed activities limit the spread of AMR bacteria (footnote 1)
.

As per Table 1, the most common activities that food handlers correctly identified as ways of protecting against the spread of AMR were: ‘cooking food thoroughly’ (48%) ‘washing or peeling fruit and vegetables’ (47%), ‘washing hands before starting to prepare or cook food’ and ‘washing hands after handling raw meat and raw poultry’ (both 45%).

Around three in ten (29%) incorrectly selected ‘washing chicken prior to cooking’ as a way of protecting against the spread of AMR. This is a particularly notable finding given FSA guidance to avoids this behaviour due to the cross contamination risk. Furthermore, one in twenty (5%) respondents said that they did not know which activities could protect against the spread of AMR.

Food handlers were generally less aware of activities that could protect against the spread of AMR than consumers. Overall, food handlers were significantly less likely to select each of the activities compared to consumers. However, significantly more consumers, over one in ten (12%), reported not knowing if any of the activities could protect against AMR, compared to one in twenty (5%) food handlers. ‘Washing hands after handling raw meat and raw poultry’ and ‘washing chicken prior to cooking’ were options added into the 2022 food handler survey to better reflect activities of food handlers, and were not included in the consumer survey.

Reflecting trends seen in the consumer research, female food handlers, and older respondents, were generally more likely to identify activities that protect against the spread of AMR (see Table 2). For example, 62% of female food handlers, and 87% of those aged 55 and above, thought ‘cooking food thoroughly’ could protect against the spread of AMR, compared to 37% of male food handlers and 32% of those aged 18-34 years.

Managerial food service staff and kitchen staff had similar levels of awareness across most of the activities, however managerial food service staff were significantly more likely to select ‘heating leftovers until they are steaming hot before eating them’ than kitchen staff (36% vs 18%). Conversely, kitchen staff were significantly more likely to incorrectly select ‘washing chicken prior to cooking’ than managerial food service staff (41% vs 25%).

Table 1: Proportion of food handlers and consumers who thought the listed activity could protect against the spread of antimicrobial resistance

Food preparation/handling activity	Food Handlers (2022)	Consumers (2021)
Cooking food thoroughly	48%	71%*
Washing or peeling fruit and vegetables	47%	55%*
Washing hands before starting to prepare or cook food	45%	69%*
Washing hands after handling raw meat and raw poultry	45%	N/A
Preparing different foods types on different surfaces/chopping boards	44%	62%*

Food preparation/handling activity	Food Handlers (2022)	Consumers (2021)
Following storage instructions on food labels	38%	58*
Storing food at 5c or below	33%	49%*
Heating leftovers until they are steaming hot before eating them	33%	49%*
Washing chicken prior to cooking	29%	N/A
None of these	1%	3%*
Don't know	5%	12%*

Base: Food handlers in 2022 (500), consumers in 2021 (2,555). *Indicates a significantly higher figure.

Table 2: Proportion of food handlers who thought the listed activity could protect against the spread of antimicrobial resistance, by gender and age

Food preparation/handling activity	Male	Female	18 to 34 year olds	35 to 54 year olds	55+ year olds
Cooking food thoroughly	37%	62%*	32%	49%**	87%***
Washing or peeling fruit and vegetables	44%	52%	35%	48%**	76%***
Washing hands before starting to prepare or cook food	31%	63%*	35%	45%**	88%***
Washing hands after handling raw meat and raw poultry	31%	63%*	29%	45%**	88%***
Preparing different food types on different surfaces/chopping boards	33%	58%*	33%	40%	82%***

Food preparation/handling activity	Male	Female	18to 34 year olds	35 to 54 year olds	55+year olds
Following storage instructions on food labels	24%	56%*	24%	34%**	83%***
Storing food at 5c or below	23%	46%*	23%	30%	70%***
Heating leftovers until they are steaming hot before eating them	30%	35%	25%	31%	58%***
Washing chicken prior to cooking	30%	28%	24%	33%	30%
None of these	1%	1%	1%	2%	0%
Don't know	5%	5%	4%	6%	3%
Total	282	218	205	219	76

*Indicates a significantly higher figure than males. **Indicates significantly higher figure than 18-34 year olds. ***Indicates significantly higher figure than both 18-34 and 35-54 year olds.

Knowledge of AMR sources

Respondents were presented with a list of food types and asked to select which they considered to be sources of AMR. All food types listed are potential sources of AMR bacteria (footnote 2). Respondents were most likely to choose poultry (36%) or red meat (35%). Around a third thought that seafood (33%) or eggs (31%), were sources of AMR and around a quarter thought that dairy products (27%) and salad / leafy greens (25%) were. However, one in ten (10%) thought none of the foods were sources of AMR and roughly a sixth (15%) didn't know. See Table 3.

Table 3: Proportion of food handlers and consumers considering each food type to be a source of antimicrobial resistance.

Food type	Food Handlers (2022)	Consumers (2021
Poultry	36%	53%*
Red meat	35%	50%*

Food type	Food Handlers (2022)	Consumers (2021
Seafood	33%	39%*
Eggs	31%	36%*
Dairy products (milk, cheese, etc.)	27%	38%*
Salad/leafy greens	25%	22%
Fruit	20%	17%
Don't know	15%	27%*
None of these	10%*	3%

Base: Food handlers in 2022 (500), consumers in 2021 (2,555). *Indicates a significantly higher figure.

Female food handlers generally had higher levels of knowledge of sources of AMR than males (Table 4), and were more likely than males to identify poultry (46% vs 29%), seafood (43% vs 26%), eggs (39% vs 25%) and dairy products (34% vs 22%). However, females were also significantly more likely to say they didn't know whether any of the food types were sources of AMR than males (19% vs 11%).

Table 4: Proportion of food handlers and consumers considering each food type to be a source of antimicrobial resistance, by Gender and Age

Food type	Male	Female	18 to 34 year olds	35 to 54 year olds	55+ year olds
Poultry	29%	46%*	24%	36%**	71%***
Red meat	35%	35%	31%	33%	50%***
Seafood	26%	43%*	19%	36%**	63%***
Eggs	25%	39%*	25%	30%	50%***
Dairy products (milk, cheese, etc.)	22%	34%*	20%	27%	49%***

Food type	Male	Female	18 to 34 year olds	35 to 54 year olds	55+ year olds
Salad/leafy greens	26%	23%	25%	22%	30%
Fruit	18%	23%	20%	21%	20%
Don't know	11%	19%*	9%	17%**	21%**
None of these	16%*	3%	14%	10%	1%***
Total	282	218	205	219	76

*Indicates a significantly higher figure than males,**Indicates significantly different figure to 18-34 year olds. ***Indicates significantly different figure to both 18-34 and 35-54 year olds.

A similar pattern was observed with age, with older respondents significantly more likely to correctly identify poultry, red meat, seafood, eggs and dairy products as sources of AMR than younger respondents (Table 4). Additionally older respondents were more likely to state that they 'didn't know' whilst younger respondents were more likely to incorrectly state that none of the food types were sources or AMR.

1. In order to be consistent with previous work with consumers, the question asked about preventing the spread of AMR, rather than AMR bacteria, as this question was shown to be understood by consumers in previous cognitive testing. Given the increased levels of AMR awareness amongst food handlers, it is possible that this clarification would have increased the likelihood of correct responses to this question. This will be explored should FSA do further research with food handlers.

2. In order to be consistent with previous work with consumers, the question asked about sources of AMR, rather than AMR bacteria, as this question was shown to be understood by consumers in previous cognitive testing. Given the increased levels of AMR awareness amongst food handlers, it is possible that this clarification would have increased the likelihood of correct responses to this question. This will be explored should FSA do further research with food handlers.

Knowledge of AMR amongst food handlers: Conclusion

In order to meet the FSA commitments under the 5-year (2019-2024) AMR National Action Plan (NAP), this research was conducted to inform the food safety section of the NAP (specifically 2.5.2) which makes references to the UK promoting good hygienic practices across the food

chain including a commitment to "assess and track the perceptions and understanding of food handlers and consumers about AMR bacteria in food and what can be done to protect people through food hygiene at home".

The findings suggest that food handlers' levels of awareness and understanding of AMR are lower than consumers. Most notably it appears that some food handlers aren't aware of the key food handling/preparation activities that can limit the spread of AMR. Subsequent research should explore this finding further to establish the need for communication/awareness campaigns.

Knowledge of AMR amongst food handlers: Annex A 2022 Food Handlers Survey Questionnaire

Q1. To what extent have you heard of the following?

- Antimicrobial resistance
- Antibiotic resistance

1. Yes, I've heard about it, and I know a lot about it
2. Yes, I've heard about it, and know a little about it
3. Yes, I've heard about it, but don't know much about it
4. Yes, I've heard about it, but don't know anything about it
5. No, I have never heard about it before today

Q2. Please tell us whether the following are true or false. We will then ask you to indicate how confident you are with your answer to each, on a scale ranging from "just guessing" to "absolutely sure".

- an illness caused by antimicrobial/ antibiotic resistant bacteria may not be able to be treated or cured with medicine
- infection with antimicrobial / antibiotic resistant bacteria could make me ill
- the spread of antimicrobial / antibiotic resistant bacteria will make us better at resisting illness
- routine medical processes such as operations will become more dangerous if antimicrobial / antibiotic resistance spreads
- the spread of antimicrobial/ antibiotic resistant bacteria can be prevented through good food hygiene practices
- thoroughly cooking your food will eliminate antimicrobial/ antibiotic resistant bacteria if it is present
- there is a higher risk I could be infected by antimicrobial/antibiotic resistant bacteria whilst travelling abroad
- I am less likely to be exposed to antimicrobial/ antibiotic resistant bacteria by preparing food at home than I am by eating out
- antibiotics are used to treat viral infections

1. True
2. False
3. Don't Know

Q2B (True). How confident are you with your answers to the previous question, on a scale ranging from "just guessing" to "absolutely sure"?

Firstly, how confident were you when you stated the following statements as true?

1. Just guessing
2. Very unsure
3. Somewhat unsure
4. Neither sure nor unsure
5. Somewhat sure
6. Very sure
7. Absolutely sure

Q2B (False). And now, how confident were you when you stated the following statements as false?

1. Just guessing
2. Very unsure
3. Somewhat unsure
4. Neither sure nor unsure
5. Somewhat sure
6. Very sure
7. Absolutely sure

Q3. Which of the following food preparation activities, if any, do you think could protect against the spread of antimicrobial resistance? Please select all that apply

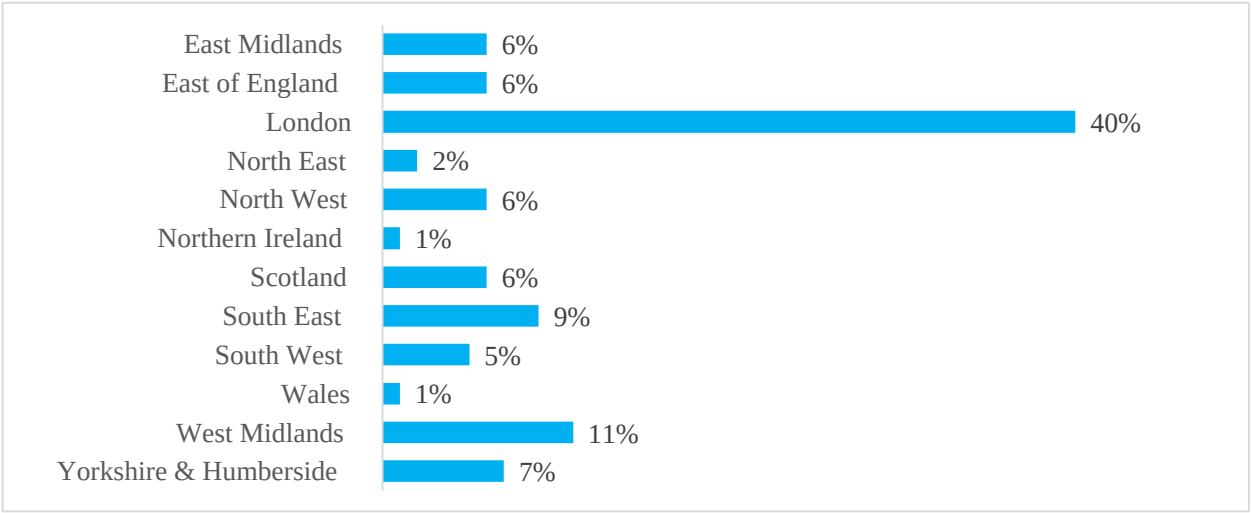
1. Preparing different food types on different surfaces / chopping boards
2. Cooking food thoroughly
3. Heating leftovers until they are steaming hot before eating them
4. Storing food at 5?C or below
5. Following storage instructions on food labels
6. Washing hands before starting to prepare or cook food
7. Washing or peeling fruit and vegetables
8. Washing hands after handling raw meat and raw poultry chicken and other raw meat
9. Washing chicken prior to cooking
10. None of these
11. Don’t know

Q4. Which of the following foods do you consider to be sources of antimicrobial resistance? Please select all that apply

1. Red Meat
2. Poultry
3. Eggs
4. Salad / leafy greens
5. Fruit
6. Seafood
7. Dairy products (milk, cheese, etc.)
8. Any other products (please specify)
9. None of these
10. Don’t know

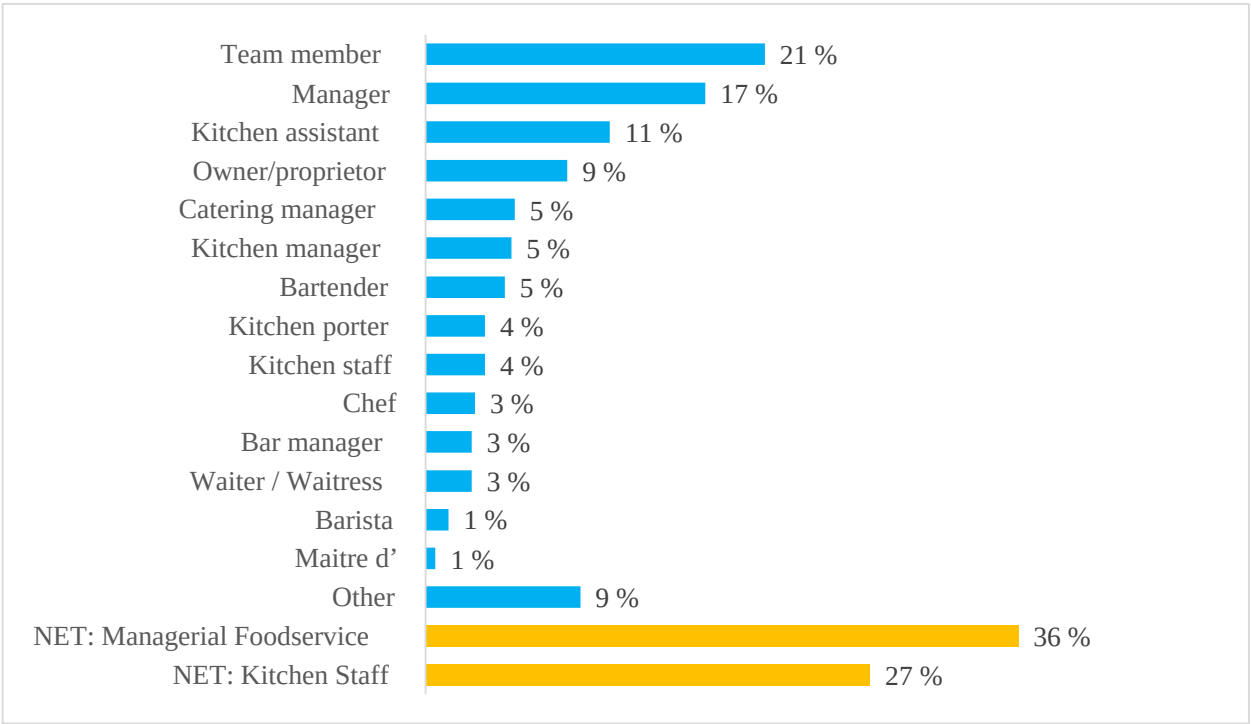
Knowledge of AMR amongst food handlers: Annex B 2022 Food Handlers sample demographics

Figure B1: Region of food handler employer



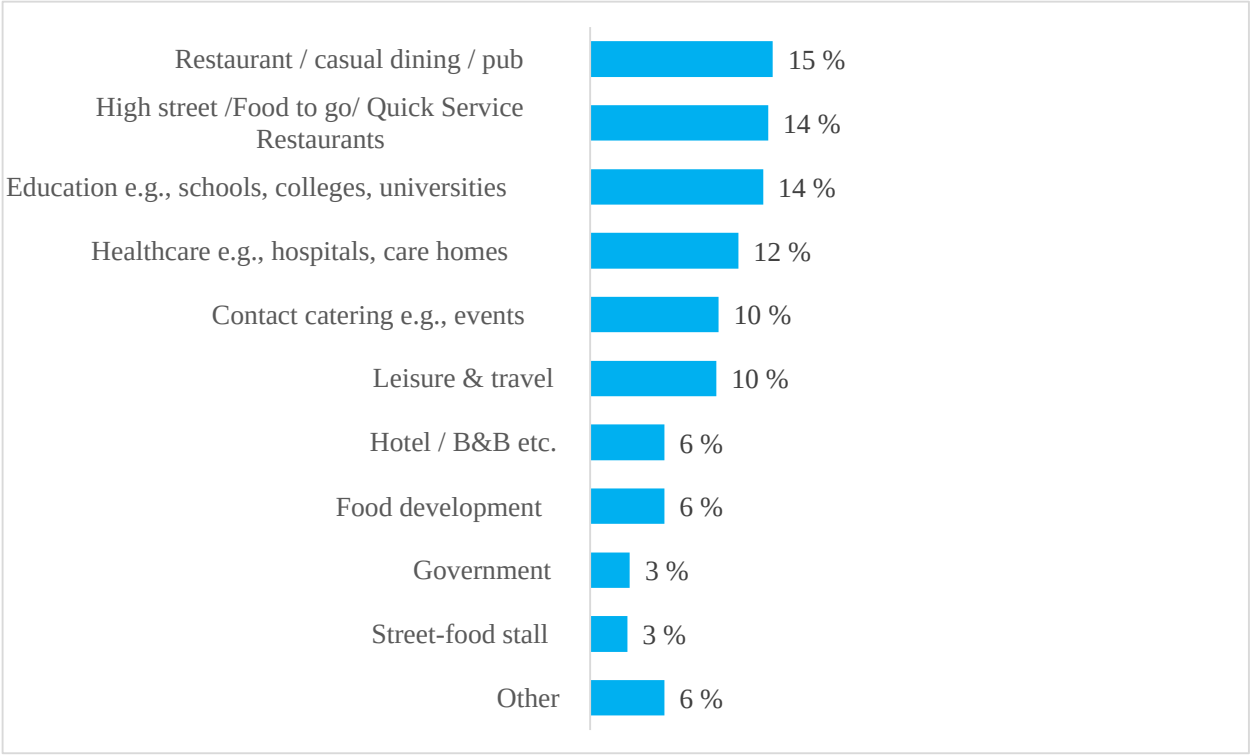
Base: Food handlers in 2022 (500)

Figure B2: Primary job role of food handler



Base: Food handlers in 2022 (500)

Figure B3: Establishment type of food handler employer



Base: Food handlers in 2022 (500)