

# 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 olds 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 olds having heard of the term, compared to a quarter (25%) of 35-54 year olds and 22% of 55+ year olds.

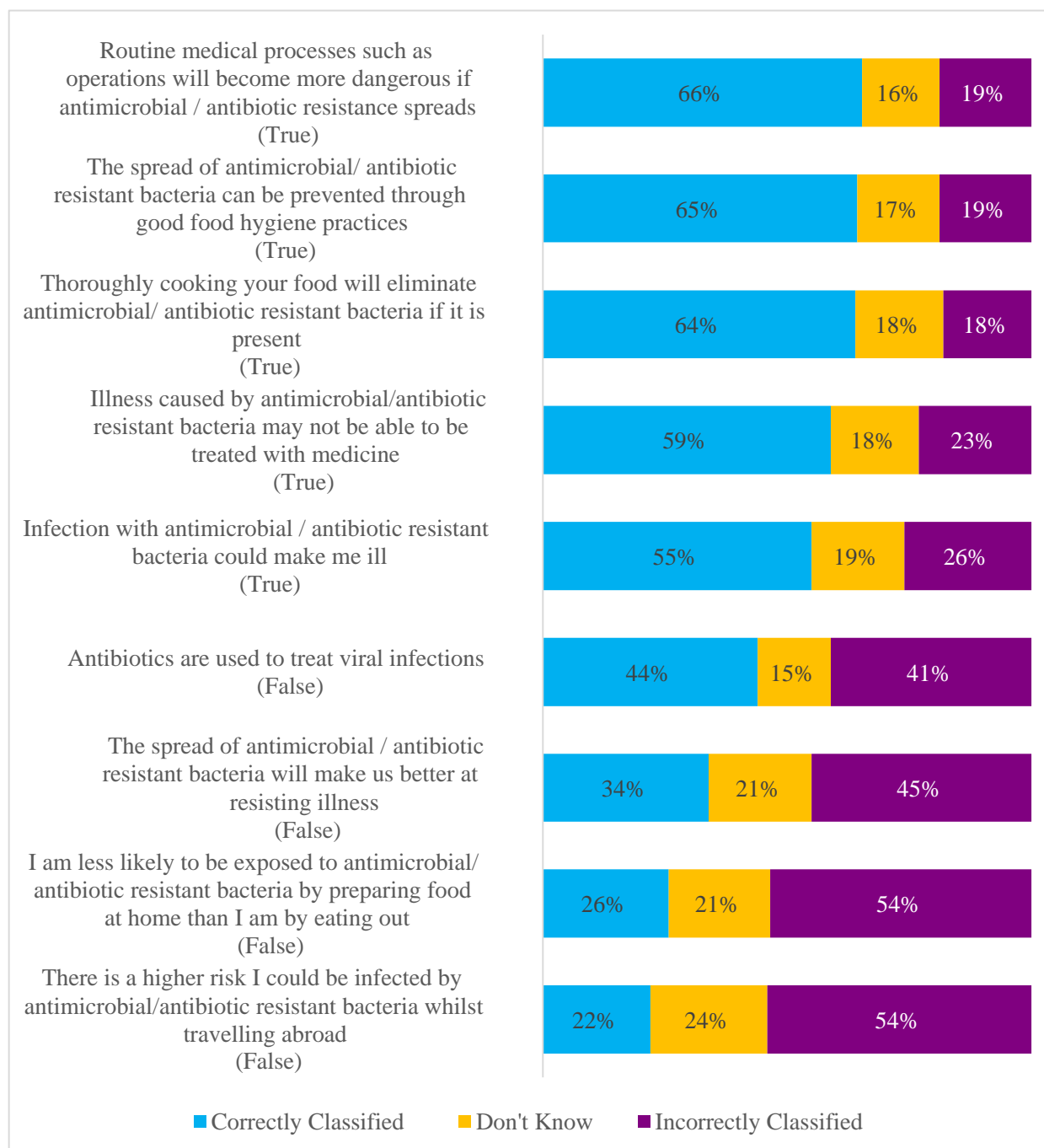
## Knowledge of AMR

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:

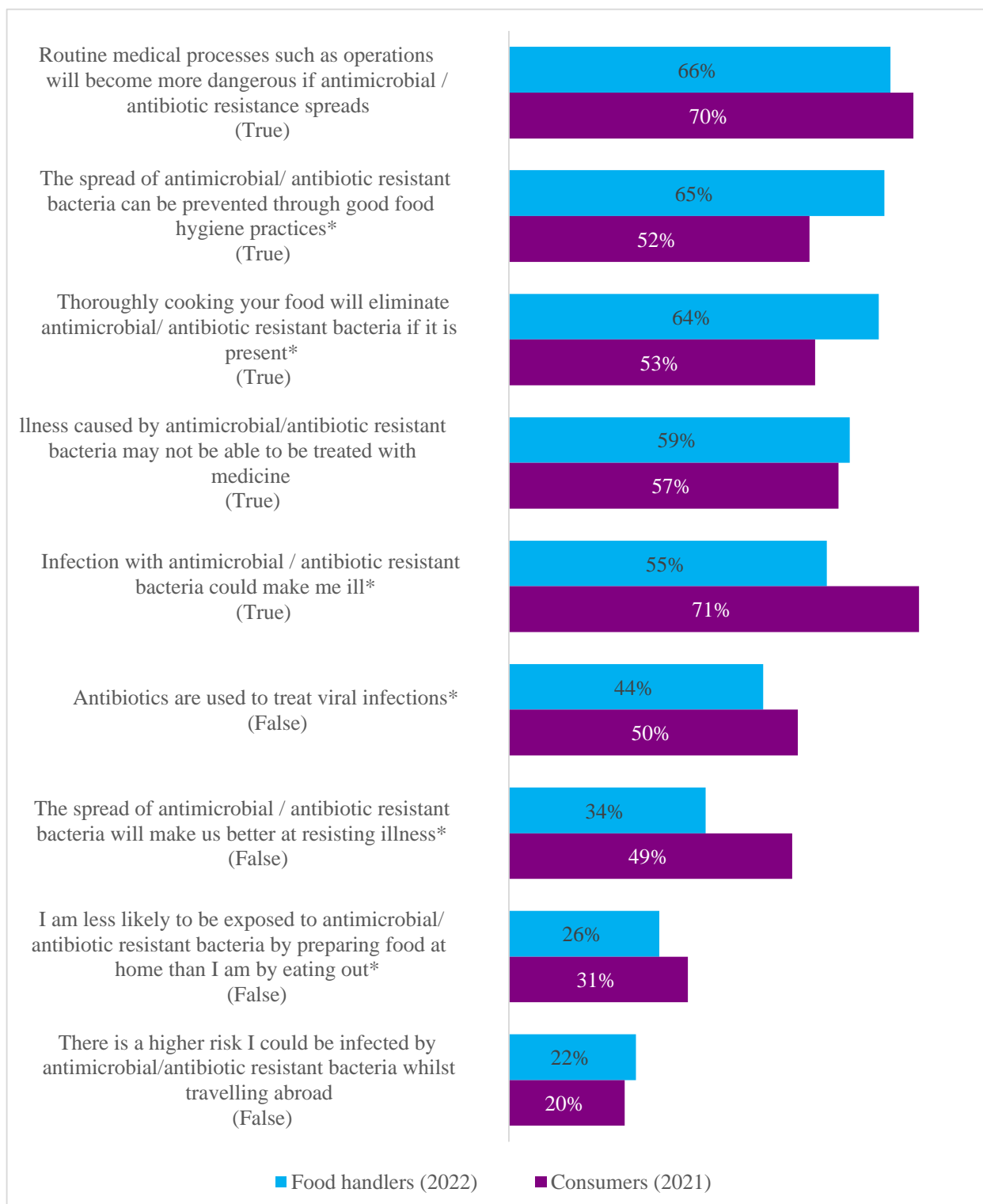
- 'the spread of antimicrobial/antibiotic resistant bacteria can be prevented through good food hygiene practices' (food handlers, 65%; consumers 52%); and

- '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.