AMR Consumer Awareness Survey

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Executive Summary

Background and methodology

- IPSOS Mori were commissioned by the Food Standards Agency to conduct quantitative research with a representative UK sample to understand awareness of and attitudes towards antimicrobial resistance (AMR).
- A series of questions were run in an online omnibus, broadly matching similar surveys run in 2016 and 2019, in order to understand changes in awareness and attitudes over time.
- A sample of 2,555 UK residents aged 16-75, representative of the UK adult online population, took part in the survey between the 9th – 12th of July 2021. The sample was boosted in Scotland in order to provide sufficient sample data to Food Standards Scotland.

Main findings

- Less than a third of respondents had heard of the term ‘antimicrobial resistance’ (26%), and only 11% had heard of the acronym ‘AMR’.
- Public awareness of ‘antimicrobial resistance’ has significantly increased by 10%, from 16% in 2016, however awareness of ‘AMR’ remained unchanged at around a tenth (11%).
- Very few respondents were able to articulate the difference between antimicrobial and antibiotic resistance.
- Around two thirds (65%) of respondents said they were concerned about antimicrobial resistance from people taking too many antibiotics, decreasing from 71% in 2019 and 72% in 2016. Levels of concern about antimicrobial resistance within the food chain is lower at 59%, moderately increasing since 2019 (from 55%), but similar to levels noted in 2016 (62%).
- Almost two fifths (39%) of respondents felt the ‘overuse of antimicrobials / antibiotics by doctors and patients’ was the biggest contributor to an increase in human infections with antimicrobial / antibiotic resistant bacteria.

- Respondents were less concerned about the risk of antimicrobial resistance from food imported from the EU (51%) or produced in the UK (48%), than they were about food imported from other countries outside of the EU (58%). This difference is seen in equivalent questions on food poisoning suggesting general concerns regarding the safety of food from other countries outside the EU, rather than specific AMR concerns.

Background and methodology

Background and objectives

As part of the UK national action plan on antimicrobial resistance (AMR), the Food Standards Agency (FSA) is working to improve the scientific evidence base around consumer perceptions and understanding. A consumer survey was carried out in 2021, asking questions broadly matching those asked in 2016 and 2019, to understand current views and awareness, and to identify any changes over time.

Methodology

IPSOS Mori were commissioned to run the 2021 survey using an online omnibus. A sample of 2,555 UK residents aged 16-75, representative of the UK adult online population, took part in the survey between the 9th-12th July 2021.

The survey was conducted with a boosted sample for Scotland (n=500) at the request of Food Standards Scotland to enable their analysis of that nation's standalone results. Please note that the UK sample includes the boost in Scotland but has been weighted to match the overall UK population.

Previous runs of the surveys also used online omnibus methodology with samples representative of the adult population, with 1,263 respondents taking part in May 2016 and 1,438 in November 2019. The 2019 survey also had a boosted sample for Scotland (n=250).

Reporting notes

The report is structured to mirror the 2021 questionnaire (found in the appendix of this report), in which respondents were provided with some additional information about antimicrobials over the course of the survey. A full explanation around the issues relating to AMR was given to respondents upon completion for information purposes.

Throughout this report, the key points from each question are summarised:

- Where the same question was asked in 2021, 2016 and 2019, the results are compared and statistically significant differences reported.
- Significant differences between demographic sub-groups within the sample have also been reported.
- Data has been weighted to ensure it is representative of the UK's population. The 'total' base figures provided are unweighted.
- Total percentages may not add up due to rounding.

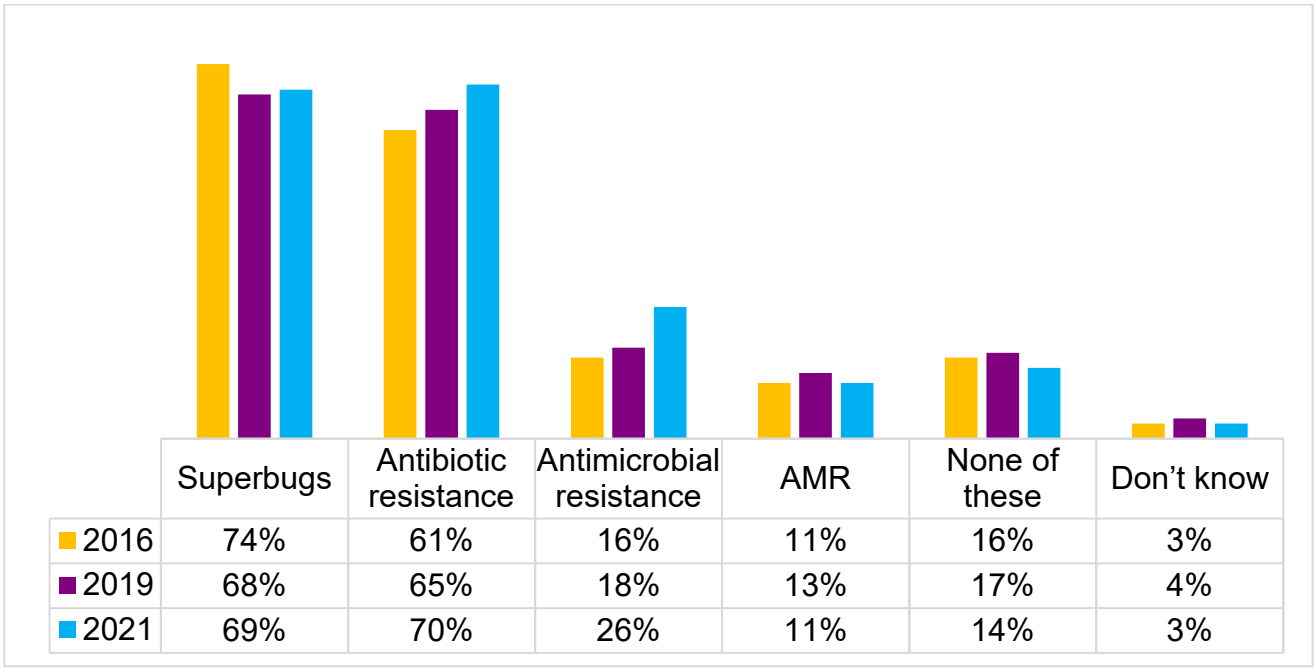
Main findings

Awareness of terminology

Less than a third of respondents had heard of the term ‘antimicrobial resistance’ (26%), and only 11% had heard of the acronym ‘AMR’. Much higher proportions were familiar with the terms ‘superbugs’ or ‘antibiotic resistance’, with around two thirds (69% and 70% respectively) having heard of these terms. Over a tenth of respondents said they had not heard of any of the terms (14%). As shown in Figure 1, this pattern is consistent with findings from previous runs of the survey where respondents were more likely to have heard of ‘superbugs’ and ‘antibiotic resistance’ than ‘AMR’ or ‘antimicrobial resistance’. ,

Public awareness of ‘antimicrobial resistance’ has significantly increased by 10% (to 26%, from 16% in 2016), a similar increase was noted in awareness of ‘antibiotic resistance’, however awareness of ‘AMR’ remained unchanged at around a tenth (11%).

Figure 1: Proportion who had heard of related terms, by survey year.



	Superbugs	Antibiotic resistance	Antimicrobial resistance	AMR	None of these	Don’t know
2016	74%	61%	16%	11%	16%	3%
2019	68%	65%	18%	13%	17%	4%
2021	69%	70%	26%	11%	14%	3%

Base: All respondents in 2021 (2,555), 2019 (1,438), and 2016 (1,263)

Whilst research in this area is limited, international research has demonstrated similarly low levels of public awareness. In North Jordan, Yusef et al (2018) found that the majority

of participants (70%) were either unable to correctly define antimicrobial resistance or had never heard of the term. Similarly, Napolitano et al (2013) found only 9% of Italian participants could correctly define AMR.

Across the three time points of the UK survey, there are no clear gender differences in awareness of ‘antimicrobial resistance’. Age however does seem to be an influencing factor, in 2021 younger respondents were more likely to have heard of ‘antimicrobial resistance’ than older respondents (34% of 16-24 years olds compared to 22% of 45-54 year olds). A similar pattern is noted for ‘AMR’, with 16% of 16-24 year olds hearing the term compared to 9% of 45-54 year olds. These findings are consistent with previous survey runs in 2016 and 2019.

Differences in awareness was also noted between social grade groupings. For example, in 2021, those in social grade AB were more likely to have heard of ‘antimicrobial resistance’, than those in social grade DE (34% compared to 20%). They were also more likely to have heard the acronym ‘AMR’ (17% compared to 8%). This pattern was noted in 2019, but only for awareness of ‘antimicrobial resistance’ not ‘AMR’. In 2016 there were no significant differences by social grade in awareness for either term.

Respondents who had heard of either ‘antimicrobial resistance’ or ‘antibiotic resistance’ (2,134), were asked what they understood the difference between the two terms to be. Over half (57%) were not able to answer this question, with 16% not providing a response and 41% stating ‘don’t know’. There were no gender differences in these responses, however age appears to be an influencing factor with 61% of those over 45 being unable to provide a response, compared to 50% of 16–24 year olds. A similar trend is noted in 2019 (47% and 30%, respectively). This question was not asked in 2016.

Those that did explain their understanding of the difference between the two terms provided varied responses. Many struggled to articulate the differences and / or provided a definition of one of the terms only. Respondents were generally more able to define ‘antibiotic resistance’ than ‘antimicrobial resistance’, reflecting the lower proportions who had heard of the latter term.

The most common descriptions of the difference between antimicrobial and antibiotic resistance referred to:

- People becoming resistant to antibiotics (8%)

- Bacteria becoming resistant to antibiotics (5%)
- Overuse of antibiotics stops them working/creates resistance to antibiotics (3%)
- Microbes becoming resistant to drugs/antimicrobial medicines (3%)

A general lack of understanding of these terms is noted in the literature. In Australia, Lum et al (2017) and Bakhit et al (2019) showed that many participants misunderstood antimicrobial resistance as the body's resistance to antimicrobial medication rather than microbes building this resistance. Furthermore, a systematic review of relevant research (McCullough et al., 2015) found that the public did not have a complete understanding of antibiotic resistance, and held misperceptions about the causes of AMR, as well as implications of medical interventions.

Concern about antimicrobial resistance

Those who stated that they had heard of 'antimicrobial resistance' or 'antibiotic resistance' (2,134) were asked how concerned they were about 1) antimicrobial resistance from people taking too many antibiotics; and 2) antimicrobial resistance within the food chain. As was also the case in 2019 and 2016, the majority of respondents were concerned about both.

Around two thirds (65%) of respondents said they were concerned about 'antimicrobial resistance from people taking too many antibiotics', decreasing from 71% in 2019 and 72% in 2016. Levels of concern differed by region in 2021, with higher levels of concern about 'antimicrobial resistance from people taking too many antibiotics' being higher in the South (71%), than in the North (63%), the Midlands (62%) and Scotland (62%).

Levels of concern about 'antimicrobial resistance within the food chain' was lower at 59%, moderately increasing since 2019 (from 55%), but similar to levels noted in 2016 (62%). In 2021 no regional differences were observed. Research that has explored public awareness of AMR in relation to the food supply chain is limited and has largely been carried out in the US. For example, US Consumer research (Brewer and Rojas, 2008) found that around three quarters of participants (74%) declared no safety concerns in relation to foods from animals treated with antibiotics where approval from the Food and Drug Administration (FDA) had been granted. However, Brewer and Rojas (2008) found that 41% of respondents showed willingness to pay more for food produce not originating from animals that were treated with antibiotics, whereas 23% of participants reported

they had already reduced the consumption of particular products that originate from antibiotic-treated animals. This demonstrates an interest in purchasing non-AMR treated meats despite relatively low levels of reported concern. More recently, but again with an American sample, Knowlton et al. (2018), found that once a link between antibiotic treatment and AMR was explained to participants, support for antibiotic use in livestock decreased.

Understanding of contributors

Respondents were provided with the following description of AMR:

“Antimicrobials, including antibiotics, are used in human and veterinary medicine to treat and prevent a wider variety of infectious diseases. Sometimes, people can develop infections that are resistant to antimicrobials.”

They were then asked to choose, from a list, what they thought contributed to an increase in human infections with antimicrobial / antibiotic resistant bacteria. As per previous survey time points, the majority of respondents in 2021 (59%) selected ‘overuse of antimicrobials / antibiotics by doctors and patients’. Similar proportions were noted in 2016 and 2019 (59% and 61%, respectively) .

In 2021, four options were most commonly chosen as contributors:

- Overuse of antimicrobials/ antibiotics by doctors and patients (59%).
- Overuse of antimicrobials / antibiotics in veterinary medicine (44%).
- Use of antibiotics or antimicrobials in farming procedures such as raising animals for food production (for example, for meat or dairy products) (47%).
- The spread of antimicrobial / antibiotic resistant bacteria through food or the food chain (40%).

Notable differences in the selection of contributors between 2019 and 2021 include:

- In 2021, 25% of respondents chose ‘poor personal hygiene, for example, hand washing’ as a contributor, a substantial decrease from 2019 (44%). This contributor was not listed in 2016.

- In 2021, 11% of respondents thought that ‘travelling abroad’ contributed to an increase in human infections with antimicrobial / antibiotic resistant bacteria. In 2019, this figure was much higher at 23%. This contributor was not listed in 2016.
- In 2021, there were no gender differences in selection of contributors. However in 2019 , females were more likely than males to choose ‘overuse of antimicrobials / antibiotics by doctors and patients’ (68% compared to 55%), and ‘poor personal hygiene’ (49% compared to 40%). as contributors

Broadly speaking, older respondents were more likely to think the listed activities were contributors than young people, except when it came to ‘travelling abroad’ and ‘poor personal hygiene’. For example, two thirds (67%) of respondents aged 55-75 think the ‘overuse of antimicrobials / antibiotics by doctors and patients’ contributes to an increase in human infections with antimicrobial / antibiotic resistant bacteria’ compared to 45% of 16-24s. This age effect is noted in both 2016 and 2019.

When asked which of the options was the biggest contributor to an increase in human infections with antimicrobial / antibiotic resistant bacteria, the most common response, given by over a third of respondents (39%), was the ‘overuse of antimicrobials / antibiotics by doctors and patients’. Figure 2 shows that this has fallen since 2019 when around half of respondents (46%) selected this option. This question was not asked in 2016.

Whilst over half (59%) of respondents reporting being concerned ‘antimicrobial resistance in the food chain’, less than a tenth (7%) felt it was the biggest contributor to an increase in human infections with antimicrobial / antibiotic resistant bacteria.

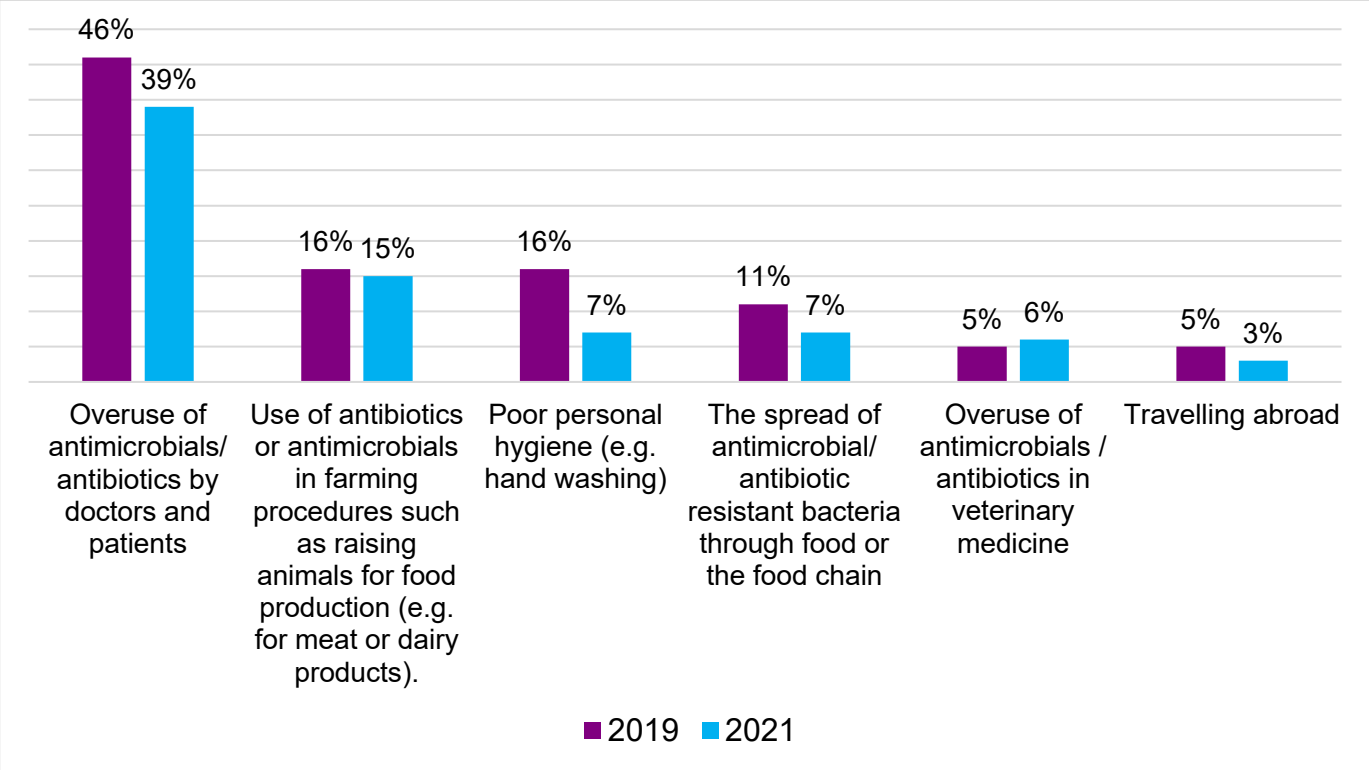
Survey respondents were given a list of statements about antibiotics and AMR and asked to state whether they thought they were true or false. Tables 1 and 2 show the proportion who correctly identified the statements as either true or false. Those statements with the lowest amount of accuracy, with less than 50% of respondents correctly classifying were:

- ‘There is a higher risk I could be infected by antimicrobial/ antibiotic resistant bacteria while travelling abroad’ (20% correctly classifying as false)
- ‘I am less likely to be exposed to antimicrobial/ antibiotic resistant bacteria by preparing food at home than I am by eating out’ (31% correctly classifying as false)

- ‘The spread of antimicrobial / antibiotic resistant bacteria will make us better at resisting illness’ (49% correctly classifying as false)

Whilst these findings suggest a number of misconceptions about antimicrobial / antibiotic resistant bacteria, around a third of respondents stated that they did not know whether these statements were true or false. For example, whilst almost half thought it was false, only 17% of respondents thought that ‘the spread of antimicrobial / antibiotic resistant bacteria will make us better at resisting illness’ was a true statement, and a further 34% did not know. The proportion of respondents thinking this was true was highest amongst younger age groups (for example, 28% of 16-24 year olds, compared to 11% of 45-54 year olds) and those in social grade AB (21% compared to 16% of those in social grade DE). Whilst the age trend can be seen in the 2019 data, there were no differences by social grade in this year.

Figure 2: Proportion selecting each factor as the ‘biggest contributor to an increase in human infections with antimicrobial / antibiotic resistant bacteria’, by survey year



Base: All 2021 respondents who selected more than one option at Q4 (2,555), all 2019 respondents who selected more than one option at Q4 (1,023)

Table 1: Proportion of respondents correctly identifying statements as true, by survey year

Statement	2016	2019	2021
An illness caused by antimicrobial/ antibiotic resistant bacteria may not be able to be treated or cured with medicine	57%	59%	57%
Infection with antimicrobial / antibiotic resistant bacteria could make me ill	71%	72%	71%
Routine medical processes such as operations will become more dangerous if antimicrobial / antibiotic resistance spreads	69%	73%	70%
The spread of antimicrobial/ antibiotic resistant bacteria can be prevented through good food hygiene practices	58%	54%	52%
Thoroughly cooking your food will eliminate antimicrobial/ antibiotic resistant bacteria if it is present	58%	55%	53%

Base: All respondents in 2021 (2,555), 2019 (1,438), and 2016 (1,263)

Table 2: Proportion of respondents correctly identifying statements as false, by survey year

Statement	2016	2019	2021
The spread of antimicrobial / antibiotic resistant bacteria will make us better at resisting illness	51%	46%	49%
There is a higher risk I could be infected by antimicrobial/ antibiotic resistant bacteria while travelling abroad	19%	18%	20%
I am less likely to be exposed to antimicrobial/ antibiotic resistant bacteria by preparing food at home than I am by eating out	N/A	29%	31%
Antibiotics are used to treat viral infections	N/A	45%	50%

Base: All respondents in 2021 (2,555), 2019 (1,438), and 2016 (1,263)

Perception of risks

Respondents were provided with the following information:

“Antibiotic resistance (which is a type of antimicrobial resistance) is the resistance of bacteria to antibiotics that have previously been effective at treating certain illnesses, therefore making them harder to treat.”

They were then asked how concerned they were about different risks relating to AMR. Across the full list of risks, males were significantly more likely than females to say they were not concerned (by contrast females were either more likely to say they were concerned or that they did not know), the same trend was found in 2019. All the listed risks were considered a concern by at least 45% of respondents (see Table 3).

Table 3: Levels of concern about each AMR risk, 2021.

Risk	%
Antimicrobial/Antibiotic resistance from people taking too many antibiotics	70%
Antimicrobial resistance from antibiotics used to boost animal growth in intensive farming	64%
Antimicrobial/Antibiotic resistance from antibiotics used for treatment of infections in farming animals	62%
Antimicrobial resistance from foods imported from other countries outside of the European Union	58%
Food poisoning from foods imported from other countries outside of the European Union	58%
Antimicrobial resistance from contaminants in solid waste and wastewater	56%
Antimicrobial resistance developed by contact with bacteria in soil, rivers, seawater	51%
Antimicrobial resistance from food	51%
Antimicrobial resistance from foods imported from the European Union	51%
Food poisoning from foods imported from the European Union	51%
Antimicrobial resistance from foods produced in the UK	48%
Food poisoning from foods produced in the UK	46%
Antimicrobial resistance from companion animals being given too many antibiotics	45%

Base: All 2021 respondents (2,555)

At the highest end, 70% of respondents reported being concerned about ‘antimicrobial / antibiotic resistance from people taking too many antibiotics’ (with a similar proportion reporting this in 2019, 72%), and at the lowest, 45% said they were concerned about

‘antimicrobial resistance from companion animals being given too many antibiotics’ (a decrease from 2019, where 54% were concerned).

Respondents were less concerned about the risk of antimicrobial resistance from food imported from the EU (51%) or produced in the UK (48%), than they were about food imported from countries outside of the EU (58%). This difference is seen in equivalent questions on food poisoning suggesting general concerns regarding the safety of food from other countries outside the EU, rather than specific AMR concerns. Respondents in the South were more concerned about the risk of AMR from food imported from countries outside of the EU (64%) than those in the North (58%), Midlands (55%) and Scotland (53%).

Protection against spread of AMR

Respondents were provided with a list of different food preparation activities and asked which ones they thought could protect against the spread of antimicrobial resistance.

Respondents were most likely to choose ‘cooking food thoroughly’ (71%) and ‘washing hands before starting to prepare or cook food’ (69%), as activities that could protect against the spread of antimicrobial resistance (each chosen by 68% in 2019). The remaining activities were chosen by at least half of respondents:

- Preparing different types of food on different surfaces / chopping boards (62%)
- Following food storage instructions on food labels (58%)
- Washing or peeling fruit and vegetables (55%)
- Storing food at 5 degrees centigrade or below (49%)
- Heating leftovers until they are steaming hot before eating them (49%)

Around one in ten (12%) respondents said that they did not know which activities could protect against the spread of antimicrobial resistance, and 3% thought that none of them could. Females and older respondents were more likely to identify at least one of the activities than males or younger respondents, the same trend was found in 2019.

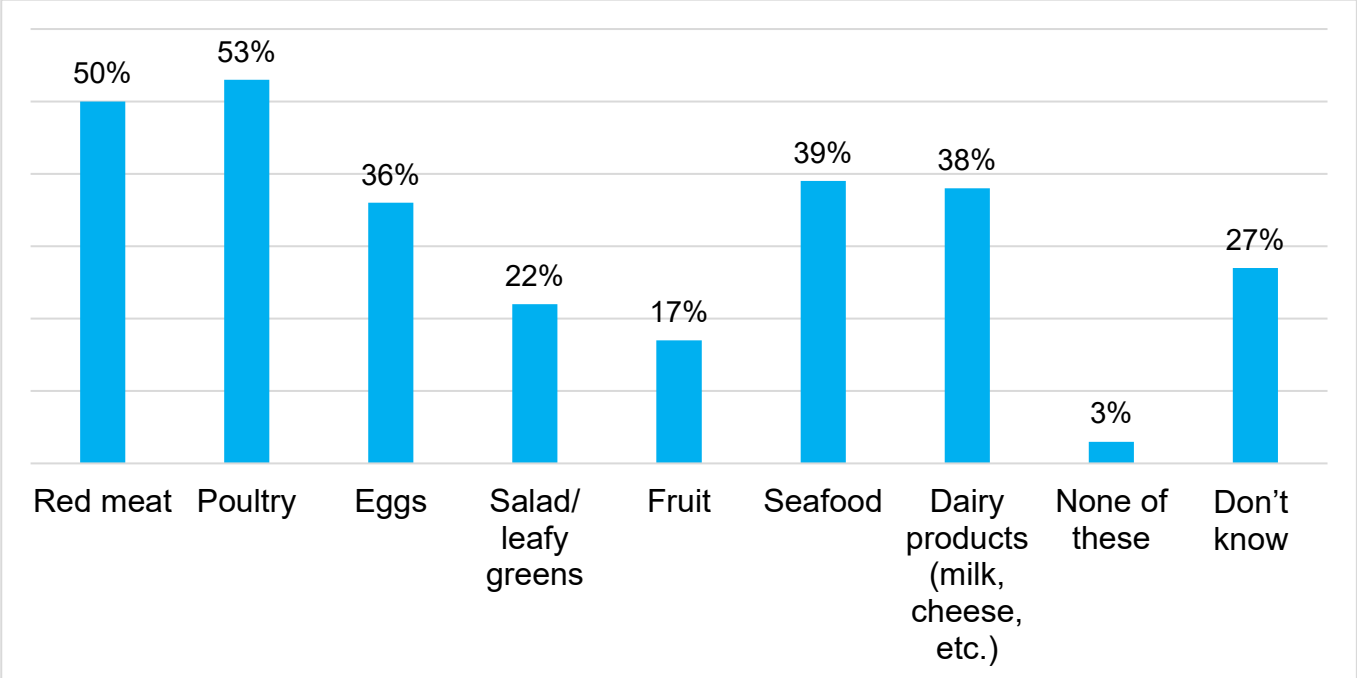
Sources of AMR

Respondents were asked to select from a list, which foods they considered to be sources of antimicrobial resistance. Respondents were most likely to choose poultry (53%) or red meat (50%), with similar proportions noted in 2019 (50% and 46% respectively).

Just over a third thought that eggs (36%), dairy products (38%), or seafood (39%) were sources of antimicrobial resistance, and around a fifth thought that salad / leafy greens (22%) and fruit (17%) were. See Figure 3.

No gender differences are noted in 2021 data but in 2019, females were significantly more likely than males to think that poultry (54% vs 46%) and dairy (39% vs 32%) were sources of antimicrobial resistance.

Figure 3: Proportion considering each food type to be a source of antimicrobial resistance, 2021



Base: All 2021 respondents (2,555)

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Appendix – Omnibus questions 2021

Q1. Which, if any, of the following terms have you heard of? (Select all that apply)

1. Antimicrobial resistance
2. Antibiotic resistance
3. Superbugs
4. AMR
5. None of these
6. Don't know

Q2. What, if anything, do you understand to be the difference between antimicrobial and antibiotic resistance?

Q3. How concerned, if at all, are you about the following?

- **Antimicrobial resistance from people taking too many antibiotics**
- **Antimicrobial resistance within the food chain**

1. Very concerned
2. Fairly concerned
3. Not very concerned
4. Not at all concerned
5. Don't know

Q4a. Antimicrobials, which include antibiotics, are used in human and veterinary medicine to treat and prevent a wide variety of infectious diseases. Sometimes, people can develop infections that are resistant to antimicrobials. To the best of your knowledge, which of the following, if any, do you think contributes to an increase in antimicrobial resistant infections in humans?

Please select all that apply

1. Overuse of antimicrobials/ antibiotics by doctors and patients
2. The spread of antimicrobial/ antibiotic resistant bacteria through food or the food chain
3. Use of antibiotics or antimicrobials in farming procedures such as raising animals for food production (for example, for meat or dairy products).
4. Overuse of antimicrobials / antibiotics in veterinary medicine
5. Poor personal hygiene (for example, hand washing)
6. Travelling abroad
7. Other forms of activity (please specify)
8. None of these
9. Don't know

4b. Which of these do you think is the biggest contributor to an increase in antimicrobial resistant infections in humans?

1. Overuse of antimicrobials/ antibiotics by doctors and patients
2. The spread of antimicrobial/ antibiotic resistant bacteria through food or the food chain
3. Use of antibiotics or antimicrobials in farming procedures such as raising animals for food production (for example, for meat or dairy products).
4. Overuse of antimicrobials / antibiotics in veterinary medicine
5. Poor personal hygiene (for example, hand washing)
6. Travelling abroad
7. Other forms of activity (please specify)
8. Don't know

Q5. Do you think the following statements are true or false?

1. An illness caused by antimicrobial/ antibiotic resistant bacteria may not be able to be treated or cured with medicine

2. Infection with antimicrobial / antibiotic resistant bacteria could make me ill
3. The spread of antimicrobial / antibiotic resistant bacteria will make us better at resisting illness
4. Routine medical processes such as operations will become more dangerous if antimicrobial / antibiotic resistance spreads
5. The spread of antimicrobial/ antibiotic resistant bacteria can be prevented through good food hygiene practices
6. Thoroughly cooking your food will eliminate antimicrobial/ antibiotic resistant bacteria if it is present
7. There is a higher risk I could be infected by antimicrobial/ antibiotic resistant bacteria while travelling abroad
8. I am less likely to be exposed to antimicrobial/ antibiotic resistant bacteria by preparing food at home than I am by eating out
9. Antibiotics are used to treat viral infections

Q6. Antibiotic resistance (which is a type of antimicrobial resistance) is the resistance of bacteria to antibiotics that have previously been effective at treating certain illnesses therefore making them harder to treat.

Bearing this in mind, how concerned, if at all, are you about each of the following risks?

1. Antimicrobial/Antibiotic resistance from people taking too many antibiotics
2. Antimicrobial/Antibiotic resistance from antibiotics used for treatment of infections in farming animals
3. Antimicrobial resistance developed by contact with bacteria in soil, rivers and seawater
4. Antimicrobial resistance from companion animals (for example, dogs, cats etc) being given too many antibiotics
5. Antimicrobial resistance from contaminants in solid waste and wastewater

6. Antimicrobial resistance from antibiotics used to boost animal growth in intensive farming out
7. Antimicrobial resistance from food
8. Antimicrobial resistance from foods produced in the UK
9. Antimicrobial resistance from foods imported from other countries outside of the European Union
10. Antimicrobial resistance from foods imported from the European Union
11. Food poisoning from foods produced in the UK
12. Food poisoning from foods imported from other countries outside of the European Union
13. Food poisoning from foods imported from the European Union

    1. Not at all concerned
    2. Not very concerned
    3. Quite concerned
    4. Very concerned
    5. Don’t know

Q7. Which of these food preparation activities, if any, do you think could protect against the spread of antimicrobial resistance?

Please select all that you think 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 5ºC 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. None of these
9. Don’t know

Q8. Which, if any, of these foods do you consider to be sources of antimicrobial resistance?

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

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