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Wellcome Monitor 2020

Public Perception of Drug-resistant Infections in Great Britain

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Pathogens that cause infections can evolve and develop resistance to the treatments used to control them, undermining modern medicine, including medical procedures like chemotherapy or surgeries which rely on effective antibiotics. Without effective antibiotics, these procedures can become too risky. To stop life-threatening infections from escalating, the spread of drug resistance can be controlled by changing the ways antibiotics and other antimicrobials are used. Between 30th March and 26th April 2020, this study surveyed 2,651 people in England, Scotland, and Wales about their awareness and attitudes to drug-resistant infections and their behaviours around their prescription and use of antibiotics. This builds on findings from previous Wellcome Monitor surveys conducted in 2015 and 2018.

Risk to public health of drug-resistant infections

Fewer people view drug-resistant infections as a very high risk compared to 2018

- While less than half viewed it as a very high risk, most people (88%) viewed drug-resistant infections as fairly or very high risk to public health
- Younger people, people in BAME groups, and people with lower incomes were all less likely to view drug-resistant infections a very or fairly high risk to public health

A substantial minority of people say they have experienced antibiotics not working

- This group were more likely to view drug-resistant infections as a very or fairly high risk to public health

Use of antibiotics

Most people take antibiotics in accordance with good practice for reducing the risk of antimicrobial resistance

- Most people took all their antibiotics at the recommended times, only took antibiotics that they had been prescribed, and did not ask medical professionals to prescribe them antibiotics
  - Younger people, people struggling financially, and those less confident making decisions about their health were more likely to fail to take all of their antibiotics, or take them at times that were not recommended
  - Younger people and those less confident making health decisions were more likely to take antibiotics without a prescription
  - People struggling financially, women, and people who are more confident making health decisions were more likely to have asked a medical professional to prescribe them antibiotics
- People who did not take all of their prescribed antibiotics were most likely to say it was because they were feeling better, with others saying it was because they forgot to take them
- People who reported taking antibiotics they were not prescribed appeared to be mostly motivated by convenience rather than economic reasons
  - Very few people got unprescribed antibiotics online, with most using antibiotics left-over from another time or from a family member or someone else

People's behaviours when taking antibiotics were not associated with their perception of drug-resistant infections as a risk to public health

Knowledge and awareness of drug-resistant infections

A large majority of people have heard of the term 'drug-resistant infections' and feel they have at least some understanding of it

Around half of people correctly identified what antibiotics can or cannot treat

- People finding it more difficult financially, those without degrees and those in BAME groups were less likely to report having a very good or good understanding of the term and were less likely to correctly identify what antibiotics can and cannot treat

People who report having a better understanding of drug-resistant infections are more likely to consider them a threat to public health

Appropriate antibiotics use was associated with people correctly identifying what antibiotics can or cannot treat

The role of the public in addressing drug-resistant infections

More people think individuals like them can have a lot of impact on reducing drug-resistant infections than in 2018

- Around half of people thought individuals like them can have a lot of impact on drug-resistant infections
- People finding it more difficult financially, those without degrees and those in BAME groups were less likely to think that people like them can have a lot of impact on drug-resistant infections
- However, people were still more likely to say the people who prescribe antibiotics and pharmaceutical companies are most responsible for addressing drug-resistant infections than people who use antibiotics

Following medical advice and taking antibiotics when prescribed were the actions seen as most likely to be effective at addressing drug-resistant infections, and those which people were most willing to take

- People were more willing to take actions that they perceived to be more effective
- Women, people aged 60+, people with higher household incomes, people with higher qualifications, and White people said they were willing to take up more of the presented actions to address drug-resistant infections
- On average, people who reported having a greater understanding of drug-resistant infections, who viewed drug-resistant infections as a higher risk, and thought people like them can have more impact on drug-resistant infections, said they were willing to do more of the actions to address drug-resistant infections

A minority thought reducing meat consumption would be effective at addressing drug-resistant infections and would be willing to do it

- The agricultural industry was also the least selected option for who is most responsible for addressing drug-resistant infections

1. Introduction from Wellcome

Wellcome supports science to solve urgent health challenges for everyone. The three global challenges we are taking on are Mental Health, Global Heating and Infectious Disease. Our vision for Infectious Disease is a world in which escalating infectious diseases are under control in the communities most affected.

The pathogens that cause infections can evolve and develop resistance to the treatments we use to control them, undermining modern medicine. Medical procedures like chemotherapy or surgeries which rely on effective antibiotics may become too risky to perform as a result. Antibiotics are vital treatments (as are other antimicrobials), but their overuse and inappropriate use in humans and animals means they are becoming less effective as a result of antimicrobial resistance. It is estimated that more than 700,000 people die every year from these kinds of drug resistant infections. To stop life-threatening infections from escalating, we must control the spread of drug resistance by changing the ways we use antibiotics and other antimicrobials.

While progress has been made since 2016 in the agenda to control Antimicrobial Resistance (AMR), global political momentum has stalled, and willingness has not always translated into action. In the midst of the global COVID-19 pandemic this is perhaps to be expected, but even in its presence drug resistant infections remain one of the biggest health crises facing the world. Indeed, the global threat of antimicrobial resistant bacteria and other superbugs is worsening as the COVID-19 pandemic increases potential threats that could affect antimicrobial stewardship activities and drive antimicrobial resistance. Increased hospital admissions during the pandemic may mean more patients receive antibiotics to keep secondary bacterial infections in check, increasing risk of health-care associated infections and transmission of multi-drug resistant organisms, and in turn increasing antibiotic use,.

In addition, the development and uptake of key interventions like new antibiotics and improved diagnostic tools to prevent, treat and control drug resistant infections has not progressed as fast as we need them too. Wellcome will support advancing a sustainable pipeline for antibiotics to protect global public health and help mobilise government-led action on AMR. We will also place an emphasis on working for the communities most affected by drug-resistant infections.

The public are often end users of antibiotics and can support the reduction of drug resistant infections, alongside healthcare professionals, clinicians, and scientists. Wellcome's Public Engagement team is piloting structured dialogues between the public, policy makers, and scientists to co-create policy asks and local solutions[4]. The public can play a role in using antibiotics more responsibly, and championing drug resistant infections as an issue on which policymakers should act. With more appropriate use and following the prescription advice of clinicians, the public can help stem the tide of drug resistant infections, buying more time for new developments.

We can support the public to play these roles, and understanding public attitudes and behaviours in relation to drug resistant infections and antibiotic use will be critical to supporting them effectively. The Wellcome Monitor is a study of the British adult population's awareness of, knowledge of, engagement with, and attitudes and behaviours towards science and health research, conducted by the National Centre for Social Research (NatCen) on behalf of Wellcome. It has previously explored public attitudes to drug resistant infections and their antibiotic prescription behaviours in Waves 3 (2015) and 4 (2018), although not all questions have been asked at each wave. This report (Wave 5) focuses on some of the key findings from public attitudes during the start of the first wave of coronavirus in the England, Scotland, and Wales (April 2020). These include exploring the perceived risk of drug resistant infections to public health, people's antibiotic use and prescription behaviours, public opinion on their potential impact to reduce drug resistant infections and who is considered most responsible, and public willingness to undertake various measures to do so.

2. Methodology

Fieldwork

Fieldwork for this wave of the Wellcome Trust Monitor was conducted using the random-probability NatCen Panel. The NatCen Panel is formed of people recruited from the British Social Attitudes (BSA) survey, a high-quality, random probability face-to-face survey. Respondents interviewed as part of BSA were asked at the end of the interview to join the Panel. Those agreeing to join the Panel are then invited to take part in additional short surveys covering a range of different topics either online or over the phone. By using a probability-based sample and allowing those without internet access to take part this design reduces the risk of bias compared to online-only surveys (which exclude those who do not have access to, or are less confident using, the internet) and surveys using convenience samples (which are more likely to include people who are more 'available' or particularly want to express their views).

The survey also included a 'boost' of participants from Black, Asian, and minority ethnic (BAME) groups[5] which increased their number from 178 to 379, allowing analysis of the experiences of people with BAME backgrounds to look at more detailed groups, although small sample sizes limit the statistical power to detect differences.

Panellists were initially invited to take part online, before being contacted by telephone if they had not completed the survey after one week. A £5 gift card was sent as a 'thank you' to those who participated. Fieldwork for this study began on the 30th of March 2020 and ended on the 26th of April 2020. Fieldwork was therefore conducted within the context of the start of the COVID-19 outbreak. During this time the context changed dramatically, with the number of deaths as a result of the coronavirus increasing from around 1,700 to around 24,000 and a number of senior politicians diagnosed with coronavirus, which may have impacted directly on people's attitudes to public health-related topics.

A total of 2,651 people took part in the survey, of whom 2,330 (88%) completed online and 321 (12%) completed on the phone. For the main sample, 2,403 of the 4,058 panel members invited took part, giving a 59% survey response rate. Taking account of non-response at the BSA interview and at the point of recruitment to the panel, the overall response rate[6] was 15%. Forty-six per cent of panel members invited to take part as part of the ethnic boost did so.

Analysis

Data have been weighted to be representative of the adult (18+) GB population, including accounting for the over-sampling of people with BAME backgrounds. The weights account for non-response in the survey used for recruitment (the BSA survey), refusal to join the panel at the end of that interview and non-response in the survey of panel members itself. All differences between groups presented in this report have been tested for statistical significance at the 95 per cent level, and all are statistically significant unless otherwise stated.

The Wellcome Monitor moved from a face-to-face interview with a fresh probability-based sample in 2015 to a web/telephone interview with a probability-based panel sample in 2018. While this report looks at changes over time, differences/similarities between the 2015 and the 2018 or 2020 Monitor waves should be treated with caution.

Equivalised household income

In this report we refer to figures for 'monthly household incomes'. These figures are based on banded household income estimates which have been adjusted to account for the number of adults and children living in the household to make them comparable between different household structures. This measure is designed to be used as broad indicators of a person's financial circumstances relative to others, rather than a precise estimate of their financial situation.

5 In this report we use the term 'BAME' to describe participants of Black, Asian, and Mixed/Other ethnicity. While this grouping is useful to explore the collective experience of racialised minority groups, it has limitations, treating different ethnic groups as a single category and potentially missing important differences. We use it as a term and grouping widely used across the higher education and public sectors and enables comparison with other studies. As important differences could be present across different ethnicity groups we look in more detail where statistically meaningful.

6 The remaining 248 cases were included as part of the boost sample

3. Perceptions of risk to public health of drug-resistant infections

This chapter looks at public perceptions of the risk of drug-resistant infections to public health. It looks at the proportion of people who think drug-resistant infections are a very or fairly high risk for public health, and how that has changed since 2018, and how it varies between different groups of the population.

It also explores whether people have experienced antibiotics not working and whether or not that is associated with viewing drug resistant infections as a risk.

Key findings

- Fewer people view drug-resistant infections as a very high risk to public health compared to 2018
- While less than half (45%) view drug-resistant infections as a very high risk, a large majority of people (88%) view drug-resistant infections as a fairly or very high risk to public health
- Younger people, people in BAME groups, and people with lower incomes are all less likely to view drug-resistant infections as a very or fairly high risk to public health
- People who are more engaged with health-related information are also more likely to view drug-resistant infections as a very or fairly high risk to public health
- A large minority of people say they have experienced antibiotics not working. This group are more likely to view drug-resistant infections as a very or fairly high risk to public health

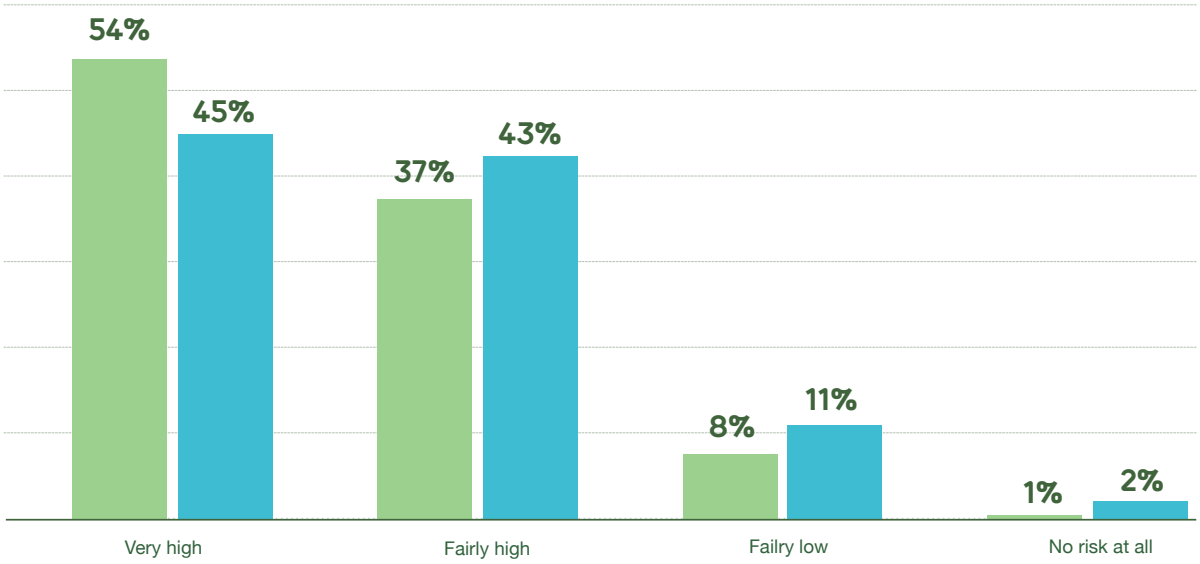
3.1 Perceived risk of drug-resistant infections

Fewer people think drug-resistant infections are a very high risk to public health than in 2018

Respondents were asked how high a risk they thought drug-resistant infections are to public health. Reflecting patterns seen in 2018, a large majority (88%) reported thinking the risk of drug-resistant infections was fairly or very high, though less than half viewed it as a very high risk (45%). There is also an indication that people were less likely to view the risk as very high in 2020 than in 2018 (Figure 3:1), potentially as a result of the COVID-19 outbreak changing people's perspectives on what constitutes a 'very high' risk to public health[7].

7 In 2018, participants were asked about drug-resistant infections alongside a list of other possible public health risks such as air pollution or people not getting vaccinated, so changes should be treated with caution.

Figure 3:1 Perceived risk of drug-resistant infections: December 2018 & March 2020



Dec-18
Mar-20

How high a risk to public health, if at all, do you think drug resistant infections are?

Base: All GB adults (18+): Dec-18 (2688); Mar-20 (2602)

Younger people and people in BAME groups, and people with lower incomes are less likely to view drug-resistant infections as a high risk

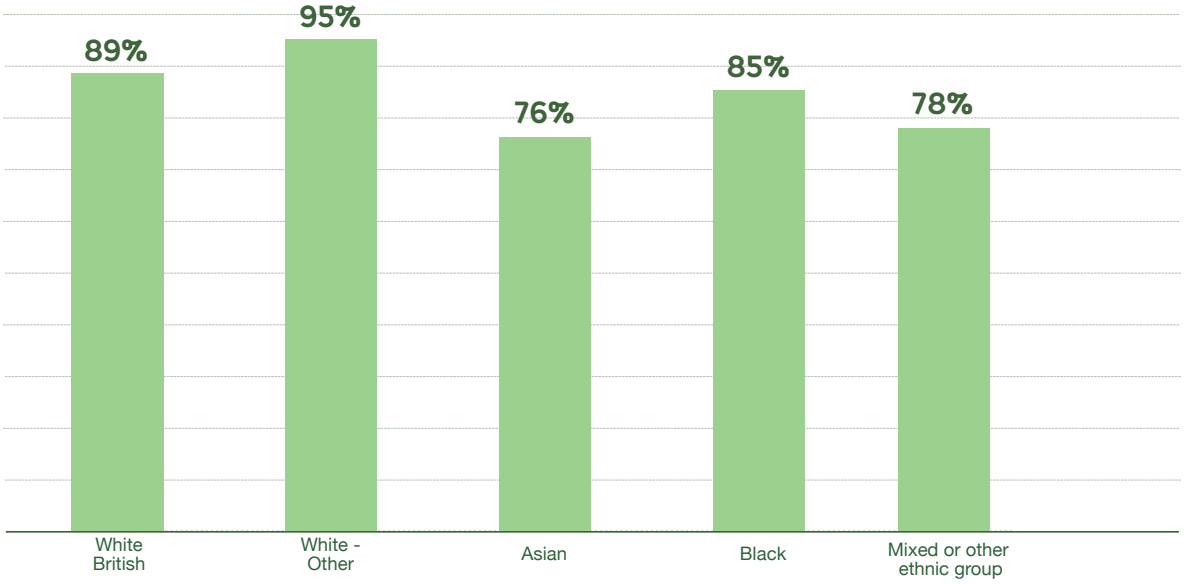
Older people were more likely to view the risk of drug-resistant infections as very or fairly high (90% of people aged 50+ compared to 85% of people age 18-49), perhaps reflecting the potential for this group to be more vulnerable to drug-resistant infections.

People with lower household incomes and people in BAME groups were less likely to view drug-resistant infections as a risk. Nine in ten (90%) people with household incomes of more than £1250 per month viewed the risk as fairly or very high compared to 84% of people with a household income of £1250 or less. Eighty-nine per cent of White people thought that the risk of drug-resistant infections was very or fairly high compared to 79% of people in BAME groups overall. In particular, Asian people and people in mixed or other ethnic groups were less likely to view the risk of drug-resistant infections as very or fairly high (Figure 3:2). There were no significant differences found between men and women or people's highest level of educational qualification.

People who are more interested in health-related information are more likely to view drug-resistant infections as a high risk

Finally, people who are more interested in health-related information were more likely to view drug-resistant infections as a risk to public health. Ninety-one percent of people who are interested in health-related information and seek it out, and 88% of those who are interested but do not seek it out, viewed drug-resistant infections as a very or fairly high risk compared to 83% of people not interested in health-related information.

Figure 3:2 Percentage viewing drug-resistant infections as a very or fairly high risk, by ethnicity



How high a risk to public health, if at all, do you think drug resistant infections are?

Base: All GB adults (18+). White British (1992), White Other (182), Black (80), Asian (172), Mixed/Other (91)

3.2 Experiences of antibiotics not working

People's experiences of antibiotics not working were explored by asking respondents whether they had taken antibiotics which did not work or whether they had ever required a second course of antibiotics. These may indicate experiences of a drug-resistant infection although they may also indicate other things such as an incorrect prescription (such as for non-bacterial infections) or the antibiotics not being taken correctly. All of these are likely to contribute to increased drug resistant infections.

People who have required a second course of antibiotics are more likely to view drug-resistant infections as a high risk

One in four people (24%) reported ever having taken antibiotics for a health issue and had them not work and two in five people (40%) reported ever having required a second course. People who reported having required a second course were more likely to view the risk of drug-resistant infections as very or fairly high – 91% compared to 86% of those who had experienced neither. However, there was no significant difference in the proportion of people that considered drug-resistant infections a very or fairly high risk by whether or not someone had taken antibiotics and had them not work.

4. Use of antibiotics

This chapter looks at people's behaviour when taking antibiotics. In particular, it looks at the extent to which people exhibit antibiotic use behaviours which may encourage drug-resistant infections: not completing a course of antibiotics or not taking them at the recommended times; taking antibiotics without a prescription; and asking a medical professional to prescribe antibiotics. It then looks at whether the proportion exhibiting those behaviours varied between different demographic groups, as well as by how confident people are in making decisions about their health and the extent to which they perceived drug-resistant infections as a risk to public health.

For people who exhibited these behaviours, we then probed a little deeper – asking why people didn't complete their antibiotics, why they got antibiotics without a prescription, and where they got them from.

Key findings

- A large majority of people take antibiotics appropriately, with around 9 in 10 people taking all antibiotics at the recommended times, and only taking antibiotics that have been prescribed to them.
  - While those taking antibiotics sub-optimally were the minority, of those who did, just as many were not taking all their antibiotics (three per cent) as were not taking them at the recommended times (three per cent).
  - People who did not take all of their prescribed antibiotics were most likely to say it was because they were feeling better, with others saying it was because they forgot.
- One in five people reported having asked a medical professional to prescribe them antibiotics, unchanged from 2018.
- People who reported taking antibiotics they were not prescribed appeared to be mostly motivated by convenience (e.g. speed), rather than economic reasons such as price.
  - Very few people got antibiotics online, with most non-prescription users taking antibiotics left-over from another time or from family member or someone else.
- Younger people were more likely to not take all of their antibiotics or to take antibiotics without a prescription.
- People finding things difficult financially were more likely to not take all of their antibiotics, to take them at times that were not recommended, or to ask a medical professional for a prescription.
- People who are less confident making decisions about their health were more likely to have not taken all their antibiotics or taken them at times that were not recommended and are more likely to have used antibiotics without a prescription.
  - However, people who are more confident making health decisions were more likely to have asked a medical professional to prescribe them antibiotics.
- People's behaviours when taking antibiotics were not associated with the extent to which they perceived drug-resistant infections as a risk to public health.

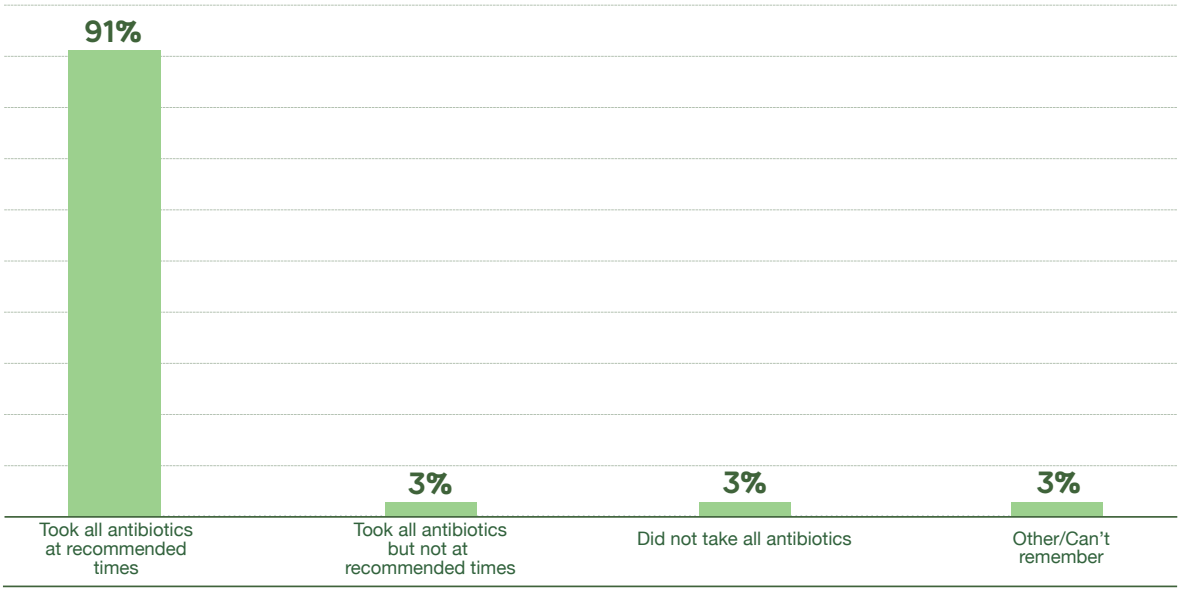
4.1 Using prescribed antibiotics

A large majority of people taking prescription antibiotics took all of them at the recommended times

Ninety-one per cent of people reported that the last time they took antibiotics they were prescribed for them (three per cent said they weren't prescribed and six per cent could not remember). Those who were prescribed their antibiotics were asked about how they took them. As shown in Figure 4:1, the vast majority of people whose last antibiotics were prescribed reported taking all of them at the recommended times. Only three per cent reported not taking the antibiotics at the recommended times, and three per cent reported not taking all their antibiotics (this compares to seven per cent and six per cent respectively in 2015)[8].

8 These differences should be treated with caution given the change in fieldwork design

Figure 4:1 Whether followed instructions for last antibiotics prescribed



And, when you were given the prescription, which of the following did you do?

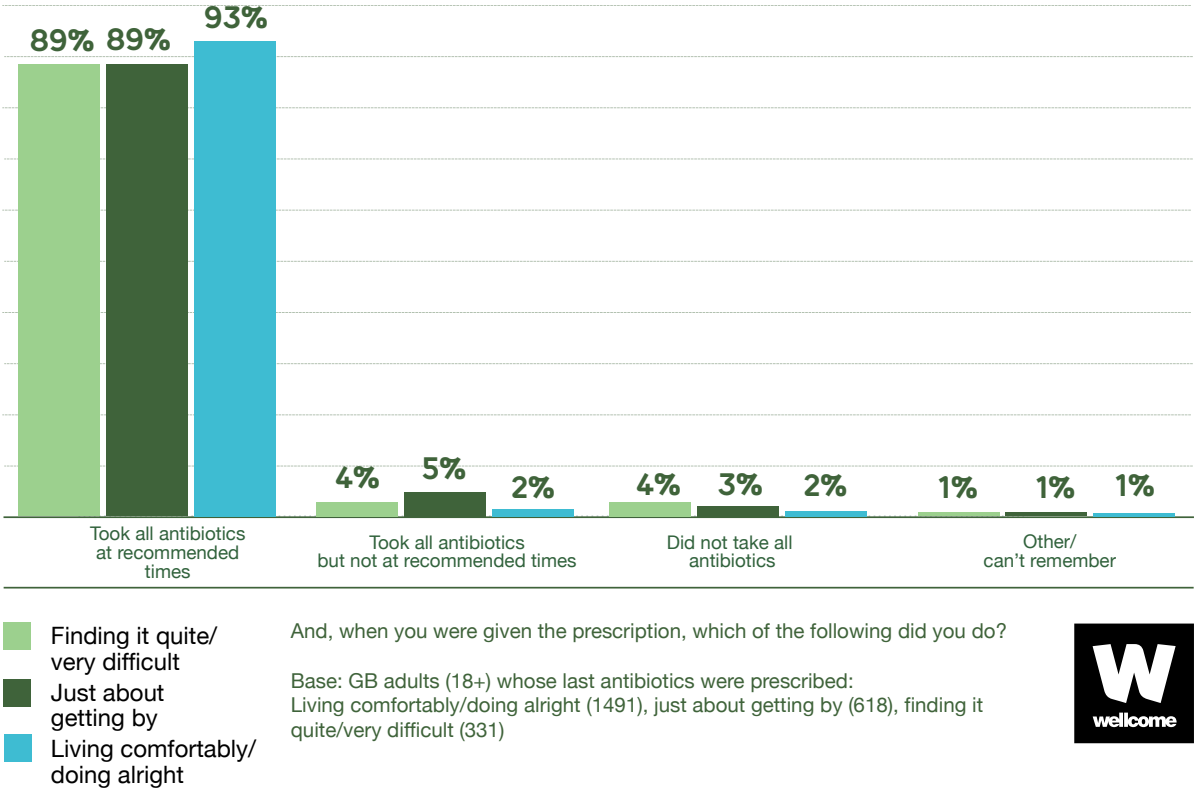
Base: GB adults (18+) whose last antibiotics were prescribed: 2446

Younger people, people finding it more difficult financially, and people who are not confident making decisions about their health were less likely to take all of their antibiotics

There was no significant variation in the proportion of people not taking antibiotics at the recommended times or completing their course by sex, ethnicity, or education.

However, people finding it quite or very difficult financially, or just about getting by, were more likely to not have taken their antibiotics at the recommended time or completed their course than people who were living comfortably or doing alright (eight per cent compared to four per cent) (Figure 4:2).

Figure 4:2 Whether followed instructions for last antibiotics prescribed, by financial circumstances

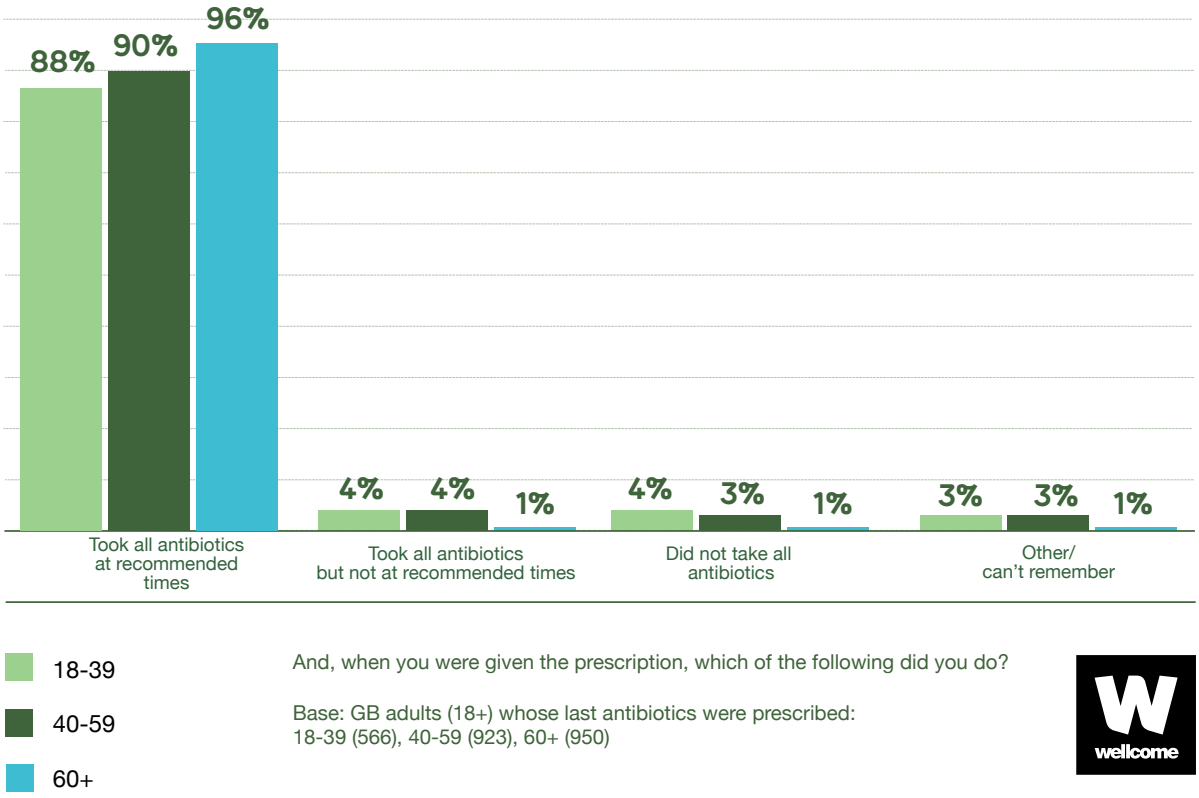


And, when you were given the prescription, which of the following did you do?

Base: GB adults (18+) whose last antibiotics were prescribed: Living comfortably/doing alright (1491), just about getting by (618), finding it quite/very difficult (331)

The proportion following clinicians' recommendations also varied significantly by age. In particular, younger people were more likely to not have taken all of the antibiotics they were prescribed (Figure 4:3).

Figure 4:3 Whether followed instructions for last antibiotics prescribed, by age group



And, when you were given the prescription, which of the following did you do?

Base: GB adults (18+) whose last antibiotics were prescribed: 18-39 (566), 40-59 (923), 60+ (950)

Finally, we find that certain measures of health attitudes – trust in doctors in relation to coronavirus and confidence in making health decisions – were associated with antibiotic behaviours.

Respondents were asked how much they trusted information about coronavirus from doctors, nurses and healthcare professionals. The majority of people (85%) said they had complete or a great deal of trust in coronavirus information from doctors, with 15% saying they had some, very little, or no trust. People who said they had complete or a great deal of trust in information about coronavirus from these medical professionals were more likely to follow clinicians' recommendations when taking their last prescribed antibiotics (92%, compared to 87% of people with some, very little, or no trust.

Respondents were also asked how confident they are in making informed decisions about their health (e.g. whether to have a flu jab or when to make a doctor's appointment). Most people (95%) reported being very (47%) or fairly (47%) confident, with four per cent saying they were not very confident and one per cent saying they were not at all confident making decisions about their health. People who were not very or at all confident making decisions about their health were more likely to not follow clinicians' recommendations (15% compared to five per cent of people who were very or fairly confident).

We do not find that people who viewed drug-resistant infections as a high risk were significantly more or less likely to follow clinicians' recommendations.

Most people who did not take all of their antibiotics did so because they felt better

Respondents who reported not taking all of their prescribed antibiotics were asked why they had done so. Reflecting patterns seen in 2015, the majority (58%) said it was because they were feeling better, while one in three (33%) forgot to take them[9].

4.2 Use of antibiotics without a prescription

A small minority have used antibiotics without a prescription

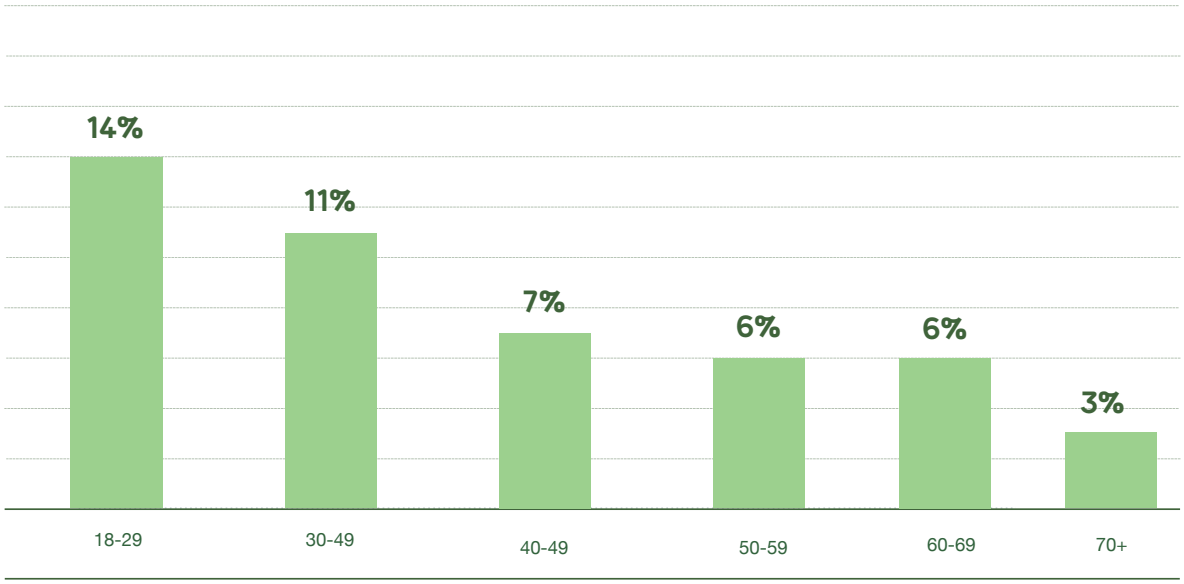
Respondents were asked whether the last time they took antibiotics they were prescribed for them, and whether they had ever taken antibiotics they were not prescribed. Seven per cent of people reported ever having taken antibiotics they were not prescribed[10], and three per cent reported that the most recent antibiotics they took were not prescribed for them (compared to one per cent in 2015)[11].

Young people, people in BAME groups, and people who are not confident making decisions about their health were more likely to have used antibiotics without a prescription

There was no significant difference in the proportion of people ever having taken antibiotics they were not prescribed by sex, financial circumstances, or education. However, younger people were significantly more likely to ever have taken antibiotics they were not prescribed (Figure 4:4)[12]. Similar patterns were seen looking at whether people were prescribed the last antibiotics they took.

9 These estimates should be treated with caution due to the small sample sizes (n = 64).
10 This compares to six per cent in 2015
11 This small difference should be treated with caution given the change in fieldwork design
12 This is despite older people having had more opportunities to have taken antibiotics in general

Figure 4:4 Percentage ever taken antibiotics they were not prescribed, by age group



Thinking about the last time you took antibiotics, were these prescribed for you?; Have you ever taken antibiotics you were not specifically prescribed?

Base: All GB adults (18+): 18-29 (193), 30-39 (393), 40-49 (442), 50-59 (487), 60-69 (490), 70+ (477)

People from BAME groups were also more likely to have ever taken antibiotics that were not prescribed to them. Fourteen per cent of people from BAME groups reported ever having taken antibiotics without a prescription compared to six per cent of White people.

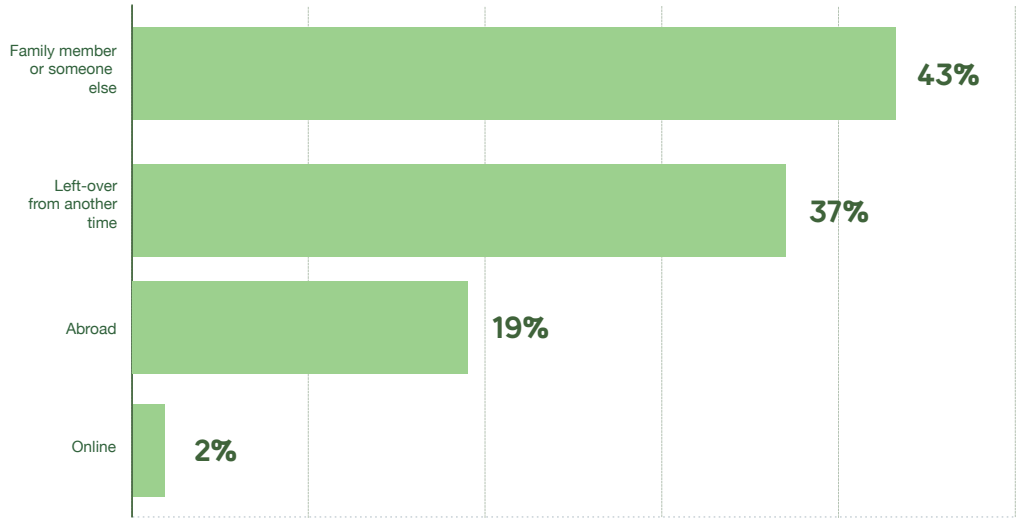
Finally, again, we do not find that people who viewed drug-resistant infections as a high risk were significantly more or less likely to take antibiotics without a prescription. However, people who were not very or at all confident making decisions about their health were more likely to have ever taken antibiotics without a prescription (16% compared to seven per cent of people who were very or fairly confident).

People taking antibiotics without a prescription are mostly motivated by convenience

Respondents who reported taking antibiotics they were not prescribed were asked where they got them from and why they took antibiotics that were not prescribed by a doctor or medical professional.

People reported getting non-prescription antibiotics from a range of sources – most commonly from a family member (32%) or someone else (13%) or left-over from another time. Very few people reported getting non-prescription antibiotics online (Figure 4:5).

Figure 4:5 Where people got non-prescription antibiotics from

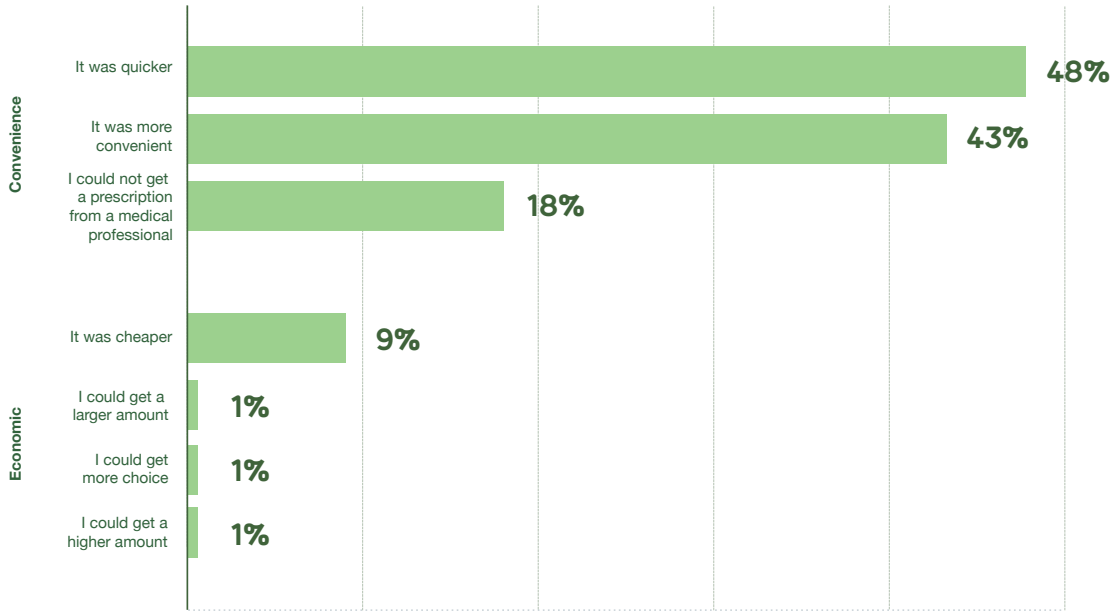


Thinking about the last time you took antibiotics you were not prescribed. Where did you get those antibiotics from?

Base: GB adults (18+) who have taken antibiotics they were not prescribed: 144

When asked why they took non-prescription antibiotics, people were most likely to say it was because it was quicker or more convenient, or because they could not get a prescription from a medical professional (Figure 4:6).

Figure 4:6 Reason for taking non-prescription antibiotics



Why did you take antibiotics that were not prescribed by a doctor or medical professional?

Base: GB adults (18+) who have taken antibiotics they were not prescribed: 139

4.2 Use of antibiotics without a prescription

A large minority of people continue to ask a medical professional to prescribe them antibiotics

Respondents were asked whether they had ever asked a GP or other medical professional to prescribe them antibiotics. A little over one in five people (22%) have ever asked a medical professional to prescribe them antibiotics, a similar proportion to that found in 2015 (21%)[13].

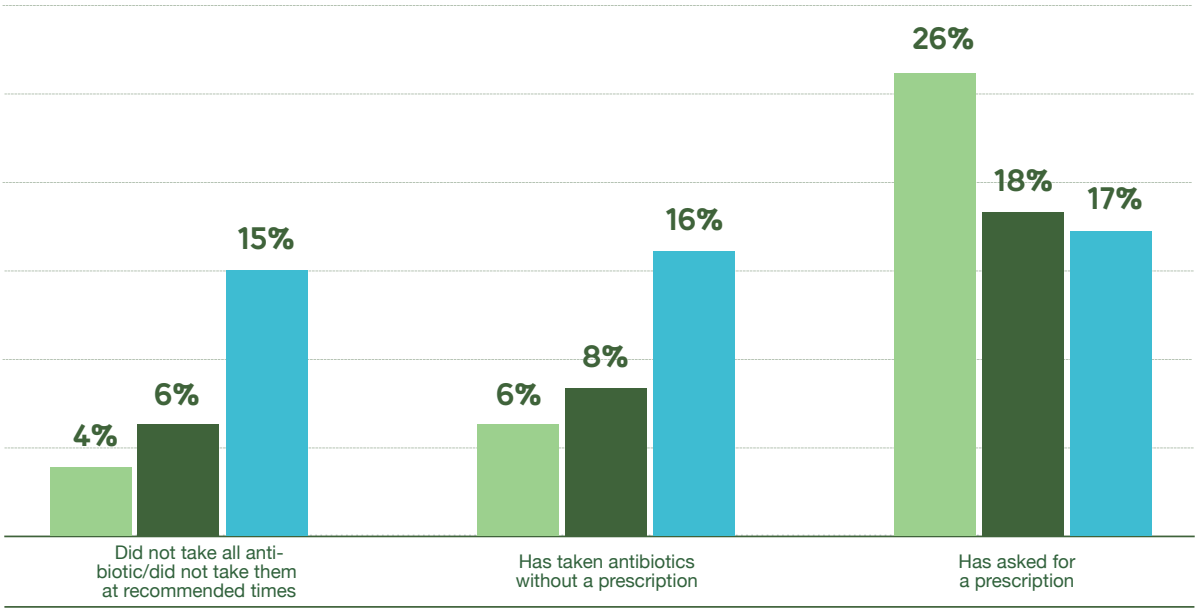
Women and people finding it difficult financially are more likely to have asked for a prescription of antibiotics

Reflecting patterns seen in 2015, women were more likely than men to have asked to be prescribed antibiotics (25% compared to 18%), but there was no variation by age, ethnicity or education. People finding things quite or very difficult financially were more likely to have asked a medical professional for a prescription of antibiotics (28% compared to 23% of people just about getting by and 20% of people living comfortably or doing alright).

While people who viewed drug-resistant infections as a high risk were not significantly more or less likely to have asked a medical professional for a prescription, we do see an association with confidence in making decisions about health. However, in contrast to the patterns seen in Sections 4.1 and 4.2, people who were very confident making decisions about their health were more likely than people who were fairly or not very or not at all confident to exhibit an antibiotic use behaviour which may encourage drug-resistant infections and report having asked a medical professional to prescribe them antibiotics (Figure 4:7).

13 Differences or similarities should be treated with caution given the change in fieldwork design

Figure 4:7 Percentage exhibiting antibiotic use behaviours by confidence making decisions about health



Very confident

Fairly confident

Not very/ at all confident

When you were given the prescription, which of the following did you do?

Base: GB adults (18+) whose last antibiotics were prescribed. Very confident (1207), fairly confident (1140), not very confident (97).

Have you ever taken antibiotics you were not specifically prescribed?

Base: All GB adults (18+). Very confident (1256), fairly confident (1217), not very confident (112).

Have you ever asked a GP or other medical professional to prescribe you antibiotics?

Base: All GB adults (18+). Very confident (1279), fairly confident (1250), not very confident (119).

5. Knowledge and awareness of drug-resistant infections

This chapter explores people's knowledge and awareness of drug-resistant infections and how antibiotics work, as well as what people understand by the term 'drug-resistant infections' in their own words. It looks at how levels of understanding vary between different parts of the population, before considering how people's knowledge of antibiotics and drug-resistant infections is associated with people's behaviour when taking antibiotics.

Key findings

- A large majority of people (81%) had heard of the term 'drug-resistant infections' and feel they have at least some understanding of the term.
  - Over half reported having a good or very good understanding (57%)
  - When asked what the term 'drug-resistant infections' meant to them, most people talked about their 'effects' (i.e. resistance to, or ineffectiveness of, treatments). Relatively few people talked about 'causes' (e.g. diseases changing or adapting or the over- or mis-use of antibiotics).
- A large majority of people knew antibiotics can treat bacterial infections, but many people also thought they can treat viral infections, fungal infections, flu, colds or allergic reactions.
  - People with a correct understanding of what antibiotics can and cannot treat were more likely to report having a very good or good understanding of the term drug-resistant infections.
- People finding it more difficult financially, without degrees, and in BAME groups were less likely to report having a very good or good understanding of the term and less likely to correctly identify what antibiotics can and cannot treat.
- People with a greater self-reported understanding of drug-resistant infections were more likely to consider them a threat to public health.
- Appropriate antibiotic use was associated with whether people correctly identify what antibiotics can or cannot treat, but not with their self-reported understanding of drug-resistant infections.

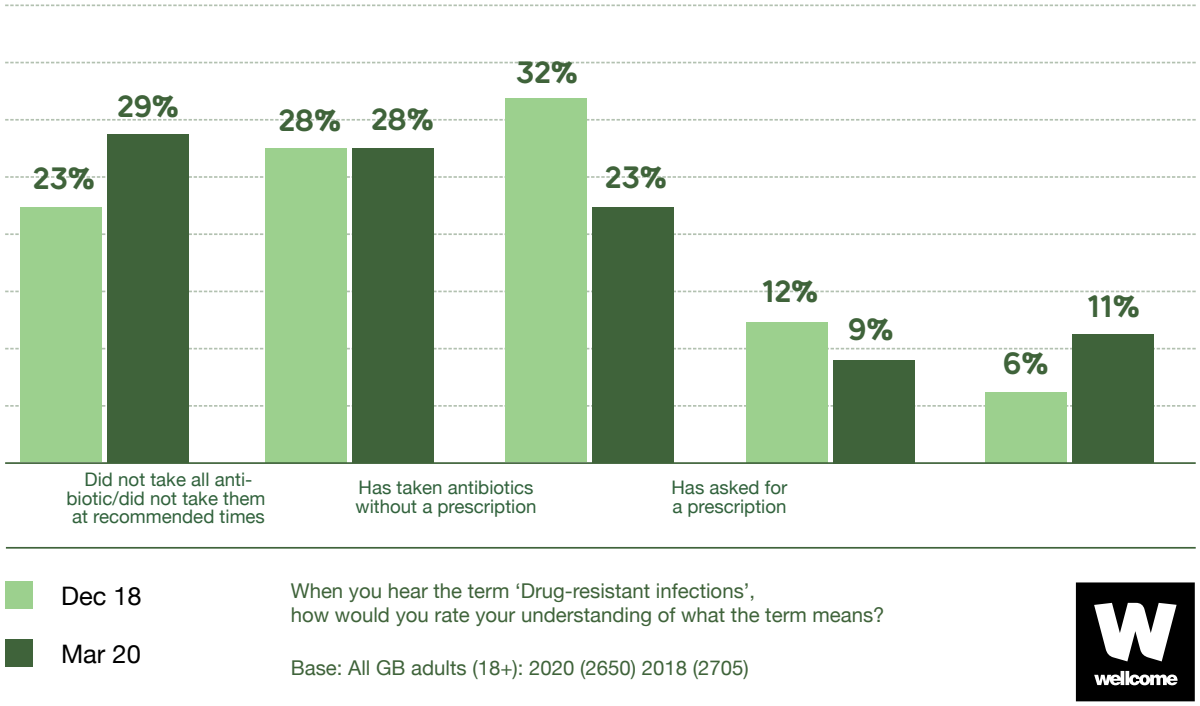
5.1 Knowledge and awareness of drug-resistant infections

A majority of people have heard of drug-resistant infections and have some understanding of them

Respondents were asked how they would rate their understanding of the term 'drug-resistant infections'. Reflecting patterns seen in 2018, a majority of people (81%) reported having at least some understanding of the term, and only a small minority (11%) reported not having heard of the term (Figure 5:1). It is also similar to the pattern seen in 2015, when 81% of people reported having at least some understanding of the term 'antibiotic resistance'[14].

14 Testing ahead of the 2018 wave of the Monitor suggested people were more familiar with the term 'antibiotic resistance' than 'drug resistant infections'

Figure 5:1 Self-reported understanding of drug-resistant infections: December 2018 & March 2020

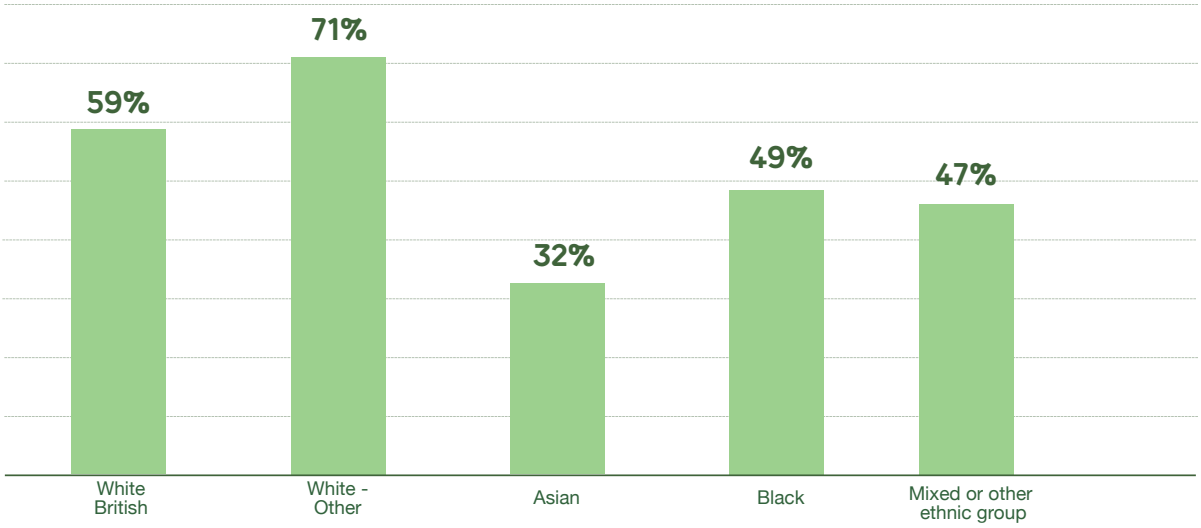


People finding it more difficult financially, without degrees, and in BAME groups have lower knowledge & awareness of drug-resistant infections

The 2018 Wellcome Monitor found that people with higher educational qualifications and in better financial circumstances were more likely to report higher levels of understanding of drug-resistant infections. This wave found similar relationships. While there was no significant variation by sex or age, people living comfortably/doing alright were more likely to report having a very good or good understanding of drug-resistant infections (61%) than people just about getting by (56%) or people finding things quite or very difficult (48%). Similarly, we find 69% of people with degrees or higher reported having a very good or good understanding of drug-resistant infections compared to 55% of people with other qualifications and 39% of people with no qualifications.

We also find that White people were more likely to report having a very good or good understanding of drug-resistant infections (60%, compared to 40% of people in BAME groups). Figure 5:2 shows that Asian people in particular were less likely to report a very good or good understanding of drug-resistant infections.

Figure 5:2 Percentage with a very good or good understanding of drug-resistant infections, by ethnicity



Dec 18

Mar 20

When you hear the term 'Drug-resistant infections', how would you rate your understanding of what the term means?

Base: All GB adults (18+). White British (2065), White Other (146), Black (99), Asian (173), Mixed/Other (106).

People with a better understanding of drug-resistant infections are more likely to consider them a risk to public health

People with a better understanding of drug-resistant infections were more likely to think they pose a very or fairly high risk. Ninety-two per cent of people with a very good or good understanding of drug-resistant infections thought they pose a risk, compared to 84% of people some or a little understanding.

Most of the public think about the 'effects' of drug-resistant infections while those with more knowledge also think about the 'causes'

Respondents were asked to say, in an open question, what the term 'drug-resistant infections' meant to them. Eighty-eight per cent of people were able to give a specific answer. Of these, most (77%) referred to resistance to, or ineffectiveness of, treatments, drugs or antibiotics – i.e. the 'effects of drug-resistant infections. A smaller proportion talked about the 'causes' – 15% mentioned diseases changing or adapting and 10% mentioned the over- or mis- use of drugs or antibiotics. Those who reported having a very good or good understanding of drug-resistant infections were more likely to mention diseases changing and the mis-use of antibiotics, suggesting a greater depth of understanding.

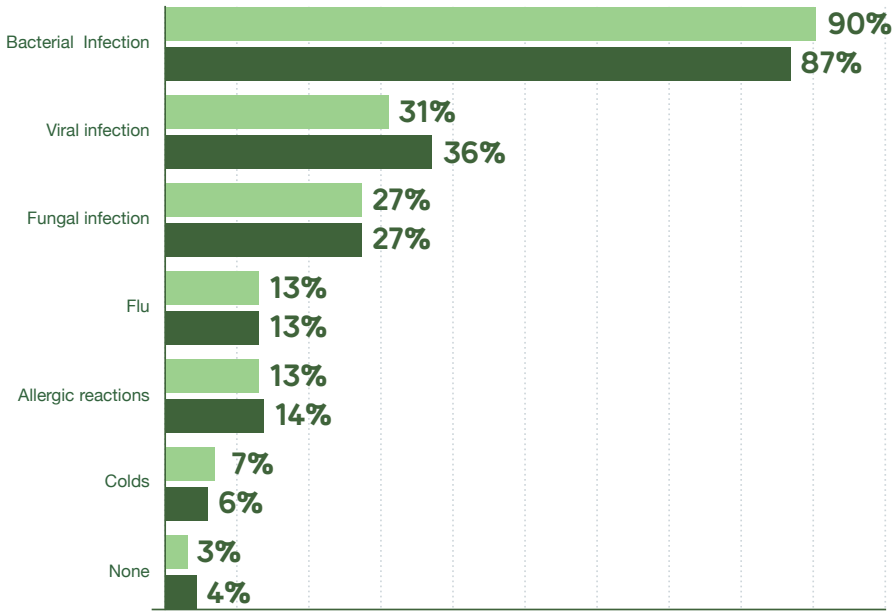
No other areas were mentioned by more than three per cent of those giving relevant answers. Despite the timing of this survey, only one per cent mentioned coronavirus, suggesting that the public were not associating the COVID-19 pandemic and drug-resistant infections at this time.

5.2. Knowledge of antibiotics

A large majority know antibiotics can treat bacterial infections, but many also think they can treat conditions they cannot

To establish levels of understanding of how antibiotics work, respondents were asked what types of conditions can be treated effectively by antibiotics. While a large majority of people (90%) correctly identified that bacterial infections can be treated by antibiotics, half (52%) incorrectly thought that they can treat at least one of viral infections, fungal infections, flu, colds or allergic reactions. Overall, 45% of people correctly identified that antibiotics can only treat bacterial infections. Similar patterns were seen in previous wave of the Monitor (Figure 5:3), when 43% of people correctly identified what antibiotics can and cannot treat.

Figure 5:3 Conditions that can be treated by antibiotics: December 2018 & March 2020



Which of the following conditions, if any, do you think can be treated effectively by antibiotics?

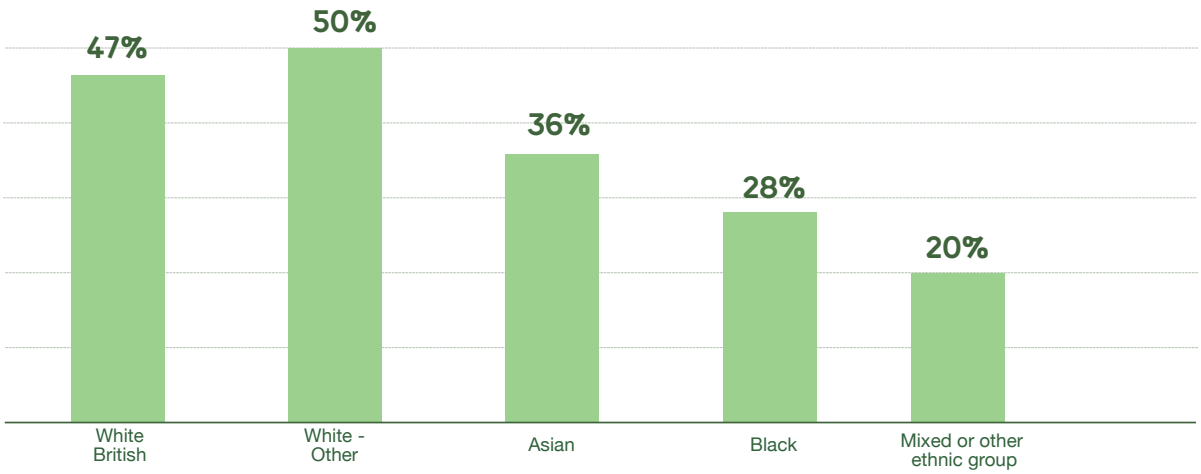
Base: All GB adults (18+): 2020 (2628) 2018 (2708)

People finding it more difficult financially, without degrees, and in BAME groups are less likely to have a correct understanding of what antibiotics can treat

The 2018 Wellcome Monitor also found that people with higher educational qualifications and in better financial circumstances were more likely to correctly identify what conditions can and cannot be effectively treated by antibiotics, and we again find similar patterns at this wave. People living comfortably/doing alright were more likely to correctly identify what antibiotics can and cannot treat (50%) than people just about getting by (42%) or people finding things quite or very difficult (36%). Similarly, we find 56% of people with a degree or higher were more likely to correctly identify what antibiotics can and cannot treat compared to 43% of people with other qualifications and 27% of people with no qualifications. Although there was no significant variation by age, we also find that women were more likely to correctly identify what antibiotics can and cannot treat than men (50% compared to 41%).

We also find that White people were more likely to correctly identify what antibiotics can and cannot treat (48%, compared to 30% of people in BAME groups). Figure 5:4 shows that, unlike with knowledge of drug-resistant infections, Black people and people of mixed or other ethnicities were less likely to correctly identify what antibiotics can and cannot treat.

Figure 5:4 Percentage with a very good or good understanding of drug-resistant infections, by ethnicity



Dec 18

Mar 20

Which of the following conditions, if any, do you think can be treated effectively by antibiotics?

Base: All GB adults (18+): White British (2050), White Other (146), Black (98), Asian (172), Mixed/Other (105).

People with a correct understanding of what antibiotics can and cannot treat were also more likely to have a better knowledge of drug-resistant infections

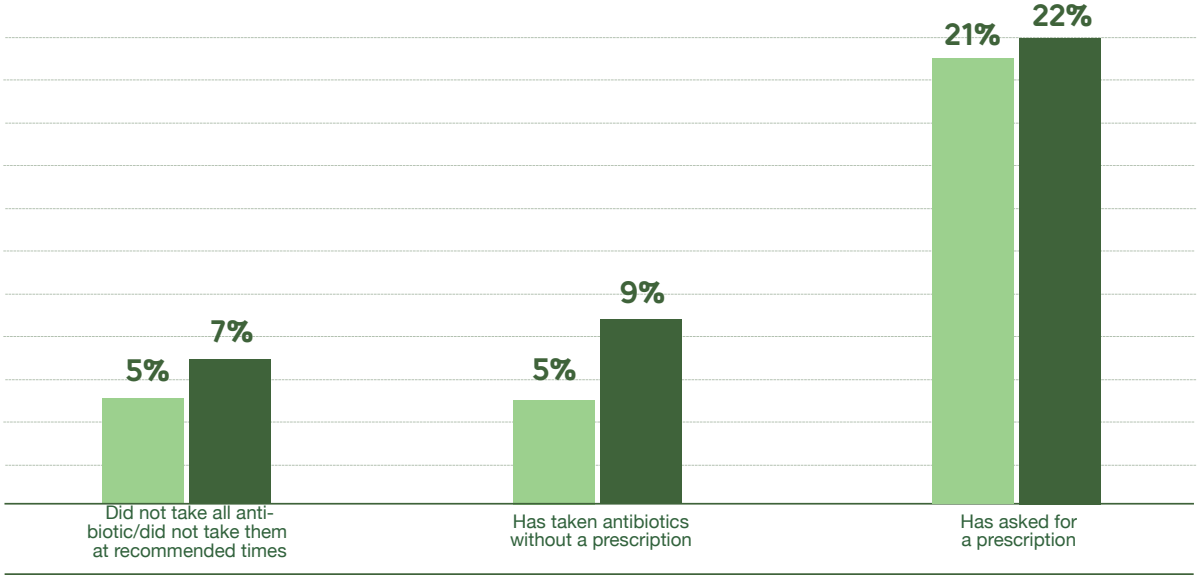
Reflecting the similarity in demographic patterns outlined above, people who correctly identified the types of conditions that can and cannot be treated by antibiotics were more likely to have a higher self-reported understanding of drug-resistant infections: 71% of people that correctly identified that only bacterial infections could be treated by antibiotics reported having a very good or good understanding of drug-resistant infections, compared to 46% people who answered incorrectly. Despite this strong association, there was still a sizeable minority (41%) of people who reported having a very good or good understanding of drug-resistant infections who thought that antibiotics could effectively treat conditions that they cannot.

5.3 Knowledge & awareness of drug-resistant infections and use of antibiotics

How people use antibiotics does not vary by understanding of drug-resistant infections, but it does vary by people's knowledge of what antibiotics can treat

Reflecting the patterns seen in Section 4 with the perceived risk of drug-resistant infections, people's knowledge of drug-resistant infections was not associated with people's behaviour when taking antibiotics. However, there is some indication that these behaviours are associated with knowledge of what antibiotics can treat. Figure 5:5 shows that people with an incorrect understanding of what antibiotics can and cannot treat were more likely than those with a correct understanding to not take all antibiotics or to not take them at the recommended times, and also to take antibiotics without a prescription. However, there was no significant difference in whether or not they had asked a medical professional for a prescription.

Figure 5:5 Percentage exhibiting antibiotic use behaviours by whether has a correct or incorrect understanding of how antibiotics work



When you were given the prescription, which of the following did you do?

Base: GB adults (18+) whose last antibiotics were prescribed. Correct understanding of how antibiotics work (1253), incorrect understanding how of how antibiotics work (1175)

Have you ever taken antibiotics you were not specifically prescribed?

Base: All GB adults (18+). Correct understanding of how antibiotics work (1291), incorrect understanding how of how antibiotics work (1273)

6. The role of the public in addressing drug-resistant infections

Optimising the consumption of antibiotics in humans and animals is a critical part of preventing drug-resistant infections from increasing. How people view their role in addressing drug-resistant infections may affect how they use antibiotics, or other behaviours that impact drug-resistant infections.

This chapter looks at people's attitudes to playing such a role. It also looks at how much impact people think their actions can have on drug-resistant infections, and views on how responsible people who take antibiotics are compared to those that produce, prescribe, and regulate them. It then looks at the public's views on actions that may help reduce drug-resistant infections: what they think is effective, what they're willing to do, and how that varies between demographic groups and with different attitudes towards drug-resistant infections.

Key findings

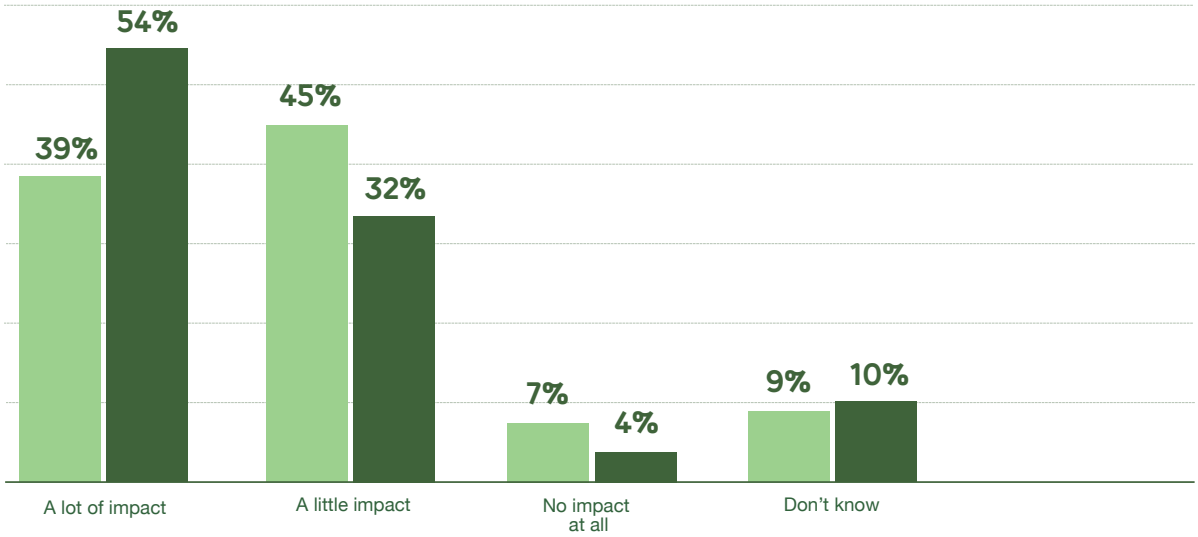
- Around half of people thought individuals like them can have a lot of impact on drug-resistant infections.
  - This has increased since 2018 among people who reported having at least some understanding of drug-resistant infections.
  - Despite this increase, people were still more likely to say the doctors or nurses who prescribe antibiotics and pharmaceutical companies who produce them are most responsible for addressing drug-resistant infections than those who use antibiotics.
  - People finding it more difficult financially, without degrees and in BAME groups were less likely to think that people like them can have a lot of impact on drug-resistant infections.
- People perceived following medical advice and taking antibiotics when prescribed as the actions most likely to be quite, very, or completely effective at addressing drug-resistant infections, and the actions they were most willing to take.
  - This was followed by ensuring good hand hygiene, and then asking a pharmacist for advice before visiting a GP, getting a flu vaccination, and taking unused antibiotics to a pharmacy.
  - A majority of people thought all of these actions would be quite, very, or completely effective and would be willing to do them.
- A minority thought reducing meat consumption would be effective at addressing drug-resistant infections and would be willing to do it. This may reflect that few people associate agriculture and drug-resistant infections: the agricultural industry was the least selected option for who is most responsible for addressing drug-resistant infections.
- People were more willing to take actions to address drug-resistant infections that they perceived to be more effective, and there was little difference between the proportion considering actions quite, very, or completely effective and the proportion willing to do them across actions.
- On average, women, older people, people in better financial circumstances, people with higher qualifications, and White people said they were willing to take up more of the presented actions to address drug-resistant infections.
- On average, people who reported having a greater understanding of drug-resistant infections, who view drug-resistant infections as a higher risk, and thought people like them can have more impact on drug-resistant infections, said they were willing to do more of the actions to address drug-resistant infections.
- On average, people who had used antibiotics inappropriately said they were willing to do fewer of the actions to address drug-resistant infections.
  - In particular, people who said they were willing to follow medical advice on when and how to take antibiotics were more likely to previously have taken all their antibiotics at the correct times, and people who said they would be willing to only take antibiotics prescribed by a medical professional were less likely to have ever taken antibiotics without a prescription.

6.1 The responsibility for addressing drug-resistant infections

More people think people like them can have a lot of impact on drug-resistant infections than in 2018

About half (49%) of people thought individuals such as themselves can have a lot of impact on drug-resistant infections. Looking at those who reported having at least some understanding of drug-resistant infections, 54% of people thought people like themselves can have a lot of impact on drug-resistant infections, increasing by fifteen percentage points since 2018 (Figure 6:1). This may reflect the role the public have been asked to play in addressing the COVID-19 pandemic by changing their behaviour, making them feel they can have more impact on public health issues.

Figure 6:1 How much impact individual people can have on drug-resistant infections: December 2018 & March 2020



Dec 18

Mar 20

When you were given the prescription, which of the following did you do?

Base: GB adults (18+) whose last antibiotics were prescribed. Correct understanding of how antibiotics work (1253), incorrect understanding how of how antibiotics work (1175)

Have you ever taken antibiotics you were not specifically prescribed?

Base: All GB adults (18+). Correct understanding of how antibiotics work (1291), incorrect understanding how of how antibiotics work (1273)

People in BAME groups, with lower incomes and with fewer qualifications are less likely to think they can have an impact on drug-resistant infections

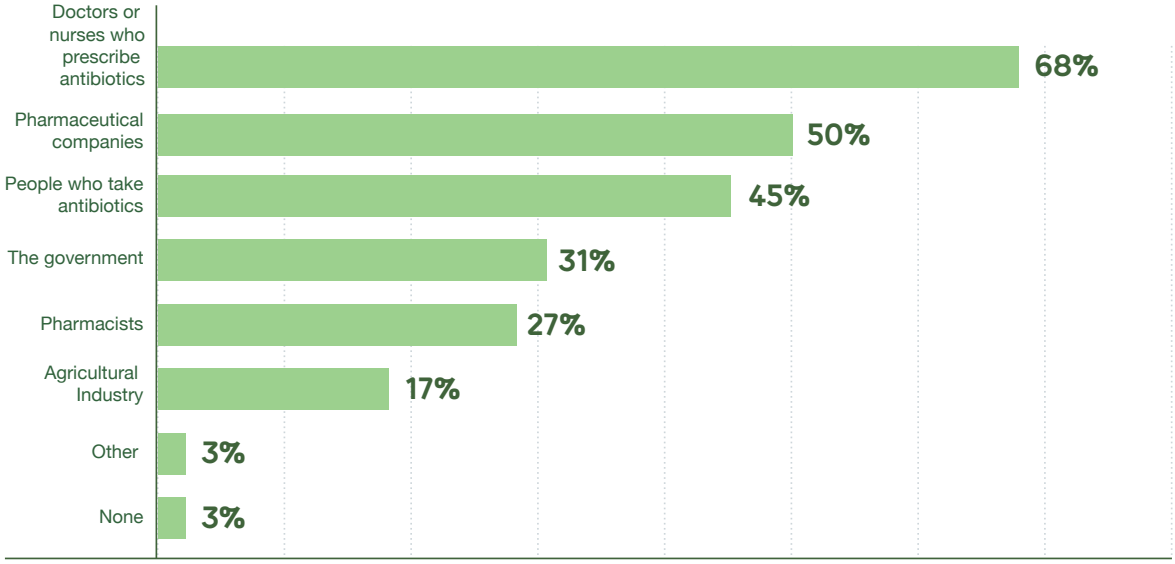
Reflecting the patterns seen in knowledge and perceived risk of drug-resistant infections, we find that people in in BAME groups, with lower incomes and with fewer qualifications were less likely to think people like them could have a lot of impact on drug-resistant infections. Fifty-one per cent of White people thought people like them could have a lot of impact compared to 38% of people in BAME groups, and 55% of people with equivalised household incomes of more than £1250 per month thought they could have a lot of impact compared to 43% of people with an equivalised household income of £1250 or less. Similarly, we find 57% of people with degrees or higher thought people like them could have a lot of impact compared to 48% of people with other qualifications and 32% of people with no qualifications.

People are most likely to think doctors or nurses are most responsible for addressing drug-resistant infections

However, reflecting patterns seen in 2018, when asked who they thought is the most responsible for addressing drug-resistant infections people were most likely to say the doctors or nurses who prescribe antibiotics. This was followed by pharmaceutical companies and people who take antibiotics, and then the government and pharmacists. The agricultural industry was seen as least responsible despite significant contributions to drug-resistant infections15 (Figure 6:2).

15 https://amr-review.org/sites/default/files/Antimicrobials%20in%20agriculture%20and%20the%20environment%20-%20Reducing%20unnecessary%20use%20and%20waste.pdf

Figure 6:2 Who is most responsible for addressing drug-resistant infections



Which, if any, of the following do you think are most responsible for addressing drug resistant infections...?

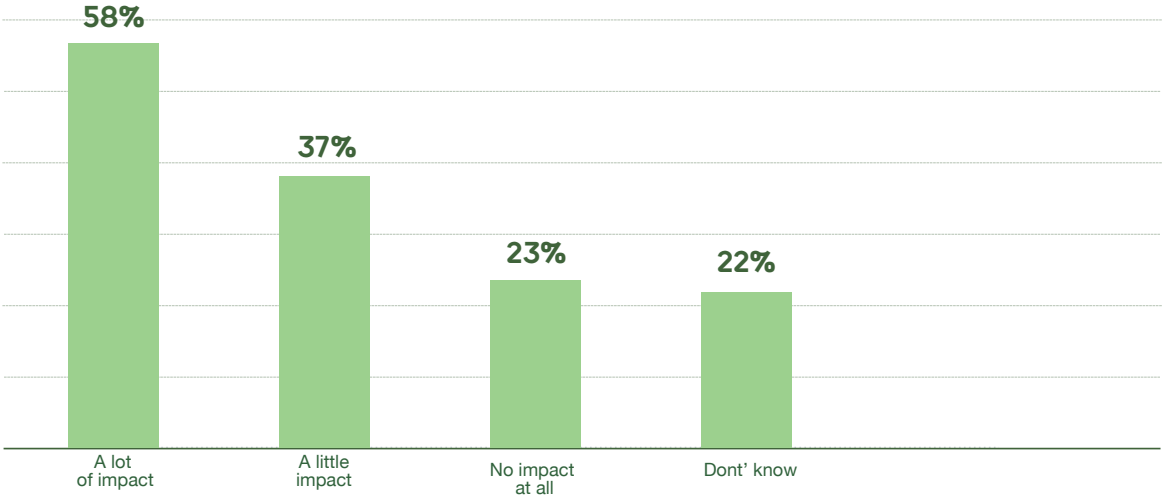
Base: All GB adults (18+): 2591

Reflecting demographic patterns in whether people feel like people like them can have an impact on drug-resistant infections, people in BAME groups, with lower incomes and with fewer qualifications were less likely to say people who take antibiotics are most responsible for addressing drug-resistant infections. However, we also find that younger people were more likely to think people who take antibiotics are most responsible. Fifty-two per cent of people aged 18-39 said people who take antibiotics are most responsible for addressing drug-resistant infections, compared to 44% of people aged 40-59 and 39% of people aged 60+.

People who think they can have a lot of impact are still more likely to think doctors are most responsible

As might be expected, people who thought people like them can have a lot of impact on drug-resistant infections were more likely to say people who take antibiotics are most responsible for addressing drug-resistant infections (Figure 6:3). However, this group was also more likely to think doctors or nurses who prescribe antibiotics are most responsible (76%), and the overall pattern remains similar between groups, although they were also less likely to say that pharmaceutical companies are most responsible for addressing drug-resistant infections.

Figure 6:3 Percentage saying people who take antibiotics are most responsible for addressing drug-resistant infections, by how much impact individual people can have on drug-resistant infections



Which, if any, of the following do you think are most responsible for addressing drug resistant infections...? How much impact do you think that the actions of individual people like yourself can have on drug-resistant infections?

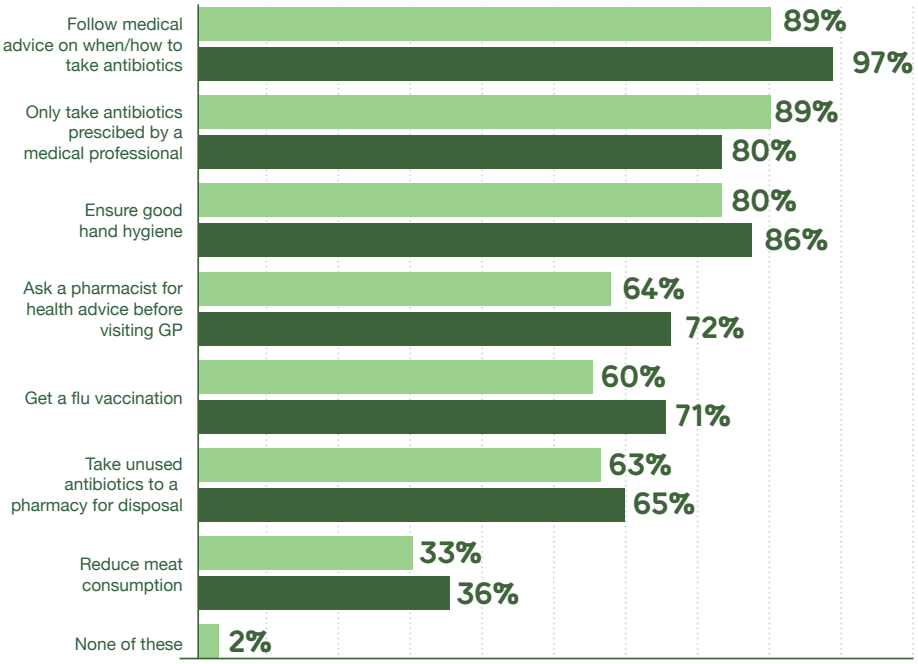
Base: All GB adults (18+). 'A lot of impact' (1388), 'A little impact' (786), 'No impact' (110), 'Don't know' (322).

6.2 Perceived effectiveness and willingness to take actions to address drug-resistant infections

People's willingness to take actions to address drug-resistant infections is associated with how effective they perceive them to be

Respondents were asked how effective a range of actions would be at reducing drug-resistant infections if everyone in the UK did them, and then which of them they would be willing to do themselves. In general, more people viewed the actions as quite, very, or completely effective than reported being willing to do them, and the actions more people perceived as effective were also those that more people were willing to do (Figure 6:4)

Figure 6:4 Who is most responsible for addressing drug-resistant infections



How effective do you think each of the following would be at reducing drug-resistant infections if everyone in the UK did them...?

Base: All GB adults (18+). Asking a pharmacist for health advice before visiting a GP (2501), Taking unused antibiotics to a pharmacy for disposal (2346), Getting flu vaccinations (2342), Only taking antibiotics prescribed by a medical professional (2577), Following professional medical advice on when and how to take antibiotics (2579), Reducing meat consumption (1940), Ensuring good hand hygiene (2498).

Which, if any, of the following would you be willing to do to reduce drug-resistant infections..?

Base: All GB adults (18+): 2646.

People are already doing the actions they are most willing to do

People perceived following medical advice and taking antibiotics when prescribed as the actions most likely to be quite, very, or completely effective and the actions they were most willing to take. This was followed by ensuring good hand hygiene, and then asking a pharmacist for advice before visiting a GP, getting a flu vaccination, and taking unused antibiotics to a pharmacy.

The same groups who were less likely to report using antibiotics appropriately (Section 4) were also less likely to be willing to take these more common actions to address drug-resistant infections.

Younger people were less willing to do even the more common actions: eighty-nine percent of those aged 18-29 were willing to follow professional medical advice when taking antibiotics, dropping to 83% amongst 30-39 year olds, then rising again to 89% amongst those 40-59. People aged over 60 were most likely to be willing (92%).

Younger people were also less likely to be willing to only take prescribed antibiotics. Eighty-six percent of those aged 18-49 said they would be willing to do this, compared to 92% of those over 50.

Similarly, those who said they were finding it harder financially were also less likely to say they would only take antibiotics prescribed by a medical professional (77% of those finding it very difficult, compared to 88% of people just about getting by or finding it quite difficult, and 91% of those doing alright or living comfortably).

Reducing meat consumption sticks out as the only action a minority viewed as effective and would be willing to do. This perhaps reflects a lack of connection in the public's mind between use of antibiotics in agriculture and drug-resistant infections: fewer than one per cent of people mentioned food/meat/animals when asked what they understood by the term 'drug-resistant infections', and the agricultural industry was identified as responsible for addressing drug-resistant infections by the smallest number of people.

There was little variation in willingness to reduce meat consumption between demographic groups. People with degrees were more likely to say they were willing to reduce meat consumption (42% compared to 27% of people with other or no qualifications), but there was no significant variation by sex, age or ethnicity. There was also no significant variation by how people felt they were managing financially, but people with higher household incomes were more likely to say they would be willing to reduce meat consumption (37% with a monthly household income of more than £2,000, 33% of people with incomes of £801 to £2,000, and 26% of people with incomes of £800 or less).

Table 6:1 looks more directly at the association between perceived effectiveness of actions and people's willingness to do them. In most instances where people view an action as completely or very effective a large majority expressed a willingness to do it. As noted above, the three options people were most willing to do are things people seem to be doing anyway – a majority said they would follow medical advice, only take prescribed antibiotics and ensure good hand hygiene even if they did not view these as effective actions for addressing drug-resistant infections. Meat consumption again sets itself apart, with a relatively small proportion of people who viewed it as completely or very effective willing to take it up.

Table 6:1 Percentage willing to do different actions to reduce drug-resistant infection by how effective they think those would be

Base: GB adults (18+)	Completely	Very	Quite	A little/ not at all
	%	%	%	%
Only take antibiotics prescribed by a medical professional	94	93	82	52
Follow professional medical advice on when and how to take antibiotics	92	92	78	63
Ensure good hand hygiene	85	86	83	60
Ask a pharmacist for health advice before visiting a GP	87	81	71	37
Take unused antibiotics to a pharmacy for disposal	82	78	71	48
Get flu vaccination	88	79	59	35
Reduce meat consumption	58	76	60	21
Unweighted base	63 - 1,011	194 - 1,299	259 - 834	63 - 1,295

How effective do you think each of the following would be at reducing drug-resistant infections if everyone in the UK did them...?
Which, if any, of the following would you be willing to do to reduce drug-resistant infections...?

Willingness to take actions varied between demographic groups

Reflecting that a majority of people reported being willing to take up most of the actions to help address drug-resistant infections, on average people were willing to do 4.8 out of 7 of the actions. However, this varied between different groups: on average, women, people aged 60+, people with higher household incomes, people with higher qualifications, and White people said they were willing to take up more of the presented actions to address drug-resistant infections.

Women, older people, White people and people with higher qualifications were generally more likely to take up actions to reduce drug-resistant infections

by sex, we found that women were equally or more likely to be willing to take up all actions than men. Appendix Table A:1 shows that women were more likely to say they would ask a pharmacist for health advice before visiting a GP (72%, compared to 57% of men), take unused antibiotics to a pharmacy for disposal (66%, compared to 61% of men), and get flu vaccinations (63%, compared to 55% of men).

Willingness to take up actions to reduce drug-resistant infections also varied by age. Appendix Table A:2 shows that older people, but also the youngest age group, were more likely to be willing to get a flu vaccination (61% of 18-29 year olds, 51% of 30-39 year olds, 54% of 40-49 year olds, 53% of 50-59 year olds, 64% of 60-69 year olds, and 76% of those 70+), but also to take up the more 'common' actions of only taking antibiotics prescribed by a medical professional, and follow professional medical advice on when and how to take antibiotics in order to help address drug-resistant infections.

Willingness to take up actions to reduce drug-resistant infections varied substantially by ethnicity, with White people more likely than people in BAME groups to be willing to take all actions other than reducing meat consumption. Appendix Table A:3 shows that Asian people in particular were less likely to be willing to take up most of the actions, although Black people were particularly less likely to say they are willing to get a flu vaccination.

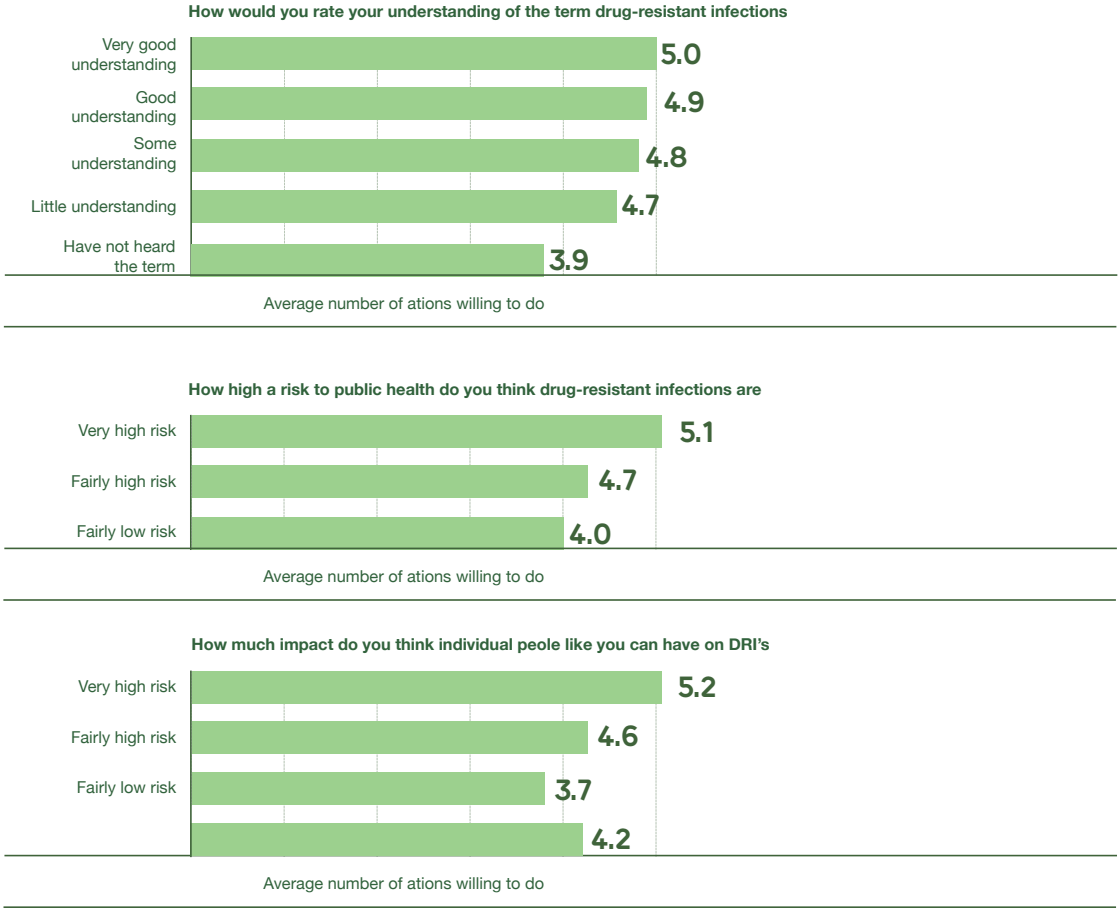
Variation was also found in willingness to take up activities by people's financial circumstances. Appendix Table A:5 shows that people finding it harder financially were less likely to be willing to do the more 'common' actions to only take prescribed antibiotics and follow professional medical advice on when and how to take antibiotics. Across the actions, those finding it very difficult stick out as particularly less willing to take up the actions compared to the other groups.

Finally, willingness to do certain actions to reduce drug-resistant infections also varied by highest qualification. Appendix Table A:4 shows that people with a degree or other qualifications were more likely than people without any qualifications to be willing to only take prescribed antibiotics, follow professional medical advice when taking antibiotics, reduce meat consumption, and ensure good hand hygiene in order to address drug-resistant infections.

Willingness to take up actions is associated with self-reported knowledge and attitudes to drug-resistant infections

We also find that the number of activities people were willing to take up was associated with people's understanding of and attitudes towards drug-resistant infections. Figure 6:5 shows that people who had heard of drug-resistant infections, who viewed it as a greater risk to public health and thought that individuals like them can have more impact on drug-resistant infections were, on average, willing to take up more of the measures to address drug-resistant infections.

Figure 6:5 Average number of actions willing to do by understanding of drug-resistant infections, perceived risk of drug-resistant infections, and amount of impact people think they can have on drug-resistant infections



When you hear the term 'Drug-resistant infections', how would you rate your understanding of what the term means?

Base: All GB adults (18+): Very good understanding (864), good understanding (801), some understanding (597), have heard the term but little understanding of what it means (193), have not heard the term (191).

How high a risk to public health, if at all, do you think drug resistant infections are?

Base: All GB adults (18+): Very high risk (1234), fairly high risk (1080), fairly low risk/no risk at all (286).

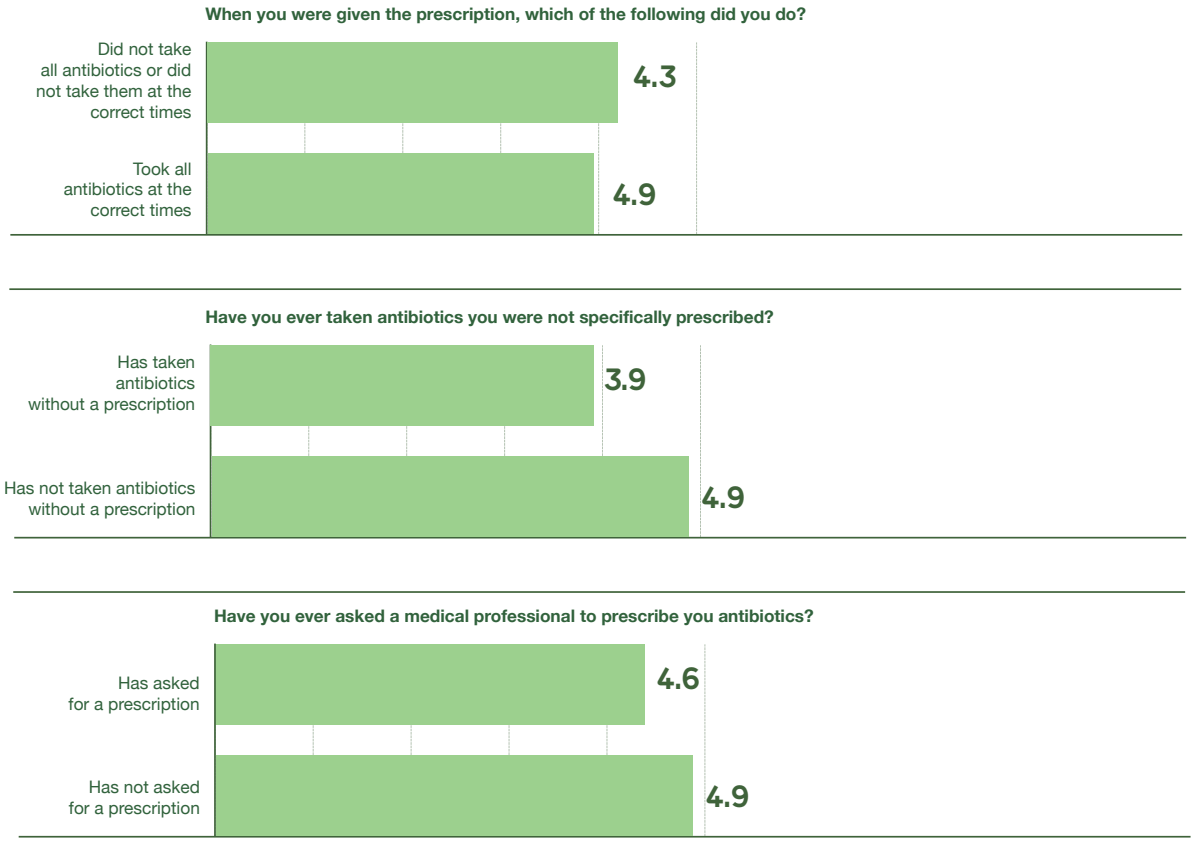
How much impact do you think that the actions of individual people like yourself can have on drug resistant infections?

Base: All GB adults (18+): 'A lot of impact' (1395), 'A little impact' (793), 'No impact at all' (111), 'Don't know' (346)

Willingness to take up actions is associated with people's existing use of antibiotics

People who exhibited behaviours that can contribute to drug-resistant infections are were less likely to be willing to take actions to address them. Figure 6:6 shows that people who did not take all their antibiotics or did not take them at the correct times, people who have ever taken antibiotics without a prescription, and people who have asked for a prescription all, on average, said they were willing to take fewer actions to address drug-resistant infections.

Figure 6:6 Average number of actions willing to do by antibiotic use behaviours



When you were given the prescription, which of the following did you do?

Base: GB adults (18+) whose last antibiotics were prescribed: Did not take all antibiotics or did not take them at the correct times (128); Took all antibiotics at the correct times (2250).

Have you ever taken antibiotics you were not specifically prescribed?

Base: All GB adults (18+): Has taken antibiotics without a prescription (176); Has not taken antibiotics without a prescription (2406).

Have you ever asked a GP or other medical professional to prescribe you antibiotics?

Base: All GB adults (18+): Has asked for a prescription (568); Has not asked for a prescription (2014).

Looking at willingness to do specific actions, people who said they are willing to do certain actions were more likely to be people who were already exhibiting those behaviours. Ninety-two per cent of people who said they were willing to follow professional medical advice on when and how to take antibiotics took all the antibiotics they were prescribed at the recommended times the last time they were prescribed antibiotics, compared to 83% of people who did not say they were willing to do it.

Similarly, only six per cent of people who said they would be willing to only take antibiotics prescribed by a medical professional had ever previously taken antibiotics not prescribed to them, compared to 22% of people who did not say they would be willing to do it.

7. Conclusion

This report looks at British adults' attitudes, understanding, and behaviour related to drug-resistant infections and antibiotic use. It explores the extent to which people view drug-resistant infections as a risk to public health, their understanding of antibiotics, and their behaviours when taking them which might contribute to infections becoming resistant to drugs. Finally, it looks at how the public see their role in addressing drug-resistant infections.

With COVID-19 potentially contributing to increased drug resistant infections, keeping them on the agenda will be even more important [16, 17],. However, Chapter 3 finds that, amidst the global COVID-19 pandemic, fewer people in Britain see drug resistant infections as a very high risk to public health than in 2018. Despite this, a large majority of people think drug-resistant infections are a risk to public health, although this perception is not consistent across the population. Younger people, people in BAME groups, and people in worse financial circumstances were all less likely to view drug-resistant infections as a high risk. With people in BAME groups and people struggling financially being more negatively impacted by COVID-19[18, 19], and emerging evidence that they are also more at risk of antimicrobial resistant infections[20 ,21], raising awareness will be especially important to ensure the communities most affected don't recover from one health crisis only to fall into another.

Chapter 4 then looked at the prevalence of antibiotic behaviours which might contribute to an increase in drug-resistant infections – not taking all of the antibiotics, not taking them at the recommended times, taking antibiotics without a prescription, and asking a medical professional to prescribe them. The vast majority of people use antibiotics appropriately, although younger people, those struggling financially, and those less confident in making decisions about their health were more likely not to. Those more confident in making decisions about their health, those struggling financially, and women were all more likely to have asked a GP or healthcare professional for a prescription. While patient requests for antibiotics have been found to encourage increased prescriptions[22, 23, 24, 25] and while reduced antibiotic use in humans (by 15% by 2024) is a key aim of the UK government's national action plan[26] for reducing antimicrobial resistance, simply reducing prescriptions could have unequal impacts on those in need of antibiotics. Better understanding of the drivers behind patient requests will be critical where optimising (and not just reducing) the use of antibiotics is sought. For example, women are more likely to require antibiotics for common UTIs and are often less believed by healthcare professionals with regards to symptoms; those struggling financially may have greater urgency when unwell to return to work.

However, prevalence of appropriate antibiotic use behaviours was not associated with people's understanding of drug-resistant infections or how high a risk they viewed them. Instead, we find people's behaviour is associated with their knowledge of what antibiotics can and cannot treat, and their confidence in making decisions about their health. This 'disconnect' could reflect a number of things. Firstly, it could reflect that when people think

16 https://www.bmj.com/content/369/bmj.m1983
17 https://www.who.int/bulletin/volumes/98/7/20-268573/en/
18 https://www.understandingsociety.ac.uk/sites/default/files/downloads/working-papers/2020-10.pdf
19 https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/articles/ronaviruscovid19relateddeathsbyethnicgroupenglandandwales/2march2020to15may2020
20 https://www.reactgroup.org/wp-content/uploads/2019/02/When-the-Drugs-Don%E2%80%99t-Work-Antibiotic-Resistance-as-a-Global-Development-Problem-Feb-2019.pdf
21 https://pdfs.semanticscholar.org/84ab/0b5ceddd52c26994e79a9a4321d6041d96d0.pdf
22 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/774129/Behaviour_Change_for_Antibiotic_Prescribing_-_FINAL.pdf
23 https://www.bmj.com/content/315/7121/1482
24 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4232501/
25 Cole A. (2014) GPs feel pressurised to prescribe unnecessary antibiotics, survey finds. BMJ 349: g5238
26 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784894/UK_AMR_5_year_national_action_plan.pdf

about drug-resistant infections they appear to think about the 'effects', but not necessarily the 'causes' (as shown in Chapter 5), and they may not relate concerns about drug-resistant infections to their own antibiotic use as a possible contributing factor. Alternatively, it could reflect people not viewing addressing drug-resistant infections as their responsibility, so although many people view them as a high risk, it is not changing how they behave: Chapter 6 shows that people are more likely to say those who prescribe antibiotics or pharmaceutical companies that produce them are most responsible for addressing drug-resistant infections than people who take them.

However, despite this, Chapter 6 also shows that most people would be willing to do most of the actions we presented for addressing drug-resistant infections (from taking antibiotics along recommended guidelines, to getting flu vaccinations, and disposing of antibiotics at the pharmacy). Willingness to take these actions is associated with how effective they are perceived to be, people's awareness of drug-resistant infections and perceptions of them as a risk to public health. Those more likely to take antibiotics appropriately were also more willing to take these actions.

An exception to this relatively high level of willingness to take actions is reducing meat consumption, which only a minority thought is effective or were willing to do, albeit still one in three. This may in part reflect a lack of awareness of the connection between drug resistant infections and agriculture – few people felt the agricultural industry is most responsible for addressing drug-resistant infections.

Promisingly, almost half of people think people like them can have a lot of impact on drug-resistant infections, increasing since 2018. This is something Wellcome has been campaigning for as part of, among other activities, its Reframing Resistance work. Given fieldwork for this study took place at the start of lockdown during the first wave of coronavirus in the UK, it is possible that the role the public been asked to play in addressing the COVID-19 pandemic has contributed to this increased sense of agency. To allow current antibiotics to last longer, help the sustainability of the new antibiotic development pipeline, and enable the effectiveness of modern medicine to continue, it could be an opportune time to translate this increased agency to action and support the public in playing their role in reducing drug resistant infections.

Appendix A. Willingness to do actions to address drug-resistant infections

This section summarises variation in willingness to do actions to address drug-resistant infections by sex, age, ethnicity, education level and financial circumstances. Variation is statistically significant in highlighted rows.

Sex

Appendix table A:1 Percentage willing to do actions to address drug-resistant infections, by sex

Base: GB adults (18+)	Male	Female	Total
	%	%	%
Only take antibiotics prescribed by a medical professional	89	90	89
Follow professional medical advice on when and how to take antibiotics	87	90	89
Ensure good hand hygiene	78	82	80
Ask a pharmacist for health advice before visiting a GP	57	72	64
Take unused antibiotics to a pharmacy for disposal	61	66	63
Get flu vaccination	55	63	60
Reduce meat consumption	31	35	33
None	3	2	2
Unweighted bases	1110	1536	2646

Which, if any, of the following would you be willing to do to reduce drug-resistant infections?

Age

Appendix table A:2 Percentage willing to do actions to address drug-resistant infections, by age group

Base: GB adults (18+)	18-29	30-39	40-49	50-59	60-69	70+	Total
	%	%	%	%	%	%	%
Only take antibiotics prescribed by a medical professional	87	85	87	91	92	94	89
Follow professional medical advice on when and how to take antibiotics	89	83	88	90	92	92	89
Ensure good hand hygiene	83	73	79	81	79	83	80
Ask a pharmacist for health advice before visiting a GP	69	66	65	63	64	61	64
Take unused antibiotics to a pharmacy for disposal	66	58	59	63	66	69	63
Get flu vaccination	61	51	54	53	64	76	60
Reduce meat consumption	34	35	33	32	30	32	33
None	3	4	3	1	0	1	2
Unweighted bases	220	431	473	509	507	498	2646

Which, if any, of the following would you be willing to do to reduce drug-resistant infections?

Ethnicity

Appendix table A:3 Percentage willing to do actions to address drug-resistant infections, by ethnic group

Base: GB adults (18+)	White British	White Other	Asian	Black	Mixed/ Other	Total
	%	%	%	%	%	%
Only take antibiotics prescribed by a medical professional	92	91	65	80	75	89
Follow professional medical advice on when and how to take antibiotics	91	85	80	76	81	89
Ensure good hand hygiene	83	76	60	61	75	80
Ask a pharmacist for health advice before visiting a GP	69	50	42	44	56	64
Take unused antibiotics to a pharmacy for disposal	67	59	41	53	46	63
Get flu vaccination	64	53	43	22	47	60
Reduce meat consumption	32	31	24	40	40	33
None	1	2	5	1	8	2
Unweighted bases	2064	146	171	99	106	2646

Which, if any, of the following would you be willing to do to reduce drug-resistant infections?

Education level

Appendix table A:4 Percentage willing to do actions to address drug-resistant infections, by highest qualification

Base: GB adults (18+)	Degree	Other qualification	No qualification	Total
	%	%	%	
Only take antibiotics prescribed by a medical professional	92	89	84	89
Follow professional medical advice on when and how to take antibiotics	91	89	82	89
Ensure good hand hygiene	82	81	73	80
Ask a pharmacist for health advice before visiting a GP	64	68	58	64
Take unused antibiotics to a pharmacy for disposal	66	63	59	63
Get flu vaccination	61	57	63	60
Reduce meat consumption	42	26	30	33
None	2	2	3	2
Unweighted bases	1197	1161	280	2646

Which, if any, of the following would you be willing to do to reduce drug-resistant infections?

Financial circumstances

Appendix table A:5 Percentage willing to do actions to address drug-resistant infections, by financial circumstances

Base: GB adults (18+)	White British	White Other	Asian	Black	Mixed/ Other	Total
	%	%	%	%	%	%
Only take antibiotics prescribed by a medical professional	92	91	88	89	77	89
Follow professional medical advice on when and how to take antibiotics	90	90	88	89	75	89
Ensure good hand hygiene	79	82	80	79	65	80
Ask a pharmacist for health advice before visiting a GP	63	65	64	70	58	64
Take unused antibiotics to a pharmacy for disposal	65	64	65	62	48	63
Get flu vaccination	63	60	61	55	48	60
Reduce meat consumption	34	33	33	31	29	33
None	1	1	3	2	5	2
Unweighted bases	571	1036	668	231	132	2646

Which, if any, of the following would you be willing to do to reduce drug-resistant infections?

Wellcome supports science to solve the urgent health challenges facing everyone. We support discovery research into life, health and wellbeing, and we're taking on three worldwide health challenges: mental health, global heating and infectious diseases.

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