



# What do European doctors know about antibiotics and antibiotic resistance?



This report was prepared by the Standing Committee of European Doctors (CPME) with the help of the Danish Medical Association (Laegeforeningen).

The report is based on data collected by the European Centre for Disease Prevention and Control (ECDC) study on healthcare workers' knowledge and attitudes about antibiotics and antibiotic.

The Standing Committee of European Doctors represents national medical associations across Europe. We are committed to contributing the medical profession's point of view to EU institutions and European policy-making through pro-active cooperation on a wide range of health and healthcare related issues.

For more information, please visit our website: <http://www.cpme.eu>

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PDF

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## Executive summary

7351 doctors from the European Union (EU)/European Economic Area (EEA) participated in a survey on healthcare professionals' knowledge and attitudes about antibiotics and antibiotic resistance. The results demonstrate that doctors possess a basic knowledge about prudent use of antibiotics and the risk of resistance. Even though more than 70% of respondents agreed that they have good opportunities to provide advice on prudent antibiotic use to individuals, when it comes to practice the lack of resources (leaflets and pamphlets) and insufficient time set barriers for doing so.

CPME highlighted the importance of prudent use of antibiotics in its 2013 position paper on antibiotic resistance. In this paper, CPME calls upon

- doctors to follow the guidelines on the prudent use of antibiotics, which means only prescribing antibiotics when necessary and ensuring use in correct dosage intervals and for the correct duration.
- CPME members to give priority to education on and audit of the use of antibiotics.

The establishment of antibiotic stewardships are important tools in implementing clinical guidelines, education and, not least, creating valuable data for audit on the local use of antibiotics. With 29% of doctors surveyed contributing to/leading antimicrobial stewardship programmes, there still seems to be some way to go before antibiotic stewardships become widespread in hospitals.

Along the same lines, the need for more information about avoiding unnecessary prescribing, administering or dispensing of antibiotics from the workplace is identified, necessitating action from hospital owners, among others.

Last but not least, there is still a long way to go in familiarising doctors with European Antibiotic Awareness Day (EAAD) and World Antibiotic Awareness Week (WAAW), and even longer in getting doctors to work as ambassadors for EAAD and WAAW. This is not down to resistance on the part of doctors, but rather their limited resources and insufficient time.

*The information contained in this report results from a survey performed by Public Health England (PHE) for the European Centre for Disease Prevention and Control (ECDC) under a specific service contract (ECD.8836)*

Public Health England (PHE) launched a multilingual survey on 28 January 2019, funded by the European Centre for Disease Prevention and Control (ECDC). The aim of the survey was to gain a greater understanding of health professionals' knowledge and attitudes towards antibiotics and antibiotic resistance. The results of the survey were released on 18 November 2019 to mark European Antibiotic Awareness Day 2019.<sup>1</sup>

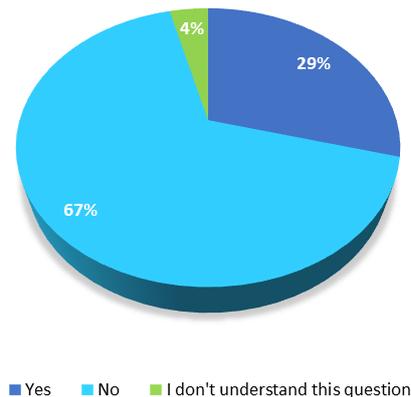
Country	Number of respondents	Country	Number of respondents
Austria	366	Italy	890
Belgium	177	Latvia	138
Bulgaria	7	Lithuania	80
Croatia	40	Luxembourg	7
Cyprus	65	Malta	6
Czech Republic	936	Netherlands	119
Denmark	251	Norway	616
Estonia	35	Poland	363
Finland	81	Portugal	74
France	376	Romania	314
Germany	151	Slovakia	221
Greece	38	Slovenia	60
Hungary	105	Spain	1080
Iceland	3	Sweden	262
Ireland	63	United Kingdom	427

This report is based on answers from the 7351 doctors from the European Union (EU)/European Economic Area (EEA) who participated in the survey. The data presented by the Standing Committee of European Doctors (CPME) in this survey was kindly shared by ECDC in order to disseminate it to a wider audience. The survey questions explored both the extent of participants' knowledge about antibiotics, their appropriate use, possible risks and side effects, as well as how informed, involved and supported European doctors felt in their efforts in promoting prudent use of antibiotics.

<sup>1</sup> European Centre for Disease Prevention and Control, Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance in the EU/EEA, November 2019, Available at: <https://www.ecdc.europa.eu/en/publications-data/survey-healthcare-workers-knowledge-attitudes-and-behaviours-antibiotics>

## 1. In your current role are you contributing to/ leading antimicrobial stewardship programmes or tackling AMR?

The first question explores the prevalence of antimicrobial stewardship programmes in the EU/EAA. 29% (N=2146) of respondents indicated that they are part of antimicrobial stewardship programmes. The remaining doctors who participated in the survey had either not had the opportunity to engage in such teams (67% | N=4917), or did not understand the question (4% | N=288).



CPME highlighted the importance of prudent use of antibiotics in its position paper on antibiotic resistance<sup>2</sup>. In this paper CPME among others calls upon

- doctors to follow the guidelines on the prudent use of antibiotics, which means only prescribing antibiotics when necessary and ensuring use in correct dosage intervals and for the correct duration.
- CPME member states to give priority to education on and audit of the use of antibiotics.

The establishment of antibiotic stewardships are important tools in implementing clinical guidelines, education and, not least, creating valuable data for audit on the local use of antibiotics.

The answers to Question 1 of the survey indicate that there is room for improvement.

In order to increase the uptake in antibiotic stewardship teams, ECDC has made available an infographic which highlights the threat that antibiotic resistance poses and the effectiveness of antibiotic stewardship programmes in addressing the issue from different angles<sup>3</sup>. In addition, a set of key messages provides further information on why hospitals should be promoting antibiotic stewardship<sup>4</sup>. These publicly available resources should be used by doctors to advocate for the implementation of antibiotic stewardships in the health sector.

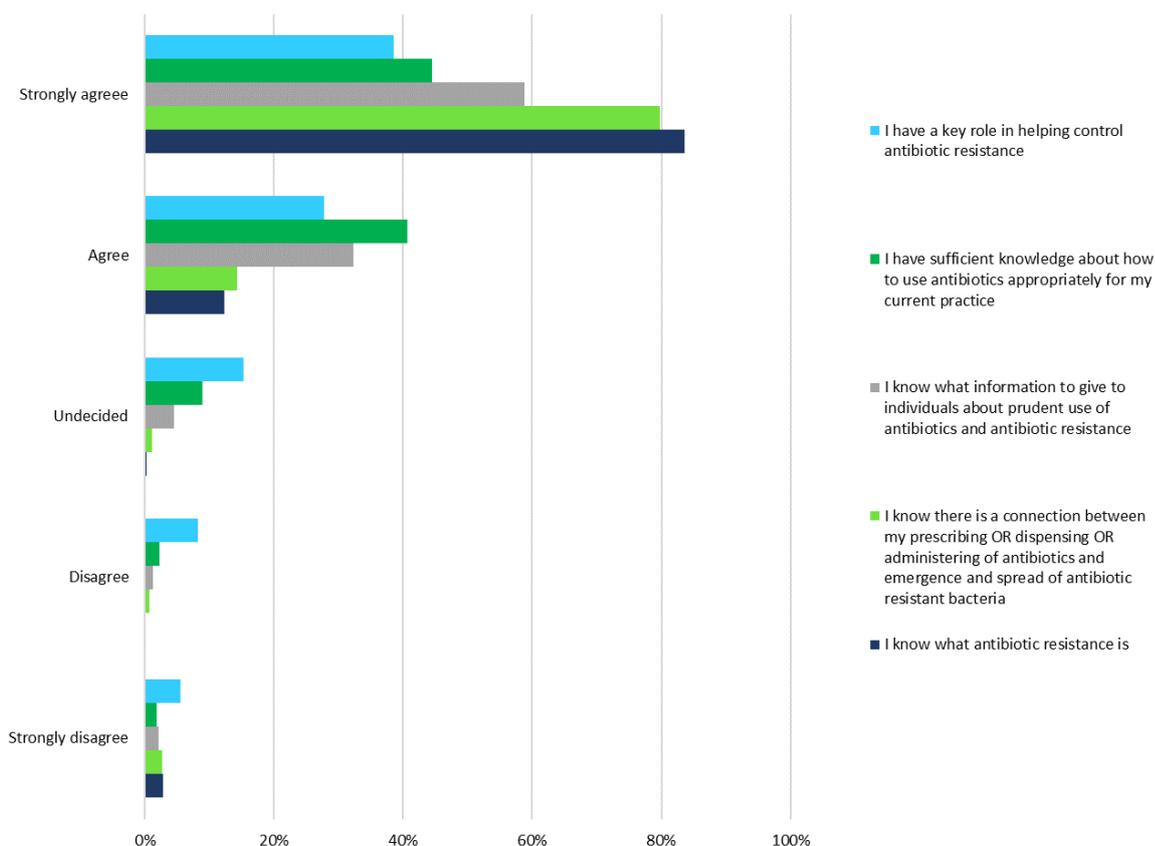
<sup>2</sup> [https://www.cpme.eu/index.php?downloadunprotected=/uploads/adopted/2013/CPME\\_AD\\_Brd\\_27042013\\_020\\_Final\\_EN\\_AMR.pdf](https://www.cpme.eu/index.php?downloadunprotected=/uploads/adopted/2013/CPME_AD_Brd_27042013_020_Final_EN_AMR.pdf)

<sup>3</sup> <https://antibiotic.ecdc.europa.eu/en/infographics-about-antibiotic-stewardship-programmes>

<sup>4</sup> <https://antibiotic.ecdc.europa.eu/en/get-informed/key-messages>

## 2. To what extent do you agree or disagree with the following statements?

The second question collected information on the knowledge of European doctors in relation to antibiotics and antibiotic resistance. Respondents were asked to rate on a scale of 1 (strongly disagree) to 5 (strongly agree) to what extent they agreed with the following statements displayed in the above graphic. An overwhelming majority of 6148 (84%) and 5863 (80%) of the 7351 European doctors who responded rated “I know what antibiotic resistance is” and “I know there is a connection between my prescribing OR dispensing OR administering of antibiotics and emergence and spread of antibiotic resistant bacteria” with “strongly agree”. While under a tenth of respondents strongly disagreed or disagreed with any of the 5 statements.



### 3. Please answer whether you believe these statements are true or false.

The following 7 statements were presented in Question 3:

- ⇒ Antibiotics are effective against viruses.
- ⇒ Antibiotics are effective against cold and flu.
- ⇒ Unnecessary use of antibiotics makes them become ineffective.
- ⇒ Taking antibiotics has associated side effects or risks such as diarrhoea, colitis, allergies.
- ⇒ Every person treated with antibiotics is at an increased risk of antibiotic resistant infection.
- ⇒ Antibiotic resistant bacteria can spread from person to person.
- ⇒ Healthy people can carry antibiotic resistant bacteria.

The respondents were asked to rate these statements as true or false.

The vast majority of the 7351 European doctors who answered stated that antibiotics are ineffective against viruses (99% | N=7284), shown in figure 1, as well as against cold and flu (99% | N=7271), as shown in figure 2.

The fact that unnecessary use of antibiotics risks making them ineffective was confirmed by 94% (N=6907) of respondents, shown in figure 3. While 98% (N=7181), shown in figure 4, acknowledged that the use of antibiotics can put a person at risk of side effects.

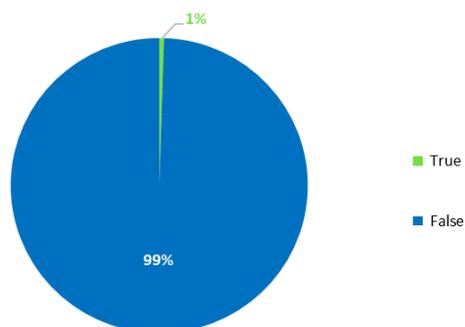
Crucially, 78% (N=5768) of European doctors agreed that every person treated with antibiotics is at an increased risk of antibiotics resistant infection, as shown in figure 5.

The fact that antibiotic resistant bacteria can spread from person to person was confirmed by 94% (N=6942) of respondents, as shown in figure 6.

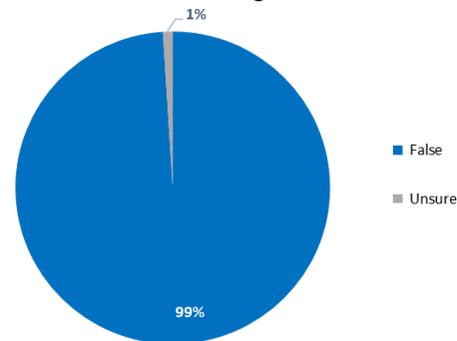
The statement that healthy people can carry antibiotic resistant bacteria was affirmed by 93% (N=6859) of respondents, as shown in figure 7.

The answers highlight the expertise of doctors and the concerns within the profession over the increase and risk of antibiotic resistant infections.

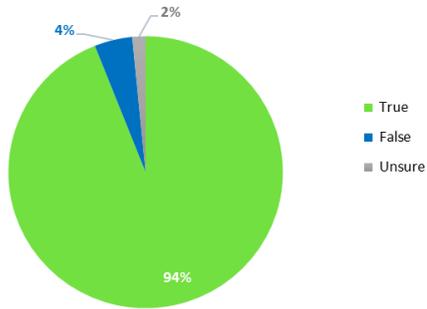
1. Antibiotics are effective against viruses



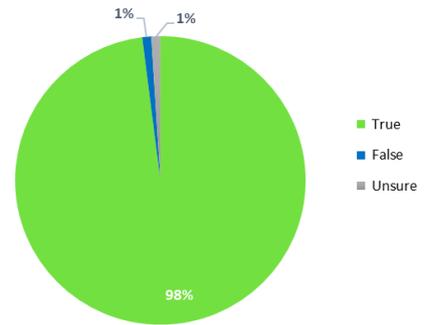
2. Antibiotics are effective against cold and flu



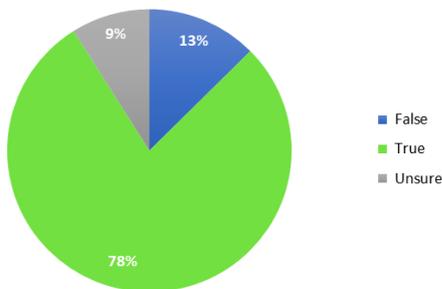
3. Unnecessary use of antibiotics make them become ineffective



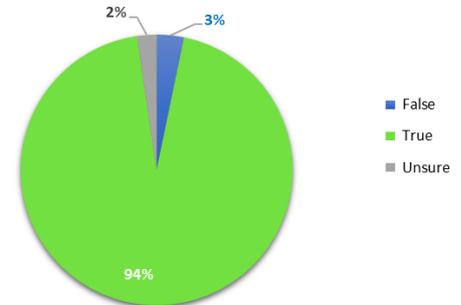
4. Taking antibiotics has associated side effects



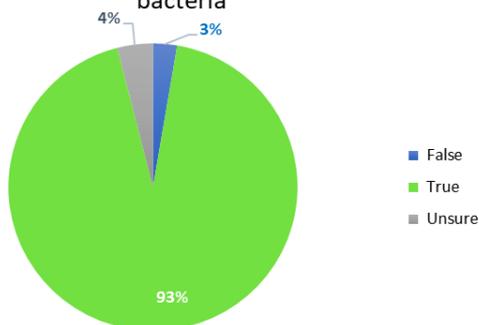
5. Every person treated with antibiotics is at an increased risk of antibiotic resistant infection



6. Antibiotic resistant bacteria can spread from person to person

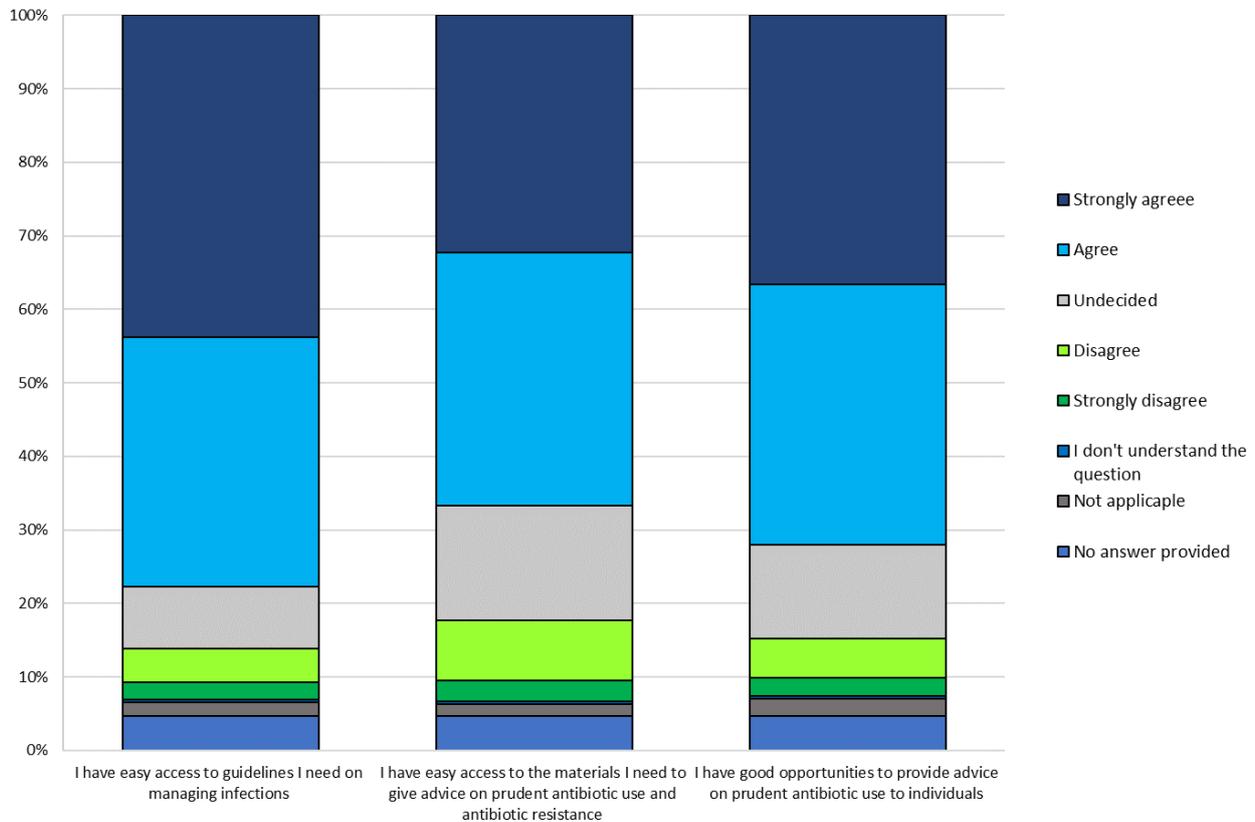


7. Healthy people can carry antibiotic resistant bacteria



#### 4. To what extent do you agree or disagree with the following statements?

Question 4 asked survey participants to comment on 3 statements on the access to guidelines and the materials and opportunities for giving advice.



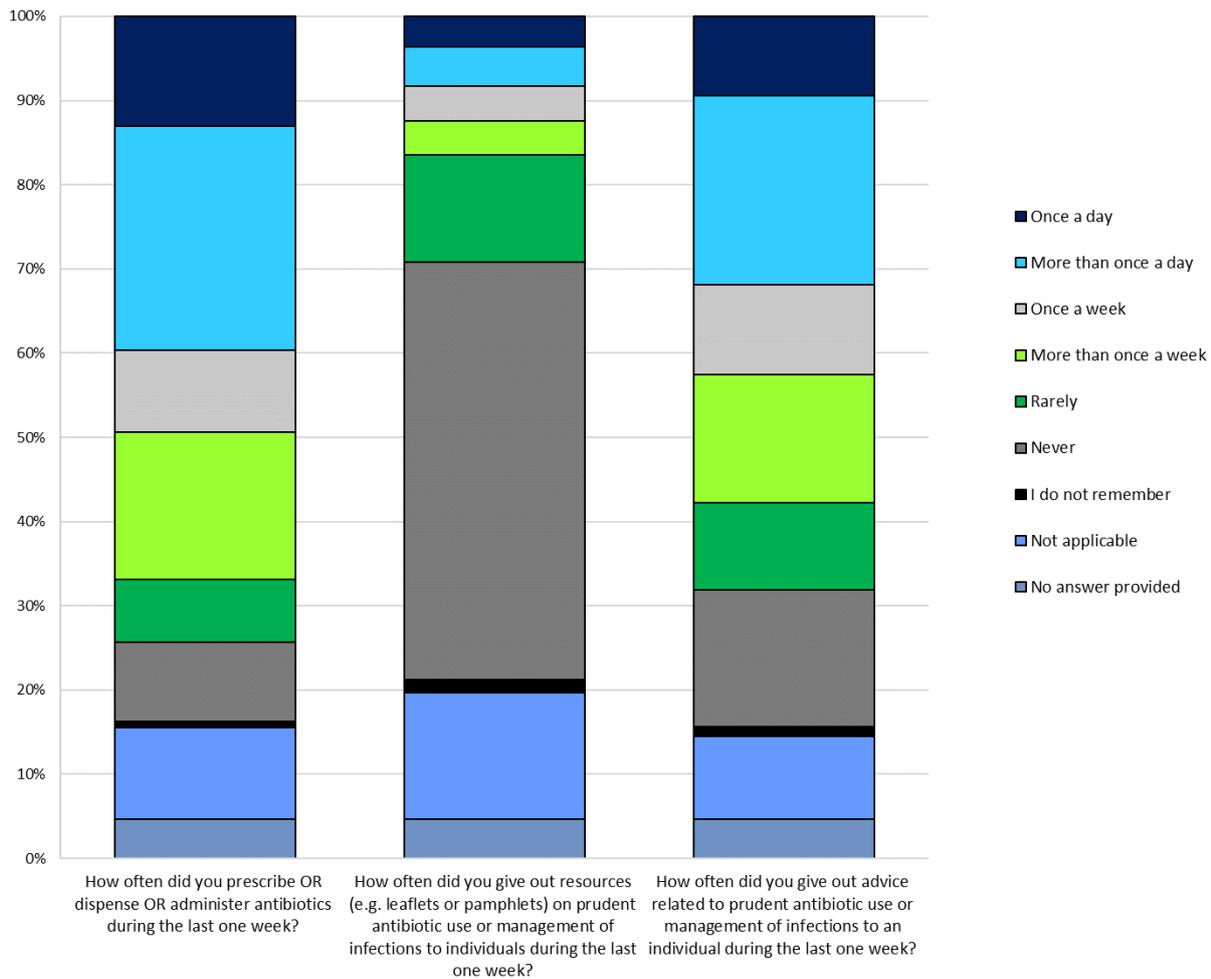
Easy access to guidelines needed for managing infections was affirmed by 78% (N= 5709) of respondents, who agreed or strongly agreed with this statement. This has potential for improvement.

67% (N=4907) agreed or strongly agreed with the statement touching on easy access to the materials they need to give advice on prudent antibiotic use and antibiotic resistance.

The presence of opportunities to provide advice on prudent antibiotic use to individuals was identified by 72% (N=5295) of respondents, who agreed or strongly agreed that these opportunities exist.

**5. Considering the last month only in your clinical practice, please rate how frequently the statements apply to you. If a question is not applicable, then please choose N/A.**

The statements listed in relation to Question 5 touched upon the dispensing of antibiotics and the provision of advice, which also included the distribution of materials on prudent antibiotic use and the management of infections. Respondents were asked to score these statements in accordance with their applicability. Possible answers included: once a day, more than once a day, once a week, more than once a week, rarely and never. In addition, it was also possible for respondents to select the non-applicability of the statement to them or to indicate that they don't remember. Some respondents (4.7% | N=346) choose not to answer this question, as indicated in the graphic.



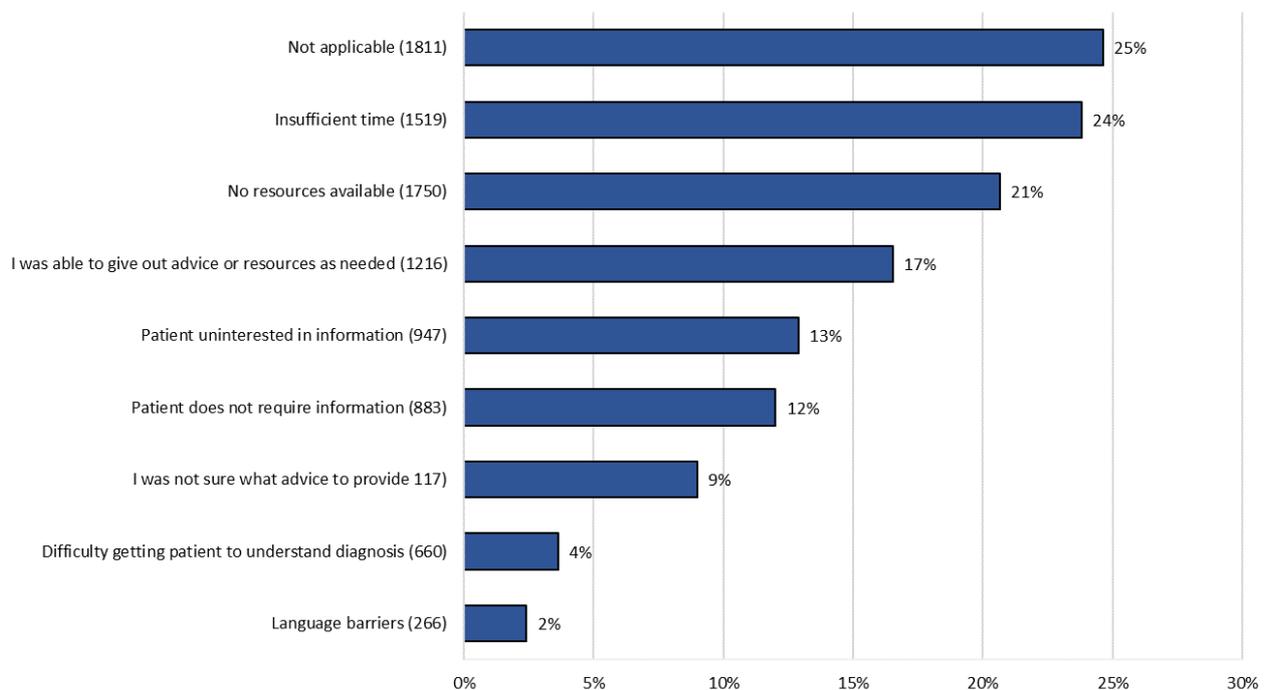
**6. If you were not able to give out advice or resources as frequently as you prescribed OR dispensed OR administered antibiotics, why was that?**

Only 1216 respondents (17%) were able to provide the advice to patients that they needed to convey to them. This is very low. 24% (N=1750) identified insufficient time as a cause for not being able to give advice on the prudent use of antibiotics more frequently when dispensing these products to patients. Lack of resources was mentioned as one of the other main causes by 21% (N=1519) of respondents.

25% (N=1811) indicated that the question was not applicable to them.

**Note: 12% (N=900) did not answer this question.**

**Note: Respondents were able to provide more than one answer to this question.**

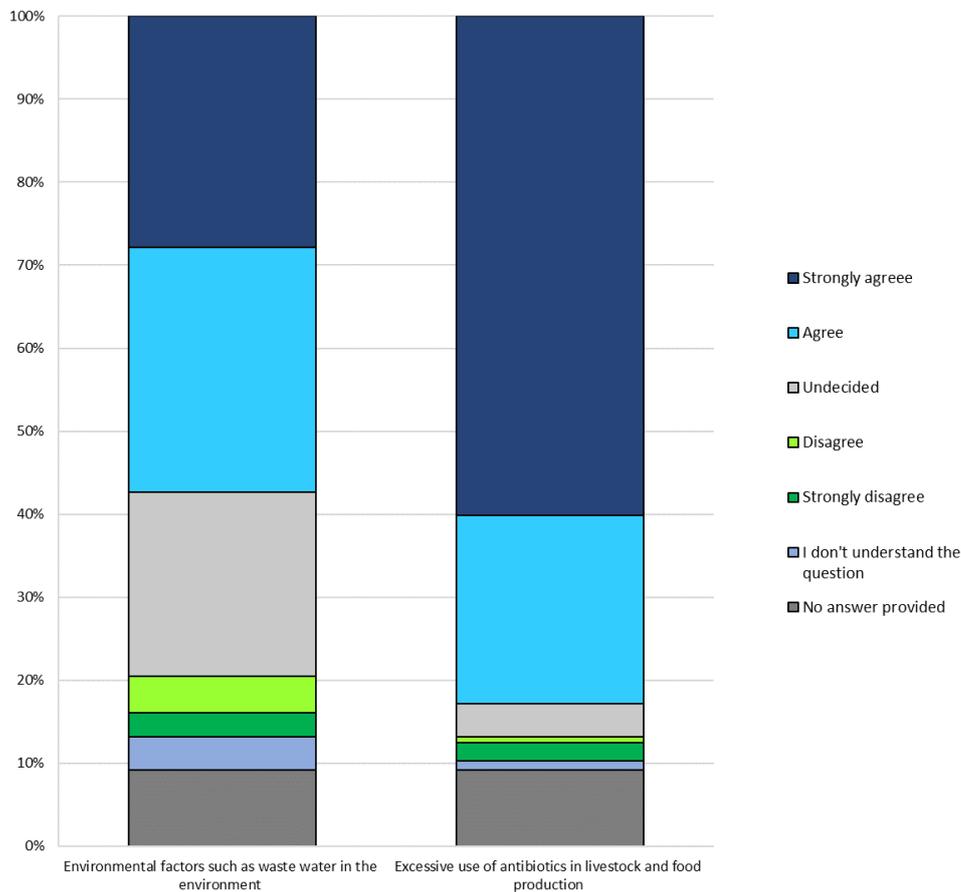


**7. To what extent do you agree or disagree that the following environmental and animal health factors are important in contributing to antibiotic resistance in bacteria from humans?**

In line with the One health approach taken by the Action Plan of the European Commission<sup>5</sup>, Question 7 inquired as to what extent European doctors agree or disagree that environmental and animal health factors are impacting antibiotic resistance in bacteria from humans.

In this regard, 57% (N=4213) of respondents agreed or strongly agreed that environmental factors such as waste water in the environment is a contributing factor. There was an even higher agreement rating for the second statement asking respondents to comment on the excessive use of antibiotics in livestock and food production, which 83% (N=6086) of respondents identified as a contributing factor.

This shows that the environment is increasingly acknowledged as a contributor to the development and spread of antimicrobial resistance by doctors. The One Health approach and fighting antimicrobial resistance in the environment and in the veterinary sector is also well covered by CPME in the Common Memorandum and cooperation with the Federation of Veterinarians of Europe (FVE).



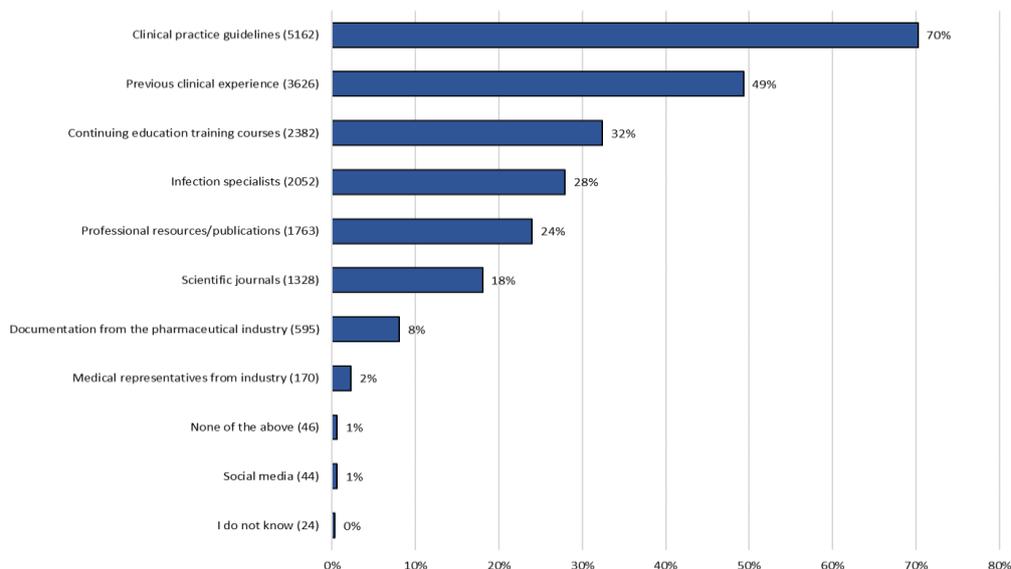
<sup>5</sup> [https://ec.europa.eu/health/sites/health/files/antimicrobial\\_resistance/docs/amr\\_2017\\_action-plan.pdf](https://ec.europa.eu/health/sites/health/files/antimicrobial_resistance/docs/amr_2017_action-plan.pdf)

### 8. In the management of infections, which of these do you use regularly?

Clinical practice guidelines were identified by the large majority of respondents (70% | N=970) as a tool that is frequently used by hospital pharmacists to manage infections.

Note: 10% (N=707) did not answer this question.

Note: Respondents were able to provide more than one answer to this question (max 3).



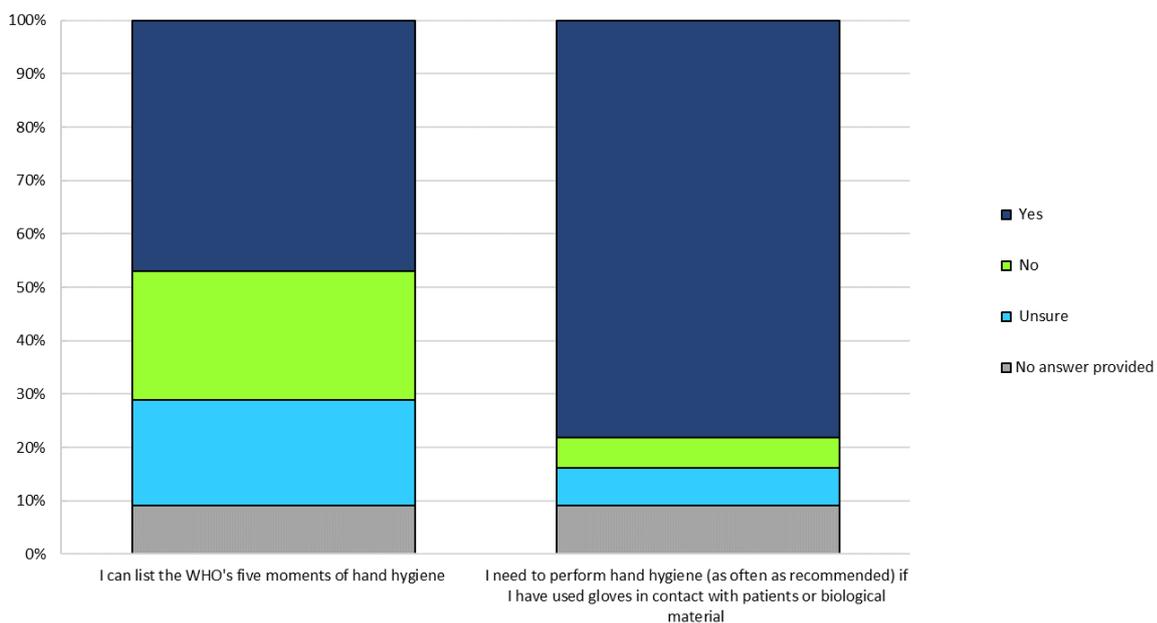
Other options that ranked highly included previous clinical experience (49% | N=3626), continuing education training courses (32% | N=2382) and infection specialists (28% | N=2051). Social media (1% | N=44) was identified as the least useful tool for the management of infections.

It is worth noting the relatively low scores given to documentation from the pharmaceutical industry (8% | N = 595) and medical representatives from industry (2% | N= 170). But it still shows that the influence of industry is present, even in areas where there are low financial gains.

**9. Please state "Yes", "No" or "Unsure" in regards to your knowledge on the following statements regarding hand hygiene.**

In relation to hand hygiene, which is a useful measure that can help lower resistance rates, survey participants were asked to comment on guidance from the World Health Organisation (WHO) and their own practice. 52% (N=626) of respondents underlined that they are aware of the five moments for hand hygiene of WHO.<sup>6</sup> This approach defines the key moments for healthcare professionals when hand hygiene should be carried out. These include washing hands

- ⇒ before touching a patient,
- ⇒ before clean/aseptic procedures,
- ⇒ after body fluid exposure/risk,
- ⇒ after touching a patient, and
- ⇒ after touching patient surroundings.

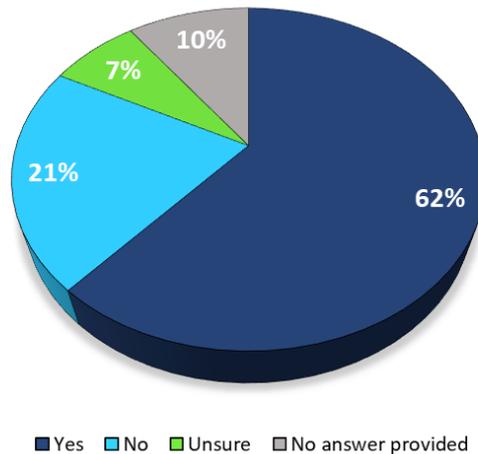


Based on the responses provided in relation to the second statement of Question 9, it can be concluded that hand hygiene recommendations are followed. 78% (N=5746) stressed that they comply with hand hygiene measures (as often as recommended) if they have used gloves in contact with patients or biological material. The Covid-19 pandemic may have raised awareness of hand hygiene. Regardless of this, health personnel should regularly be offered courses in hygiene.

<sup>6</sup> WHO guidelines on Hand Hygiene in Health Care, available at: [https://apps.who.int/iris/bitstream/handle/10665/44102/9789241597906\\_eng.pdf;jsessionid=DCCB9337E910A4749CDB7E30467F4B05?sequence=1](https://apps.who.int/iris/bitstream/handle/10665/44102/9789241597906_eng.pdf;jsessionid=DCCB9337E910A4749CDB7E30467F4B05?sequence=1)

### 10.1 In the last 12 months, do you remember receiving information about avoiding unnecessary prescribing or administering or dispensing of antibiotics?

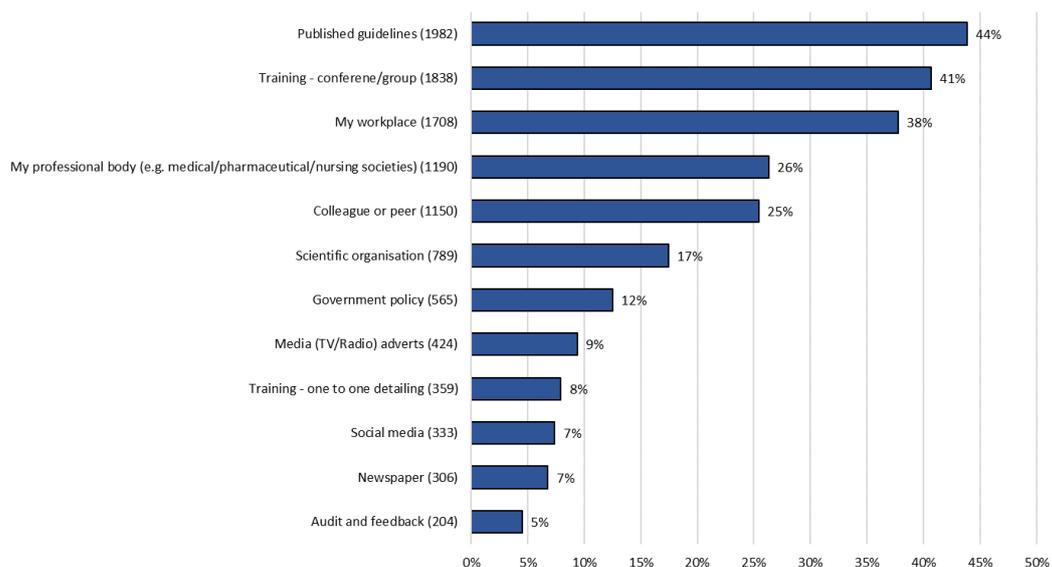
62% (N= 4522) of respondents pointed out that they have received information detailing how unnecessary dispensing of antibiotics can be avoided, while 21% (N=1554) did not receive such information and 7% | N=538) were not sure.



### 10.2 If yes, how did you first get this information about avoiding unnecessary prescribing or administering or dispensing of antibiotics?

Those doctors that responded positively to Question 10.1 were asked to further detail from whom they received information on the prudent use of antibiotics. Published guidelines (44% | N=1982), training – conference/group (41% | N=1838) and the workplace (38% | N=1708) were named as the sources that are most frequently used to obtain information.

**Note: 6% (N=456) did not answer this question, even though they answered “yes” to the previous question.**  
**Note: Respondents were able to provide more than one answer to this question.**

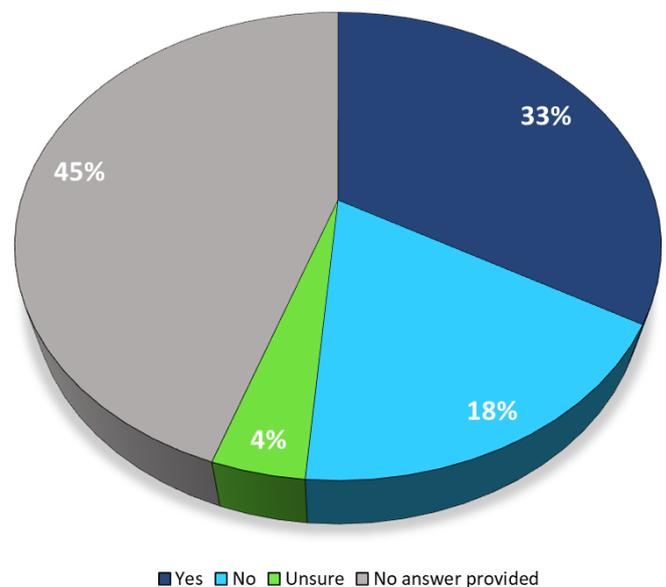


Audit and feedback (5% | N=204) and newspaper articles (7% | N=306) were only found useful by a very small group of respondents. Feedback from colleagues or peers (25% | N=1150) and scientific organisations (17% | N=789) were ranked in the middle group. Information from the workplace scored surprisingly low (38% | N=1708), and requires action at workplace level.

The answers in general recall those to Question 1 and the necessity for establishing antibiotic stewardships in order to focus on the subject in clinics.

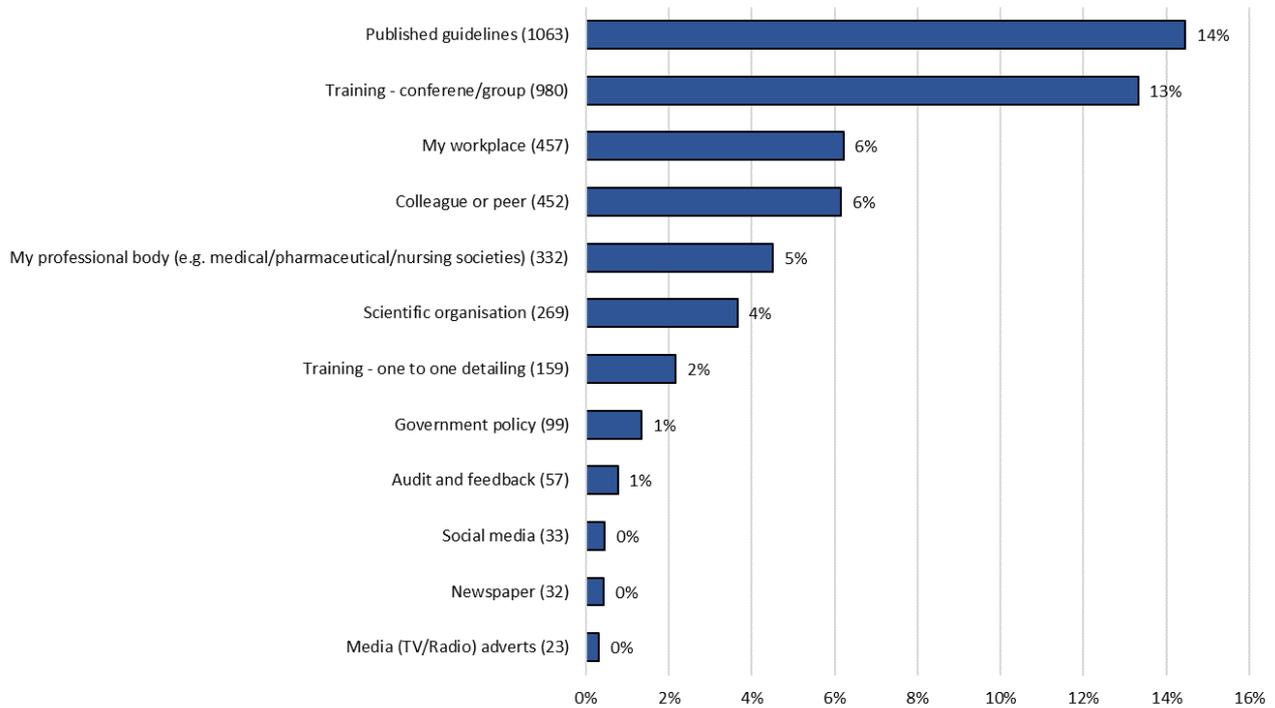
### 11.1 Did the information contribute to changing your views about avoiding unnecessary prescribing or administering or dispensing of antibiotics?

For 33% (N= 2449) of respondents, the information that they received on appropriate dispensing of antibiotics changed their views. A higher number of respondents (45% | N=3290) did not provide an answer to this question.



### 11.2 Which source(s) of information has had the most influence on changing your views?

Concerning the sources of information, 4938 respondents chose not to provide feedback. Out of the remaining 2413 respondents, the majority identified published guidelines (14% | N=1063) as their main source of information.



Note: 67% (N=4938) did not answer this question.

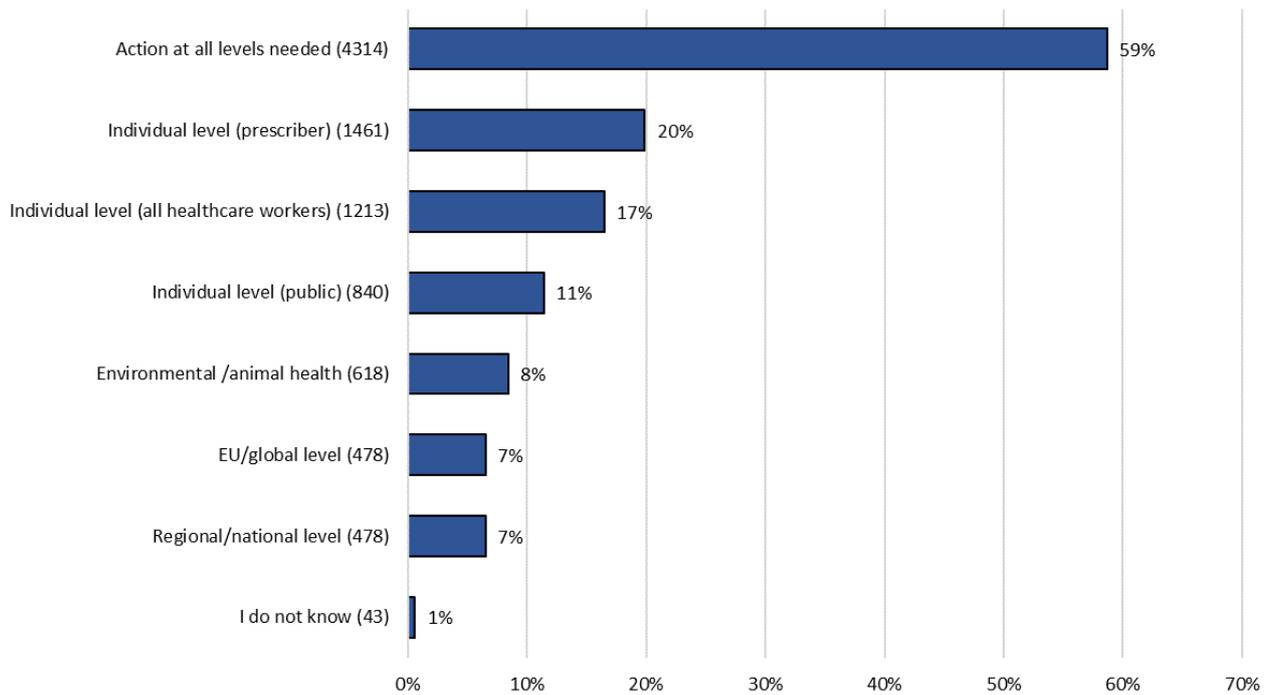
Note: Respondents were able to provide more than one answer to this question (max 2).

## 12. At what level do you think it is most effective to tackle resistance to antibiotics?

In relation to the level at which antibiotic resistance should be tackled, over half of the respondents (59% | N=4314) highlighted that it would be wise to address the issue at a global, EU, national, regional and individual level.

Note: 14% (N=1000) did not answer this question.

Note: Respondents were able to provide more than one answer to this question (max 2).

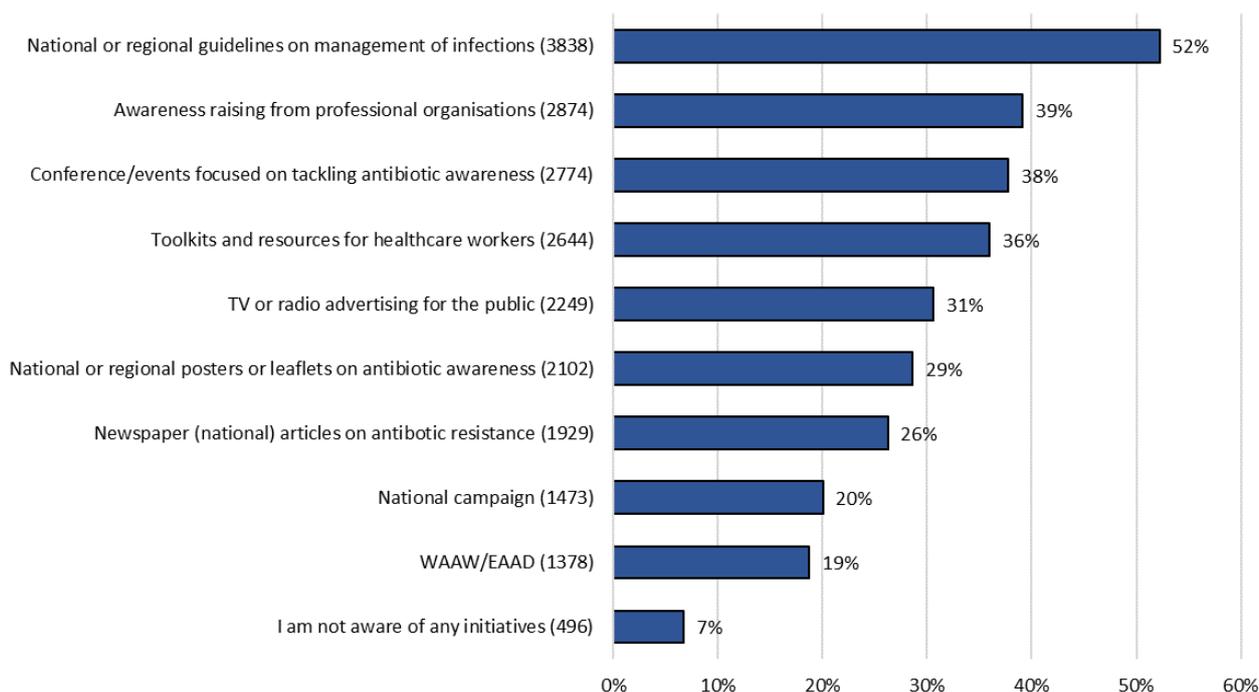


### 13. What initiatives are you aware of in your country which focus on antibiotic awareness and resistance?

The responses regarding the awareness of national measures were quite mixed, with a majority (52% | N=3838) naming national or regional guidelines on the management of infections. Other measures included professional organisations (39% | N=2874), conferences and events focused on tackling antibiotic resistance (38% | N=2774), toolkits and resources for healthcare professionals (36% | N=2644) and advertising (31% | N=2249).

Note: 14% (N=1000) did not answer this question.

Note: Respondents were able to provide more than one answer to this question.

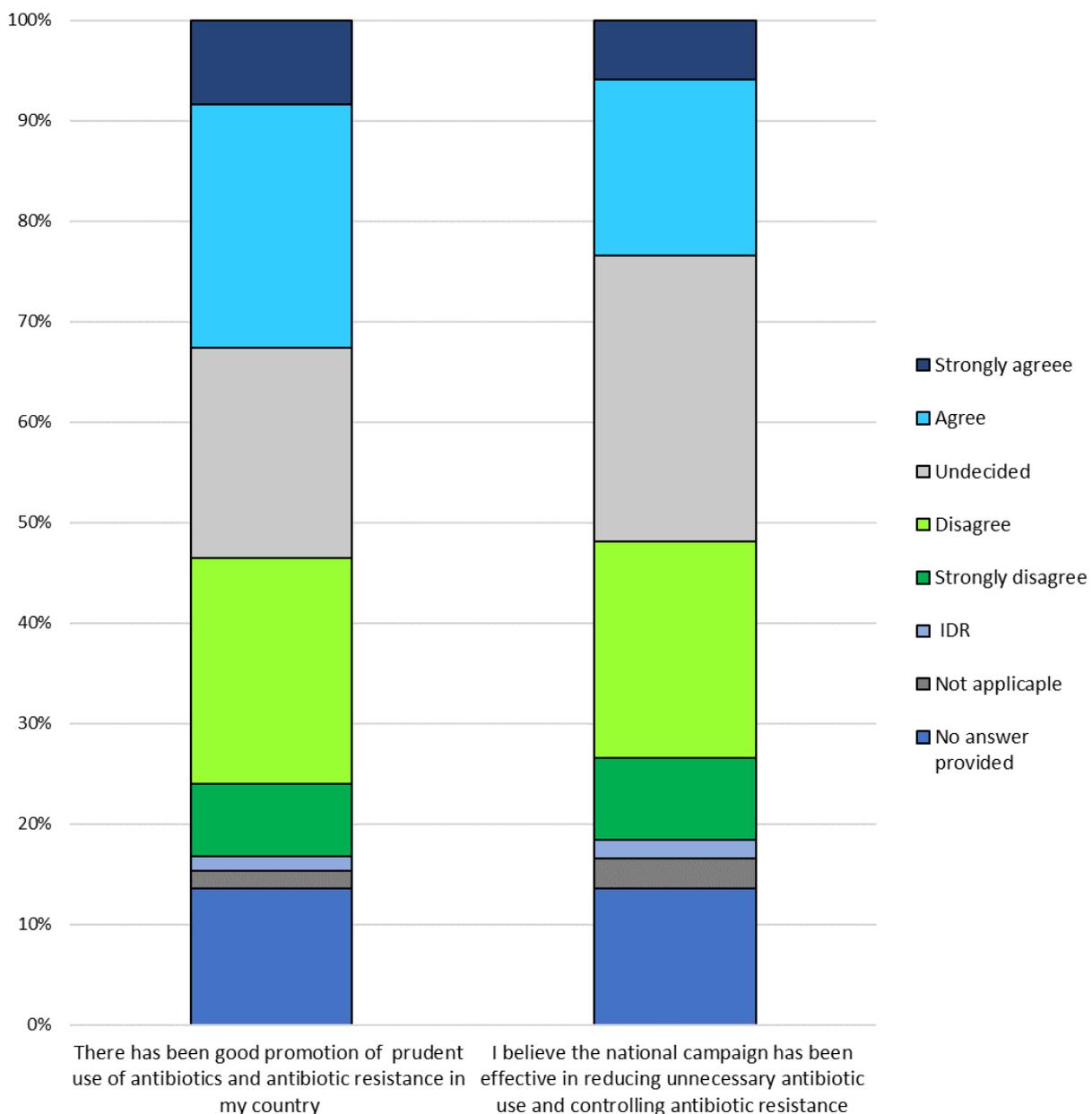


In addition, World Antibiotic Awareness Day and European Antibiotic Awareness Day (WAAW/EAAD) were mentioned by 19% (N=1378) of respondents as a tool that is used in their country to raise awareness about antibiotic resistance. This is almost at the same level as national campaigns, which scored 20% (N = 1473).

**14. To what extent do you agree or disagree with the following statements regarding the national initiatives about prudent use of antibiotics in your country?**

33% (N=2392) of respondents agreed or strongly agreed that there has been good promotion of prudent use of antibiotics and antibiotic resistance in their country. (21% | N=1543) could not decide whether to agree or disagree with the statement. Regarding the effectiveness of national campaigns, only 23% (N=1720) of respondents agreed or strongly agreed that these have contributed to reducing unnecessary antibiotic use and controlling antibiotic resistance. More people (30% | N=2182) disagreed or strongly disagreed with this statement.

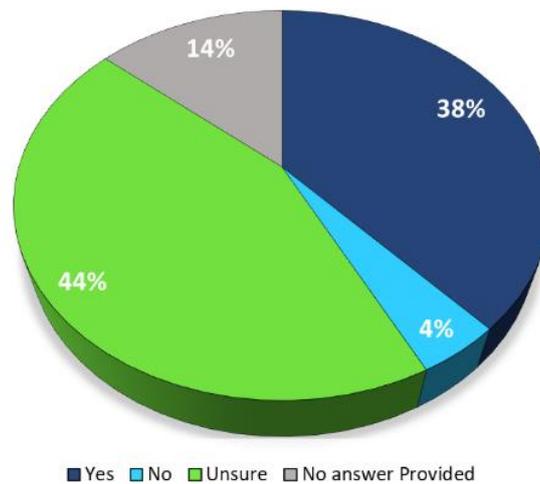
The results match the results from Question 13 and underline the need for stronger national campaigns.



### 15. Does your country have a national action plan on antimicrobial resistance?

38% (N=2810) of respondents remarked that their country has a national action plan in place, while 44% (N=3218) were unsure about the existence of such a plan. This shows that an understanding already exists among European doctors, but at the same time also highlights that further steps could be taken to raise awareness about national action plans.

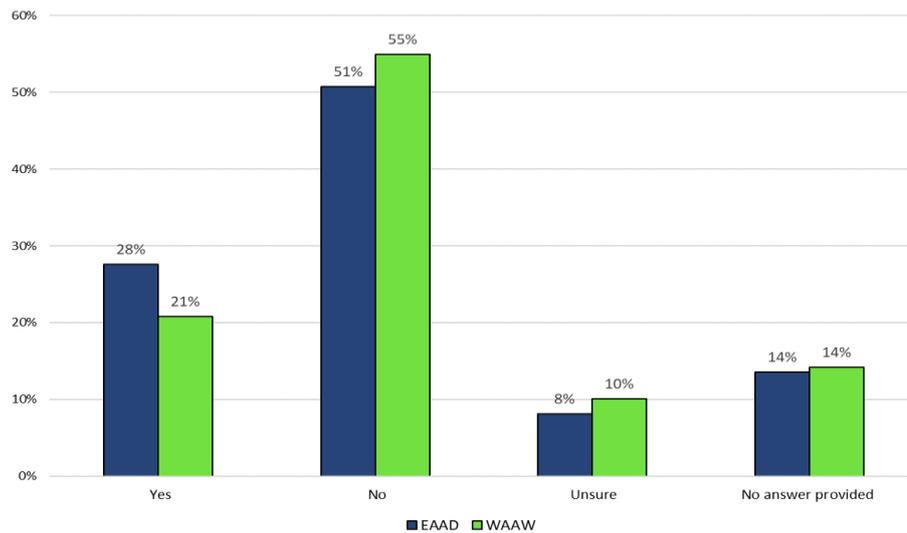
However, the general question remains as to how many countries actually have national action plans.



### 16. Have you heard of European Antibiotic Awareness Day (EAAD) or World Antibiotic Awareness Week (WAAW)?

When asked about European Antibiotic Awareness Day (EAAD), 28% (N=2026) of European doctors stressed that they had heard of it, while 51% (N=3727) stressed that they had not. Similar responses were received regarding awareness of World Antibiotic Awareness Week (WAAW), which 21% (N=1526) of respondents had heard of, while 55% (N=4040) had not.

**Note: 14% (N=1045) did not answer this question.**



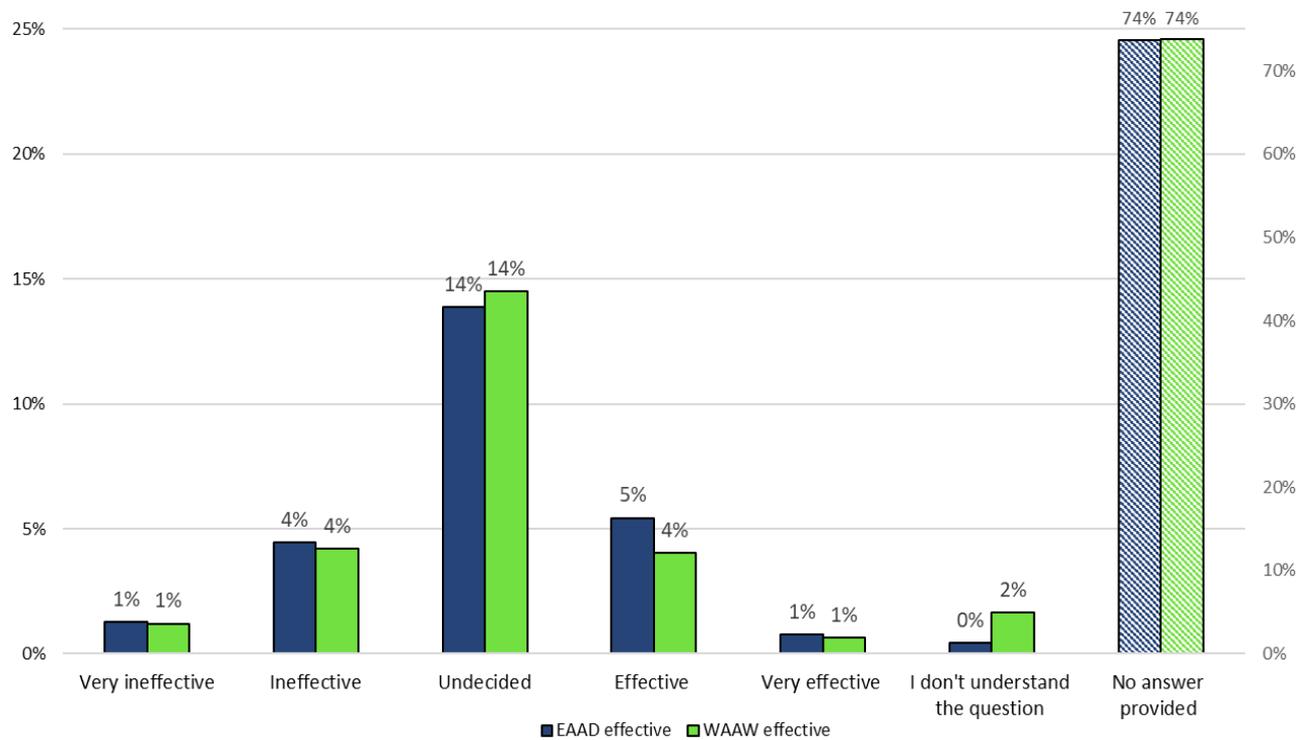
The feedback shared by respondents shows that efforts taken at both national and European level have not reached the majority of doctors. Although it must be stressed that the primary focus of EAAD and WAAW is not doctors specifically, but the population in general.

**17. How effective do you believe EAAD and WAAW have been in raising awareness about prudent use of antibiotics and antibiotic resistance in your country?**

In relation to the effectiveness of EAAD and WAAW, the main group seemed to be undecided (EAAD 14% | N=1019 / WAAW 14,5% | N=1065) about the impact of both events in their country. Only 6% (N=458) of respondents deemed EAAD effective or very effective, while 5% (N=345) of respondents provided the same answer for WAAW.

The answers reflect the low positive score regarding doctors' knowledge of EAAD and WAAW in Question 16.

**Note: (EAAD 74% | N=5420 / WAAW 74% | N=5423) did not answer this question. "No answer provided" is calculated on the second axis.**



## Conclusion

Overall, it can be concluded that the doctors who participated in the study on healthcare professionals' knowledge and attitudes about antibiotics and antibiotic resistance have a basic knowledge about prudent use of antibiotics and the risk of resistance.

Areas identified for improvement included

- increasing the provision of advice to patients – but in general more resources, including time, will be necessary to make this possible
- enhancing the uptake of antibiotic stewardship teams in hospitals
- ensuring that doctors' knowledge about resistance and prudent use remains up to date. Clinical guidelines are vital, but the need for more information about avoiding unnecessary prescribing or administering or dispensing antibiotics from the workplace was identified and indicates a need for action. The key messages put together by ECDC for hospital prescribers are a useful tool that helps with identifying tasks related to improving antibiotic use<sup>7</sup>.

Last but not least, there is still a long way to go in familiarising doctors with European Antibiotic Awareness Day (EAAD) and World Antibiotic Awareness Week (WAAW), and even longer in getting doctors to work as ambassadors for EAAD and WAAW. This is not down to resistance on the part of doctors, but rather their limited resources and insufficient time.

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<sup>7</sup> <https://antibiotic.ecdc.europa.eu/en/get-informed/key-messages/key-messages-professionals-hospitals-and-other-healthcare-settings/key-5>

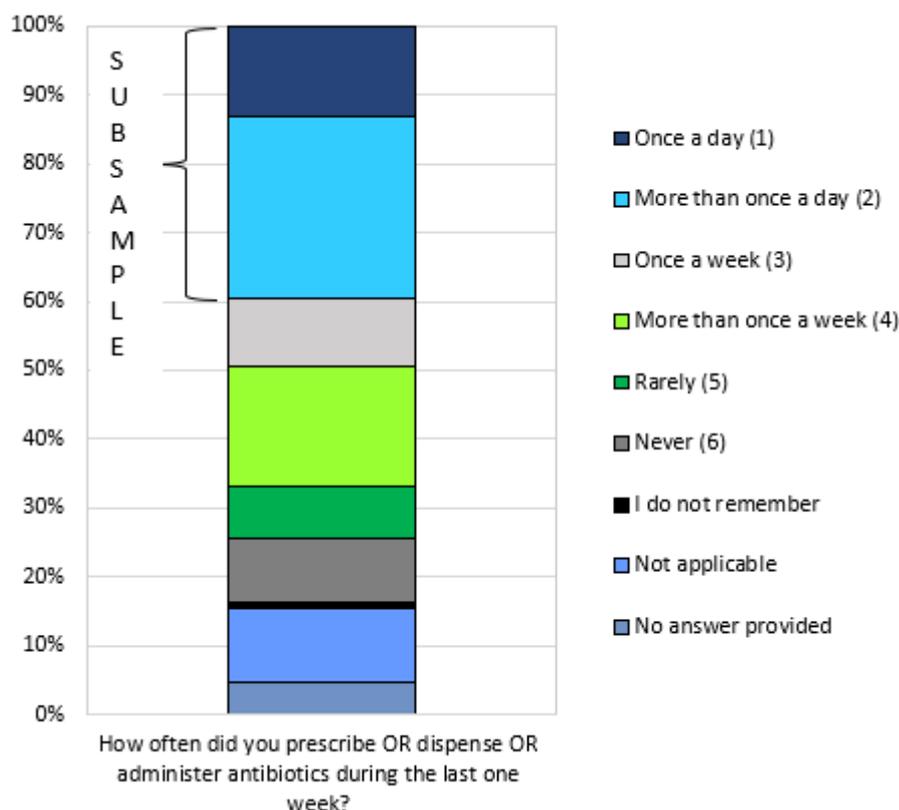
# Appendix

**(1) Analysis of a subsample ..... 24**

## (1) Analysis of a subsample

### I. Analysis of a subsample (2916 respondents). Those respondents in table 5 who administered antibiotics at least once a day.

- Q. How often did you prescribe OR dispense OR administer antibiotics during the last one week?  
 A. Once a day  
 A. More than once a day



The analysis of the subsample – doctors who administered antibiotics at least once a day – shows only small differences compared to the sample as a whole. In general, doctors in the subsample scored a little higher, for example in having easy access to guidelines for managing infections, materials for advice and in opportunities to provide advice on prudent antibiotic use to individuals (figure i4).

Most significant are the results in figure i5, showing that approx. 55% gave advice related to prudent antibiotic use or management of infections to an individual during the last week, compared to approx. 30% of the whole sample. Challenging is that a third of the 45% who were not able to give advice have no resources available, and one third states insufficient time as a reason for not being able to give advice.

The subsample, as with the sample as a whole, scored relatively low (20% and 18%) on knowledge of national campaigns and European Antibiotic Awareness Day (EAAD) or World Antibiotic Awareness Week (WAAW).

Figure i.2 - To what extent do you agree or disagree with the following statements?

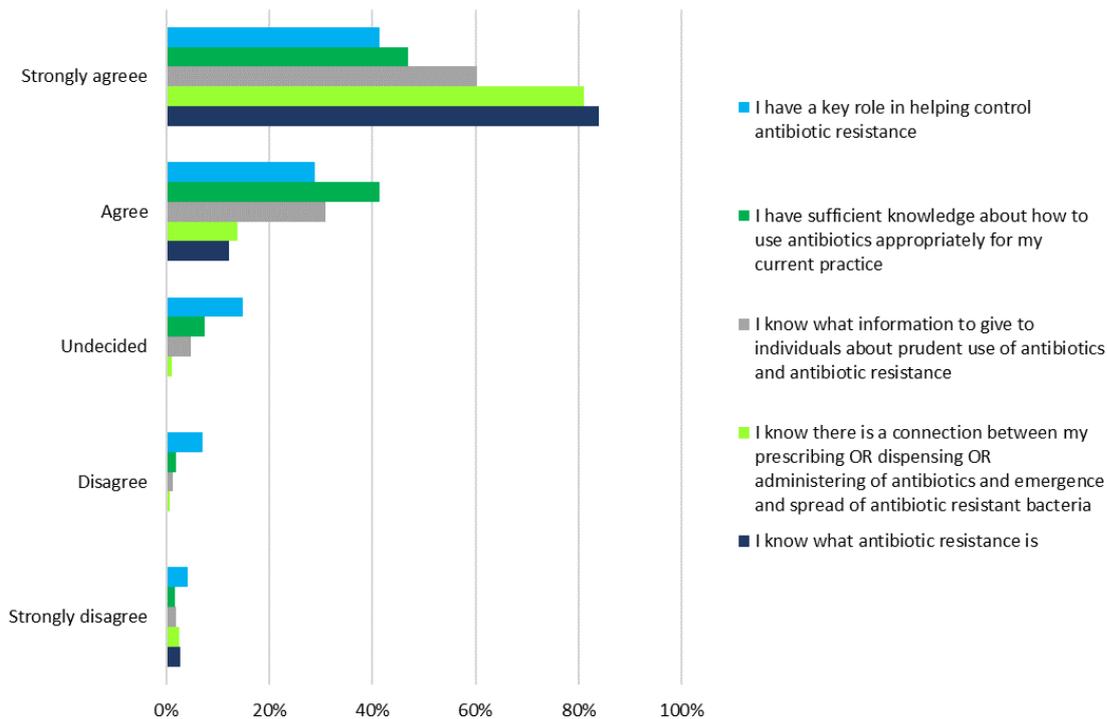
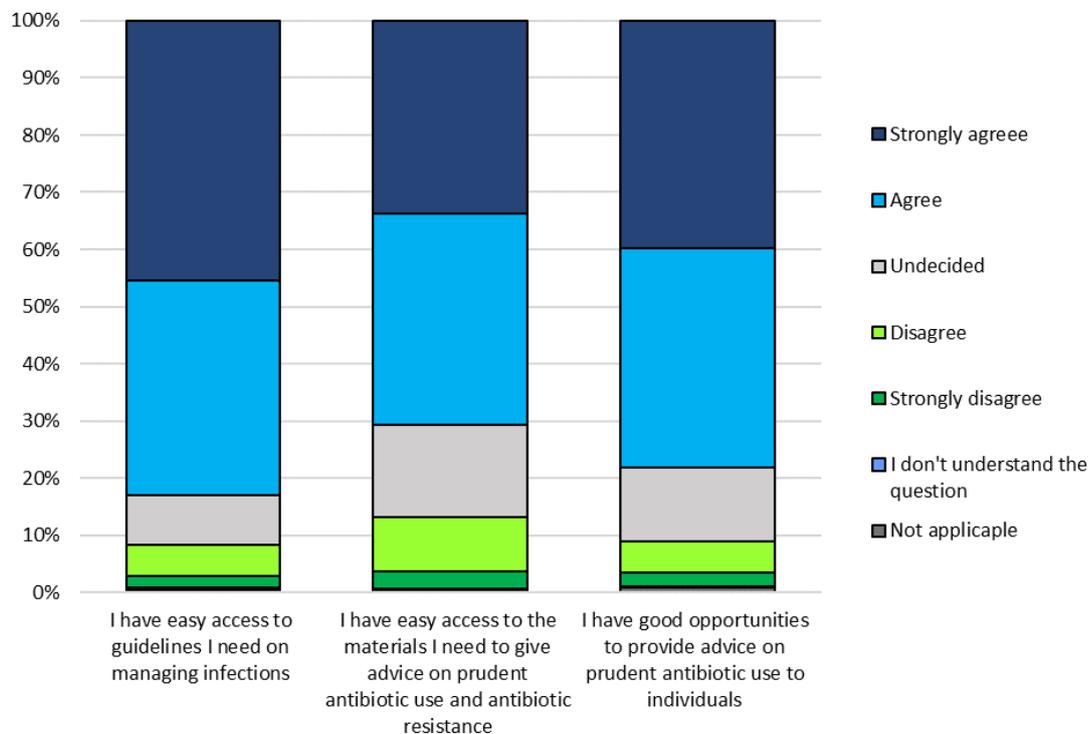
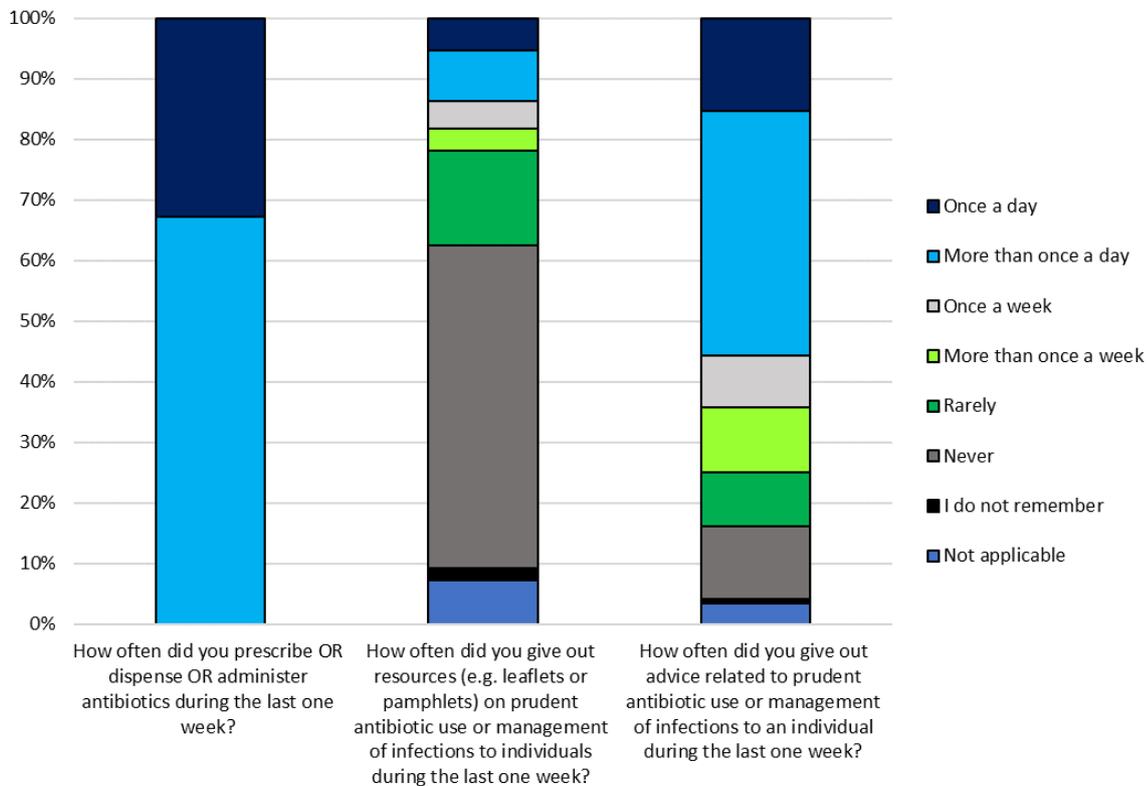


Figure i.4 - To what extent do you agree or disagree with the following statements?

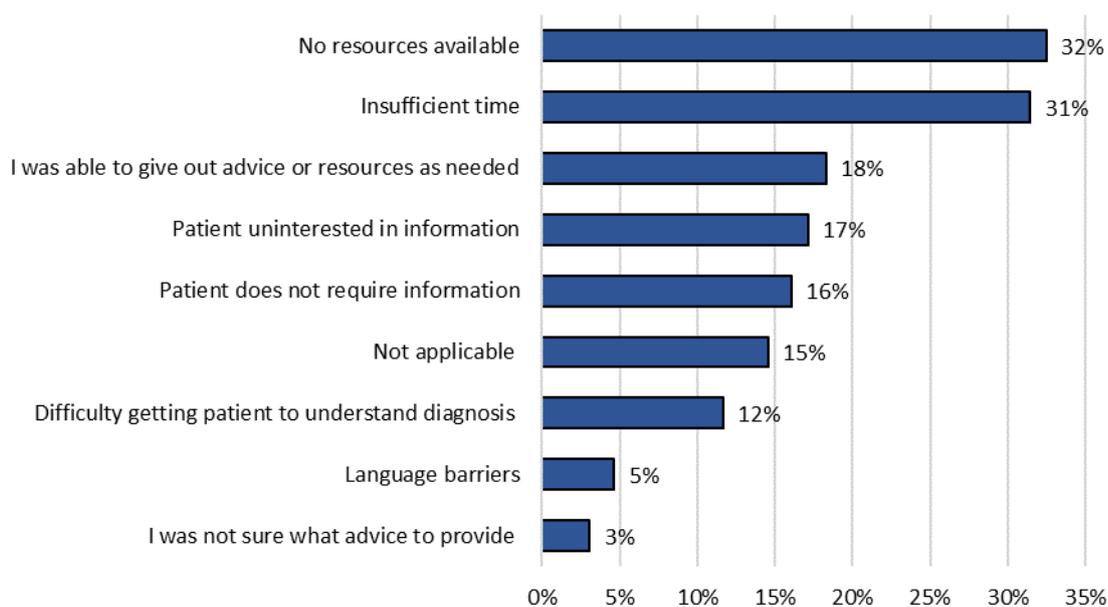


**Figure i.5 - Considering the last month only in your clinical practice, please rate how frequently the statements apply to you. If a question is not applicable, then please choose N/A.**



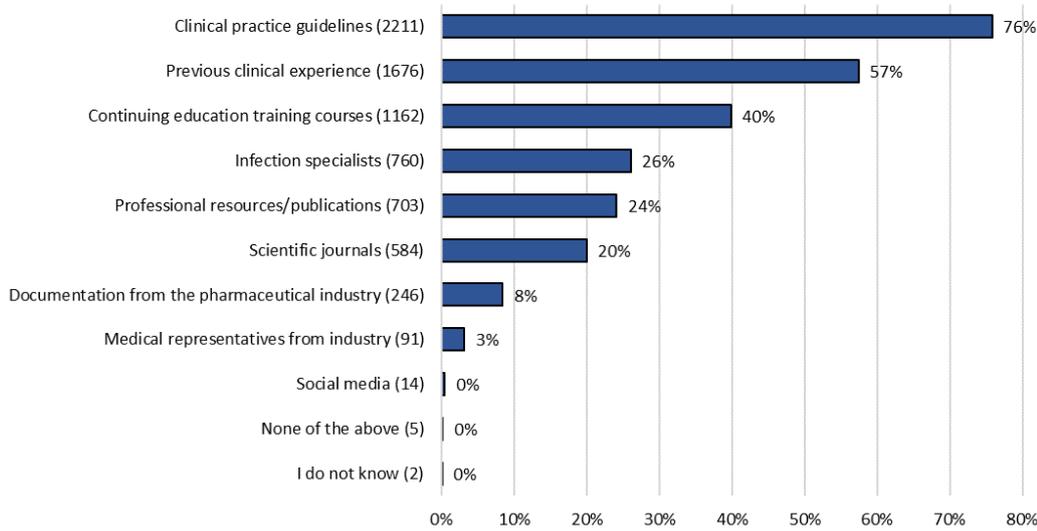
**Figure i.6 - If you were not able to give out advice or resources as frequently as you prescribed OR dispensed OR administered antibiotics, why was that?**

Note: Respondents were able to provide more than one answer to this question.

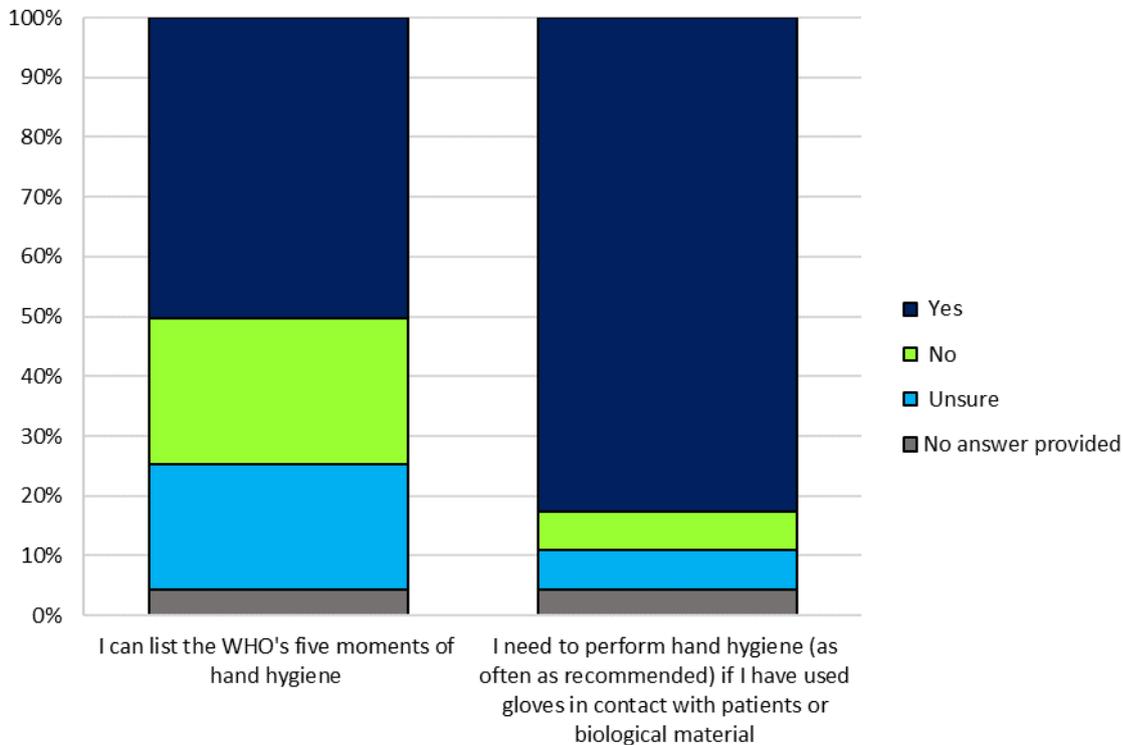


**Figure i.8 - In the management of infections, which of these do you use regularly?**

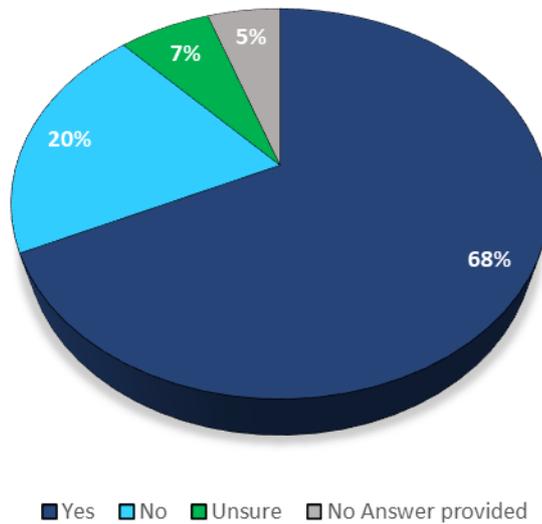
Note: Respondents were able to provide more than one answer to this question (max 3).



**Figure i.9 - Please state "Yes", "No" or "Unsure" in regard to your knowledge on the following statements regarding hand hygiene.**

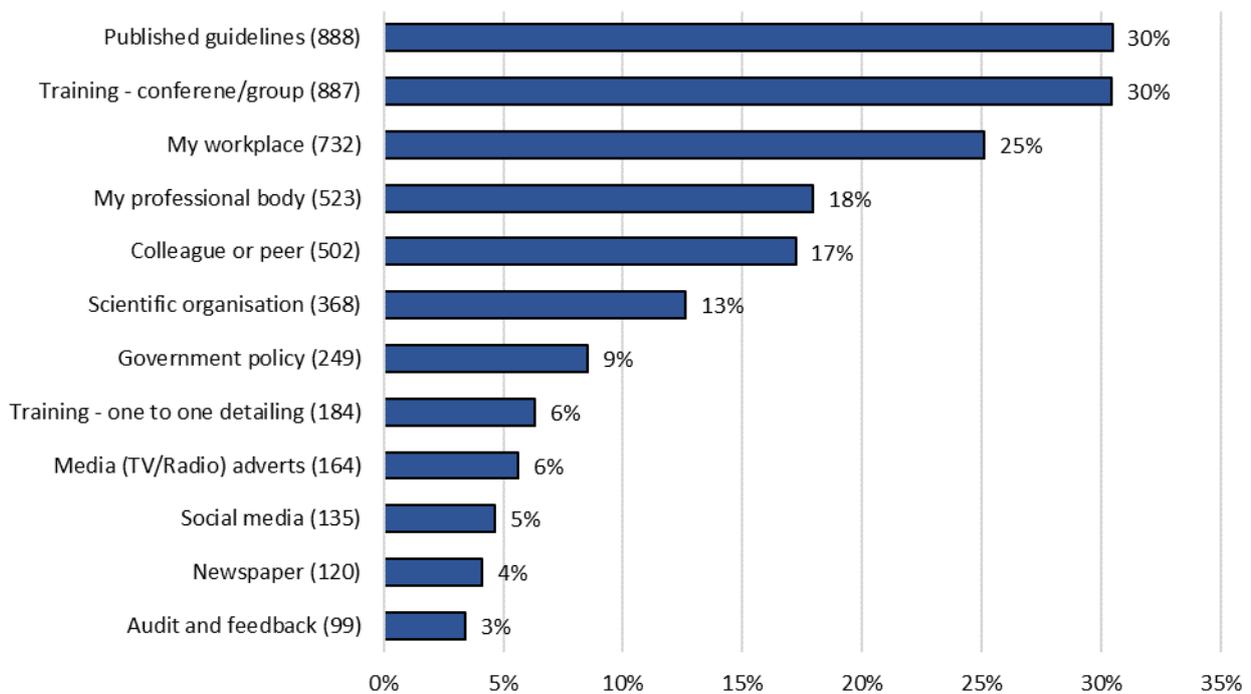


**Figure i.10.1 - In the last 12 months, do you remember receiving information about avoiding unnecessary prescribing or administering or dispensing of antibiotics?**



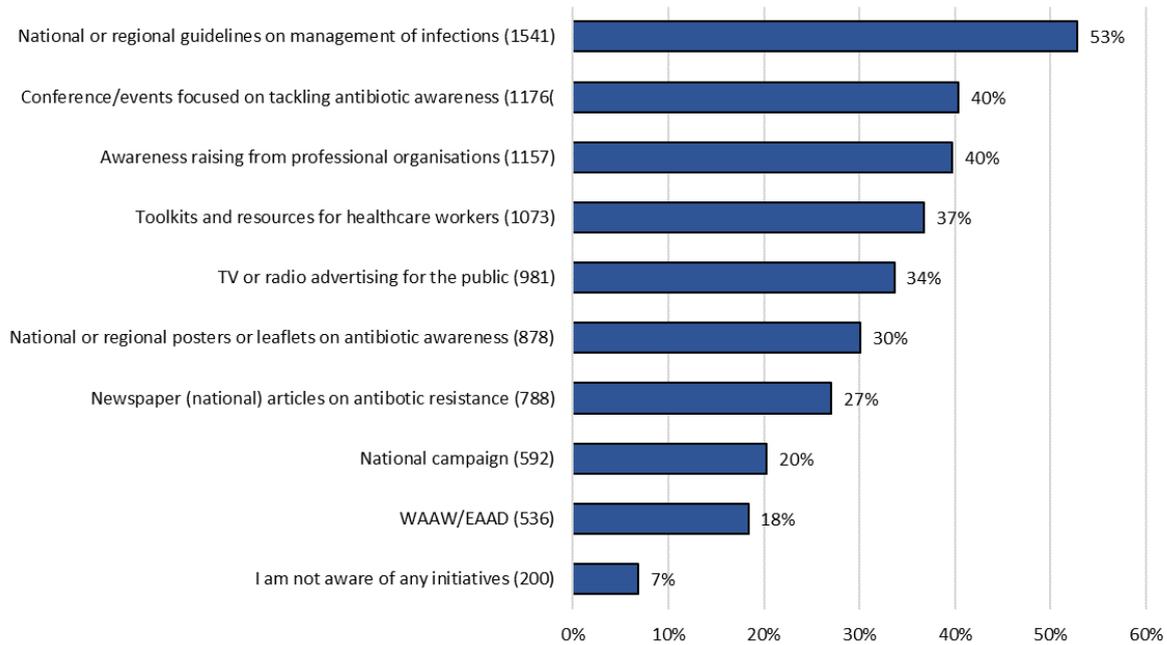
**Figure i.10.2 - If yes, how did you first get this information about avoiding unnecessary prescribing or administering or dispensing of antibiotics?**

Note: Respondents were able to provide more than one answer to this question.



**Figure i.14 - What initiatives are you aware of in your country which focus on antibiotic awareness and resistance?**

Note: Respondents were able to provide more than one answer to this question.





COMITÉ PERMANENT DES MÉDECINS EUROPÉENS  
STANDING COMMITTEE OF EUROPEAN DOCTORS



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