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

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Background

- Several studies have assessed the knowledge, attitudes and behaviours of the general public, healthcare students and individual professional groups in EU Member States regarding antibiotics

- However, there is a lack of literature on the topic including a range of healthcare workers

- This is the first multi-country/multi-professional KAP study of healthcare workers regarding antibiotics, antibiotic use and antibiotic resistance in the EU/EEA

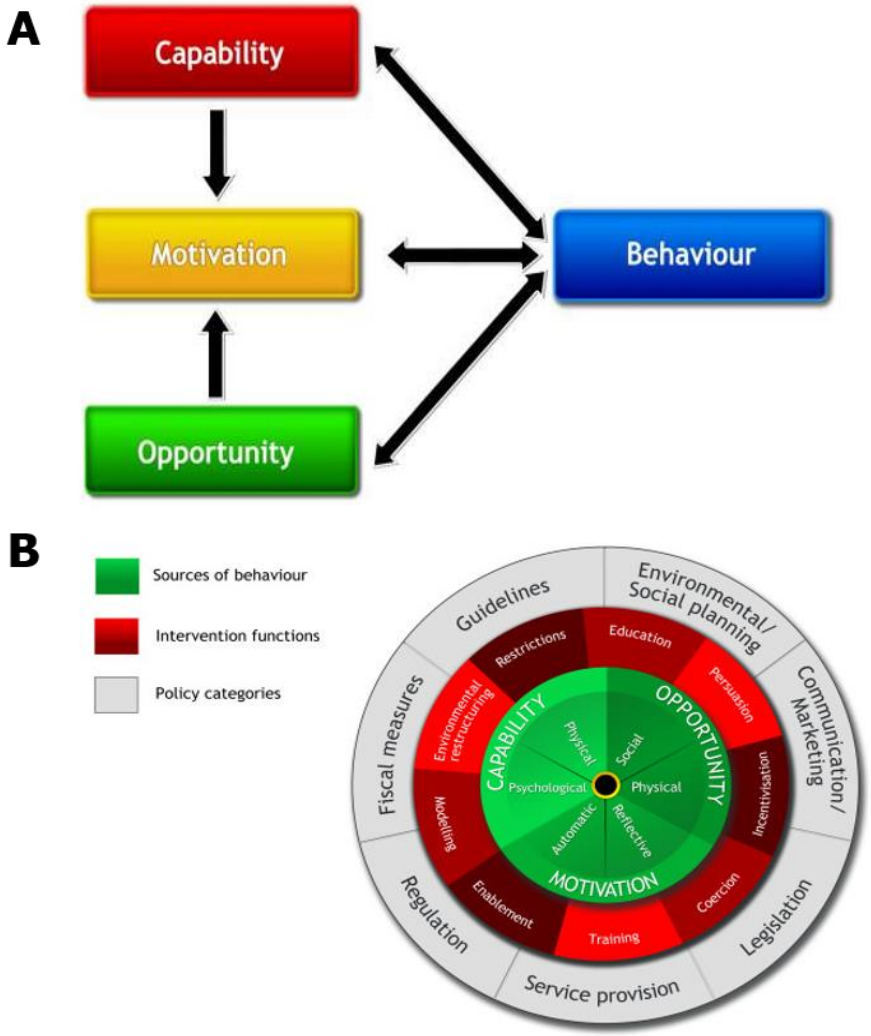
Study aims

- To provide a broad understanding of healthcare workers' knowledge and perceptions in order to provide an evidence base to support future policy and education changes

- To obtain information to contribute to the evaluation of communication campaigns targeting healthcare workers

Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

The COM-B behavioural change model



- Capability: The psychological and/or physical ability to engage in a behaviour
- Motivation: The want or need to perform the behaviour more than any other competing behaviours at that moment
- Opportunity: Physical and social factors that prompt or facilitate a given behaviour

Source: Michie S, et al. Implementation Science. 2011;6(1):42.
https://implementationscience.biomedcentral.com/articles/10.1186/1748-5908-6-42

Questionnaire development process

1. Literature review to identify key topic areas
2. Two-round modified Delphi consensus process to develop questions:
   - ✓ Project Advisory Group (PAG), consisting of designated country representatives and selected European health professional organisations/groups
3. Draft questionnaire piloted across EU/EEA countries
4. Translation into 24 official EU languages and Norwegian

Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Sampling, questionnaire distribution, and analysis

- Quota sampling approach was used to determine the target survey sample size for each country and professional group
  - Based on the EU healthcare personnel statistics per profession and country
  - 0.2% of the workforce was sought for each healthcare profession in each country (except for nursing professionals, 0.1%)
- Target survey sample size was calculated as 11 931 for the EU/EEA overall
- Questionnaire distributed online by Project Advisry Group (PAG) members, and also promoted via social media (#ECDCAntibioticSurvey)
- Participation was voluntary
- The online questionnaire was open between 28 January to 4 March 2019
- Data were analysed using Microsoft® Excel (2010) and STATA release 15

Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Respondents

- 18 365 healthcare professionals responded from across 30 EU/EEA countries
  - NB - Role of PAG in dissemination
- 24 countries met or exceeded their target quota sample size

Profession	Quota sample size	Actual number of responses	Percentage of quota sample size (%)
Physicians	3 692	7 351	**199.1**
Nurses, nursing professionals & midwives	4 599	4 772	**103.8**
Dentists	735	1 085	**147.2**
Pharmacists	915	3 258	**356.1**
Other healthcare workers (e.g. hospital managers, pharmacy/dental technicians, allied health professionals)	1 988	1 092	54.9
Scientists, Others, Unknown	-	807	NA
All healthcare workers	**11 929**	**18 365**	**147.2**

Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Number of responses and quota sample size by profession, selected countries chosen as examples

Country	Physicians		Nurses, nursing professionals & midwives		Dentists		Pharmacists		Other healthcare workers		Healthcare workers without quota size	Total	
	Quota	Total	Quota	Total	Quota	Total	Quota	Total	Quota	Total	Total	Quota	Total
Belgium	70	177	126	69	17	14	28	86	48	33	20	288	399
Czech Republic	78	936	89	4	16	1	14	5	39	6	12	236	964
Malta	3	6	4	10	0	10	1	9	2	21	1	11	57
Norway	47	616	94	630	9	38	8	35	32	88	59	191	1 466
Portugal	99	74	69	87	20	19	18	184	41	11	11	247	386
Slovakia	38	221	20	179	5	1	8	27	14	8	0	86	436
EU/EEA	**3 692**	**7 351**	**4 599**	**4 772**	**735**	**1 085**	**915**	**3 258**	**1 988**	**1 092**	**807**	**11 929**	**18 365**

Beware country comparisons!

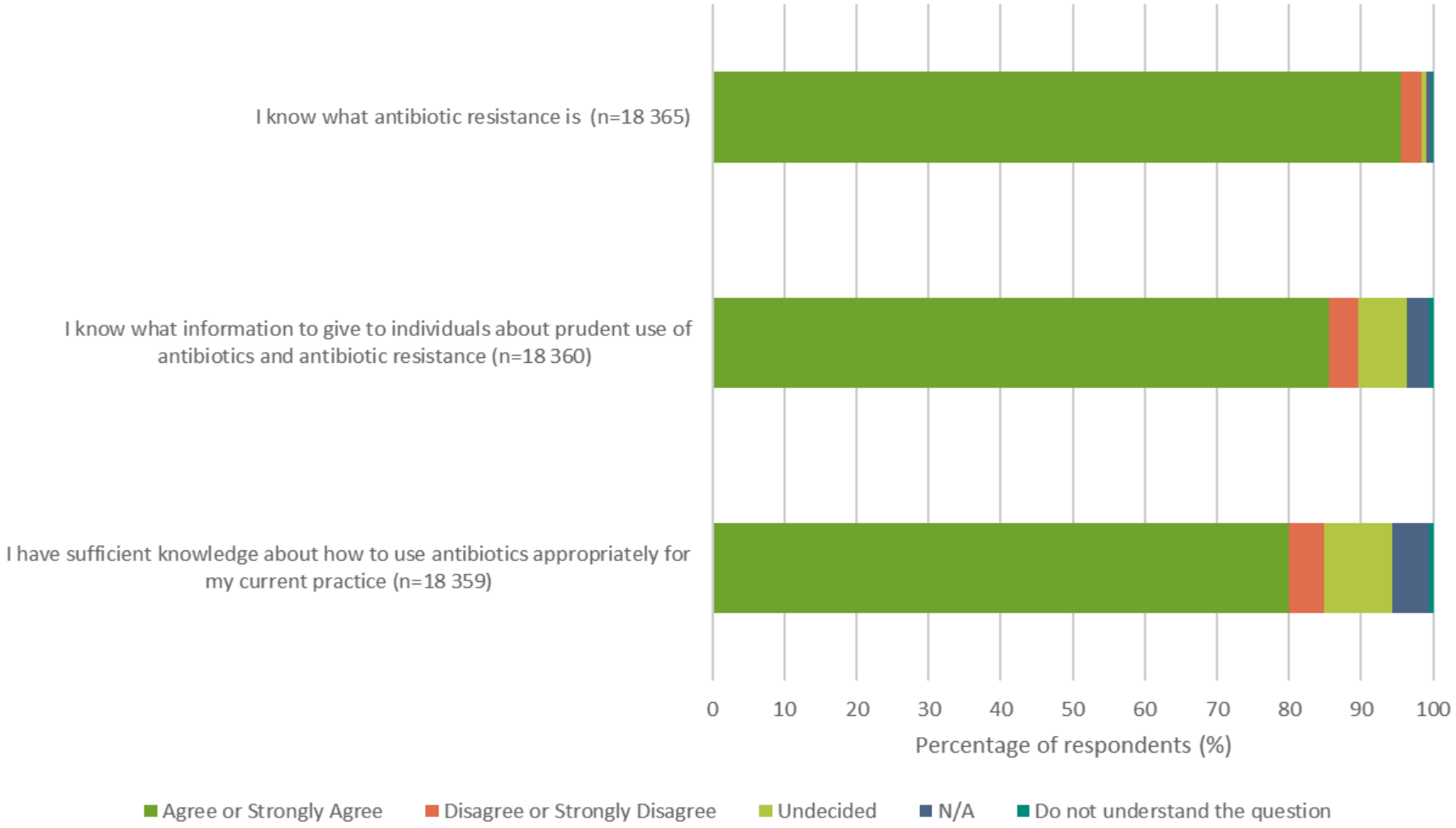
Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Settings in which respondents predominantly practice (i.e. >50% of their time)

Setting	Number of respondents (%)
Hospital	8 972 (49%)
Community (= primary healthcare, e.g. general practice)	3 982 (22%)
Pharmacy	1 742 (9%)
Long-term care facility	1 071 (6%)
Other	2 598 (14%)
Total	**18 365 (100%)**

Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Percentage of respondents who agreed/disagreed with the following statements:



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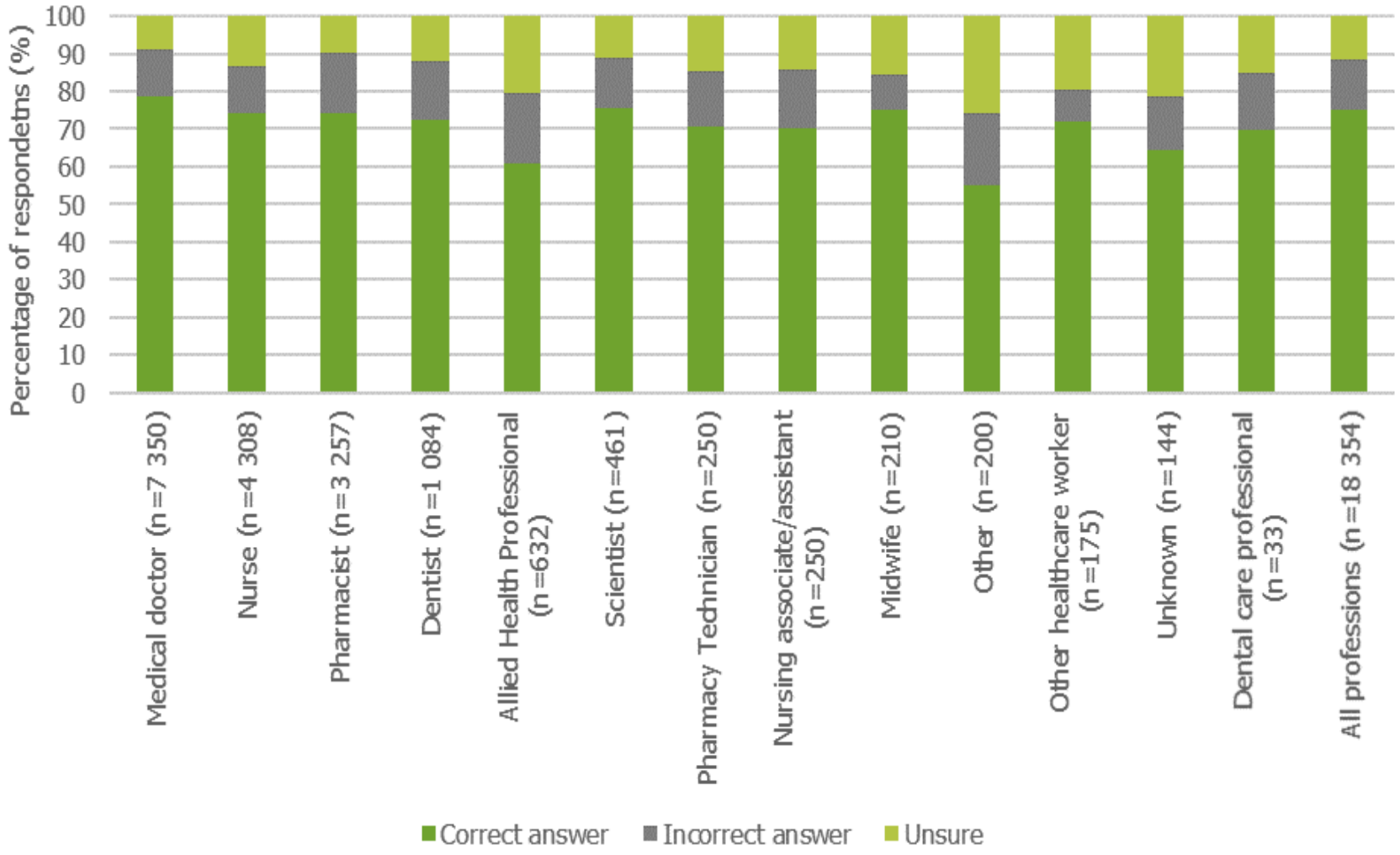
Percentage of respondents who answered each key knowledge question correctly

Key knowledge question (n)	Correct answer	% Correct (country range)	% Incorrect (country range)	% Unsure (country range)
Antibiotics are effective against viruses (n=18 357)	False	**97.5** (91.7-100.0)	1.7 (0.0-8.3)	0.8 (0.0-5.6)
Antibiotics are effective against cold and flu (n=18 356)	False	**97.0** (89.5-100.0)	1.7 (0.0-7.0)	1.3 (0.0-8.3)
Taking antibiotics has associated side effects or risks such as diarrhoea, colitis, allergies (n=18 356)	True	**96.5** (88.9-98.7)	1.9 (0.0-5.6)	1.7 (0.0-11.1)
Unnecessary use of antibiotics makes them become ineffective (n=18 356)	True	**94.0** (85.3-99.1)	4.1 (0.0-11.4)	1.9 (0.0-6.3)
Healthy people can carry antibiotic resistant bacteria (n=18 348)	True	**88.2** (66.5-97.1)	3.8 (0.0-13.0)	8.0 (2.2-20.5)
Antibiotic resistant bacteria can spread from person to person (n=18 350)	True	**86.9** (66.7-95.8)	7.4 (1.4-20.4)	5.7 (1.8-16.1)
Every person treated with antibiotics is at an increased risk of antibiotic resistant infection (n=18 354)	True	**75.0** (60.2-93.4)	13.7 (0.0-29.5)	11.3 (1.5-21.9)

[Compare with results from Eurobarometer: 43% of the general public correctly stated that it is false that antibiotics are effective against viruses]

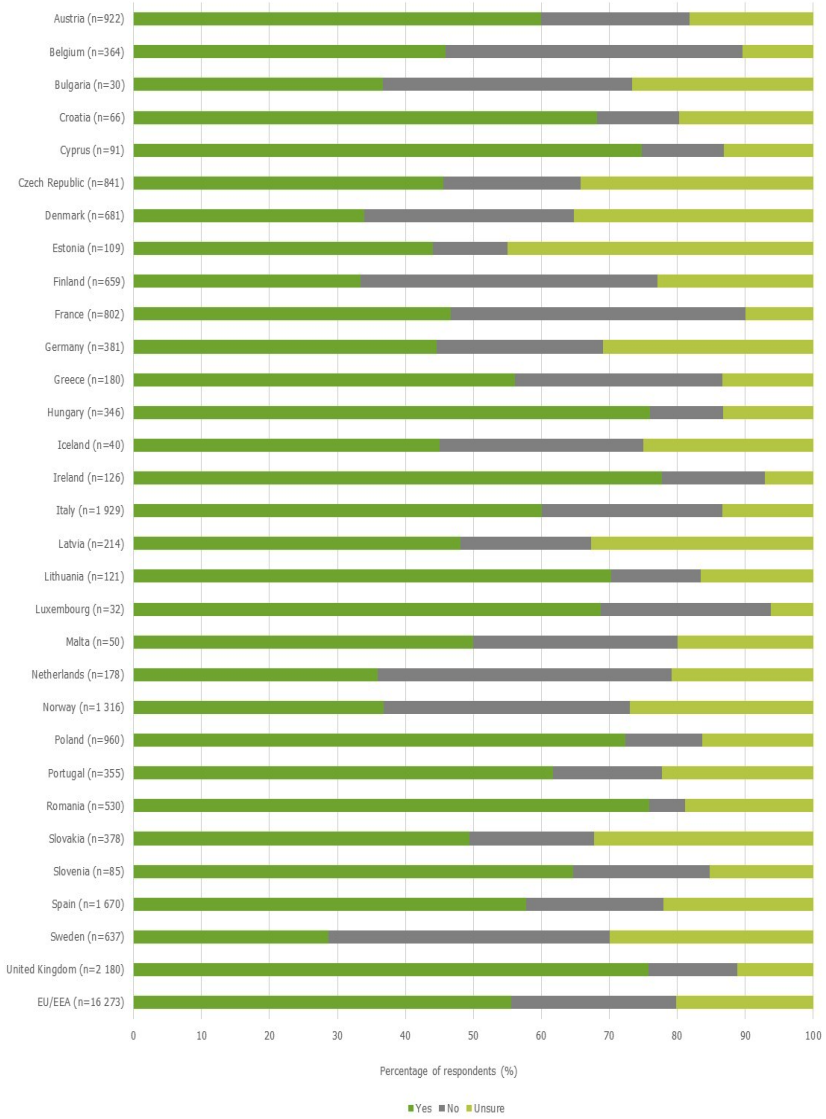
Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Knowledge question: *Every person treated with antibiotics is at an increased risk of antibiotic resistant infection*. Responses by profession



Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

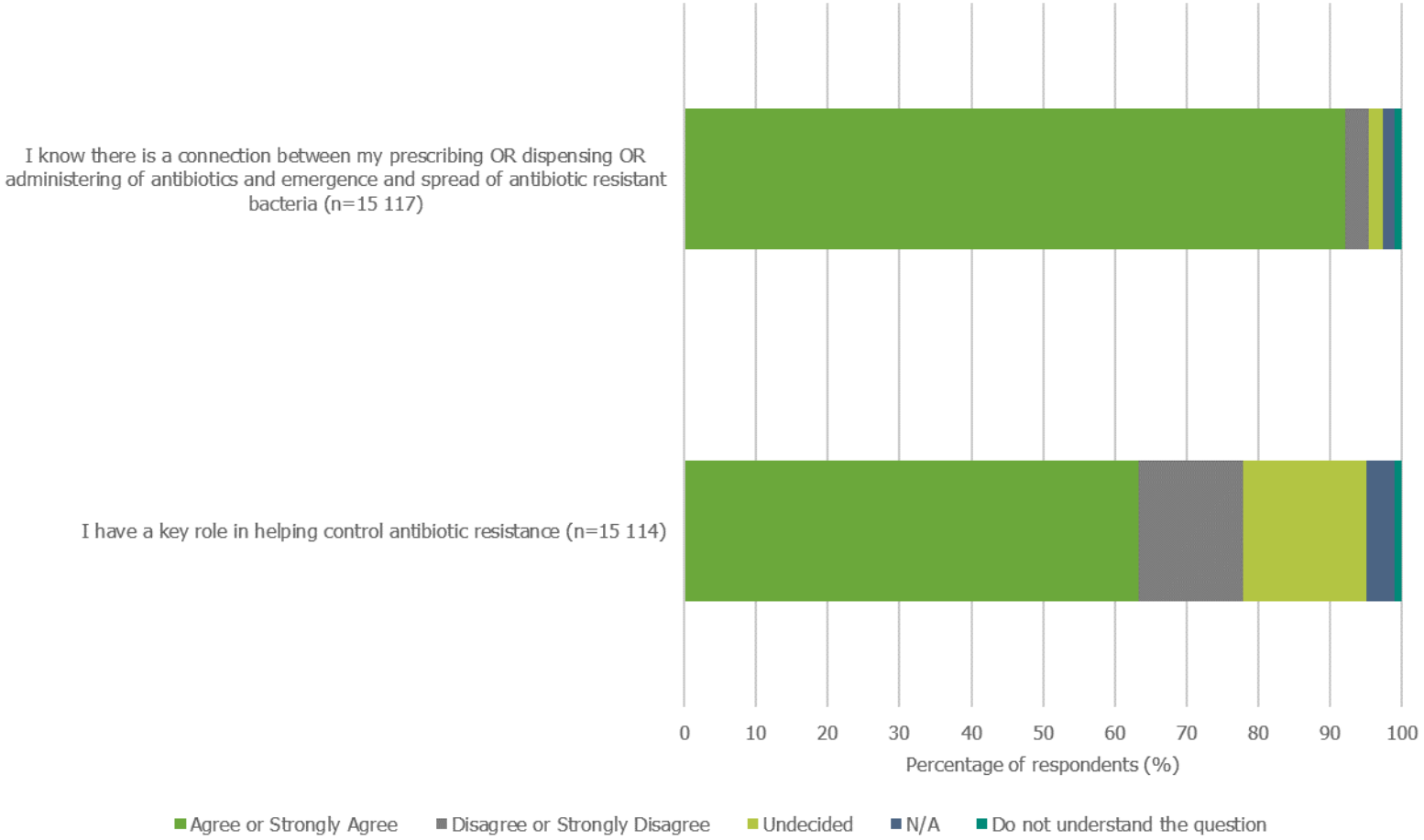
Percentage of respondents who stated they could list the WHO's 'Five moments for hand hygiene'



- 56% stated that they could list WHO's '*Five moments for hand hygiene*'
- Nurses and nursing associates were significantly more likely than other healthcare workers to perform hand hygiene when dealing with patients or biological material (96% and 92%, respectively)

Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Percentage of respondents with direct patient or public involvement who agreed with the following statements



The proportion of respondents who strongly agreed or agreed that they have a key role in helping control antibiotic resistance was **higher for those that work in community settings** (65%) compared to hospital (56%) and other settings (55%)

Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

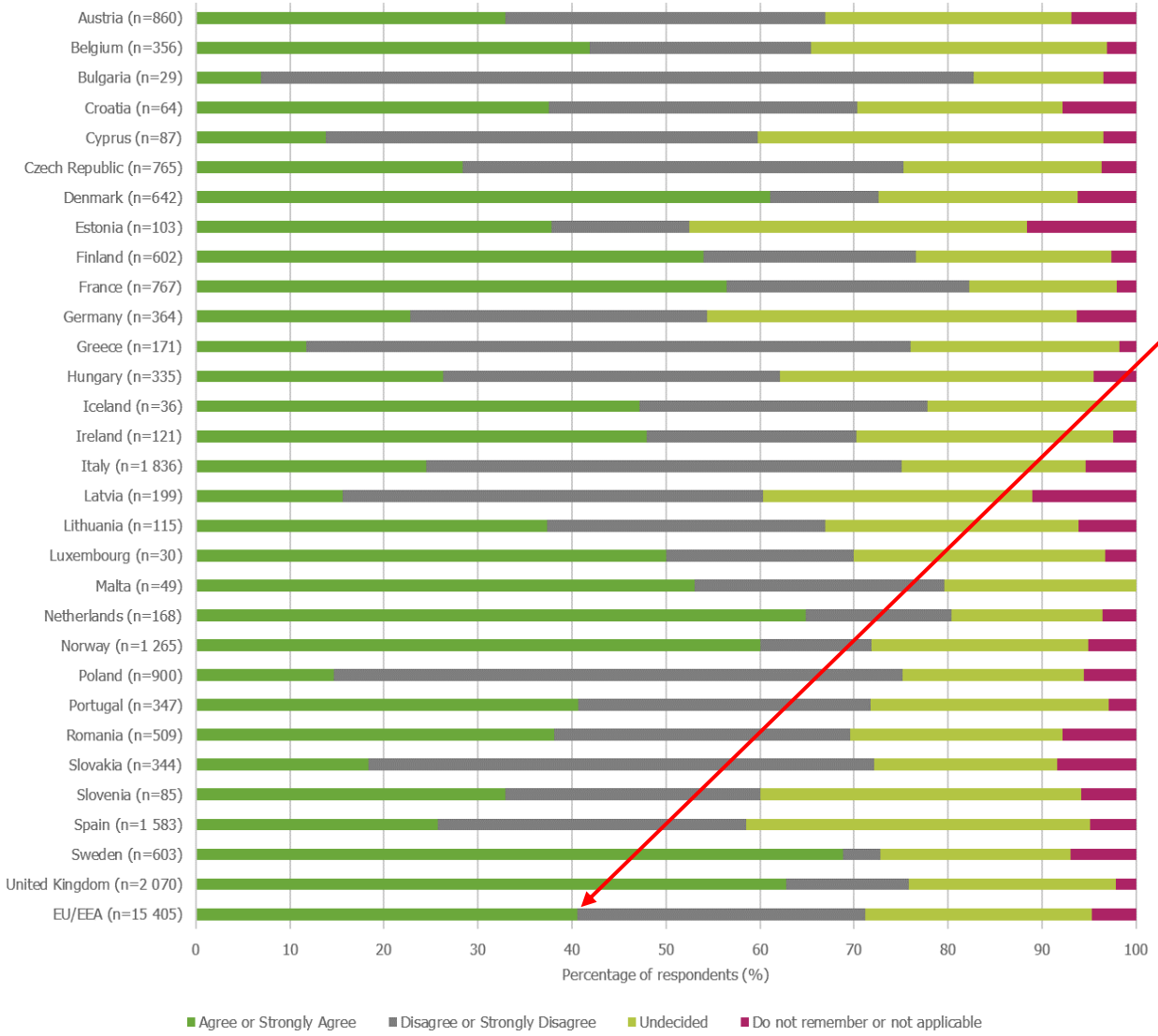
Receipt and effect of information about antibiotics

	Yes n (%)	No n (%)	Unsure n (%)
In the last 12 months, do you remember receiving any information about avoiding unnecessary prescribing OR administering OR dispensing of antibiotics? (n = 16 144)	9 707 (60.1)	4 913 (30.4)	1 524 (9.4)
On the basis of the information you received, have you changed your practice on prescribing OR administering OR dispensing antibiotics? (n = 8 650)	3 641 (42.1)	3 727 (43.1)	1 282 (14.8)

82% of those who have not changed were already following the principles of the messages

Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Percentage of respondents who agreed/disagreed that there had been good promotion of prudent antibiotic use and information about antibiotic resistance in their country



Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Awareness levels of AMR/antibiotic initiatives

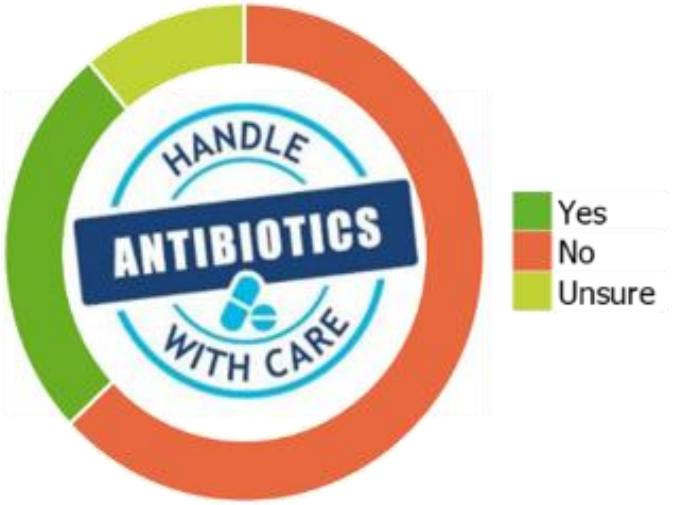
A

(A) Percentage of respondents who were aware/unaware of whether their country had a national action plan on AMR (n=15 385)

B

(B) Percentage of respondents who had/had not heard of European Antibiotic Awareness Day (n=15 518)

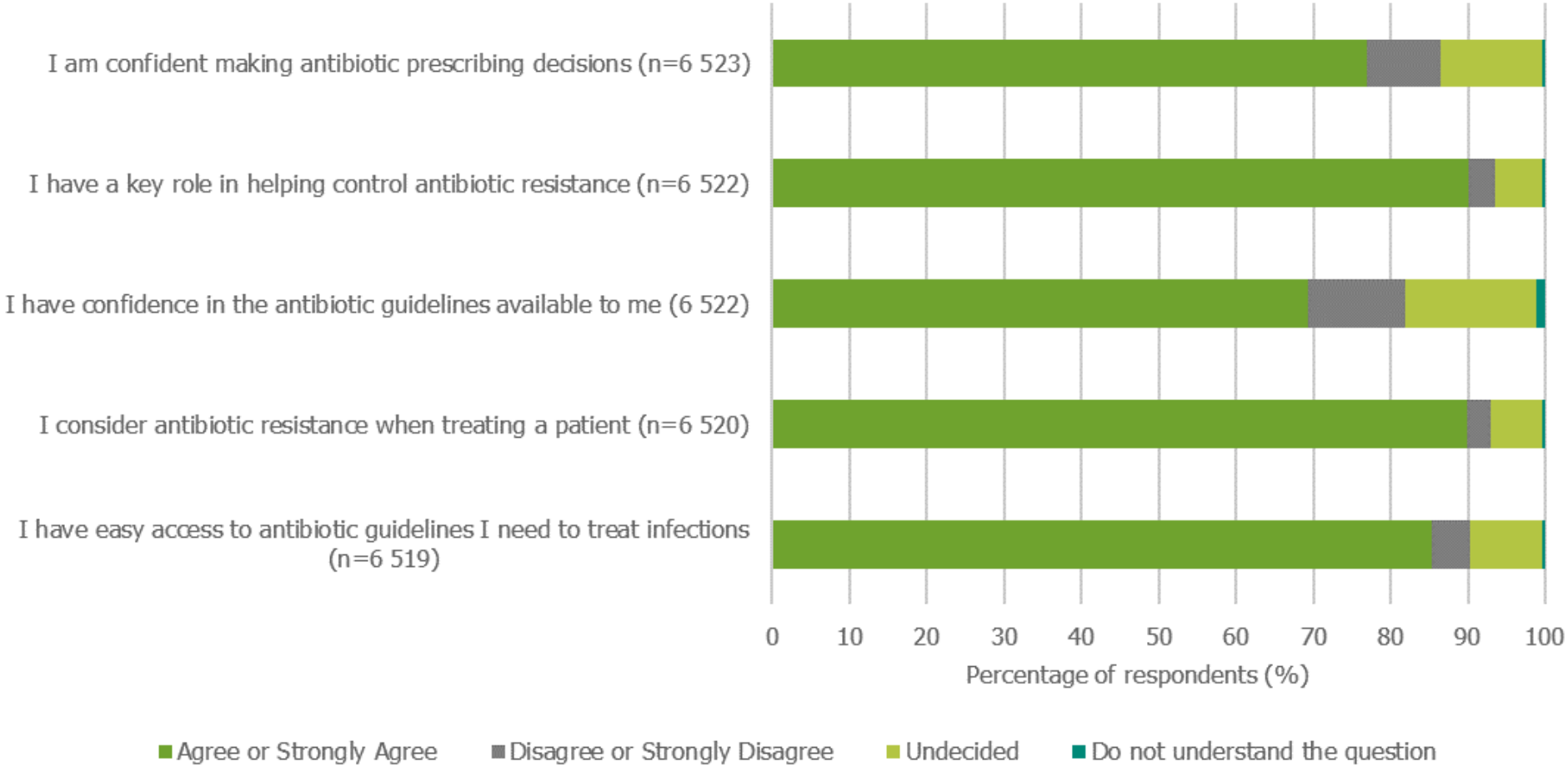
C



(C) Percentage of respondents who had/had not heard of World Antibiotic Awareness Week (n=15 397)

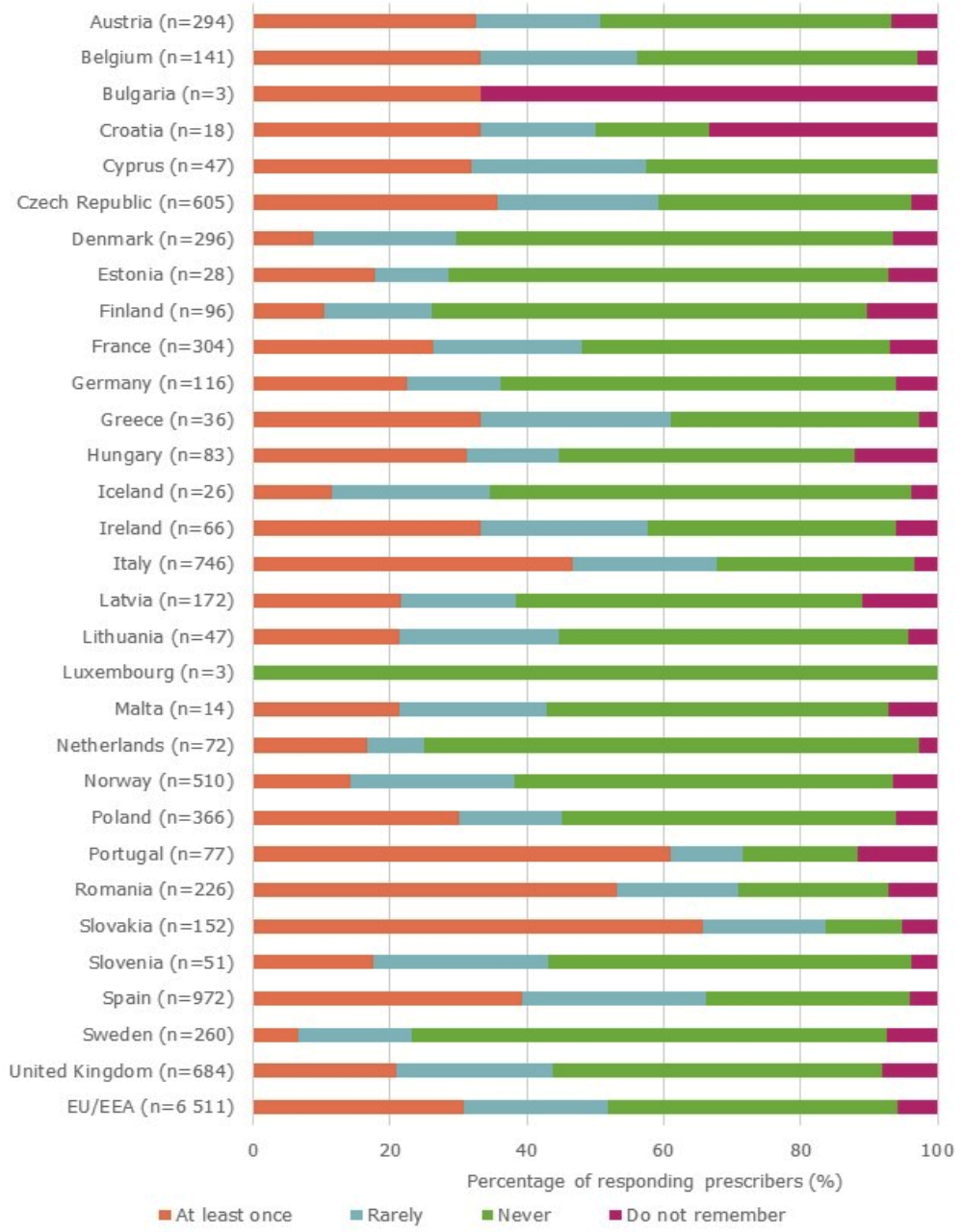
Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Percentage of responding prescribers who agreed/disagreed with the following statements:



Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Frequency of antibiotic prescriptions during the last one week, for which the prescriber would have preferred not to prescribe an antibiotic, by country

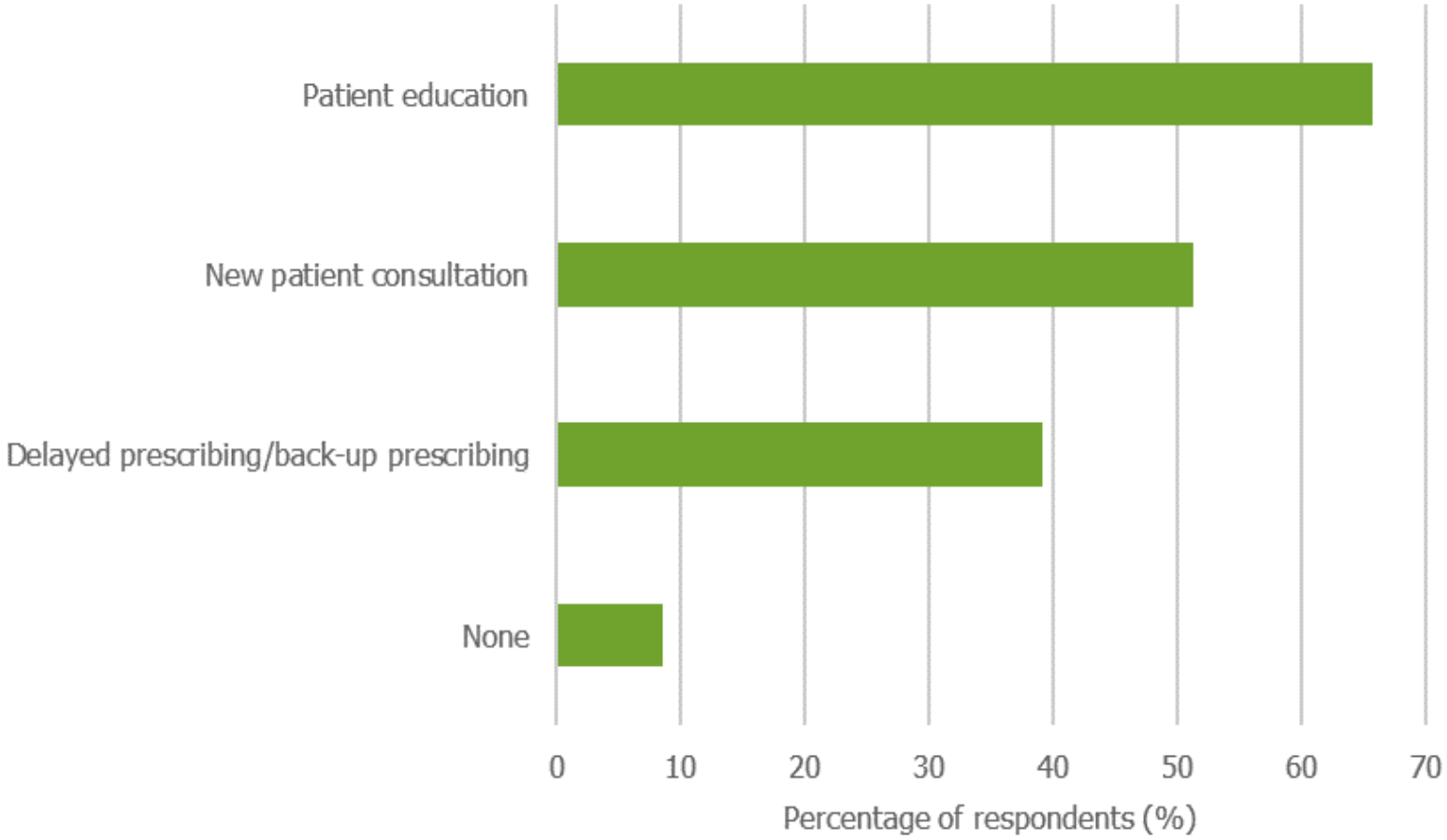


Reasons given for prescribers prescribing an antibiotic even when they would have preferred not to:

- **Fear of patient deterioration or fear of complications (43%)**
- Uncertain diagnosis (26%)
- Impossible to follow up on the patient (23%)
- Limited time to explain why an antibiotic may not be indicated (10%)
- Maintaining the patient relationship (8%)

Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Percentage of responding prescribers selecting the following as strategies for promoting prudent antibiotic prescribing



Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Conclusions

a) Perceived knowledge about antibiotic resistance is high

b) Healthcare workers are generally quite knowledgeable about antibiotics and antibiotic resistance (much more than the general public); and doctors are the most knowledgeable professional group

c) Nurses have the best hand hygiene practices

d) However, clear knowledge gaps remain, for example in relation to prudent use of antibiotics

Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Conclusions (continued)

e) Nearly 1/3 of respondents have received no information about avoiding unnecessary prescribing/administering/dispensing of antibiotics over the past year

f) Only around 40% of respondents think there has been effective promotion of good practice and information in their countries

g) Confidence in the available antibiotic guidelines was expressed by <70% of prescribers

h) Fear of patient deterioration accounts for 43% of antibiotic prescriptions when the prescriber would have preferred not to prescribe an antibiotic

Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Options for action

1. Develop new and/or expand existing educational materials aimed at healthcare workers to ensure that the identified knowledge gaps are filled

2. Particular attention should be paid to those groups of healthcare workers with sub-optimal knowledge, or a self-perception that they do not have sufficient knowledge or skills

Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Options for action (continued)

3. Address the factors that influence prescribers to prescribe even where they think it is not clinically necessary
   - Development of rapid diagnostic tests?
   - More promotion of back-up/delayed prescribing?

4. Barriers to providing patients with written resources on antibiotics and antibiotic resistance should be addressed

5. Antibiotic awareness interventions should target both healthcare workers and the community. Multi-faceted interventions occurring on multiple levels can only be effective after addressing locally existing barriers

Source: Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance, EU/EEA, 2019. ECDC: 2019.

Survey of healthcare workers' knowledge, attitudes and behaviours on antibiotics, antibiotic use and antibiotic resistance in the EU/EEA (2019). Stockholm: European Centre for Disease Prevention and Control; 2019

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This report was sent for consultation to The Project Advisory Group - a multidisciplinary group consisting of representatives of each EU/EEA country as well as representatives of EU health professional organisations.