



2019 EAHP MEDICINES SHORTAGES REPORT

MEDICINES SHORTAGES IN EUROPEAN HOSPITALS

Medicines shortages in the hospital sector - prevalence, nature and impact on patient care

2019 Medicines Shortages Survey results

3 168 total responses

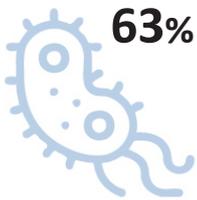
Hospital pharmacists:

2136 responses from 39 countries

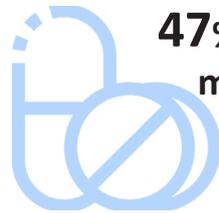
Are medicines shortages a
current problem?

95% (2019) vs 91.8% (2018)

Type of medicines most frequently in shortage



63% Antimicrobial
agents



47% Oncology
medicines



38% Anaesthetic
agents

How often did you experience shortages with
products from one manufacturer?



81% More than three times

Type of impact medicines shortages had on patient care

42% Delays in care
or therapy

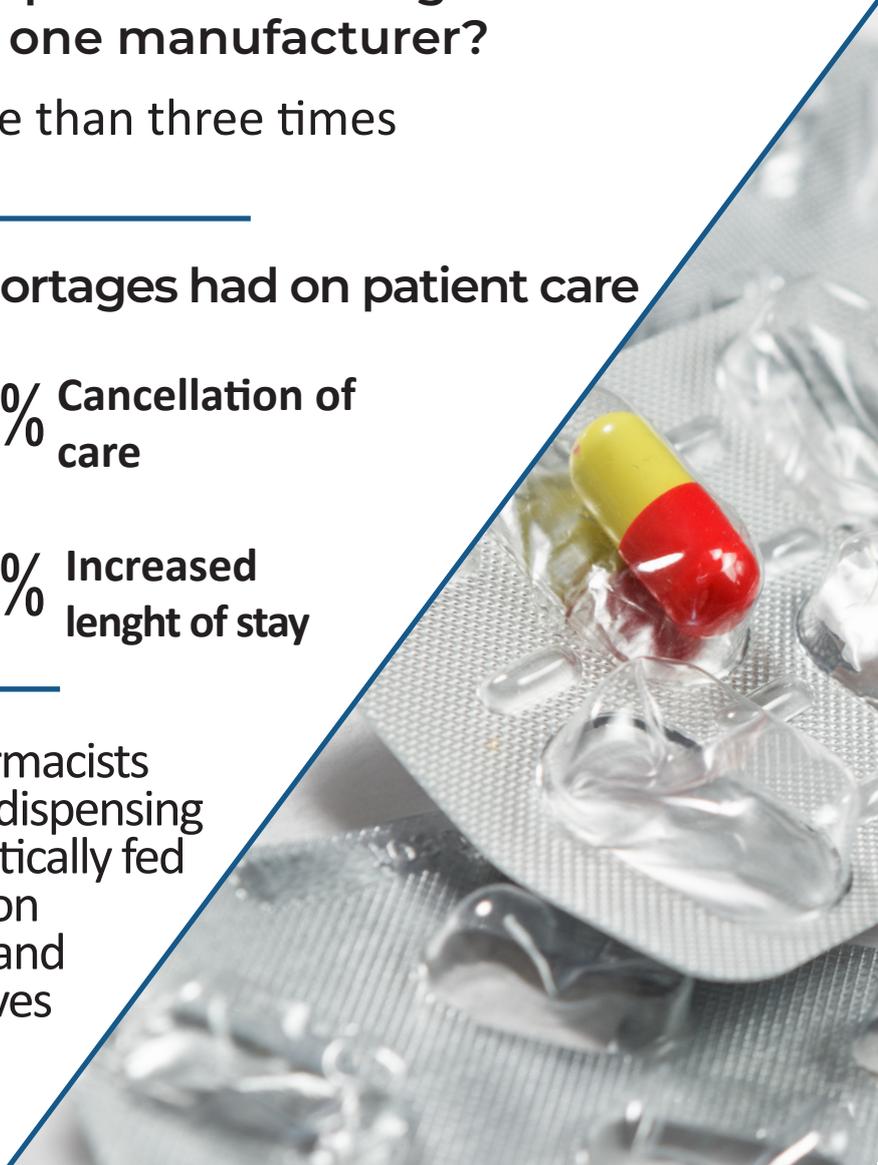
27% Cancellation of
care

28% Suboptimal
treatment

18% Increased
length of stay



70% of hospital pharmacists
reported that prescribing/dispensing
IT system are not automatically fed
with information on
ongoing shortages and
potential alternatives



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FOREWORD

BY THE PRESIDENT

The results of the 2019 Medicines Shortages Survey of the European Association of Hospital Pharmacists (EAHP) were collected between November 2019 and mid-January 2020. They showed that more and more patients are suffering deterioration in their health status, as they cannot receive their prescribed medicines promptly, creating a serious public health threat in Europe. With the COVID-19 pandemic unfolding in Europe, the situation will presumably worsen. EAHP, consequently, welcomes the efforts of the European Medicines Agency (EMA) and its partners in the European medicines regulatory network.

For hospital pharmacists, it is now time to act. The problem should not only be tackled since it will further increase during the COVID-19 pandemic but because it has already been persisting for over 10 years. The survey on the causes of medicines shortages, to be prepared by the European Commission in 2020, is the first step towards targeted pan-European action. Given that medicines shortages are impacting patient care in all Member States, a strong EU commitment is very much needed to adequately address certain causes of medicines shortages. The measures at European level should be supported by national action.

Targeting shortages through a mix of reactive and proactive measures

EAHP believes that medicines shortages cannot be tackled by a single act alone. Consequently, the Association is working towards the application of reactive and proactive measures. On the reactive side, the implementation of Section 2.5 of the European Statements of Hospital Pharmacy, encouraging the adoption of contingency plans for shortages, will be further advanced. Also, individual hospital pharmacists will continue to raise awareness within their hospitals and exchange with prescribers and managers on the best-suited solutions for patients. Other reactive measures include increasing transparency, carrying out prospective risk assessments and compounding medicines for individual patients when and where appropriate.

On the proactive side, EAHP is pushing for the adoption of prudent tendering procedures that move away from 'the winner takes it all' solutions. Procurement practices focusing solely on the price have in recent years created more and more unintended problems due to players pulling out of different national markets. Adjusting the number of winners of a tender would not only support health competition between manufacturers but also lower the risk of single supplier dependence. Also, EAHP is encouraging discussions on the sensible pricing for older yet essential medicines, to ensure that these products remain on the market.

Communication on medicines shortages

The improving communication, in particular between hospital pharmacists and other supply chain actors, remains one of EAHP's priorities. As a reliable catalogue of medicines in shortage across Europe, listing reasons, estimated duration, and other advice to pharmacies, prescribers and patients is still missing, EAHP acknowledges the work carried out by the task force on the availability of authorised medicines for human and veterinary use of the Heads of Medicines Agencies (HMA) and EMA throughout 2019. However, given the limitation of the current catalogue to medicines shortages of centrally authorised products, EAHP would like to reiterate its request towards the HMA/EMA task force. The development of a comprehensive communication strategy on shortages should be considered to guarantee that all supply chain actors, including hospital pharmacists, receive adequate and timely information on the shortage of medicines.

Awareness-raising about the problems caused for patients by medicines shortages now needs to be turned into concrete action. In particular, to lower the impact that the COVID-19 outbreak will have on the availability of active pharmaceutical ingredients and medicines in Europe. EAHP commits to working on the implementation of reactive and proactive measures and hopes that also other stakeholders affected by medicines shortages are joining this initiative.

Petr Horák
President

European Association of Hospital Pharmacists

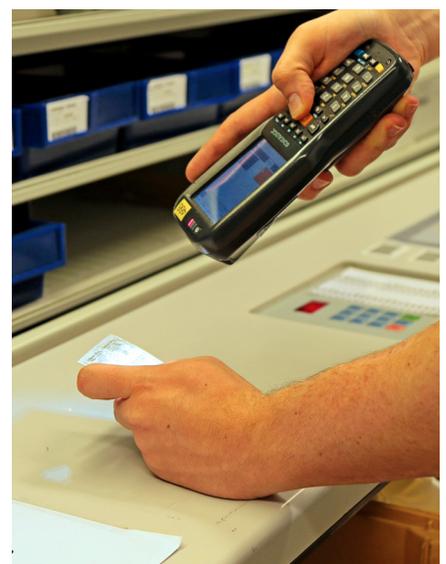
EXECUTIVE SUMMARY

Hospital pharmacists have been working for over 10 years on the subject of medicines shortages. Due to the lack of information on this topic, EAHP has started to collect evidence on medicines supply shortages in the hospital sector, its prevalence, nature and impact on patient care. Surveys conducted in 2013, 2014 and 2018 provided detailed insights into the situation in Europe. In particular, the percentage of hospital pharmacists reporting shortages to be an issue in terms of delivering the best care to patients has seen a significant increase with 91.8% respondents in 2018, compared to 86.2% in 2014 stressing that medicines shortages are a problem faced in their hospital pharmacy.

This negative trend has continued to materialise in EAHP's 2019 Medicines Shortages Survey which gathered in total 3168 responses from hospital pharmacists, patients, physicians, nurses and other healthcare professionals coming from 39 different European countries. The number of hospital pharmacists which reported that medicines shortages are a major problem in their hospital increased from 91.8% in 2018 to 95% in 2019. In comparison only 89% of other healthcare professionals, 72% of physicians and 69% of nurses considered medicines shortages to be a current problem in the hospital they are working in, in terms of delivering the best care to patients.

More than half of the respondents from the different professional groups that participated in EAHP's survey, except nurses for which the response rate was slightly lower, indicated that they personally experienced how medicines shortages negatively impacted one or more of their patients. Delays in care or therapy, cancellation of care, suboptimal treatment and increased monitoring were frequently reported as impacts on patient care. Physicians even saw an increased length of hospital stay triggered by a medicine shortage.

For the first time, EAHP gathered information on possible reasons for shortages. The top three answers for hospital pharmacists and other healthcare professionals were the global shortage of an active pharmaceutical ingredient (API), manufacturing and supply chain problems. Physicians named the price of a medicine, supply chain problems and issues related to parallel export as the main reasons for shortages. Nurses observed that problems with shortages were caused by the price of a medicine, manufacturing problems and supply chain problems. The feedback on tendering was mixed, with hospital pharmacists and other healthcare professionals indicating that tendering is carried out at many different levels in the different European countries. Hospital pharmacists are mainly involved in tendering processes carried out at hospital level. Engagement in procedures at country or regional level is lower.



Also, the feedback for the question investigating the usefulness of the national reporting system, in case such a system exists, was mixed. Around half of the participating hospital pharmacists, nurses and other healthcare professionals deemed their national reporting system useful and regularly updated. Among the group of physicians, slightly more than 1/3 agreed with this statement. In comparison to the information collected in 2018, the groups of medicines most frequently in shortage did not change considerably. Antimicrobial agents (63%), oncology medicines (47%) and anaesthetic agents (38%) were named by hospital pharmacists as top three medicines frequently in shortage in 2019. In 2018, hospital pharmacists reported antimicrobial agents (77%), preventive medicines such as vaccines (43%) and oncology medicines (39%) as medicines most frequently in shortage.

The large majority of respondents confirmed the communication of information on medicines shortages within their workplace. Exchanges by email, by phone or via face-to-face meetings were the preferred medium through which information was shared. Question 20 (for hospital pharmacists)¹ put forward the following five proposals and asked respondents to rank them in accordance with their usefulness:

1. Better enforcing the mandatory early notification of a medicine shortage.
2. Ensuring appropriate staffing levels in order to lower the impact that medicines shortages currently have on the overall patient services.
3. Conducting a European wide analysis of the causes to provide targeted solutions.
4. Strengthening collaboration between the European countries and the European institutions.
5. Mandating improved communication among all stakeholders (manufacturers, parallel traders, wholesalers and healthcare professionals).

Proposal number 1 and number 5 were deemed the most useful solution by hospital pharmacists, other healthcare professionals, nurses and physicians. The free text responses to question 21 (for hospital pharmacists)² showed that improving communication, obliging manufacturers to share information about medicines shortages in a timely manner and applying prudent tendering/procurement mechanisms that ensure that there is more than one supplier per medicine/API in Europe could be the most useful solutions to help tackle the problem of medicines shortages.



1. Question 43 (for physicians) | question 64 (for nurses) | question 100 (for other healthcare professionals): How would you rank the usefulness of the following proposals? (0 = not useful | 5 = very useful).

2. Question 44 (physicians) | question 65 (nurses) | question 101 (other healthcare professionals): Do you have another proposal that is currently being applied in your hospital/ your country that could help alleviate the problem of medicines shortages? (free text).



BACKGROUND

For the first time EAHP expanded the scope of its Medicines Shortages Survey and reached out to patients, physicians, nurses and other healthcare professionals.

Information on medicines shortages collected by EAHP in 2014 and 2018 shed light on the impact medicines shortages have on patients and hospital pharmacists. For the 2019 edition of EAHP's Medicines Shortages Survey, the decision was taken to expand the survey to physicians, nurses and other healthcare professionals working in the hospital environment. Also, patients were encouraged to provide feedback on their experiences with medicines shortages. Data from these groups were collected between 7th November 2019 and 13th January 2020. The survey questions were made available via SurveyMonkey in Bosnian/Croatian, English, French, Greek, Italian, Portuguese, Romanian, Serbian, Slovak and Spanish.

EAHP's survey activities in the field of medicines shortages are closely linked to the European Statements of Hospital Pharmacy, in particular Statement 2.5 ('Each hospital pharmacy should have contingency plans for shortages of medicines that it procures.'). Consequently, question 19 of the 2019 Medicines Shortages Survey specifically investigated the existence of contingency plans or protocols in hospitals.

The 2019 edition of EAHP's Medicines Shortages Survey explored issues linked to communications of medicines shortages within hospitals and possible reasons for shortages and their impact on patients. In addition, current management strategies were collected by asking how survey participants would like to see medicines shortages handled and/or resolved.

An analysis aimed to detect statistically significant differences in the percentage of respondents in a country reporting shortages to be 'a problem in terms of delivering the best care to patients and/or operating the hospital pharmacy' between 2018 and 2019 surveys were performed.

Terminology

p	p-value
t	t-value
d	Effect size
df	Degrees of freedom

RESPONSE RATES

Hospital pharmacists submitted 2136 responses to the 28 questions posed by the 2019 Medicines Shortages Survey. The table below provides information on the response rate per country to EAHP's Medicines Shortages Surveys in 2014, 2018 and 2019. The response rate increased by 28% from 2018 (N=1666) to 2019. The countries which saw the biggest increase in response between 2018 and 2019 were France (+166 responses), Germany (+129 responses), the Czech Republic (+88 responses) and Slovakia (+77 responses).

Country	Responses (2019)	Responses (2018)	Responses (2014)	Country	Responses (2019)	Responses (2018)	Responses (2014)
Albania	2	1	0	Lithuania	2	1	8
Andorra	3	0	0	Luxembourg	7	3	0
Austria	44	29	21	Malta	3	6	11
Belgium	135	90	94	Montenegro	6	4	0
Bosnia & Herzegovina	26	19	9	Netherlands	29	20	11
Bulgaria	9	3	6	North Macedonia	34	14	4
Croatia	23	26	25	Norway	21	21	11
Cyprus	2	2	1	Poland	12	32	13
Czech	114	26	4	Portugal	129	85	42
Denmark	2	10	25	Romania	69	24	2
Estonia	12	17	15	Russia	1	1	0
Finland	12	33	1	Serbia	77	20	8
France	358	192	3	Slovakia	100	23	16
Germany	207	78	10	Slovenia	22	18	5
Greece	110	84	14	Spain	198	190	105
Hungary	37	33	12	Sweden	77	5	0
Iceland	2	9	4	Switzerland	83	67	7
Ireland	43	51	47	Turkey	8	61	5
Italy	34	73	41	United Kingdom	83	291	7
Latvia	0	4	2				

Table 1 Response rate of hospital pharmacists (N=2136) to EAHP's Medicines Shortages Surveys conducted in 2014, 2018 and 2019 grouped by country.

For the first time data from physicians, nurses, patients and other healthcare professionals were collected. 385 patients provided feedback to 8 patient-specific questions (questions 73 to 80 in the survey) which touched on the experiences that they had with medicines shortages during their hospital stay. The 29 questions (questions 81 to 109 in the survey) addressed to 'other healthcare professionals' were the same as those asked to hospital pharmacists. The only difference lays in an additional question that gathered information on the professional background of those choosing to answer the survey for 'other healthcare professionals'. 289 responses were received from other healthcare professionals.

The questions for physicians and nurses omitted the section investigating the influence of medicines tendering. 209 physicians provided input via the 21 questions addressed to them (questions 30 to 50 in the survey). Nurses were asked 22 questions on the reasons for and management of shortages and its impact on patients (questions 51 to 72 in the survey). 149 answers were received from nurses.

Country	Patients	Physicians	Nurses	Other Healthcare Professionals	Country	Patients	Physicians	Nurses	Other Healthcare Professionals
Albania	-	1	-	1	Latvia	-	-	-	1
Armenia	-	1	-	-	Luxembourg	-	1	-	-
Austria	-	2	-	-	Malta	-	-	-	1
Azerbaijan	1				Netherlands	4	2	2	9
Belgium	7	11	1	4	Norway	1	-	-	3
Croatia	-	1	5	1	North Macedonia	-	-	1	-
Cyprus	-	-	-	1	Poland	-	-	-	1
Czech Republic	2	4	33	4	Portugal	16	8	1	8
Denmark	2	2	1	-	Romania	73	39	6	49
Estonia	-	-	-	2	Serbia	6	3	10	13
Finland	1	-	-	-	Slovakia	57	49	61	24
France	52	5	3	34	Slovenia	-	1	-	3
Germany	6	1	-	4	Spain	5	6	1	11
Greece	72	59	13	27	Sweden	1	1	1	14
Hungary	1	-	-	-	Switzerland	1	-	1	5
Iceland	-	-	-	3	Turkey	1	-	-	-
Ireland	2	-	2	23	Ukraine	-	1	-	-
Italy	7	12	3	4	United Kingdom	68	1	4	36

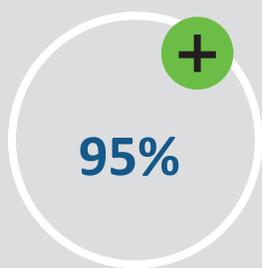
Table 2 Response rate of patients (N=385), physicians (N=209), nurses (N=149) and other healthcare professionals (N=289) to EAHP's 2019 Medicines Shortages Survey grouped by country.

Nurses that responded to the 2019 Medicine Shortages Survey work in a wide range of hospital departments, including but not limited to the intensive care unit, the emergency department, the unit responsible for paediatrics and neonatology, the operating room and the oncology department. Similarly to nurses, the participating physicians covered a wide range of specialities, including but not limited to anaesthesiology, dermatology, general medicine, gynaecology, internal medicine, paediatrics, oncology and urology.

The 289 other healthcare professionals do not only work in the hospital environment, but also in the community pharmacy sector, for the pharmaceutical industry or as wholesalers. Hospital managers, laboratory personnel, pharmacy technicians and midwives were among the groups of professionals working in the hospital. In addition, pharmacy and medical trainees that are currently interning in a hospital participated in the survey.

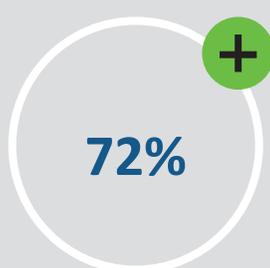
PREVALANCE OF SHORTAGES IN EUROPEAN HOSPITALS

FACTS



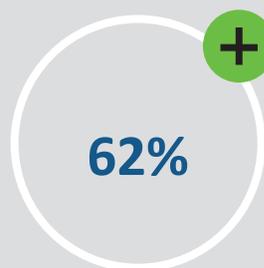
Hospital Pharmacists

There is a statistically significant increase in the percentage of countries where hospital pharmacists reported shortages to be a problem from the 2018 survey and the 2019 survey.



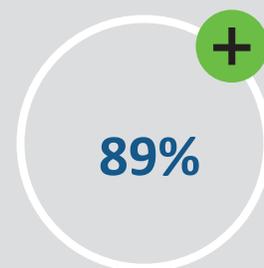
Physicians

Most physicians stated that medicines shortages are causing a problem in delivering the best possible care to patients.



Nurses

More than half of nurses also believe that medicines shortages are a problem in their hospital.



Other Healthcare Professionals

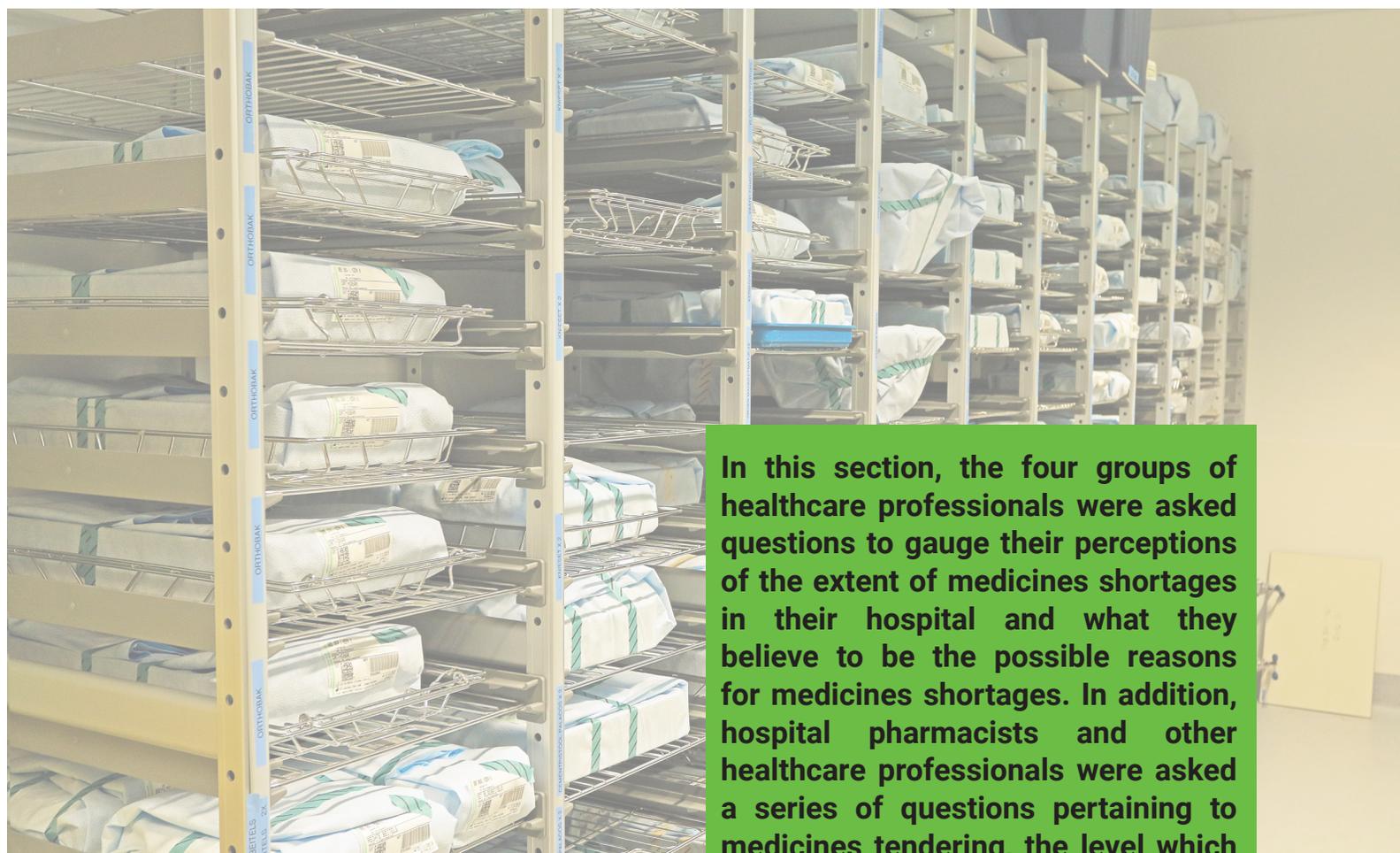
A significant majority of other healthcare professionals agree that medicines shortages are currently an issue for them and for patient care.

HIGHLIGHTS

The four groups of healthcare professionals surveyed agreed that medicines shortages are preventing the delivery of the best care to patients and comparisons with the 2018 EAHP Medicines Shortages Report demonstrates that the problem has worsened. However, the responses differed when it came to the question of possible reasons, with hospital pharmacists being more likely

to lay the blame on global shortages of APIs, manufacturing and supply chain problems than physicians or nurses. This section also looked at hospital pharmacist's involvement in tendering, and the differences in medicines tendering depending on the level of which it is conducted was also highlighted.

PREVALANCE OF SHORTAGES IN EUROPEAN HOSPITALS



In this section, the four groups of healthcare professionals were asked questions to gauge their perceptions of the extent of medicines shortages in their hospital and what they believe to be the possible reasons for medicines shortages. In addition, hospital pharmacists and other healthcare professionals were asked a series of questions pertaining to medicines tendering, the level which they are conducted, the criteria used and whether they are involved in the process.

Question 3 (hospital pharmacists) | question 32 (physicians) | question 53 (nurses) | question 83 (other healthcare professionals):
Are shortages of medicines a current problem in the hospital you are working in, in terms of delivering the best care to patients and/or operating the hospital pharmacy?

A large majority (95%|N=2036) of the hospital pharmacists that answered this question agreed that medicines shortages are frequently encountered in their hospital, while only 5% (N=100) believed that medicines shortages are not a current problem for delivering the best care to patients and/or operating the hospital pharmacy.

Compared to the results of EAHP's 2018 Medicines Shortages Survey in which 90% of respondents answered affirmative to the question 'Are shortages of medicines a current problem in the hospital you are working in, in terms of delivering the best care to patients and/or operating the hospital pharmacy?', the problems posed by medicines shortages seem to have grown. This trend becomes even more obvious when going back to data collected by EAHP's 2014 Medicines Shortages Survey

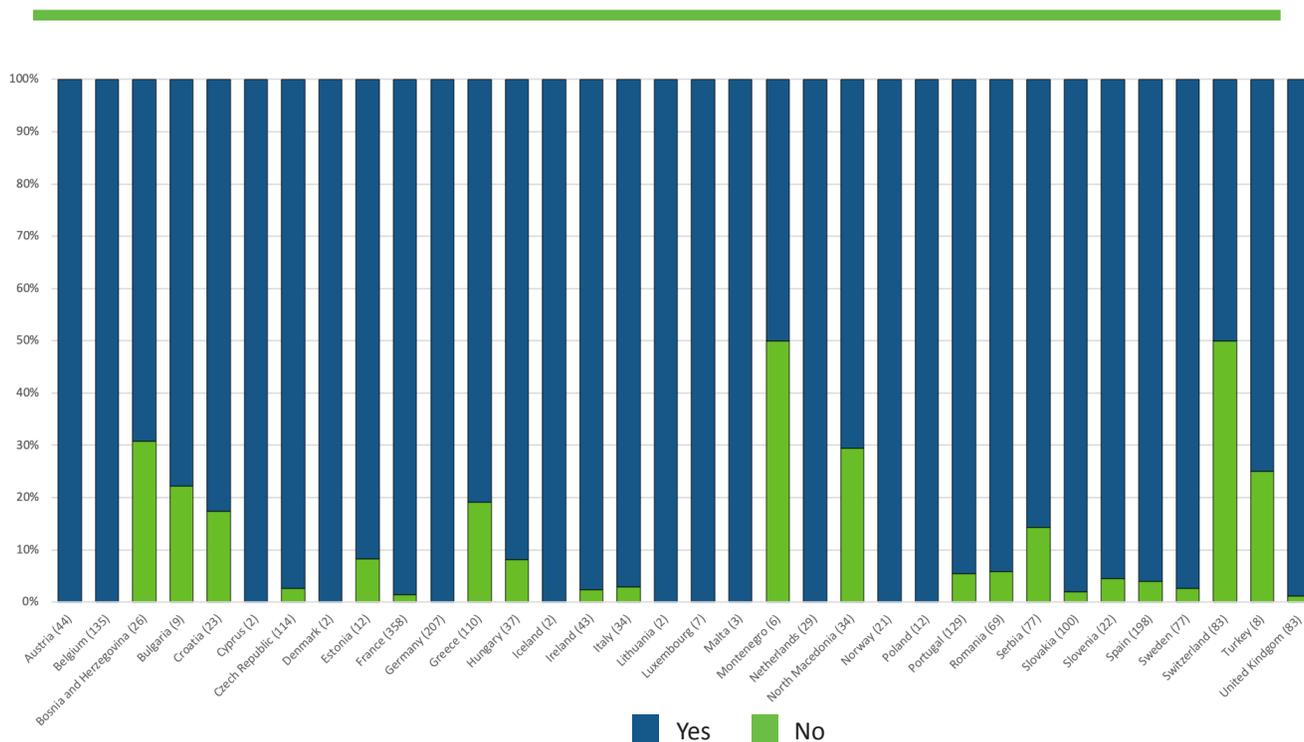


Figure 1 Percentage of responses by hospital pharmacists (N=2136) for question 3 'Are shortages of medicines a current problem in the hospital you are working in, in terms of delivering the best care to patients and/or operating the hospital pharmacy?', grouped by country.

which showed that 86% of hospital pharmacists believed that shortages were a current problem in their pharmacy at that time.

The responses, in particular of nurses and physicians paint a different picture. While the majority of other healthcare professionals (89% | N= 258) agreed that medicines shortages are a problem, only 62% of nurses (N= 92) and 72% (N= 150) of physicians shared this view.

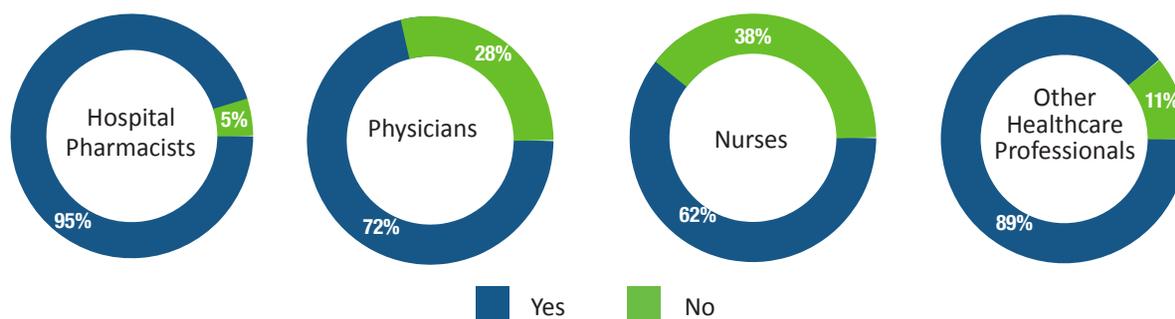


Figure 2, 3, 4 and 5 Percentage of responses by hospital pharmacists (N=2136) for question 3, physicians (N=209) for question 32, nurses (N=149) for question 53 and other healthcare professionals (N=289) for question 83 'Are shortages of medicines a current problem in the hospital you are working in, in terms of delivering the best care to patients?', grouped by profession.

An analysis was carried out which aimed at detecting statistical significant differences in the percentage of respondents in a country reporting shortages to be "a problem in terms of delivering the best care to patients and/or operating the hospital pharmacy" in the 2018 and the 2019 Medicines Shortages Survey. The analysis was performed considering only countries that answered to both surveys. The 2019 survey foresaw two answers possibilities for question 3: 'yes' and 'no'. While in the 2018 survey participants could choose between 'yes', 'no' and 'unsure'. For this reason, the calculation of the percentage of 'yes' answers for each country in 2019 was based on the division of the number of 'yes' answers by the sum of the number of 'yes' and 'no' answers. For the results of the 2018 survey, the percentage of 'yes' replies was obtained by dividing the number of 'yes' responses by the sum of all responses from hospital pharmacists.

Data obtained was cleaned for outliers and tested with a paired student's t-test. The t-test results showed a statistical significant increase in the percentage of countries that reported shortages to be a problem in terms of delivering the best care to patients and/or operating the hospital pharmacy in 2019 compared to 2018 (T= 3,959; df= 27; p= 0,0005; d= 1.024).

Question 4 (hospital pharmacists) | question 33 (physicians) | question 54 (nurses) | question 84 (other healthcare professionals): What do you see as possible reasons of shortages in your hospital? Tick all that apply.

When asked what they believed to be the possible reasons for medicines shortages in their hospital the top three answers for hospital pharmacists were, global shortage of an active pharmaceutical ingredient (API) (72%), manufacturing (72%) and supply chain problems (49%). The top three answers were the same for other healthcare professionals, with 55% choosing global shortage of API as one of the possible causes of medicines shortages in their hospital, 58% choosing manufacturing problems and 44% opting for supply chain problems. For physicians, the top three responses were the price of a medicine (either too low or too high) with 40%, supply chain problems (33%) and issues related to parallel export (32%). For nurses, the top three responses were similar to those of physicians, with the price of a medicine (either too low or too high) with 37%, manufacturing problems (33%) and supply chain problems (32%).

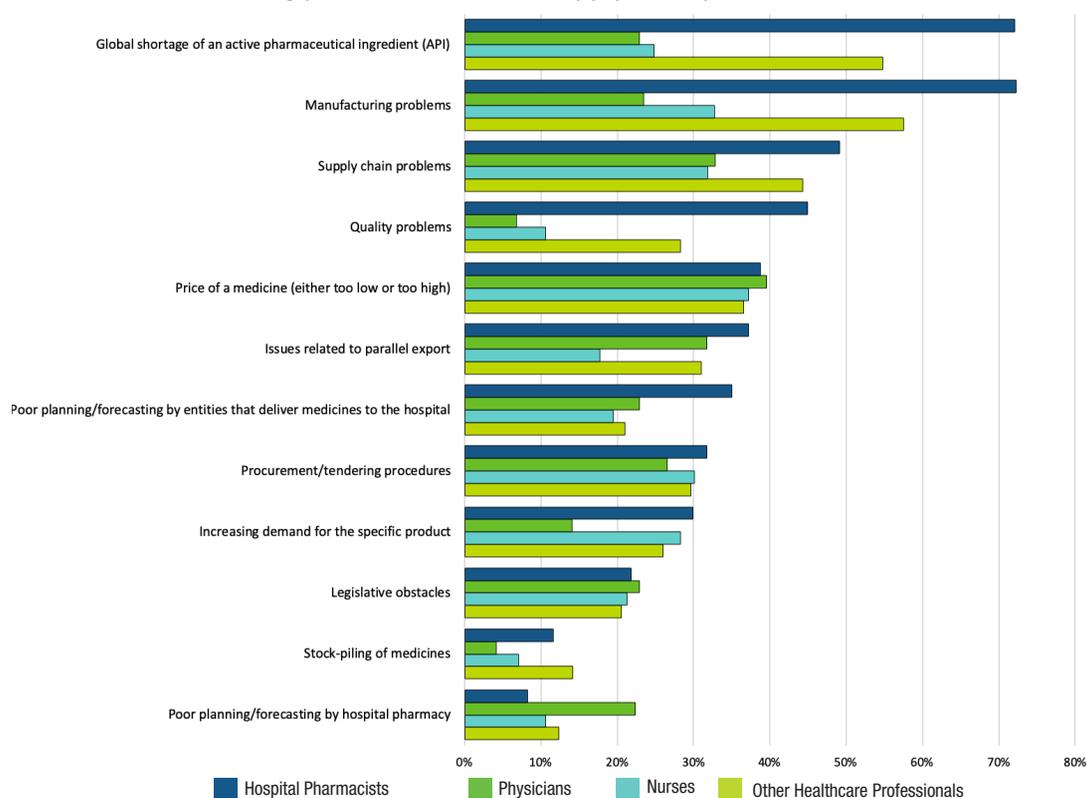


Figure 6 Percentage of responses by hospital pharmacists (N=2075) for question 4, physicians (N=192) for question 33, nurses (N=113) for question 54 and other healthcare professionals (N=219) for question 84 ‘What do you see as possible reasons of shortages in your hospital?’, grouped by profession. (Note that this was a tick all that apply question).

The results reveal considerable differences in the perception, between the four groups of healthcare professionals, on the possible reasons for medicines shortages. The biggest divergence can be seen at the top of the graph which demonstrates that while 72% of hospital pharmacists believed that a global shortage of an API was the reason behind medicines shortages in their hospital, only 23% of physicians and 25% of nurses answered the same. Similarly, 72% of hospital pharmacists replied that manufacturing problems were causing medicines shortages in their hospital, compared to only 23% of physicians and 33% of nurses. Physicians were also more likely to believe that poor planning/forecasting by the hospital pharmacy was causing medicines shortages in their hospital, with 22% of physicians choosing that answer possibility, when only 8% of hospital pharmacists, 11% of nurses and 12% of other healthcare professionals chose that option.

These results demonstrate that although the four groups of healthcare professionals do have very similar perceptions on some of the possible causes of medicines shortages, such as the price of medicines, procurement/tendering procedures and legislative obstacles for example, there are also significant differences. Hospital pharmacists are noticeably more concerned with issues related to the manufacturing process and the supply chain which might reflect the differences in the tasks and responsibilities of the healthcare professions surveyed.

Question 5 (hospital pharmacists) | question 85 (other healthcare professionals): At which level is medicines tendering carried out in your country?

Hospital pharmacists and other healthcare professionals were then asked at which level medicines tendering is carried out in their country. Other healthcare professionals (32%) were significantly more likely to answer that they didn't know than hospital pharmacists (11%). For hospital pharmacists, the answers were fairly diverse with 25% stating that medicines tendering is conducted both nationally and at hospital level, 22% stating that it was done at the hospital level and 19% stating that it was done via purchasing group.

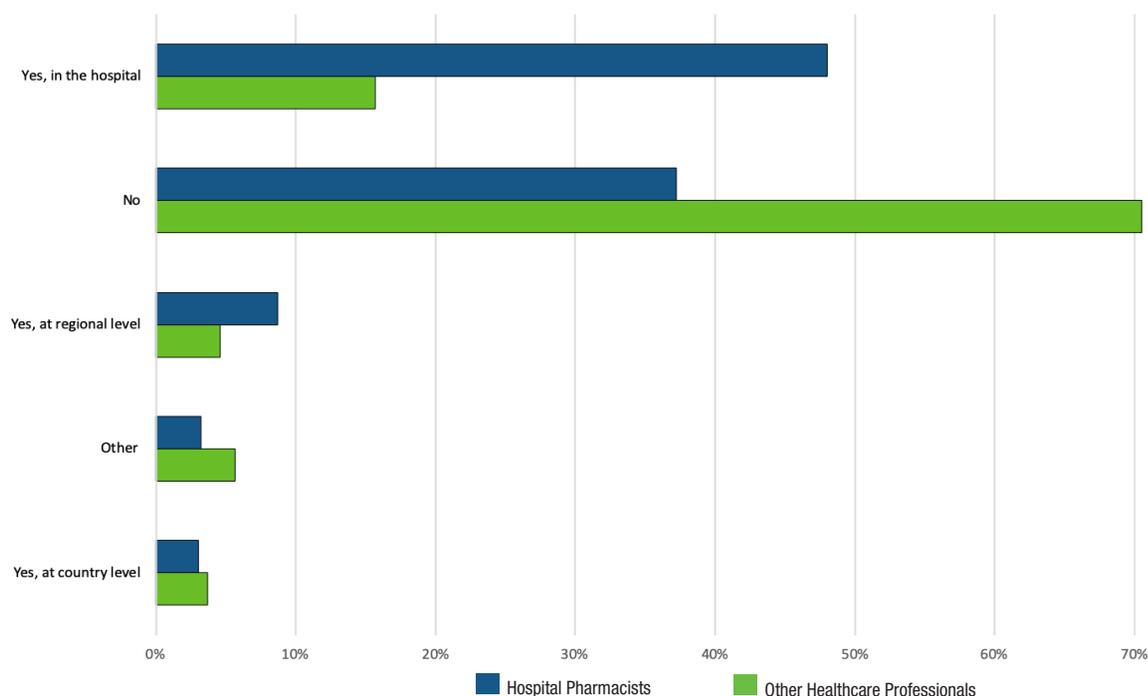


Figure 7 Percentage of responses by hospital pharmacists (N=2034) for question 5 and other healthcare professionals (N=199) for question 85 'At which level is medicines tendering carried out in your country?', grouped by profession.

As highlighted in EAHP's position paper on procurement the procedures for medicines tendering vary significantly across Europe and are conducted at different levels in different countries. The answers to question 5 therefore reflect the diverse procurement landscape in Europe.

Question 6 (hospital pharmacists) | question 86 (other healthcare professionals): Are you involved in medicines tendering? Tick all that apply.

Hospital pharmacists and other healthcare professionals were asked whether they are involved in medicines tendering. Hospital pharmacists were significantly less likely to answer ‘no’, with 37% of hospital pharmacists stating that they were not involved in medicines tendering compared to 71% of other healthcare professionals. Most of the participating hospital pharmacists who take part in medicines tendering are involved on the hospital level (48%), with some participating in the tendering process on the regional level (9%). This demonstrates that hospital pharmacists play a substantial role in medicines tendering, especially in hospitals.

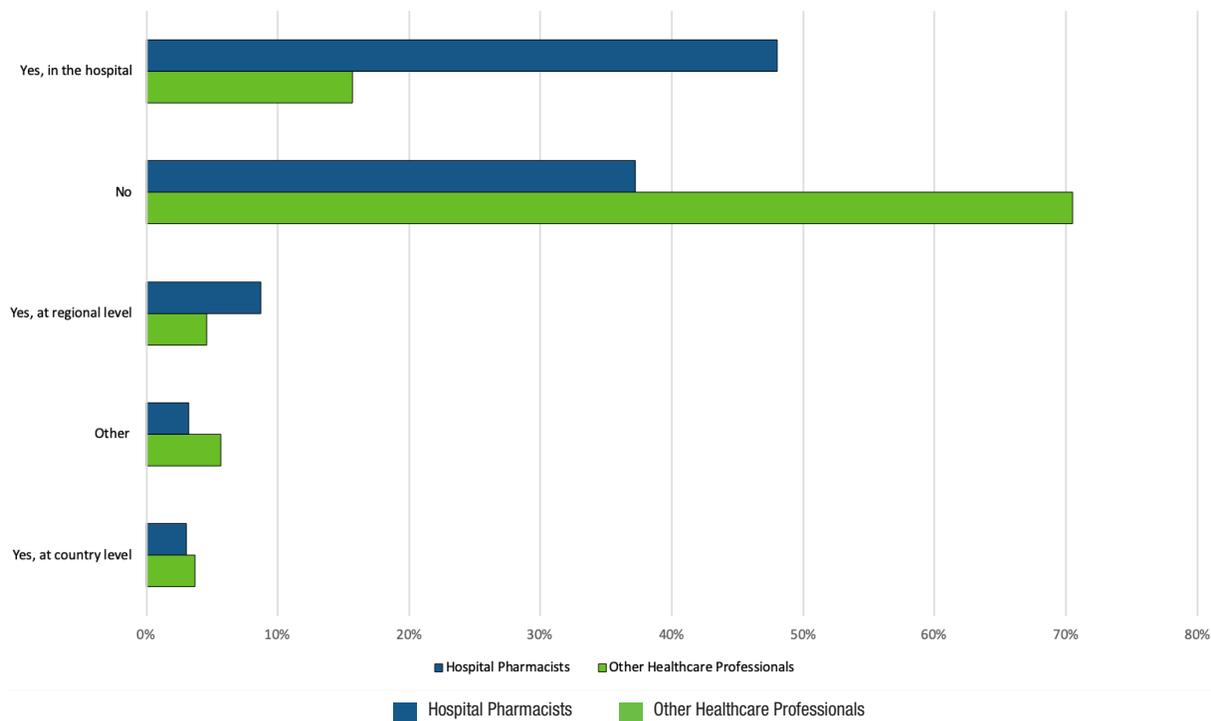


Figure 8 Percentage of responses by hospital pharmacists (N=2034) for question 6 and other healthcare professionals (N=217) for question 86 ‘Are you involved in medicines tendering?’, grouped by profession.

Respondents who ticked the answer possibility ‘other’ were given the option to specify in a free text response. Of those who did many stated that they were involved in medicines tendering on several different levels, such as medicines tendering on the hospital level with regional cooperation. Several respondents highlighted that the level of the medicines tendering varied depending on the medicine. With some medicines being tendered on the hospital level while others on the regional or country level. The most frequent free text response to the ‘other’ answer option was that of purchasing groups or syndicates:

“Mainly in the hospital but some in co-operation at regional level/purchasing group” – Hospital pharmacist, Finland

“Our hospital is part of a purchasing group, this purchasing group is acting for a group of hospitals, not only regional and not valid for the whole country. Furthermore, not all medicines are tendered by this purchasing” – Hospital pharmacist, Germany

Question 7 (hospital pharmacists) | question 87 (other healthcare professionals): Please mark all criteria relevant for the tendering procedure.

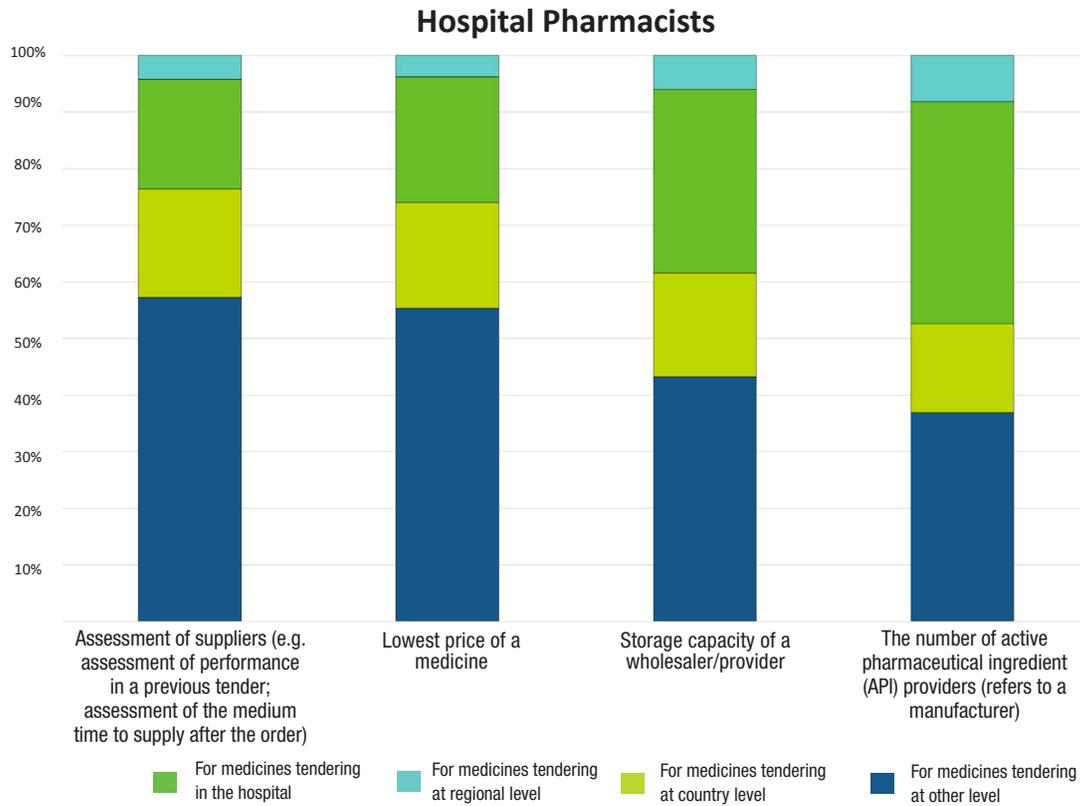


Figure 9 Percentage of responses by hospital pharmacists (N=1182) for question 7 'Please mark all criteria relevant for the tendering procedure'. Grouped by profession. (Note that this was a tick all question).

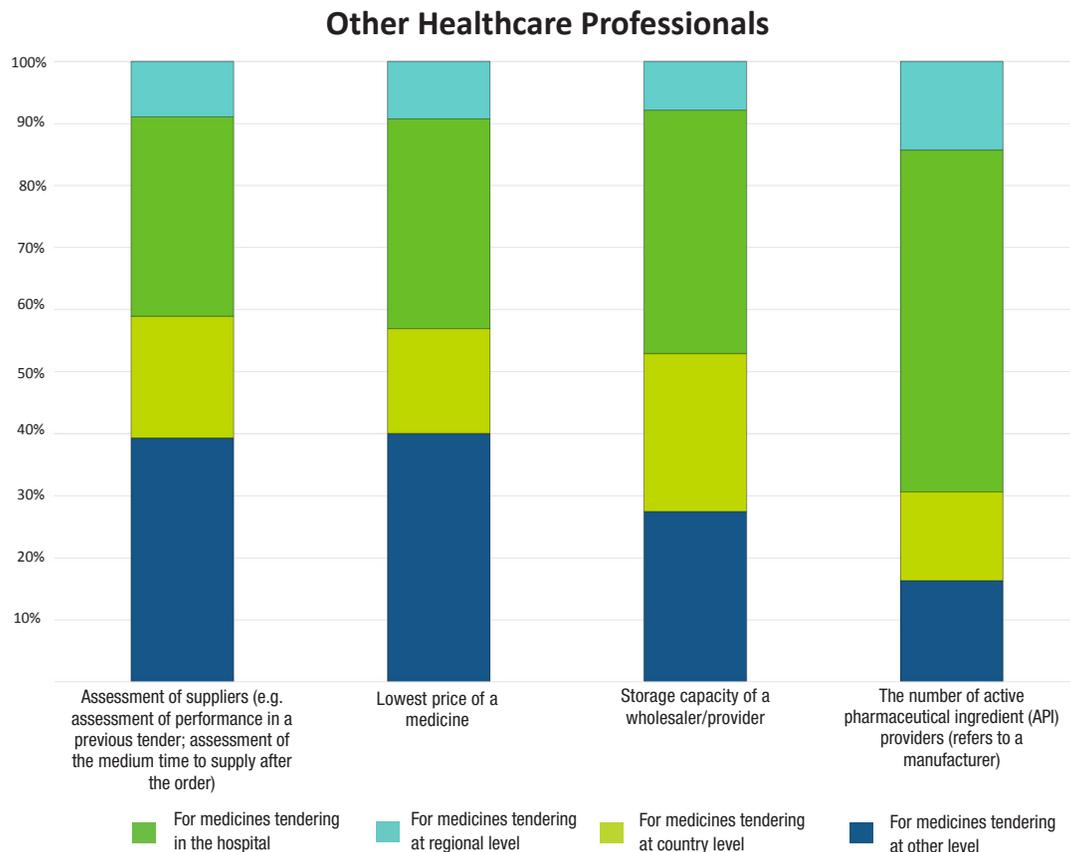


Figure 10 Percentage of responses by other healthcare professionals (N=66) for question 87 'Please mark all criteria relevant for the tendering procedure'. Grouped by profession. (Note that this was a tick all question).

In order to ascertain whether the criteria for medicines tendering differ depending on which level the tendering is conducted at, the hospital pharmacists and other healthcare professionals who had stated in question 6 that they were involved in medicines tendering, were asked to choose which criteria were the most relevant to the different levels of tendering. 59% of hospital pharmacists and 39% of other healthcare professionals stated that the assessment of suppliers was the most relevant criteria for medicines tendering in the hospital, as well as the lowest price (55% of hospital pharmacists and 40% of other healthcare professionals) and the storage capacity of a wholesaler/provider (42% of hospital pharmacists and 27% of other healthcare professionals). The number of API providers was deemed to be more significant for medicines tendering at the country level for both groups, with all four criteria being deemed almost equally as important for medicines tendering at the regional level. Indicating that the tendering procedure does vary depending on the level which it is conducted at.

Question 8 (hospital pharmacists) | question 88 (other healthcare professionals): In your experience, how many times have you experienced a shortage for a medicine in 2019, which is provided by a single pharmaceutical company?

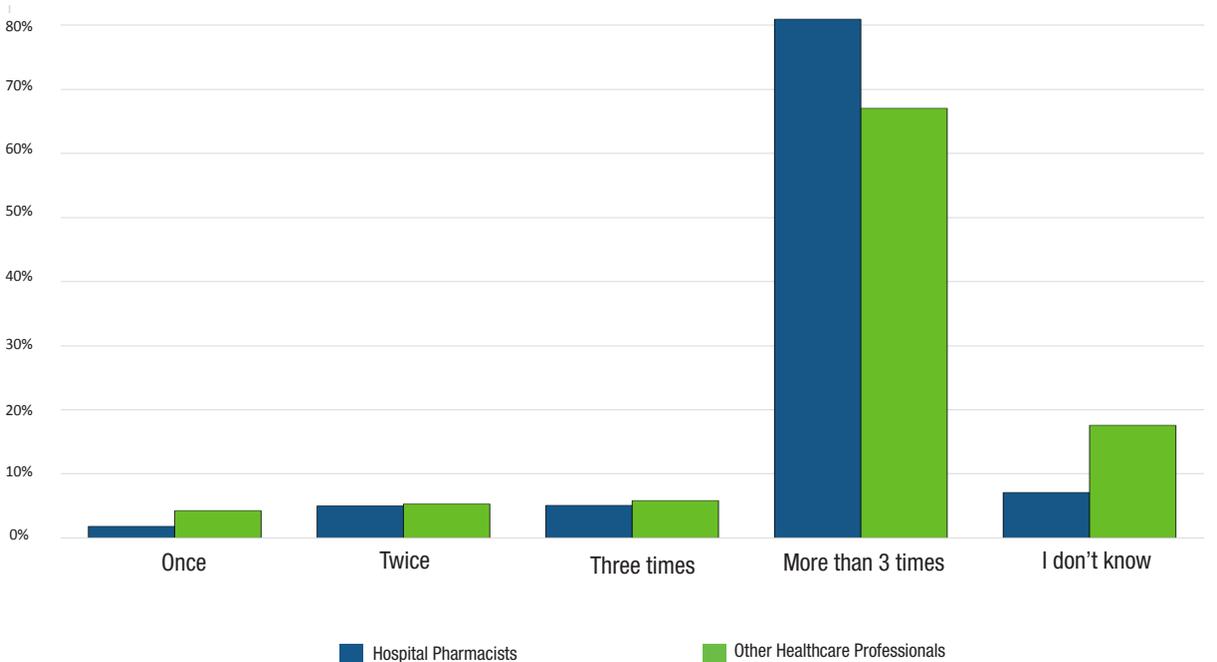


Figure 11 Percentage of responses by hospital pharmacists (N=1944) for question 8 and other healthcare professionals (N=188) for question 88 'In your experience, how many times have you experienced a shortage for medicine in 2019, which is provided by a single pharmaceutical company?', grouped by profession.

The vast majority of both hospital pharmacists (N=1806) and other healthcare professionals (N=155) stated that they have experienced a shortage for a medicine in 2019, which was provided by a single pharmaceutical company. With 81% of hospital pharmacists and 67% of other healthcare professionals answering that this has occurred in their hospital more than three times in 2019. This indicates that one possible solution to address medicines shortages would be to ensure a diverse set of suppliers for medicines.

Question 9 (hospital pharmacists) | question 89 (other healthcare professionals): Is parallel trade prohibited in your country by law under certain circumstances (e.g. in case of a shortage of a particular medicine)?

For this question, 29% of hospital pharmacists and 20% of other healthcare professionals stated that there are laws in their country to restrict or prohibit parallel trade in certain circumstances. However, in both groups a significant portion of respondents answered, 'I don't know', which might suggest that hospital pharmacists and respondents who identified as other healthcare professionals, are either unaware of or unconcerned with legislative instruments such as those which restrict parallel trade.

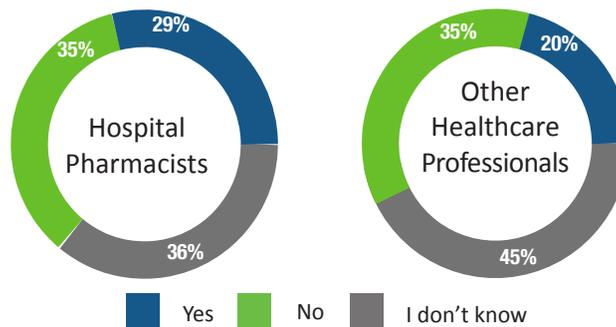


Figure 12 and 13 Percentage of responses by hospital pharmacists (N=1961) for question 9 and other healthcare professionals (N=198) for question 89 'Is parallel trade prohibited in your country by law under certain circumstances (e.g. in case of a shortage of a particular medicine)?', grouped by profession.

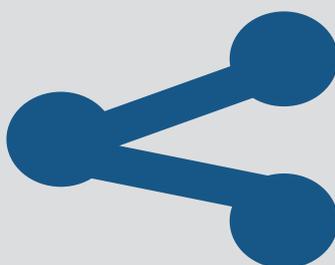
Respondents who answered 'yes' were given the option to specify the national legislation. Several free text responses from Hungary referenced to "449/2017. (XII. 27.) Government Decree on the authorisation of wholesale and parallel import activities with medicinal products". Replies from the United Kingdom mentioned "Regulation 43(2) of the Human Medicines Regulations 2012" which mandates the creation of a list of medicines which cannot be exported. There were also several free text responses from the Czech Republic which quoted "Act No. 378/2007 about medicines" and from Germany which referred to "§73 Medicinal Products Law".

FACTS

The top three proposals put forward by hospital pharmacists to help alleviate the problem of medicines shortages:



Improving communication.



Obliging manufacturers to share information about medicines shortages in a timely manner.



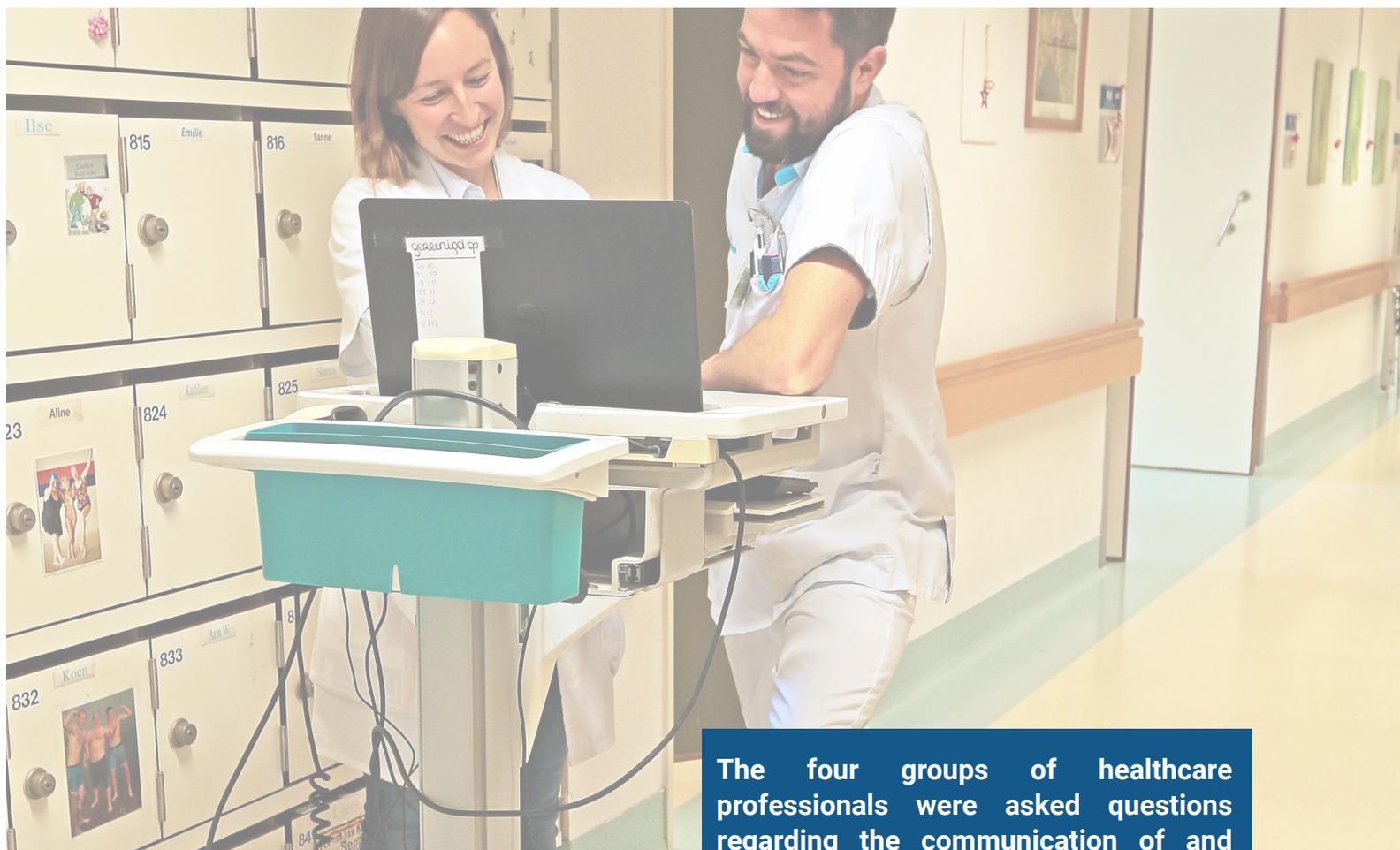
Applying prudent tendering/procurement mechanisms that ensure that there is more than one supplier per medicines/API in Europe.

HIGHLIGHTS

Hospital pharmacists, physicians, nurses and other healthcare professionals prefer proposals which aim to tackle the cause of medicines shortages and to strengthen European wide cooperation and communications to manage shortages when they do occur. The results also reveal gaps in medicines shortages management. With 70% of hospital pharmacists stating that the medicine prescribing/

dispensing IT system is not automatically fed with information on shortages and potential alternatives and 61% answering that they do not have a protocol/contingency plan on managing medicines shortages in their hospital.

MEDICINES SHORTAGES MANAGEMENT



Question 10 (hospital pharmacists) | question 34 (physicians) | question 55 (nurses) | question 90 (other healthcare professionals): Who is managing the public shortages reporting system in your country?

Respondents were then asked who manages the public shortages reporting system in their country. The most common answer for both hospital pharmacists and other healthcare professionals was 'medicines agency' with 64% (N=1254) of hospital pharmacists and 58% (N=109) of other healthcare professionals choosing that option. In contrast, the most common answer for physicians (N=96) and nurses (N=86) with 54% each was 'I don't know'.

The four groups of healthcare professionals were asked questions regarding the communication of and management strategies for medicines shortages in their hospitals. Including questions regarding the national public shortages reporting system, who is able to report shortages to these systems, whether they are updated and useful and whether they receive feedback from their national competent authorities. Respondents were also asked to rank the usefulness of several suggested proposals to address and/or manage medicines shortages in Europe.

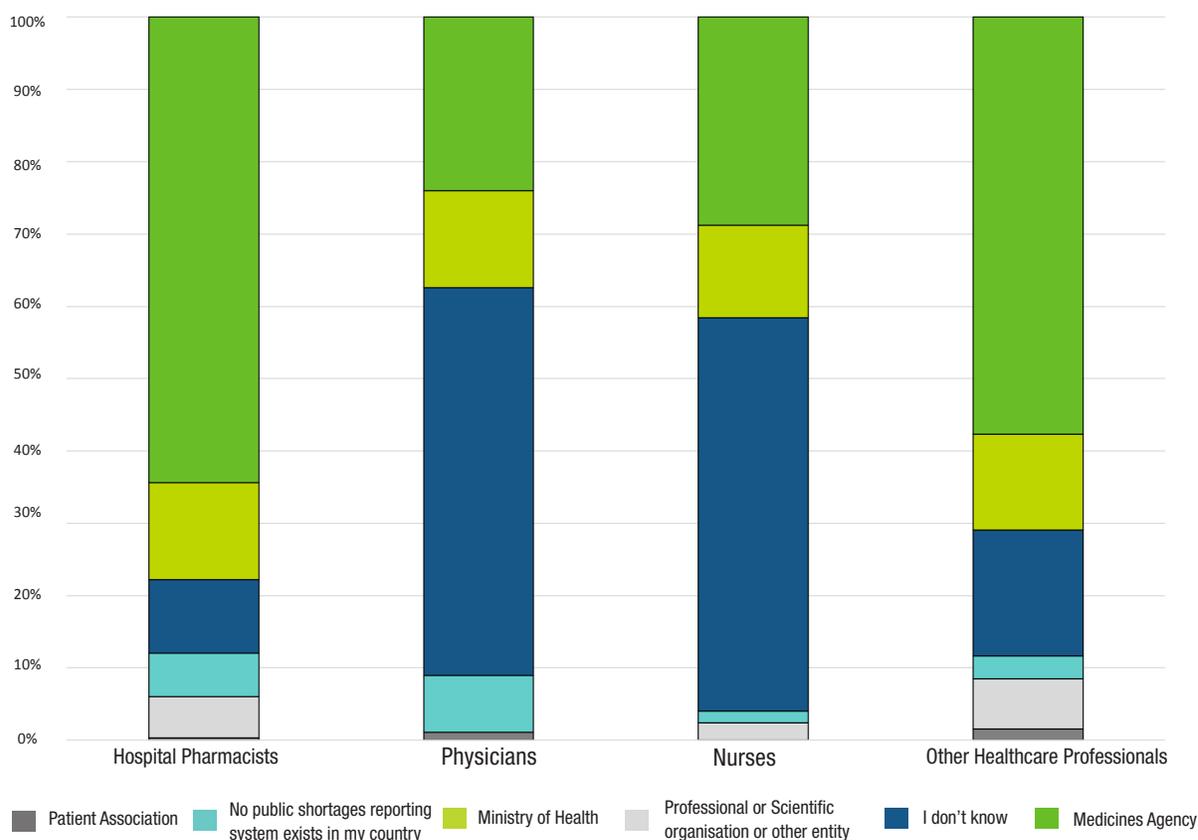


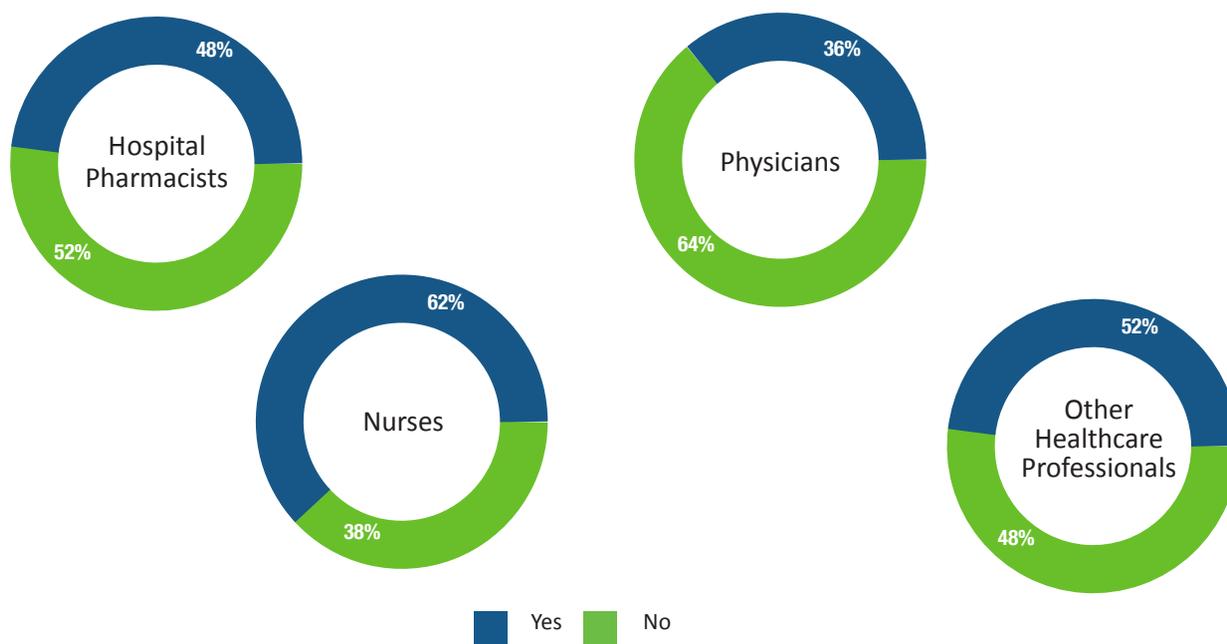
Figure 14 Percentage of responses by hospital pharmacists (N=1948) for the question 10, physicians (N=179) for the question 34, nurses (N=125) for the question 55 and other healthcare professionals (N=189) for question 90 'Who is managing the public shortages reporting system in your country?', grouped by profession.

The differences between the healthcare professions are again demonstrated in the responses to question 10. Physicians and nurses were significantly more likely to state that they didn't know who was managing the public shortages reporting system in their country, compared to only 10% of hospital pharmacists and 17% of other healthcare professionals. This does suggest that awareness of the public shortages reporting system is often not extended to those healthcare professionals who are not directly involved in the tendering or dispensing of medicine in the hospital.

Respondents were given the option to specify their answer with a free text response. Several hospital pharmacists from the Netherlands highlighted that there it is the Dutch Association of Pharmacists who manages the public shortages reporting system. Several hospital pharmacists from Switzerland also identified a private initiative called www.drugshortage.ch, which is used for monitoring shortages in addition to the public system.

Question 11 (hospital pharmacists) | question 35 (physicians) | question 56 (nurses) | question 91 (other healthcare professionals): Do you find that your national public reporting system on shortages is useful and regularly updated?

Those who didn't answer 'I don't know' to question 10 were asked whether they found their national public reporting system on shortages to be useful and regularly updated. Of the four groups, nurses were the most positive, with 62% (N=36) answering 'yes', along with other healthcare professionals of which 52% (N=79) answered 'yes'. In comparison, only 36% (N=32) of physicians and 48% (N=762) of hospital pharmacists found their national public reporting system on shortages to be useful and regularly updated.



Figures 15, 16, 17 and 18 Percentage of responses by hospital pharmacists (N=1594) for question 11, physicians (N=90) for question 35, nurses (N=58) for question 56 and other healthcare professionals (N=152) for question 91 'Do you find that your national public reporting system on shortages is useful and regularly updated?', grouped by profession.

A similar question was included in EAHPs 2018 Medicines Shortages Survey where hospital pharmacists were asked 'do you judge [public reporting system for shortages] it as effective/working/functional?', to which 56% of hospital pharmacists (N=663) replied that they regarded their reporting system to be effective/working/functional. This does indicate that satisfaction with the national public reporting systems has decreased among hospital pharmacists between 2018 and 2019.

Question 12 (hospital pharmacists) | question 37 (physicians) | question 57 (nurses) | question 92 (other healthcare professionals): Please name the database and share the link of the website.

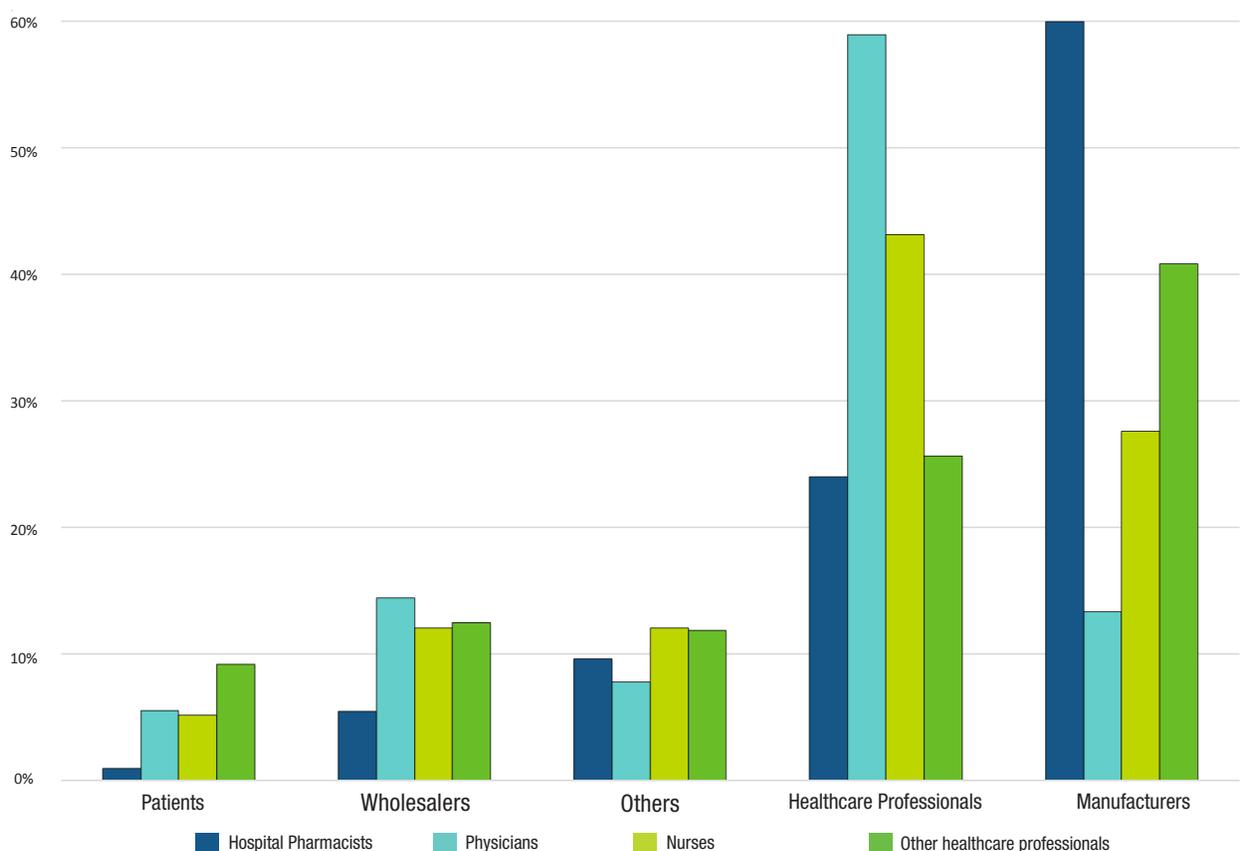
This question inquired about existing national public reporting system via which medicines shortages can be reported in each country. A summary of the responses is included in Annex 1.

Question 13 (hospital pharmacists) | question 37 (physicians) | question 58 (nurses) | question 93 (other healthcare professionals): Who can report medicines shortages via the public shortages reporting system?

When asked the question ‘who can report medicines shortages via the public shortages reporting system’ the four groups of respondents varied in their responses. 60% of hospital pharmacists (N=950) answered that manufacturers can report medicines shortages, while only 13% of physicians (N=12) and 28% of nurses (N=16) answered the same. Physicians (59%) and nurses (43%) were more likely to state that healthcare professionals are able to report via the public shortages reporting system, in comparison only 24% of hospital pharmacists and 26% of other healthcare professionals said the same. Of those hospital pharmacists who responded with ‘other’ 62 respondents specified in a free text response that anyone can report to the medicines shortages via the public shortages reporting system:

“Manufactures, wholesaler and healthcare professionals. The Medicines Agency also has a phone where the patients can ask questions regarding shortages.” – Hospital pharmacist, Norway

“Marketing authorisation holders and their offices, and any other including the public (anonymously on the website).” – Hospital pharmacist, Iceland



Figures 19 Percentage of responses by hospital pharmacists (N=1584) for question 13, physicians (N=90) for question 37, nurses (N=58) for question 58 and other healthcare professionals (N=152) for question 93 ‘Who can report medicines shortages via the public shortages reporting system?’, grouped by profession.

This variance in the responses from the four groups of healthcare professionals is most likely due to the fact that a significant portion of physicians and nurses are not aware of their national public shortages reporting system. The large difference between the answers from the physicians and nurses on the one hand and the hospital pharmacists on the other might simply indicate that physicians and nurses are more likely to be aware and informed of such systems if they have the ability to contribute and report to the public shortages reporting systems.

Question 14 (hospital pharmacists) | question 38 (physicians)| question 59 (nurses)| question 94 (other healthcare professionals): Do you get feedback from your national competent authority/ authorities when you report a medicine shortage?

The difference between the groups was lesser in comparison to the results from question 13 when asked whether they received feedback from their national competent authority when they reported a medicine shortage. A significant portion of each group, 45% of hospital pharmacists (N=839), 45% of physicians (N=61), 50% of nurses (N=45) and 40% of other healthcare professionals (N=61) answered that they didn't know. Of the four groups, physicians were most likely to report that they do get feedback, with 40% saying yes, with nurses being least likely with only 16% saying 'yes'.

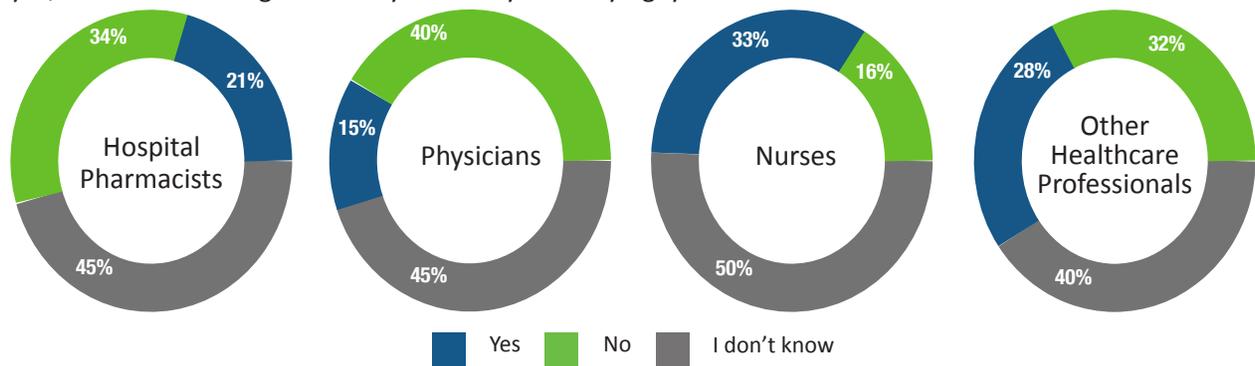


Figure 20, 21, 22 and 23 Percentage of responses by hospital pharmacists (N=1854) for question 14, physicians (N=137) for question 38, nurses (N=89) for question 59 and other healthcare professionals (N=153) for question 94 'Do you get feedback from your national competent authority/authorities when you report a medicine shortage?', grouped by profession.

Question 15 (hospital pharmacists) | question 95 (other healthcare professionals): Do manufacturers communicate the shortage of a medicine independently of or based on legal obligations?

Both hospital pharmacists (N=1854) and other healthcare professionals (N=153) were asked to provide feedback on the reporting obligations of manufacturers. The responses were quite mixed. The majority of hospital pharmacists (38%) and other healthcare professionals (37%) indicated that the notification by manufacturers is based on legal obligations. 28% of hospital pharmacists and 24% of other healthcare professionals believed that reporting is carried out independently. The remaining survey participants were unsure and therefore opted for the answer possibility 'I don't know'.

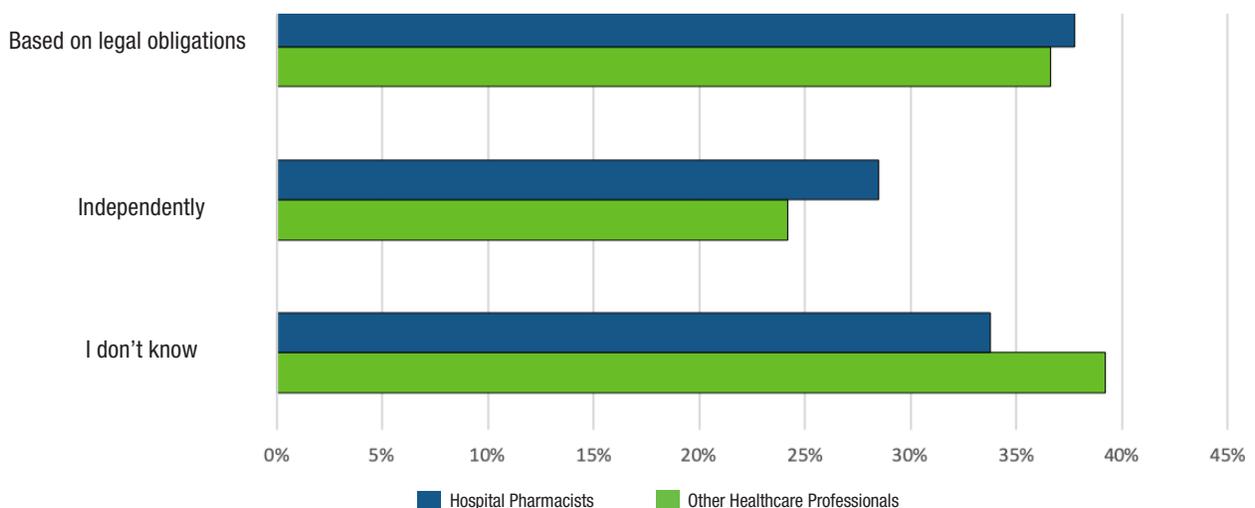


Figure 24 Percentage of responses by hospital pharmacists (N=1854) for question 15 and other healthcare professionals (N=153) for question 95 'Do manufacturers communicate the shortage of a medicine independently of or based on legal obligations?', grouped by profession.

The disparities between the answers of both hospital pharmacists and other healthcare professionals show that information in relation to the reporting obligation under Article 23a of Directive 2001/83/EC, which requires the holder of a marketing authorisation to notify the competent authority if a medicinal product ceases to be placed, either temporarily or permanently, on the market, is not widely known among practitioners.

Question 16 (hospital pharmacists) | question 39 (physicians) | question 60 (nurses) | question 96 (other healthcare professionals): Do you have a medicine shortages task force group or dedicated team?

Given the importance of coordinating responses on medicines shortages question 16 inquired about the existence of a task force group or team dedicated to this topic. Task forces and/or dedicated teams are mostly situated in the hospital or at national level. Only a small percentage of professionals (8% of other healthcare professionals | 5% of hospital pharmacists | 1% of physicians | 0% of nurses) are aware that such groups are organised regionally. From the answers, it can be deduced that other healthcare professionals seem to be most aware of the existence or non-existence of dedicated shortage discussion groups since only 14% (N=34) of hospital pharmacists and 22% (N=226) of other healthcare professionals could not provide feedback.

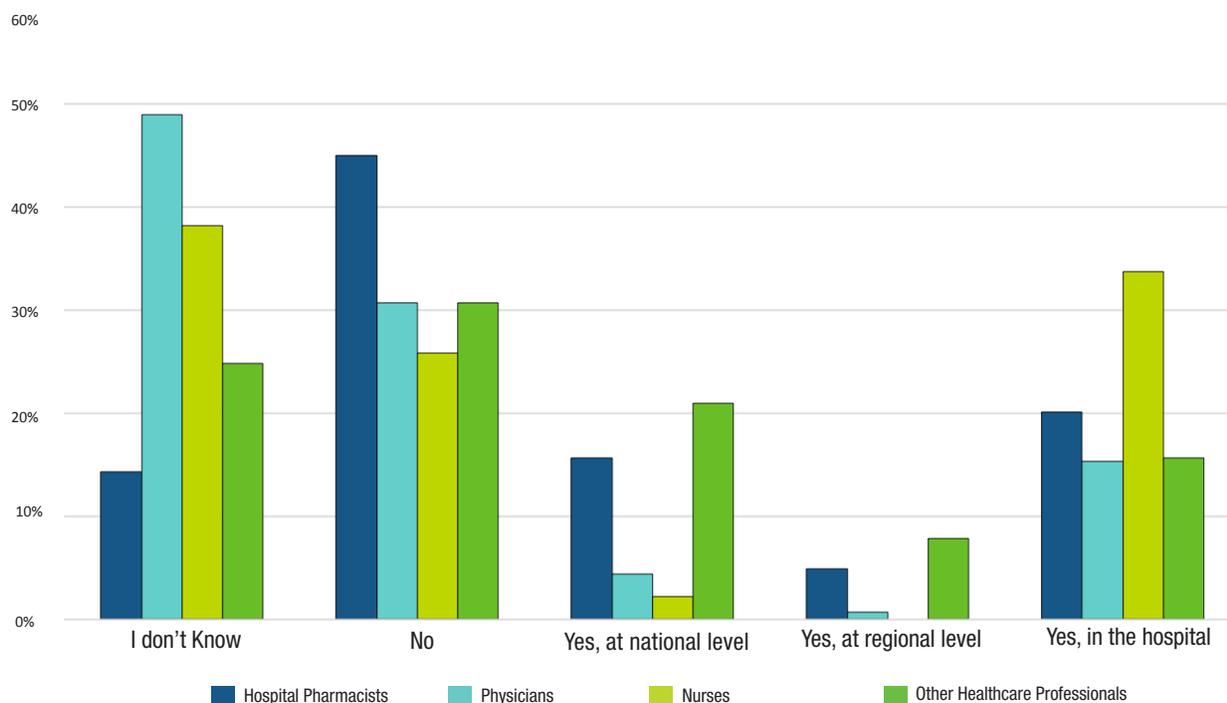


Figure 25 Percentage of responses by hospital pharmacists (N=1854) for question 16, physicians (N=137) for question 39, nurses (N=89) for question 60 and other healthcare professionals (N=153) for question 96 'Do you have a medicine shortages task force group or dedicated team?', grouped by profession.

Despite the fact that the question did not investigate the involvement of different professionals in the task force or dedicated team, it is notable that nurses and physicians are rarely aware of the existence of such groups at national or regional level. This difference in response rate could be linked to the fact that nurses and physicians are more often involved in medicines shortages task forces set up at hospital level, while hospital pharmacists and other healthcare professionals are in general more active in task forces set up at all levels, including the national level.

Question 17 (hospital pharmacists) | question 40 (physicians) | question 61 (nurses) | question 97 (other healthcare professionals): How do you communicate information on shortages/alternatives with other healthcare professionals in your hospital?

Email and phone communication were identified by all four groups of professionals as the most commonly used mediums through which information on medicines shortages and alternatives is shared with the different professionals in their hospitals. Hospital pharmacists (62% | N=1145) and other healthcare professionals (55% | N=84) most frequently resorted to email communication, while physicians preferred phone communication (28% | N=38). For nurses, both mediums ranked equally with 36% (N=39) using either email or the phone.

Apps such as WhatsApp, Viber and other social media programmes were the least favoured means of communication among hospital pharmacists (2% | N=31) and nurses (2% | N=2). Print materials in open space were identified by physicians (1% | N=1) and other healthcare professionals (3% | N=5) as the least frequently used means to communicate with colleagues. Exchanges within the Drug and Therapeutics Committee was listed as an infrequently used medium by all professionals. 2% of hospital pharmacists, 8% of nurses, 14% of other healthcare professionals and 17% of participating physicians chose not to provide feedback to the question on how shortages are communicated.

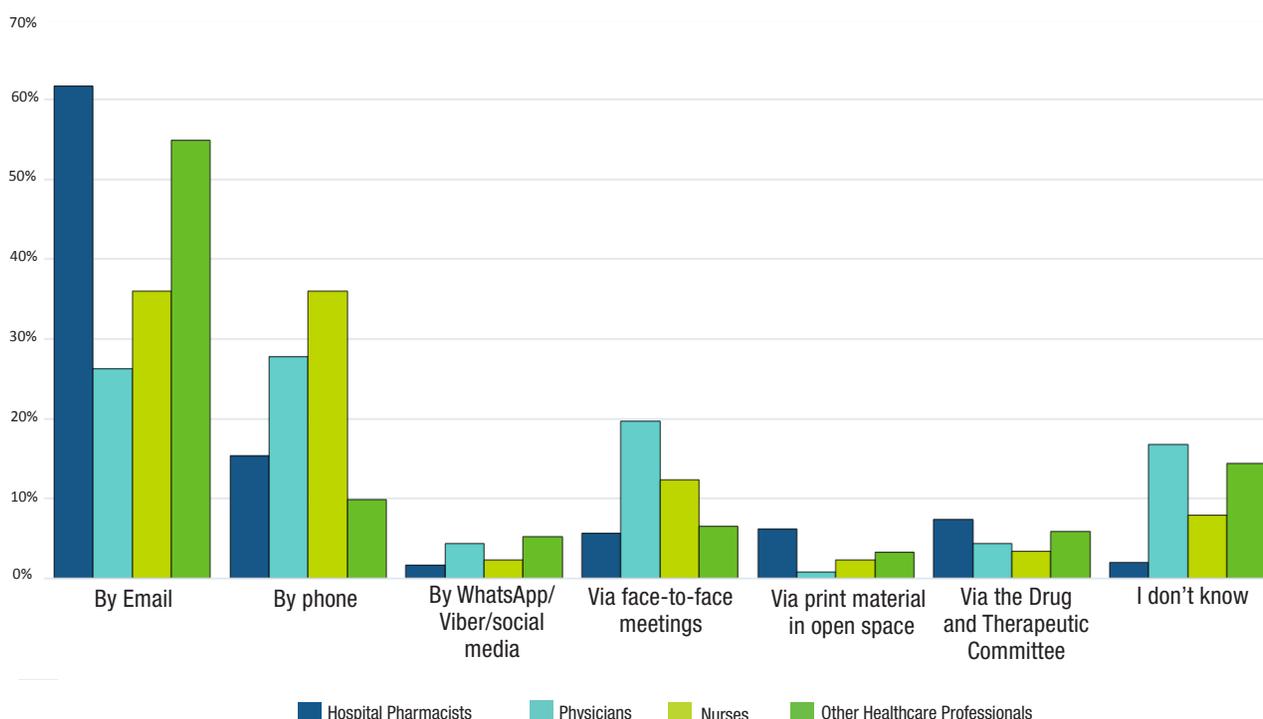


Figure 26 Percentage of responses by hospital pharmacists (N=1854) for question 17, physicians (N=137) for question 40, nurses (N=89) for question 61 and other healthcare professionals (N=153) for question 97 'How do you communicate information on shortages/alternatives with other healthcare professionals in your hospital?', grouped by profession.

Question 18 (hospital pharmacists) | question 98 (other healthcare professionals): Is the medicine prescribing/dispensing IT system automatically fed with information on ongoing shortages and potential alternatives in your hospital?

Hospital pharmacists (N= 1854) and other healthcare professionals (N=153) were asked whether the medicine prescribing/dispensing IT system automatically fed with information on ongoing shortages and potential alternatives in their hospital. The difference between the two groups was minimal with 70% of hospital pharmacists and 59% of other healthcare professionals answering 'no'.

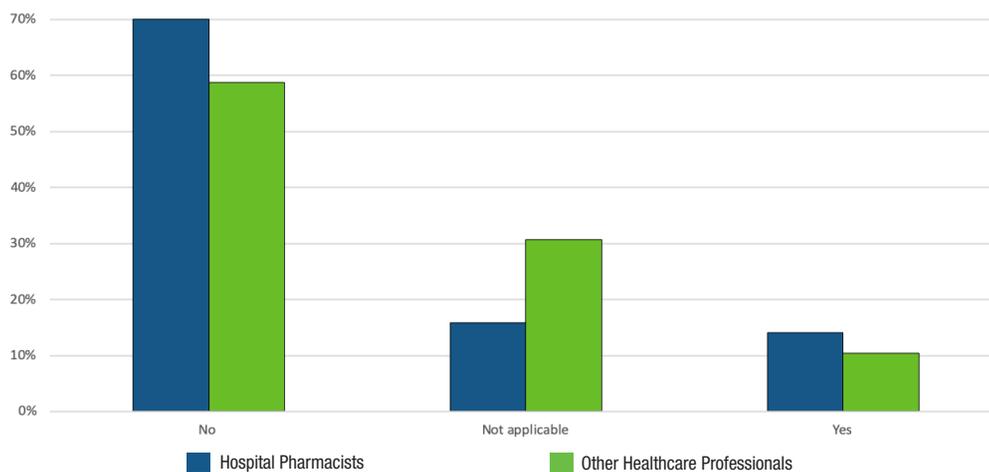


Figure 27 Percentage of responses by hospital pharmacists (N=1854) for question 18 and other healthcare professionals (N=153) for question 98 'Is the medicine prescribing/dispensing IT system automatically fed with information on ongoing shortages and potential alternatives in your hospital?', grouped by profession.

Question 19 (hospital pharmacists) | question 99 (other healthcare professionals): Do you have a protocol/contingency plan on managing medicines shortages in your hospital?

Hospital pharmacists (N=1854) and other healthcare professionals (N=153) were then asked whether they have a protocol/contingency plan on managing medicines shortages in their hospital. Other healthcare professionals were more likely to answer that they didn't know with 35% choosing that option compared to only 9% of hospital pharmacists. However, in both groups, a sizable portion of respondents answered that there are no protocols or contingency plans on managing medicines shortages in their hospital. With 61% of hospital pharmacists and 37% of other healthcare professionals answering 'no' to the question.

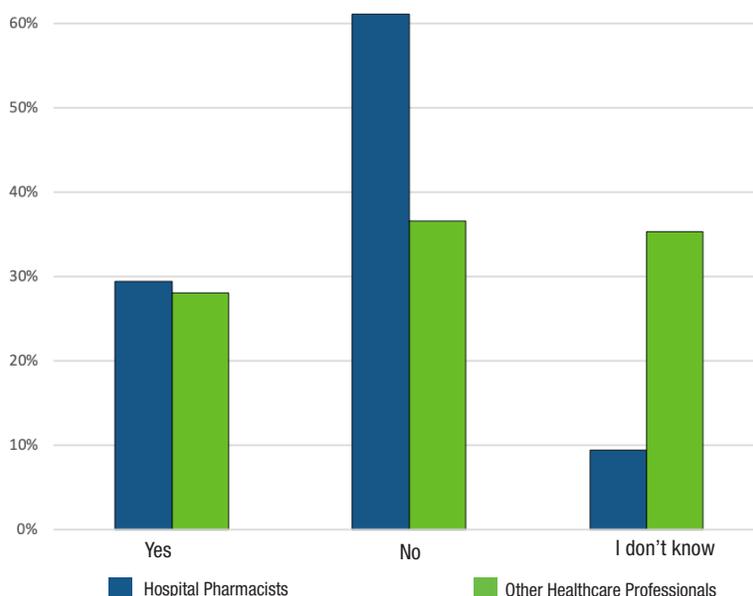


Figure 28 Percentage of responses by hospital pharmacists (N=1854) for question 19 and other healthcare professionals (N=153) for question 99 'Do you have a protocol/contingency plan on managing medicines shortages in your hospital?', grouped by profession.

Question 20 (hospital pharmacists) | question 43 (for physicians) | question 64 (for nurses) | question 100 (for other healthcare professionals): How would you rank the usefulness of the following proposals? (0 = not useful | 1 = rarely useful | 2 = sometimes useful | 3 = unsure | 4 = useful | 5 = very useful)

In order to explore not only the problems, but possible solutions as well, the four groups of healthcare professionals were asked to rank the usefulness of five different proposals. The answers provided demonstrate that the four groups have very similar opinions on which solutions are most likely to be effective and useful in addressing medicines shortages. The five proposals were well received by all four groups of professionals, with 5 being the favoured rank for all but one of the proposals. The least preferred suggestion was to ‘ensure appropriate staffing levels in order to lower the impact that medicines shortages currently have on the overall patient services’. This suggests that appropriate staffing levels cannot mitigate the impact of medicines shortages on patients. Health professionals preferred proposals which aim to tackle the root of the problem of medicines shortages on the European level and improve communications.

Better enforcing the mandatory early notification of a medicine shortage

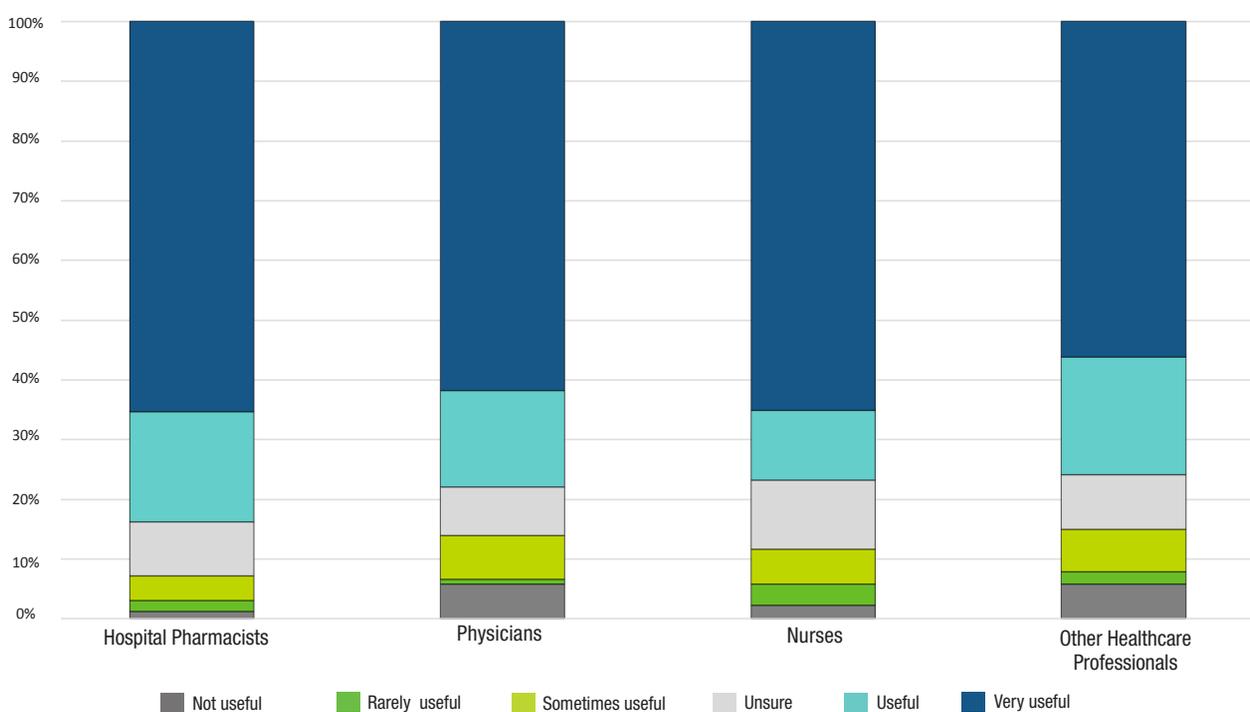


Figure 29 Percentage of responses by hospital pharmacists (N=1845) for question 20, physicians (N=136) for question 43, nurses (N=86) for question 64 and other healthcare professionals (N=153) for question 100 ‘How would you rank the usefulness of the following proposals? (0 = not useful | 5 = very useful)’ proposal ‘Better enforcing the mandatory early notification of a medicine shortage’, grouped by profession.

65% of hospital pharmacists (N=1205), 62% of physicians (N=84), 65% of nurses (N=56) and 56% of other healthcare professionals (N=86) gave the proposal ‘better enforcing the mandatory early notification of a medicine shortage’ a ranking of 5 (very useful).

Ensuring appropriate staffing levels in order to lower the impact that medicines shortages currently have on the overall patient services

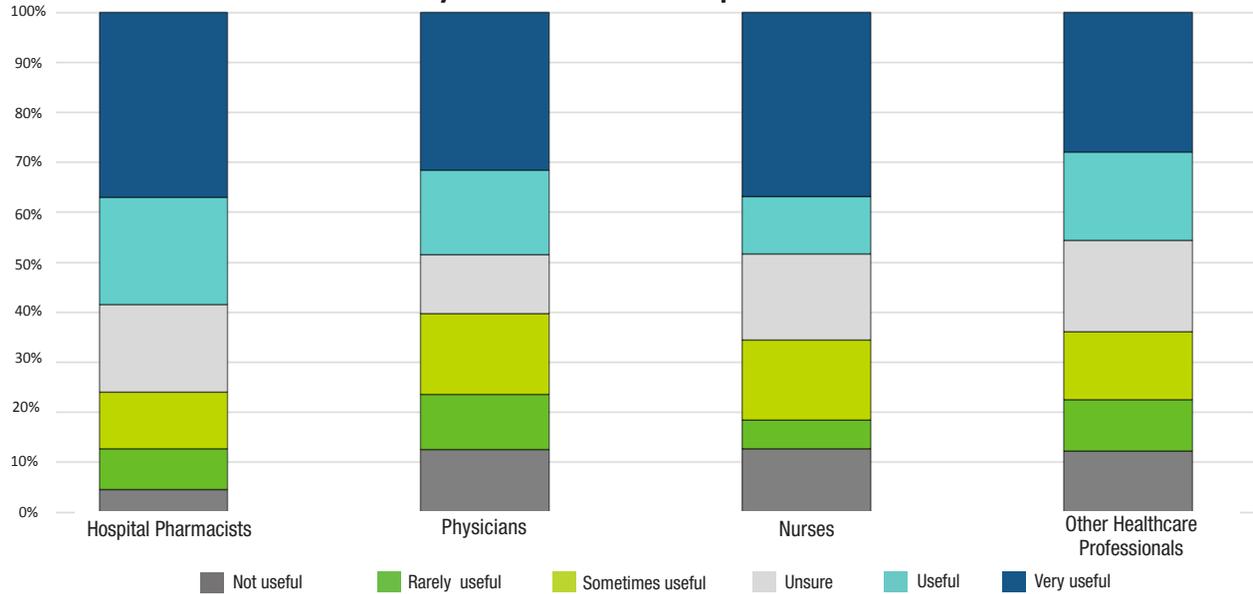


Figure 30 Percentage of responses by hospital pharmacists (N=1820) for question 20, physicians (N=136) for question 43, nurses (N=87) for question 64 and other healthcare professionals (N=147) for question 100 'How would you rank the usefulness of the following proposals? (0 = not useful | 5 = very useful)' proposal 'Ensuring appropriate staffing levels in order to lower the impact that medicines shortages currently have on the overall patient services', grouped by profession.

The proposal 'ensuring appropriate staffing levels in order to lower the impact that medicines shortages currently have on the overall patient services' was not as well received by respondents. With only 37% of hospital pharmacists (N=674), 32% of physicians (N=43), 37% of nurses (N=32) and 28% of other healthcare professionals (N=41) giving it a ranking of 5.

Conducting a European wide analysis of the causes to provide targeted solutions

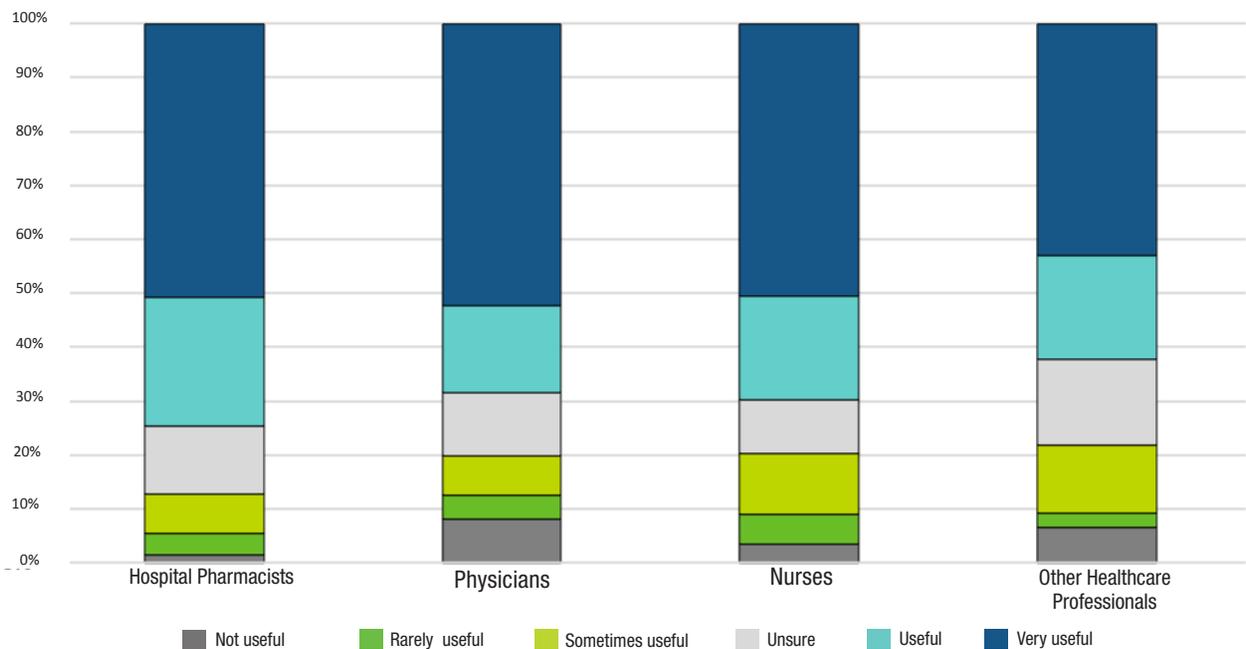


Figure 31 Percentage of responses by hospital pharmacists (N=1834) for question 20, physicians (N=136) for question 43, nurses (N=89) for question 64 and other healthcare professionals (N=151) for question 100 'How would you rank the usefulness of the following proposals? (0 = not useful | 5 = very useful)' proposal 'Conducting a European wide analysis of the causes to provide targeted solutions', grouped by profession.

The proposal 'conducting a European wide analysis of the causes to provide targeted solutions' was better received. With 51% of hospital pharmacists (N=930), 52% of physicians (N=71), 51% of nurses (N=45) and 43% of other healthcare professionals (N=65) giving this proposal the highest ranking of 5. Confirming that respondents prefer proposals which aim to tackle the causes of medicines shortages.

Strengthening collaboration between the European countries and the European institutions

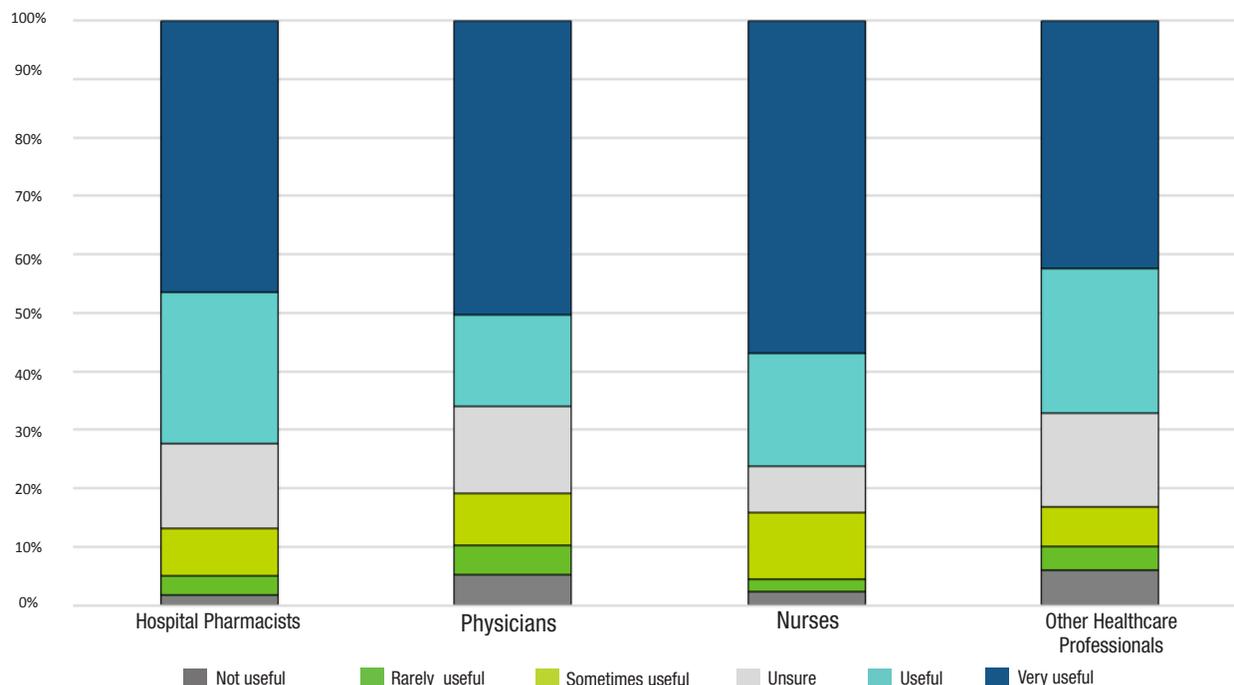


Figure 32 Percentage of responses by hospital pharmacists (N=1830) for question 20, physicians (N=135) for question 43, nurses (N=88) for question 64 and other healthcare professionals (N=149) for question 100 'How would you rank the usefulness of the following proposals? (0 = not useful | 5 = very useful)' proposal 'Strengthening collaboration between the European countries and the European institutions', grouped by profession.

The proposal of 'strengthening collaboration between the European countries and the European institutions' received slightly less positive feedback compared to the previous statement. With 46% of hospital pharmacists (N=848), 50% of physicians (N=68), 37% of nurses (N=50) and 47% of other healthcare professionals (N=63) giving the proposal a ranking of 5. However, very few respondents were entirely against this proposal, with other healthcare professionals being the group with the least favourable opinion on the proposal with 7% giving it a ranking of 0.

Mandating improved communication among all stakeholders (manufacturers, parallel traders, wholesalers and healthcare professionals)

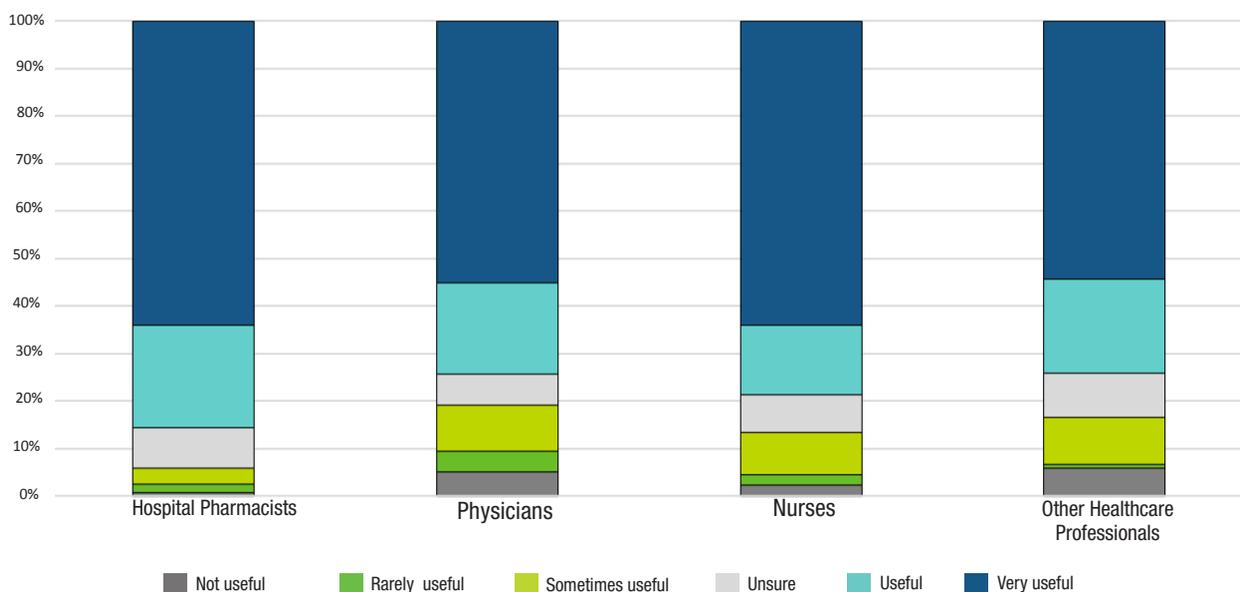


Figure 33 Percentage of responses by hospital pharmacists (N=1840) for question 20, physicians (N=136) for question 43, nurses (N=89) for question 64 and other healthcare professionals (N=151) for question 100 'How would you rank the usefulness of the following proposals? (0 = not useful | 5 = very useful)' proposal 'Mandating improved communication among all stakeholders (manufacturers, parallel traders, wholesalers and healthcare professionals)', grouped by profession.

The proposal ‘mandating improved communication among all stakeholders (manufacturers, parallel traders, wholesalers and healthcare professionals)’ received a very positive response. With 64% of hospital pharmacists (N=1176), 55% of physicians (N=75), 64% of nurses (N=57) and 54% of other healthcare professionals (N=82) giving the proposal a ranking of 5 (very useful).

Question 21 (hospital pharmacists) | question 44 (physicians) | question 65 (nurses) | question 101 (other healthcare professionals): Do you have another proposal that is currently being applied in your hospital/ your country that could help alleviate the problem of medicines shortages? (free text)

The 235 proposals submitted by hospital pharmacists in relation to question 21 were diverse. Suggestions ranged from improvements within the supply chain towards adjustments inside the hospital. Some of the most common themes which emerged from the free text responses of hospital pharmacists to question 21 are listed below:

Improving communication (46 responses):

“Improve communication at all levels to solve the problem of medicines shortages.” – Hospital pharmacist, Bosnia and Herzegovina

“The problem could be solved by improving communication at all levels and updating the development of the shortage on a day-to-day basis at all levels (national and hospital).” – Hospital pharmacist, Belgium

Obliging manufacturers to share information about medicines shortages in a timely manner (42 responses):

“Requiring manufacturers to do fast notifications via the on-line web application of the Medicine Agency within a maximum to 3-5 days.” – Hospital pharmacist, Czech Republic

“Real-time platform to track problems where healthcare institutions can also report that they are experiencing shortages. There should be tripartite management: regulator, manufacturer and end user (hospitals).” – Hospital pharmacist, Portugal

“Timely information and alternative therapeutic suggestions.” – Hospital pharmacist, Greece

Applying prudent tendering/procurement mechanisms that ensure that there is more than one supplier per medicine/API in Europe (36 responses):

“Legislative requirement to have an acceptable number of API producers and/or manufacturers of required medicines.” – Hospital pharmacist, Germany

“Tendering procedures shall be constructed in a way that they inherently counteract shortages by maintaining a healthy market diversity and competition.” – Hospital pharmacist, Hungary

“Procurement should not only be focused on one supplier, but two alternative suppliers must be safeguarded from the outset.” – Hospital pharmacist, Portugal

Centralising the monitoring of shortages at national and/or European level and making sure that information on alternatives is being made available by the authorities (31 responses):

“Create a European database in which the data of the individual EU countries is shown.” – Hospital pharmacist, Italy

“I propose to connect the database of the Spanish Agency of Medicines (AEMPS) with the database of contingencies in the supply of the General Council of Pharmacists (CISMED), and that both open automatic alerts in the electronic prescription in both Primary Care of the Sistema Nacional de Salud, as in the hospital. CISMED detects supply problems before the total shortage alert goes off.” – Hospital pharmacist, Spain

Mandating manufactures to stop ‘just in time production’ and to increase stocks at national level, especially for those products that are essential and/or regularly out of stock (29 responses):

“Make it mandatory that pharmaceutical companies built up stock for at least 4 months of normal demand, the just in time delivering and producing should be forbidden.” – Hospital pharmacist, Germany

“Implementation of a risk-based stock quantity of medicines, that means augmentation of stock in case of medicines with a high risk of drug shortage” – Hospital pharmacist, Switzerland

“Oblige manufacturers to have sufficient stock to supply the countries concerned.” – Hospital pharmacist, France

Imposing/enforcing penalties for the non-communication of a medicine shortage (24 responses):

“I have no idea that is already being implemented in Germany, but only the obligation to deliver security with very high penalties for the industry will solve the problem.” – Hospital pharmacist, Germany

“Enforcement of penalties (depending on the reason for the supply shortage, the company’s annual turnover and the availability of alternatives.” – Hospital pharmacist, Austria

“We should have an estimated time when the product is available again. Anything too long should incur a fine from the authority.” – Hospital pharmacist, United Kingdom

Moving the production of active pharmaceutical ingredients (APIs)/medicines back to Europe (22 responses):

“This should be solved by increasing the number of drugs and API produced in well-developed countries in Europe.” – Hospital pharmacist, Norway

“To regain autonomy in the production of medicines in France or in Europe concentrating the manufacturing of APIs and medicines should be stopped.” – Hospital pharmacist, France

“More production in the EU instead of in Asia.” – Hospital pharmacist, the Netherlands

Fewer responses were received from the other professional groups. The majority of the 5 nurses that made suggestions, proposed to limit exports. For the 12 physicians that provided feedback, improving and centralising the reporting were the main suggestions. Out of the 26 other healthcare professionals that responded, the majority proposed stockpiling, local production/compounding and improving communication as solutions that could help tackle shortages.

FACTS



Risk assessments are still far from being routine for hospital pharmacists.



Shortages impacted patient care for more than half of the participating physicians.



Non-recognition of the replacement medicine is only a problem for nurses in 1/3 of the cases.



Other healthcare professionals identified oncology medicines as the medicine most frequently in shortage.

HIGHLIGHTS

More than half of all hospital pharmacists, physicians and other healthcare professionals that participated in the survey indicated that they had experienced shortages having an impact on patient care in their hospital. Delays in care or therapy were for all professionals the type of impact that was chosen the most.

MEDICINES SHORTAGES

PATIENT IMPACT



Question 22 (hospital pharmacists) | question 45 (physicians) | question 66 (nurses) | question 102 (other healthcare professionals): In which area of medicine does your hospital experience shortages most commonly? Please refer to the year 2019. Tick all that apply.

More than half of the hospital pharmacists (N=1158) that responded to this question selected antimicrobial agents as the area of medicine which is most commonly in short supply in their hospitals. With 47% of hospital pharmacists listing them in short supply, oncology medicines ranked second. Followed by anaesthetic agents which 38% of hospital pharmacists found most commonly in shortage.

This section investigated how medicines shortages affect patients. The four groups of professionals were asked about the medicines most frequently in shortage and how the problem impacted patients. Concerning patient care on prioritisation and admission rate increases caused by medicines shortages. Patients provided feedback on their experience with medicines shortages.

The findings for physicians, nurses and other healthcare professionals differed from those for hospital pharmacists. While physicians (43%) and nurses (31%) identified antimicrobial agents as the area of medicine that is most commonly in short supply, other healthcare professionals have observed more shortages for oncology medicines (39%). For them antimicrobial agents together with cardiovascular medicines (both 37%) ranked second. For 31% of physicians' preventive medicines, such as vaccines, were the type of medicines that is second most commonly in shortage. Nurses had identified analgesics and oncology medicines (both 29%) as areas of medicines that are frequently in shortage.

Hospital Pharmacists

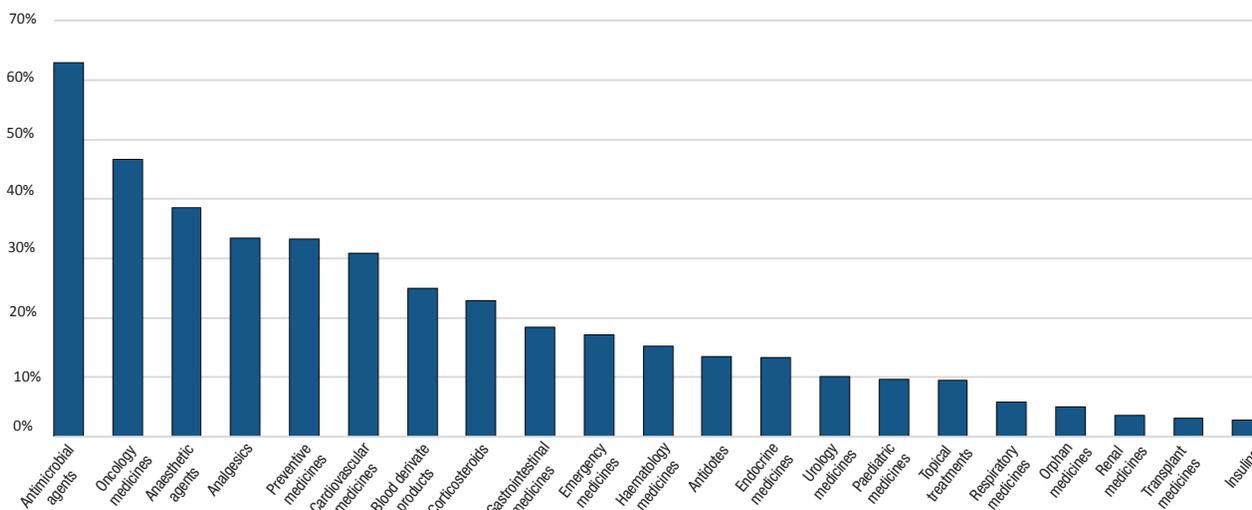


Figure 34 Percentage of responses by hospital pharmacists (N=1837) for question 22 'In which area of medicine does your hospital experience shortages most commonly? Please refer to the year 2019.' (Note that this was a tick all question)

Physicians

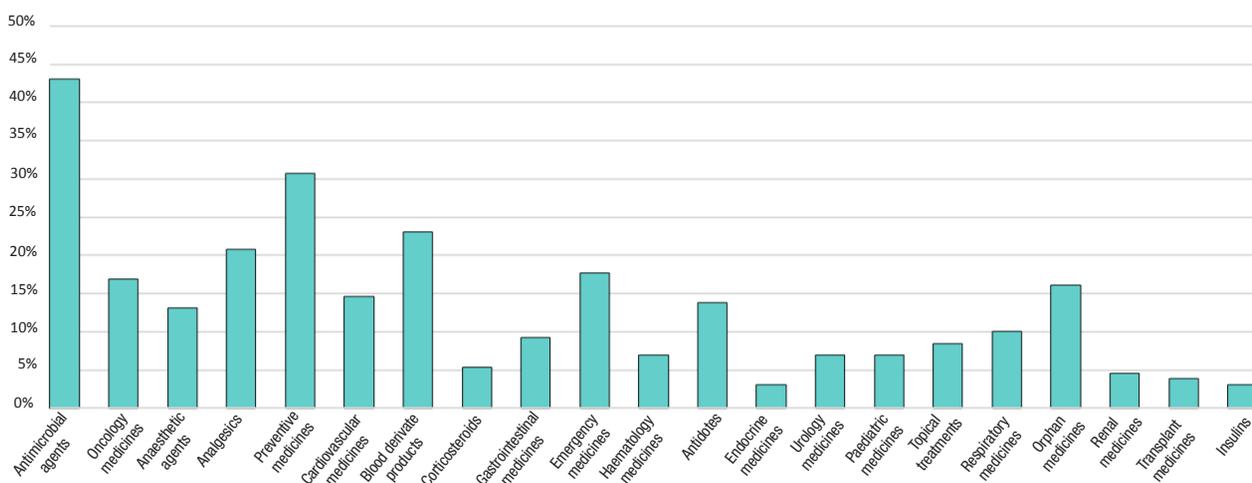


Figure 35 Percentage of responses by physicians (N=130) for question 45 'In which area of medicine does your hospital experience shortages most commonly? Please refer to the year 2019.' (Note that this was a tick all question)

Nurses

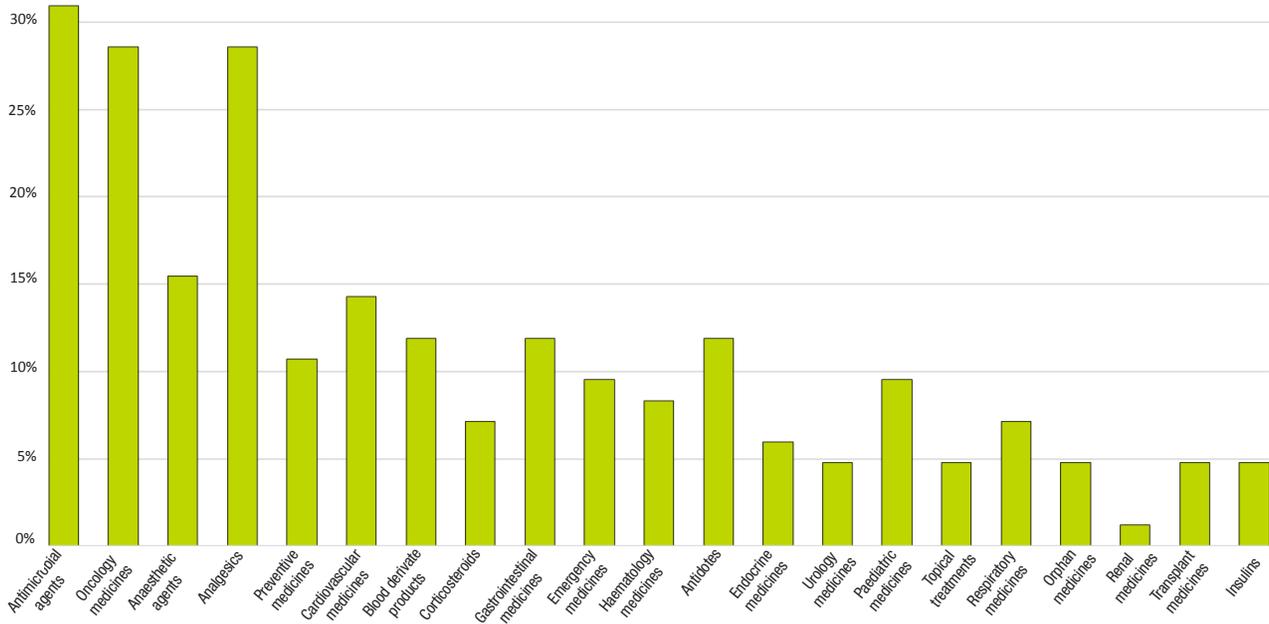


Figure 36 Percentage of responses by nurses (N=84) for question 66 'In which area of medicine does your hospital experience shortages most commonly? Please refer to the year 2019.' (Note that this was a tick all question)

Other Healthcare Professionals

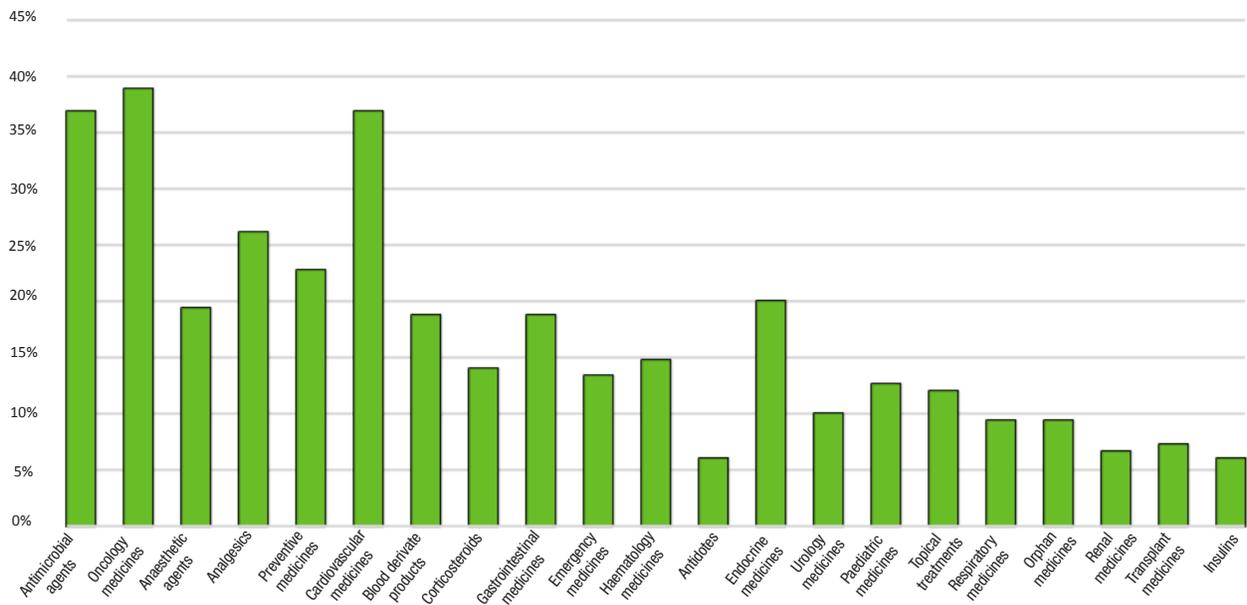


Figure 37 Percentage of responses by other healthcare professionals (N=149) for question 102 'In which area of medicine does your hospital experience shortages most commonly? Please refer to the year 2019.' (Note that this was a tick all question)

Compared to the 2018 Medicines Shortages Survey results, shortages for oncology medicines increased from 39% in 2018 to 47% in 2019, while those for anaesthetic agents remained stable with 39% in 2018 and 38% in 2019. After the increase to 77% in 2018 from 57% in 2014, the reports for antimicrobial agents decreased to 63%.

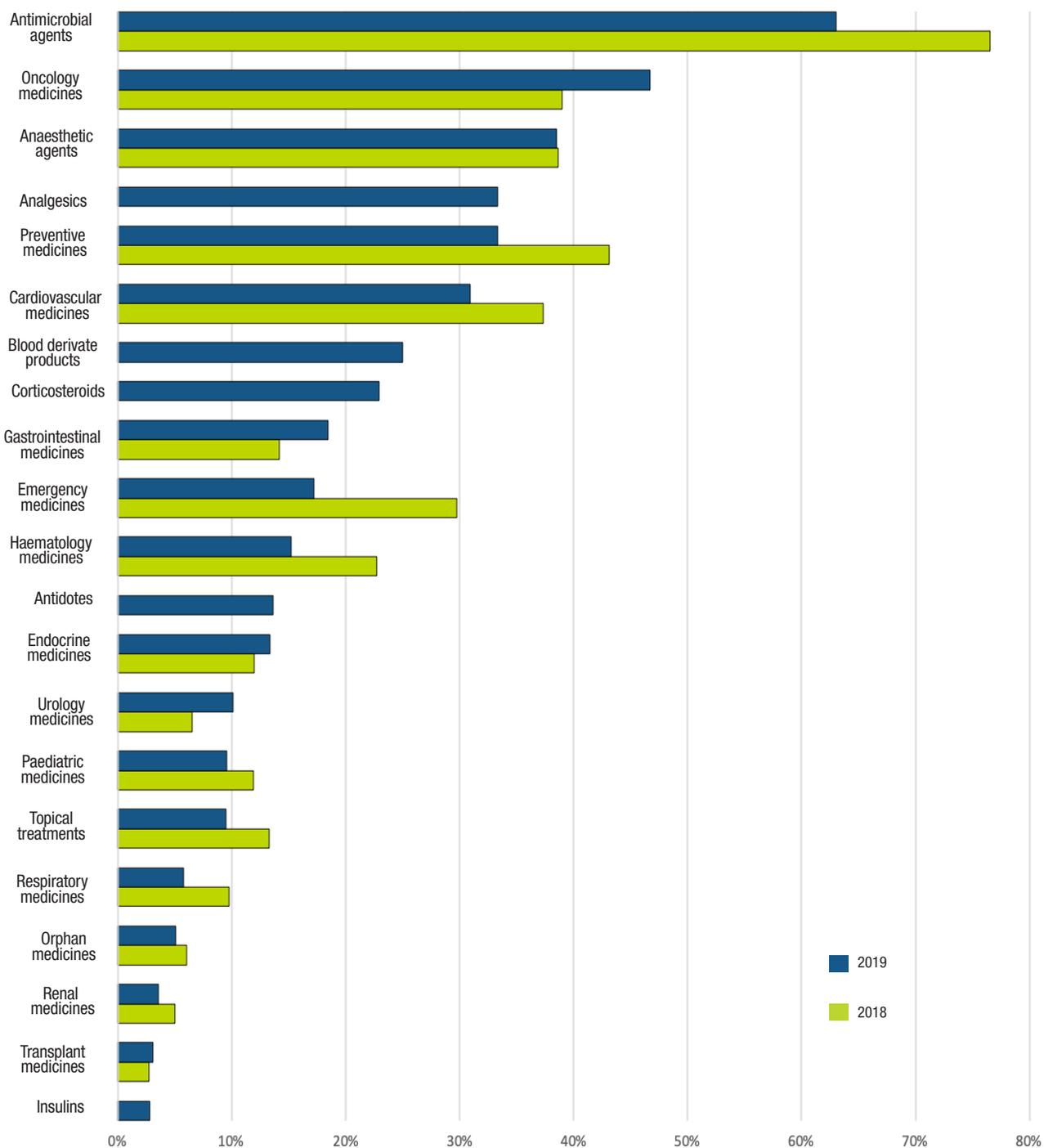


Figure 38 Percentage of responses by hospital pharmacists (N=1837) for question 22, 'In which area of medicine does your hospital experience shortages most commonly? Please refer to the year 2019.' compared to responses by hospital pharmacists (N=1348) to the question 'In which area of medicine does your hospital experience shortage most commonly?' from the 2018 Medicines Shortages Survey. (Note that this was a tick all question)

Question 23 (hospital pharmacists) | question 46 (physicians) | question 68 (nurses) | question 103 (other healthcare professionals): Are you aware if the shortage/the shortages you have experienced had an impact on patient care in your hospital?

More than half of the hospital pharmacists (63 % | N= 1153) that participated in the survey indicated that they had experienced shortages having an impact on patient care in their hospital. A similar response rate was observed for physicians (58% | N=75) and other healthcare professionals (52% | N=78). For nurses the picture was more homogenous with a third of the respondents either having experienced shortages that had a patient impact, having noted no impact or not being able to respond to the question.

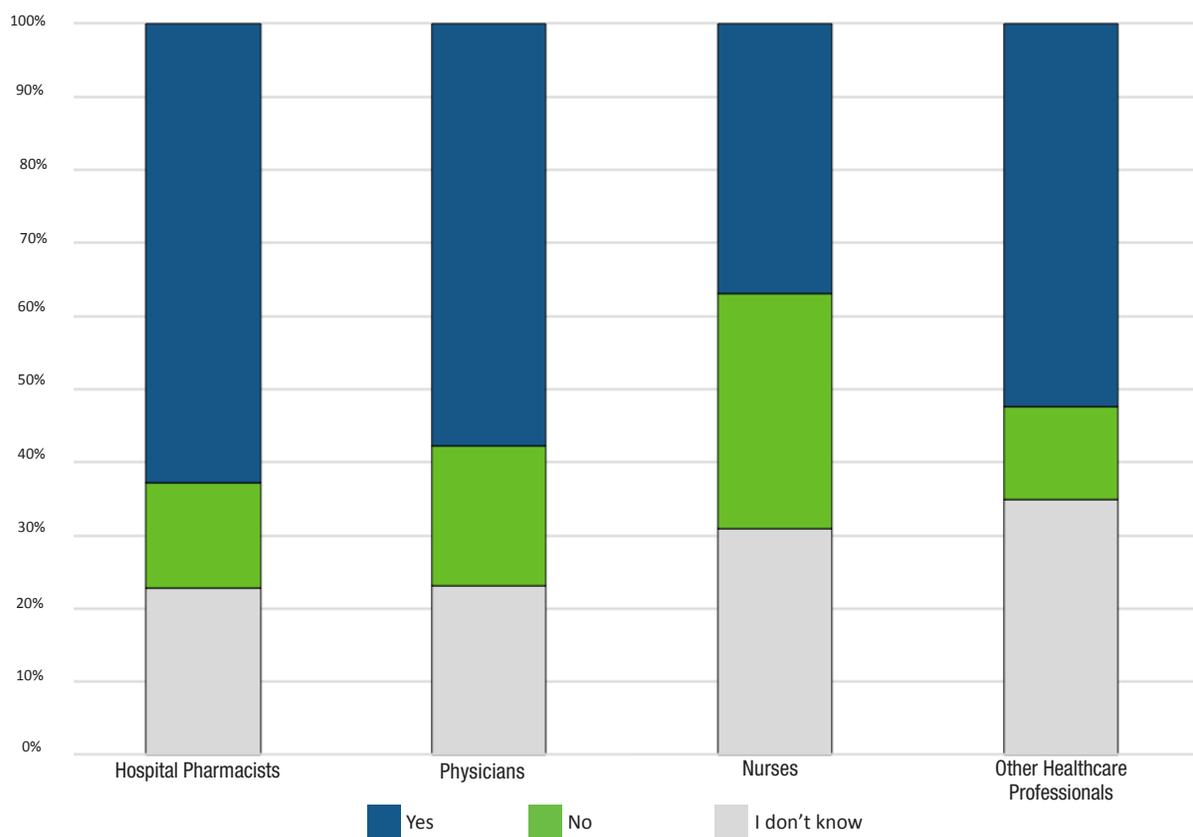


Figure 39 Percentage of responses by hospital pharmacists (N=1837) for question 23, physicians (N=130) for question 46, nurses (N=84) for question 68 and other healthcare professionals (N=149) for question 103 'Are you aware if the shortage/the shortages you have experienced had an impact on patient care in your hospital?', grouped by profession.

Question 24 (hospital pharmacists) | question 47 (physicians) | question 69 (nurses) | question 104 (other healthcare professionals): Please choose the type of impact medicines shortages had on patient care in your hospital. Tick all that apply.

Question 24 analysed the effect that medicines shortages had on patient care from the perspective of the four different groups of professionals that participated in the survey. Hospital pharmacists identified delays in care or therapy (42% | N=771), suboptimal treatment, as well as including inferior efficacy (28% | N=512) and cancellation of care (27% | N=488) as the main consequences of medicines shortages in the hospitals that they practice in. Physicians and other healthcare professionals named the same consequences as their top three, with physicians providing 47 (delays in care or therapy), 44 (suboptimal treatment) and 33 (cancellation of care) responses and other healthcare professionals providing 56 (delays in care or therapy), 37 (suboptimal treatment) and 32 (cancellation of care) responses. For nurses, the increased length of stay in the hospital was the second most common cause identified (19% | N=16), which ranked fourth for hospital pharmacists (18% | N=326) and physicians (23% | N=30) and fifth for other healthcare professionals (12% | N=18).

Readmission due to treatment failure received the third lowest amount of responses from hospital pharmacists (5% | N=88), while it ranked in the top five for physicians and nurses. Death and adverse events/greater toxicity were named as the least common consequences by all four groups of professionals.

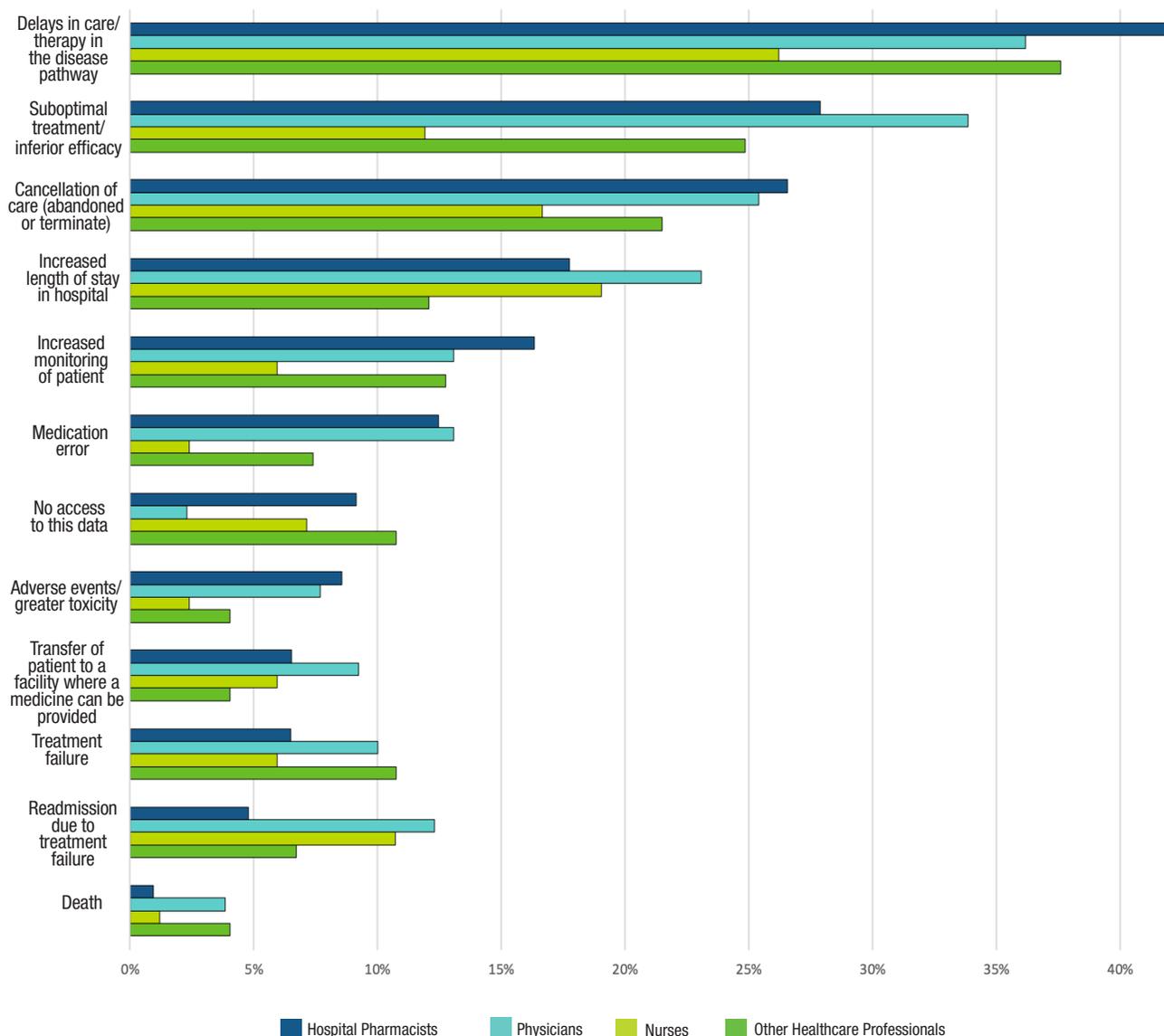


Figure 40 Percentage of responses by hospital pharmacists (N=1837) for question 24, physicians (N=130) for question 47, nurses (N=84) for question 69 and other healthcare professionals (N=149) for question 104 'Please choose the type of impact medicines shortages had on patient care in your hospital', grouped by profession. (Note that this was a tick all question)

A similar question was asked to hospital pharmacists that answered to the 2018 Medicines Shortages Survey. The 946 hospital pharmacists that responded to the 2018 Medicines Shortages survey, also included delays of care or therapy (59% | N=555) and cancellation of care (31% | N=297) among the main consequences of a medicine shortage that have had an impact on patient welfare. Suboptimal treatment ranked fourth (25% | N=239), while medication errors (25% | N=241) were listed as the third most common problem. The latter ranked sixth in the 2019 Medicines Shortages Survey, with 12% (N=229) of hospital pharmacists naming medication errors as a consequence that medicines shortages had on patient care in their hospital.

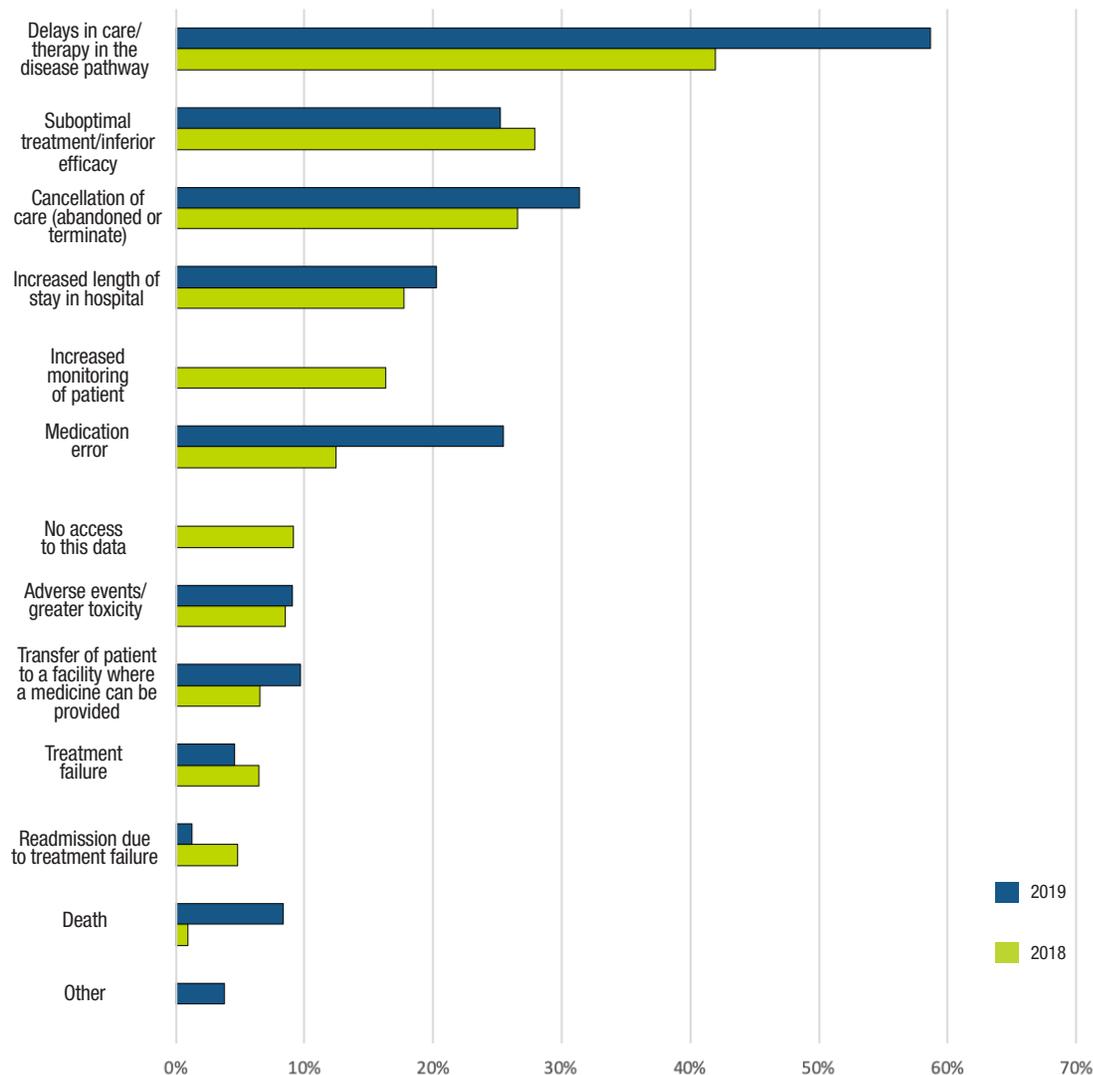


Figure 41 Percentage of responses by hospital pharmacists (N=1837) for question 24, 'Please choose the type of impact medicines shortages had on patient care in your hospital' compared to responses by hospital pharmacists (N=1348) to the question 'Please provide any relevant examples from your hospital over the past year of the impact medicines shortages have had on patient safety welfare.' from the 2018 Medicines Shortages Survey. (Note that this was a tick all question)

Question 25 (hospital pharmacists) | question 48 (physicians) | question 70 (nurses) | question 105 (other healthcare professionals): Were you in a position to prioritise provision of medicines to the patients based on their disease/clinical status when it comes to medical treatment affected by shortages?

For medical treatment affected by medicines shortages, half of the hospital pharmacists (50% | N= 910) that participated in the survey were able to prioritise the provision of medicines to patients based on their disease/clinical status in 2019. Nurses were able to prioritise in 58% of the cases, while both physicians and other healthcare professionals could do so in only 41% of the cases.

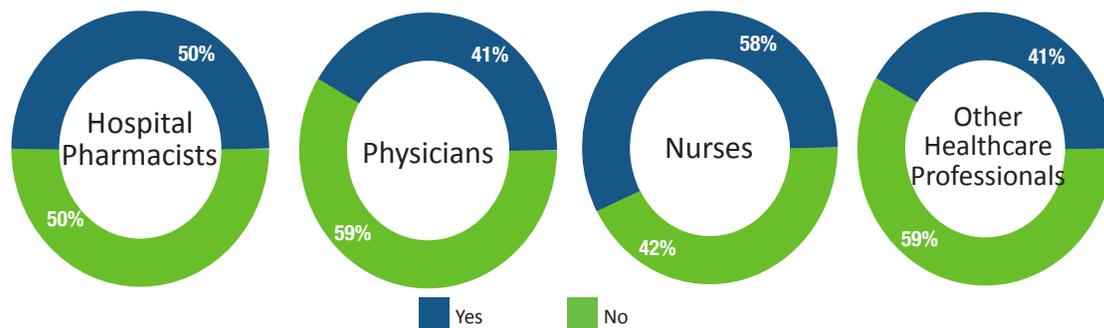
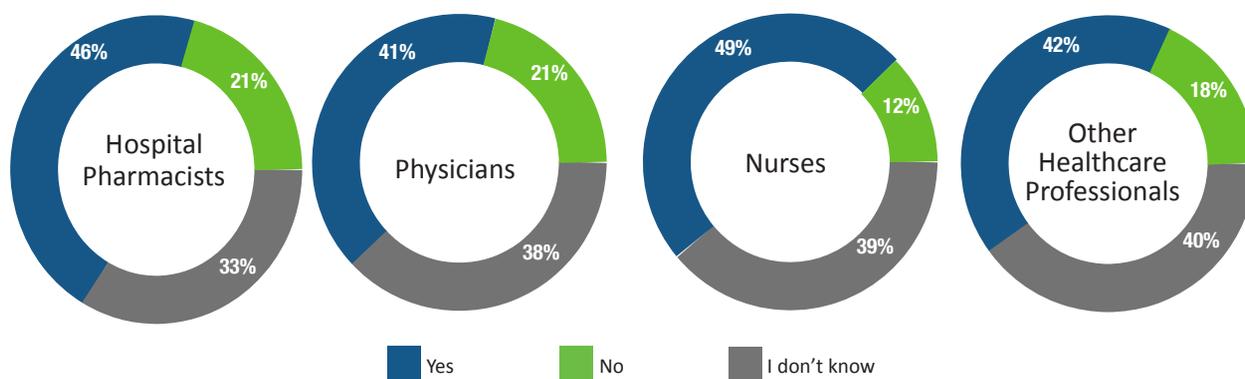


Figure 42, 43, 44 and 45 Percentage of responses by hospital pharmacists (N=1825) for question 25, physicians (N=128) for question 48, nurses (N=84) for question 70 and other healthcare professionals (N=147) for question 105 'Were you in a position to prioritise provision of medicines to the patients based on their disease/clinical status when it comes to medical treatment affected by shortages?', grouped by profession.

Question 26 (hospital pharmacists) | question 49 (physicians) | question 71 (nurses) | question 106 (other healthcare professionals): Did this prioritisation affect a larger group of patients who might benefit from the treatment?

Those that responded positively to the previous question were asked if the prioritisation affected a larger group of patients. The responses by the different professionals that participated in the survey were mixed. Out of the 910 hospital pharmacists, 3 choose not to answer the question while 46% indicated that prioritisation affected a larger group of patients. The remaining 54% of respondents either could not provide feedback (33%) or confirmed that only a small group of patients was affected (21%). Similar to the previous question the responses for physicians and other healthcare professionals were closely aligned. Prioritisation was possible for both of these groups in 41% (physicians) and 42% (other healthcare professionals) of the cases. Nurses reported that almost half (49%) of the cases affected a larger patient group.

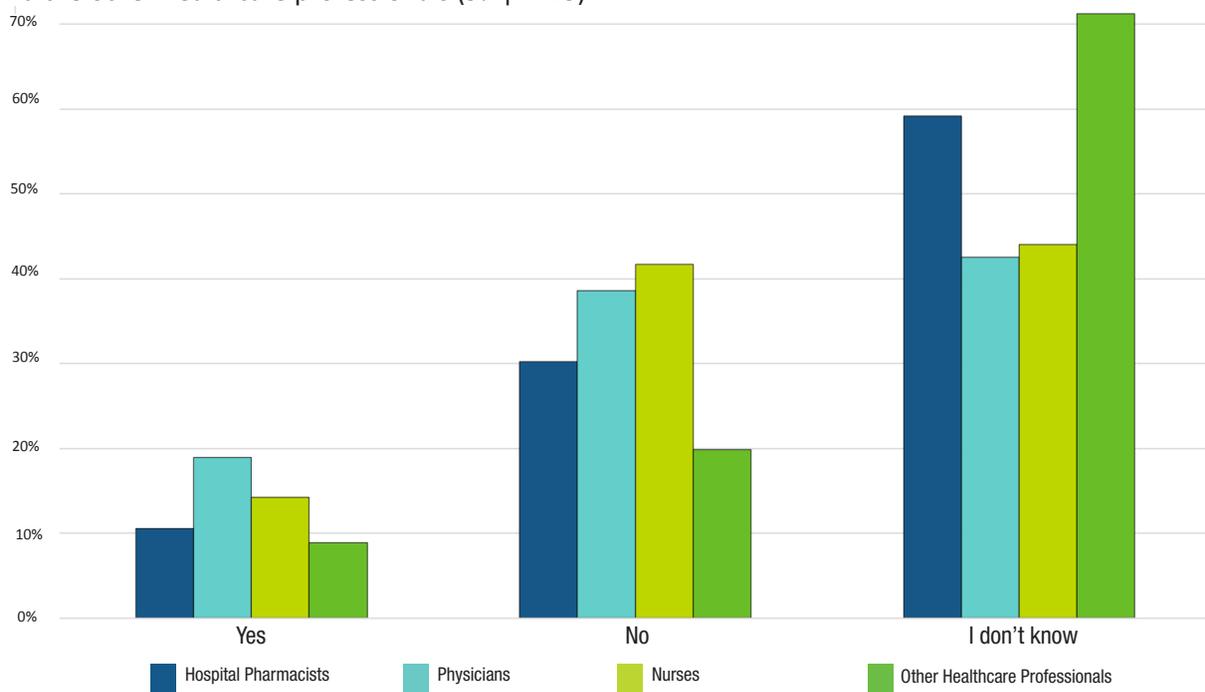


Figures 46, 47, 48 and 49 Percentage of responses by hospital pharmacists (N=910) for question 26, physicians (N=53) for question 49, nurses (N=49) for question 71 and other healthcare professionals (N=60) for question 106 'Did this prioritisation affect a larger group of patients who might benefit from the treatment?'; grouped by profession.

Question 27 (hospital pharmacists) | question 50 (physicians) | question 72 (nurses) | question 107 (other healthcare professionals): Did you experience higher admission rates at your hospital as a consequence of shortages?

More than half of the hospital pharmacists and other healthcare professionals stated that they didn't know whether they had experienced higher admission rates at their hospital as a consequence of shortages. With 59% (N=1076) of hospital pharmacists and 71% (N=104) of other healthcare professionals choosing that answer. In comparison, physicians and nurses were less likely to say that they didn't know with only 43% (N=54) of physicians and 44% (N=37) of nurses answering so.

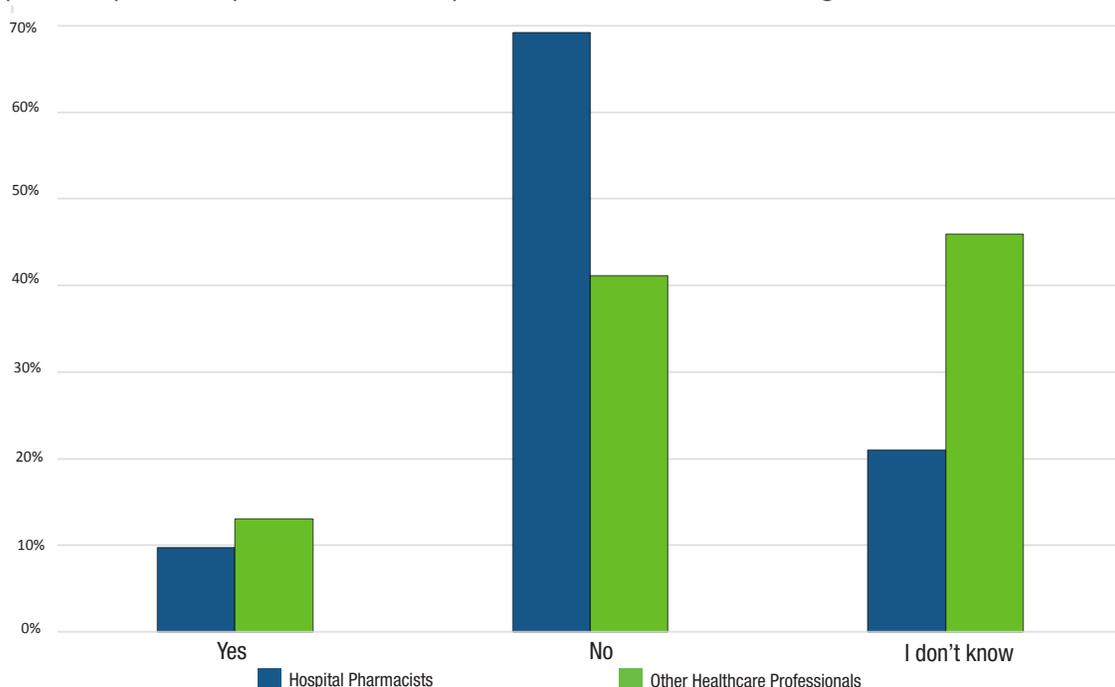
The graph shows that the highest percentage of health professionals that didn't experience higher admission rates were the nurses (42% | N=35) and physicians (39% | N=49). Hospital pharmacists presented a lower percentage, (30% | N=549) compared to other healthcare professionals (20% | N=29). 19% (N=24) of physicians and 14% (N=12) of nurses answered yes, followed by the hospital pharmacists, (11% | N=192) and the other healthcare professionals (9% | N=13).



Figures 50 Percentage of the responses by hospital pharmacists (N=1817) for question 27, physicians (N=127) for question 50, nurses (N=82) for question 72 and other healthcare professionals (N=145) for question 107 'Did you experience higher admission rates at your hospital as a consequence of shortages?', grouped by profession.

Question 28 (hospital pharmacists) | question 108 (other healthcare professionals): Are you carrying out risk assessments in case of a shortage?

Figure 51 shows that only 10% (N=177) of hospital pharmacists and 13% (N=19) of other healthcare professionals are carrying out risk assessments in case of a shortage. 69% (N=1258) of hospital pharmacists and 41% (N=60) of other healthcare professionals are not carrying out risk assessments. 21% (N=382) and 46% (N=67) of hospital pharmacists and other healthcare professionals answered that they didn't know. This demonstrates that the conducting risk assessments in case of a shortage is not widely done in European hospitals, despite the increased prevalence of medicines shortages.



Figures 51 Percentage of the responses by hospital pharmacists (N=1817) for question 28 and the other healthcare professionals (N=146) for question 108 'Are you carrying out risk assessments in case of a shortage?', grouped by profession.

Question 29 (hospital pharmacists) | question 109 (other healthcare professionals): If yes, which tool do you use?

Hospital pharmacists and other healthcare professionals had the option to give a free text response to specify what tool they use if they answered 'yes' to question 26. There were 123 free text responses and the answers provided focused not only on the tools but also on the strategies used by their hospitals. The following tools were provided in the answers: In House, Datix, FMEA, AMDEC, Excel, SOP, Brexit reporting tool, ad hoc risk assessment and email. Several respondents stated that their hospital used national agencies in case of risk assessment such as NHS England and HPRA.

Below are some of the strategies shared on how hospitals tackle medicines shortages. The strategies focus on analysing the information from previous years, having interprofessional working groups on shortages, the development of their own tool and searching for possible replacements to the medicine experiencing shortages.

"Internal records about shortages in my hospital's pharmacy service." – Hospital pharmacist, Spain

"Market analyses including statistics on need and use of products by different providers." – Hospital pharmacist, Switzerland

"Professional meetings and shared thinking for access to therapy and replacement with complementary therapy." – Hospital pharmacist, North Macedonia

"We have developed a risk assessment and monitoring application integrated to the hospital IT system" – Hospital pharmacist, Greece

“In-house developed in conjunction with our internal SOPs.” – Other healthcare professional, United Kingdom

“Direct communication through regular meetings at hospital wards.” – Hospital pharmacist, Bosnia and Herzegovina

“For the shortage of a parenteral nutrition product (sulmetin) we assessed how it affected service management, clinic and service economy. We collected the data of patients administered with the drug and the alternatives and evaluated the clinical part with the statistical program SPSS. The rest was with unit price data and excels that we exported from the nutrition program.” – Hospital pharmacist, Spain

Question 67 (nurses): Have medicines shortages in your hospital led to non-administration/ delays of administration due to non-recognition of the replacement medicine?

Nurses were asked whether medicines shortages had affected the administration of medicines in their hospital. Nurses are the healthcare professionals responsible for the administration of the drugs, as they are the ones in contact with the patient on the moment of administration. 83 nurses responded to this question, with 27% (N=22) of them reporting that shortages had led to non-administration/delays of administration due to non-recognition of the replacement medicine. 42% (N=35) of respondents stated that medicines shortages had not affected the administration of treatment and 31% (N=26) answered that they didn't know.

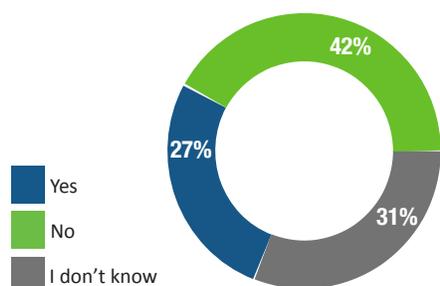
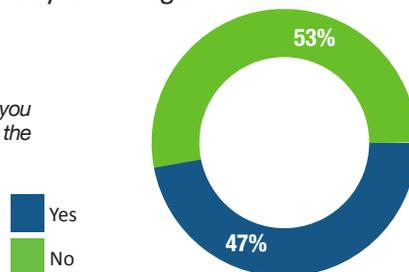


Figure 52 Percentage of responses by nurses (N=83) for question 67 'Have medicines shortages in your hospital led to non-administration/ delays of administration due to non-recognition of the replacement medicine?'

Question 74 (patients): Did you or one of your family members during treatment at a hospital ever experience the shortage of medicines?

Patients were given their own set of questions beginning with question 74. This question had 357 respondents, with 47% (N=169) of them reporting that they had experienced medicines shortages to their own person or by a family member. 53% (N=188) of the patients that answered to this question said that neither they nor a member of their family had been affected by a shortage.

Figure 53 Percentage of responses by patients (N=357) for question 74 'Did you or one of your family members during treatment at a hospital ever experience the shortage of medicines?'



Question 75 (patients): Did you receive information about the reasons of the medicines shortage from your hospital pharmacist/nurse/physician or any other healthcare professional working in the hospital?

This question was only answered by those patients who had responded 'yes' to question 74. This question had 160 responses from patients, with 46% (N=74) answering positively when asked if they had been informed of the reasons behind the shortage of their medicine, while 54% (N=86) gave a negative answer.

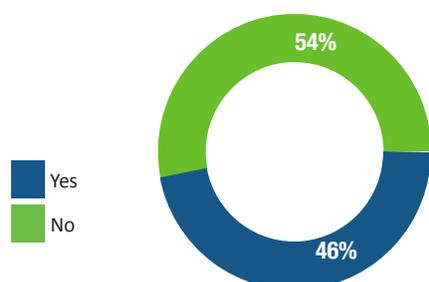


Figure 54 Percentage of responses by patients (N=160) for question 75 'Did you receive information about the reasons of the medicines shortage from your hospital pharmacist/nurse/physician or any other healthcare professional working in the hospital?'

Question 76 (patients): What solution was offered to you?

This question was only answered by those patients that responded 'yes' to the question 74. 158 responses were received from patients of which 40% (N=63) reported that they were offered a substitution as a solution for a medicines shortage, 13% (N=20) were advised to miss one dose and 3% (N=5) were told to take a lower dose. 9% (N=15) didn't know the answer to this question and 35% (N=55) of patients chose "Other" meaning that the solutions offered was not listed as one of the options.

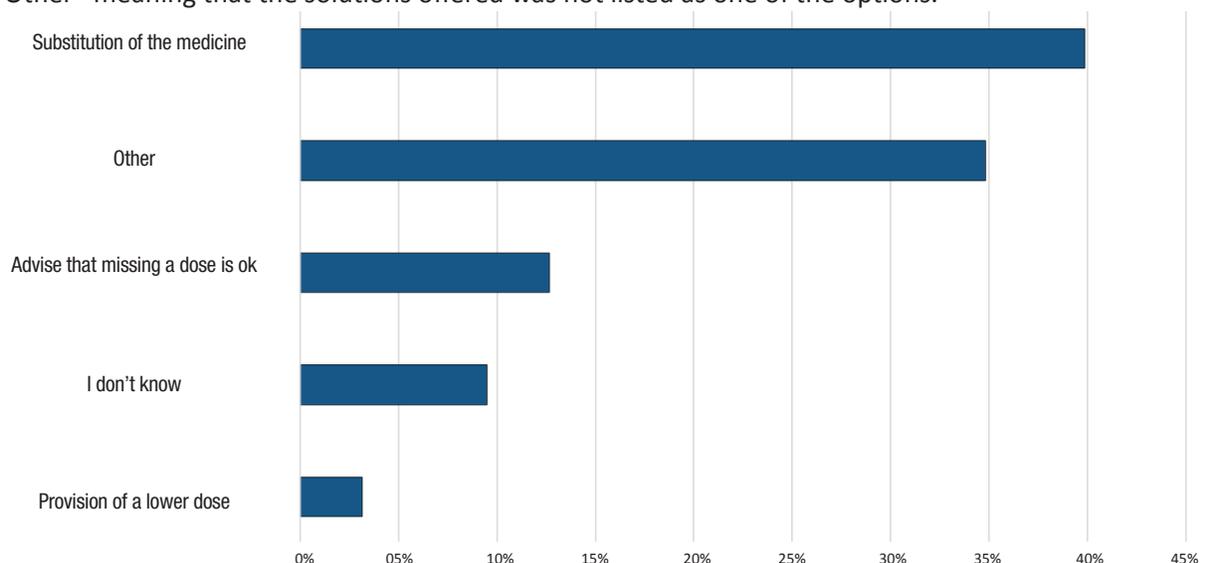


Figure 55 Percentage of responses by patients (N=158) to question 76 'What solution was offered to you?'.

Three themes emerged from the free text responses included by patients that selected the option 'other'. These included taking medicines from home to the hospital, buying medicines and treatment delay. A common answer provided by the Romanian patient was to purchase the medicine outside of the country. Some of the 52 free text responses related to the main themes are displayed below:

Patients bringing the medicines from home to the hospital :

"Had to wait a day until my wife brought the drug from home." – Patient, United Kingdom

"Taking my own treatment with me to the hospital." – Patient, France

"Asked me to bring my own treatment for my 1 month hospital stay." – Patient, France

Patients buying the medicines themselves:

"Independent procurement abroad." – Patient, Serbia

"Purchase on own account." – Patient, Romania

"Purchase of the drug outside the hospital." – Patient, Romania

Treatment delay:

"Non-administration of drug treatment and monitoring at three months." – Patient, France.

In some cases, there was no solution provided, the patients were just informed that the medicines were not available in the country. There were patients that were advised to take more pills from a lower dose. Viewing this data it is possible to see that the patients are not always receiving proper solutions in case of shortages.

Question 77 (patients): Do you feel that the problem was correctly handled?

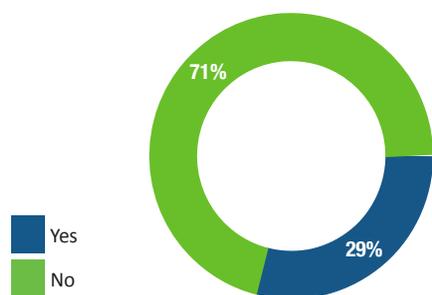


Figure 56 Percentage of responses by patients (N=158) for question 77 'Do you feel that the problem was correctly handled?'.
Legend: Yes (blue), No (green)

This question was only answered by those patients which had responded 'yes' to question 75 which inquired if patients received information about the reasons of the medicines shortage from their hospital pharmacist, nurse, physician or any other healthcare professional working in the hospital. There were 158 responses to this question, with only 29% (N=46) of respondents stating that they felt that the problem had been correctly handled. In contrast, 71% (N=112) of the patients that answered to this question stated that they did not feel that their problem was correctly handled.

Question 78 (patients): Since you felt that the problem was not correctly handled, please tell us what went wrong and should be improved.

There were 71 free text responses to this question. Patients were asked to give recommendations on how to improve the solutions offered to patients and their families in the event of a medicine shortage. In general, the patients used this opportunity to share the issues that they had experienced with medicines shortages. Despite not being within the scope of the question, one Slovakian patient also commented on the practice of parallel trade, while another urged to stop the sale of overpriced, ineffective drugs at all costs. Some common themes which emerged from the responses are listed below:

Reason behind not receiving the prescribed treatment:

"I should have been given a reason why there was a shortage and that reason should have come from a pharmacist and no one else." – Patient, United Kingdom

"They should have told me about the problem and I would have tried to find the drug from a drugstore." – Patient, Greece

"Lack of information. Impression of abandonment. Long and fruitless wait." – Patient, France

"After 4 days, I was told that my medicines were ordered but that no information on the delivery date could be given and I found myself without medicines." – Patient, France

Substitution medicine had more adverse effects or was less effective:

"The medicine suggested as a substitute was less effective than the originally proposed treatment." – Patient, Greece

"The alternatives offered did not have the same effect as the original drug. The problems worsened." – Patient, Romania

"The drug replacement did not work for me as the original medicine should improve the health system should improve because I think those doctors were not responsible for the fact that the medicine was not available in pharmacies." – Patient, Slovakia

Solutions or replacements were not found/were not possible or no solution was offered:

"They didn't have several of the medications I needed and they just said they were sorry that they didn't stock those items. No substitutes were offered and they did nothing to get them." – Patient, United Kingdom

"I did not receive the medicine resulting in deregulation of end-stage heart failure." – Patient, Greece

“No solution untreated for 3 months and I needed to be operated on again.” – Patient, France

Advised to bring or buy their own medicines to the hospital:

“Hospital’s should not have to ask patients to bring in their own tablets.” – Patient, United Kingdom

“Medications should exist in the hospital, the patient’s family has enough worries, should not run through pharmacies.” – Patient, Romania

“A common drug should not be missing from the hospital pharmacy, the patient should not be sent to buy the necessary medicines.” – Patient Romania

Bigger stocks or a better planning from the hospital:

“ If there was a centralized list of how many doses there are and how many patients they need then the problem would not have appeared.” – Patient, Romania

“Given that the drug was inaccessible to immunotherapy - targets (erlotinib), its pausing led to a certain degree of exacerbation of malignant changes and the progression of the tumour, which was stably kept under control during therapy. It is necessary to develop a better organization and prevent it from happening.” – Patient, Serbia

“ Recurrent lack of common and less common medicines, incorrect / inadequate information from pharmacies, avoiding the emergence drug ordering system – Patient, Slovakia

Question 79 (patients): Do you believe that the shortage/the shortages that you or one of your family members experienced impact your/the family members’ care in the hospital?

This question had 104 responses from patients, with 65% (N=68) of them reporting that the care provided at the hospital was affected by the medicines shortages, while 35% (N=36) stated that they did believe that the shortage had an impact on the care provided in the hospital.

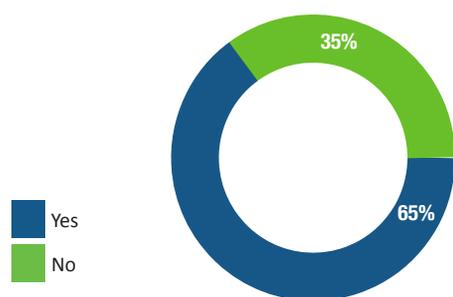


Figure 57 Percentage of responses by patients (N=104) for question 79 ‘Do you believe that the shortage/the shortages that you or one of your family members experienced impact your/the family members’ care in the hospital?’.

Question 80 (patients): Please choose the type of impact medicines shortages had on your care/the care of your family member. Tick all that apply.

The impact resulting from medicines shortages to the patients are shown in Figure 58, which highlights the magnitude of this problem. 30% (N=48) of the respondents have seen care delayed as a consequence of medicine shortages, 12% (N=20) experienced a failure of treatment, 11% (N=18) had an increased length of stay in the hospital. 10% (16) of the patients had their treatment cancelled while 8% (N=13) experienced adverse events or greater toxicity. Readmission due to treatment failure and increased monitoring was presented by 6% (N=8) of the population, in addition, 3% (N=5) of the patients were transferred to a facility where the medicine could be provided. 2% (N=4) of respondents answered that they knew of instances where death had occurred as a result of medicines shortages. 11% (N=17) stated that they didn't know what type of impact the medicines shortage had on their treatment.

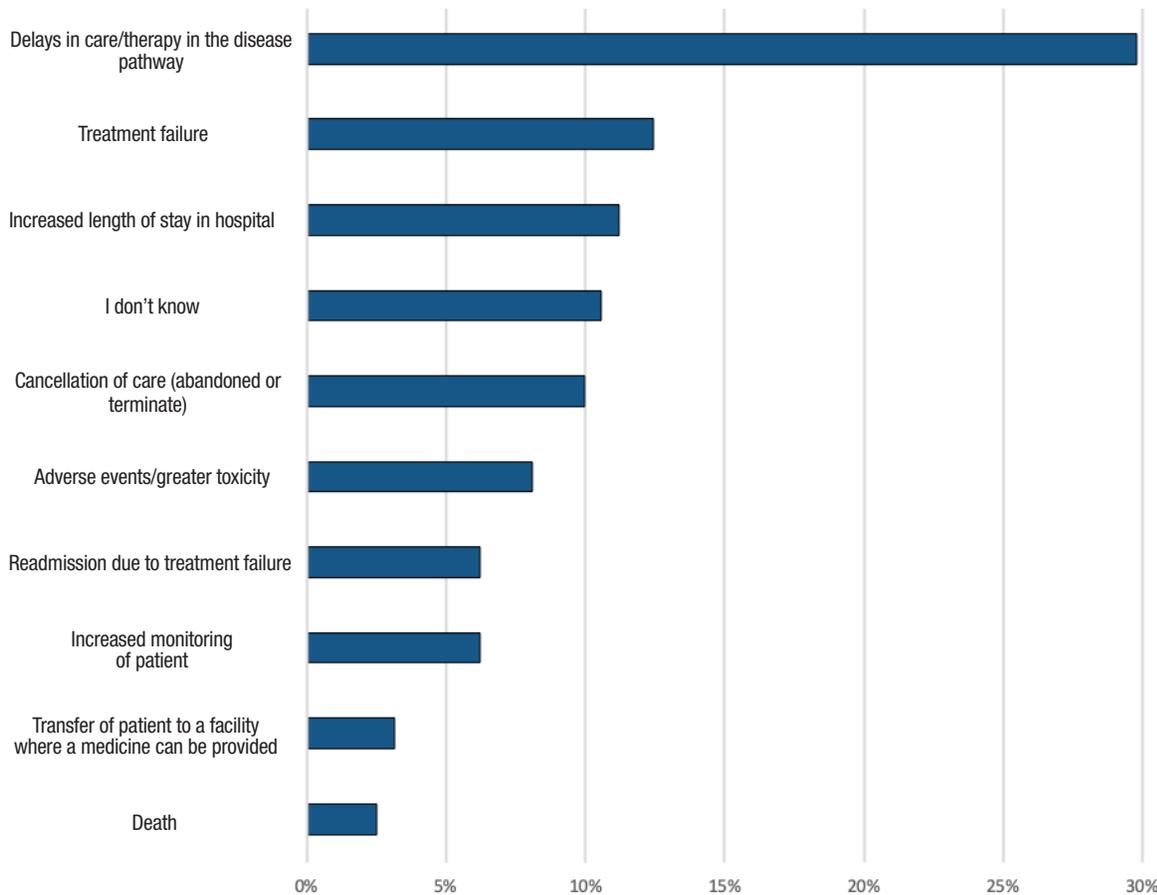


Figure 58 Percentage of responses by patients (N=161) for question 80 'Please choose the type of impact medicines shortages had on your care/the care of your family member.' (Note that this was a tick all question).

The table below gives a summary the medicines shortages reporting websites named by respondents in relation to question 12 (hospitalpharmacists), question 37 (physicians), question 57 (nurses) and question 92 (other healthcare professionals).

Country	Website of the reporting system	Feedback provided in relation to the reporting system
Albania		<i>No information provided.</i>
Andorra		<i>No information provided.</i>
Austria	https://www.basg.gv.at	The BASG (Bundesamt für Sicherheit im Gesundheitswesen Austrian Federal Office for Safety in Health Care) has made available information that is shared by pharmaceutical companies regarding shortages of their products, managed by the public health institution.
Belgium	www.bcfi.be	An overview of out of stock medication is available via the website the Belgian Centre for Pharmacotherapeutic Information, the Federal Agency for Medicines and Health Products and the Belgian Pharmacy Association.
	www.afmps.be	
	www.apb.be	
	https://pharmastatus.be	The Pharmastatus website of the Federal Agency for Medicines and Health Products contains an overview of the human and veterinary medicines in shortage. It is possible to search by medicine.
Bosnia and Herzegovina	http://www.almbih.gov.ba/	Manufacturers or wholesalers inform the Medicine Agency which provides information on their website.
Bulgaria	https://www.bda.bg/	-
Croatia	http://www.halmed.hr/	There is a list available for download at HALMED (Agency for Medicinal Products and Medical Devices of Croatia). There are no proposed solutions for therapy substitution. It is unclear how often this list is being updated.
Cyprus	https://www.gesy.org.cy/	The information on the website of the General Health System is not often used by hospital pharmacists.
Czech Republic	http://www.sukl.cz/	The State Institute for Drug Control (SUKL) makes available information about shortages and (if available) about reimbursement.
	http://www.mzcr.cz/dokumenty/seznam-lecivych-pripavkujejichz-distribucido-zahranici-maji-distributori-povi_14530_883_1.html	An Excel list of the Ministry of Health is providing the information on reported shortages.
	https://www.lekarnici.cz/Pro-cleny/Aktualni-temata-(1)/Nedostatkov-LP.aspx	-

Country	Website of the reporting system	Feedback provided in relation to the reporting system
Denmark		<i>No information provided.</i>
Estonia	https://ravimiamet.ee/#tab_3-tab	The Agency of Medicines of the Republic of Estonian has a list for shortages of medicines. It is updated with new information every day.
Finland	https://www.fimea.fi/web/en/databases_and_registers/shortages	The Finnish Medicine Agency (FIMEA) has a website where medicine companies can inform about common shortages and proposed solutions, and where pharmacies can get the information.
France	https://ansm.sante.fr/	The National Agency for the Safety of Medicines and Health Products (ANSM) shares information on shortages and sometimes also on replacement possibilities. The system is not very efficient because shortage information is not given early enough (sometimes several weeks without news).
Germany	https://www.abda.de/	The German Hospital Pharmacy Organisation shares information on shortages.
	https://www.bfarm.de/	Companies report shortages. These are listed by the Federal Institute for Drugs and Medical Devices. The list is often not up to date, and not all shortages are included since notification is not mandatory and there are different limitations for the inclusion of a shortage in the list.
developed a risk assessment and monitoring application	https://www.eof.gr/web/guest/shortage	There is an on-line reporting system for medicine shortages on the website of the National Organisation for Medicines (EOF). The tool is supervised by EOF and hospital pharmacists can report any relevant problem. EOF provides quick responses by e-mail or via phone calls that inform about the existing level of information for a shortage.
Hungary	https://www.ogyei.gov.hu/gyogyszeradatbazis	There is a list by the National Institution of Pharmacy and Nutrition that is being updated frequently. It is based on the notification by manufacturers.
Iceland	https://www.lyfjastofnun.is/eftirlit/lyfjaskortur/	The Iceland Medicines Agency has an overview of the medicines shortages.
Ireland	http://www.hpra.ie/homepage/medicines/medicines-information/medicinesshortages	The Health Products and Regulatory Authority shares information on medicines shortages on its website.
Lithuania	https://www.vvkt.lt/Vaistu-tiekimo-sutrikimai	The State Medicines Control Agency of Lithuania shares information on medicines shortages via an excel table.

Country	Website of the reporting system	Feedback provided in relation to the reporting system
Luxembourg		No information provided.
Malta		No information provided.
Montenegro		No website available. Shortages are reported by email.
Netherlands	https://farmanco.knmp.nl/	The Farmanco reporting site is run by the Royal Dutch Society of Pharmacy. Manufacturers and wholesalers can report shortages on this website.
	https://www.meldpuntgeneesmiddelenkortendefecten.nl/	The Ministry of Health hosts a response form on its website via which shortages can be reported.
North Macedonia	www.malmed.gov.mk	An overview on medicines shortages is provided.
Norway	https://legemiddelverket.no/legemiddelmangel	The Norwegian Medicine Agency shares information on medicines shortages via its website.
Poland	http://dziennikmz.mz.gov.pl/compatible/KeywordsSearch/55	The Official Journal of the Health Ministry provides an overview of the medicines shortages in the country.
	http://wif.poznan.ibip.pl/public/	Chef Pharmaceutical Inspectorate of Poznan collects data reported by pharmacies regarding drug shortages and produces a list of medicines at risk of being illegally exported. Pharmacists are obliged to report shortages online giving details of nature of shortage. The reporting system is web based but considered by many not user friendly which may hinder the reporting system.
Portugal	https://www.infarmed.pt/web/infarmed/gestao-da-disponibilidade-domedicamento	The Portuguese Medicines Agency runs a reporting system for medicines shortages.
Romania	http://medicamentelipsa.ms.ro/	The website provides an overview on medicines shortages in Romania.
Russia		No information provided.
Serbia	http://site.zus.rfzo.rs/def	The National Insurance Fund runs a website where pharmacists can report shortages. No access is provide to the databases with all reported shortages from other institutions.

Country	Website of the reporting system	Feedback provided in relation to the reporting system
Slovakia	https://portal.sukl.sk/PreruseniePublic/?act=PrerusenieOznList&mId=2	The State Institute for Drug control has a website with information. This website does not provide feedback on alternatives and manufacturers often don't want to inform about the length of a shortage.
Slovenia	https://www.jazmp.si/humana-zdravila/podatki-o-zdravilih/zdravila-na-trgu/	A system exists run by the Public Agency of the Republic of Slovenia for Medicines and Medical Devices, but manufacturers don't report consistently to the system.
	http://www.cbz.si/cbz/bazazdr2.nsf/Search/\$searchForm?SearchView	Via the Central Medicines Database, it is possible to search for all the medicines on the Slovenian market. The website uses a colour system to categorize the medicine (no colour – no information on shortages; green – medicine available; yellow – shortage might happen; red – medicine shortage). It is also possible to search for the list of medicines shortages per fields.
Spain	https://cima.aemps.es/cima/publico/home.html	The Spanish Medicines Agency provides information via e-mail and on its website. There is also a webpage via which it is possible for hospital to obtain medicines from abroad.
Sweden	https://lakemedelsverket.se/OVRIGA-SIDOR/Restnoteringar/	The Swedish Medical Products Agency has a residual list which shares information on temporary shortages.
	https://docetp.mpa.se/LMF/Reports/Restnoteringar.xlsx	An excel list with the all the information on shortages reported in the country is also available.
Switzerland	https://www.bwl.admin.ch/bwl/fr/home/themen/heilmittel/meldestelle.html	The Federal Office for National Economic Supply hosts an information system which does not contain the most up-to-date information.
	https://www.drugshortage.ch/index.php/uebersicht/	A hospital pharmacist launched the site to provide manufacturers with a place where they can voluntarily report shortages. Other healthcare professionals can also report shortages.
	https://www.swissmedic.ch/swissmedic/fr/home/medicaments-a-usagehumain/surveillance-du-marche/out-of-stock.html	The Swiss Agency for Therapeutic Products has a list of the medicines in shortage in the country.
Turkey		<i>No information provided.</i>
United Kingdom		<i>No website available. Information on shortages is circulated via an email list.</i>



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