

Medicine shortages in Australia

A snapshot of shortages in
Australian hospitals

June 2017

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About SHPA

The Society of Hospital Pharmacists of Australian (SHPA) is the national membership organisation for pharmacists, pharmacist technicians and pharmacy interns working in hospitals and other healthcare settings, with more than 4,400 members across Australia. SHPA's members are progressive advocates for clinical excellence, passionate about patient care and committed to evidence-based practice.

SHPA is committed to facilitating the safe and effective use of medicines. SHPA supports pharmacists to meet medication and related service needs, so that both optimal health outcomes and economic objectives are achieved for Australians, as individuals, for the community as a whole and for healthcare facilities within our systems of healthcare.



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Medicine shortages in Australia

Discussion of the results of SHPA's medicines shortages prevalence study April 2017

Introduction

Major shortages of frequently used intravenous antimicrobials in hospitals have increasingly become a source of concern and uncertainty for many hospital pharmacy departments around the country. While vancomycin and metronidazole shortages were reported in the [news media in late 2016](#), SHPA members advise that medicines shortages are far broader and more frequent than reported publicly.

According to feedback from members; pharmacy directors and procurement officers regularly experience considerable difficulties procuring important antimicrobials for intravenous use including: vancomycin, metronidazole, aciclovir, meropenem, azithromycin, ceftazidime, daptomycin, fluconazole, ampicillin, amoxicillin. These medicines are used to treat life-threatening bacterial, viral and fungal infections.

Shortages of intravenous antimicrobials severely damage significant years of pharmacy work supporting optimal prescribing to address the risk of antibiotic resistance and to force hospitals to depart from well-established hospital treatment protocols and [Therapeutic Guidelines](#). SHPA is extremely concerned that a need to adjust treatment protocols depending upon medicine availability presents a significant 'Quality Use of Medicines' risk.

Increasingly, hospital pharmacists are spending large amounts of time, contacting multiple suppliers, in order to pay a higher price for a delayed delivery of key medicines.

An [analysis by the Premier Healthcare Alliance](#) in the United States found medicines shortages cost hospital budgets a minimum of US\$200 million annually through the forced purchasing of expensive alternatives to essential medicines; the additional labour resourcing to source alternatives was estimated to be US\$216 million per annum. This directly impacts patient care by diverting precious staff time and reducing pharmacists' capacity to provide clinical services, creating a need to prioritise prescribing of key antimicrobial medicines for patients, and impacting hospital medicine budgets.

The manufacture and distribution of medicines in Australia play an important role in our well-regulated health care system. However, notification of shortages is voluntary, and anecdotal evidence indicates information provision from manufacturers and wholesalers is poor. To assess supply notifications and measure the impact of shortages, SHPA has undertaken a prevalence study of medicine shortages as experienced in Australian pharmacy departments

Methodology

SHPA undertook a point of prevalence survey of medicine shortages experienced by members in hospitals across Australia to demonstrate their extent and impact on hospital pharmacy and clinical practice, as well as the timeliness and quality of information provided to clinicians from regulators, sponsors and wholesalers.

The online Medicines shortages prevalence survey was conducted on Tuesday 4 April 2017. The Directors of Pharmacy at all Australian hospital pharmacy departments were invited to complete a survey and state which medicines were unavailable for ordering on that day, and how it affected the care they provided for patients. In addition, the survey was promoted in the SHPA member e-newsletter and to healthcare stakeholders. All participation was voluntary.

Participants (who included procurement officers as well as hospital pharmacists) had until midnight Friday 9 April to complete the online survey which allowed up to 30 entries. Once received, all information was de-identified, compiled and analysed in Microsoft Excel. All entries were compared to a list of known medicines shortages, and grouped by therapeutic group as well as brand name (medicine product name) and active ingredient, to identify true shortages rather than examples of standard brand substitution.

Respondents were asked how they were notified of the shortage, their action in response to the shortage, any cost or patient impact, and any timeframe given for when the product would be available. Free text comments on the impact of medicines shortages and possible stockpiling were also recorded. SHPA downloaded data from the Therapeutic Goods Administration (TGA)'s Medicines Shortages Initiative website (<https://www.tga.gov.au/medicine-shortages-information-initiative>) on 4 April in order to compare publicly reported shortages to shortages recorded in the survey.

For the purposes of the study all shortages were classified as a medicine that a hospital planned to order for use with patients but was unable to. This is in line with the formal definition by the International Pharmaceutical Federation as '[a drug supply issue requiring a change. It impacts patient care and requires the use of an alternative agent.](#)'

An unforeseen limitation of SHPA's data collection tool was that survey respondents were only able to submit a maximum of 30 medicine shortages; in some instances, respondents had more medicine shortages to report but were not able to practicably do so.

A limitation on accurately projecting the extent of medicine shortages is the difficulty of counting how many hospitals utilise a hospital pharmacy service, or are supported by community pharmacies, hence the report of 'approximately 280 healthcare facilities'. Similar to hospitals, hospital pharmacies differ considerably in size and organisation and both centralised pharmacy and outsourced pharmacy arrangements are common. However, the high response rate and large number of shortages recorded indicated a significant problem exists across numerous hospital pharmacies.

Key results

One thousand five hundred and seventy-seven (1,577) entries of medicine shortages were recorded across approximately 280 healthcare providers, which included public (72.9%), private (17.8%) and not-for-profit (9.3%) health service facilities and generally proportional geographic spread across Australia. Sixty-seven per cent of respondents were in metropolitan locations. There was also good representation of health service facilities of different sizes (Chart 1).

Key findings:

- 100% of respondents said they had experienced a medicine shortage in the preceding 12 months.
- 95% of respondents recorded at least one medicine shortage on 4 April.
- Across all respondents, a total of 1,577 entries were recorded, comprising 365 different commercial products across 154 different active ingredients (see Appendix 1. List of medicines unavailable for ordering).
- Entries covered a wide range of medicine classes; the most frequent recorded shortages were antimicrobials (20%), then anaesthetics/analgesia (12%), cardiology (10%), endocrinology (10%), chemotherapy (9.5%) and neurology (9%) medicines.
- Of the 365 different medicine product shortages reported in the survey, only 54 (14.8%) were reported on TGA's Medicines Shortage Initiative website on 4 April.
- Information provided on the TGA website on 4 April did not align with reported hospital experience indicating the 'date of supply' information was largely inaccurate.

Discussion

In light of the data collected, it appears medicine shortages remain a substantial problem for public and private hospitals across Australia with significant implications for patient care, staff resourcing and expenditure.

From late 2016, Australian media attention regarding this issue focused on shortages of key antimicrobials such as intravenous metronidazole and vancomycin which are used to treat life-threatening infections. The Medicines Shortages Prevalence Survey (aka 'the survey') indicated that antimicrobials remain a major concern, as they comprised half of the ten most common shortages (Table 2), and were the medicine class respondents most frequently attempted to stockpile. However, although supply of antimicrobials remains particularly problematic, shortages impact the breadth of medicines supply. More than 60% of reported shortages were for medicines other than antimicrobials. The next most prevalent class of medicines shortages were anaesthetics/analgesics which accounted for 14% of the 1,577 entries, a rate [consistent with international evidence](#) of ongoing anaesthetic shortages.

Nationally, the lack of accurate information available regarding medicine shortages exacerbates the problems inherent in the complex supply chain of a vital product. By far, the most common time (70%) when procurement officers realised a medicine was in shortage was when their hospital's ordering system displayed the medicine was 'out of stock' or 'on back order'. This retrospective advice does not allow for health service facilities, in particular prescribers and pharmacists, to proactively plan for disruptions and provide optimal patient care.

The data collected shows hospital pharmacists are required to respond to medicine shortages on a daily basis, resulting in a range of actions including using emergency stock;

alternative brands and formulations available in Australia; and stockpiling and using the TGA's Special Access Scheme (SAS) to obtain alternatives from overseas. This supports SHPA's understanding that hospital pharmacists have developed sophisticated and administratively burdensome 'workarounds' to mitigate medicines shortages, which are costly in terms of staff time and hospital expenditure, in order to minimise the impact on patient care as much as possible.

SHPA recommends that greater attention be paid to the need for proactive notification of medicine shortages to reduce the staff time spent and expenditure allocated by individual hospitals in response to a systemic problem.

The results collected highlight a number of specific concerns:

Significant impact on clinical care

More than 32% of the actions taken in response to medicines shortages have a direct impact on patient care through either the substitution of a less efficacious medicine, change in the route of administration due to a different formulation or a lack of alternatives for treatment (Table 4).

Using a less efficacious medicine means taking more time to treat the same condition, thus potentially increasing the length of a hospital admission and subsequent cost to the taxpayer. Using less efficacious medicines may also mean exposing patients to medicines with more adverse effects which will also incur extra costs to monitor and treat; both of these workarounds may negatively impact patient quality of life during care episodes.

A key principle of medicines safety is to always use the least invasive route of administration, (ie. switching a patient receiving intravenous antibiotics to an oral antibiotic as soon as practicably possible), as the invasive nature of injectable medicines carry a further risk of serious infection. However, shortages of oral doses often require intravenous administration which is exacerbates patient risk unnecessarily. Patients may not be aware of the reason for their treatment revision.

Frequent shortages of antimicrobials

Antimicrobials made up half of the most commonly reported shortages (Table 2) and accounted for almost 40% of all the individually reported medicines product shortages and over 20% of all unique medicine product shortages. The most common response to this shortage was the use of emergency/constrained stock (28.3%). The next most frequent responses all had the potential to negatively impact on both patient care and antimicrobial stewardship practices, with 10.1% switching to a different dose form/strength, 8.2% using second or third line medicines and 6.4% reporting 'no alternatives' for treatment.

These responses to antimicrobial medicine shortages carry inherent problems for pharmacy practice. The threat of widespread antimicrobial resistance is well documented and many years of work have resulted in increased awareness among medical practitioners of the problems with inappropriate antibiotic usage. This good work is undone when a pharmacist has to revise treatment advice for doctors due to a shortage. Members report that the prescriber rarely easily returns to best practice prescribing.

Reports of frequent use of emergency/constrained stock is also problematic as it is a temporary solution which often creates an environment conducive to stockpiling.

Antimicrobial medicines were also reported as the most likely to be stockpiled. Stockpiling of essential resources by individual hospitals can negatively affect the capability of less well-resourced facilities to obtain essential medicines when required, most commonly regional and rural services.

Common use of the Special Access Scheme (SAS)

In the data the Federal Government's SAS was regularly recorded as a key means of addressing shortages, despite its different purpose and the significantly increased procurement costs it incurs. Twenty per cent of the most common shortages prompted use of the SAS, which would potentially impact on hospital budgets given the higher procurement costs of sourcing medicines internationally (Table 5), the most common use of the scheme. Use of the SAS increased costs in 93% of cases across all medicines, and 100% of the time when the SAS was used to procure antimicrobials (Chart 6).

In addition to increased expenditure, procuring medicines from overseas has a number of negative ramifications. Ordering through a specific scheme presents a significant burden of administration for hospital staff including returning to the prescribing doctor for authorisation and completing the TGA form. Medicines that are not registered in Australia often have labelling and packaging that do not comply to Australian standards, do not feature English, or do not have Product Information or Consumer Medicines Information documents. This presents challenges for pharmacists, nursing staff and consumers in pursuit of optimal medication safety and 'Quality Use of Medicines'.

Unreliability of notifications

A persistent problem reported by respondents was the poor quality and low frequency of medicine shortage notifications from stakeholders. The survey results show procurement officers were made aware of 70% of medicines shortages only when they attempted to order the medicine using their electronic ordering system (Chart 3). This notification is too late to allow efficient medicine management. Minimal information was also provided by suppliers on hospital ordering systems regarding when medicines would again be available (Chart 4). Anecdotally many pharmacists also report inaccurate information being supplied by pharmaceutical representatives.

The government-supported mechanism for notification is the TGA's Medicine Shortage Initiative (MSI) website which relies on voluntary notification from suppliers, and sometimes pharmacists. Of the 365 different medicine products reported as unavailable in SHPA's survey, only 54 (14.8%) were listed on the TGA MSI website on the date of the survey. Not only were many medicines shortages not reported on the website, but the data that was published was not current or accurate in many cases.

Conclusion

The issue of medicine shortages is not a new one, however SHPA members report that it is regularly considered by hospital management, government and pharmaceutical suppliers as an administrative inconvenience rather than a clinical concern. The data collected in this survey indicates that shortages have a clinical impact as well as absorbing considerable pharmacy staff time and medicines budgets. And according to SHPA members even in the period since this study was undertaken, shortages have continued to worsen.

SHPA believes the data collected in this survey should encourage greater consideration of strategic approaches to reducing the impact of shortages, notably the requirement for improved notification from manufacturers or wholesalers. This would require legislative change as the issue of an Australian Register of Therapeutic Goods (ARTG) number includes no implicit requirement to ensure supply, or notify inability to supply, to the Federal Government.

In practice, the burden of managing widespread medicine shortages is currently being borne by individual pharmacy departments across the country, where it is a destabilising factor in efforts to improve clinical collaboration and patient care. A systemic approach to both supply and notification has the potential to substantially improve efficiency and increase hospitals' capacity to support optimal patient care. As medicines shortages continue to increase in Australia and overseas this would address a growing pressure on hospitals.

Looking forward, an investigation into the economic impact of medicine shortages, both in the cost of purchasing higher priced foreign and domestic medicines, and opportunity cost of clinical pharmacy resources used in procurement workarounds, would be valuable data to enable a comprehensive picture of the costs of shortages.

Due to the serious implications of inadequate supply, manufacturers and wholesalers have a responsibility to inform the Australian community when they are unable to supply medicines they are registered to provide. Given the increasing complexity of the international medicines marketplace and the varying reliability of global supply chains it may be reasonable to accept interrupted supply is inevitable. In this case, notification is the obligation of the social license granted to the medicines industry given their important role in healthcare. SHPA is confident that a commitment to timely and effective notification would return a significant dividend for Australians, both in patient care and in the effective use of limited hospital resources.

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Tables

Table 1: Health Service Facility Site Peer Groups

Principal referral hospitals	19%
Public acute group A / Public acute group B hospitals	20%
Public acute group C / Public acute group D hospitals	13%
Private acute group A / Private acute group B hospitals	9%
Private acute group C / Private acute group D hospitals	4%
Children's / Women's / Combined Women's and children's	6%
Psychiatric hospital	9%
Same day hospital	9%
Sub- and non-acute hospitals (Public or private rehabilitation)	11%

Table 2: Most commonly reported medicine shortages

Vancomycin	9.4%
Metronidazole	9.2%
Norfloxacin	5.7%
Remifentanil	4.5%
Glyceryl trinitrate	3.0%
Fentanyl	2.9%
Aciclovir	2.6%
Dantrolene	2.2%
Tranexamic acid	2.2%
Azithromycin	2.2%

Table 3. Most commonly reported medicine shortages by therapeutic group

Antimicrobials	20.5%
Anaesthesia/Analgesia	12.0%
Cardiology	10.3%
Endocrine	10.3%
Chemotherapy	9.4%
Neurology	9.0%
Psychotropics	6.0%
Blood disorders	4.3%
Gastrointestinal	3.8%
Anti-inflammatory	2.6%
Vaccine	2.1%
Antiemetics	1.7%
Other	8.1%

Table 4: What action did you take because of the shortage?

Borrowing stock from another pharmacy	1%
Use second/third line medicines	6%
Use an alternative medicine of equal efficacy	7%
I have no alternatives	12%
Procuring stock through SAS	13%
Switch to a different dose form/strength	15%
Using emergency stock	20%
Using an alternative brand	26%

Table 5: Action taken for most common medicines shortages

Procuring stock through SAS	20.2%
Use an alternative medicine of equal efficacy	6.5%
Using an alternative brand	17.8%
Use second/third line medicines	5.7%
Using emergency stock	31.0%
Switch to a different dose form/strength	10.9%
Borrowing stock from another pharmacy	1.1%
I have no alternatives	6.8%

Table 6. Did this action increase costs?

Yes	51%
No	37%
N/A	13%

Charts

Chart 1. Health services by peer group



Chart 2. Pharmacist action per medicine shortage

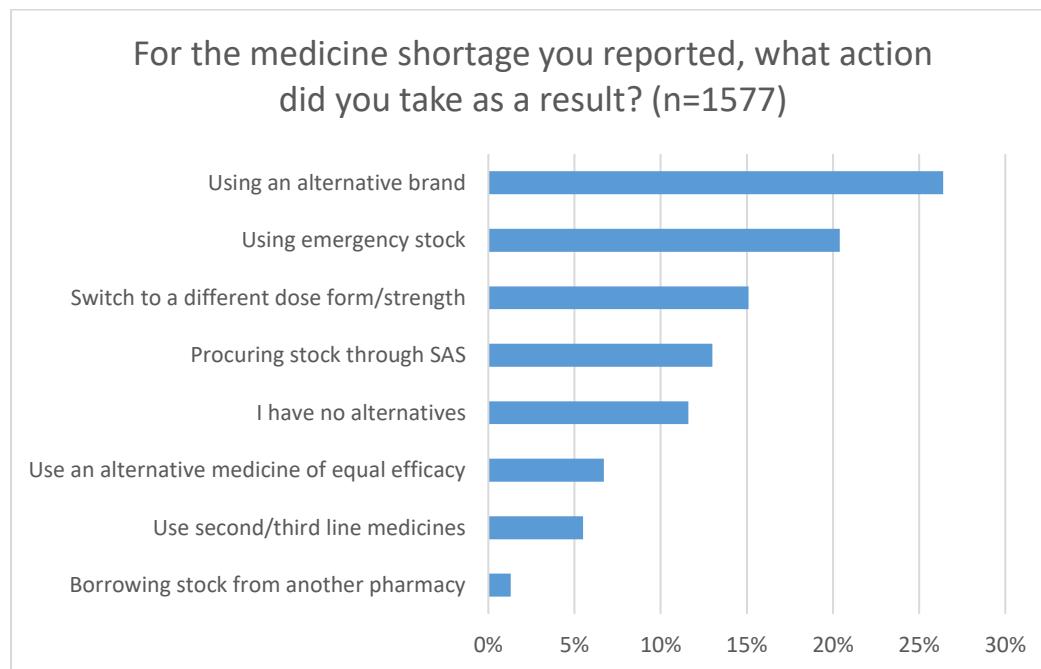


Chart 3. Methods of notification of medicine shortages

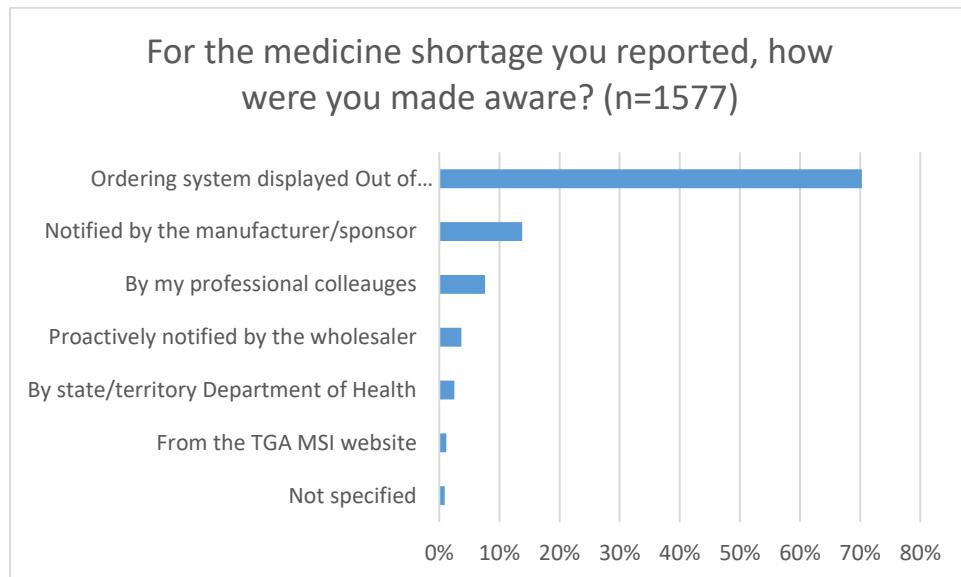


Chart 4. Notification of expected availability for reported shortage

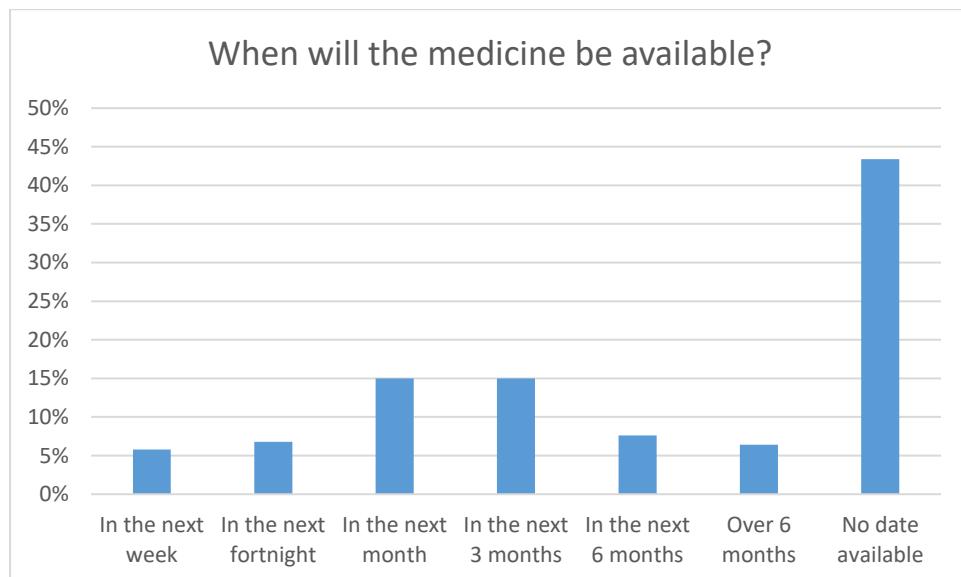


Chart 5. Incurring increased costs on antimicrobials versus all shortages

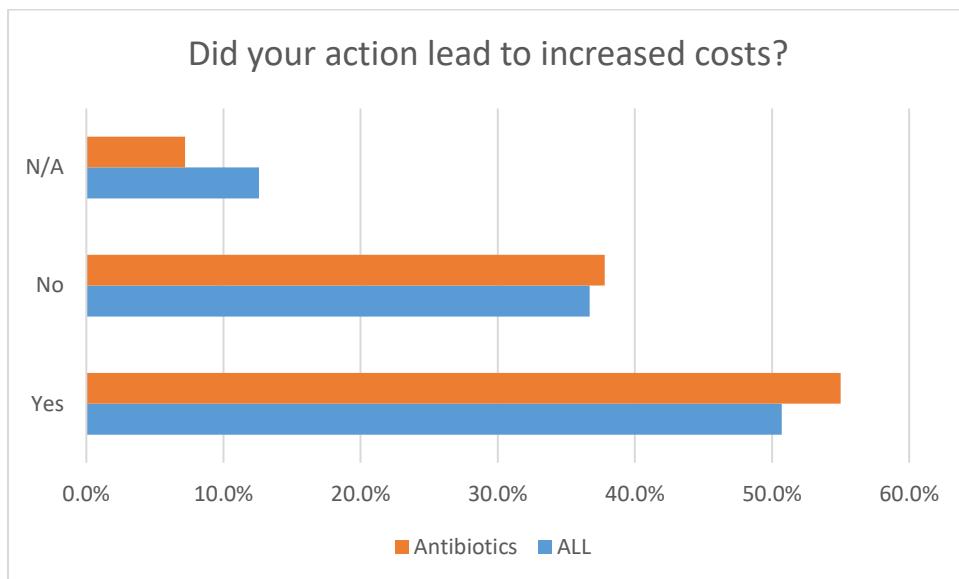
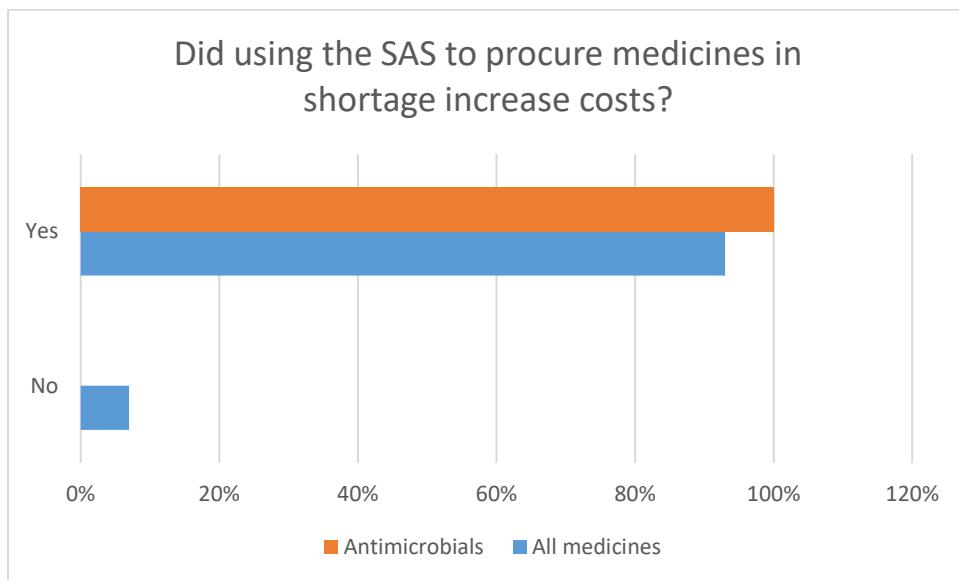


Chart 6. Incurring increased costs using the SAS to obtain antimicrobials versus all shortages



Appendix 1: List of medicine shortages by active ingredient

Medicines are listed in order of prevalence of shortage. Duplicates may appear due to the combination of active ingredients in products.

Vancomycin	Disulfiram
Metronidazole	Oxaliplatin
Norfloxacin	Midazolam
Remifentanil	Ciprofloxacin
Glyceryl trinitrate	Nicotine
Fentanyl	Octreotide
Aciclovir	Phenytoin
Dantrolene	Sildenafil
Tranexamic acid	Cephalexin
Azithromycin	Chlorhexidine gluconate
Hepatitis B vaccine	Epirubicin
Etoposide	Imipramine
Zoledronic acid	Nystatin
Benztropine	Telmisartan
Meropenem	Cocaine
Dinoprostone	Pyridoxine
Mupirocin	Biperiden
Trifluoperazine	Carbamazole
Dexamethasone/framycetin/gramicidin	Methylprednisolone
Indomethacin	Mirtazapine
Gabapentin	Risperidone
Dexamethasone	Testosterone
Piperacillin/tazobactam	Allopurinol
Meningococcal vaccine	Atropine
Isoprenaline	Cefepime
Bupivacaine/fentanyl	Cephazolin
Heparin products	Fosinopril/HCT
Dexmedetomidine	Hydromorphone
Oestradiol	Isosorbide mononitrate
Fluconazole	Melphalan
Ligocaine	Ondansetron
Pantoprazole	Paracetamol
Tramadol	Prochlorperazine
Hyoscine hydrobromide	Valaciclovir
Ketamine	Amantadine
Lamotrigine	Ampicillin
Pancreatic enzymes	Aprepitant
Calcium folinate	Benzocaine/adrenaline/zinc
Candesartan	Candesartan/HCT
Spironolactone	Cefoxitin
Vasopressin	Clotrimazole
Diphtheria & tetanus vaccine	Dipyridamole/aspirin

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Dothiepin	Framycetin
Entecavir	Hyoscine butylbromide
Estradiol	buprofen
Flucloxacillin	Lorazepam
Fosinopril	Macrogol 3350-Electrolytes
Gemcitabine	Methotrexate
Ketorolac	Mycophenolate
Levetiracetam	Nandralone
Metaraminol	Oseltamavir
Metoprolol	Oxazepam
Morphine	Oxytocin
Pitressin	Phosphate
Pramipexole	Pioglitazone
Propantheline	Potassium chloride
Propofol	Probanthine
Quinapril	Raloxifene
Ranitidine	Ramipril
Ribavirin	Reteplase
Simvastatin	Rocuronium
Sumatriptan	Tacrolimus
Adenosine	Tinidazole
Adrenaline	Topiramate
Amoxicillin	Valsartan
Amphotericin	Voriconazole
Anakinra	
Anidulafungin	
Atorvastatin	
BCG vaccine	
Bifidobacterium bifidum-lactobacillus acidophilus	
Bivalirudan	
Bupivacaine	
Calcipotriol	
Carbachol	
Cimetidine	
Desferrioxamine	
Diphtheria-Tetanus-Pertussis-Poliovirus vaccine	
Dopamine	
Dornase alfa	
Doxorubicin	
Esomeprazole	
Famciclovir	
Ferrous sulphate	
Flumazenil	
Fluorouracil	
Fluphenazine	
Flutamide	

Appendix 2: Copy of data collection tool

Attached.



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Preliminary Medicines Shortage Prevalence Survey

Background

Introduction

Throughout 2016, the Society of Hospital Pharmacists of Australia (SHPA) has been listening to concerns raised by many members regarding medicines supply issues in their hospital pharmacy departments, the methods in which they are notified of medicines supply issues, and how they manage it in their pharmacy departments. Members tell us this has the potential to cause significant disruption to workflows and affect the quality of patient care, however there is not sufficient data about medicines supply to inform policy in this area.

What SHPA is doing

In response to member interest SHPA established a Medicines Shortage Working Group (MSWG), comprised of all Branch Chairs and several Federal Councillors. On behalf of this group SHPA has made written submissions to the TGA and all state/territory Health Ministers in late 2016 to highlight our sector's concerns specifically about the shortage of intravenous antimicrobials and the impact on patient care.

Collecting data

As a continuation of our efforts to gather data about and to highlight the significance of this issue, MSWG aims to undertake a preliminary point prevalence survey to identify medicines shortages and supply issues in your hospital pharmacy department on 4 April 2017. This will provide a 'snapshot' of the situation for SHPA to discuss with our stakeholders.

SHPA invites all hospital pharmacy departments to complete the survey to demonstrate the problems faced day to day regarding medicines supply in Australia, and how such information is alerted to our sector from the TGA, manufacturers, wholesalers and suppliers. All information will be de-identified before it is compiled and analysed.

Responding to this survey

SHPA recognise that stock and supply of medicines is a complex area. This survey asks you to list each medicine that is currently unavailable, information about the impact of this, how you were informed and when you expect it to be available.

The survey must be completed in one sitting, and does not allow for your responses to be saved and revisited later. It might be easier to complete in partnership with your Procurement Manager, or if you gather the information beforehand on a single sheet for entry. The survey will work in a variety of web browsers, however Google Chrome provides the optimal experience.

The survey aims to gather the thoughts of members working in this areas, so your best answer or opinion about these instances is welcomed.



Preliminary Medicines Shortage Prevalence Survey

Hospital pharmacy profile

Any identifying information is collected only for the purpose of SHPA secretariat any follow up required.
SHPA **will not** provide any identifiable data to any person or stakeholder.

*** 1. Please tell us the name of your hospital network/pharmacy service and list the sites it services**

*** 2. What state is your hospital pharmacy department in?**

- Australian Capital Territory
- New South Wales
- Northern Territory
- Queensland
- South Australia
- Tasmania
- Victoria
- Western Australia

*** 3. Are you a public or private/not for profit hospital?**

- Public
- Private
- Not for profit

*** 4. Is your hospital in a regional/rural area or metropolitan area?**

- Metropolitan
- Regional
- Rural

*** 5. What is your hospital site(s) peer group(s)? (Select all that apply)**

- Principal referral hospitals
- Public acute group A / Public acute group B hospitals
- Public acute group C / Public acute group D hospitals
- Private acute group A / Private acute group B hospitals
- Private acute group C / Private acute group D hospitals
- Children's / Women's / Combined Women's and children's
- Psychiatric hospital
- Same day hospital
- Sub- and non-acute hospitals (Public or private rehabilitation)



Preliminary Medicines Shortage Prevalence Survey

Medicines shortages

* 6. Has your pharmacy department experienced any shortages in the preceding 12 months?

- Yes
- No

* 7. How do you TYPICALLY find out about/are alerted to medicines shortages? (select all that apply)

- By the manufacturer/sponsor
- By the wholesaler
- By TGA's Medicines Shortages Information website (<http://apps.tga.gov.au/prod/MSI/search/>) or email updates
- By the state/territory department of health
- By my professional colleagues
- When the ordering system displayed Out of Stock/On Back Order
- Other (please specify)

* 8. On Tuesday 4 April 2017, did your pharmacy department experience any medicines shortages?

- Yes
- No



Preliminary Medicines Shortage Prevalence Survey

What medicines shortages did you experience on 4 April 2017?

This survey aims to take a snapshot of any medicines shortages you experienced on 4 April 2017, if at all. This includes medicines that:

- are unavailable for order on this particular day
- have been unavailable in the last week and still cannot be ordered today
- have had longstanding shortage issues in the preceding months

The survey also aims to gather data on how you were made aware of the shortages, and how your hospital pharmacy department has managed it.

This survey provides space for you to list **UP TO 30 products**, for medicines with more than one strength or dose form, please enter them as **separate entries**. If you have more than 30 entries, please enter the 30 products that have impacted the most on patient care.

It may be helpful for you to download this sheet and fill it out before completing this survey.

If you would like to make further comments on the supply of a specific medicine please do so in the

space for 'further comments' at the end of this survey.

Entries 1 - 5

9. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand
i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

10. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?
-

11. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand
i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

12. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?
-

13. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand
i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

14. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?
-

15. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand
i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

16. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

- [] [] [] []

17. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand
i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

[]

18. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

- [] [] [] []

19. Do you have more medicines shortage to report on?

- Yes
 No



Preliminary Medicines Shortage Prevalence Survey

What medicines shortages did you experience on 4 April 2017?

This survey provides space for you to list **UP TO 30 products**, for medicines with more than one strength or dose form, please enter them as **separate entries**. If you have more than 30 entries, please enter the 30 products that have impacted the most on patient care.

If you would like to make further comments on the supply of a specific medicine please do so in the space for 'further comments' at the end of this survey.

Entries 6 - 10

20. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand
i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

[]

21. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

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22. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

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23. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

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24. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

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25. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

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26. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

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27. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

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28. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

--

29. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

-	↑	↑	↑	↑	↑	↑	↑
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30. Do you have more medicines shortage to report on?

- Yes
 No



Preliminary Medicines Shortage Prevalence Survey

What medicines shortage did you experience on 4 April 2017?

This survey provides space for you to list **UP TO 30 products**, for medicines with more than one strength or dose form, please enter them as **separate entries**. If you have more than 30 entries, please enter the 30 products that have impacted the most on patient care.

If you would like to make further comments on the supply of a specific medicine please do so in the space for 'further comments' at the end of this survey.

Entries 11 - 15

31. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

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32. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

-	↑	↑	↑	↑	↑	↑	↑
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33. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

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34. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

- [] [] [] []

35. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

[]

36. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

- [] [] [] []

37. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

[]

38. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

- [] [] [] []

39. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

[]

40. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

- [] [] [] []

41. Do you have more medicines shortage to report on?

Yes

No

Preliminary Medicines Shortage Prevalence Survey

What medicines shortages did you experience on 4 April 2017?

This survey provides space for you to list **UP TO 30 products**, for medicines with more than one strength or dose form, please enter them as **separate entries**. If you have more than 30 entries, please enter the 30 products that have impacted the most on patient care.

If you would like to make further comments on the supply of a specific medicine please do so in the space for 'further comments' at the end of this survey.

Entries 16 - 20

42. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand
i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

43. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

-	<input type="button" value="▼"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>	<input type="button" value="▲"/>
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44. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand
i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

45. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

-	<input type="button" value="▼"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>	<input type="button" value="▲"/>
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46. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand
i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

47. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

-	<input type="button" value="▼"/>	<input type="button" value="▲"/>	<input type="button" value="▼"/>	<input type="button" value="▲"/>
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48. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

49. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

i. How has your hospital pharmacy managed this?

ii. Did this result in increased costs?

iii. How were you made aware of this shortage?

iv. When have you been told this medicine will be available?

-	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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50. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

51. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

i. How has your hospital pharmacy managed this?

ii. Did this result in increased costs?

iii. How were you made aware of this shortage?

iv. When have you been told this medicine will be available?

-	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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52. Do you have more medicines shortage to report on?

- Yes
 No



Preliminary Medicines Shortage Prevalence Survey

What medicines shortages did you experience on 4 April 2017?

This survey provides space for you to list **UP TO 30 products**, for medicines with more than one strength or dose form, please enter them as **separate entries**. If you have more than 30 entries, please enter the 30 products that have impacted the most on patient care.

If you would like to make further comments on the supply of a specific medicine please do so in the space for 'further comments' at the end of this survey.

Entries 21 - 25

53. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

54. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

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55. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

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56. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

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57. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

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58. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

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59. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

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60. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

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61. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

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62. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

-	↑	↑	↑	↑	↑	↑	↑
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63. Do you have more medicines shortage to report on?

- Yes
 No



Preliminary Medicines Shortage Prevalence Survey

What medicines shortages did you experience on 4 April 2017?

This survey provides space for you to list **UP TO 30 products**, for medicines with more than one strength or dose form, please enter them as **separate entries**. If you have more than 30 entries, please enter the 30 products that have impacted the most on patient care.

If you would like to make further comments on the supply of a specific medicine please do so in the space for 'further comments' at the end of this survey.

Entries 26 - 30

64. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

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65. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

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66. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

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67. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

-

▲	▼	▲	▼
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68. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

69. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

-

▲	▼	▲	▼
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70. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

71. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

-

▲	▼	▲	▼
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72. Specify ONE medicine that was unavailable on 4 April 2017.

Please enter answers in the format: drug, strength(s), dose form, brand

i.e. Metronidazole, 500mg/100mL, intravenous infusion, Sandoz

73. For your medicines shortages listed above, how were you FIRST made aware and how have you managed it at this point of time?

- i. How has your hospital pharmacy managed this? ii. Did this result in increased costs? iii. How were you made aware of this shortage? iv. When have you been told this medicine will be available?

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▲	▼	▲	▼
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Preliminary Medicines Shortage Prevalence Survey

Final comments

*** 74. How often do you check the TGA's Medicines Shortage Information Initiative website?**

- Daily
- Approximately weekly
- Approximately monthly
- Less than monthly
- I've never checked the Medicines Shortage Information Initiative website
- Why/why not?

*** 75. As a result of medicines shortages, have you stockpiled any medicines?**

- Yes, any medicine that is experiencing a shortage
- Yes, but only for medicines that we deem critical
- No, we would like to stockpile but are unable to
- No, we do not wish to stockpile

76. If so, which medicines have you stockpiled or attempted to stockpile?

77. Do you have any further comments about medicines supply or specific drug shortages?