

# BMJ Open What role do pharmacists play in mediating antibiotic use in hospitals? A qualitative study

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## ABSTRACT

**Objective:** To understand Australian hospital pharmacists' accounts of antibiotic use, and the potential role of pharmacy in antibiotic optimisation within a tertiary hospital setting.

**Design, setting and participants:** Qualitative study, utilising semistructured interviews with 19 pharmacists in two hospitals in Queensland, Australia in 2014. Data was analysed using the framework approach and supported by NVivo10 qualitative data analysis software.

**Results:** The results demonstrate that (1) pharmacists' attitudes are ambivalent towards the significance of antibiotic resistance with optimising antibiotic use perceived as low priority; (2) pharmacists' current capacity to influence antibiotic decision-making is limited by the prescribing power of doctors and the perception of antibiotic use as a medical responsibility; and, (3) interprofessional and organisational barriers exist that prevent change in the hospital setting including medical hierarchies, limited contact with senior doctors and resource constraints resulting in insufficient pharmacy staffing to foster collaborative relationships and facilitate the uptake of their advice.

**Discussion:** While pharmacy is playing an increasingly important role in enhanced antibiotic governance and is a vital component of antimicrobial stewardship in Australia, role-based limitations, interprofessional dynamics and organisational/resource constraints in hospitals, if not urgently addressed, will continue to significantly limit the ability of pharmacy to influence antibiotic prescribing.

## INTRODUCTION

Suboptimal prescribing of antibiotics in Australian hospitals is common<sup>1</sup> despite the rollout of antimicrobial stewardship (AMS) programmes nationally. Around 50% of hospital inpatients in Australia will receive an antibiotic and the 2013 National Antimicrobial Prescribing Survey of 151 Australian hospitals recorded that 22.9% of these antibiotic prescriptions were inappropriate.<sup>2 3</sup> Studies internationally illustrate

## Strengths and limitations of this study

- Provides depth of insight into the significance of hospital pharmacy in antibiotic use and governance.
- Examines the perspectives of a core, but often unrecognised, stakeholder in infection management and antibiotic decisions.
- Highlights the crucial role played by pharmacists in negotiating interprofessional dynamics in hospitals.
- Exposes the role-based limitations of pharmacy input into optimal antibiotic decision-making.
- The sample, while appropriate for a qualitative study, could be expanded in future studies to incorporate other sites, organisational environments and professional perspectives.

similar trends.<sup>4 5</sup> There is considerable concern around the relationship between antibiotic overuse and escalating antimicrobial resistance,<sup>6 7</sup> and thus optimising antibiotic use across healthcare sectors remains a key component of global and local efforts to protect antibiotic options for the future and curb the escalation of resistant organisms.<sup>8</sup>

Suboptimal use of antibiotics has previously been conceived as largely a medical issue given doctors are the prescribers.<sup>9</sup> Yet, infection management and antibiotic decisions are team-based, and interprofessional in nature.<sup>10</sup> In many Australian hospitals, decisions about antibiotics involve input from pharmacists, as well as infectious diseases specialists. The expansion of AMS programmes in Australia has increased the collaborative nature of antibiotic decision-making, formalising the role of pharmacists in many settings as advisors in attempts to improve prescribing.<sup>11 12</sup>

Optimising antimicrobial use within hospitals is now a legislative requirement in many countries.<sup>13</sup> In Australia, the National Safety and Quality Health Service Standards require every hospital to have an effective AMS programme in place to fulfil

accreditation requirements.<sup>14 15</sup> Evidence indicates that AMS programmes are not leading to the level of practice change and antibiotic optimisation anticipated.<sup>1 3</sup> Persistent suboptimal antibiotic use, post roll-out of AMS programmes, has raised questions around the social and behavioural drivers of suboptimal antibiotic use<sup>16</sup> and the need for in-depth examination of health professionals' experiences of antibiotic decision-making.<sup>17</sup>

Research drawing on social and behavioural approaches has illustrated that the character of relationships between doctors can heavily influence antibiotic decisions.<sup>16</sup> This includes being influenced by entrenched localised norms of antibiotic use, professional hierarchies and the tendency to prioritise short-term infective risk reduction, rather than the long-term optimisation of antibiotics.<sup>9</sup> Yet, there has been little research completed on antibiotic use from the perspective of pharmacists, including their views on barriers to optimisation.<sup>10 18 19</sup> Given the emerging role for pharmacy in AMS,<sup>10 11</sup> this study sought to address this oversight. The objective of the study was to investigate hospital pharmacists' accounts of antibiotic use, and the potential role of pharmacy in antibiotic optimisation.

## METHODS

This qualitative study was developed to explore pharmacists' experiences of use of antibiotics at two hospitals in Queensland, Australia. The hospitals are small to mid-size with approximately 500 beds between them and are affiliated with a university-based clinical school. As is compulsory in Australia, the participating hospitals have an AMS in place in which pharmacy is allocated a significant role. Pharmacists are actively encouraged to participate in AMS including referring restricted antimicrobials to the AMS team. Pharmacy education sessions have been regularly undertaken to engage pharmacy in AMS activities.

### Data collection and sample

Employing an inductive approach, data was collected through semistructured interviews with 19 pharmacists. The study was advertised to all pharmacists working at each of the two participating hospitals in Queensland, Australia. Pharmacists expressing an interest in the study (by responding to the email on a voluntary basis) were then contacted to arrange a time and place convenient for an interview and given the information sheet. Over 90% (n=29) of the contacted pharmacists agreed to participate. Nineteen of the pharmacists were available during the scheduled fieldwork days. The researchers agreed following completion and analysis of the 19 interviews that data saturation had been reached—that is, we had reached the point when no new themes were emerging.<sup>20</sup> The sample included a range of early career, mid-career and senior pharmacists as well a gender split (12 females and 7 males). All participants were given ample opportunity to ask questions before consenting to

participate. Each interview lasted between 30 and 60 min, was digitally audio recorded and transcribed in full by a professional transcribing company. An interview guide was utilised around the following domains: understanding and awareness of issues around antibiotic use and resistance; role of pharmacy within the hospital; knowledge and expertise regarding antibiotics; professional and interprofessional issues; and, governance and organisational context.

## Analysis

NVivo10 software was used to systematically conduct a thematic content analysis of the full interview transcripts. The thematic analysis of the data was driven by the framework approach.<sup>20</sup> Independent coding of the data was provided initially by members of the research team (AB and EK), which was then cross-checked to facilitate the development of themes (JB and SP), moving towards an overall interpretation of the data. Analytic rigour was enhanced by searching for negative, atypical and conflicting or contradicting cases in coding and theme development. Inter-rater reliability was ensured by integrating a number of research team members in the final analysis (AB, EK and SP), including a clinical infectious diseases specialist (JB).

## RESULTS

Here we report the themes which emerged from the analysis of the interviews. It was clear from the interviews that pharmacists often experience barriers that limit their ability to influence antibiotic usage, or enact change. Our analysis revealed three main themes, which are summarised in [table 1](#), with indicative examples of subthemes raised by the participants within the interviews.

### Attitudes towards significance of antibiotic use in hospitals and the threat of resistance

A key topic within the interviews was the relative significance of optimising antibiotic use and antimicrobial resistance for pharmacists in hospital contexts. The participants' views were inconsistent, reflecting considerable variation across the pharmacists interviewed regarding improving antibiotic use as a core practice problem. Approximately half of the participants talked about antibiotic use as highly significant, with frequent references to the importance of optimal prescribing, particularly given increasing rates of resistant organisms:

I think [pharmacists] take [antibiotic use] very seriously. I think they love to get involved... [Participant #3]

There was however, consensus throughout the interviews that awareness of resistance did not translate into suitable levels of concern on the ward:

I've been to a few seminars on [antibiotic resistance], and you get the dire messages coming out [about

**Table 1** Summary of themes

Theme	Examples of subthemes
Attitudes towards significance of antibiotic use in hospitals and the threat of resistance	<ul style="list-style-type: none"> <li>▶ Divergent views on significance of antibiotic use and resistance for pharmacy</li> <li>▶ Optimising antibiotics relatively low priority in day-to-day pharmacy work</li> <li>▶ Perception of more urgent areas of practice to enforce practice change than antibiotics</li> </ul>
The capacity of pharmacists to influence antibiotic decision-making	<ul style="list-style-type: none"> <li>▶ Divergent perspectives as to pharmacy's level of responsibility for optimising antibiotic use</li> <li>▶ Lack of capacity to enforce best practice given prescribing power of doctors</li> <li>▶ Antibiotic use as 'everyone's problem', but in practice a medical responsibility</li> <li>▶ Perception of limited authority and lack of capacity to actualise considerable pharmacy expertise in shaping antibiotic use</li> </ul>
Interprofessional and organisational barriers to enacting change	<ul style="list-style-type: none"> <li>▶ Medical hierarchies, and limited contact with senior doctors, limit pharmacists capacity to optimise prescribing</li> <li>▶ Relationship between doctors and pharmacists needs to shift from pharmacy as 'police' to 'stewards' or 'advisors'</li> <li>▶ Pharmacy staffing highly significant in shaping relationships and uptake of advice</li> </ul>

resistant organisms]. Then you walk back into your own area of practice and you just see, there doesn't seem to be that urgency around it. [Participant #10]

There was a clear perception within the participant group that optimal antibiotic use and the broader concept of antibiotic resistance was not a priority in day-to-day pharmacy work:

I don't think there's a very good awareness [of suboptimal prescribing]...It's so easy to get bogged down in the particular case in front of you and just not think about the global impact of what decision you're making has. [Participant #7]

Another participant responded:

What are you supposed to do [about antibiotics]? There's a basic delivery of services which needs to happen and that is the delivery of medication, and everything else is extra...you have to ensure that the core service is functional. [Participant #19]

Ultimately, while views were divergent on level of awareness within pharmacy, there was consistency in the view that suboptimal antibiotic use and the threat of enhanced resistance was not a focus of daily activity and warranted further attention both within and outside pharmacy.

### The capacity of pharmacists to influence antibiotic decision-making

The second theme emergent from the interviews was the self-perceived capacity of pharmacy to influence antibiotic use within hospitals settings. Discussion within

the interviews included the roles played by pharmacists and the relative responsibility of pharmacy to optimise practice. Although the interviews revealed divergent perspectives as to pharmacy's level of relative responsibility for optimising antibiotic use, the majority of participants citing pharmacy as having limited responsibility:

We do have a big responsibility to ensure that, with any drug, that it's prescribed appropriately and used appropriately... pharmacy is really important, but the doctors do need to take that responsibility when they are prescribing [antibiotics]. [Participant #7]

Another participant responded:

There is some responsibility that lies with me because you're assisting in the prescribing process. [Participant #4]

There was significant awareness of prescribing as 'everyone's' problem, but in practice, as shown in the quotes above, antibiotic prescribing was predominantly deemed a medical responsibility, with pharmacy assisting. That said, approximately half of the participants talked about their efforts to improve practice. As one participant said:

I'm really diligent about [about antibiotics], well, I try to be, about what I can do on charts. [Participant #19]

Participants frequently articulated self-perceived limited authority to enact change in antibiotic prescribing. Also identified was a lack of capacity to convey advice and expertise in antibiotic use in their current role, particularly the challenges associated with not

always being 'at the bedside' to give advice at the point of initiation of antibiotics (ie, regarding issues of choice, dosage, duration and mode of delivery). Despite limited authority and capacity in their current role, all of the participants referenced the untapped knowledge and skills of pharmacy in educating, informing and assisting medical staff in best-practice decision-making around antibiotics. A lack of consultation early in the decision-making process meant that pharmacists were often not well placed to offer their support around optimising use. As one participant said:

A lot of the time pharmacists don't see it [antibiotic prescribing] until after it's already happened, it's too late, there's not a lot you can do about it. [Participant #1]

### Interprofessional and organisational barriers to enacting change

The final theme emergent from the interviews was the interprofessional and organisational barriers to pharmacists contributing to the optimisation of antibiotic use. This included difficulties experienced in managing the relationship between pharmacy and medicine, and the delineation of professional territories. All of the pharmacists recognised the pressures faced by doctors in decision-making around antibiotic use, and stressed the challenges involved with intervening in such decisions. As one participant discussed, issues around 'face saving' and concerns around reputation hindered feedback from pharmacist to doctor:

You're dealing with people who prescribe and as you as a non-prescriber are asking them to come on board, you're needing to move them [doctors], and you can't move them in front of each other because there's too much at stake. [Participant #5]

The majority of participants talked about the necessity for doctors to drive change given their authority in terms of decision-making. As one participant noted:

They're [medical staff are] prescribers after all, when we're just down the food chain. [Participant #11]

When asked who owns the prescribing decision for an antibiotic, a participant responded:

I'm not a prescriber...

Interviewer: ...who owns the decision, do you know what I mean? Like when an antibiotic gets to a patient...?

I think if the pharmacist has reviewed it on the ward, well, then yes, I think some responsibility...But...more of that responsibility still has to fall with the doctor who is still actually prescribing it...I'm not trying to say that it's all them... [Participant #1]

The interaction of pharmacy with junior medical staff (rather than senior doctors) regarding antibiotics was

also viewed as a key interprofessional problem, with junior doctors perceived by pharmacy as highly uncertain regarding optimal use, resulting in a lack of capacity of pharmacists (and junior doctors) to question antibiotic decisions:

[A problem is the] junior doctors are writing [the prescription], but they're being told by someone else what to do...it's not really a lot of times based on therapeutic guidelines and evidence...if you question "why are you prescribing this?" [They'll say] "well, that's what I was told to do"...I guess it's just a culture, just a prescribing culture. [Participant #1]

Organisational and resourcing factors were perceived as impeding pharmacy's contribution to improvement in antibiotic prescribing practice, predominantly through limiting the capacity of pharmacy to contribute in real-time antibiotic decisions at the bedside. For example, one participant said:

The [pharmacy staff] allocation is probably insufficient because [and]...they're actually not there at the beginning of the patient journey, which is the [antibiotic] prescribing...And then they become almost the [antibiotic] policeman [sic]. [Participant #9]

The majority of participants discussed the need for enhanced organisational support for pharmacy to assist in day-to-day improvements in antibiotic practice:

It would have to be policy makers that drive [prescribing improvement]. Because doctors won't inherently be concerned, they're more interested in lots of other things, treating their patient...I think it just has to be somewhere high up. [Participant #11]

Recent organisational changes such as the appointment of an AMS pharmacist within the hospital, were viewed positively in going some way to improving prescribing practice.

I find it very helpful [to have an AMS pharmacist] because if you have an issue with something, like anything that needs ID approval often you're like "oh, I don't know if they really should be using this." And it takes that pressure away from you and it means that it's actually getting looked at. [Participant #1]

It was clear from the interviews that pharmacy staffing was highly significant in shaping interprofessional relationships and the delivery of expertise within the hospital. Medical staff were viewed 'owning' the antibiotic prescribing decision and as central to enacting and shaping change, with acknowledgement by the majority of participants of the pressure experienced by doctors and the need for organisational support to facilitate timely 'at the bedside' advice-giving, and team-based approaches to improving prescribing practice.

## DISCUSSION

This study provides important insights into the experiences of pharmacists in decisions about antibiotics within the hospital sector. This reinforces previous work pointing to the expanding role of pharmacists in governing antibiotic usage, including leadership within AMS programmes internationally.<sup>15–21</sup> Yet, these results indicate key role-based and interprofessional issues that require attention if antibiotic stewardship roles are to be effective.<sup>22–24</sup> Researchers have previously suggested that doctors remain in a challenging position regarding the use of antibiotics,<sup>9</sup> if they are required to assume all responsibility for decisions about choice, dosage, duration, in addition to being often under-informed about antibiotics in contexts where antibiotic choice is perceived as a peripheral rather than core clinical decision. Pharmacists are well placed to contribute to decision-making and to enhance optimisation of antibiotic practice.<sup>22</sup>

This data indicates that to enact significant change in hospital antibiotic prescribing, there is a need for a shift in relations between doctors and pharmacists. As has been shown elsewhere, pharmacy increasingly occupies the perceived role of ‘antibiotic police’ rather than stewards or advisors.<sup>23–24</sup> Our findings support those of other studies highlighting the limitations imposed by such dynamics and the need to reposition the contributions of pharmacy in positive interprofessional terms. Collaborative decision-making around antibiotics, with direct contact between senior doctors (ie, those making the ultimate treatment decisions) in clinical situations of uncertainty or ambiguity, may facilitate improved relationships and capacity to advise and add-value to antibiotic prescribing. Without these higher-level relations, the hierarchical nature of hospital medicine will prevent significant influence by pharmacy in processes of improving antibiotic prescribing. Enhancing the role of pharmacists in antibiotic decision-making would in turn function to ease pressures on medical staff, with existing well-documented problems around ongoing suboptimal dosage and duration of antibiotics in Australian hospitals well within pharmacy’s remit to streamline.<sup>10</sup>

The study also reinforces the need for a renewed emphasis on promoting awareness of antibiotic use and the proliferation of resistance across different health professional groups, as previously identified by other researchers.<sup>25</sup> Consistent with their observation that the effective dissemination of the multifaceted costs associated with inappropriate antibiotic use remains challenging, our findings confirm levels of awareness and responsiveness perceived as low in day-to-day clinical work. This is despite the fact that this study was conducted in hospitals with an active AMS programme. If awareness of antibiotic resistance and its significance remains low, motivation to enact change in use will also remain low. Equally, if the self-perceived ineffectiveness on the part of pharmacists in influencing antibiotic prescribing persists, motivation to participate in antimicrobial stewardship activities will also remain low.

Our study has various limitations related to research design that need to be acknowledged. The sample size, while appropriate for a qualitative study, is limited to the accounts of a relatively small group of pharmacists within these two hospital settings. Further, cross-institutional research should be undertaken, with national and international comparative samples. These pharmacists’ accounts may in turn be shaped by the organisational or cultural context of the setting, and therefore, generalisability is limited. However, we argue that this limitation is outweighed by the nuanced accounts emergent from this qualitative design; accounts which can inform AMS policy and institutional design. Future research would benefit by including other sites and exploring other professional perspectives, and utilising group-based designs to capture dynamics across individuals.

## CONCLUSION

Antimicrobial resistance poses one of the most significant public health threats of the 21st Century<sup>7</sup> and promoting awareness and enhanced involvement in optimisation across the range of health professionals is required for antibiotic options to be protected for future generations. AMS programmes taking into account interprofessional relationships between pharmacists and doctors, and acknowledging the influence of professional hierarchies, are likely to be more effective in enacting lasting change.

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**Contributors** The project was designed and developed by AB, JB and EK. Data was collected by AB and EK. Data analysis was led by AB, EK and SP with input from all authors. All authors contributed to the drafting and revising of the manuscript, and approved the final version of the manuscript.

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