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Exploring pharmacists' perspectives on preparing discharge medicine lists: A qualitative study

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ABSTRACT

Background: Hospital pharmacists play an important role in the discharge process, including conducting medicine reconciliation, counselling patients or carers, and generating discharge medicine lists. These contribute to medicine handover at transition of care from hospital discharge. However, pharmacists face numerous barriers to providing comprehensive discharge services.
Aim: To gain a deeper understanding of the hospital pharmacists discharge processes.
Method: Qualitative study design was used to explore pharmacists' experiences and opinions regarding (1) the use of technology and software to prepare patient discharges, (2) involvement of pharmacy assistants in discharge processes, and (3) challenges and facilitators in preparing patient discharges. An independent researcher conducted semi-structured interviews with 15 pharmacists between 29 October and 22 December 2021 (mean interview 21 min). Interview transcriptions were analysed using thematic analysis.
Results: Interviews revealed four overarching themes: patient safety, staff involved in discharge processes, discharge handover procedures and electronic health software. Barriers to completing discharges included staff workloads, poor medical record software integration and lack of advanced discharge notice. Good communication between pharmacists and other clinicians, including the presence of a discharge nurse on the inpatient unit, made discharges more efficient, and most pharmacists favoured utilisation of pharmacy assistants in preparing discharge medicine lists.
Conclusion: Poor integration between medical software systems negatively impacts pharmacists' ability to complete discharge medicine lists. Pharmacists require advance notice of upcoming discharges to effectively prioritise high workloads, while increased utilisation of trained pharmacy assistants may facilitate discharge workflows.

1. Introduction

Medication-related harm (MRH) collectively encompasses both noxious, unintended reactions caused by medicine at appropriate doses in addition to adverse medicine events or injuries resulting from inappropriate dosage or medical error.[1] Although MRH can happen throughout any stage of the medication-use pathway,[2] it appears highest after patients are discharged from hospital.[3] It is estimated that between 17 and 51% of elderly patients experience MRH within the first 30–60 days post discharge,[1] often causing hospital readmission. A systematic review of 54 studies published between January 1990 and March 2019 showed nearly 20% of patients discharged to the community report MRH or readmission to hospital in the weeks following discharge.[4] Delayed, incorrect or insufficient communication between hospitals, patients and primary care clinicians can contribute to increased risk of MRH in the critical period following discharge.[5] The World Health Organisation states that improving communication during transitions of care is essential to reducing MRH.[6]

Hospital pharmacists play a vital role in the discharge process, including conducting medicine reconciliation, counselling patients or carers, and generating discharge medicine lists. Discharge medicine lists serve as a critical tool to communicate medicine changes and ongoing medicine management to patients and primary care clinicians to minimise and prevent subsequent MRH.[3,7] Across most Australian public hospitals, discharge medicine lists are used to counsel and educate patients and carers, and are attached to discharge summaries sent to the patient's general practitioner (GP) at discharge.[8,9] To facilitate easier communication between healthcare providers, discharge medicine lists can be viewed within the patient's My Health Record; an online database allowing health professionals to upload and view patient health records.[10] Despite this, research shows many patients are discharged from hospital without a discharge medicine list

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prepared by a pharmacist, raising patient safety concerns.[11,12] This is partly due to hospital pharmacists facing numerous barriers to providing comprehensive clinical services, including understaffing,[13] having to reconcile medicines across multiple electronic platforms[14] and complexities with the utilisation of pharmacy assistants.[7,15] These are further exacerbated by increasing numbers of complex patient admissions with multiple comorbidities and polypharmacy.[16] Therefore, pharmacists need to prioritise patients who they deem to be at highest risk for MRH.

A recent time-and-motion study collected data on 50 discharges and the time taken by pharmacists to complete the various discharge tasks, Data showed the total average time pharmacists worked on discharges was 26.31 min with about half this time (13.22 min) to check and prepare documentation using electronic health software. Pharmacists spent 15% of the discharge process (4.0 min) manually retyping and reconciling medicine lists between two software systems to generate discharge medicine lists. This highlighted a need for better integration between the software platforms.[17] A systematic review of 36 studies published between January 1990 and March 2011 showed electronic health databases that facilitated efficient, clear and structured generation of discharge summaries were associated with a reduction in patient re-admissions to hospital.[18] Whilst this review focused on discharge summaries in general (not specifically the medicine information component), learnings are relevant in highlighting the importance of optimising electronic health systems. The time-and-motion study also showed minimal pharmacy assistant involvement in preparing discharge lists.[17] There is a growing body of literature to suggest pharmacy assistants can be effectively utilised to obtain medication histories[19] and data entry, resulting in improved discharge preparation workflow for pharmacists.[15]

A need was identified at Gold Coast Hospital and Health Service (GCHHS) to explore hospital pharmacists' experiences and opinions about the preparation of patient discharges with a specific focus on their use of software systems and utilisation of pharmacy assistants.

2. Methods

Qualitative methodology, involving semi-structured interviews with experienced hospital pharmacists, was used to gain a deeper understanding of their discharge processes. This study was approved by the GCHHS Human Research Ethics Committee on 1 October 2021, reference number: LNR/2021/QGC/79719. The COREQ guidelines were used for the reporting of the data.[20]

2.1. Aims and objectives

The aim of this study was to explore pharmacists' experiences and opinions in preparing patient discharges. Specific objectives were to explore pharmacists' experiences and opinions regarding:

1. The use of technology and software to prepare patient discharges,
2. Involvement of pharmacy assistants in discharge processes, and
3. Challenges and facilitators in preparing patient discharges.

2.2. Study sites/settings

Data was collected at the GCHHS, incorporating both Gold Coast University Hospital (GCUH) – a tertiary hospital with approximately 750 beds – and Robina Hospital, with approximately 350 beds.[17]

2.3. Participants

Inclusion criteria:

- Working as an inpatient unit (IPU) pharmacist at the time of data collection AND
- In a clinical role required to provide IPU services including preparing discharge medicine lists, referred to as discharge medication records (DMRs) within Queensland Health AND
- Minimum of six months experience working at GCHHS in the previous two years AND
- Health Practitioner (HP) level 3 to 5. In Queensland Health, all allied health professionals are employed under an eight level Health Practitioner (HP) structure based on their qualification and skill requirements, with higher levels indicating more senior and managerial positions.[18] Clinical pharmacist roles typically range from HP3 to HP5.

Exclusion criteria:

- Pharmacist intern OR
- Pharmacists on leave during the four-week period of data collection

Pharmacists who met the inclusion criteria were purposively selected to represent a variety of experience levels, HP level, age, gender and roles. Potential participants were provided with a copy of the study participant information of consent form. Interview times were arranged with consenting pharmacists.

2.4. Data collection tools

A semi-structured interview guide was developed considering previous literature regarding use of technology to generate discharge medicine lists and pharmacy assistants,[7,22] as well as results from the time-and-motion study.[17] The questions were assessed for content and face validity by three researchers and two pharmacists. Comments were incorporated as appropriate. This was followed by two trial interviews with GCHHS pharmacists by HG. The trial interviews served two purposes: 1) to further assess the overall interview structure for flow and validity, and 2) hone the researcher's interview skills.

The final interview guide contained 17 questions, including prompts to help clarify in case pharmacists did not understand the question, or did not know how to respond (see supplementary material).

2.5. Data collection

Face-to-face interviews were conducted by HG, who was independent from GCHHS. Prior to commencing data collection, two practice interviews were conducted to reduce bias and ensure impartial questioning techniques.

Demographic information was collected using a questionnaire asking for relevant information about the pharmacists' experience working in hospital pharmacy such as their primary clinical area, experience working with GCHHS-specific technology, and experience working with IPU pharmacy assistants.

Field notes were taken throughout the interviews to facilitate reflexivity and improve the validity of theme development.[23–25] A summary of key points from each interview was distributed to the research team after each interview. Audio recordings were transcribed verbatim and quality checked.

2.6. Data analysis

Thematic analysis was used to identify the most salient opinions and experiences expressed by pharmacists, using a similar approach to previous qualitative studies of pharmacists working in Queensland hospitals[26] or community pharmacies.[27] NVivo version 12 (QSR International Pty Ltd) was used to facilitate coding and analysis through an inductive approach. The initial coding process was conducted by HG and involved reading the transcripts several times to gain a deeper understanding and identify topics emerging from the interviews. Initial codes were generated by HG, then grouped into categories to form subthemes. These subthemes were then rearranged to produce emerging topics, which were used to develop an analytical framework. The coding framework was independently checked by a second study investigator (LH) and uncertainties discussed within the study team until consensus was reached.

3. Results

A total of 15 hospital pharmacists with varying levels of experience were invited to participate in interviews between 29 October and 22 December 2021, all of whom accepted. Participants had a range of experience levels working as hospital pharmacists across a mix of clinical areas (Table 1). The mean interview time was 21 min, 3 s (min: 15 min, 12 s, max: 31 min, 28 s). Saturation was reached after approximately 12 interviews, meaning no new concepts emerged,[28] however three more interviews were conducted to ensure no important information was missed.

3.1. Thematic analysis

Four key interlinked themes were identified, summarised in Table 2: patient safety, staff involved in discharge processes, discharge handover procedures and electronic health software, with three to eight subthemes under each theme.

3.1.1. Medication safety

Medication safety was identified as one of the main benefits of the pharmacist discharge process and availability of DMRs. This theme incorporated three subthemes: patient understanding, communication with primary care providers, and opportunity for medicine review. An overview of exemplar quotes is summarised in Table 3.

Table 1
Interview participants' demographic data and characteristics.

Demographic criteria	No. Participants (n = 15)	
*Health Practitioner Level	n	percent
3	6	(40%)
4	7	(47%)
5	2	(13%)
Total years experience as a hospital pharmacist		
<5	6	(40%)
5–10	4	(27%)
>10	5	(33%)
Total years of experience working as a hospital pharmacist at GCHHS[a]		
<5	7	(47%)
5–10	5	(33%)
>10	3	(20%)
Experience working with ieMR[b]		
<1 year	0	(0%)
1–2 years	2	(13%)
>2 years	13	(87%)
Time per week on inpatient units		
8 to 20 h	1	(7%)
20 to 30 h	6	(40%)
>30 h	8	(53%)
Experience working with pharmacy assistants		
Never	4	(27%)
Limited	5	(33%)
Moderate	5	(33%)
Extensive	1	(7%)
Main clinical area[c]		
General medicine	6	40%
Mental health and other specialist services	5	33%
Specialist medicine	3	20%
Surgical	3	20%
Rehabilitation	1	7%
Emergency medicine	1	7%
HITH[d] / GEMITH[e]	1	7%
Respiratory	1	7%

* Health Practitioner (HP) structure based on qualification and skill requirements with higher levels indicating more senior and managerial positions.
[a] Gold Coast Hospital and Health Service.
[b] integrated Electronic Medical Records.
[c] Pharmacists were allowed to select more than one option, and hence the total frequency adds up to >15 and the percentages to >100%.
[d] Hospital in the Home.
[e] Geriatric Evaluation and Management in the Home.

Table 2
Summary of key themes and subthemes.

Theme	Subtheme
1. Medication safety	a) Patient understanding
	b) Communication with primary care providers
	c) Opportunity for medicine review
2. Staff involved in discharge processes	a) Staff shortages and high workload
	b) Communication with other healthcare clinicians
	c) Increased utilisation of pharmacy assistants
	d) Staffing considerations in specialist areas
3. Discharge handover procedures	a) Lack of advance notice
	b) The need to improve discharge documentation
	c) Commencing discharge without an admission medication history
	d) Doctors not understanding the significance of the discharge reconciliation in ieMR
	e) Completing the discharge reconciliation during IPU[a] rounds
	f) Junior doctors completing the discharge reconciliation
	g) Pharmacists attending IPU rounds
	h) Expanded scope of practice for pharmacists
4. Electronic health software	a) Issues with software integration
	b) Benefits of ieMR[b]
	c) eLMS[c] related issues
	d) Complexity of commencing employment at GCHHS[d]

[a] inpatient unit.
[b] integrated electronic Medical Records.
[c] enterprise-wide Liaison Medication System.
[d] Gold Coast Hospital and Health Service.

a) **Patient understanding**

Many interview participants discussed how providing patient-friendly written and verbal information from pharmacists was important to facilitate patients' understanding of which medicines to take, and how to take the medicines, resulting in reduced chance of readmission to hospital.

b) **Communication with primary care providers**

Many participants believed DMRs assisted with communication during transition of care to primary care providers, mainly to patients' GPs or community pharmacies. However, this opportunity for communication and continuation of care was sometimes hindered by delays in the discharge summary being produced and forwarded to primary care clinicians.

c) **Opportunity for medicine review**

Some participants suggested the pharmacist discharge process, including the generation of DMRs, provided them with an opportunity to review patients' medicines, resulting in identification and resolution of errors that may otherwise have gone unnoticed.

3.1.2. Staff involved in discharge procedures

The second key theme that emerged from the interviews was opinions and perceptions relating to the impact of hospital workforce on pharmacists' discharge procedures, with four subthemes. An overview of exemplar quotes is summarised in Table 4.

a) **Staff shortages and high workload**

Most interview participants perceived high workloads and lack of pharmacists/ consistent staffing to be one of the biggest barriers impacting their discharge process. Additionally, pharmacists discussed how time pressure caused by high workload and lack of staff could lead to increased risk of data-entry errors. Overall, most participants believed more staff and better planning should enable pharmacists to complete more admission histories, and resolve more medicine errors, prior to patients being discharged.

b) **Communication with other healthcare clinicians**

Participants highlighted that the discharge process relies heavily on pharmacists being able to communicate and collaborate with other

Table 3
Exemplar quotes related to medication safety.

Key issues	Exemplar quotes
Patient understanding	*"I think, overall, health consumers' health literacy is pretty poor, so giving them information in both written and verbal form, I think may assist in safe medication use. [Patients] might well be frightened to ask questions in front of an entire team. Whereas a pharmacist, more often than not a singular person, providing both written and verbal information, hopefully provides a better outcome." – P 6.*
Communication with primary care providers	*"It is very important if you're sending a patient home, if, for example …. someone were suicidal and if I'm sending them with a full box of tablets, then whoever's taking on the care, they would want to know as a risk management strategy to see how much tablets they have at home." – P 11*
Opportunity for medicine review	*"… pharmacists being, knowing more about medicines, can pick up on any errors or clarify any intentions with prescribers before chatting to the patient, to make sure that there is a decent plan in place and hopefully follow up on those points." – P 6*

clinicians, particularly doctors, nurses and discharge nurses. Examples of poor communication with doctors included doctors failing to complete the discharge reconciliation in a timely manner to allow generation of a DMR and when medical teams were working across multiple IPUs in the hospital, resulting in less opportunities for face-to-face discussion.

A few participants discussed how poor communication with nursing staff could negatively impact pharmacists' discharge process. A common frustration was when nurses discharged a patient without consulting pharmacy.

Overall, having nurses that focus on discharge planning was identified as one of the biggest facilitators to a pharmacists' discharge process. Specifically, pharmacists discussed how discharge nurses could 1) help pharmacists prioritise their workload, 2) follow up with the treating team to action outstanding prescriptions, 3) flag potential or confirmed discharges, and 4) organise how patients are getting home, including logistics of medication pickup.

c) **Increased utilisation of pharmacy assistants**

Almost all interview participants had positive comments about increased utilisation of ward-based pharmacy assistants. Entry of medicine lists into enterprise-wide Liaison Medication System (eLMS) was a task that participants wanted pharmacy assistants to help with as they believed this would reduce the amount of time pharmacists spent on data entry, resulting in more efficient discharges and freeing up pharmacists to spend more time on clinical tasks. Furthermore, pharmacists wanted pharmacy assistants to help with taking medication histories. Interview participants explained that having more medication admission histories completed should speed up the discharge process because it provides pharmacists with more accurate information. Additionally, one participant pointed out it might be easier to identify errors when checking someone else's work.

Other participants mentioned that assistants might only be needed on high turnover IPUs, and that due to issues with workload and staffing, they would prefer an adequate number of pharmacists before introducing assistants.

d) **Staffing considerations in specialist areas**

A mental health pharmacist explained the wide geographical layout and pharmacy staff shortages at the one hospital particularly contributed to it being difficult for pharmacists to maintain a physical presence on the IPUs. A physical presence was regarded as important, as it prompts nurses and doctors to approach pharmacists with medicine-related enquiries and involve pharmacists in the discharge process. Another unique challenge related to mental health was a comparatively lower proportion of specialist pharmacists and higher proportion of rotational junior pharmacists, compared to other speciality areas such as oncology.

3.1.3. Discharge handover processes

This theme focused on how discharge procedures impacted on pharmacists' ability to prepare patient discharges with seven subthemes, summarised in Table 5 with example quotes.

a) **Lack of advance notice**

Lack of advance notice was perceived to be one of the major barriers impacting pharmacists' discharge process. Participants explained that if pharmacists were given sufficient notice, it provided them an opportunity to effectively prioritise their workload. Conversely, many participants felt like they were often informed of patient discharges at the very last minute, resulting in a rushed and stressful discharge process.

b) **The need to improve discharge documentation**

Several participants expressed a need for improvements in the doctors' discharge documentation, including clearer medicine plans and reasons for medicine changes. For example, some participants said it would be helpful if doctors had to write a reason for medicine changes upon discharge, to

Table 4
Exemplar quotes related to staff involved in discharge procedures.

Key issues	Exemplar quotes
Staff shortages and high workload	*"If our workload is heavy, there is the possibility with the steps that we have for us to miss medication, to input directions incorrectly or to not cease a medication – like not communicating the ceasing of a medication just purely based on time I would say if that stuff is not documented." —P 2.*
Communication with other healthcare clinicians	*"If they [discharge nurses] have got a system on that particular ward [where] they tell the doctors straightaway that they need prescriptions, [and] the more they tell the doctors that, the more the doctors will do it before they have to get told and berated. So, the good ones are good at actually instituting that. As soon as the doctors start on their rotations, [they make it known that] these are the expectations. The pharmacist should be trying to do that as well, but obviously, it helps if the discharge coordinator is doing that… then it's not on us to be saying constantly 'can you please do the discharge rec, can you please do prescriptions.' They have already had that droned into them by the discharge coordinator." – P 10.* *"I think for me, what's difficult is I work with at least five different medical teams. Those medical teams work across multiple wards in the hospital. So, they're often not on my ward. Which means I often can't find them to discuss things. It relies on me ringing them. Which means I'm probably interrupting them. Which means the chances of me getting their full attention might be reduced, because they're in the middle of a ward round, or concentrating on another patient, or answering someone else's queries. I always find phone conversations a bit more difficult to ensure that the person's giving me full attention, versus face-to-face." – P 8.*
Increased utilisation of pharmacy assistants	*"Swiss cheese rule, if you have someone else do something you're more likely to pick up a mistake because you haven't looked at it 10 times." – P 3.* *"If they [pharmacy assistants] are involved in more admission history taking, having more admissions histories available speeds up the discharge process, because you have an accurate starting record. As well, for that reason, the treating team can make hopefully, better decisions of care because they're making choices based on better information, because they have admission medications there… On the same basis, if clinical assistants, if once all of the histories are taken, and they're assisting with discharges, if they're entering all of those PAHNs [Pharmacist Admission History Notes] into eLMS, so we've got our starting list, again, that's just another fairly extensive step that's taken off the pharmacist, that would definitely speed things up as well." – P 6.*
Staffing considerations in specialist areas	*"Our biggest challenge right now, as I said, with the pharmacists is that they can't be physically present on the unit, so for us, the staffing would have to be increased to be more present than we are at the moment, As much as possible, I try and get them to be present at the case reviews, because the staff sees them, they put a face to the name, there's an excellent opportunity to ask questions and interact." – P 12.*

Table 5
Exemplar quotes related to discharge handover processes.

Key issues	Exemplar quotes
Lack of advance notice	*"I think when discharges are planned well, that just takes - it takes away all the time pressure of a discharge. Nothing has to be rushed and you have time to chase things up before the patient leaves. Sometimes the things that make the discharges most stressful is when someone tells a patient that they're being discharged before any of the discharge things are ready, i.e., the lists and the prescriptions that we deem essential, … when the doctors go around in the morning and go, 'you are going home today'. But we've got 20 other people to see and we'll do your paperwork at 2 pm.' So when it's like that and unplanned, that's when we feel the pressure. The patient wants it. The doctor gives it to us and is planning for it to be done immediately, with the snap of a hand. But rehab wards, for example, they have really great discharge processes. They'll flag someone about a week ahead. They'll let us know. They'll let the doctor know. We can get it planned ahead of time. We have time to fix any issues and have everything sorted well before the patient is actually due to leave. Then all the time pressure that we're worried about is non-existent because we're just prepared." – P 5.*
The need to improve discharge documentation	*"…I think there could be some clear communications written down … The plan is to do this and maybe a slight explanation as to why. Even if it's just in brackets like low body weight…" – P 13.*
Commencing without an admission history	*"So, for us one of the biggest barriers is that we do not get to see patients when they present to hospital. So, we don't have PAHNs [Pharmacist Admission History Notes] to start with. So quite often we end up making a profile on discharge that is based on what's been charted whilst [being an] inpatient. So, we end up leaving the last column blank which talks about changes in the medication. So, it becomes a very, quite often incomplete, profile." – P 11.*
Doctors not understanding the significance of the discharge reconciliation	*"… they'll say, 'just do the tick and flick so we can get the patient out'. Now, tick and flick is a great little way of saying it but I guess it seems to take away a bit of the importance that that's meant to be the source of truth whatever is on that discharge rec [reconciliation] when that patient goes. When they come back in – whatever was on that rec will be what's classed as their home medicines at that point in time and if it's not right – if they come into ED [Emergency Department], and I see it all the time, people are – home medicines get played [charted] because, oh, they've only in hospital two weeks ago therefore this must be right… But certainly, stuff that's been stopped – like an apixaban that's been stopped for a GI [gastrointestinal] bleed, that's been played, it's just going to get played again when they come back into hospital." – P13.*
Completing the discharge reconciliation during IPU rounds	*"A good example is the medical teams when they're doing their rounds in the morning, they might flag a patient for discharge. They say, 'yep, this patient's right to go home,' but rather than the consultant or registrar giving the resident the time at that point to actually complete the discharge process – it doesn't take that much time extra for them – maybe it's only five minutes for them to actually [do it], and they've got the consultant and the registrar there. So, it's much easier for them to then say, 'which medications are we continuing, which ones are we stopping. What are we prescribing,' bang. Discharge reconciliation is done on the spot. Prescriptions are printed.* *Most of the portable computers that the doctors have are mapped to a particular printer that has prescription paper in it. If they would allow the time to do that, that would make the process much easier. They've made the decision to discharge that patient. The discharge reconciliation is done. The prescriptions have printed. Then they move to the next patient. Unfortunately, the way the teams work is, the consultant wants to get their rounds done as soon as possible. So, they'll say, 'this person's for discharge' and then they move on straight to the next patient. Then that doctor does not have the time to do what they're supposed to do… I wouldn't be surprised if that's the number one barrier to efficient discharging in the hospital." – P 10.*
Junior doctors completing the discharge reconciliation	*"Often they [the junior doctors] are left to do that [the discharge reconciliation] by themselves. So, they'll finish the round with the consultant and the registrar, if the registrar is there, and then they'll go back to the doctor's room. I guess then they'll have their list of patients that they're discharging. Then they've got to go and then make the decision, often themselves, what medications the patient that'll be going, to be going home on which is not the best scenario. Often, you've got a junior doctor, maybe if this is their first rotation out of medical school and they're expected to make these decisions… very often there's mistakes made in that process." – P 10.*
Pharmacists attending IPU rounds	*"I think the best thing would be to have ward-based doctors and ward-based pharmacists, so that you can go on a ward round and know the doctors on your ward and sort out the issues there. Whereas I think the whole trying to go with a team across the hospital. I think there always seems to be some patients that no one takes responsibility for and they get like, left out or they're not, sort of cared for properly. So, I think a ward-based approach would work better overall… But I don't know whether that's feasible depending on how many different specialties are on the ward." – P 15.*
Expanded scope of practice for pharmacists	*"…for instance, I just did a discharge now and they did a Vytorin® [Ezetemibe/ simvastatin] script - we don't stock it – [it was for] a new nursing home patient, so you've got to split it. So if a pharmacist planned that discharge rec, we would have known, we need an ezetimibe script and we need a simvastatin script… it's more work for us, but it probably saves us work, if that makes sense." – P 4.*

save the pharmacist from having to regularly contact the treating team to confirm that these changes were intentional, and the reasoning.

One participant pointed out that improved discharge documentation would be especially beneficial in circumstances where pharmacists were covering IPUs for a short time period, to avoid having to sort through lengthy documentation to determine why individual medicines had been changed.

c) **Commencing discharges without an admission history**

Many interview participants indicated that commencing the discharge process without a prior pharmacist recorded medication history had a negative impact upon their ability to prepare patient discharges. This was for two main reasons: firstly, starting the discharge process without a prior medication history meant the pharmacist would have to take a very hurried history (while the patients were rearing to go home), resulting in increased risk of errors, and secondly, when a pharmacist took a retrospective medication history they might uncover problems that should have been identified and acted on earlier during the inpatient episode.

d) **Doctors not understanding the significance of the discharge reconciliation**

Several participants expressed frustration that some doctors do not understand the significance of discharge reconciliation in integrated electronic Medical Records (ieMR). Specifically, a few said that doctors sometimes refuse to complete the discharge reconciliation in the first place. This then makes a pharmacist's discharge process difficult because pharmacists cannot accurately generate DMRs without the medicines being reconciled.

Other participants were concerned that doctors just 'tick the box' to get the patient discharged, but believe that not enough thought and consideration goes into the process.

e) **Completing the discharge reconciliation during IPU rounds**

Several interview participants believed that the practice of doctors not completing the discharge reconciliation during IPU rounds was one of the major barriers to efficient discharging in hospital. Instead of doctors taking the time to complete discharge reconciliations and writing prescriptions immediately after each patient's consult, they often wait until after the IPU round. This impacts on pharmacists' workload as needing to process an overwhelming number of discharges in the afternoon.

Participants agreed that if doctors were allocated sufficient time to complete discharge reconciliations and discharge prescriptions during IPU rounds, this may result in more efficient patient discharges.

f) **Junior doctors completing the discharge reconciliation**

Many participants expressed frustration that junior doctors had responsibility to complete the discharge reconciliation, often without support. This results in increased risk of error that may impact patient safety and prolong the discharge process. They proposed for junior doctors to be allocated sufficient time to complete the discharge reconciliation during ward rounds, so they can complete discharge reconciliations under the supervision of more senior and experienced doctors, which should result in fewer errors.

g) **Pharmacists attending IPU rounds**

A few participants, especially those with experience attending a rapid discharge round that was introduced in the Medical Assessment/Diagnostic unit, said that it was helpful for pharmacists to attend medical IPU rounds. Not only does it allow pharmacists an opportunity to resolve medicine issues and clarify any enquires regarding patients, but it often provides them an overview regarding who might be discharged, and when, allowing them to better prioritise workload. However, it is not always feasible for pharmacists to attend all the IPU rounds, since there are often multiple medical teams conducting IPU rounds simultaneously. To address this challenge, one senior pharmacist recommended that the hospital adopt an IPU-based approach, meaning medical teams are based on a single ward, rather than seeing patients across multiple wards.

h) **Expanded scope of practice for pharmacists**

Due to the frustration with having to wait or prompt doctors to complete the discharge reconciliation, as well as the time that pharmacists spend addressing errors, several interview participants suggested a process for pharmacists to complete the discharge reconciliation for sign-off by the doctor/treating team. However, some senior pharmacists believed this would not be possible without increased staffing, and without pharmacy being a 24/7 service. Additionally, some participants wanted the ability to edit home medicines after discharge reconciliation has been completed (upon verbal agreement from a doctor).

3.2. Electronic health software

This theme focused on how use of technology impacted on pharmacists' ability to prepare patient discharges with three subthemes, summarised in Table 6 with example quotes.

a) **Issues with software integration**

Participants expressed frustration that the import link (designed to import medicine lists between ieMR and eLMS) did not provide a benefit due to issues with functionality. For example, it did not transfer directions or indications. Additionally, several participants said they experienced frequent system errors, where the import link was unable to 'find' certain medicines. It was therefore suggested it might be easier to generate a DMR in ieMR, rather than a separate program.

b) **Benefits of ieMR**

Even though participants experienced the integration issues outlined above, most still believed that ieMR made their discharge process more efficient overall. For the most part, this was because they could access the patient's information at any time, instead of having to wait for nurses or doctors to finish with medicine charts. Additionally, for pharmacists who had to cover multiple IPUs at once, it was also useful to be able to access patient information from anywhere in the hospital, rather than having to be physically present at the patient's location, saving time walking back and forth around a large geographical area. Other reported benefits of ieMR included: better legibility compared to doctor's handwriting, being able to search for key words in previous documentation and increased accountability since being able to identify the individual doctor who completed the discharge reconciliation.

c) **eLMS Related Issues**

In addition to the import issues previously discussed, many participants reported finding the eLMS system 'outdated' and 'clunky'. Software improvements recommended included:

- making it less click heavy and more keyboard friendly
- adding a column for GP follow-up or recommendations from the pharmacist on the DMR
- Saving more predictive text or short codes into the system, especially for common medicines such as simple analgesics
- Eliminating character limits in the comment boxes
- Adding a function to be able to sort medications by alphabetical order to facilitate medicine reconciliation between ieMR and eLMS
- Automatically importing the pharmacists' name when logging in, rather than the pharmacist having to type it each time

4. Discussion

To our knowledge, this is the first study that has comprehensively explored hospital pharmacists' experiences and opinions in preparing discharge medicine lists in an Australian context. Our study revealed a complex web of issues impacting on a smooth and efficient discharge workflow for hospital pharmacists such as lack of advance notice, examples of poor communication with nurses and medical teams, staffing issues, software integration problems, lack of support for junior doctors and underutilisation of pharmacy assistants. Addressing these issues require multiple strategies, and it is likely that changes to one area may have flow-on effects to other areas. However, it is important to optimise discharge processes because inefficient discharges not only impact on patient flow through the hospital,[29] but poorly planned discharges are also associated with increased risk of medicine errors leading to MRH and higher readmission rates.[3,6]

Our research adds to previous studies that suggested optimisation of software integration[17] and increased utilisation of pharmacy assistants[30–32] can reduce the amount of time pharmacists spend performing time-

Table 6
Exemplar quotes related to electronic health software.

Key issues	Exemplar quotes
Issues with software integration	*"I think the biggest challenge right now is having multiple systems that overlap to some extent and don't communicate very well." – P12.*
Benefits of ieMR	*"[the introduction of ieMR has made the discharge process] Much quicker. Because we don't have to fight for medication charts. So when we discharge, we used to have to check against the medication chart and the scripts, now we just have to look on ieMR and five people can be on ieMR at the same time. So it makes it much quicker, you can do it from pharmacy, you can do it on the ward, you can do a discharge from anywhere… [additionally] with paper charts you would have to read a doctor's writing, with a computer it's quite standardised. Yeah, the only thing is that when the computer system goes down, you can't do anything." – P14*
eLMS related issues	*"I remember when I first started using it [eLMS] I thought it was the most slow and semi-redundant piece of program to use. Everything was a bit clunky and you're opening so many windows and you've got to wait for things to load and it could be streamlined." – P5*

ieMR: integrated electronic Medical Records.
eLMS: enterprise-wide Liaison Medication System.

consuming data entry, allowing them to allocate more time to specialised clinical tasks. Pharmacists suggested a need to improve ieMR software to include the capacity to generate discharge medicine lists, eliminating the need for retyping medicine lists in eLMS. Pharmacists also stated they were eager for pharmacy assistants to take medicine admission histories, as absence of admissions histories complicates the discharge process. Additionally, pharmacists believed that when patients did not receive a timely admission history, this increased the chance of medicine discrepancies being discovered at discharge, such as patients missing regular medicines, or being accidentally restarted on ceased medications, which is supported by the literature.[33,34]

Pharmacists highlighted the importance of successful communication between pharmacists, medical teams, nurses and discharge nurses throughout the discharge process. As one pharmacist suggested, changing to an IPU-based medical system may prove beneficial for improving interdisciplinary communication because it results in less time wasted on phoning doctors, and more face-to-face discussion. Research shows increased face-to-face interaction facilitates stronger relationships and collaboration between healthcare professionals,[35,36] which is also linked to improvements in patient safety.[37] This highlights the need to investigate alternative models that facilitate increased options for face-to-face communication between pharmacists and doctors to reduce the risk of potential MRH.

Several interview participants expressed frustration with the amount of time spent correcting errors on prescriptions and discharge reconciliations completed by junior doctors, attributing this to the fact junior doctors are often left to complete these tasks independently, after IPU rounds. Indeed, numerous studies have shown that junior doctors are responsible for most prescribing errors in hospitals,[38–40] junior doctors are twice as likely to make prescribing errors compared to senior doctors[39] and junior doctors often rely upon pharmacists to identify and explain their mistakes.[41] Due to this, several interview participants believed it would be more efficient if pharmacists could plan the discharge reconciliation for checking and signoff by the doctors, rather than the other way round. Although pharmacists performing discharge reconciliations are associated with a significant reduction in medicine errors,[42] this may reduce a junior doctor's opportunity to develop their medicine and prescribing knowledge[43] and needs to be considered in terms of the pharmacy workforce.

An alternative option would be for junior doctors to complete discharge reconciliations during IPU rounds, under the supervision of more experienced doctors or pharmacists who can facilitate on-the-job learning through immediate feedback. Having completing discharge reconciliations during IPU rounds may also result in a more even spread of discharges throughout the day rather than the current situation of having the majority of discharges in afternoons, contributing to unmanageable time pressures and workloads for pharmacists.[44] Indeed, one pilot study showed earlier completion of discharge reconciliations and order forms (by 6 pm on the day before discharge) by doctors, can result in patients being discharged three hours earlier each day, as well as reduced hospital readmission rates.[45] Notably, these shifts in workflow did not result in any extra work for discharge clinicians, only meant that certain tasks were completed at different times, and was positively received by pharmacy staff because it resulted in a more balanced distribution of workload throughout shifts.[45]

5. Strengths and limitations

Strengths of this study included the wide experience levels of recruited participants from a variety of clinical areas, involvement of an independent interviewer and continuing interviews until data saturation was reached. However, qualitative research is limited in that we were unable to determine the truthfulness and accuracy of participant responses,[46] furthermore qualitative research is rarely designed to incorporate statistically representative population samples,[47] and is more useful for formulating hypotheses rather than to test them.[46]

While our study revealed that discharges are very complex, requiring input and collaboration between multiple healthcare practitioners, we only interviewed pharmacists from one health service and therefore only collected a narrow range of perspectives. Future research could examine the opinions and perspectives of other discharge clinicians including doctors, nurses and pharmacy assistants from various health services.

6. Conclusion

This study provides insights into pharmacists' perceptions of discharge medicine handover, demonstrating a need to streamline processes through better integration and optimisation of electronic health software systems and increased utilisation of trained pharmacy assistants. Pharmacists require advance notice of upcoming discharges to effectively prioritise high workloads. Having pharmacists participate in ward rounds may reduce prescribing errors by junior doctors and potential MRH, however this needs careful planning given current workloads and staffing levels. Further research is needed to investigate potential electronic solutions, increased utilisation of pharmacy assistants, and improving processes to facilitate better discharge workflows.

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Declaration of Competing Interest

The authors do not have any conflicts of interest.

Appendix A. Supplementary data

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