


## Perspective Piece

# Pharmacist-led medicines optimisation service in an inpatient mental health setting

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### Abstract

Medicines optimisation ensures that people get the best possible outcomes from their medicines. As those with severe mental illness (SMI) are frequently prescribed psychotropic medicines with potentially significant side-effects, poor adherence to treatment and physical morbidity are common. This results in suboptimal symptom control, physical health problems and negative health outcomes. The specialist mental health pharmacist (SMHP) is best placed to provide leadership for medicines optimisation in the inpatient mental health setting. By adopting a patient-centred approach to providing information, improving adherence, screening, initiating and maintaining medicines, and supporting self-advocacy, the SMHP can ensure the patients' experience of taking medicines is optimised. As there is currently limited understanding of what a baseline clinical pharmacy service in a mental health setting looks like, we aim to outline a framework for pharmacist-led medicines optimisation for those with SMI. This framework is suitable to be scaled and adapted to other settings.

**Keywords:** Severe mental illness; specialist mental health pharmacist; medicines optimisation; pharmacy service; side-effects

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### Introduction

Medicines optimisation is a person-centred approach to safe and effective medicines use, to ensure people obtain the best possible outcomes from their medicines (NICE 2015). By focusing on patients and their experiences, medicines optimisation aims to help patients to: improve their outcomes, take their medicines correctly, avoid taking unnecessary medicines, reduce wastage of medicines and improve medicines safety (RPS 2013). Psychotropic medicines, namely antidepressants, antipsychotics and mood stabilisers, are the main pharmacological treatments for severe mental illnesses (SMIs) such as schizophrenia, psychosis, schizoaffective, bipolar and major depressive disorders (NHS 2018; Maidment et al. 2022). However, such medicines have potentially significant side-effects resulting in poor adherence to treatment and physical morbidity, and such a population has a significantly increased risk of premature mortality (up to 30 years earlier than the general population) (DE Hert et al. 2011). Thus, to ensure adequate control of symptoms of mental illness, while avoiding serious complications and negative physical health outcomes, psychotropic medicines must be optimised (Carolan et al. 2019).

The specialist mental health pharmacist (SMHP) working in the inpatient mental health setting can provide leadership and support for medicines optimisation. People with SMI are less likely to have regular contact with a general medical provider and receive routine physical health screening, monitoring or interventions (Carolan et al. 2022). As a result, their time as an inpatient in a mental health setting is an ideal opportunity to optimise both physical and mental health medicines use. The SMHP can provide integral contributions to screening, initiating and maintaining treatments, improving medicines adherence, providing medicines information as well as supporting self-advocacy (El-Den et al. 2020).

There is presently limited understanding of what a baseline clinical pharmacy service in a mental health setting looks like. Here we describe a medicines optimisation service provided by a SMHP to three inpatient mental health teams from a community mental health service in Ireland with a catchment area population of over 175,000 with approximately 230 hospital admissions annually. This service is carried out weekly following SMHP review of medication charts, electronic patient records, progress notes and laboratory results and interventions are relayed to the treating team via a structured internal email. By describing this medicines optimisation service and the evidence behind it, we aim to provide a framework for pharmacist-led medicines optimisation (SJOG Medicines Optimisation Checklist© available in supplementary material) that is scalable and adaptable to other settings where those with SMI may be treated.

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## Patient-facing interventions

### Medicines reconciliation on admission to hospital

The medicines optimisation process begins at the very start of the hospital journey with the medicines reconciliation (med-rec). Med-rec is the process of creating the most accurate list possible of all medicines a patient is taking and comparing it to the clinician's admission/transfer/discharge order, with the goal of providing correct medicines to the patient (Midelfort 2011). Those with SMI are often prescribed multiple medicines for both mental and physical health problems, and complex regimes including restricted access/higher risk medicines (e.g. clozapine, lithium, Monoamine oxidase inhibitors (MAOI), long-acting antipsychotic injections). As a result, they are particularly at risk of medicines discrepancies on admission to hospital (Wheeler et al. 2018). Psychiatrists are more likely to be involved in overseeing psychotropic medicines, while GPs are expected to manage physical health medicines (Wheeler et al. 2018). This disconnect is compounded by poor adherence to medicines meaning an accurate reflection of what the patient was actually taking prior to admission is difficult to achieve (Lacro et al. 2002; Lambert et al. 2004; Bauer et al. 2019; Dell'Osso et al. 2020).

As med-rec reduces medication errors and improves patient outcomes, it is an important first step in the medicines optimisation process (Wheeler et al. 2018). Given that the patient is the one 'constant' during a transition of care, a patient-centred approach to medicines reconciliation is essential (Wheeler et al. 2018). The SMHP plays a leading role in the med-rec process by linking directly with the patient and/or their community pharmacy. This facilitates corroboration of admission medicines against those dispensed to/taken by the patient prior to admission, referral/transfer information, admission notes and outpatient prescriptions. Omissions or discrepancies are communicated to the clinician and followed up by the SMHP. A med-rec is completed for all new admissions within three working days of coming to hospital. And so the pharmacist-led medicines optimisation journey begins.

### Medicines information: patient information leaflets and medicines lists

The provision of information on the indications and possible side-effects of psychotropic medicine is an important aspect of medicines optimisation as it is linked to improved adherence to treatment and supports shared decision making (Daltroy et al. 1991; Mitchel and Selmes 2007). It is also a regulatory requirement in Ireland and is in line with international guidelines; however, it remains suboptimal (Barnes et al. 2011; NICE 2014; CQC 2022; MHC 2023). The SMHP can provide independent education and advice about medicines, including information on the likely benefits and possible side-effects, to those in an inpatient mental health setting (NAPICU 2014). Patient information leaflets (PILs) contain all of the relevant information on psychotropic medicine and are provided by the SMHP directly or via nursing staff with pharmacist details included to all new admissions and to those newly commenced on a psychotropic medicine.

While PILs are suitable for those who are aware and familiar with their diagnosis, the indication described may not be acceptable for some. Those without a formal diagnosis, prescribed psychotropic medicine outside the licensed indication, who lack insight into their condition or who feel stigmatised/marginalised by a mental health diagnosis may also benefit from information on the symptoms the medicine is helping with (Timimi 2014).

**Table 1.** My medicines list

My mental health medicines list			
Medicine	Dose	Time	Why I take it
Venlafaxine	150 mg	9 am	Helps with low mood and anxiety
Lithium	800 mg	10 pm	Helps with your mood (highs and lows)
Olanzapine	10 mg	10 pm	Helps with your thoughts
Lamotrigine	100 mg	9 am and 10 pm	Helps to protect against low mood

The 'Medicines List' (Table 1) details the medicine's name, dose, time(s) of administration and targeted symptoms and is provided to all inpatients approximately 2 weeks into their hospital stay. As patients who understand the purpose of a medicine are twice as likely to take it, than those who do not, providing information on targeted symptoms in conjunction with the PIL is an additional step in optimising medicines use (Daltroy et al. 1991).

### Assessing antipsychotic side-effects

Antipsychotic medicines are frequently prescribed to those with SMI and are associated with a varying range of subjectively unpleasant side-effects including sedation, weight gain, constipation, urinary incontinence, breast milk production, erectile and sexual dysfunction. As a result, many do not take their medicines effectively and the prevalence of non-adherence is high – up to 80% of those prescribed antipsychotic medicine discontinue prematurely (Lacro et al. 2002, Lambert et al. 2004). The impact of non-adherence on patient outcomes is marked and it is one of the most powerful predictors of relapse resulting in rehospitalisation and longer hospital admission (Velligan et al. 2009, Marder 2013). In effect, there is a five-fold increase in relapse rates amongst those with schizophrenia and a five-fold increase in suicide rates amongst those with bipolar disorder that do not adhere to medicines (Gonzalez-Pinto et al. 2004; Velligan et al. 2009). Non-adherence is mainly determined, among other factors, by negative attitudes towards antipsychotic medicine and several studies have shown that side-effects can influence attitudes and subjective well-being negatively (Lacro et al. 2002; Lambert et al. 2004).

Patients may be reluctant to openly report certain side-effects, especially those of an embarrassing nature (e.g. sexual dysfunction, constipation, nocturnal enuresis). A true reflection of the experience of antipsychotic side-effects is therefore obtained by using a structured assessment tool (Byerly et al. 2006; Yusufi et al. 2007; Hynes et al. 2020). While antipsychotic side-effects are known to impact adherence negatively, it is in fact the distress caused rather than an objective measure of severity that is most relevant (Haddad et al. 2014). Eliciting both the frequency of side-effects and the associated distress is therefore essential to obtaining an accurate picture of the patient experience of side-effects. The Glasgow Antipsychotic Side-effects Scale (GASS) is a 22-question self-rating scale for detecting the frequency and distress caused by second generation antipsychotic side-effects (Waddell and Taylor 2008). The GASS for clozapine (GASS-C) is a 16 question self-report side-effects scale for those on clozapine (Hynes et al. 2015). The use of rating scales over time ensures that the experience of antipsychotic side-effects is captured at regular intervals and facilitates the implementation of interventions to minimise their burden (Lehman et al. 2004).

While both the GASS and GASS-C are self-report scales, administration by the SMHP facilitates patient involvement in a discussion about their experience of side-effects/associated distress and dialogue on the mechanism of side-effects and management options available (Hynes et al. 2020). These range from practical tips (chewing sugar-free gum to alleviate dry mouth); to dose manipulation (weighting dose to night time for daytime drowsiness); to the addition of another medicine (laxative for constipation) (Stroup and Grey 2018). However, those experiencing antipsychotic side-effects have varying priorities when it comes to managing them. Some may opt for no intervention; others may prefer non-pharmacological strategies and some may choose additional medicine to manage side-effects. As such, by meeting face-to-face to assess side-effects and discuss management options, the SMHP can support self-advocacy by recommending patient-centred interventions. Systematic side-effects assessment is offered to all patients following two consecutive weeks of antipsychotic treatment and takes approximately 5 minutes to complete. As the GASS-C was developed and validated by this pharmacy team and the clinical utility of the GASS and GASS-C was assessed by SMHPs at this mental health setting, this step in the medicines optimisation process is research-informed and ensures that those with SMI taking antipsychotics obtain the best possible outcomes from their medicines (Hynes et al. 2015, Hynes et al. 2020).

### *Individualised patient consultations*

While med-rec, the provision of PILs and Medicines Lists and the systematic assessment of antipsychotic side-effects are standardised interventions in the pharmacist-led medicines optimisation process, other patient-facing interventions can arise outside of this. These may include clozapine or lithium consultations which are offered to all patients newly commenced on these medicines during an admission. The consultation includes a discussion around the risks and benefits of these higher risk medicines and monitoring (mandatory for clozapine) associated with their use. Other individualised consultations may be prompted by clinicians or nursing staff in response to a patient-specific query. These individualised consultations may occur at any point throughout the admission and serve to ensure that the patient's medicines-needs are met as they arise.

### **Clinician-facing interventions**

#### *Physical health monitoring and cardiovascular risk assessment*

While the interventions detailed above are 'visible' to the patient, there are many others occurring behind the scenes (clinician-facing interventions). The first of these involves the physical health monitoring associated with psychotropic medicines. Antidepressants, antipsychotics and mood stabilisers have side-effects that can lead to physical morbidity and worsening of existing comorbidities including metabolic syndrome, diabetes, dyslipidaemia, cardiovascular disease (CVD), etc. (NICE 2014; Carolan et al. 2019). These side-effects can worsen quality of and shorten life (NICE 2014; Keating et al. 2017). In fact, the majority of deaths in those with SMI are due to preventable physical diseases, in particular, CVD – 2–3 times higher risk of dying from CVD compared with the general population (Sud et al. 2021).

SMHPs' roles as medicines experts enable them to support the physical healthcare of those living with SMI by prompting the monitoring of physical health parameters at each weekly review

(Table 2) (El-Den et al. 2020). In line with manufacturers' monitoring recommendations and international guidance, local physical health monitoring guidelines developed by SMHPs and approved by the multidisciplinary Drug and Therapeutics committee (unpublished) are used to ensure those prescribed psychotropic medicines have appropriate physical health screening (Barnes et al. 2011; NICE 2014; Taylor et al. 2021). Furthermore, the SMHP can provide advice on how best to manage out of range results in a patient-centred manner for all of those with deranged results (considering concomitant medicines and comorbidities) – 'don't just screen, intervene'. Given that the risk of death from CVD is so high in this group, a cardiovascular (CV) risk assessment is a useful intervention that can be carried out by the SMHP using physical health monitoring test results.

The QRisk3 algorithm calculates a person's risk of developing a heart attack or stroke over the next 10 years and is used by the SMHP to assess CV risk in those aged > 40 (Hippisley-Cox et al. 2017). By inputting patient-specific demographic and clinical information, a risk score is calculated which indicates whether statin therapy is indicated, i.e., risk score > 10 (NICE 2014). Despite the convincing evidence for increased CV risk in those with SMI prescribed psychotropic medicines (specifically antipsychotics), as well as explicit recommendations provided by guidelines, such screening is often incomplete or inconsistent (Sud et al. 2021). Thus, a medicines optimisation intervention such as physical health monitoring and CV risk assessment carried out by the SMHP will serve to identify and mitigate the risk of premature mortality in those with SMI.

#### *De-prescribing and anticholinergic burden assessment*

While physical health monitoring/management supported by the SMHP may often result in the prescription of a new medicine, "de-prescribing" is equally high on the medicines optimisation agenda. De-prescribing is the process of supervised medication withdrawal, with the goal of managing polypharmacy and improving outcomes (Reeve et al. 2015). Polypharmacy is commonplace amongst those with SMI. However, as the number of medicine doses per day is inversely related to treatment adherence, eliminating unnecessary medicines and simplifying the medicines regime is critical for a group already at risk of poor adherence (Claxton et al. 2001).

In an effort to optimise medicines use through de-prescribing, the SMHP clinically reviews all medicines weekly and rationalises the indication and frequency. Medicines that may no longer be indicated, have been consistently declined or are prescribed at a high frequency are brought to the attention of the clinician along with information on how to safely reduce, adjust or discontinue.

Medicines with anticholinergic properties have long been recognised as causing symptoms such as dry eyes, dry mouth, constipation, urinary retention, dizziness, impaired cognition and physical decline (SIGN 2018; King and Rabino 2023). Dry mouth in particular can result in poor oral health including high rates of tooth decay, gum disease and tooth loss – a less recognised health inequality associated with SMI (Tharian et al. 2023; Lancaster University 2022). There may also be an association with falls, increased mortality and CV events (SIGN 2018). Many psychotropic medicines have inherent anticholinergic effects, while others may require the prescription of concomitant anticholinergics to manage extra-pyramidal side-effects. Anticholinergic burden (ACB) scales, such as the ACB calculator can quantify these effects, and provide a practical tool for optimising prescribing

**Table 2.** Physical health monitoring checklist

Clinician-facing Interventions				Baseline	Repeat (1)	Repeat (2)				
Physical Health Monitoring										
BMI (Weight)	Antidepressant (ECG for es/citalopram, TCAs, trazodone)	Antipsychotics (TFTs for quetiapine only)	Lithium	Mood Stabiliser (TFTs, TDM for carbamazepine only)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
ECG (>440 M, >470 F)					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Full Blood Count					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Urea & Electrolytes					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Liver Function Tests					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
HbA1c/Glucose					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Lipids					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Prolactin (<65 M, <50 F)					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Thyroid Function Tests					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Corrected Calcium					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Therapeutic Drug Monitoring (Clozapine/Lithium/Valproate)	Clozapine	Lithium			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Troponin					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
CRP					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Vitamin D					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Folate					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Pregnancy test/ Contraception					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
<b>Clinician-facing Interventions</b>										
<b>Cardiovascular Risk Assessment &gt;40 years</b>										
Statin Indicated?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
<b>Deprescribing</b>										
All medicines indicated at current frequency?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Anticholinergic burden assessment indicated?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>High dose Antipsychotic Treatment</b>										
Repeat ECG and U&Es (3-monthly)?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>Drug-drug Interactions Screen</b>										
QTc prolonging agents prescribed?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
At risk of serotonin syndrome?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
At risk of GI or other bleed?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Prescribed lithium?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>Comments/Follow Up</b>										

(Boustani et al., 2008; King and Rabino 2023). Although not all medicines with anticholinergic properties may individually increase risk of side-effects, when used in combination, effects may accumulate (SIGN 2018). So, by calculating the ACB score, the SMHP can determine the degree of burden the patient is subject to and provide advice to the clinician on how to monitor for and minimise this through de-prescribing.

**High dose antipsychotic treatment**

By screening and intervening with physical health parameters and ensuring all medicines prescribed are indicated, the SMHP endeavours to achieve the correct balance when it comes to medicine. However, there are some circumstances where this balance is harder to achieve, such is the case for those prescribed high dose antipsychotic treatment (HDAT). HDAT is defined as the prescription of either a single antipsychotic at a dose above the

upper limit or two or more antipsychotics concomitantly, that when expressed as a percentage of their respective maximum dose, and combined, result in a cumulative dose of > 100% (excluding clozapine) (Mace and Taylor 2015). While there is no firm evidence that the prescription of HDAT is more effective than standard doses, there may be some clinical rationale in certain circumstances due to individual patient differences (Mace and Taylor 2015). In practice, HDAT prescribing rates both locally and internationally sit between 20% and 25% of hospital inpatients (Hynes et al. 2020). However, as HDAT may be associated with an increased risk of CVD, metabolic syndrome and mortality amongst those with SMI, it must be accompanied by increased physical health monitoring and regular clinical review (Correll et al. 2015; Liu et al. 2017; Das and Yanson 2021). On foot of a prescription of HDAT, the SMHP informs the clinician of the percentage HDAT prescribed along with relevant information on documentation requirements and monitoring criteria to be fulfilled.

**Table 3.** Drug–drug interactions checklist

This table is for illustrative purposes and may be subject to updates – cross-check with the manufacturers’ information is advised*	
<b>QTc prolonging medicines</b> (SmPC Cipramil 2022, SmPC Lexapro 2022, SmPC Motilium 2022, Baxter and Preston 2023, Credible Meds 2023, SmPC Haldol 2023):	
<ul style="list-style-type: none"> <li>Concomitant prescription of these medicines increases the risk of QTc interval prolongation and warrants ECG monitoring to preclude harm associated with the combination</li> </ul>	
<b>Mental health</b>	<b>Physical health</b>
Antipsychotics *	Azithromycin *
Haloperidol **	Clarithromycin *
Citalopram **	Ciprofloxacin *
Escitalopram **	Domperidone **
Lithium *	Erythromycin *
Trazodone *	Fluconazole *
Tricyclic antidepressants *	Levofloxacin *
Methadone **	Ondansetron*
* Caution	** Contraindicated
<b>Serotonin syndrome</b> (UKMi 2018, Baxter and Preston 2023)	
<ul style="list-style-type: none"> <li>A potentially life-threatening condition associated with increased serotonergic activity in the central nervous system characterised by a triad of features (alterations in mental status, neuromuscular abnormalities and autonomic hyperactivity)</li> <li>Can occur after initiation/dose increase of a single serotonergic medicine in those who are sensitive, but more likely to occur following simultaneous administration of two (or more) serotonergic agents</li> <li>Onset of symptoms is usually rapid (within hours), patients should be monitored for symptoms during this initial period and the offending agent(s) stopped should symptoms emerge</li> </ul>	
<b>Mental health</b>	<b>Physical health</b>
Antipsychotics	Chlorphenamine
Buspirone	Diphenhydramine
Bupropion	Linezolid
Lithium	Metoclopramide
MAOIs	Ondansetron
Mirtazapine	Opioids
SNRIs	Triptans
SSRIs	
TCAs	
Trazodone	
Vortioxetine	
<b>Gastrointestinal (GI) bleed (or other)</b> (Taylor et al., 2021, Baxter and Preston 2023)	
<ul style="list-style-type: none"> <li>SSRI administration results in depletion of platelet serotonin levels which increases the risk of bleeding as there is a reduced ability to form clots</li> <li>Risk of GI bleed is doubled when an SSRI is administered with low dose aspirin and quadrupled with NSAIDs compared with SSRIs alone and proton pump inhibitor prophylaxis may be considered to reduce the risk</li> <li>Caution is advised when SSRIs or SNRIs are administered with warfarin or any of the novel oral anticoagulants (rivaroxaban, dabigatran, apixaban and edoxaban) and patients should be closely monitored for signs of bleeding or anaemia (unexplained bruising, black/tar-like bowel motions)</li> </ul>	
<b>Mental health</b>	<b>Physical health</b>
SSRIs	Apixaban
SNRIs	Aspirin (low dose)
TCAs	Dabigatran
Vortioxetine	Edoxaban
	NSAIDs
	Rivaroxaban
<b>Lithium</b> (Baxter and Preston 2023, English et al., 2012, SmPC Priadel 2022, Bazire 2020, SmPC Forxiga 2023)	
<ul style="list-style-type: none"> <li>Interactions relating to lithium involve changes in distribution or elimination by concomitantly administered medicines</li> <li>Thiazide diuretics may reduce lithium clearance leading to intoxication within days of initiation and a lithium dose reduction should be considered if a thiazide is to be prescribed (furosemide considered one of the safest diuretics with lithium although still a risk of a level increase within a month of initiation)</li> <li>Lithium levels may take up to a month to increase on initiation of an ACE inhibitor</li> <li>Tetracyclines such as doxycycline which may be indicated to treat respiratory tract infections may also result in increased lithium levels</li> </ul>	

(Continued)

**Table 3.** (Continued)

<ul style="list-style-type: none"> <li>• Ibuprofen and diclofenac may increase lithium levels by up to 25%, whereas short-term treatment with naproxen has little effect and aspirin does not appear to interact with lithium at all</li> <li>• Sodium-containing antacids such as Gaviscon® (which contains sodium bicarbonate) may result in lower lithium levels and is best avoided for those taking lithium</li> <li>• Dapagliflozin may increase renal lithium excretion and the blood lithium levels may be decreased</li> <li>• Ensure lithium levels are appropriately monitored (weekly) if a medicine with potential to alter lithium exposure is initiated</li> </ul>	
Increase levels	Decrease levels
ACE inhibitors	Gaviscon® (Sodium bicarbonate)
Angiotensin II receptor antagonists	Dapagliflozin
Furosemide	
NSAIDs	
Tetracyclines	
Thiazide diuretics	

### Clinically significant drug–drug interactions

There are a number of notable drug–drug interactions specific to the mental health setting. Considering the high rate of physical morbidity and associated polypharmacy in those with SMI, the risk of drug interactions is increased in this population (Khawagi et al. 2021). Although life-threatening drug–drug interactions are rare, clinically significant interactions impacting response to medicine or resulting in serious adverse drug reactions have been reported and can impact long-term outcomes and patient experience negatively (English et al. 2012). Interactions may occur between two psychotropic medicines or between a psychotropic and a physical health medicine and may occur as a result of the medicines' pharmacodynamics or pharmacokinetics. In carrying out mental health specific interaction screening, the SMHP ensures that it is safe for all medicines prescribed to be taken concomitantly which is an essential part of medicines optimisation.

The most clinically significant pharmacodynamic drug–drug interactions include those between medicines that prolong the QTc interval, those that result in serotonin toxicity and those that increase the risk of bleeding, while lithium's pharmacokinetics account for a range of drug–drug interactions (Table 3). While some medicines that exert these effects are contraindicated when administered concomitantly, others should be prescribed with caution.

### Conclusion

In order to ensure those with SMI get the most out of their medicines, pharmacist-led medicines optimisation is essential. By engaging directly with patients to reconcile medicines on admission, provide medicines information in various formats, systematically assess for antipsychotic side-effects and provide one-to-one consultations on request, the SMHP gains an insight into the patient's relationship with psychotropic medicines. This can inform patient-centred interventions to improve the medicines experience. Additionally, given their knowledge and expertise on both physical and psychotropic medicines, the SMHP can positively influence patient health outcomes through physical health monitoring and management, de-prescribing, high dose antipsychotic monitoring and clinically significant drug–drug interaction screening. Evidence supports the positive impact that SMHPs can have on outcomes, prescribing practices, patient satisfaction and resource use for those in the inpatient mental health setting (Sud et al. 2021). However, given the limited

understanding of what a clinical pharmacy service in a mental health setting looks like, there is a need for a framework that describes evidence-informed interventions. By outlining our medicines optimisation service, this paper may aid other services to adopt pharmacist-led medicines optimisation in their own setting whether it is a hospital or community-based mental health service to improve outcomes for patients with SMI (see SJOG Medicines Optimisation Checklist© in supplementary material).

**Supplementary material.** The supplementary material for this article can be found at <https://doi.org/10.1017/ipm.2023.46>.

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