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The benefits of pharmacy technician-led pre-operative assessment clinics

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Executive Summary

This project set out to demonstrate and embed the value of a pharmacy technician-led contribution within pre-operative assessment clinics at the Royal National Orthopaedic Hospital (RNOH) NHS Trust, strengthening medicines optimisation and releasing pharmacist capacity for more complex peri-operative work. It aimed to evaluate the impact of the pharmacy technician role on medicines optimisation, patient safety, service efficiency, and multiprofessional collaboration. The focus was on adult surgical patients referred to the pre-operative assessment pharmacy service (including higher-risk and complex cohorts) across a nine-month evaluation period (August 2023–April 2024).

Working virtually via telephone clinics at two points in the pathway (post-clinic referral and 7 to 10-day pre-admission revalidation), the pharmacy technician completed core medication histories, provided stop/continue advice, supported peri-operative planning and escalated defined complex cases to a pharmacist.

Findings

Findings indicate that the pharmacy technician delivered a substantial proportion of pharmacy reviews independently, increased the volume of medication histories completed earlier in the pathway, maintained high levels of patient satisfaction, and contributed to efficiency gains (including reduced avoidable medicine-related on-the-day theatre cancellations and generated cost savings through increased use of patients' own medicines). The work also enabled pharmacists to redirect time towards service development (for example, advancing anaemia optimisation and other specialist pathways). Key limitations included current constraints from limited digital integration and administration support, the specialist knowledge required for safe escalation decisions, and the reliance on local criteria and in-house training due to a lack of established national prioritisation guidance for pharmacy input in pre-op assessment.

Overall, the project aim was met: the evaluation demonstrates clear benefits and feasibility of embedding a pharmacy technician within the pre-operative assessment multiprofessional team. Their integration supports workforce optimisation, enhances patient care, improves operational efficiency, and supports delivery of national priorities, including the Elective Recovery Plan and perioperative transformation programmes.

Recommendations

- Maintain and further embed the role with defined escalation criteria and supervision
- Strengthen training through a structured competency workbook and protected learning time

- Improve digital and administrative infrastructure to increase review capacity
- Refine and standardise referral/prioritisation criteria (including consideration of additional high-risk cohorts)
- Explore further service expansion opportunities

Background/Context

The Royal National Orthopaedic Hospital (RNOH) NHS Trust is a leading tertiary hospital specialising in complex orthopaedic care, including management of bone tumours and neuro-musculoskeletal conditions[1]. The pre-operative assessment clinic plays a vital role in ensuring patients are medically optimised prior to surgery, thereby reducing perioperative risk and improving outcomes.

The clinical pharmacy service has been embedded within the pre-operative assessment clinic at RNOH has been established since 2016, supporting nurses and anaesthetists with medicines management and optimisation. Initially delivered by a single specialist pharmacist, the service expanded in June 2023 to include an additional pharmacist and a pharmacy technician, reflecting the increasing demand for medicines optimisation and multiprofessional input in perioperative care.

National guidance from organisations such as the Royal College of Anaesthetists (RCoA)[2], Centre for Perioperative Care (CPOC)[3, 4] and Getting It Right First Time (GIRFT)[5] highlight the importance of the pharmacy workforce in perioperative care[6 - 10]. Furthermore, the NHS Improvement Emergency Care Improvement Programme[11] recognises the contribution of pharmacy professionals in pre-admission clinics, particularly in medicines optimisation and discharge planning to improve patient flow. Pharmacy teams play a key role in medicines reconciliation, management of complex patients, and optimisation of long-term conditions, contributing to improved outcomes and reductions in surgical cancellations.

The role of a pre-operative assessment pharmacist has evolved and expanded in line with clinical practice in the pharmacy profession. This project demonstrates how pharmacy technicians can also be an asset in this setting. The pharmacy teams are sharing workload pressures of the wider multiprofessional team, improving patient safety, providing enhanced quality of care and building efficiencies.

Pharmacy technicians and pharmacists in pre-operative assessment clinics are in a unique position to work closely with primary care prior to admission, and with secondary care during admission, to optimise and influence prescribing decisions. The opportunity to provide

medicines reviews and make recommendations, whilst working collaboratively with the wider multiprofessional team, enables teams to positively influence patients' healthcare outcomes and experience.

Expanding the role of pharmacy technicians in this specialist area of practice presents a strategic workforce development opportunity which enables pharmacists to focus on the management of patients with more complex and high-risk profiles. The involvement of the pharmacy team in what has traditionally been a nurse or anaesthetists' role, enables their time to be released for their respective clinical roles. Pharmacy presence therefore enables skill mix optimisation in the provision of patient care, capitalising on the clinical knowledge and skillset of each pharmacy team member. In addition to offering a pharmacy technician development opportunity, the productivity of the wider, multiprofessional team is enhanced as early medicines optimisation reduces the likelihood of last-minute cancellations, improves patient experience, and enhances surgical flow.

The drive within RNOH to increase the number of patients seen as day cases and minimise length of stay, links to the need for patients' medication histories to be accurately documented in readiness for admission. In turn, this links to discharge planning highlighting the need for this to be considered before patients arrive at the hospital. There is a robust assumption that patient safety and experience would be improved due to accurate medication histories being completed by the pharmacy technician. This also helps with reduction of on-the-day medicine related theatre cancellations. The aim is that the pharmacy technician would also provide holistic care and support in prehabilitation to improve surgical outcomes and recovery.

The project has been undertaken within a broader context of NHS transformation, where the National Perioperative Care Programme (also known as Getting It Right First Time)[5] is driving improvement in perioperative care and shifting a focus on early screening and optimisation. RNOH's designation as a GIRFT-accredited elective surgical hub underscores the importance of efficient patient pathways and high-quality perioperative care. This project supports the Elective Recovery Plan[12] by contributing to a reduction in theatre cancellations related to medicines, while enhancing patient safety and satisfaction. In addition, it supports the Trust's strategic ambition to remain a leading specialist orthopaedic provider, strengthening its international reputation for excellence in patient care, research, and education. The project further contributes to the pharmacy department's vision of collaboration with secondary and tertiary care providers, enabling shared learning and continuous improvement in patient care.

Project Aim

The aim of the project is to demonstrate the benefits of, and embed, the pharmacy technician's role in pre-operative assessment clinics to support medicines optimisation for patients prior to surgery. This project focuses on adult surgical patients at RNOH, with varying American Society of Anaesthesiologists (ASA) patient classification and surgical grades[13] and involves review of high risk or complex patients referred to the pharmacy team.

Methodology

1.1 Design and setting

Data were collected over nine months (August 2023 to April 2024). This timeframe allowed time to recruit the pharmacy technician, complete induction and training, and then evaluate the service once it was running routinely.

The evaluation took place within the adult pre-assessment service at RNOH and included patients undergoing elective procedures under general anaesthesia. Non-elective, private, and paediatric patients were excluded.

1.2 Service model

The pharmacy technician contributed to two key stages of the patient pathway:

1. Clinic review
    a. Following referral by a nurse or anaesthetist based on defined criteria (appendix 1)

2. Pre-admission review 7-10 days prior to surgery
    a. Revalidation of medication histories
    b. Reinforcement of perioperative medication instructions provided at the initial clinic review
    c. Identification of issues that could impact surgical readiness

Both stages were delivered virtually via telephone consultations.

The clinical role of the pre-operative assessment pharmacy technician and pharmacist at RNOH is summarised in Appendix 2. A 'core' pharmacy review entails documenting a medication history on the Electronic Prescribing and Medicines Administration (EPMA) system, providing verbal and written instructions on medications to stop and formulating peri-operative plans where applicable.

The pre-admission review was introduced in December 2023, after a period of training and competency of conducting clinic reviews for four months. Pre-admission reviews were undertaken during morning sessions, while clinic reviews were completed in the afternoons, with flexibility to accommodate meetings, training, and other responsibilities.

1.3 Patient selection criteria

There is no apparent guidance or evidence available on clinical prioritisation for which cohort of patients need to be reviewed in a pre-assessment setting by the pharmacist or pharmacy technician. Referral criteria (appendix 1) were based on locally defined standards, incorporating critical or high-risk medicines and medical conditions and perioperative planning requirements.

Patients were prioritised based on:

- High-risk medications (e.g. anticoagulants, antiplatelets, insulin)
- Complex medical conditions
- Age ≥65 years
- Expected length of stay ≥3 days
- Higher surgical complexity (surgery grade ≥4)

1.4 Data Collection and Outcome Measures

Data was collected using the RNOH electronic systems, including EPMA and the Insight dashboard.

Measured outcomes included:

- Volume of patients reviewed
- Medicines reconciliation activity
- Medication-related theatre cancellations
- Patient satisfaction
- Cost savings associated with patients' own medicines

Additional data included non-clinical interventions and escalation requirements identified during pre-admission reviews.

Appointments were booked on the RNOH Patient Administration System and a dashboard was used to extract the relevant information. Patient feedback and experience was collected via Microsoft Forms following a clinic review.

A snapshot audit was conducted for admissions over a week to estimate cost savings from using patients' own medicines. This was dependent on the information entered on EPMA and data was extrapolated to establish annual savings. The estimated cost was calculated using British National Formulary (BNF) pricing excluding Value Added Tax (VAT) for original pack dispensing.

Comparative analysis of medication-related theatre cancellations was performed across financial years 2022–2023 and 2023–2024 to establish avoidable cancellations on the day of surgery.

Results

The pharmacy technician completed induction and training in July 2023. Evaluation data were collected from August 2023 to April 2024. Where a comparison between two five-month periods is presented, July 2023 may be included to support a more balanced baseline comparison.

Service activity

During the evaluation period, nursing and anaesthetic pre-assessment activity averaged approximately 570 patients per month. Of these, an average of 172 patients (30%) received a pharmacy clinic review following referral from a nurse or anaesthetist. The pharmacy technician completed a pre-admission review for an average of 238 patients.

The volume of patients reviewed by the pharmacy team was dependent on pre-assessment activity (impacted by nurse or anaesthetist absence leave), and referrals made by the nurse or anaesthetist following the pre-assessment.

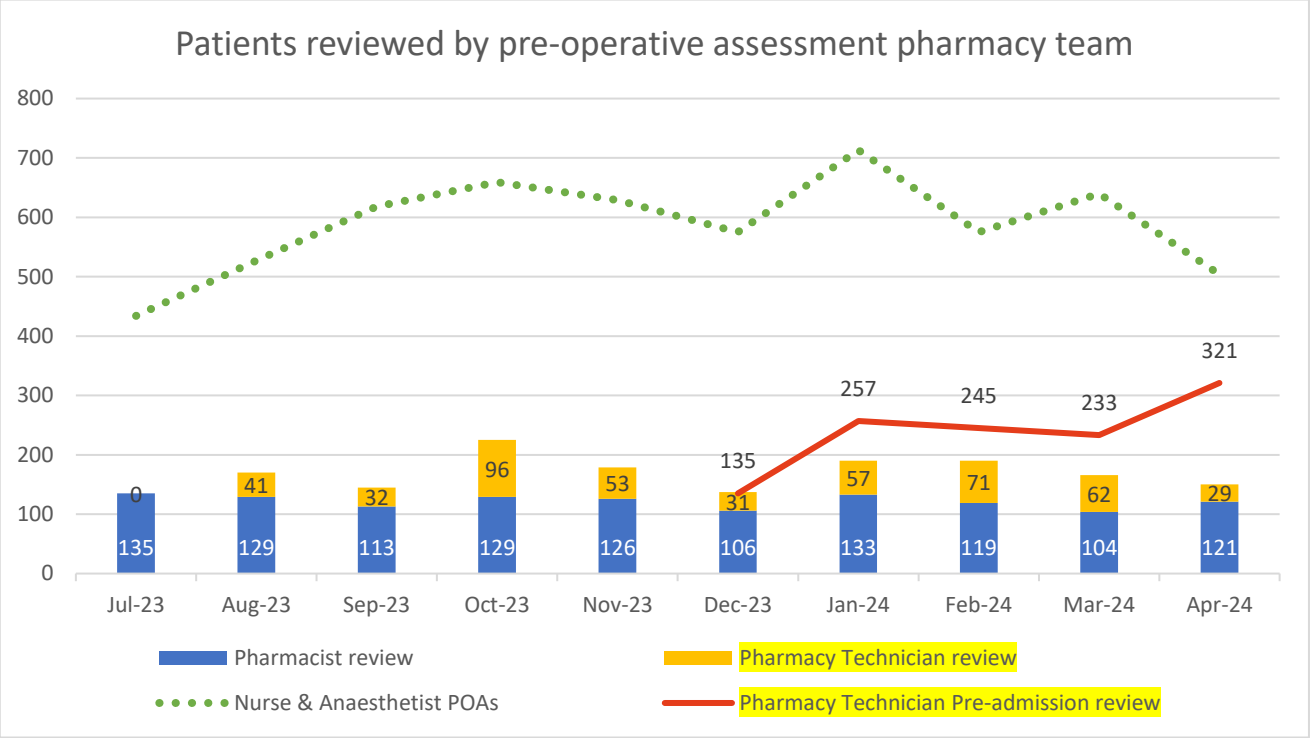

Figure 1: Number of patients reviewed by pharmacy pre-operative assessment team

Figure 1 shows the number of patients reviewed by the pharmacy technician and pharmacist alongside the total number of nurse and anaesthetist appointments. More patients were reviewed at the pre-admission stage because many medicines histories were already available in EPMA and medication instruction letters did not need to be generated at this point, reducing the administrative workload associated with each review.

Of the average 52 clinic reviews completed each month by the pharmacy technician, 26 (50%) were escalated to the pharmacist for review in line with the criteria in Appendix 2, while the remainder were managed independently by the pharmacy technician. This suggests that the pharmacy technician role can make a substantial contribution to service delivery while supporting appropriate triage of more complex cases to the pharmacist.

Figure 1 does not show a corresponding increase in the number of patients seen by pharmacists. However, the additional capacity created by the pharmacy technician role appears to have enabled pharmacists to focus more on service development and role enhancement. One example is the review and streamlining of the pre-operative anaemia pathway, with the aim of moving towards a pharmacist-led model and releasing time for other clinicians involved in that pathway.

In addition, pre-operative assessment pharmacists were able to broaden their contribution by delivering regular education and training sessions on medication management for ward-based

nurses, attending weekly complex case multiprofessional team meetings, contributing to clinical trials, and undertaking audits and further service improvement work.

The referral criteria may be refined further to enable the pharmacy team to review a greater proportion of patients. This could include continued education for pre-operative assessment nurses on identifying and advising on lower-risk medicines that need to be stopped before surgery, with the aim of reducing medicine-related incidents or cancellations. A further area for development is to identify where pharmacist input could add value across other pathways or patient cohorts.

As the role of the pharmacy technician in pre-operative assessment is still developing, there may be further opportunities to integrate the role into additional service pathways and enhance patient care, for example by supporting counselling on oral or intravenous iron and related nutritional advice or teaching patients or carers how to administer low molecular weight heparin (LMWH) injections.

Medication histories

Data on medicines histories completed in pre-operative assessment, medicines histories completed on the ward, and overall medicines reconciliation during admission were obtained from the Trust EPMA dashboard.

Average total patient admissions were 1,267 for July to November 2023 and 1,483 for December 2023 to April 2024. This excludes private and day case patients.

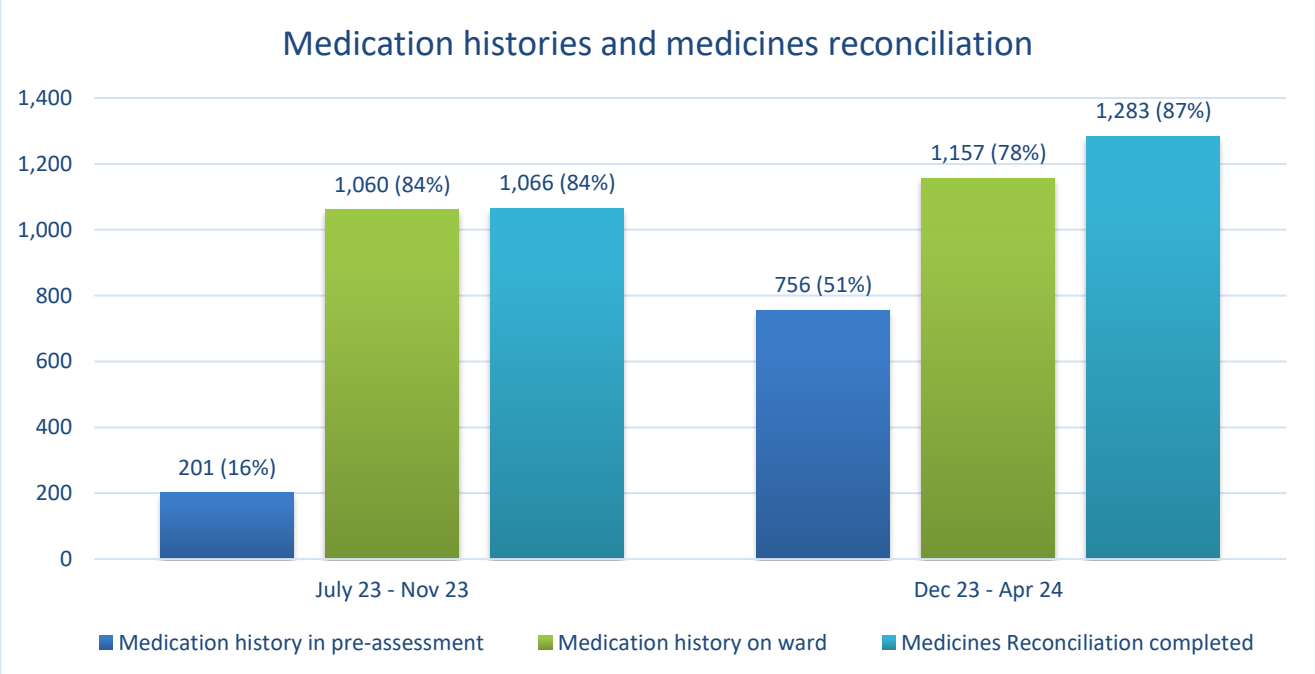

Figure 2: Comparison of medicine histories completed in pre-operative assessment and on the ward, with medicines reconciliation rates

Figure 2 shows an increase in the number of medicines histories completed after the pre-admission review was introduced in December. Although this did not appear to change the overall medicines reconciliation rate, completing the medicines history earlier in the pathway offers several potential advantages compared with waiting until admission:

- **Determining an accurate allergy, intolerances or previous adverse drug events** list enhances patient safety and allows for appropriate intervention e.g. liaising with microbiologists for alternative surgical prophylaxis supporting antimicrobial stewardship
- Compiling and documenting an accurate medication history **assists the prescriber in transcribing the medication for admission** and making better informed clinical decisions e.g. checking for interactions, which also enables a timely medicines reconciliation. Lack of and/or inaccurate medication history may lead to missed or delayed doses, inadvertent taking of medications leading to surgery cancellations, impacting theatre scheduling and patient experience.
- **Sustaining the use of patients' own medicines** by informing them to bring their medicines for use on admission. This supports formulary management, reduces waste and need for large stock lists on the wards, avoids missed or omitted doses as medicines are readily available.
- **Identifying patients who use compliance aids** and informing them to bring supplies in original packaging for admission.
- **Discharge preparation**- informing patients to keep simple analgesia or laxatives at home in advance of their admission is cost saving and streamlines the discharge process as it eliminates the need to wait for medicines on discharge, enhancing patient satisfaction and improving bed flow. There is also an opportunity to assess the patient's ability to manage their medicines after discharge and plan accordingly.
- Counselling and **educating patients on the safe and effective use of their medication**, i.e.
    - informing patients to re-start medications that are to be stopped prior to surgery
    - informing patients which medicines are essential to continue prior to surgery,
    - discussing new medicines that may be required post-surgery e.g. use of analgesia, anti-emetics, laxatives or venous thromboembolism prophylaxis

- **Identifying issues patients may have with taking their medicines as intended by the prescriber**, which is particularly relevant for optimisation of diabetes and blood pressure control before surgery
- **Prehabilitation and general health promotion** - reducing alcohol intake and smoking prior to surgery, identifying patients at risk of alcohol withdrawal and making appropriate referrals to the discharge team in anticipation of potential for extended length of stay
- Collaborative **medicines optimisation** with primary care, nursing or care homes, prison services. This is an ideal setting to assess the pharmaceutical care needs of patients including deprescribing and long-term optimisation. The surgical team managing the patient during admission may not address interventions that the pharmacist believes are necessary for ongoing medical problems.
- Early identification and **planning** e.g. organising non-formulary medications supplies, or medicines that may not be routinely stocked, ready for inpatient stay
- Liaising with the relevant multiprofessional team and formulating peri-operative plans, **sourcing the appropriate medicines** and communicating plans with surgical teams, anaesthetists and ward pharmacy teams e.g. Factor replacement therapy for haemophilia patients

Patient feedback and experience

Patient feedback was collected continuously from May 2023 to support ongoing service improvement and staff development. Figures 3 and 4 compare patient feedback before and after the introduction of the pharmacy technician role within the clinic.

A total of 68 responses were received between May and July 2023, and 312 responses were evaluated between August 2023 and April 2024.

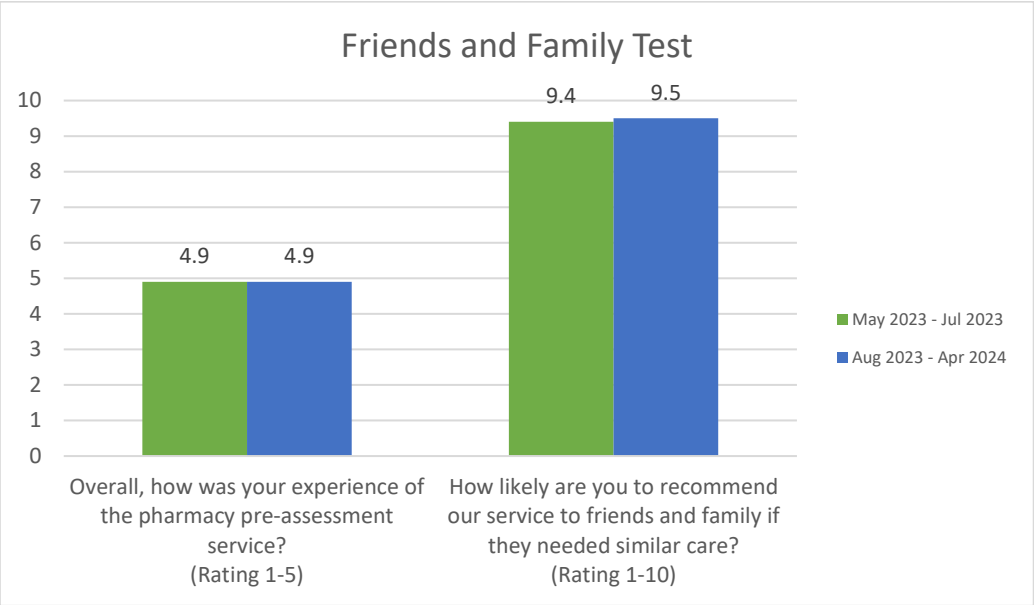

Figure 3: Pharmacy pre-operative assessment service Friends and Family Test

Figure 3 indicates that patient satisfaction and experience were maintained following the introduction of the pharmacy technician role within the service.

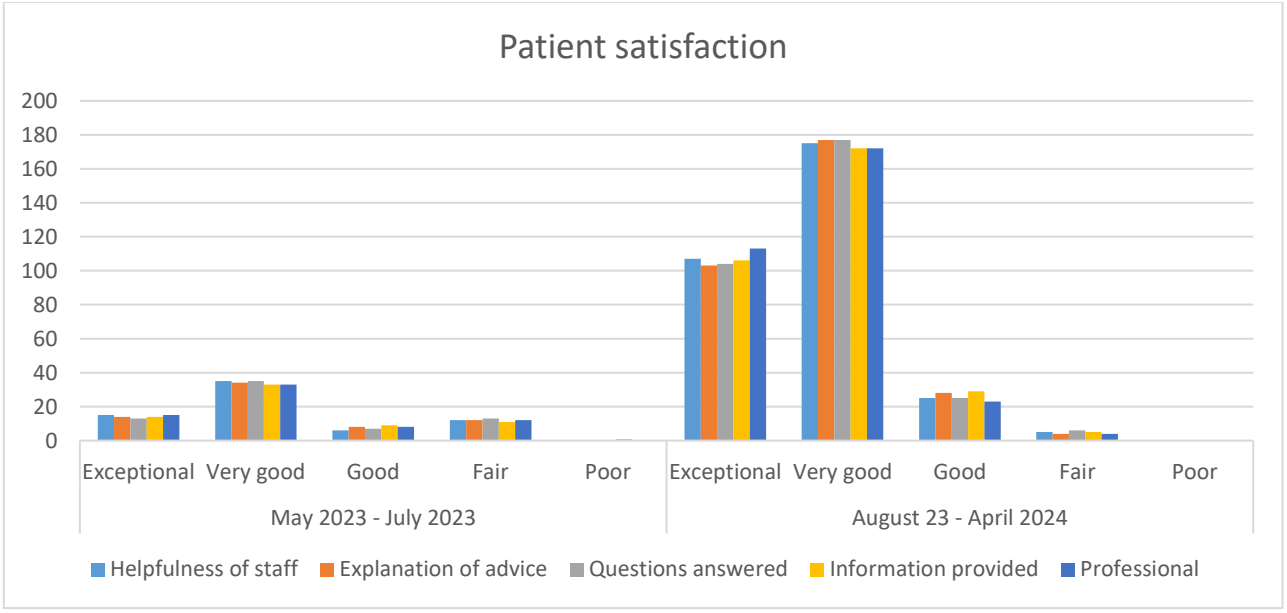

Figure 4: Patient satisfaction with pre-operative assessment pharmacy staff

Patient feedback was collected anonymously. Where patients included their names and responses could be attributed to a specific staff member, no difference in satisfaction was identified between pharmacists and the pharmacy technician.

Other metrics

Pre-operative assessment medicine related incidents

There have been no medicine related incidents in pre-operative assessment from April 2023 – April 2024

Cost savings from using patient's own medicines

An estimated saving of £5,138 was identified from one week of admissions. Extrapolated across a full year, this equates to an indicative annual saving of £267,176. This estimate should be interpreted with caution, as not all ward patients were reviewed by pharmacy staff and documentation of patients' own medicines was therefore incomplete.

On the day medicine related theatre cancellations

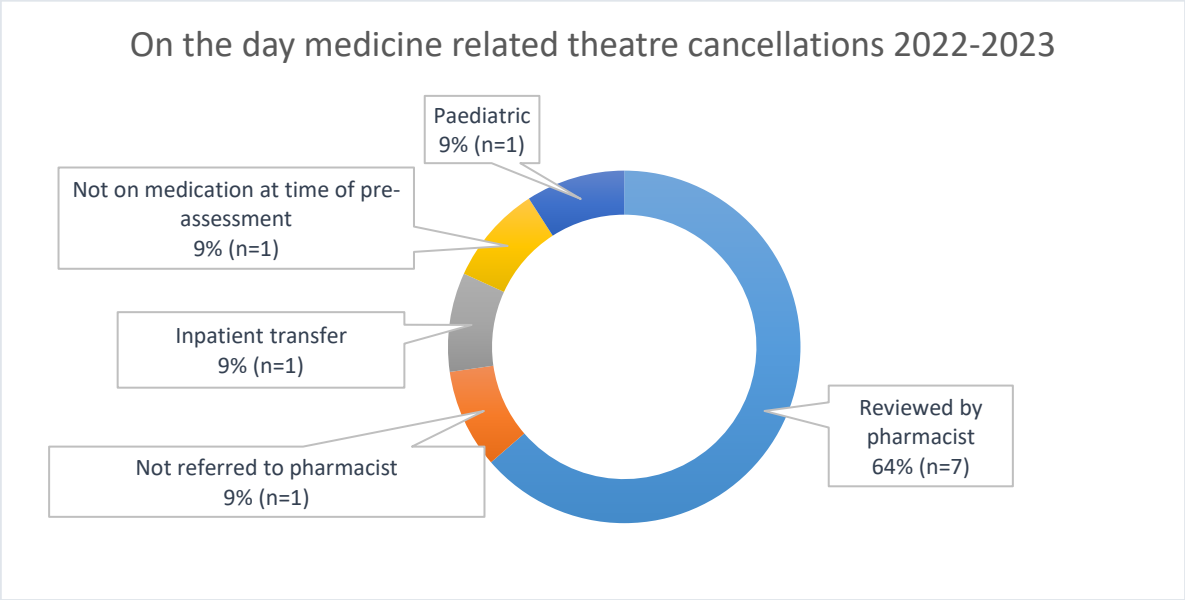

Figure 5: On the day medicine related theatre cancellations from April 2022-March 2023

Figure 5 shows that in the 2022–2023 financial year there were 15 on-the-day cancellations for medicine-related reasons. Four involved private patients and were excluded from the analysis. Of the remaining 11 cancellations, 9 (82%) were considered avoidable. Eight of these nine patients were taking anticoagulants or antiplatelets, and one was taking hormone therapy that had been started after pre-operative assessment.

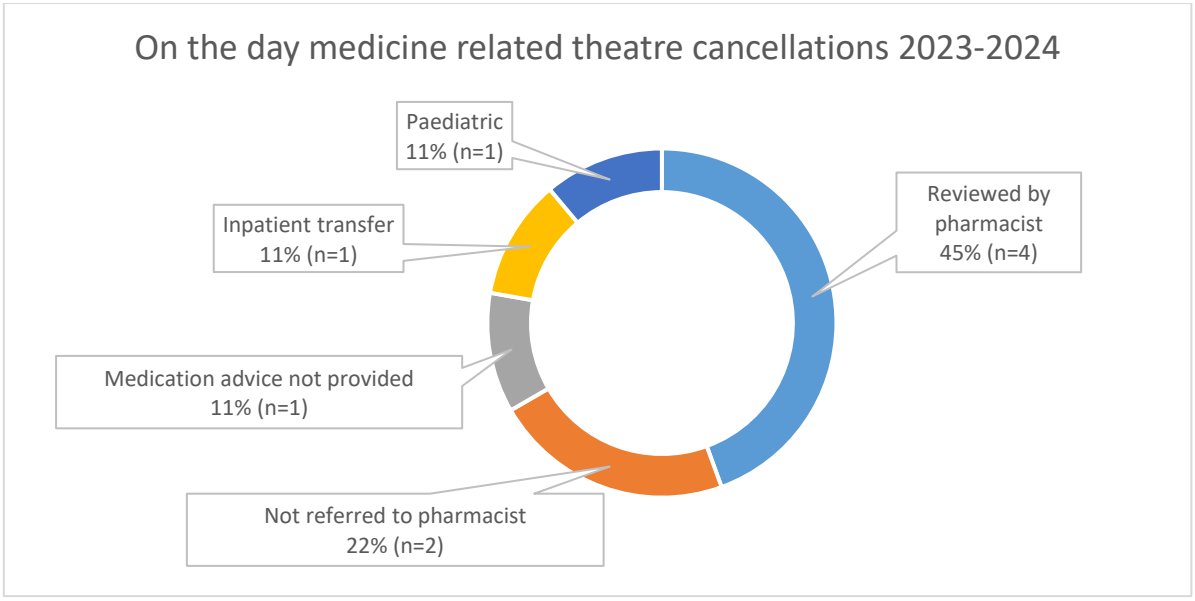

Figure 6: On the day medicine related theatre cancellations from April 2023-March 2024

Figure 6 shows that in the 2023–2024 financial year there were nine on-the-day cancellations for medicine-related reasons, of which seven (78%) were considered avoidable. Of the two cases not referred to the pharmacist, one involved a medicine that should have been stopped but was not identified by the nurse, and the other involved hormone therapy in a procedure usually considered low risk for venous thromboembolism, but where the patient's wider medical history indicated higher risk. In a further case, emergency contraception had been taken in the immediate pre-operative period and was considered to increase venous thromboembolism risk.

Figures 5 and 6 suggest that, in some cases, patients did not stop medicines as previously advised despite receiving verbal and written instructions following review.

After the introduction of the pharmacy technician-led pre-admission review, one cancellation was recorded in the subsequent period, representing a reduction compared with the earlier period.

Pre-admission review non-clinical interventions

A total of 148 non-clinical interventions were recorded by the pharmacy technician over five months, of which 61 (41%) were associated with postponement of forthcoming surgery.

- 57 patients were identified to be on a recent course of antibiotics (within 6 weeks), 25 (44%) of their operations were cancelled
- 19 patients had changes in medicines / medical status e.g. started on blood pressure medication, steroids or feeling unwell, 11 (56%) of their operations were cancelled
- 24 patients required escalation as seven had not stopped their medication as advised previously, 11 people required further pharmacist review, six people were referred to the nurse. 10 (42%) of operations were cancelled
- 48 patients were diabetic, on anticoagulants or high-risk medicines, and not referred to the pharmacy team. Of these, 19 had a pre-operative assessment booked less than 10 days prior to surgery, hence not identified earlier. Of the 48 patients, 15 (31%) had their operations cancelled, mainly due to not stopping their anticoagulation.

The pre-admission review identified a high number of patients who required intervention, including some whose surgery was subsequently postponed. While an automated reminder system may help prompt patients about medicines to stop before surgery, it would be less able to identify the wider issues described above. The Surgical Admissions and Procedure Unit (SAPU) also telephones all patients on the day before surgery to provide key information and

reinforce relevant advice. As part of this process, patients are asked whether they have followed the medicines instructions provided during pre-operative assessment.

Before the pre-admission review was introduced in December, SAPU nurses frequently highlighted patients to the pharmacy team shortly before surgery. This created pressure for staff, who then needed to liaise urgently with anaesthetists and surgical teams to decide whether patients could still proceed the following day. Since these issues are now being identified and managed earlier, calls from SAPU nurses have reduced, helping to avoid last-minute cancellations.

Limitations and Challenges

The pre-operative assessment pharmacy review processes are currently constrained due to lack of digital integration and administration support. As the Trust moves to rolling out an Electronic Patient Records system over the next year, efficiency will be maximised enabling streamlined reviews, better identification of patients that need to be reviewed and therefore increasing the volume of patients reviewed prior to surgery. An automated system may be helpful in reminding patients about medications to stop for surgery, but it would have to be developed in a smart way to recognise which medication needs to be stopped, the instructions provided, and when the surgery date is, considering these may vary on a case-by-case basis and not always dependent on the medication.

Pre-operative assessment is a specialist area that requires a high level of clinical knowledge. With limited training courses readily available specifically aimed for pharmacy technicians compared to those for pharmacists, this area may be challenging for self-directed learning and personal development without the appropriate support. It is usually led by pharmacists practising at specialist or advanced pharmacy practice level, with early careers level pharmacists assisting in service delivery as rotational pharmacists. It may present a steep learning curve for less experienced pharmacy technicians. Additionally, there is also a gap for education and training aimed specifically for pharmacists and pharmacy technicians in pre-operative assessment, so it is dependent on in-house training, or attendance of courses aimed at the nursing workforce.

Knowledge of when to refer or escalate complex patients or queries to the appropriate nurse, anaesthetist or pharmacist relies on developing pharmacy technicians' experience of this specialist area where there is a need to consider a holistic approach to peri-operative care and not just focus on the medicines management. Shifting the mind-set of pharmacy technicians from delivering their traditional role and empowering use of their clinical knowledge and harnessing their skills is required.

Building resilience and innovative staff models within a service may be challenging. Contingency for absence leave e.g. annual/ study/ sick leave is required to maintain a high-quality service. Employing rotational pharmacy technicians may mitigate this to some extent however the frequency and intensity of training in the highly specialist area can be burdensome.

Scaling up a pharmacy technician's capability relies on access to the relevant guidelines, policies, standard operating procedures and support and training.

Conclusion

The pharmacy technician integrated well into the pre-operative assessment multiprofessional team and has been a well-respected and an indispensable resource. Working in pre-operative assessment can be rewarding for pharmacy technicians due to the ability to positively influence patient healthcare by medicines optimisation, prehabilitation and making clinical interventions. There is potential to develop or refine transferable skills essential for the pharmacy technician workforce. Pre-operative assessment clinics are a high paced and busy environment, demanding skills such as prioritisation, multitasking, organisation, communication, decision-making, attention to detail, working as a team and ability to manage own case load.

Working in a pre-operative assessment clinic can provide a varied experience as colleagues will be exposed to a wide variety of patients and surgical interventions. The pharmacy technician is required to learn about medications that may be new or unfamiliar to them. In addition, they acquire knowledge about medical conditions and are provided with information about basic surgical procedure details before considering peri-operative planning and decision making.

Besides building on individual knowledge and skills, the pharmacy technician has directly and indirectly contributed to the education and training for pharmacists and nurses. They have assisted in ongoing education and training for the pre-operative assessment nurses, foundation trainee pharmacists, undergraduate pharmacy students and pharmacy technicians during clinical practice and by sharing case-based discussions. Their presence has also released time for the pre-operative assessment pharmacists to upskill e.g. receiving training from anaesthetists and utilising independent prescribing skills to lead on the pre-operative anaemia pathway.

Embedding the pharmacy technician in pre-operative assessment has enabled workload pressures of the wider multiprofessional team to be shared. By completing a higher proportion of medication histories, the workload for ward-based pharmacy technicians is also alleviated,

enabling their skills to be maximised in other clinical areas. Supporting the pre-operative assessment pharmacists and sharing their workload has enabled a transformation in their role e.g. streamlining the anaemia pathway which has also directly impacted on reducing notes review caseload for anaesthetists.

The pharmacy technician has contributed to the provision of enhanced quality of care by making appropriate reviews, clinical interventions and supporting pharmacists so that together they are making a positive impact on quality of patient care. Completing medication histories earlier in the pre-operative assessment journey provides opportunity for optimisation of long-term conditions and improving patient safety via timely medicines reconciliation on admission.

They have also helped to build efficiencies, e.g. reducing medicine related theatre cancellations and promoting use of patients' own medicines.

The project has achieved its aim by demonstrating the value of a pharmacy technician in pre-operative assessment clinics.

Future directions

The pre-operative assessment domain has transformed enormously following the pandemic, with the contribution of pharmacy staff's knowledge and skills still remaining slightly unexplored. The role of pharmacy staff in pre-operative assessment is very broad with a lot of opportunities for future expansion. Many Trusts start developing their service based on time and resource availability which may take time to cultivate and refine. As the contribution to enhancing patient care continues to flourish, some possibilities for utilising pharmacists and pharmacy technicians in the pre-operative assessment setting are envisioned below.

Satellite dispensing or near patient dispensing using pre-packs in pre-operative assessment clinics to enable faster access to some medicines may provide benefit e.g. where long term medical conditions are optimised in clinic and there may be a delay in obtaining prescriptions and medications from primary care; some discharge medications e.g. Venous Thromboembolism (VTE) prophylaxis supplied in advance therefore easing burden on the discharge process (including discharge prescriptions) from surgical wards and enhancing patient satisfaction. Additional access to pre-operative bridging therapy, staphylococcus eradication, pre-loads, antibiotics etc. could also be provided.

Many NHS organisations may already have an established Perioperative medicine for older people having surgery (POPS) service pioneered by Guy's and St Thomas's Hospital with minimal or no pharmacy input. As is the ambition for the RNOH pre-operative assessment

team, making pharmacists and pharmacy technicians an integral part of this recognised service to optimise patient care may be a progressive approach.

Pharmacy led anaemia optimisation pathways – independent prescribing pharmacists may diagnose and treat anaemia with oral or intravenous iron, whilst pharmacy technicians may administer intravenous iron under patient group directions (PGDs) or be trained in administering medications. Whilst medication administration by pharmacy technicians and diagnosis and prescribing by pharmacists may have been an unimaginative way of working in this profession a few decades ago, this may now not be a revolutionary vision for pharmacy staff to contribute to high quality patient care and the wider healthcare system.

As the nursing workforce has its recruitment challenges in the pre-operative assessment field, there may be an opportunity for pharmacists to advance their role by carrying out pre-operative assessments for American Society of Anaesthesiologists (ASA) grade I/II patients[13]. RNOH has used this model with health care assistants hence there may be an opportunity for pharmacists to function in a similar approach at advanced or consultant level practice. Pharmacy technicians could also support with carrying out blood pressure checks, spirometry, point of care testing and reviewing investigations such as blood results, escalating to the appropriate multiprofessional team when necessary.

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Appendix 1 – Referral criteria for pharmacy review

This list is not exhaustive; it summarises circumstances when a pharmacy technician is expected to refer to the pharmacist. This can be during medicines review (where decision making is done by the pharmacist), peri-op plan review requires overall review by a pharmacist, but the pharmacy technician is able to assist in formulating a peri-operative plan. For all other patients, the pharmacy technician can review independently when competent, with support from or escalation to a pharmacist when required.

Medications to be reviewed or checked by a pharmacist

- Antiplatelets e.g. Aspirin, Clopidogrel, Ticagrelor, Prasugrel, Dipyridamole
- Anticoagulants e.g. LMWH, Warfarin, DOACS – Dabigatran, Rivaroxaban, Apixaban,
- Antibiotics for chronic infection suppression
- Chemotherapy
- Clozapine or Lithium
- Hydroxycarbamide/ Hydroxyurea
- Immunosuppressants e.g. Tacrolimus, Sirolimus, Cyclosporin, Mycophenolate
- Immunoglobulin therapy
- Oral Acitretin, Alitretinoin, Isotretinoin
- MAOI's e.g. Phenelzine, Isocarboxazid, Tranylcypromine, Moclobemide
- Medications for substance dependence - Methadone liquid or Buprenorphine (Subutex® sublingual tablets/ Sixmo® implant / Buvidal® injections)
- Methotrexate/ Biologic therapy/ JAK inhibitors e.g. Adalimumab, Etanercept, Infliximab, Rituximab, Baricitinib, Tofacitinib etc
- Somatostatin analogues e.g. Lanreotide, Octreotide

Conditions to be referred to a pharmacist when identified during medical history

- Adrenal insufficiency/ Addison's Disease – long term/ high dose Prednisolone (≥10mg) or Hydrocortisone
- Dementia
- Diabetes insipidus
- Diabetes mellitus – uncontrolled, compliance concerns, insulin pumps, prolonged NBM period

- Dialysis patients
- Epilepsy
- Haemophilia or blood disorder patients that may require pharmacy input for peri-operative plans
- HIV
- Myasthenia Gravis
- Parkinson's Disease

Other types of referrals to the pharmacist

- Blood refusers
- Patients with allergies to anaesthetic agents or multiple antibiotics/ analgesia
- Patients expected to have prolonged NBM period, on regular antiemetics pre-op or history of post-operative nausea and vomiting that may require alternative liquid or injection formulations
- PEG/ NG/ TPN feeding patients
- Smokers - for detailed cessation advice
- Medically prescribed cannabis

Appendix 2 – Clinical role of pre-operative assessment pharmacy technician

- Medication history taking, advising on essential medicines to be continued or stopped for surgery and making key interventions prior to surgery
- Providing verbal and written advice about medicines to stop prior to surgery
- Assisting in formulating peri-operative plans by liaising with specialist consultants, nurses and wider multiprofessional team
- Informing patients to bring their own medicines and advising on keeping simple analgesia at home
- Counselling on common medications to be expected post-operatively and on discharge
- For patients requiring anticoagulation bridging pre-operatively or VTE prophylaxis post-operatively, teaching LMWH injection technique using dummy syringes, helping to address patient's concerns and ease anxiety
- Early identification of extra support required to support adherence to medications and opportunities for medicines optimisation e.g. in diabetes, hypertension, anaemia
- General health promotion e.g. smoking cessation and reducing alcohol intake
- Collaborative working and making referrals to wider multiprofessional team e.g. acute pain team, dietitians
- Dealing with high level pre-operative assessment medicine related queries received from key service users and escalate complex ones to the pharmacist
- Providing general support and expert advice to the pre-operative assessment multiprofessional team
- Supporting audits and service improvement in pre-operative assessment
- Contribute to training and education for nurses, doctors and pharmacy colleagues (foundation trainee pharmacists, pharmacy technicians, MPharm placement students) in specialist area

Example of clinical intervention by pharmacy technician:

An example of the knowledge and skill accomplished in clinical practice is demonstrated in the intervention below.

A 69-year-old female patient was listed for arthrodesis, major lower limb procedure for two stage reconstruction of foot deformity and flap by plastic surgery team. Referred to pharmacy team due to medical history of myasthenia gravis. Pharmacy technician contacted microbiology team to obtain specific surgical prophylaxis plan This is because the patient had an allergy to penicillin and there are limited choices of antibiotics to use peri-operatively due to cautions with myasthenia gravis. This prompted a multiprofessional team discussion, and the microbiologist recommended formal allergy testing prior to procedure therefore referral made.

On receipt of the perioperative plan and the recommended choice of antibiotic, the pharmacy technician ensured the antibiotics were prescribed, dispensed and available in theatre on the morning of surgery, with appropriate communication to the relevant surgical, anaesthetic and pharmacy staff.

This intervention required the pharmacy technician to have specific knowledge to identify that the surgical prophylaxis protocol (using flucloxacillin and gentamicin is not suitable and requires peri-operative planning).

Providing comprehensive training and education to pharmacy technicians to recognise the need for this intervention and action they could take (beyond carrying out a medication history and identifying any medicines to stop) enabled delivery of enhanced patient care.

An intervention such as this would not routinely be highlighted by the pre-operative assessment nurses and anaesthetists; arguably it would not need pharmacist intervention as the pharmacy technician resolved this independently with escalation to the pharmacist where necessary.

Additional clinical roles that could be supported by the pre-operative assessment pharmacist (and in some cases pharmacy technician) – some are not currently provided at RNOH

- Assist with prescribing regular medicines for admission or medications specified in pre-operative plans e.g. tranexamic acid or desmopressin
- Provide bridging plans for anticoagulants – includes prescribing, teaching administration and providing clear written instructions
- Supply staphylococcus decolonisation medications to patients under a PGD
- Supporting the anaemia pathway – prescribing intravenous iron or epoetin and arranging supply for outpatient clinics

- Support diabetes specialist nurse with formulating peri-operative plans for insulin pump patients
- Provide a consistent service to paediatric and private patients and for patients admitted through other pathways e.g. interhospital transfers
- Transcribing/ prescribing of regular medications, post-operative medications as per agreed protocols or discharge summaries
- Completing VTE risk assessments and prescribing VTE prophylaxis
- Prescribing antimicrobial prophylaxis as per agreed protocols
- On the spot initiation or optimisation of treatment of long-term conditions such as diabetes, high blood pressure, atrial fibrillation, heart failure etc.