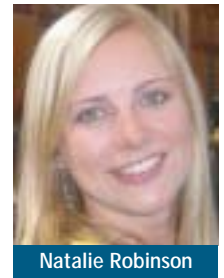


Facilitating A Timely Discharge: Transformation Of A Hospital Pharmacy Service

Natalie Robinson, Clinical Pharmacist; Joan Wareham, Principal Pharmacist; Kath Ward, Chief Technician:

Pharmacy Department, Stockport NHS Foundation Trust

Correspondence to: natalie.robinson@stockport.nhs.uk



Natalie Robinson

Summary

This paper:

- indicates the rate-limiting steps and the distribution of workload in the discharge process
- identifies actions to improve the process
- demonstrates that improvement was made following the implementation of some actions.

Background

The demand on the NHS is ever-increasing as hospital admissions reach the highest level in a decade.¹ As bed pressures increase in secondary care, the need for greater efficiency in the discharge process becomes more apparent. As part of the national Quality, Innovation, Productivity and Prevention (QIPP) agenda, the streamlining of hospital pharmacy discharge services will enable greater productivity and the easing of bed pressures by reducing length of stay at a time when widespread savings need to be made in hospital budgets.²

At Stockport NHS Foundation Trust, innovation through technology has been well accepted as a means to improve pharmacy services. Efficiencies have already been made through the introduction of

automated dispensing systems, the use of electronic discharge health care records (HCRs), the integration of electronic shared healthcare records (SHR) between primary and secondary care, which enables more efficient medicines reconciliation, and the introduction of electronic prescribing and medicines administration software (ePMA) used for prescribing, monitoring and ordering of medication.

Further service developments have also been made through skill mix review, one-stop dispensing and a move towards ward-based dispensing. At present, discharge prescriptions are dispensed at four main sites across the hospital; three separate ward-based dispensing teams and the main pharmacy department. The three discharge teams, which each cover three medical wards, consist of one pharmacist and one technician. They are situated at ward level and clinically check, dispense and accuracy check all of the discharge prescriptions for that area. Surgical discharge prescriptions are principally processed at ward level by trained nurses through the checking and return of patients' own drugs (PODs), one-stop dispensing packs and TTO ('To Take Out'/discharge prescription) pre-packs. Surgical prescriptions that cannot be processed at ward level and the discharge prescriptions from the remaining medical wards not covered by pharmacy discharge teams are dispensed at the main pharmacy dispensary. At the

main dispensary, discharges are processed alongside outpatient prescriptions, clinical trials prescriptions and all of the stock and non-stock inpatient ward medication orders for the entire hospital.

In view of the QIPP agenda, further efficiencies were needed to reduce patient discharge delays without an increase in pharmacy staffing levels. A study was therefore carried out to identify the rate-limiting steps in the completion of a hospital discharge prescription with the primary aim of streamlining departmental procedures and identifying any bottlenecks. A secondary aim of the study was to ascertain the discharge prescription workload across the hospital throughout the day to improve deployment of the pharmacy workforce to meet demand. Achieving these aims will enable the hospital pharmacy department to progress patient discharges faster in line with the QIPP agenda, ultimately helping to relieve bed pressures in secondary care.

Aims and objectives

- Identify rate-limiting steps in the completion of hospital discharge prescriptions to streamline departmental procedures.
- Ascertain discharge prescription workload across the hospital to improve the deployment of pharmacy workforce to meet demand.

"As bed pressures increase in secondary care, the need for greater efficiency in the discharge process becomes more apparent."

Methodology

For one month every discharge prescription (TTO) processed through both the main dispensary and the three ward pharmacy discharge teams was recorded on a data collection sheet. The types of data recorded are shown in Figure 1.

This paper documents the analysis of the data collected and identifies actions to improve the discharge process.

Results

During the month of April 2014, 914 TTOs were dispensed via the main pharmacy dispensary and a further 531 TTOs were dispensed by the ward-based discharge teams.

Table 1 demonstrates that, on average, the time taken to complete a TTO following receipt by pharmacy was faster when carried out by the ward-based pharmacy team, with 7.6% more TTOs

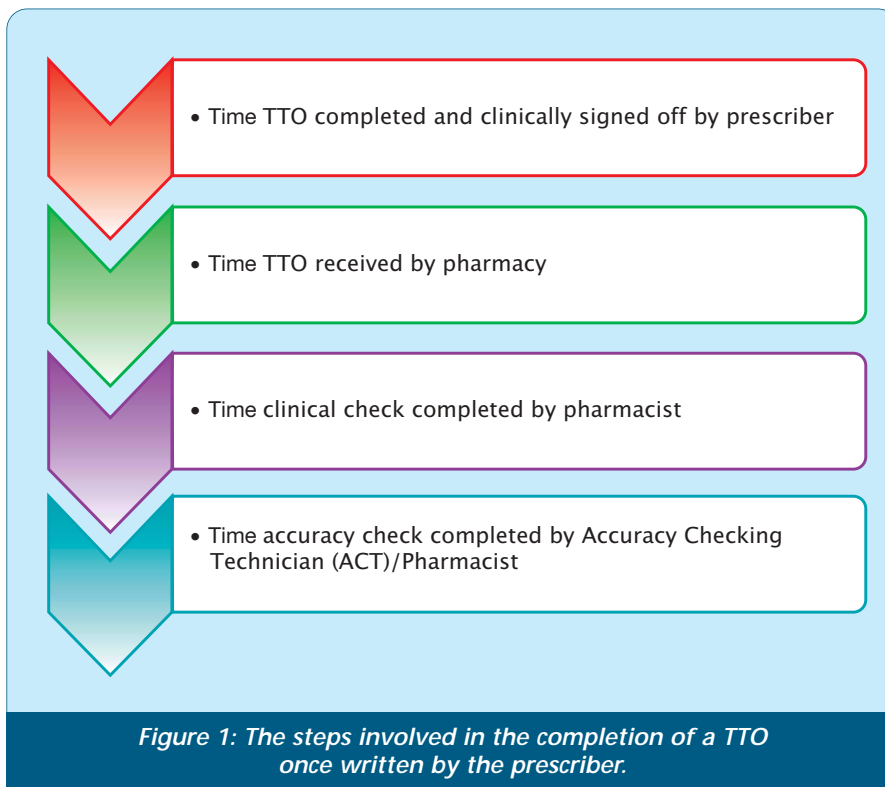
being completed within one hour of receipt. However, two Key Performance Indicators (KPIs) at Stockport NHS Trust stipulate that 100% of TTOs should be completed within three hours of receipt, with a further aim for the discharge teams to complete TTOs on the ward within one hour. From Table 1, it is clear that improvements need to be made to achieve these targets.

Rate-limiting steps

In line with the aims of the study, further analysis of the data was carried out to evaluate which steps of the discharge prescription process, as shown in Figure 1, were delaying the discharge.

The average time taken for the dispensary and ward pharmacy teams to complete steps in the discharge process is shown in Table 2. This indicates that there are a number of rate-limiting steps:

- Receipt of prescription from the ward.
- Delivery of completed prescription back to the ward.
- Delay in completion of the clinical check by the pharmacist.
- Delay in the dispensing and accuracy check of the TTO.



Where TTOs were completed	Average TTO turnaround	% completed within 1 hour	% completed within 2 hours	% completed within 3 hours
DISPENSARY	1 HOUR 41 MINS	30.8	68.4	88.7
WARD TEAMS	1 HOUR 26 MINS	38.4	77.2	90.5

Table 1: Completion rates for TTOs by dispensary and ward pharmacy teams

Where TTOs were completed	Average time from TTO clinical sign-off by prescriber to received by pharmacy	Average time from received to clinically checked	Average time from clinically checked to accuracy checked	Average TTO turnaround from time received in pharmacy
DISPENSARY	46 mins (46% within 20 mins)	36 mins (61% within 30 mins)	1 hour 5 mins (55% within 60 mins)	1 hour 41 mins
WARD TEAMS	21 mins (76% within 20 mins)	29 mins (73% within 30 mins)	57 mins (64% within 60 mins)	1 hour 26 mins

Table 2: Time taken for dispensary and ward pharmacy teams to complete steps in the TTO process.



Patients may need to wait hours for their TTO to be delivered

Receipt of prescription from the ward

Table 2 indicates that, when comparing the main dispensary and the discharge teams, the main mean difference in the delay for completion of TTOs was the receipt of the prescription from the ward following the clinical sign-off by the prescriber. On average, this delay increased the turnaround time of the TTO by 22 minutes. This delay is most likely a result of the physical time taken for ward staff/porters to deliver the TTO to the main dispensary when compared to the delivery of TTOs to the ward-based pharmacy teams.

Delivery of prescription back to the ward

In addition to delay in the receipt of the

prescription from the ward, anecdotal evidence suggested that once the TTO was completed, it was delivered immediately by the ward discharge teams to the ward thus enabling the patient to go home. However, for TTOs completed in the main dispensary, patients may have to wait a number of hours for their TTO to be delivered by the porters' service, adding further to the discharge delay.

Time taken to complete clinical check

Table 2 indicates that in the main dispensary TTOs took on average 7 minutes longer to receive a clinical check compared to TTOs completed by the ward discharge teams. This is likely to result from the increased workload received in the main dispensary (72%

more TTOs compared to the ward teams). All of these TTOs required a clinical check from a singular responsible pharmacist, creating a bottleneck in the work flow. Meanwhile, on the medical wards, each of the three ward-based teams had at least one pharmacist available to complete clinical checks.

Time taken to complete dispensing process

In addition to the delay to receive a clinical check, Table 2 also demonstrates that in the main dispensary TTOs took on average a further 8 minutes to be dispensed and accuracy checked compared to those completed by the ward-based teams. This could perhaps again be attributed to the increased

“... the main mean difference in the delay for completion of TTOs was the receipt of the prescription from the ward . . .”

volume of TTOs received in the main dispensary compared to on the wards. Another reason could be that ward order sheets, controlled drug orders, clinical trials and outpatient prescriptions are all processed in the dispensary alongside the discharge prescriptions.

Due to the findings, and to investigate the secondary aim of the study, further analysis was carried out to compare and contrast the discharge workload distribution seen across all of the dispensing sites at different times of the day.

Workload distribution

Figure 2 displays an uneven distribution of workload for the pharmacy department across the day. The peak hours for receipt of TTOs were pre- and post- the 13:00-14:00 pharmacy lunch hour, with 44.1% of TTOs being received in the main dispensary and by the discharge teams between 12:00 and

15:00. This timing coincides with the completion of morning ward rounds by the consultants, enabling their junior doctors to write the TTOs.

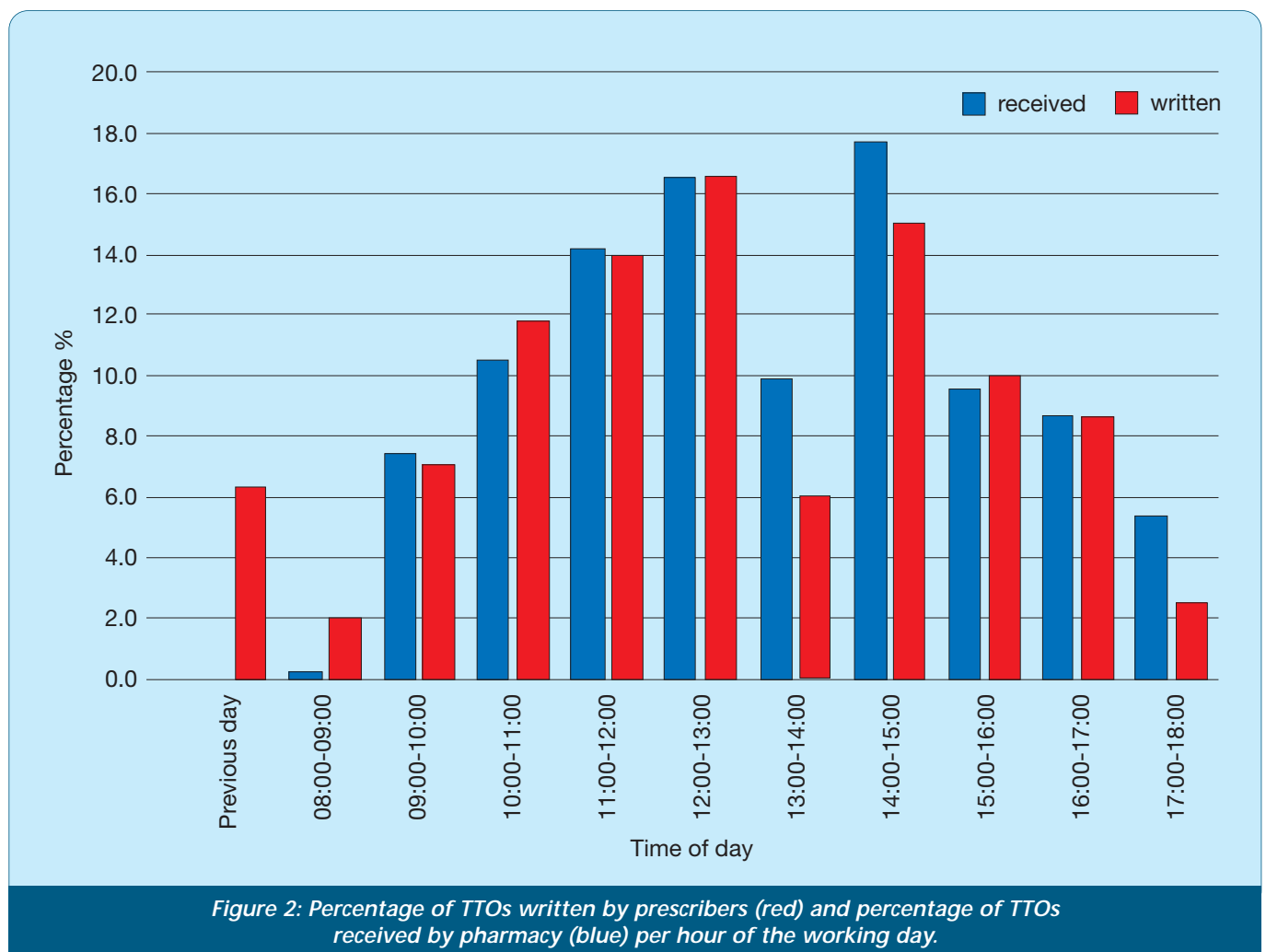
In contrast to these central peaks in workload, only 6.1% of TTOs were written by prescribers the day before discharge and only 2% were written before 9:00am on the morning of a patient's discharge.

A further 5.3% of all TTOs were received between 17:00 and 18:00; a time when only minimum dispensary cover remains to complete leftover inpatient medication orders and discharge prescriptions.

The pattern of workload depicted by Figure 2 leads to a delay in the time taken by the pharmacy department to turn TTOs around, as shown by Figure 3. Peaks in workload appear to create a bottleneck in the pharmacy department, with TTOs queuing to be clinically checked, dispensed and accuracy checked, ultimately leading to

an overall delay in the discharge.

Figure 3 demonstrates that 41% of the TTOs that took longer than 3 hours to complete in the main dispensary were received between 09:45 and 11:45, correlating with the workload distribution shown in Figure 2. Furthermore, 100% of the discharge prescriptions that took longer than 5 hours to complete were received between 09:45 and 12:00. Upon further analysis of the data, these tended to be anomalous 'problem' prescriptions which had a rate-limiting step outside of the scope of this study: for example, TTOs held up at the clinical checking stage for prolonged periods of time whilst pharmacists were unable to contact the prescriber to answer a query, TTOs that required sourcing of medication from another hospital to complete the TTO or TTOs awaiting warfarin yellow books to be completed by the anticoagulation department before it could be released from pharmacy.



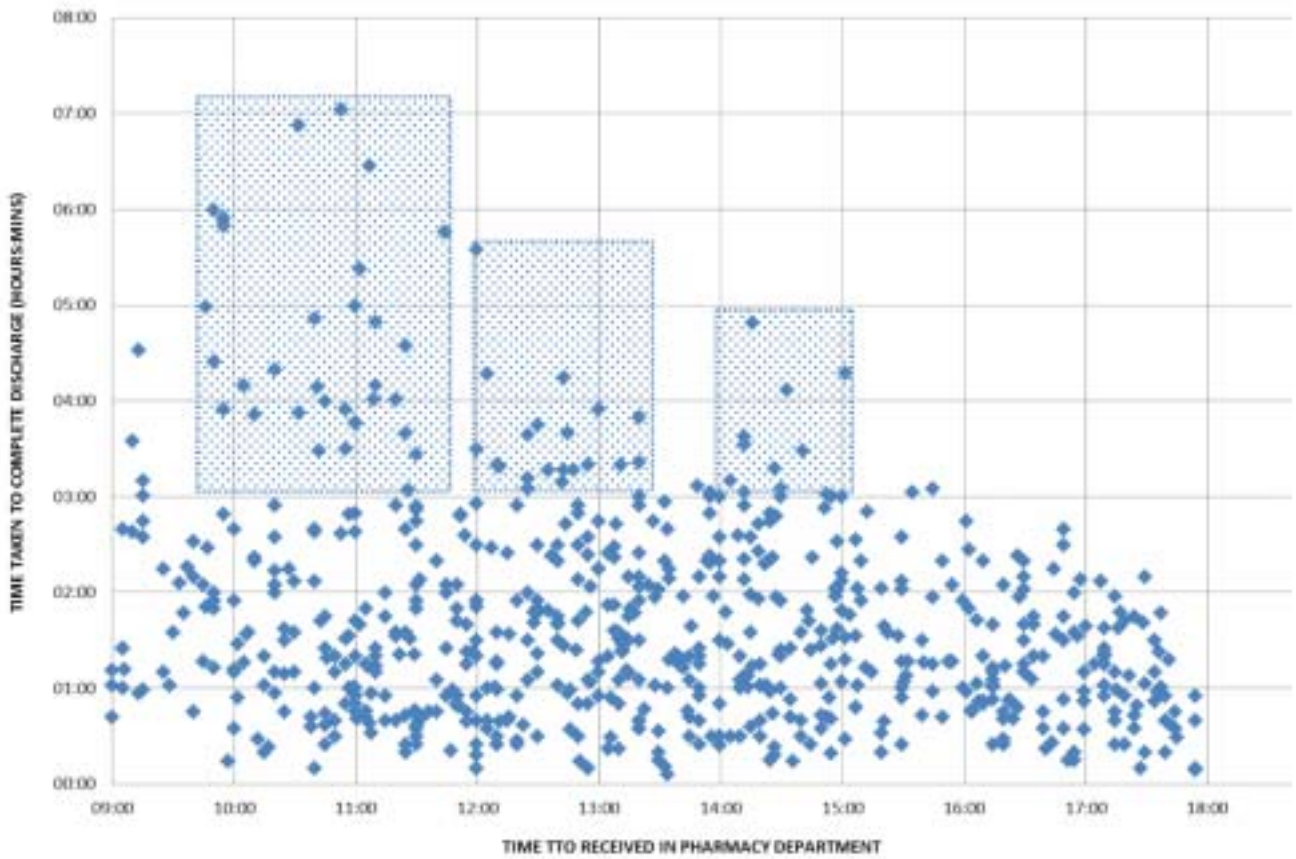


Figure 3: Scatter graph showing the time taken for the pharmacy department to complete a TTD once received in the main dispensary at varying times during the day. Boxes highlight clusters of TTDs which took a significant amount of time to complete (>3 hours).

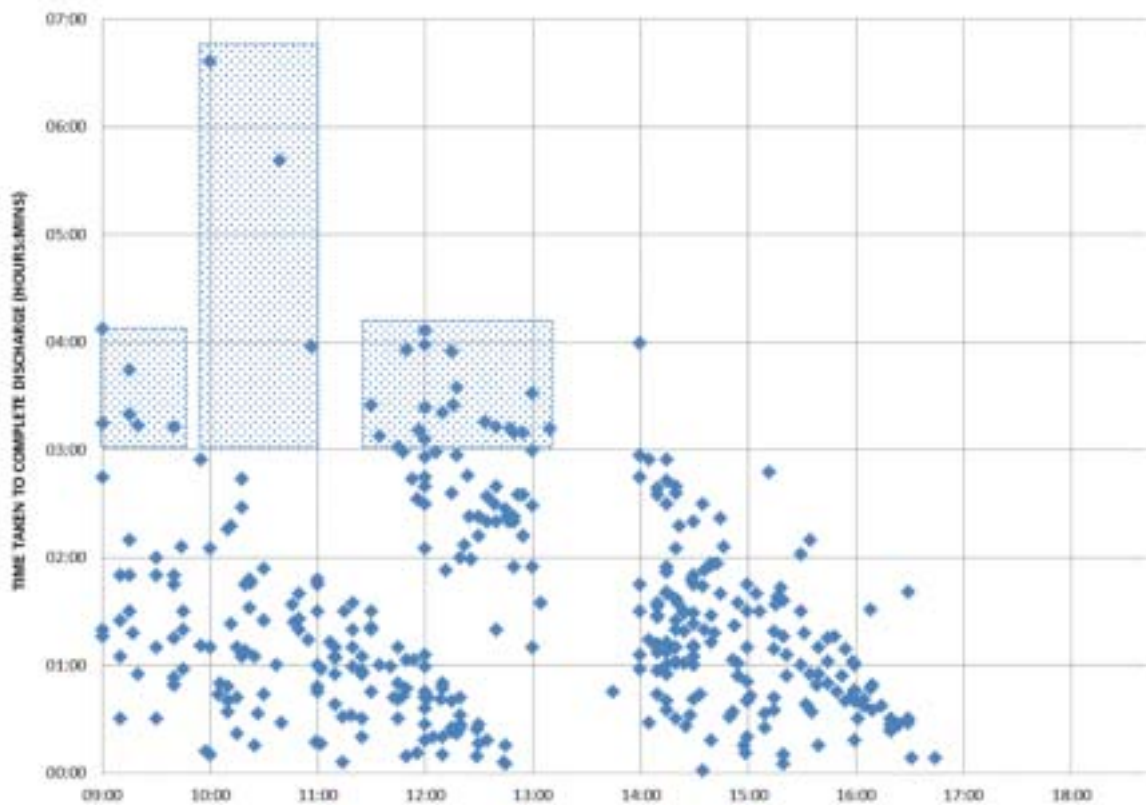


Figure 4: Scatter graph showing the time taken for the pharmacy department to complete a TTD once received by the ward discharge teams at varying times during the day. Boxes highlight clusters of TTDs which took a significant amount of time to complete (>3 hours).

In Figure 3, two further peaks can be seen between 12:00 until 13:30 and then from 14:00 until 15:00, representing a further 47% of the TTOs that took greater than 3 hours to turn around. As previously discussed, the large volume of discharges received in the main dispensary within these time frames are likely to have contributed towards delays in TTO completion, pushing the TTO turnaround time beyond the 3 hour target.

The second root cause in these delays is likely to be the result of the standard departmental lunch break taken between 13:00 and 14:00, causing a delay of an extra hour in the completion of numerous TTOs. This trend was most obvious amongst the ward discharge teams, as shown by Figure 4. Only 3% of TTOs were received

between 13:00 and 14:00, as there was no pharmacy discharge team cover on the wards at this time.

Figure 4 displays similar trends when compared to Figure 3 in terms of clustering of the TTOs that took longer than 3 hours to complete; 68% of TTOs that took over 3 hours to complete were received by the ward based discharge teams between 11.30 and 13:30 and 100% of TTOs that took longer than 5 hours to complete were received between 10:00 and 10:45.

Some of the longest TTO turnaround times on the ward based pharmacy teams, shown in Figure 4, were as a result of the prescriptions not being required until the following day, for example if a patient was deemed medically fit for discharge but

awaiting re-instatement of packages of care. These were therefore prioritised below the TTOs required immediately and so took longer to complete overall.

Action plan for improvements

From the results of this study, a number of actions were identified, as shown in Table 3 (rate limiting steps) and Table 4 (workload distribution) to improve the discharge process.

A number of these action plans are to be carried out in conjunction with new Trust schemes to facilitate timely discharges, for example the Advantis Ward Electronic Whiteboard System.

Rate-limiting steps	Action plans: Streamlining departmental procedures
Delay in receipt of TTOs from the wards	<ul style="list-style-type: none"> • Pharmacy to utilise the new Advantis Ward Electronic Whiteboard System to electronically 'receive' TTOs, as the project is rolled out across wards in the Trust • Advantis Ward Electronic Whiteboard System automatically highlights when prescriber completes writing TTOs for a patient • Nursing staff to electronically send TTO to pharmacy once patient ready for discharge • Pharmacy staff to 'receive' electronic TTO from the system on both dispensary and ward teams • Pharmacy staff to print off and work from electronic copy, eliminating delay in receipt through manual delivery of TTO by nurses/HCAs/porters
Delay in delivery following completion of TTOs in the dispensary	<ul style="list-style-type: none"> • Request funding for a pharmacy-run round-robin porter system • Cut off time introduced for medication orders and TTOs for outside hospitals, therefore ensuring that medication is sent with transport in the morning delivery and that the minimum number of taxis required for any additional orders can be sent to their destinations earlier in the afternoon
Delay in the clinical check and dispensing and accuracy check of TTOs due to greater volume of TTOs received in the main pharmacy compared to the ward teams	<ul style="list-style-type: none"> • Re-distribution of trained technicians for greater dispensary cover • Greater Pharmacy Support Worker cover throughout the day, in the dispensary, to ensure all other medication orders are efficiently dispensed • No Emergency Department (ED) or outpatient prescriptions accepted at the main dispensary on Saturdays and Sundays (HP10 prescription pads to be distributed to ED and clinics) so that the weekend pharmacy team can focus on discharges • Plans for the opening of a newly built facility, 'The Pharmacy Shop', which would be the dispensing hub for all of the outpatient prescriptions enabling the main dispensary to focus only on inpatient orders and discharge prescriptions

Table 3: Summary of the rate-limiting steps in the discharge prescription process, leading to slower TTO turnaround in the main dispensary and action plans for improvement through the streamlining of departmental procedures.

Workload distribution	Action plans: Improved deployment of pharmacy workforce to meet demand
Greater volume of TTOs received in the main dispensary compared to the ward-based teams	<ul style="list-style-type: none"> • As above for action plan 1.4 • Introduction of more ward-based pharmacy teams to cover more of the medical/surgical wards, thereby reducing the workload in the main dispensary
Delays in TTOs received prior to the lunch hour (13:00-14:00)	<ul style="list-style-type: none"> • Staff working in the dispensary evenly assigned split lunches to allow for greater dispensary cover between 13:00-14:00 • Introduction of a discharge team to work over the lunch hour in the dispensary and complete any discharges received but not completed prior to the lunch break • Ward-based discharge teams to bring back urgent discharges to the dispensary to be completed over the lunch hour • Main dispensary phone to be put on answerphone between 13:00 and 14:00 weekdays and for the majority of weekend hours (urgent clinical queries answered via a bleep system) to allow available staff to focus on dispensing and accuracy checking of TTOs
Peaks in workload, e.g. large volume of TTOs received pre- and post- lunch hour, leading to TTO delays	<ul style="list-style-type: none"> • Review of medical working practice: working with the Business Groups to attempt to stagger when ward rounds are carried out • Introduction of 'Escalation' procedure: recruiting pharmacy staff from other duties to relieve pressure and reduce discharge times when the volume of workload increases beyond current pharmacy staffing capacity • Ward pharmacy technicians to prioritise discharge prescriptions above all other ward work i.e. ward discharge teams to help complete TTOs from other ward pharmacy teams prior to doing any of their other ward work, such as locker top-ups, to alleviate workload pressure
Very few TTOs written early in the morning, or the day before, the day of discharge	<ul style="list-style-type: none"> • Pharmacy to work in conjunction with wards through the introduction of new working schedules by the Trust to drive early day discharges: <ul style="list-style-type: none"> • Board rounds on ward to identify suitable early discharges and identify next day's discharges • KPIs to write TTOs and transfer patients to the Transfer Unit (discharge lounge) by 11am • Write next day's TTOs by 3pm for pharmacy to dispense
Significant workload received in pharmacy between 17:00 and 18:00 (when skeleton staffing in situ in the pharmacy department from 17:15)	<ul style="list-style-type: none"> • Changing the closing time of the dispensary to 17:00 three days a week to encourage earlier writing of TTOs, and to help ensure prescribers are still available to be contacted for prescription queries once TTOs are received in the pharmacy department • Changing staffing working hours to provide greater evening cover

Table 4: Summary of the workload distribution in the hospital across the day and the action plans to streamline departmental processes and improve deployment of the pharmacy workforce to meet demand.

Progress in practice

Following implementation of some of the identified actions, a repeat of the data collection was carried out 10 weeks later,

for a further month. The results in Table 5 demonstrate that, despite an increase in the number of TTOs dispensed by the pharmacy department during this time period, both the dispensary and the ward

pharmacy teams showed an improved TTO turnaround time. A greater percentage of TTOs being completed within the one and three hour target timeframes was also recorded.

DISPENSARY RESULTS	Initial results (April)	Repeat results (July/August)	WARD TEAM RESULTS	Initial results (April)	Repeat results (July/August)
Total number of discharges	914	1148	Total number of discharges	531	565
Average TTO turnaround	1 hour 41 mins	1 hour 30 mins	Average TTO turnaround	1 hour 26 mins	1 hour 21 mins
% completed within 1 hour	30.8	36.9	% completed within 1 hour	38.4	42.1
% completed within 3 hours	88.7	94.2	% completed within 3 hours	90.5	95.7

Table 5: Comparison of completion rates for TTOs dispensed in the main dispensary and by ward pharmacy discharge teams following the implementation of key actions

Conclusions

It has been possible to identify the rate-limiting steps and the workload distribution involved with the discharge process. From this, key actions to improve the process have been identified and improvement has been demonstrated after implementation of some of these.

The changes being implemented by the department have had a positive effect on pharmacy workflow and, therefore, the rest of the action plan will continue to be implemented.

Following the full implementation of all actions, further follow-up studies will be carried out repeating the same data collection process. This will help to ascertain whether further improvements in the pharmacy discharge service have been made, such as achieving the pharmacy discharge KPI.

The resolution of inefficiencies in the pharmacy discharge service should enable the hospital pharmacy department to progress patient discharges even faster, ultimately helping to relieve bed pressures in this secondary care setting.

Acknowledgements

Paul Buckley for his guidance and advice

Declaration of interests

- **Natalie Robinson:** None
- **Joan Wareham:** None
- **Kath Ward:** None

“It has been possible to identify the rate-limiting steps and the workload distribution involved with the discharge process.”

REFERENCES

1. Barnes S. Health Service Journal. Increase in hospital admissions. November 2013. Available at: <http://www.hsj.co.uk/news/increase-in-hospital-admissions/5065093.article#>. [Accessed July 2014].
2. Appleby J, Galea A, Murray R. The Kings Fund. The NHS Productivity Challenge: Experience from the front line. May 2014. Available from: http://www.kingsfund.org.uk/sites/files/kf/field/field_publication_file/the-nhs-productivity-challenge-kingsfund-may14.pdf. [Accessed July 2014].