

## Pharmacy innovation at discharge - impact of pharmacist non-medical prescribing on quality and streamlining processes

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### Abstract

#### *Title*

Pharmacy innovation at discharge - impact of pharmacist non-medical prescribing on quality and streamlining processes.

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#### *Introduction*

Having recognised the issues arising from an ineffective discharge process, the Pharmacy Department undertook a project to assess how the process could be changed to bring about benefits to patients and the Trust. Data was collected to determine if utilising prescribing pharmacists in the discharge process could realise benefits in terms of accuracy and timeliness of discharge.

#### *Methods*

A comprehensive baseline data collection was undertaken to understand the discharge process. Every step was timed so that any inefficiency could be identified, reviewed and improved without compromising safety. The prescribing error rate by the doctor and the accuracy of the documentation of changed medications were also recorded. The impact of a pharmacist prescriber and a satellite pharmacy were subsequently measured using the same data collection tool.

#### *Results*

During the baseline data collection the average time taken to discharge a patient was 8 hours and 34 minutes. The utilisation of an Independent Prescribing Pharmacist (IPP) reduced the discharge process to 5 hours. The subsequent introduction of a satellite pharmacy reduced the entire discharge process further to just over 3 hours. The prescribing error rate fell from 22% to 0.7% with an IPP. The accuracy of information transferred to general practitioners (GPs) increased from 46% to 99% with an IPP.

#### *Conclusion*

The initial data collection showed that the discharge process at the Trust was inefficient and potentially unsafe due to prescribing errors by doctors on the discharge prescription and a lack of information being transferred to a patient's GP in primary care. The impact of IPPs demonstrated clear benefits, with the process becoming more streamlined as the patient could be discharged earlier in the day with a more accurate and complete discharge prescription.

**Keywords:** Independent Prescribing Pharmacist, Discharge Pharmacist, non-medical prescribing, NMP, discharge, transfer of information on discharge, satellite pharmacy, prescribing errors, time to discharge.

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### Background

A review of patient complaints relating to medicines at Lancashire Teaching Hospitals identified that a high proportion related to poor experience at the point of discharge from the hospital, largely due to delays in receiving discharge medicines. A review of incident reports regarding patient safety issues at discharge also identified aspects of the process in need of

improvement. In addition, a large proportion of concerns and complaints raised by local general practitioners (GPs) about medicines related to insufficient information on the discharge summary, especially around aspects such as medications started, changed or stopped during admission. Anecdotally, a similar picture is seen in many Trusts across the UK, indicating there is a clear need to revise the current processes for the management of prescriptions at discharge.

## Introduction

Having recognised the issues arising from an inefficient discharge process, the Pharmacy Department undertook a project to assess how the process could be changed to bring about benefits to patients and the Trust. The local Clinical Commissioning Groups were engaged at an early stage to ensure benefits to the wider health economy were captured. A literature search was undertaken to identify established alternative processes for completing a secondary care discharge prescription via such mechanisms as non-medical independent prescribers, but yielded no positive results. The majority of published work of independent prescribing pharmacists (IPPs) related to niche roles, working in specific clinical specialities.<sup>1,2</sup> However, data from Northumbria Healthcare NHS Foundation Trust described the very successful deployment of prescribing pharmacists in a generalist role supporting patient admissions.<sup>3</sup> Based on this, a three-phase data collection project was devised to determine if utilising prescribing pharmacists in the discharge process could realise benefits in terms of accuracy and timeliness of discharge.

## Objectives

The key objectives of the project were to quantify the impact of pharmacy services in a revised discharge process by:

- measuring the quality aspects of the discharge process such as the accuracy of prescribing and the accuracy of the information provided at the point of transfer of care to

GPs relating to medicines started, stopped or changed during admission

- measuring the time taken for all stages of the discharge process
- identifying the impact of a new satellite pharmacy located within the medical block of wards.

## Method

The data collection tool was developed and piloted in September 2014. Key stakeholders such as general managers, medical consultants and nursing staff were engaged throughout the pilot to provide input to the project and address concerns. The tool was designed to collect the following data:

- Prescribing errors.
- Accuracy of information captured in the initial discharge letter relating to medicines started, stopped or changed during the inpatient stay.
- Time taken for each step of the discharge process from the time the medical team decide a patient can be discharged on the ward round to the final step where the patient has all their medication and leaves the ward.

Three phases of data collection were planned. In the first phase (October/November 2014), a comprehensive baseline data collection (see Figure 1) was undertaken to capture the

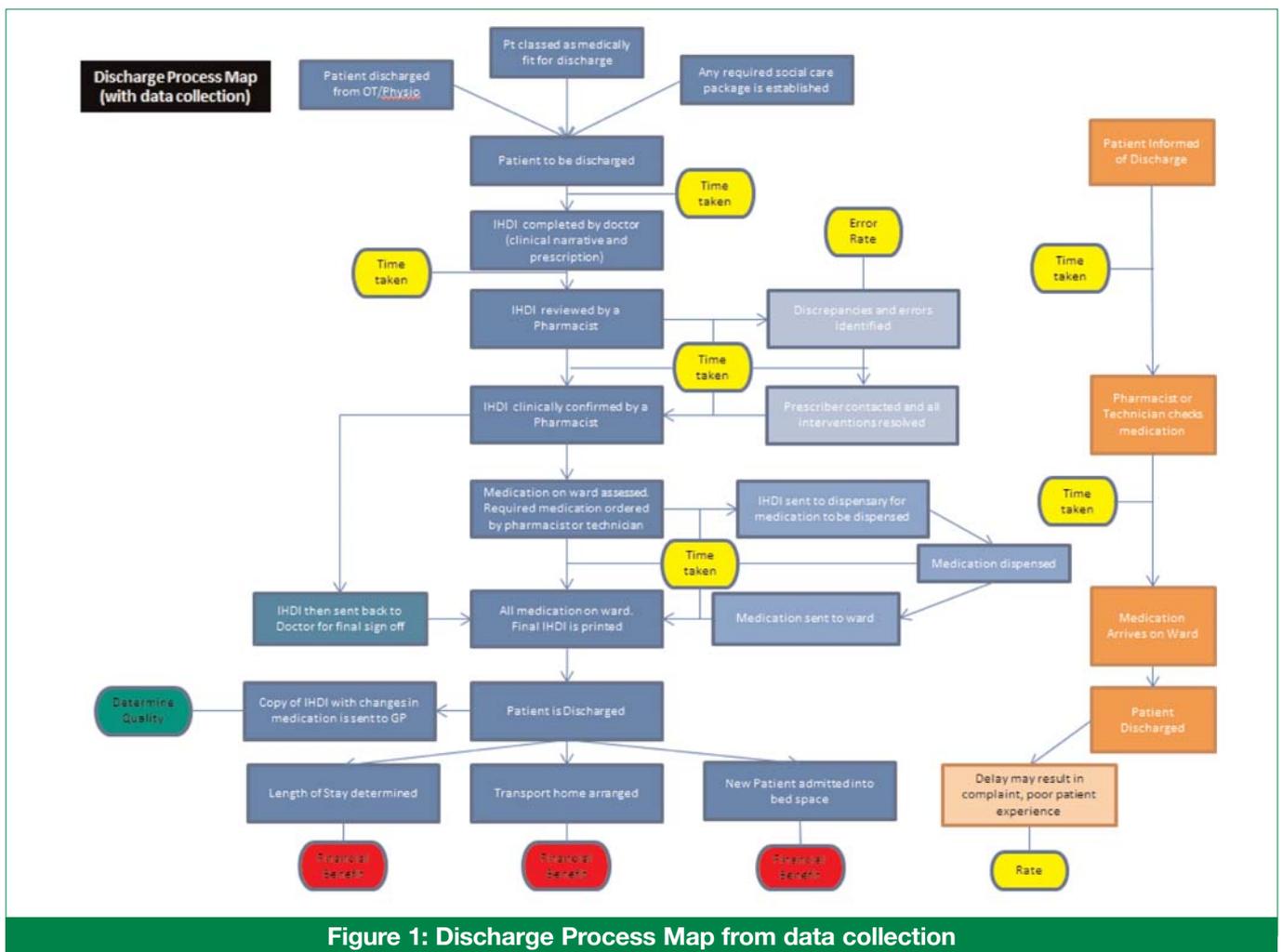


Figure 1: Discharge Process Map from data collection

effectiveness of the traditional discharge process, where medical staff generated the discharge prescription. Data collection took place on three acute medical wards – the medical assessment unit (MAU), the respiratory ward (w23) and the gastroenterology ward (w24).

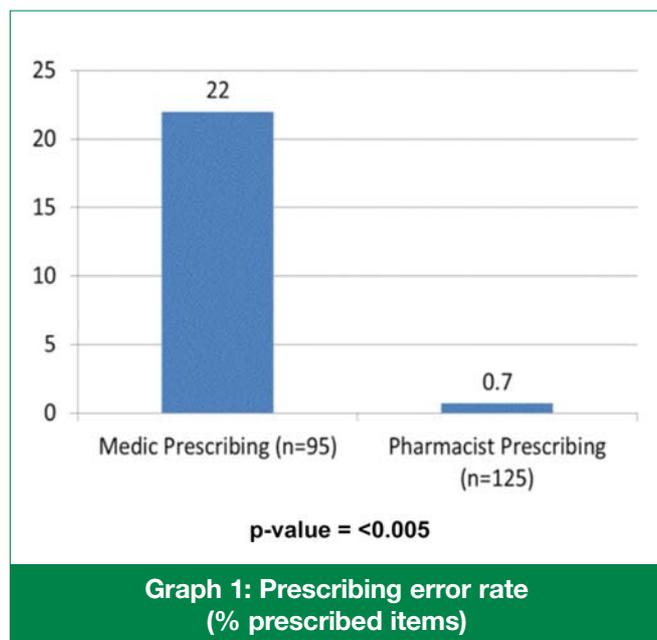
During the second phase of data collection (December 2014/January 2015) the same data set was collected to capture the effectiveness of a new discharge process where an IPP was seconded to undertake the prescribing role in the discharge process. The patients for discharge were identified through communication at ward level with the discharge co-ordinator, nurse in charge and the ward pharmacist. The live ward 'white-board' was also used as a two-way communication tool between the aforementioned staff groups to keep all parties updated during the discharge process.

Finally, during the third period of data collection (January/February 2015), an IPP continued to prescribe the discharge medication in the same manner as during the second phase but, additionally, the medicines were prepared using a satellite pharmacy close to the wards rather than in the main pharmacy department.

Data collected relating to error rate and timeliness of processes was reviewed for accuracy by an independent practitioner.

## Results

The analysis of data collected from phase 1 (95 patients, 782 prescribed items) and 2 (125 patients, 1149 prescribed items) of the study identified a very significant reduction in prescribing errors (97% reduction) when the prescribing duties transferred to the IPP, as demonstrated in Graph 1.



The prescribing errors were identified by the ward pharmacist performing the clinical check of the discharge prescription. It should be noted that the ward pharmacist was instructed to complete the same clinical check of the discharge prescription regardless of which type of prescriber was involved. This helped to ensure no bias was introduced into the data collection

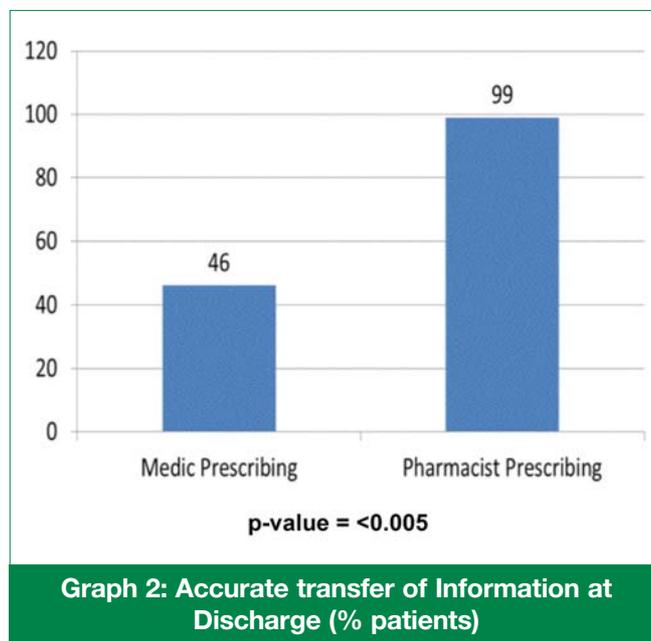
process. The prescribing errors recorded were subsequently categorised as either minor, significant, serious or potentially lethal using the same model as reported in Appendix D (Severity Error Classification Scheme) of the EQUIP study,<sup>4</sup> where examples of the types of errors associated with each category can be found - see pages 207/208 at:

[http://www.gmc-uk.org/FINAL\\_Report\\_prevalence\\_and\\_causes\\_of\\_prescribing\\_errors.pdf\\_28935150.pdf](http://www.gmc-uk.org/FINAL_Report_prevalence_and_causes_of_prescribing_errors.pdf_28935150.pdf)

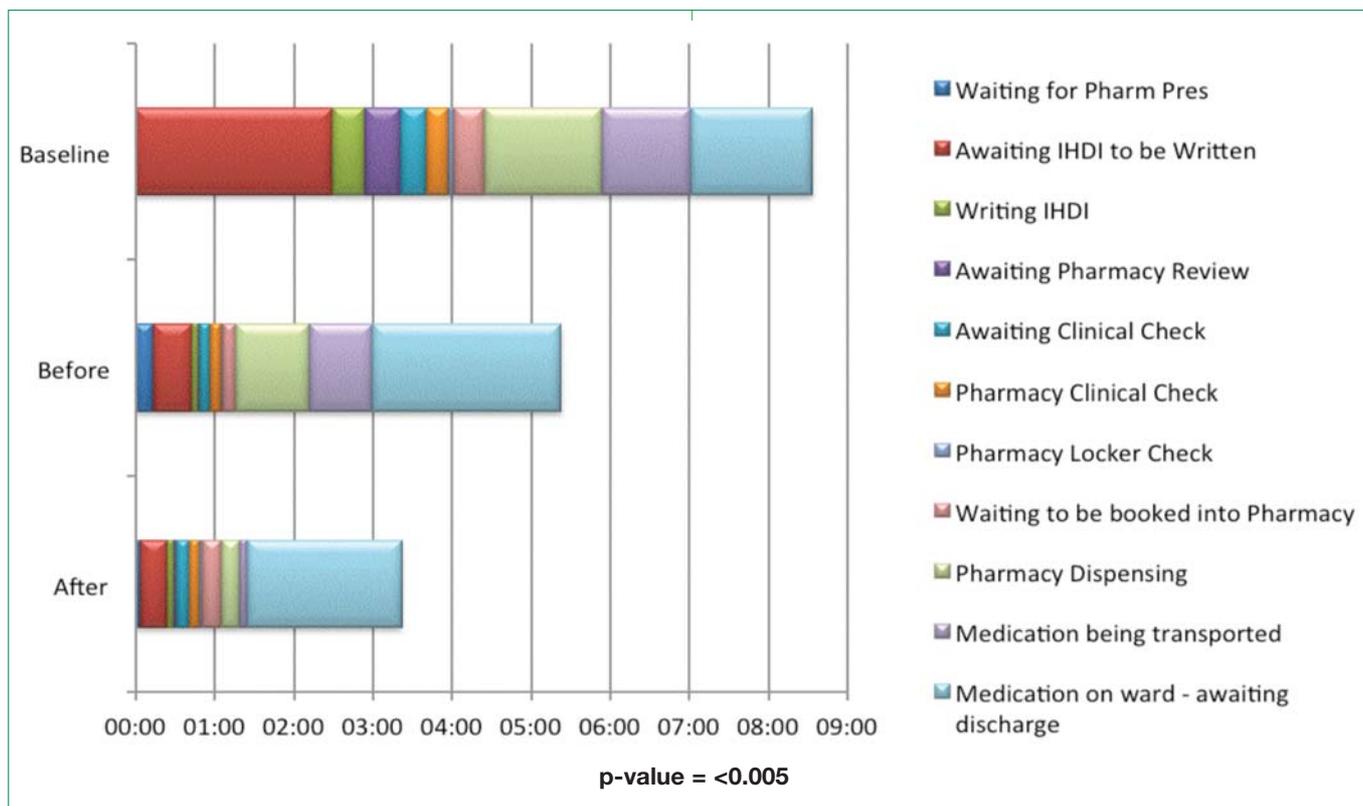
Some examples of the types of errors seen for the different categories at Lancashire Teaching Hospitals during the data collection period are shown below:

- Minor – no frequency stated for hydrocortisone cream on discharge prescription.
- Significant – amlodipine missing from discharge prescription.
- Serious – aspirin stopped due to GI bleed on inpatient chart but prescribed on discharge prescription.
- Potentially lethal – insulin not prescribed on discharge prescription.

An analysis of the accuracy of information (medicines started, stopped and changed during admission) captured in the initial discharge letter also showed a very significant improvement with the introduction of the IPP to the prescribing role in the process, as demonstrated in Graph 2. The proportion of patients with a discharge letter containing accurate information about their medicines more than doubled, increasing from 46% of patients at baseline to 99% of patients when an IPP generated the discharge prescription.



The data captured relating to the times taken for the different stages of the discharge process are represented in Graph 3. The baseline phase of data collection is represented in the top chart, phase 2 data in the middle chart and phase 3 in the bottom chart.



**Graph 3: Times taken for the stages of the discharge process**

### Definitions of terms

**IHDI:** Immediate Hospital Discharge Information.

**Awaiting Pharmacy Review:** time elapsed when IHDI is actually written but the Pharmacy team are unaware of the need to process.

**Awaiting Clinical Check:** time elapsed that pharmacy are aware of an IHDI but attending to other urgent clinical needs e.g. review of clinical priority patients, processing other discharges.

**Pharmacy Clinical Check:** involves identifying potential pharmacotherapeutic problems by collating and evaluating all relevant information that is available at the time before a medicine is supplied.

The key points to note are:

- The total time for the discharge process from the time the patient is told they can go home to the patient leaving the ward reduced from an average of 8 hours and 34 minutes at baseline to just over 5 hours in phase 2, and just over 3 hours in phase 3.
- The time to an accurate discharge prescription being available reduced from 4 hours at baseline to just over 1 hour in phase 2, and just under an hour in phase 3.
- The time to dispense the medicines (measured from the time of accurate discharge prescription to discharge medicines available on the ward) reduced from 3 hours at baseline to just over 1 hour 30 minutes in phase 2 and just over 30 minutes in phase 3.

### Discussion

There is a clear value in utilising patient feedback, reviewing

incident reports and collecting robust data to evaluate the effectiveness of work processes and identify aspects that can be improved. The engagement of not only the ward based pharmacy teams but the wider multidisciplinary team, hospital management and external stakeholders were key to the success of this project.

The key objectives of the study have been achieved:

- **Reduction in the prescribing error rate**  
The high rate of prescribing errors recorded with junior doctor prescribing at Lancashire Teaching Hospitals is consistent with that found in other Trusts across the region/country as described in the EQUIP study.<sup>4</sup> There are a number of contributing factors to the high prescribing error rate of the junior doctors, such as limited knowledge/experience of medications, competing tasks, working under pressure to generate the discharge prescription and over-reliance on pharmacists to correct mistakes. Prescribing pharmacists undergo medicines management training (undergraduate and postgraduate combined) for approximately 8 years before they become prescribers. The extent of this training may contribute to the very low error rate seen in the data for the prescribing pharmacists. The low error rate is comparable to that reported in the Northumbria study.<sup>3</sup>
- **Improved transfer of accurate information to primary care**  
A previous study in Liverpool<sup>5</sup> presented data on the large number of hospital admissions due to adverse drug reactions (6.5% of all admissions), the majority of which were avoidable medication errors. The data presented in this paper illustrated that less than half the patients had a discharge letter that accurately captured information about their medicines when junior doctors generated the prescriptions. The consequence of this is that the GP is

Process	Process Value/Waste	Benefit of Prescribing Pharmacist	Benefit of Satellite Pharmacy
Awaiting Immediate Hospital Discharge Information (IHD) to be written	Waste	Greater availability of IPP to write discharge more promptly.	Not Applicable (N/A)
Writing IHD	Value	Expert knowledge of medication allows quicker generation of IHD.	N/A
Awaiting Pharmacy Review	Waste	Improved communication between IPP and ward pharmacist results in reduced time wastage.	N/A
Awaiting Clinical Check	Waste	Ward pharmacist aware of discharge and can plan resources to complete discharge in a timely manner.	N/A
Pharmacy Clinical Check	Value/Waste	Ward pharmacist can complete clinical check faster as less prescribing errors on discharge as well as all relevant information fields completed e.g. changed/ stopped meds and allergies.	N/A
Pharmacy Locker Check	Waste	N/A	N/A
Waiting to be booked into pharmacy	Waste	Earlier generation of discharge prescription avoids bottleneck of large numbers of discharge prescription in the dispensary late in the afternoon.	Faster turnaround as focus of satellite pharmacy is medical ward discharges. Remove the need for a fax machine.
Pharmacy Dispensing	Waste	Earlier generation of discharge prescription avoids bottleneck of large numbers of discharge prescription in the dispensary late in the afternoon.	Faster turnaround as focus of satellite pharmacy is medical ward discharges. Remove the need for a fax machine.
Medication transported to ward	Waste	N/A	Faster delivery as satellite pharmacy in close proximity to medical wards.
Medication on ward – awaiting discharge	Waste	N/A	N/A

**Table 1: Impact of Prescribing Pharmacist and satellite pharmacy during phase 2 and 3 of data collection**

unaware of decisions made during the inpatient stay in hospital and may not, therefore, be able to prescribe to continue the treatments as intended, which may result in patient attendances at the Emergency Department (ED) and readmissions due to medication related problems. The transfer of information relating to medicines was greatly improved with the introduction of the prescribing pharmacist to very nearly 100% accuracy.

- *Enhancing the patient experience due to an earlier discharge*

Very significant improvements to the timeliness of medicines supply for discharge were seen with the introduction of the prescribing pharmacist and satellite pharmacy. The introduction of the prescribing pharmacist resulted in the earlier generation of an accurate discharge prescription which arrived in the dispensary earlier in the day, leading to an improvement in workflow through the dispensary and avoiding the usual bottleneck caused by the very large proportion of discharge prescriptions arriving in the dispensary late in the afternoon. The introduction of the satellite pharmacy next to the acute medical wards led to a very significant improvement to the dispensing turnaround times. The net effect of these changes was an increase in the proportion of patients with all their discharge medicines at the bedside ready to go by 1.30pm from 14% at baseline to 50% in phase 2. This has not only had a very positive effect on the patient experience, but also a positive effect in supporting patient flow in the organisation and achievement of the 4 hour target in ED.

Additional benefits realised from introducing the new process for discharge:

- *Medical staff time released for other patient care activities.*

After the completion of the ward round, junior medical staff are able to focus on attending to critically ill patients, making urgent referrals, ordering scans, taking bloods and seeing outliers on other wards. The clinical narrative and follow-up sections of the discharge letter can be completed by the doctor at a more convenient time later in the day after the urgent duties are completed.

- *Enhanced pharmacy status in the multidisciplinary team*

Pharmacy was often seen as the cause of delays to discharges because patients had to wait for their supplies of discharge medicines. The data collected in this study clearly demonstrates there were a number of non-pharmacy factors involved in the delays to discharges. The new discharge process, utilising the prescribing pharmacists and satellite pharmacies, has enhanced the status of the pharmacy team – who are now clearly viewed as ‘enablers’ to promoting good patient flow.

- *Recruitment and retention of pharmacy staff*

Both initiatives (generalist prescribing role and satellite pharmacy) have been very positively received by pharmacy staff. There is a clear career pathway for the pharmacists which has supported the recruitment and retention strategy, from pre-registration trainee – band 6/diploma pharmacist – band 7 senior pharmacist

(undertake the prescribing course) – band 8a prescribing pharmacist (generalist). The development of the band 8a prescribing pharmacist position has enabled highly trained members of staff to be mainly ward based with significant benefits realised. For example, they can act as a support mechanism for junior pharmacists on rotations, write and implement ward based policies/procedures and maintain a patient facing role utilising all the knowledge and skills gained through day to day practice as a clinical pharmacist. The introduction of the satellite pharmacy has liberated more staff from the Pharmacy Department to work closer to the patients in the ward environment.

## Conclusion

This paper captures the benefits of using feedback from patients and stakeholders to inform service review processes. The paper also demonstrates the benefit of designing the service review such that robust data is collected to give a clear picture of the current and future process, and a clear measure of the benefits of the changes introduced.

The phase 1 data collection (baseline) showed that the discharge process at the Trust was inefficient and was potentially unsafe due to prescribing errors by junior doctors. The data also highlighted that a very large proportion of patients had incomplete information relating to medicines captured in the discharge letter and transferred to the patient's GP. This is not unique to Lancashire Teaching Hospitals; a similar picture is seen in many Trusts across the UK. The impact of introducing IPPs to the discharge process resulted in clear benefits, with the new process being safer in terms of reduced prescribing errors and more streamlined (resulting in the patient being discharged earlier in the day and a more accurate and complete discharge letter being sent to the GP).

## Future Developments

Since collecting the data for this paper, the team of prescribing pharmacists at Lancashire Teaching Hospital has been expanded to provide the services outlined above to all acute medical wards. Plans are in place to train more prescribing pharmacists and expand the team further so that the model can be implemented Trust-wide across all clinical specialities.

Thinking beyond the traditional 'niche' roles of non-medical prescribers has enabled a more generalist role to be explored. As long as the Pharmacist Prescriber is prescribing within their field of competence, this is a great opportunity to utilise the unique knowledge and skills of pharmacists. This is particularly relevant when the impact of reduced numbers of junior doctors in the coming years is considered and more so with the challenges presented by the recent introduction of salary caps for locum medical staff. Many Trusts are exploring the roles of Physicians Associates (who currently cannot prescribe) and it is essential that the unique skills of a generalist prescribing pharmacist are developed to complement the multidisciplinary team.

## Declaration of interests

None of the authors has anything to disclose.

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