Assessing the effectiveness of one-stop dispensing

By Stuart Jones, MPharm, MRPharmS

An audit carried out at a Kent hospital looking at one-stop dispensing found that a framework has to be put in place for the system to be fully effective

The announcement in 1999 that the health budget would increase by 35 per cent over the following five years was a crucial step forward for the National Health Service. This new capital and its cost-effective use now drives the Government agenda for change. New ideas to improve the NHS, funded by this money, aim to maximise the effectiveness of treatment and streamline services. An important factor in the agenda is the provision and use of medicines. An estimated 11 per cent of the health budget is spent on medicines; this is more than on any other form of treatment.[1] Therefore, to develop a better health service there is a need for effective medicines management.

In "Pharmacy in the future — implementing the NHS plan" the Government set out its intent to invest a minimum of £30m over the following three years, specifically to secure the better use of medicines within the NHS.[2] This has led to many new medicines management initiatives in both primary and secondary care. Within the hospital setting, the majority of these new initiatives aim to control the introduction of new medicines and promote evidence-based prescribing. However, with the publication of "A spoonful of sugar"[3] the Government has shown it now realises the benefits of a more holistic approach. Medicines management is a multifactorial process and a comprehensive system within secondary care must take into account several factors. Its focus has now widened to incorporate not only effective prescribing, but also efficient purchase, supply and use of medicines.

The use of patients' own drugs (PODs) and one-stop dispensing (OSD) are two schemes promoted by both the "NHS plan" and "A spoonful of sugar" as mechanisms which act to enhance medicines management. They are driven by the new pharmacy teams on the wards and aim to maximise the use of current resources and speed up patient discharge.[4] However, as NHS trusts come under increasing pressure to implement these newly designed re-engineering schemes, their pitfalls are being ignored. Often, new medicines management initiatives are concurrently implemented and their effects are hard to isolate and assess.[5]

At Kent and Canterbury Hospital, OSD was implemented more than two years ago, and similar schemes are now being set up nationwide. However, at present, there is a lack of data to show the effectiveness of this new supply system.

Medicines for the patient to take home after leaving hospital are usually dispensed just before discharge. Using OSD, medicines labelled with full patient directions can be supplied upon admission to hospital. Patients receive a three-week supply of medicines which they use during their inpatient treatment and take home, if necessary, for continuing therapy when they leave. Providing that the patients have at least a seven-day supply of medication remaining, there is no need to redispense additional supplies before discharge, thus speeding up the process.[4]

This audit assessed the effectiveness of OSD by using waste medicines as an outcome measure. It investigated the type and quantity of waste medicines returned to the hospital pharmacy, the reason for their return and the cost of any items destroyed. Analysing the data indicated if this system delivered medicines to patients effectively within secondary care.

Audit Standards

A literature search was conducted to identify standards for evaluating drug wastage. Several studies, including one by Cromarty and Downie[6] have been carried out in a primary setting to measure the quantity of medicines returned by the public to community pharmacies. The standards in these studies could not be applied to the hospital setting because of the vast differences in the reasons for producing waste in primary and secondary care. In order to set standards for this study, a small pilot was conducted. The pilot involved collecting all returns from the 18 wards in the hospital over one day. There were 42 returned items and each one was recorded, costed and classified according to the reason for its return. This information, together with figures on monthly hospital workload (represented by finished consultant episodes) and average daily dispensed items, was presented to the hospital's lead clinical pharmacists. Analysis of these data with respect to both clinical and non-clinical aspects of the pharmacy supply system led to the production of the following standards:

- Less than 5 per cent of medicines labelled for discharge and dispensed by the hospital pharmacy should be returned because of a change to therapy
- Less than 0.2 per cent of medicines labelled for discharge and dispensed by the hospital pharmacy should be returned because of systems error
- No medicines labelled for discharge and dispensed by the hospital pharmacy should be returned because they had passed their expiry date

The returned medicines were classified as shown below.

Therapy change Therapy change was defined as the replacement of a drug with an alternative to treat a disease state, change of strength of a drug or discontinuation of a drug that had been used by the patient.

System error System error was defined as items that had been returned to the pharmacy due to an error in the supply system and could not be classified by therapy change, expired stock or patient death. For example, items that had been dispensed in duplicate or lost on the ward.

Methods

Mr Jones wrote this article during his preregistration training year at Kent and Canterbury Hospital. He is now undertaking a PhD at King's College, London

The study was conducted at the Kent and Canterbury Hospital, an acute district general hospital with 437 beds which is part of the East Kent NHS Trust. The work looked at all types of medicines issued from the hospital and returned to the pharmacy including inpatient, discharge and stock items. The items were sent back to the pharmacy via ward boxes or brought back from the wards by staff. No medicines were disposed of on the wards.

The audit collected data for two weeks and involved recording returned medicines each day from all the hospital's wards. At the end of the period, each of the patients whose discharge medicines had been returned was followed up by means of hospital data. The past medication record of the patients, held on the hospital's pharmacy computer, and a list of deaths in the hospital were used to try to classify the reasons for returning the discharge medicines (definitions as described above). Any returns that could not be classified using this information were followed up further by retrieving the patient's hospital notes. No items were excluded from the data set and each of the items was successfully classified and costed, based on the individual purchasing price. Once all the raw data had been recorded, the items were either returned to stock or destroyed according to the hospital's current returns policy.

Results

Of the medicines dispensed over the study period, 8.6 per cent (434 items) was returned to the pharmacy. This comprised 6.7 per cent of the discharge medicines (with 1.9 per cent being inpatient items), dispensed over the two weeks. Medicines which were dispensed in the hospital pharmacy and returned unused accounted for 4.7 per cent of the total number of items dispensed. Returned medicines which were dispensed in the hospital pharmacy and had to be destroyed accounted for 3.4 per cent of the total and had a value of £2,100.

Further categorisation showed the reasons for returning the discharge medicines to the pharmacy. Out of 3,343 discharge medicines dispensed in the two weeks, 337 were returned. Of these returns, 248 items (7.4 per cent) were brought back to the pharmacy due to a change in a patient's therapy. Only 17 of the returned discharge medicines (0.5 per cent) were because of a patient's death, the remaining 72 (2.2 per cent) were as a result of the supply system failing. No expired medicines were returned. Only one audit standard for waste production was met in the study and this was the percentage of expired discharge medicines returned (nil, see Table 1).

The wards that sent back the most items to the pharmacy were the medical and the health care of the older person (HCOOP) wards. The proportion of medicines that had to be destroyed compared with the proportion returned to pharmacy stock from these two wards was similar. In the two-week period, a 24-bed medical ward returned medicines with a value of over £600. Just under half of these returned medicines (valued at £292) were destroyed.

Discussion

The quantity of medicines returned to the pharmacy during the audit was unexpected. In the time scale of the study, it was shown that 8.6 per cent of all medicines dispensed by the pharmacy was returned. The supply chain at Kent and Canterbury Hospital exceeded the maximum permissible set by all but one of the standards for the type of return in this audit, (see Table 1). Medicines labelled for discharge and returned due to a change in a patient's therapy was over 50 per cent more than the standard (5 per cent) while medicines returned due to supply system failure was over four times the set standard of 0.5 per cent. This implies serious procedural error. It is recognised that the confines of the study meant that the pilot used to set the three standards only employed data covering one day, whereas the audit collected data for two weeks. A greater sample for both the pilot and audit would invariably give a more accurate assessment of acceptable levels of waste medicines. However, due to restrictions of limited resources and time this was not possible. The relatively small sample set does not detract from the fact that eight out of every 100 items that the pharmacy dispensed were being returned, half of which were unused.

Compounding the problem of the quantity of medicines returned to the pharmacy was the proportion of these items that were destroyed. The implementation of "one- stop" means that there is a greater number of discharge items on the wards. The fact that this type of medication is labelled with full patient instructions means that there is no easy method of identifying whether or not a patient has taken the medicine home, eg, on weekend leave or during a quick discharge and readmission. Good practice dictates that without any reassurance regarding the storage history of the medicines, a pharmacist cannot reissue them, hence all the waste discharge medicines returned must be destroyed.

The greater proportion of discharge medicines dispensed using the OSD system means it is more important than ever for the supply chain to work efficiently, otherwise mistakes will lead to a financial loss more frequently.

OSD relies heavily on two factors to be effective:

- Patients and their medicines must never be separated
- Discharge medicines should only be dispensed to patients on admission if their therapy is likely to remain stable

If either of these principles are contravened, then it is likely that the issued discharge medicine items will return to the pharmacy and new items redispensed. This not only reduces the proposed improvements in efficiency by using the OSD system but also causes a vast increase in the amount of waste medicines.

The audit showed that the supply system at Kent and Canterbury Hospital was failing in both these areas. Medicines were dispensed inappropriately as discharge medicines (7.4 per cent of the total discharge medicines dispensed being returned due to a change in therapy) or separated from the patients (2.2 per cent of the discharge medicines were returned due to a systems error) causing financial losses of over £1,000 per week. There are several inherent flaws within the OSD system which must be recognised and solved before implementation. These are discussed in the next section.

When to dispense?

The decision to dispense discharge medicines for a patient on admission to hospital is critical and can only be assessed accurately at ward level. It needs knowledge not only of the patient's disease state and drug therapy, but also of the intentions of the doctor treating the patient, which commonly can only be found in the medical notes. It is accepted that even the most stable therapy may change. However, supplying discharge medicines on admission for an unstable disease state will invariably cause the pharmacy to redispense the medicines following every therapy alteration. For example, if an ACE inhibitor, which is being titrated up to its maximum tolerated dose, is dispensed as discharge medicines, a new dispensing must follow each dose increment to keep the label consistent with the patient's therapy. The discharge will be quicker (providing the dose was stable for the few days before discharge)

Table 1: Audit results comparison with standards

Type of discharge medicines return	Standard	Audit result
Because of a therapy change	not more than 5 per cent	7.4 per cent
Because of a system error	not more than 0.5 per cent	2.2 per cent
Past its expiry date	0	0

because there will be no need to redispense further supplies immediately before the patient leaves hospital. However, the proposed improvements in efficiency have been quashed as the dispensary may have issued the same item four or five times, each time with a different label.

At Kent and Canterbury Hospital, a pharmacy service is only provided at ward level in the morning. During this time, a pharmacist on the ward screens all requisitions for medicines. However, the lack of service provision in the afternoon means that discharge medicines may be dispensed inappropriately to patients on admission during this time. The only way to combat the problem is to provide a whole-day service to the wards. A pharmacist on the ward will then screen every item requested from pharmacy and is in a better position to decide whether or not to dispense medicines ready for discharge. This should drastically reduce the number of items returned to pharmacy because of a change in patients' therapy.

Ensuring no separation

Medicines can be misplaced within the hospital system at any time during a patient's stay. However, the most likely time for patients to be separated from their medicines is if they move wards or upon discharge. It was beyond the scope of this study to investigate which of these two problems had the greatest prevalence and they were both grouped together and classified as a supply system failure. In both cases, the mechanism that provides medicines to patients had failed.

Moving from an assessment ward to a ward for full admission is a classic example of when medicines can be misplaced. However, during this audit, less than £200 worth of medicines was returned to the pharmacy from the assessment wards. This was unexpected because of the large number of patients that transfer from these wards. However, the loss of medicines from initial assessment to full admission is an "all or nothing" effect. If a mistake occurs, this commonly results in all of a patient's medicines being lost. For patients with several chronic disease states, the total cost of their medicines can be vast, hence it only takes one mistake to make a significant impact on medicines that are wasted. This study did not capture a clear picture of these types of mistakes, either because they did not occur during the two-week period or the study design masked their prevalence. Further work needs to be be done to evaluate their nature and incidence.

Ensuring every patient is sent home with their complete supply of discharge medicines presents as a complex problem. Without individual patient lockers, medicines are often found in numerous places. At Kent and Canterbury Hospital, medicines are kept in trolleys, a stock cupboard, with patients' own belongings (inhalers, eye drops, etc) and within a special patients' own medicines cupboard. The more places that items are stored, the higher the chance that they will not be transferred with the patient. Several boxes of the same drug may be supplied to the ward for one patient. For example, lansoprazole 30mg can be supplied in a hospital pack size of seven. One box may be stored in the medicines trolley and because of lack of space the other three will be stored elsewhere. When it comes to discharge, it is likely that only the box in the medicines trolley will be sent home with the patient, the other three being returned to pharmacy and destroyed (if they were dispensed as discharge medicines).

The audit results indicated that providing individual medicine lockers to every ward is not the solution to this problem. The single medical ward which has the lockers returned just as much waste as the other wards: £133 in one week. The reason for the failure of individual patient lockers on this ward is linked to the means by which they are used. Without adequate pharmacy technical support to ensure that these lockers are kept up to date and stock levels are maintained, they do little to improve the supply of medicines to patients. Kent and Canterbury Hospital only has sparse ward technician cover, thus reversing any potential improvements in the supply system which individual patient lockers can provide.

Pharmacy technicians

Pharmacy ward based technicians are crucial for OSD to function effectively. Although this study has not directly proved their worth, parallels can be drawn between the problems with OSD and the potential role of ward-based pharmacy technicians.

Principally, technicians have two roles within OSD:

- To locate and monitor the supply of every medicine on a ward
- To streamline patient discharge

It is imperative that ward-based technicians take on a larger role in the basic supply of medicines. Technicians should pick up initiation of any new medicines, dosage alterations and stock shortages on a daily basis because OSD shifts the supply workload from the dispensary to the wards. Without technician support, a ward-based pharmacist may find that they spend all their time dealing with supply problems leaving little time to provide clinical support.

Conclusion

There are several key support systems that must be in place for OSD to be effective. This can be described as a "five pillar" approach in which each of the following five support mechanisms play a part:

- A full-day pharmacy service at ward level
- Lockable ward medicine lockers for each individual patient
- Adequate pharmacy technical support
- Transfer documentation that incorporates a checklist of patients' drugs when they switch wards (a delivery note)
- A method of returning discharge medicines into dispensary stock if returned unused

Each of these elements does not stand alone. To achieve an efficient, streamlined supply system, each component must be implemented concurrently and running smoothly. There are many solutions to correct the problems encountered in OSD, such as relabelling medicines on wards and the use of discharge medicine packs with "fill in the blanks" style labels, etc. Correcting the inherent flaws in an underperforming OSD system simply reduces the many advantages it can provide. Although relabelling items on the ward will reduce waste medicines returned to the pharmacy, this is offset by the cost of the resource and equipment that is required to achieve it. These corrective solutions may have a role to play to facilitate OSD but an effective supply system must first be in place otherwise this new system is serving to speed up discharge only, irrespective of whether or not it is an efficient mechanism to provide medication to patients.

This audit has shown what a finical burden an underperforming supply system can be. OSD has now been running ineffectively at Kent and Canterbury Hospital for 30 months. Estimated on the figures shown by this study, this could be at a cost of £120,000 for the wasted medicines alone, ignoring the staffing implications. The NHS cannot afford to waste its crucial funding in such a way!

References

1. Horne R. Nonadherence to medication: causes and implications for care. In: Gard P, editor. A behavioural approach to pharmacy practice. Oxford: Blackwell Science, 1998.
2. Department of Health. Pharmacy in the future — implementing the NHS Plan. London: DoH; 2000.
3. Audit Commission. A spoonful of sugar—medicines management in NHS hospitals. London: Audit Commission; 2001.
4. Leech D. Patient-directed pharmacy services — do they benefit patients? Hosp Pharm 2000;7:263–4.
5. Hospital Pharmacists Group. One-stop dispensing, use of patients' own drugs and self-administration schemes. Hosp Pharm 2002;9:81–6.
6. Cromarty E, Downie G. Drug wastage—what is acceptable? Pharm J 2001;261:424.