BEST PRACTICE IN PHARMACY MANAGEMENT

Reducing The Length Of Hospital Inpatient Stay: Impact On Drug Expenditure And Pharmacy Workload

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Summary

This paper indicates that:

- a strategy which aims to reduce the length of inpatient admission will increase secondary care drugs costs and pharmacy workload if the inpatient bed is occupied immediately by a new patient
- the impact of such a strategy on both medication costs and pharmacy workload are greatest when shorter inpatient admissions are further shortened
- the effect of the strategy to efficiently manage inpatient bed utilisation and patient flow will need consideration by managers when drug budgets are allocated and pharmacy and other staffing arrangements (including medical and nursing staff) are under consideration.

Background

In the current challenging economic environment, productivity and efficiency are paramount and when hospital care is needed, the NHS needs to minimise that time, whilst still ensuring that patient safety and the highest quality of care is provided to patients.

As a consequence, there is an increasing emphasis to reduce the length of hospital inpatient stay for medical patients. Set against this commendable aim is the reality that bed occupancy on many medical wards approaches 100%, meaning that no sooner is a patient discharged then another patient is admitted to occupy the vacated bed.

Furthermore, while data is available to show that a reduction in length of hospital inpatient stay saves money for the NHS as a whole,[1] there appears to be little information available regarding the impact of this strategy on drug expenditure for the individual ward or acute hospital or the impact of this strategy for pharmacy workload in acute hospitals.

Acutely ill medical patients tend to receive more intensive therapy at the start of their inpatient stay e.g. intravenous therapy antibiotics or treatment doses of low molecular weight heparin. Furthermore, patients who fail to bring their own regular medication (patients' own drugs or 'PODs') into hospital also need these to be dispensed as soon as possible following admission.

As the inpatient stay progresses and the patient's health improves, therapy tends to be de-escalated as intravenous drugs are changed to oral and some acute treatments are discontinued. Later, when the patient is considered fit for discharge, further drug costs are then incurred when the patient is issued with a take-home prescription ('To Take Out' or TTO).

Pharmaceutical care of acutely ill medical patients is 'front-loaded' to ensure prescribed medication is clinically appropriate and optimised. Significant time is spent undertaking medicines reconciliation and subsequently liaising with medical and nursing staff regarding treatment recommendations, rectifying errors, dispensing medication and ensuring the provision of safe, effective and timely drug therapy.

As the inpatient stay progresses, pharmacists and technicians continue to contribute to the pharmaceutical care of patients through drug chart review, ongoing clinical monitoring and clinical interventions, and patient counselling. At

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discharge, further time is needed to transcribe the TTO prescription to an electronic discharge system (including any explanatory notes to the GP regarding medication changes or deletions, etc), dispensing medication, checking the accuracy of the dispensed TTO and counselling the patient.

Our study provides an estimate of the impact a reduction in the average length of inpatient stay has on drug expenditure and pharmacy workload in an acute hospital.

Method

From August to October 2013, the inpatient medication charts of 94 patients discharged from seven wards at Morriston Hospital were retrospectively reviewed. Patients were selected consecutively for review at discharge, assuming that their inpatient stay had been between 2 and 10 days. The maximum duration of inpatient stay was arbitrarily capped at 10 days as the focus of the review was to examine the impact of front-loading of patient care and the impact on finance and workload of reducing the length of inpatient stay.

The cost of prescribed medication was calculated for each day of the inpatient stay, including the cost of the TTO prescription. The average purchase price of medicines used in secondary care (as informed by the hospital computer system) was used to calculate the cost of prescribed medication.

Duration of inpatient admission in days	Number of patients (n=94)%
2	10
3	10
4	13
5	17
6	13
7	8
8	8
9	5
10	10

Table 1: Duration of inpatient admission (n = 94)

Day of admission	Average cost of medication day of inpatient admission
1	£25.72
2	£6.98
3	£6.08
4	£3.31
5	£3.92
6	£2.92
7	£2.96
8	£1.91
9	£2.30
10	N/A

Table 2: Average cost of medication for each day of admission

'Pharmacy time' refers to time invested by all grades of pharmacy staff (pharmacists, technicians and assistants) when providing pharmaceutical care to inpatients to ensure they receive medication in a timely, appropriate and safe manner.

Pharmacy time has been estimated as:

- Day 1: 30 minutes per patient (which includes medicines reconciliation, medicines optimisation, resolution of any clinical queries, patient counselling, etc)
- Day 2 onwards: 15 minutes per patient (drug therapy monitoring, clinical interventions and patient counselling)
- Day of discharge: 25 minutes per patient (clinical queries, transcribing and dispensing the TTO, and patient counselling).

Results

94 patient charts were retrospectively reviewed.

The length of inpatient admission in days is outlined in Table 1.

The cost of all prescribed medication for each patient was determined for each day of inpatient admission. This allowed calculation of the average cost of medication for each day of admission (see Table 2 and Graph 1).

The average cost of a TTO for the 94 patients in the audit was calculated to be £29.87.

Combining the average cost of a TTO with the average cost of medication for each day of admission allows a calculation of the average total cost of medication for an inpatient stay of between 2 and 10 days (see table 3 and Graph 2).

The amount of pharmacy time needed to service the pharmaceutical care needs of patients on each day of admission is expressed in Table 4 and Graph 3.

Discussion

The data show that drug costs are significantly higher on day 1 of admission, when patients tend to receive more intensive therapy (e.g. intravenous antibiotics) and medicines are dispensed for patients who fail to bring their own regular medication (PODs) into hospital.

Subsequently, as the inpatient admission progresses, therapy tends to be de-escalated or stopped, and treatment costs therefore decrease. Treatment costs then increase on the day of discharge when the patient receives a TTO.

Furthermore, from a pharmacy perspective, the shorter the hospital admission, the greater amount of time (proportionately) is required from pharmacy staff to service the pharmaceutical needs of a patient.

Hence, shorter hospital inpatient stays have the potential to increase drug costs and pharmacy workload if hospital beds are filled soon after a patient is discharged. This effect is most apparent with patients that have very short hospital inpatient stays.

The impact that a strategy to reduce the average length of inpatient admission has on drug expenditure and hospital pharmacy workload can be tested in the following hypothetical worked examples

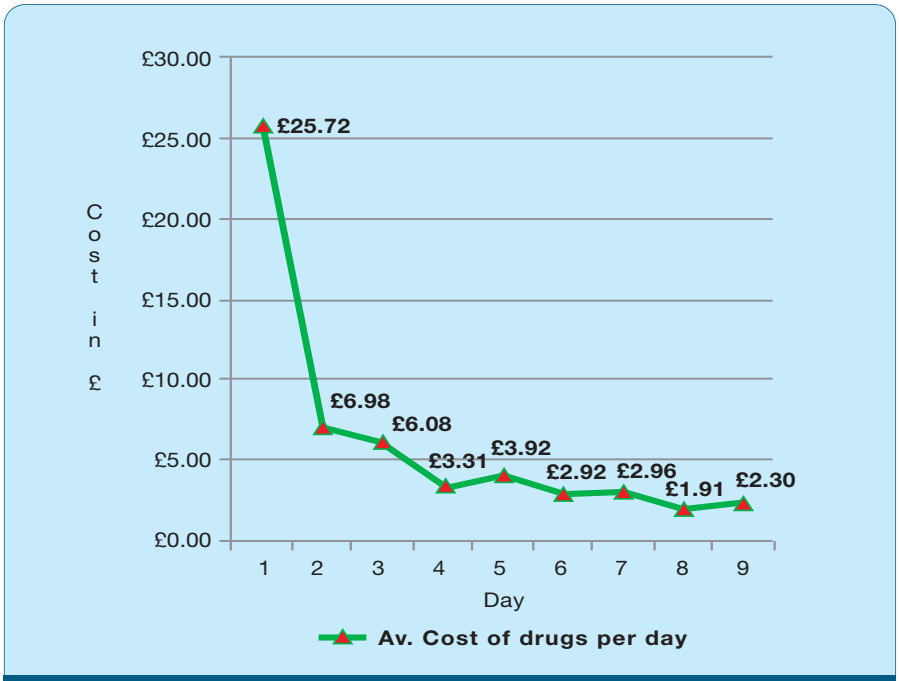
Case 1

Consider a ward with 28 inpatient beds in which the average length of stay is 4 days. Consider the scenario if the average length of stay is reduced to 3 days for 25% of the patients.

What effect will this change in practice have on drug costs and pharmacy workload over a 28-day period, assuming all beds are occupied at all times?

When the average length of inpatient admission is 4 days:

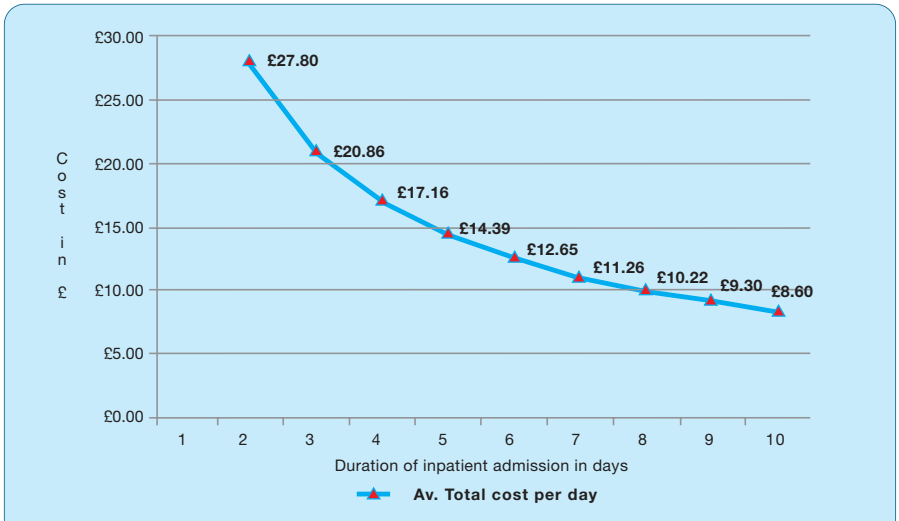
- there are a total of 784 bed days and each bed will service 7 patients over a 28-day period i.e. 196 patients will be treated



Graph 1: Average cost of medication for each day of admission

Inpatient admission duration	Total cost of medication	Average cost of medication per day of admission
2	£55.59	£27.80
3	£62.57	£20.89
4	£68.65	£17.16
5	£71.96	£14.39
6	£75.88	£12.65
7	£78.80	£11.26
8	£81.76	£10.22
9	£83.67	£9.30
10	£85.97	£8.60

Table 3: Average total medication costs associated with different lengths of inpatient admission (including the cost of drugs dispensed as part of a TTO)



Graph 2: Average total medication costs associated with different lengths of inpatient admission (including the cost of drugs dispensed as part of a TTO)

More intensive therapy means that costs are higher just after admission

- drug costs will be 196 x £68.65 (total cost of medication from table 3) = £13,455.40
- pharmacy time servicing these patients will be 16,660 minutes.

However, if 25% of patients (49) are discharged early on day 3, then 49 additional bed days will be available to treat more patients (we will assume these 'new' patients have an inpatient admission of 4 days):

- 147 patients treated with an average length of admission of 4 days = 147 x £68.65 = £10,091.55
- 49 patients treated with an average length of admission of 3 days = 49 x £62.57 = £3,065.93
- 49 additional bed days with drug costs charged as if patients average length of stay will be 4 days = £17.16 x 49 = £840.84
- **drug costs with this strategy are £13,998.32 (4% increase in medication costs)**
- **pharmacy time servicing these patients will be 16,954 minutes (1.8% increase in time).**

Case 2

Consider a ward with 28 inpatient beds in which the average length of stay is 3 days. Consider the scenario if the average

Day	Pharmacy time used to service inpatients during admission (mins)	Average amount of pharmacy time per day of admission (mins)
1	30	30
2	55	28
3	70	23
4	85	21
5	100	20
6	115	19
7	130	19
8	145	18
9	160	18
10	175	18

Table 4: Pharmacy time used to service inpatients during admission

length of stay is reduced to 2 days for 50% of the patients. What effect will this change in practice have on drug costs and pharmacy workload over a 28-day period, assuming all beds are occupied at all times?

When average length of inpatient admission is 3 days:

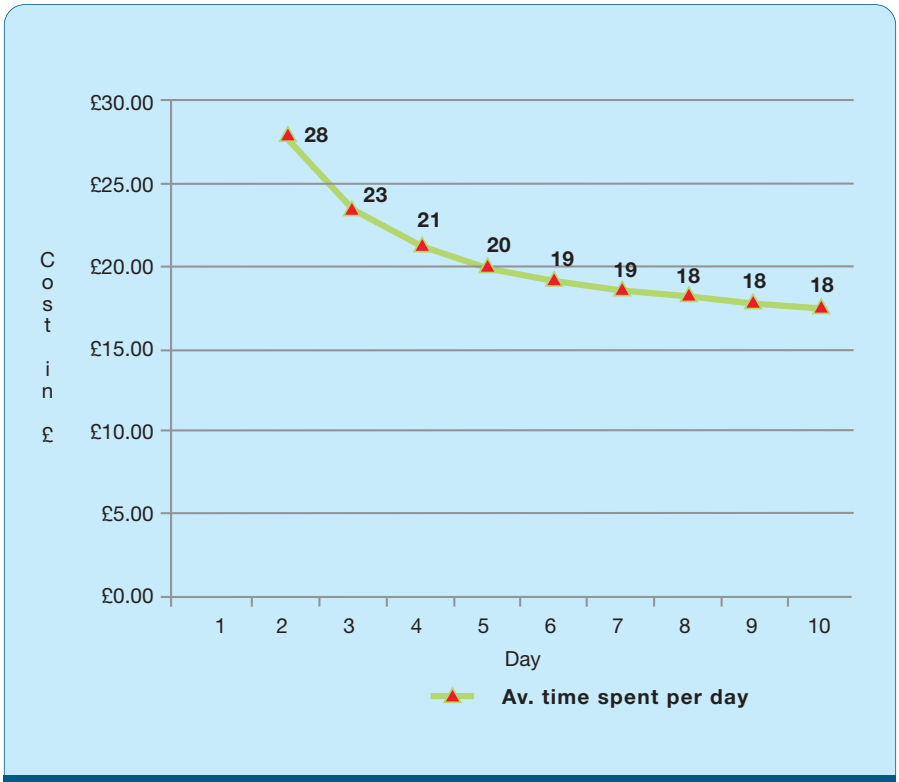
- there are a total of 784 bed days
- drug costs will be 784 x £20.89 = £16,377.76
- pharmacy time servicing these patients will be 18,032 minutes.

However, if 50% of patients are discharged early on day 2, then 130 additional bed days will be available to treat more patients (we will assume these 'new' patients have an inpatient admission of 3 days):

- 130 patients treated with an average length of admission of 3 days = 130 x £62.57 = £8,134.10
- 130 patients treated with an average length of admission of 2 days = 130 x £55.59 = £7,226.70
- 130 additional bed days with drug costs charged as if patients average length of stay will be 3 days = £20.89 x 130 = £2,715.70
- **drug costs with this strategy are £18,076.50 (10.4% increase in medication costs)**
- **pharmacy time servicing these patients will be 19,240 minutes (6.7% increase in time).**

Conclusion

The audit has clearly demonstrated that a strategy which aims to reduce the length of inpatient admission will increase secondary care drugs costs and pharmacy workload if the inpatient bed is occupied immediately by a new patient.



Graph 3: The average amount of time required by pharmacy to service inpatients during admission

As the worked examples demonstrate, the impact on both medication costs and pharmacy workload are greatest when short inpatient admissions are further shortened e.g. the impact is significantly greater when an inpatient admission is reduced from 3 days to 2 days, compared with a reduction from 6 days to 5 days.

This issue has particular relevance and implications for wards which already have relatively short periods of inpatient admission. Furthermore, with increasing pressures on inpatient beds, there is an increasing trend to 'treat and transfer' acutely ill medical patients to peripheral hospitals, once their condition has been stabilised. This practice can be predicted to significantly increase medication costs, pharmacy workload and the workload of hospital doctors, nurses and other healthcare staff at acute hospitals.

The impact of such strategies to manage inpatient bed utilisation and patient flow will need to be considered by managers when drug budgets are reviewed and pharmacy staffing arrangements are under consideration.

Declaration of interests

- **Scott Pegler:** None
- **Sarah Robinson:** None

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1. Reducing Length of Stay. Available at: http://www.reducinglengthofstay.org.uk . [Accessed 081214]. Available at: www.npsa.nhs.uk/.../risk-matrix-for-risk-managers.

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