Improving the quality of prescribing in the emergency department

Prescribing errors are common and can have a significant negative impact on patients. This article presents an audit and intervention which aimed to improve prescribing safety, documentation and handover in the emergency department. The authors identified shortcomings in the emergency department drug chart, which were subsequently confirmed by audit. To address these shortcomings, a new drug chart was designed and introduced, before repeating the audit. This intervention resulted in significantly more frequent documentation of key aspects of the prescription including date and time, and rate and volume for infusions. This low cost intervention is applicable to other emergency department settings.

Prescribing errors are common and can have a significant negative impact on patients. The scale of this issue is very large indeed; a systematic review (Tully et al, 2009) gave a prescribing error rate of 7% (interquartile range 2–14%), affecting 52 per 100 hospital admissions in the UK (interquartile range 8–227). Of note, the prescribing relating to a patient's initial hospital admission was 70% more commonly associated with a prescribing error compared to prescriptions made more than 24 hours after admission.

A General Medical Council-led study (Dornan et al, 2009) examined causes of prescribing error among UK junior doctors. This suggested a multifactorial cause: an interaction between active failures (knowledge or rule based mistakes and lapses) and error provoking conditions (poor medication chart design, patient, communication and workload-related factors).

One area where the above factors are most likely to interact is when the patient transitions (or transfers) from the emergency department to an inpatient care setting. This situation combines high patient turnover, unfamiliar patients and the need for good written communication, particularly in handover between these settings.

Design solutions have been shown to decrease rates of prescribing error. For example, a new drug chart introduced in Australian hospitals resulted in a significantly reduced frequency of prescribing error (Coombes et al, 2009).

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Project aims

The authors identified shortcomings in the design of the drug chart used in the emergency department in their institution. All other charts in the trust used a standardized format, but that used in the emergency department was different. Crucially, the emergency department chart had space for prescribing three medications with no dedicated space for the prescription date. There was also no separate area for intravenous fluids or infusions, and consequently no specific area for volume and rate.

The aims were to investigate the impact of the current emergency department drug chart on prescribing quality and to investigate whether changes in the design of the chart could lead to improvements in prescribing practices.

Methods

In order to achieve the stated aims of the project, the authors conducted prospective audits of the quality of prescribing in the emergency department, before and after the introduction of a new drug chart.

Inclusion criteria

The authors included all patients being admitted to the acute medical unit from the emergency department in a quaternary university hospital, with a 56-bed acute medical unit.

Audit standard

As the audit standard a sufficient prescription was defined as one which had the following:

- Drug name
- Dose
- Route
- Date and time of prescription
- Signature and identification of doctor or nurse prescriber
- Time and signature of the administrator.

In addition to the above, intravenous infusions also required:

- Solution name
- Rate
- Volume
- Additive and dose (where appropriate).

Where a prescribed drug was not given, it was expected that a reason for its omission would be documented.

Audit method

Data were gathered from prescriptions that were written in the emergency department relating to the pre-defined audit standards for 100 consecutive admissions to the acute medical unit from the emergency department. This was performed before and after the introduction of the new emergency department drug chart. All data were gathered by physicians external to the departments. Where serious concerns regarding the prescriptions were found, these were raised with the senior physician in the department.

Design of new drug chart and implementation

Shortcomings in the original emergency department drug chart were evident before the start of the project. These observations, together with the results from the first audit, were used to inform the design of a new chart. This consisted of an A4 colour sheet attached to the emergency department notes (*Figure 1*). The chart was formatted identically to others used in the trust, and

contained separate columns for date and time of prescription, and a separate area for infusions, within which was space for rate, volume and additives to infusion solutions. The trust-wide standardized numeric code used to record reasons for dose omissions was also added, as was a dedicated section for documenting allergy status, in line with the trust-standardized chart.

Funding was approved for a trial of 10 000 patient admissions to the emergency department. This was forecast to last approximately 1 month. The second audit was performed during this month.

Statistics

The data pre- and post-intervention were compared to identify areas in prescribing which had been improved by the intervention. Fischer's exact test was used to compare the data sets, using STATA (Stata Corp version 11.0).

Results

Number of prescriptions

In the first audit, 100 patient admissions resulted in 241 individual prescriptions; in the second, 271 prescriptions were written. In addition, as illustrated in *Figure 2*, up to nine prescriptions were made using the new chart, as compared with six on the old.

Figure 1. The new drug chart designed for use in the emergency department.

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UCH EMERGENCY DEPARTMENT PRESCRIPTION AND ADMINISTRATION RECORD

Note: Medicines for patients to take at home must be prescribed using outpatient prescription forms or the electronic TTA system as appropriate
If the patient is being admitted then a booklet inpatient prescription chart must be used.

Allergies, sensitivities and adverse drug reactions

No known allergies ☐ Not possible to ascertain ☐ Initials & date

Medicine/ substance	Reaction and severity	Initials & date

Patient details/ addressograph

Weight (kg) | NHS / Hospital number
Surname
Height (cm) | First name
Surface area (m²) | Date of birth

Prescriptions for once only, pre-medication or surgical prophylaxis only

Date	Time to be given	Medicine (approved name)	Dose	Route	Prescriber's signature	Pharmacy	Time given	Given	Checked

Sample

Infusion prescriptions

Date	Route	Drug: Approved name	Drug: Dose	Infusion fluid: Name & strength	Infusion fluid: Volume	Duration or Rate	Prescriber's signature	Given: Check	Start time / Finish time	Pharm

Guidance for prescribers

a) Write prescriptions legibly.
b) Ensure all demographic details have been completed
c) Write doses less than 1mg in micrograms.
d) Changes in dose and/ or frequency: discontinue drug and re-prescribe on a new line. Do not alter existing instructions.
e) Discontinue medicine (s) with a vertical line through the prescribing and administration records. Sign and date the discontinuation.
f) All intravenous flush solutions *must* be prescribed, administered and recorded according to local policy.

Guidance for recording administration

Nurse initials to indicate medicine administered. When medicine (s) are not given as prescribed, record the appropriate code in the administration box and initial. Ensure appropriate action is taken as a result of drug omission to promote continuity.

1 Patient away from ward.
2 Patient unable to receive e.g. NBM, vomiting.
3 Patient refused.
4 Medicine not available (check emergency drug cupboard & on-call pharmacist).
5 Other—document in nursing notes.

Routes of administration

I.V. – intravenous
I.M. – intramuscular
S.C. – subcutaneous
P.O. – oral
TOP – topical
S.L. – sublingual
P.V. – vaginal
P.R. – rectal
INH - inhalation
NEB – nebulisation

All other routes must be in full

Quality of prescriptions

Statistically significant improvements were seen in many of the defined audit standards. A documented date of prescription increased from 0% of prescriptions to 92.0% of prescriptions following the intervention ($P \leq 0.001$). Time of prescription was recorded in 1.2% of medication charts before the intervention, this increased to 31.2% of prescriptions on the new chart ($P \leq 0.001$). Dose and units of prescriptions was documented in 91.7% and 87.1% of prescriptions respectively before the intervention, this increased to 98.2% and 96.0% respectively when the new chart was used. Route of administration of prescription was documented in 90.9% of prescriptions originally, this increased to 98.2% of prescriptions following the intervention.

With regards to fluids, the proportion of prescriptions with a documented rate increased from 35.3% of prescriptions to 84.7% of prescriptions ($P \leq 0.001$), and volume documentation was increased from 85.3 to 94.9% of prescriptions ($P=0.002$) following the introduction of the new chart (*Figure 3*).

Reasons for dose omission

Before the intervention, 33 prescriptions had no evidence of being administered. None of these had a documented reason for omission. In the new chart, 34 prescriptions were not administered, of which 11 (32%) had a documented rationale for omission.

Discussion

The audit cycle demonstrated that the new drug chart improved the quality of prescribing, for both drugs and infusions in the emergency department. This included significant improvements in the documentation of the date of prescriptions, and units and dose of drugs. It also improved documentation of reasons that prescriptions were not given.

Another important finding was that the number of prescriptions recorded using the new drug chart was higher than the number recorded on the previous chart, because the previous chart only had space for three drugs. Thus when more than three drugs were required either the subsequent pre-

scriptions were written in the margins of the page (further reducing the quality of the prescription), or an inpatient chart was used (thus splitting the record of drugs administered in the emergency department). The new chart allows for all drugs administered in the emergency department to be prescribed accurately in one place. Thus the new chart serves as a true record of what was prescribed in the emergency department, and is an effective handover document.

One ongoing problem highlighted by the second audit was the paucity of information regarding omitted doses, even after the new chart was introduced. This is probably a result of the nursing staff in the emergency department being unfamiliar with this system, and it is hoped it will improve over time.

It is not possible to show direct causation between the new chart and increased patient safety as no significant adverse incidents were recorded in either of the audit cycles. Therefore, increased patient safety can only be inferred by the demonstration of better quality prescribing and better handover documentation.

The benefits of standardization of medication charts have been previously described (Coombes et al, 2009), and this project confirms this finding. By increasing the space available, providing prompts for key information, having a separate space for infusions and making documentation familiar, drug prescribing and administration became much better documented.

A weakness of the methodology was in excluding patients admitted to inpatient settings other than the acute medical unit, including those who were admitted directly to the intensive care unit for example. These are often complex patients, who require a significant number of drugs while in the emergency department. Furthermore, the authors did not audit the prescribing across the emergency department, but rather in those patients being admitted. This was to maximize the number of prescriptions per patient, but means the data cannot be extrapolated to make comments on the emergency department as a whole.

It is acknowledged that the design of the original emergency department medication chart was particularly poor, this was indeed a main reason for beginning the audit cycle. Further data from multiple centres would be needed to assess the generalizability of this intervention. It is difficult to control for one specific aspect of the design of the medication chart in assessing the relative contributions to the effect described above.

Figure 2. Number of prescriptions per patient with the old and new drug charts.

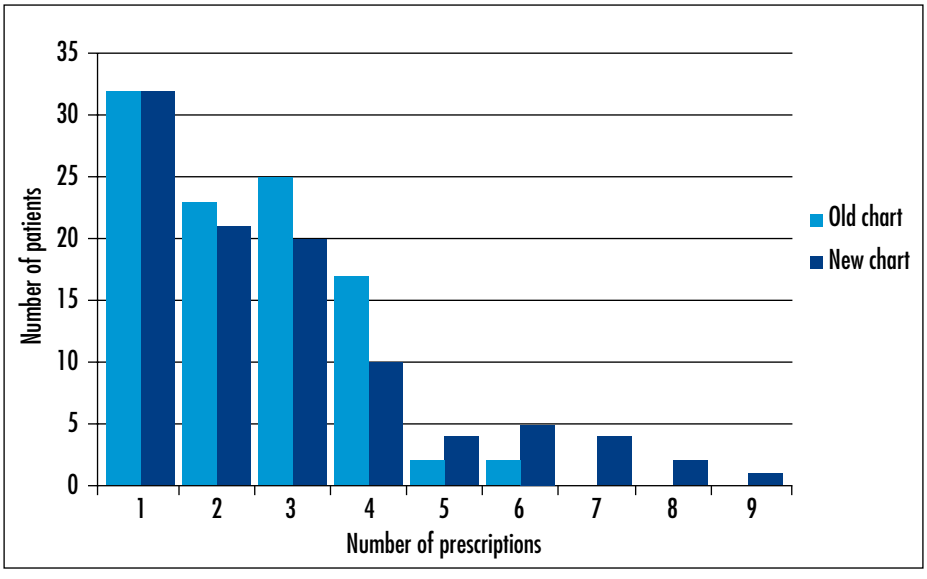
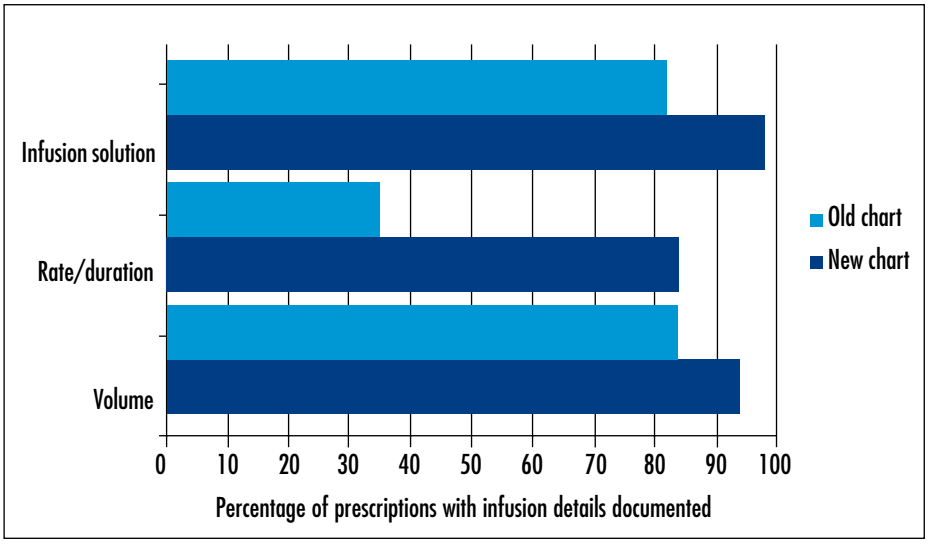


Figure 3. Quality of infusion prescriptions with the old and new drug charts.



Conclusions

It is well recognized that prescribing and administering drugs in very busy departments such as the emergency department carry increased risks relative to other clinical areas. This audit has highlighted that a small, low cost intervention can facilitate better practice in such a setting. BJHM

Conflict of interest: none.

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LEARNING POINTS

- Prescription errors are highest in the first 24 hours of admission.
- High quality prescribing in the emergency department is crucial to patient safety.
- Good drug chart design can increase the quality of prescriptions in the emergency department.