The impact of Automated Dispensing Cabinet implementation on medication omissions

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Background

In September 2017 a site-wide implementation of Automated Dispensing Cabinets (ADCs) was undertaken at the Royal Adelaide Hospital. ADCs were intended to increase the range of medications available on wards from approximately 40% to 85% of prescribed doses. The expanded range of medications available was predicted to improve timely medication administration[1]. There is some international evidence that suggests ADCs reduce medication omissions but there is limited published information in the Australian context[2].

Aim/Objective(s)

To assess the impact of the implementation of Automated Dispensing Cabinets on the number of missed doses for inpatients using the VicTAG critical missed doses medication safety package.

Method

Evaluation of the number and criticality of omitted doses was undertaken pre and post ADC implementation. All data was collected via case note audit. Ethics approval was granted by the Central Adelaide Local Health Network (CALHN) Human Research Ethics Committee.

Data Collection

- Data was be collected using the VicTAG audit tool by one auditor

Inclusion Criteria

- Patients admitted to inpatient medical and surgical wards during the data collection periods

Exclusion Criteria

- Outpatients at the Royal Adelaide Hospital
- Patients with a length of stay less than 24 hours at the time of auditing
- Patients with no regularly prescribed medications

Recruitment

- Each arm of the study reviewed 49 patient's medical records
- Pre data was collected retrospectively from June/July 2017
  - Wards with early implementation of ADCs were excluded
- Post data was collected prospectively from randomly selected inpatients during August/September 2018

Figure 1 – VicTAG Audit Tool[3]

AUDITOR:
WARD:
Date:

Critical Omitted Doses Audit Tool

Patient number	Patients admitted > 24 hours (EXCLUDE first 24 hrs of admission)		Medicines prescribed on regular, variable (including warfarin), once only & telephone sections of chart											
	Patient identifier	Team Medical (M) Surgical (S) Paed (P)	Total prescribed doses (excluding PRN)	Number of doses missed		Missed doses of Critical Medicines					Time Day (D) Evening (E) Night (N)	Regular Variable STAT Telephone Warfarin	Comments / Patient outcome as a result of missed critical medicine.
				Not available Ⓝ	Unapproved code, unclear, not signed ?, NA, X	On Critical list? Y / N	Critical for this patient? Y / N	ONLY CONTINUE FOR CRITICAL MEDICINES	Medicine name	Number doses missed	Route			

Results

Prior to implementation of ADCs approximately 2.5% of prescribed doses were missed. Following implementation of the ADCs approximately 1.3% of prescribed doses were missed. This was approximately a 47% reduction in missed doses relative to prescribed doses.

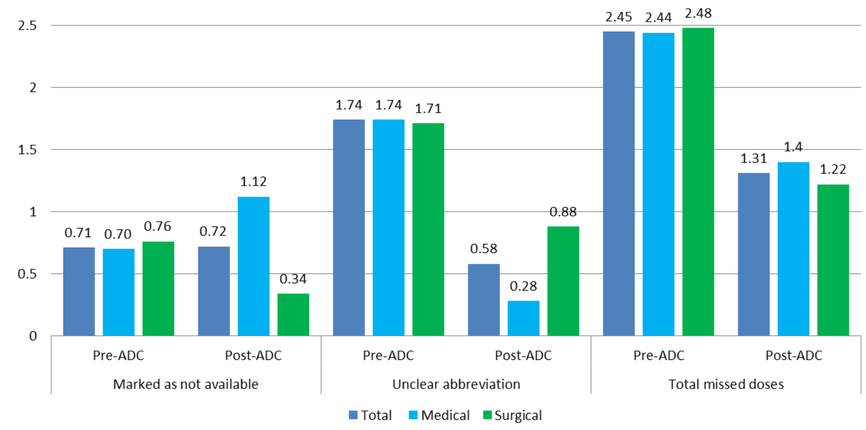
Table 1 – Total missed doses vs prescribed doses

	Number of patients	Total doses prescribed	Total doses not given	% Total doses not given compared to total prescribed	% Difference since ADC implementation	Total Missed Doses Critical
Pre Data - Total	**49**	**2535**	**62**	2.45		**5**
Pre- Medical	31	2010	49	2.44		4
Pre-Surgical	18	525	13	2.48		1
Post Data - Total	**49**	**2909**	**38**	1.31	-46.59	**0**
Post- Medical	23	1428	20	1.40	-42.55	0
Post - Surgical	26	1481	18	1.22	-50.92	0

Documentation

The auditor reviewed whether correct NIMC documentation or unclear abbreviations (e.g. blank, N/A, ?) were used to document missed doses. The documentation breakdown is demonstrated in figure 2.

Figure 2 – Percentage of doses missed relative to total prescribed doses



Critical missed medications

Critical missed medications were defined by the audit tool. The pre data identified 5 doses which were missed that were considered to be critical medications. No critical medications had missed doses after the implementation of the ADCs.

Critical medications missed prior to ADC implementation

- Enoxaparin
- Gabapentin
- IV benzylpenicillin
- Gliclazide
- IV metronidazole

Discussion/Limitations

Medication omissions have the potential to lead to treatment delays and patient harm[3]. Australian research has indicated approximately 2.5% of reported medication incidents are associated with dose omissions and audit of medication charts demonstrates omission rates up to 11%[3-4].

- This study demonstrated a baseline rate of omissions of approximately 2.5% which was further reduced to 1.3% following ADC implementation

Critical medications

No critical medication were missed following ADC implementation, however the VicTAG criteria was used by the auditor. The VicTAG criteria may not reflect local patient acuity or be familiar to nursing staff to promote escalation when doses are missed.

- Consideration should be given to improving local awareness of critical medications

Reduction in overall missed doses and critical medications missed may have positive patient outcomes

Documentation

Correct documentation on the NIMC for an omission increased in the medical wards following ADC implementation. This was an incidental finding but it may be valuable to assess any interventions in these areas which could be used to improve documentation on medication charts.

Limitations

- The auditor did not include stat or once-only doses
  - during prospective data collection it was difficult to identify if a medication has been missed or just recently charted
- Small sample size due to time consuming manual data collection

Conclusions

At the Royal Adelaide Hospital the implementation of Automated Dispensing Cabinets has resulted in a greater availability of medications on the ward.

Greater availability has translated into less omissions overall and demonstrated a reduction in the omission of critical medications.

References

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