

Evaluating the impact of pharmaceutical care bundles on patient outcomes in 10 Queensland Public Hospitals

Martin Canning¹, Ross McDougall², Stephanie Yerkovic^{3,4}, Michael Barras^{5,6}, Ian Coombes^{6,7}, Clair Sullivan^{1,6}, Karen Whitfield⁶

1. Metro North Health. 2. The Prince Charles Hospital. 3. Menzies School of Research. 4. Queensland University of Technology. 5. Princess Alexandra Hospital. 6. The University of Queensland. 7. Royal Brisbane & Women's Hospital

Background

Medication errors are a leading cause of preventable healthcare associated harm. Clinical pharmacists perform patient-centred activities to optimise medicines use and prevent harm. Historically, clinical pharmacy quality indicators have measured individual activity process and are not linked to outcomes.

Aims

To determine the proportion of patients for which individual and bundled pharmaceutical care activities were performed and to investigate associations between patient outcomes and delivery of pharmaceutical care bundles.

Methods

Key clinical pharmacy activities were defined within relevant state-wide clinical information systems. Routinely recorded data was extracted at ten participating sites for adult patients who had a completed non-same day hospital stay over the 2021 calendar year. Associations between extent of pharmaceutical care bundle delivery and outcomes were investigated. The tables below define the medication-related activities and data sources.

Table 1 – Pharmaceutical Care Bundle components and definitions

Medication-related activity	Data source	Definition
Medication history	ePADT (coded data)	Presence of procedure code "96027-00" within any episode of care which makes up the hospital stay
Medication review	ePADT (coded data)	Presence of procedure code "95550-00" within any episode of care which makes up the hospital stay
Medicine list provided	Enterprise Liaison Medication System (eLMS) or electronic Discharge Summary (eDS)	Medication list authorised by a pharmacist within 24 hours of discharge date
Medicines present on discharge summary	Enterprise Discharge Summary (EDS)	Any medicines information on a completed transfer of care (discharge) summary

Table 2 – Outcome measure definitions

Outcome	Data source	Definition
Length of stay	ePADT	Number of days between admission date and discharge date
Unplanned readmission within 30 days	ePADT	A subsequent hospital stay commenced at the same facility within 30 days of the discharge date and the admit status was recorded as 'emergency'
Average hospital standardised mortality ratio (HSMR)	Safety & Quality reporting	Ratio between expected deaths and actual deaths multiplied by 100

Results

Ten hospitals participated, comprising of 283,813 hospital stays.

Table 3 outlines the demographics of sites who volunteered to participate in the study.

Table 4 outlines the extent of individual clinical pharmacy service delivery, as well as all activities delivered as a 'pharmaceutical care bundle'.

Table 3 – Participating site demographics

	Rural / Regional / Metropolitan	Overnight beds	Clinical Pharmacist FTE (average per day)	Bed:FTE ratio	Secondary / Tertiary	Prescribing system
Hospital A	Regional	290	7.57	38.3	Secondary	Paper
Hospital B	Regional	500	18.14	27.6	Secondary	Paper
Hospital C	Metropolitan	418	13.6	30.7	Secondary	Electronic
Hospital D	Metropolitan	573	22.6	25.3	Tertiary	Paper
Hospital E	Metropolitan	789	25	31.6	Tertiary	Electronic
Hospital F	Regional	370	13.14	28.2	Secondary	Paper
Hospital G	Regional	168	Not provided	Not provided	Secondary	Electronic
Hospital H	Metropolitan	792	22.3	35.5	Tertiary	Paper
Hospital I	Regional	510	15.34	33.2	Secondary	Electronic
Hospital J	Regional	598	19.21	31.1	Tertiary	Electronic

Table 4 – Extent of individual and bundled clinical pharmacy service delivery

	Number of Hospital Stays	Medication History	Medication Review	Discharge Medication List	Medications on Discharge Summary	Pharmaceutical Care Bundle
Hospital A	19,002	45.31% (n=8,609)	43.81% (n=8,324)	41.38% (n=7,863)	47.95% (n=9,112)	25.88% (n=4,918)
Hospital B	28,861	25.49% (n=7,357)	16.14% (n=4,657)	33.09% (n=9,550)	41.88% (n=12,088)	4.32% (n=1,246)
Hospital C	27,669	65.37% (n=18,088)	66.10% (n=18,290)	30.20% (n=8,357)	37.10% (n=10,266)	25.47% (n=7,047)
Hospital D	28,635	75.14% (n=21,517)	77.16% (n=22,096)	75.03% (n=21,484)	73.38% (n=21,013)	61.18% (n=17,518)
Hospital E	38,202	71.15% (n=27,180)	70.56% (n=26,957)	45.34% (n=17,321)	56.42% (n=21,552)	40.08% (n=14,312)
Hospital F	21,099	65.89% (n=13,903)	66.73% (n=14,080)	55.96% (n=11,806)	64.37% (n=13,582)	41.83% (n=8,826)
Hospital G	12,939	53.79% (n=6,960)	45.44% (n=5,880)	42.38% (n=5,484)	43.43% (n=5,619)	27.47% (n=3,554)
Hospital H	44,519	55.63% (n=24,765)	57.84% (n=25,749)	36.53% (n=16,265)	45.98% (n=20,468)	26.74% (n=11,906)
Hospital I	33,643	41.77% (n=14,052)	47.17% (n=15,871)	23.06% (n=7,757)	44.48% (n=14,966)	17.42% (n=5,861)
Hospital J	29,244	17.45% (n=5,102)	9.9% (n=2,895)	17.10% (n=5,001)	38.04% (n=11,125)	0.55% (n=162)
All Hospitals	283,813	51.98% (n=147,533)	51.02% (n=144,799)	39.07% (n=110,888)	49.25% (n=139,791)	26.90% (n=76,350)

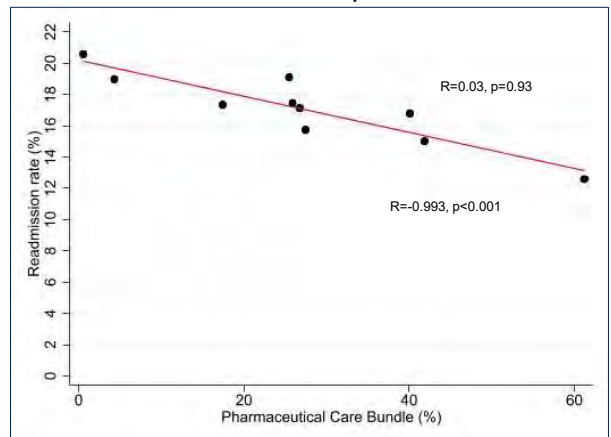
Table 5 outlines the delivery of the PCB according to age group, prescribing system and length of stay (LOS). Older patients were more likely to receive a complete PCB, as were those who had a longer length of stay. Patients from hospitals with a paper-based prescribing system were also more likely to receive the complete PCB.

Table 5 – Characteristics associated with PCB delivery

		No PCB (n, %) N=207,463	PCB (n, %) N=76,350	p-value
Age group	18-24 yrs	18,008 (8.7%)	2,346 (3.1%)	<0.001
	25-54 yrs	92,627 (44.6%)	19,132 (25.1%)	
	55-64 yrs	27,320 (13.2%)	12,472 (16.3%)	
	65-84 yrs	55,575 (26.8%)	32,590 (42.7%)	
	>=85 yrs	13,933 (6.7%)	9,810 (12.8%)	
Prescribing system	Electronic	109,761 (52.9%)	31,936 (41.8%)	<0.001
	Paper	97,702 (47.1%)	44,414 (58.2%)	
Length of Stay (LOS)	LOS 1	94,521 (45.6%)	10,070 (13.2%)	<0.001
	LOS 2	35,972 (17.3%)	12,412 (16.3%)	
	LOS 3	20,864 (10.1%)	10,546 (13.8%)	
	LOS 4-6	26,772 (12.9%)	18,661 (24.4%)	
	LOS 7+	29,334 (14.1%)	24,661 (32.3%)	

No statistically significant association between PCB and bed:FTE ratio (R=0.183, p=0.64) or HSMR (R=0.03, p=0.93) was observed, however a strong and statistically significant association between PCB delivery and unplanned readmission within 30 days was observed (R=-0.993, p<0.001). (See figure 1).

Figure 1 – Association between PCB and unplanned readmission within 30 days



Conclusion

Hospital sites where a larger proportion of patients receive a pharmaceutical care bundle consisting of a medication history, medication review, provision of a medication list and medicines information on the discharge summary have lower unplanned readmission within 30 days.

Martin Canning

Consultant Pharmacist, Metro North Clinical Governance
Martin.Canning@health.qld.gov.au

Contact Us

