

Prospective medication order review in the emergency department: An evaluation of pharmacist impact on the medication-use process

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Background¹⁻³

- Implementation of prospective medication order review in the emergency department (ED) is considered best practice by organizations such as Joint Commission, but few health systems have implemented this process
- Main concern with prospective order review in the ED is the potential for a delay in patient care
- Feasibility of prospective medication order review by pharmacists in the ED has not been extensively studied
- One previous investigation found order verification accounted for a small part of the overall medication-use process timeframe

Purpose: Determine the impact of pharmacist prospective order review on the medication-use process in the ED

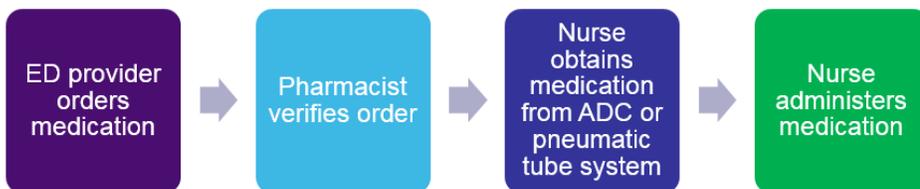
Methods

- Prospective, single-center, observational
- Study groups
 - Pre-implementation: ordered between August 1, 2017 and September 30, 2017
 - Post-implementation: ordered between December 1, 2017 and January 31, 2018

Inclusion Criteria	Exclusion Criteria
Medications	Medications
Ordered by an ED provider	Administered >5 hours after order verification
Dispensed from: <ul style="list-style-type: none"> • ED ADC • Inpatient pharmacy via pneumatic tube 	Dispensed from: <ul style="list-style-type: none"> • ED ADC prior to order verification • Inpatient pharmacy without a trackable delivery date and time
	Orders
	Automatically placed by the computer system
	Order actions other than the initial verification
ADC: automated dispensing cabinet	Missing any pertinent data points

Primary Outcome

- Overall time from order entry to medication administration among medications ordered in the ED



Secondary Outcomes

- Time from order entry by a provider to order verification by a pharmacist
- Time from order verification by a pharmacist to medication dispensing from either the automated dispensing cabinet (ADC) or inpatient pharmacy
- Time from medication dispensing from the ADC or inpatient pharmacy to medication administration

Results

- Orders screened (n=22,059)
- Orders excluded (n=19,752)
 - Missing data point (n=13,020)
 - Non-ED provider (n=3520)
 - System-placed order (n=2968)
 - Not initial order verification (n=201)
 - Other (n=43)
- Orders included (n=2307)
 - 10.5% of orders screened were included

Medication Orders			
Results, n (%)	Pre (n=337)	Post (n=1971)	P Value
Pharmacist Shift			
Pharmacist in ED	205 (60.8%)	1334 (67.7%)	0.014
No Pharmacist in ED	132 (39.2%)	637 (32.3%)	
Dispense Location			
ED ADC	120 (35.6%)	1763 (89.4%)	<0.001
Main Inpatient Pharmacy	217 (64.4%)	208 (10.6%)	
Medication Category			
Anti-infective	42 (12.5%)	197 (10%)	0.169
Other	295 (87.5%)	1774 (90%)	
Medication Urgency			
Non-emergent	216 (64.1%)	740 (37.5%)	<0.001
Emergent	121 (35.9%)	1231 (62.5%)	

Result, (minutes) mean ± SD	Primary Outcome			Day of Week		
	Pre (n=337)	Post (n=1971)	P Value	Weekday (n=1618)	Weekend/ Holiday (n=690)	P Value
Order entry to verification (pharmacist role)	11.7 ± 11.4	8 ± 10.5	<0.001	8.7 ± 11.1	8 ± 9.7	0.134
Verification to dispensing	6.7 ± 16.7	13.5 ± 19.7	<0.001	12.9 ± 19.9	11.7 ± 18.1	0.179
Dispensing to administration	22.4 ± 34.4	8.8 ± 16.6	<0.001	11.3 ± 22.7	9.5 ± 15.1	0.054
Order entry to administration (total time)	40.7 ± 37	30.3 ± 28.1	<0.001	33 ± 32	29.2 ± 23.7	0.006

Result, (minutes) mean ± SD	Medication Category			Dispense Location		
	Other (n=2069)	Anti- Infective (n=239)	P Value	Main Inpatient Pharmacy (n=425)	ED ADC (n=1883)	P Value
Order entry to verification (pharmacist role)	8.2 ± 10.5	11.5 ± 11.6	<0.001	11.9 ± 11.5	7.8 ± 10.3	<0.001
Verification to dispensing	12.8 ± 19.4	10.3 ± 19.3	0.055	1.5 ± 9.9	15 ± 20.2	<0.001
Dispensing to administration	9.7 ± 18.7	20.5 ± 32.1	<0.001	31.3 ± 33.1	6.2 ± 12.8	<0.001
Order entry to administration (total time)	30.7 ± 28.7	42.2 ± 36.2	<0.001	44.7 ± 35.3	29 ± 27.6	<0.001

Discussion

- Significant decrease in overall process time after implementation of prospective order review
- Uneven characteristics between pre- and post-implementation groups
 - Significantly more medications dispensed from main pharmacy in the pre-implementation group
 - Significantly fewer non-emergent medications in the post-implementation group
- Majority of orders verified by an ED pharmacist
- Significantly longer process for anti-infectives vs other medications
- No significant difference between weekday and weekend/holiday shifts

Limitations

- Exclusion criteria eliminated majority of the order population
- Unable to track pharmacist interventions

Conclusions

- Statistically significant decrease in the overall medication-use process time following implementation of pharmacist prospective order review in the emergency department
 - Decreased time for order entry to verification (pharmacist role)
 - Increased time from verification to dispensing (~90% of orders dispensed from the ED ADC)
 - Decreased time from dispensing to administration

References

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