

# Radio frequency identification tags to improve accuracy of anesthesia medication trays in the procedural setting

Anthony Scott, PharmD; Samantha Bastow, PharmD, BCPS; Randall Knoebel, PharmD, BCOP

## Background

- Pharmacy departments in hospital settings continue to face pressures to increase productivity and patient safety using technology and automation.<sup>1</sup>
- Manual processes relying on human labor can introduce the risk for human errors and potentially increase the cost of care.<sup>1-3</sup>
- Previous studies show error percentages as high 33.1% in pharmacy filled drug trays using manual workflows without the use of technology. Reasons for error include missing medications, look alike/sound alike drug mistakes, and expired medication remaining within the trays.<sup>3</sup>
- Quality improvement studies have shown with automated workflows using radio frequency identification tags (RFID) on medications, error rates in medication trays can be completely eliminated when following proper workflows with tagging and scanning medications.<sup>4</sup>

## Goal

- The primary goal of this project was to implement an RFID enabled process for all medication trays in circulation in the UCM adult procedural areas to enhance medication safety and error reduction.
- The RFID technology should lead to safe tray preparation, improved awareness of medication utilization patterns, and create new methods to help with productivity and waste reduction in the procedural areas.

## Strategy

- With Pharmacy and IS oversight, Intelliguard® technology was installed and implemented in the Center for Care and Discovery's General Operating Room (GOR) satellite pharmacy on the 6<sup>th</sup> floor.
- The vendor supported the full implementation process, which requires RFID tags to be encoded and added onto existing and new tray medications supported by the system. A remote scanner is used to verify the contents of each tray prior to distribution for use. Checkpoints require both pharmacy technician and pharmacist approval at various stages.



### RFID TAG



## Results

### UCM Intelliguard® Expired Medication Report 12/6/2017 – 3/6/2018

Medication	Qty.	Daily Avg.
Succinylcholine 100mg/5ml syringe	82	0.91
Neostigmine 5mg/5ml syringe	54	0.60
Phenylephrine 1mg/10ml syringe	52	0.58
Rocuronium 10mg/ml 10ml syringe	34	0.38
Lidocaine 1% 3ml Syringe	30	0.33
Ephedrine 50mg/5ml syringe total	26	0.29
Atropine 0.4mg/ml 20ml	20	0.22
Bupivacaine 0.5% 10ml 5mg/ml 10ml	18	0.20
Famotidine 10mg/ml 2ml	10	0.11
Glycopyrrolate 1mg/5ml syringe	7	0.08
Neostigmine 1:1000(1mg/ml) 10ml	5	0.06
Calcium Gluconate 10% 100mg/ml 10ml	3	0.03
Aminocaproic Acid 250mg/ml	1	0.01
Etomidate 2mg/ml 10ml	1	0.01
Rocuronium 10mg/ml 5ml	1	0.01
Ketoralac 15mg/ml 1ml	1	0.01
Naloxone 0.4mg/ml 1ml	1	0.01
Vercuronium 10mg	1	0.01
<b>Total</b>	<b>347</b>	<b>3.86</b>

### UCM Intelliguard® Medication Utilization Patterns 12/6/2017 – 3/6/2018

Total Medication Utilization by Tray			Tray Utilization by Area		
Tray Type	Quantity	Daily Avg.	Tray Type	Total # of Exchanges	Weekly Avg.
GOR	15,428	171.4	GOR	1,499	124.9
DOR	4,555	50.6	CLI (A, B, C)	541	45.1
POR	3,699	41.1	DOR	452	37.6
CLI (A, B, C)	2,997	33.2	POR	405	33.7
Adult Cardiac	1,960	21.7	Adult Cardiac	203	16.9
ANS Block	102	1.1	ANS Block	21	0.2

\* Data includes the following medication trays: General (GOR), Procedural (POR), Chicago Lying-In (CLIOR), Duchossois Center for Advanced Medicine (DOR), and Anesthesia Blocks (ANS)

## Conclusions and Next Steps

- Intelliguard® technology implementation has enabled significant reporting for medication tray utilization in the procedural areas. Over a 3-month period:
  - 347** expired medications were captured by the RFID scanner in all tray types, showing avoided near misses in patient care areas
  - 28,741** medications were used in all trays, highlighting pharmacy productivity and providing inventory utilization information
  - 2,631** trays were scanned and replenished by the GOR satellite pharmacy
- Limitations of the reported data include the lack of reporting metrics showing other errors caught by the scanner (eg, incorrect drug quantity placed in a tray), discrepancies occurring due to staff training and competency during implementation, and missed scans / capture rates due to hardware downtimes.
- The inpatient pharmacy will look to deploy RFID tagging and scanning of medication in trays and carts outside of the procedural areas throughout the medical center as resources allow to improve data analysis and medication accuracy.

## References

- Brennan TA, Leape LL, Laird NM, Hebert L, Localio AR, Lawthers AG, et al. Incidence of adverse events and negligence in hospitalized patients. Results of the Harvard Medical Practice Study I. *N Engl J Med.* 1991;324(6):370-6.
- Wilson RM, Runciman WB, Gibberd RW, Harrison BT, Newby L, Hamilton JD. The Quality in Australian Health Care Study. *Med J Aust.* 1995;163(9):458-71.
- Kohn LT, Corrigan JM, Donaldson MS, editors. *To err is human—building a safer health system.* Washington (DC): National Academy Press; 1999. American Society of Health-System Pharmacists. ASHP statement on bar-code verification during inventory, preparation, and dispensing of medications. *Am J Health Syst Pharm.* 2011 Mar 1;68(5):442-5. doi: 10.2146/sp100012.
- The risk of relying on human perfection: A MEPS Real-time Inc. White Paper. MEPS Real-Time and Intelliguard; 2015:1-9.