ANESTHESIA AND INFORMATION TECHNOLOGY PARTNERSHIPS TO PREVENT DRUG DIVERSION

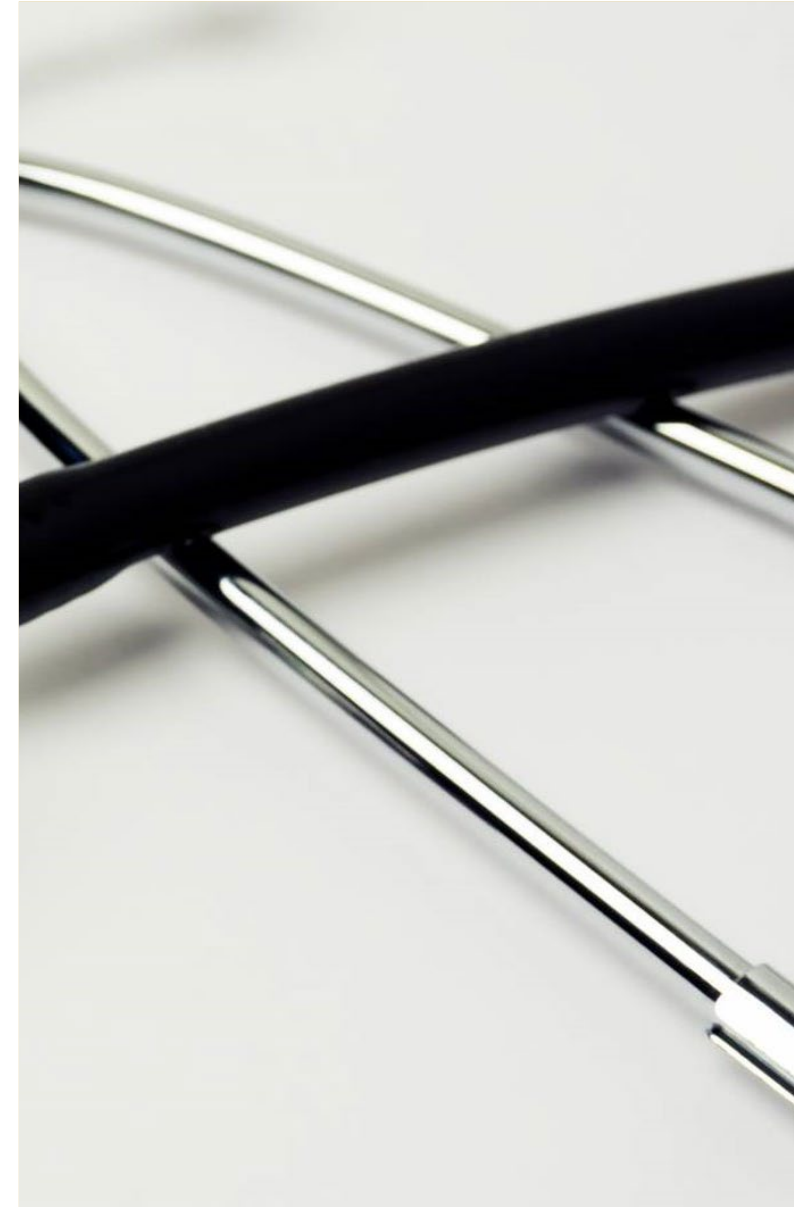DOMINIC CAROLLO, MD, FASA

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OBJECTIVES

- Review the "call to action" on drug diversion (5 min)

- Discuss the evolution of OR technology to support controlled substance management (7 min)

- Discuss the role of IT partnerships in deployment of analytics software for drug diversion prevention (7 min)

- Share vision for the future (5 min)

CALL TO ACTION

- Current state
- Leadership commitment & importance of anesthesia leadership
- Role of technology

Drug-addicted, dangerous and licensed for the operating room [1]

NEWS

He says he woke up during surgery. Lawsuit blames it on fentanyl use by anesthesiologist [2]

A lawsuit contends former anesthesiologist   was a longtime drug addict who did not give enough anesthesia to a patient, and was later found overdosed in a hospital bathroom in 2017.

Doctor's overdose death prompts warning over misuse of anaesthetics [3]

coroner finds   self-administered a cocktail of drugs including the powerful drug propofol

Doc Who Overdosed in Hospital Bathroom Face [4] Lawsuits

— Anesthesiologist found unconscious, "covered in vomit with his pants down around his ankles"

1. The Denver Post, Apr 23, 2016
2. San Diego Union-Tribune Nov 25, 2022
3. The Guardian Nov 24, 2016
4. MedPage Today, Feb 10, 2020

DRUG DIVERSION WITH TAMPERING
IMPACT ON PATIENT SAFETY

Pain[1]

Patients not receiving pain medications due to delay, underdosing, or non-dosing

Treatments/surgical intervention without adequate pain relief

Viral Heptitis[2]

2008 – 2019: 4 outbreaks by HCV-infected health care providers – with at least 90 outbreak-associated cases of HCV and 28,989 persons notified for screening[2]

Long incubation period + (typically) asymptomatic illness with HBV and HCV = underdetected and underreported[2]

Other Bacterial Infections[3-6]

- Achromobacter xylosoxidans
- Serratia marcenses
- Sphingomonas paucimobilis
- Pseudomonas picketti
- Ochrobactrum anthropic
- Stenotrophomonas maltophilia

1. Joint Commission Quick Safety Brief. Drug Diversion and Impaired Health Care Workers. April 2019
2. CDC. Viral Hepatitis Outbreaks Related to Health Care.
3. Medical Professionals Reference, July 7, 2017
4. MMWR 2019;68 (16):374-6
5. The Washington Post, Aug 8, 2019
6. JAMA Network Feb 27, 1991

AVAILABLE DATA

10-15% of anesthesia providers will experience substance use disorder (SUD)[1]

Anesthesiologists represent only 4.2% of physicians but account for 11.4% of physicians in treatment for SUD[2]

"Considered the number one occupational hazard for anesthesia professionals"[1]

Mortality rate estimated at 15.7 per 100,000 (resident-years)[1]

- By comparison, 2014 rates for police officers 13.4

1 in 8 will develop SUD,

4 in 10 relapse over the course of a career[3]

1 in 9 residents who manifest SUD (during residency) will die[3]

1. Warner D., et al. Substance Use Disorder Among Anesthesiology Residents 1975-2009
2. Berge K. Chemical Abuse in Anesthesia Personnel: An Occupational Hazard, presented to the IHFDA, 2016
3. Warner D., et al. Risk and Outcomes of Substance Use Disorder among Anesthesiology Residents. Anesthesiology 2015

ASHP GUIDELINES ON PREVENTING DIVERSION OF CONTROLLED SUBSTANCES

- Released in 2016, updated in 2022

- Highlights areas recognized as high risk for controlled substance (CS) diversion – procedural areas and anesthesia

  - Automation and technology recognized as a key element to deploy due to high volume of CS

    - Automated dispensing cabinets

  - Surveillance should occur in areas including anesthesia and procedural areas

- Recognizes the importance of anesthesia leadership on the controlled substance diversion prevention program (CSDPP)

- Ochsner operates 46 hospitals and more than 370 health and urgent care centers across Louisiana, Mississippi, Alabama and the Gulf South.

- More than 37,000 employees and over 4700 employed and affiliated physicians

- Over 90 medical specialties and subspecialties

- 1.4 million patients served in 2022

EVOLUTION OF OR TECHNOLOGY TO PREVENT DRUG DIVERSION

Documentation

Historical carts/paper records

Electronic medical records

Storage

Carts and trays

Automated dispensing cabinets

Labeling systems
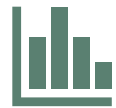
Handwritten labels

Barcode generated

Waste detection

Limited/no monitoring for accuracy of volume or drug contents

Monitoring

Surveillance Software

Reports

Analytics

OCHSNER MEDICAL CENTER EXPERIENCE WITH DRUG DIVERSION

- Different sites, different systems
  - Manual
  - Pyxis
  - Epic
- Failed internal audit for reproducibility
- System wide pharmacy leader
- Develop the IT

ADVANCED ANALYTIC DRUG DIVERSION SURVEILLANCE SOFTWARE

- Often powered by artificial intelligence (using machine learning)

- New types of transaction details can be visible; many of which support organizational policies

  - Prolonged dispense to administration

  - Administration to waste/return

  - Documentation accuracy

  - Removal for discharged patients

- User patterns/trending

  - Full vial/package wasting

  - Pulling items from different locations than expected

  - Using a "buddy" for waste consistently

Vendor

Expertise in development of new software but lacked expertise into anesthesia practice and workflows

- Complexity
- Diversity of practice

Hospital

Existing drug diversion prevention program with designated OR staff to review cases for potential anomalies

Pharmacy and anesthesia engagement in development process

VENDOR PARTNERSHIPS

Study to assess the impact of analytics software on operating room controlled substance management and drug diversion

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Purpose: This study investigated the impact of an advanced analytics software solution in the operating room (OR) on tracking and evaluating controlled substance discrepancies. The authors hypothesized that the software would increase identification of these discrepancies and improve the efficiency of the preexisting manual process.

Methods: In this evaluation comparing data from before to after implementation of the software, data were collected using the preexisting manual process for 50 days before implementation, followed by a 25-day period for acclimation to the new software, and ending with a 49-day postimplementation review period. Data collected included the total number of medication discrepancies, time required for discrepancy review and reconciliation by an OR analyst, types of discrepancies, and number of discrepancies leading to provider audits.

Results: Before implementation of the analytics software, there were 7,635 OR cases with a total of 674 charting discrepancies (8.83 discrepancies per 100 total OR cases) discovered across 439 OR cases. After implementation, there were 7,454 OR cases with a total of 930 charting discrepancies (12.48 discrepancies per 100 total OR cases; $P < 0.0001$) discovered across 680 OR cases. While discrepancies increased by 38%, the median review time for the OR analyst per case decreased ($P < 0.0001$) and the percentage of incidents resolved by the OR analyst increased by 14% while the number of cases requiring additional documentation by the provider decreased by 10%.

Conclusion: Implementation of advanced analytics software in the OR significantly increased the number of controlled substance charting discrepancies identified compared to the preimplementation review process while increasing the efficiency of the OR analyst.

Keywords: anesthesiology, controlled substances, drug diversion prevention, operating room, pharmacy analytics

KEY POINTS:

Review of all OR transactions can be time intensive and can omit anomalous behaviors

Implementation of a software solution supported a reduction in time and quantity of unresolved transactions and led to more cases being assessed for potential diversion

Implementing a surveillance system can help identify blind spots undetected by manual process

Carollo et al. Study to assess the impact of analytics software on operating room controlled substance management and drug diversion. *Am J Health Syst Pharm*. 2024; 81 e322-338

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	Pre-implementation	Post-implementation
Total OR procedures with discrepancies (%)	439 OR procedures (5.7)	680 OR procedures (9.1)
Total resolved by OR analyst (%)	299 (68)	559 (82)
Total pending resolution by provider (%)	140 (32)	121 (18)
Avg No. reviewed per day (new + pending resolution)	21	30
OR CS transactions with discrepancies (%)	4.6	6.6
Frequency of Discrepancy Types Reviewed (% new incidents)	Pre-implementation	Post-implementation
Total unequal to dispensed	195(44)	148 (16)
Timeframe	174 (40)	140(15)
No dispense recorded	164 (37)	183 (20)
Dispense only	47(11)	33 (4)
Other type discrepancy	38 (9)	56 (6)
Concentration caused error	27 (6)	20 (2)
Different provider	12 (3)	31 (3)
Incorrect patient	9 (2)	12 (1)
Different Area	3 (1)	1 (0.1)
Whole dose waste or return	5 (1)	248 (27)
Dispense after discharge or transfer	NA	11 (2)
Irreconcilable	NA	47 (7)
Total Discrepancies	674	930

CHARTING ANOMALIES

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TIME METRICS

	Pre-implementation N=642	Post-implementation N=808	P-Value
Total days Analyst reviewed	31	27	NA
Case type reviewed, N (%)			<0.0001
New Case	439 (68.4)	680 (84.2)	
Pending Case	203 (31.6)	128 (15.8)	
Cases reviewed with any interruptions, N (%)	30 (4.7)	58 (7.2)	0.05
Total review time[a]			
All Cases	23:28:46	25:37:48	NA
Cases without interruptions	21:16:23	20:34:51	NA
Cases with interruptions	02:12:23	05:02:57	NA
Median (IQR) review per case[a]			
All cases	00:01:40 (00:01:23)	00:01:07 (00:01:14)	< 0.0001
New cases	00:01:50 (00:01:32)	00:01:13 (00:01:26)	< 0.0001
Pending cases	00:01:33 (00:00:59)	00:00:47 (00:00:26)	< 0.0001
Average time for Auditor to complete review of potential diversion (self-tracked and reported)	3 business days	50 minutes	NR

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VISION FOR THE FUTURE

Close gaps in current technology

Behavioral early warning signs

Enhanced tampering detection

Case type/length normalization to detect outliers

Integration of waste activities/behaviors

Enhancing culture of safety

Culture of safety/speak up culture

"see something- say something"

THANK YOU

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