# Diversion Management: Application of Analytics in Clinical Practice

May 3, 2019





- Review the analytics background and framework
- Describe the journey, operationalization, and value at the University of Virginia Health System
- Understand the use of data for outcomes and metrics
- Discuss opportunities for implementation strategies

# Speakers

- Roy Joseph, PharmD
   Senior Pharmacy IT Application Analyst
   University of Virginia Health System
- Katelyn Hipwell, PharmD, MPH Pharmacy Clinical Operations Manager University of Virginia Health System
- Tushar Sathe
   Associate Director, Outcomes Solutions
   BD

#### **PROBLEM:** MEDICATION DIVERSION



of the General Population will misuse substances at some point in their lives, including healthcare workers who have access to controlled substances<sup>2</sup>



#### Current methods are ineffective

- Reactive approach
- Time consuming reconciliation of ADC and EMR transactions
- High false positive rates



#### Left undetected, diversion can lead to

- Risk to the diverter
- Serious patient safety risk
- Significant liability risk to the organization<sup>4</sup>

### **SOLUTION:** BD HEALTHSIGHT<sup>™</sup> DIVERSION MANAGEMENT





Prioritize investigative efforts and analyze transactions

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Consolidate information to assist with investigation and reporting

**1 REF-5401** Centers for Disease Control and Prevention. 2018 Annual Surveillance Report of Drug-Related Risks and Outcomes — United States. Surveillance Special Report. Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. Published August 31, 2018. **2 REF-5400** Baldisserri MR. Impaired healthcare professional. Crit Care Med. 2007;35(suppl):S106-16. **3 REF-5398** Fuehrlein, B and Ross, A. Opioid Use Disorder: A Desperate Need for Novel Treatments. Biol Psychiatry. 2017 April 01; 81(7): e43–e45. doi:10.1016/j.biopsych.2017.01.014 **4 REF-5399** ASHP Guidelines on Preventing Diversion of Controlled Substances, Am J Health-Syst Pharm. 2017; 74:e10-33



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## BD HealthSight<sup>™</sup> Diversion Management Key Capabilities



Multiple behavioral signals combined into a <u>single risk score</u> to identify anomalous behavior



<u>Machine Learning</u>-enabled algorithms to help improve anomaly detection



<u>Intuitive workflow</u>-based investigation capability



<u>Automated reconciliation</u> between Pyxis and eMAR



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## Demonstration

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# Demographics

- Tertiary care academic medical center
- 612 Beds
  - 494 Average Daily Census
  - 28,359 Inpatient Admissions
- 64,780 ED Visits
- 878,781 Outpatient Visits
- Level 1 Trauma Center
- Comprehensive Transplant and Stroke Center
- Nationally recognized Cancer and Heart Center







2018 statistic data



# **Opportunities for Diversion**

Procurement	<ul> <li>Purchase order and packing slip removed from records</li> <li>Unauthorized individual orders for CS on stolen DEA Form 222</li> <li>Product container is compromised</li> </ul>
Preparation and Dispensing	<ul> <li>CS are replaced by product of similar appearance when prepackaging</li> <li>Removing volume from premixed infusion</li> <li>Multidose vial overfill diverted</li> <li>Prepared syringe contents are replaced with saline solution</li> </ul>
Prescribing	<ul> <li>Prescription pads are diverted and forged to obtain CS</li> <li>Prescriber self-prescribes CS</li> <li>Verbal orders for CS created but not verified by prescriber</li> <li>Written prescriptions altered by patients</li> </ul>
Administration	<ul> <li>CS are withdrawn from an ADD on discharged or transferred patient</li> <li>Medication documented as given but not administered to patient</li> <li>Waste is not adequately witnessed and subsequently diverted</li> <li>Substitute drug is removed and administered while CS is diverted</li> </ul>
Waste and Removal	<ul> <li>CS waste is removed from unsecure waste container</li> <li>CS waste in syringe is replaced with saline</li> <li>Expired CS are diverted from holding area</li> </ul>

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From: ASHP Guidelines on Preventing Diversion of Controlled Substances Am J Health Syst Pharm. 2017;74(5):325-348. doi:10.2146/ajhp160919 Am J Health Syst Pharm | Copyright © 2017 by the American Society of Health-System Pharma<u>cists, Inc. All rights reserved.</u>

# **Pain Points**





### **Current Controlled Substance Audit Process**

#### **Background**

- Team members that handle controlled substances (CS) are compared to team members from the same practice area whose administration data shows ≥ 2+ SD higher than team members on the unit
  - Completed on a monthly basis



### **Surveillance Audits**

#### **Pre Analytics Tool**

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	Pyxis Activity Log						Documentation Assessment - EPIC						Pain As	ssessment - EPIC		Assignment Assessment		
	Provided b	y Pharmacy							Review by Manager				Re	view by Nursing		Review by Manager		
Patient Name	MRN	Transation Type	Medication Name	Quantity	Waste quantity (if applicable)	Witness (if applicable)	Time documented on MAR	Delay from Pyxis removal, or charted as given before removed?	EPIC medication order description	Dose removed from Pyxis match Epic order?	Waste appropriate? (if applicable)	Pain score prior to dose	Pain score after dose	Was dose documented appropriate for pain score?	Are pain scores consistent with previous and subsequent caregivers?	Medication removed prior to or after shift?	Was patient assigned to this caregiver?	Was p the t
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#### Sections of Template

- Blue = ADC Activity Log
- Yellow = Documentation Assessment EHR
- Orange = Pain Assessment EHR
- Green = Assignment Assessment

### **Tracking Issues Manually**

Number of Issues	Classification					
7.6%	Documentation Practice					
8.9%	Multiple discrepancies/More reports to audit					
3.8%	Override Practice					
7.6%	Owner of audit					
32.9%	Did not complete					
15.2%	Pain Score					
1.3%	Wrong Patient					
21.5%	Wasting Practice					
1.3%	Wrong Frequency					
100.0%	Total					



# **Challenges vs. Limitations**

### **Current Limitations**

- 1. Not specific to patient care type
- 2. Limited comparison by dispensing cabinet

# 3. Manually tracking in excel spreadsheets

- a. Investigation transactions
- b. Quality assurance trends
- c. Trends
- d. Receipt, Completion, Actions
- 4. High rate of false positives
- 5. Data Assessment
  - a. Manual monthly intervals
- 6. Traveler staff leave before detection
- 7. Communication and investigation completion
  - a. Emails

### Analytics Tool Improvements

- 1. Evaluation based on machine learning
- 2. Compares similar patient types regardless of dispensing cabinet
- 3. All tracking is automated and completed within the tool
- 4. Potential to decrease false positives
  - a. Determine post-implementation
- 5. Data Assessment
  - a. Updated and available daily
- 6. Timely traveler staff detection
- 7. Communication and investigation completion



a. Located in tool







### **BD HealthSight™ Analytics Tool**

 Updated controlled substance surveillance system designed by BD in partnership with UVA



### **BD** HealthSight<sup>™</sup> Diversion Management

Transact ime Frame .ast Week View Details ~ Patient	Patient Choose	·	Medication Choose	Issues Choose	Last da     Station Name     Choose	ata load: 02-01-2019 Sort Tispense Time	Export Report
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ast Week View Details ↓ Patient		·	Choose	- Choose	<ul> <li>Choose</li> </ul>	Dispense Time	-
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	Dispense	Time	Medication Order		Dispensed Medication		
	Jan 31 18	3:38	2 ML SYRINGE CI HYDROMORPHOI LIQD   1.00 mg	USTOM NDC : NE HCL 1 MG/ML PO	HYDROmorphone (HYD SOLUTION	DROmorphone) 2 mg/2 r	mL (2 mL)
Dispensed W AMT A 2mg 1	Waste AMT   Time 1 <b>mg 0 min</b>	Unreconciled AMT 1mg					
View Details 🗸 🗸	,						
Patient	Dispense Jan 31 17	Time 7:49	Medication Order OXYCODONE HCL mg	L 5 MG PO TABS   5.00	Dispensed Medication oxyCODONE (oxyCODO	DNE) 5 mg TABLET UD	
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5mg 5	5mg						
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### **Surveillance Audits Pre and Post Analytics Tool**

 Updated controlled substance surveillance system designed by BD in partnership with UVA

#### **Pre Analytics Tool**

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21.5%	Wasting Practice						
1.3%	Wrong Frequency						
100.0%	Total						

#### 40 – 44+ hours/month

#### **Post Analytics Tool**



### **Outcomes and Measures**

- Enhanced reporting capabilities with integrated data sets
- Allows for more accurate reconciliation between dispensing cabinets and the EHR
- Flexibility for additional metrics and measures to report related to controlled substance management



### **Outcomes and Measures**

- Unreconciled amounts
- Delay in user actions
  - Delayed Administration
  - Delayed Return
  - Delayed Waste
- Overrides
- Whole wasted doses





## **Key Metrics for UVA**

- Currently Reported Metrics
  - Unreconciled Dispenses
  - Undocumented Waste
  - Unreconciled Discrepancies > 24h
- Future Metrics to Consider
  - Unreconciled Dispenses
  - Time to Administer
  - Time to Waste

EMR
24h
Dispensing cabinet

- BD HealthSight™ Analytics



### **UVA Controlled Substance Reporting**

Measure by Priority	Frequency	Expected Changes
Unreconciled Dispenses	Nursing – Daily Pharmacy – Daily Reported - Monthly	<ul><li> Ability to assess daily</li><li>% trend down</li></ul>
Unresolved Discrepancies > 24 hours	Nursing – Daily Pharmacy – Weekly Reported – Weekly	• Maintain
Undocumented Waste	Nursing – Daily Pharmacy – Weekly Reported – Weekly	<ul> <li>Ability to assess daily</li> <li>% trend down</li> </ul>
Overrides	Nursing – Daily Pharmacy – Weekly Reported – Monthly	<ul> <li>Increase in resolution of unlinked overrides</li> <li>% trend down</li> </ul>
Time to Administration	TBD	<ul> <li>Start consistently measuring</li> <li>Establish baseline</li> </ul>



## **Lessons Learned**

- Interprofessional partnerships
  - Development feedback
- Informatics connections
- System limits
- Over communication
- Process mapping







