The Journey of electronic messages– Patient safety catalyst or information overload

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MEDICINE *of* THE HIGHEST ORDER

UNIVERSITY *of* ROCHESTER MEDICAL CENTER

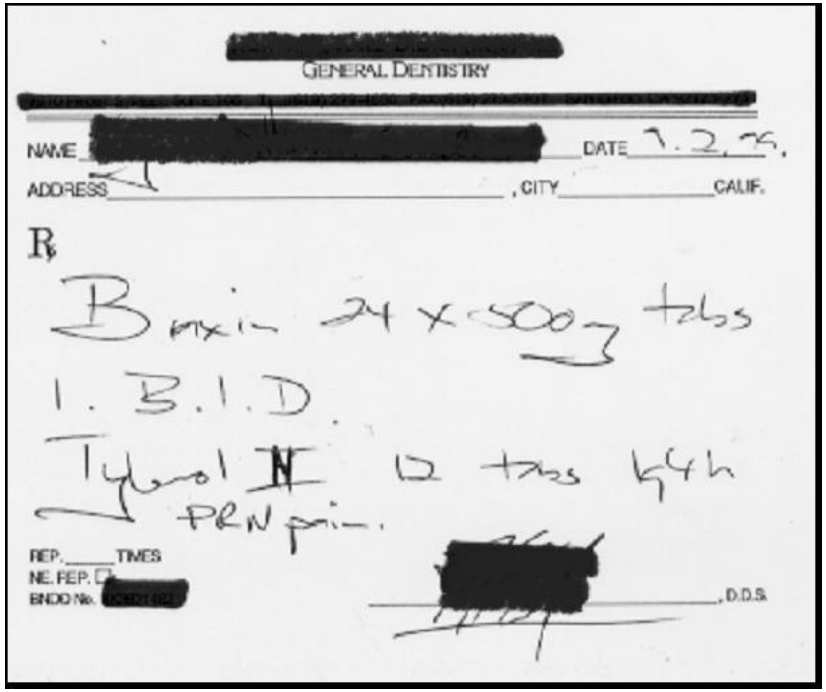
Objectives

- Review of ePrescribing process and national standards in the medication information sharing process
- Demonstrate the patient safety advantages of electronic information exchange with discontinuation messages and medication history exchanges
- Examples of innovative programs with medication information exchange

Wouldn’t it be great if:

We were able to send accurate patient medication information electronically from the provider to the pharmacy and have pharmacists electronically communicate back information to providers about medication therapy management and compliance risk and have it incorporated into patient care on a consistent basis

Examples of hardcopy prescriptions


[redacted]
GENERAL DENTISTRY
[redacted]
NAME [redacted] DATE 7.2.75.
ADDRESS _____, CITY _____ CALIF.
℞
Bmix 24 x 500 mg tabs
1. B.I.D.
Tylenol #4 12 tabs
PRN pain.
REP. ____ TIMES
NE. REP. ☐
BNDD No. [redacted]
[redacted] D.D.S.

Prescription Sample

TUFTS UNIVERSITY SCHOOL OF DENTAL MEDICINE
One Kneeland Street
Boston, MA 02111
555-999-9999

Name: Jane Doe
Age: 28
Address: 10 Kneeland Street
Boston , MA 02111
Date: 12/03/06

Drug: Amoxocillin 500 mg / capsule
Directions: 500 mg qid x 5 days
Quantity: 20
Refills: 0 (zero)

DEA #: XX55372

Signature: .....
Print Name: .....

INTERCHANGE is mandated unless the practitioner Writes the words "NO SUBSTITUTION" in this space

(c) 2006 Kanchan Gupta, M.D.

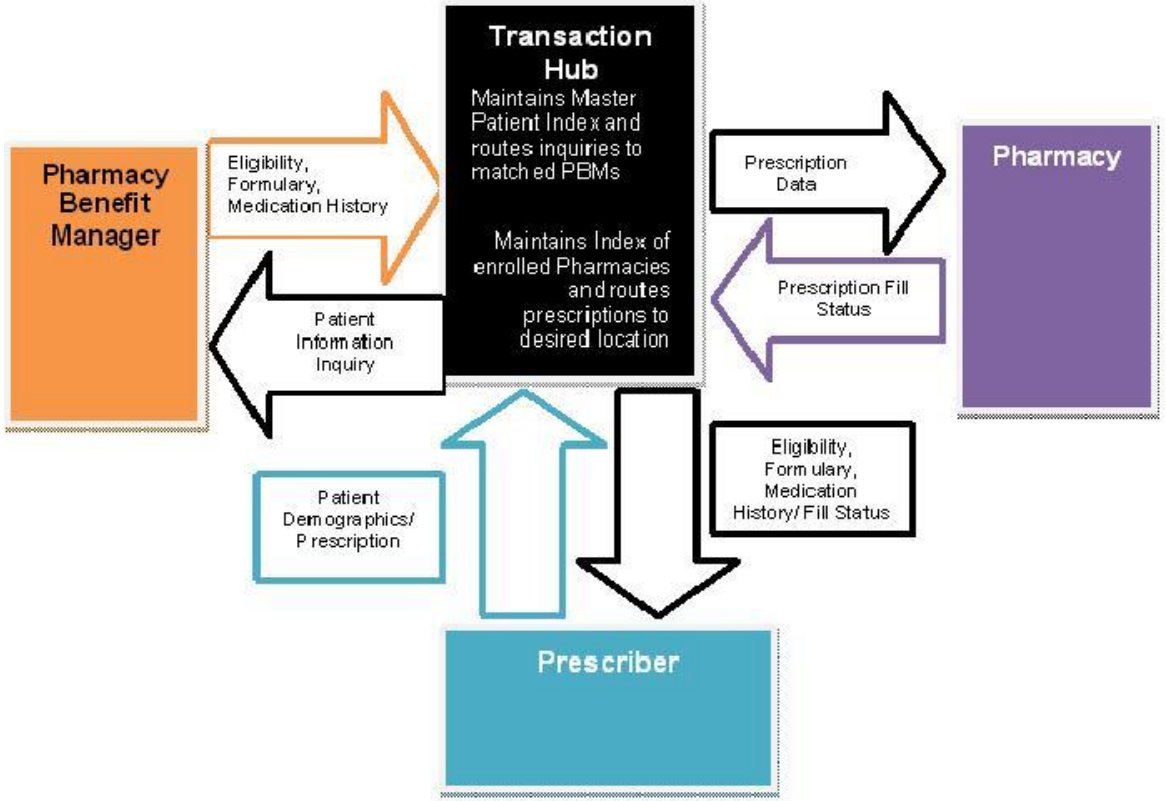
Background

- In 2000 the Institute of medicine reported that medication errors were the most common medical error estimating causing several thousand deaths per year
- Legibility of orders and prescriptions was a leading cause of medication errors and implementation of CPOE and ePrescribing has greatly reduced the legibility issues
- Change Management and training is a huge factor in transitioning from paper to electronic
- Starting in early 2000's, EHR technology incorporated printed prescriptions as a precursor to ePrescribing
- NY state mandated that all prescriptions be ePrescribed including controlled substances by March 2016

Standards

- ePrescribing standards are set through NCPDP- National Council for Prescription Drug Programs
- Requirements on what needs to be in the software requirements on each side (EHR and Pharmacy systems) as well as the bi-directional interfaces specifications
- Effort to streamline and standardize what EHR and Pharmacy software packages will accept and force standardization
- Recommendations but not regulations – no enforcement arm

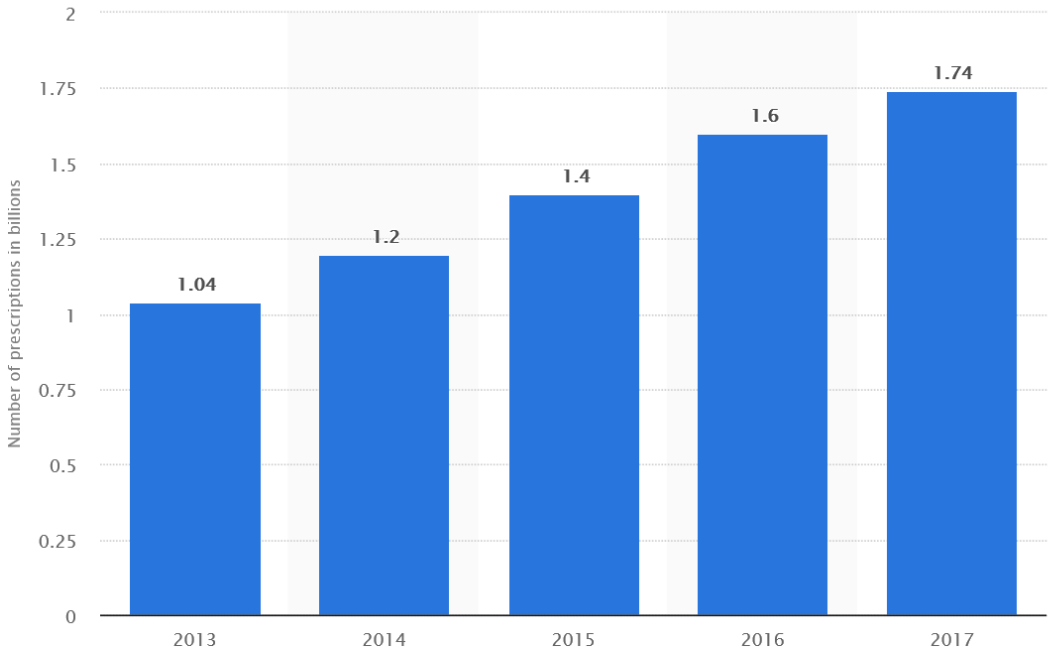
Electronic Prescription Workflow



Benefits of ePrescribing

- Instant notifications of allergies, drug-drug interactions and duplicate therapy while prescribing
- Prevention of medication errors
- Monitor controlled substances prescribing
- Medication Reconciliation ease
- More easily track prescription fulfillment- dispensing data
- Insurance coverage of prescribed is visual
- Improved medication adherence – 10% increase with eRX

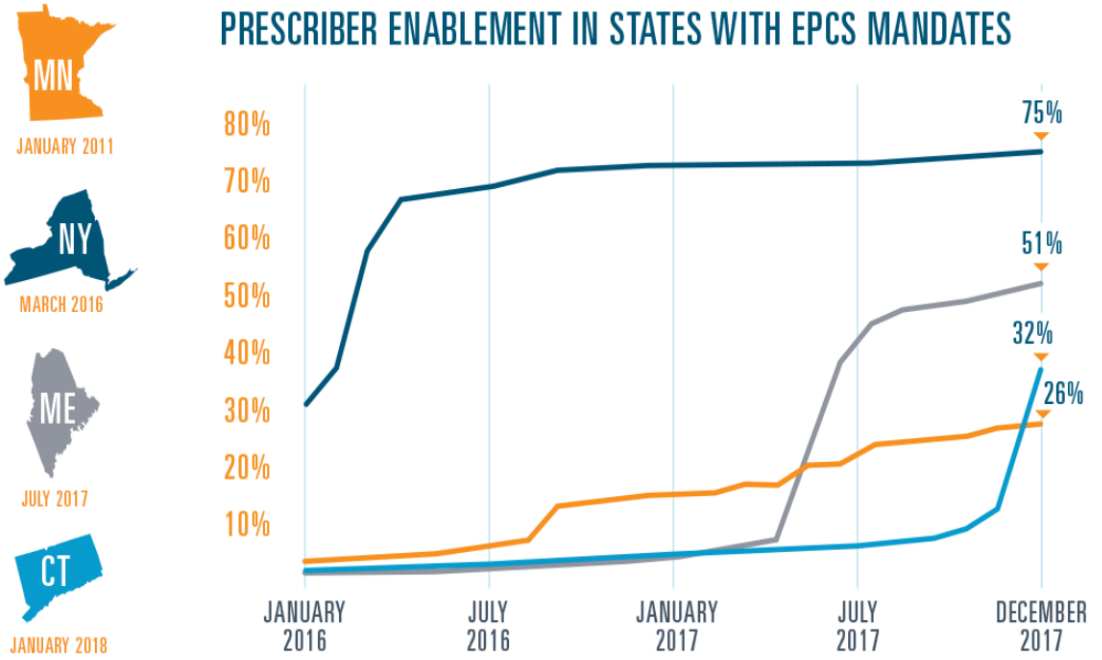
Number of e-Prescriptions in the United States from 2013 to 2017 (in billions)



Electronic Prescribing of Controlled Substances

- Mandated by NYS I-Stop Law

  in March 2016



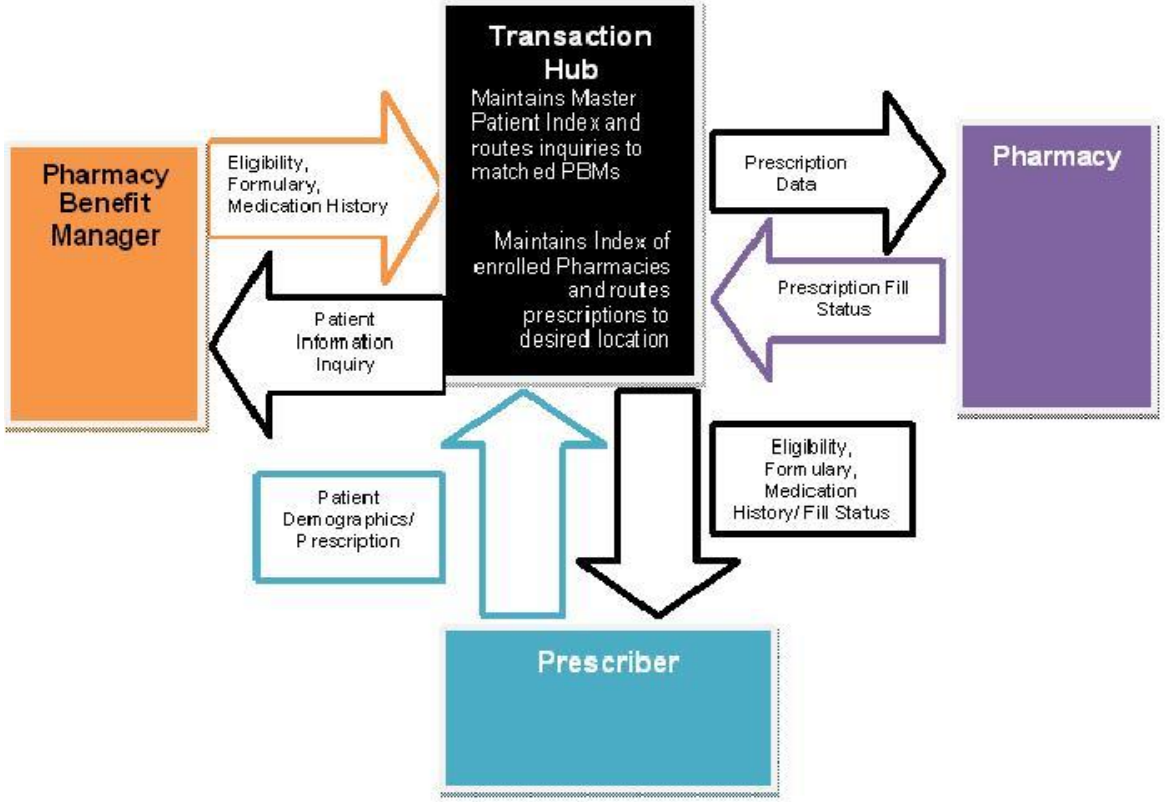
Nuances with ePrescribing messages (NewRX):

- Medications messages must contain an NDC code-
  - Without it there were mis-matches of products- Patient safety
  - Challenges with compounded medications- Need to use the NDC of an ingredient
  - Challenges with DME
- A frequency is not a frequency is not a frequency
  - Translation tables
  - Discrete Sigs

Challenges with ePrescribing correctly

- April 2016 JAMA published study Dhavle and colleagues[1]
  - 14.9 % of electronic Rx with free text notes
    - 66.1% contained inappropriate content fro which structured data exists in the new standard
    - Almost 20% of these inappropriate notes contained conflicting medication directions (SIGs) from the structured fields intended for this purpose
    - 9.6% were prescription cancellation requests for which separate ePrescribing message exists but is not widely supported on the community pharmacy software side

Electronic Prescription Workflow



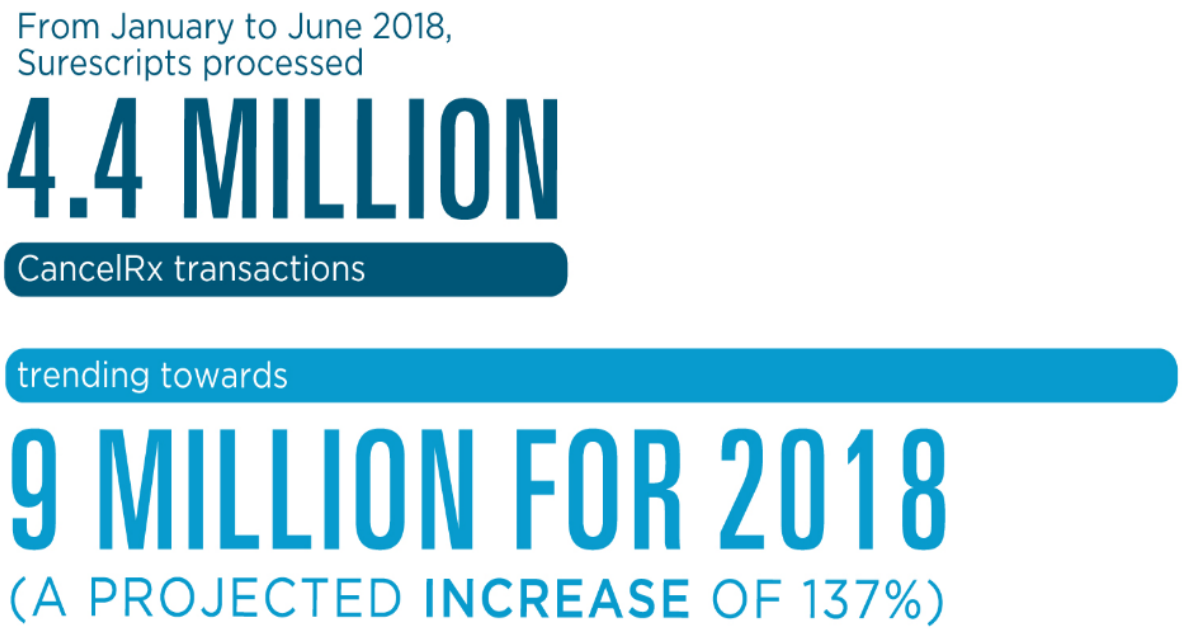
Discontinuation of Medication messages

- Improves clinical outcomes and patient safety.
- Simplifies pharmacy and prescriber workflows by eliminating manual processes.
- Saves the time and money of manual processing.
- Strengthens collaboration between pharmacists and prescribers.
- Enhances the patient experience.
- Enables a fully electronic workflow.
- Helps reduce inadvertent duplicate prescriptions.
- Enables electronic changes to treatment course.
- Improves patient safety by ensuring patients pick up only the prescriptions their prescribers intend for them.

Literature review

- Yang et al, Aug 2018 *Journal of the American Medical Informatics Association* looked at 1.4 Million messages and how many New RX messages were really discontinuation messages
- 9735 (0.7% of the total) NewRx messages containing prescription cancellation instructions with 78.5% observed in the Notes field; 35.3% of identified NewRxs were associated with high-alert or LASA medications.
- The most prevalent cancellation instruction types were medication strength or dosage changes (39.3%) and alternative therapy replacement orders (39.0%).
- These findings reveal the need for wider industry adoption of the CancelRx message by electronic health record (EHR) and pharmacy systems, along with clearer guidance and improved end-user training, particularly as states increasingly mandate electronic prescribing of controlled substances

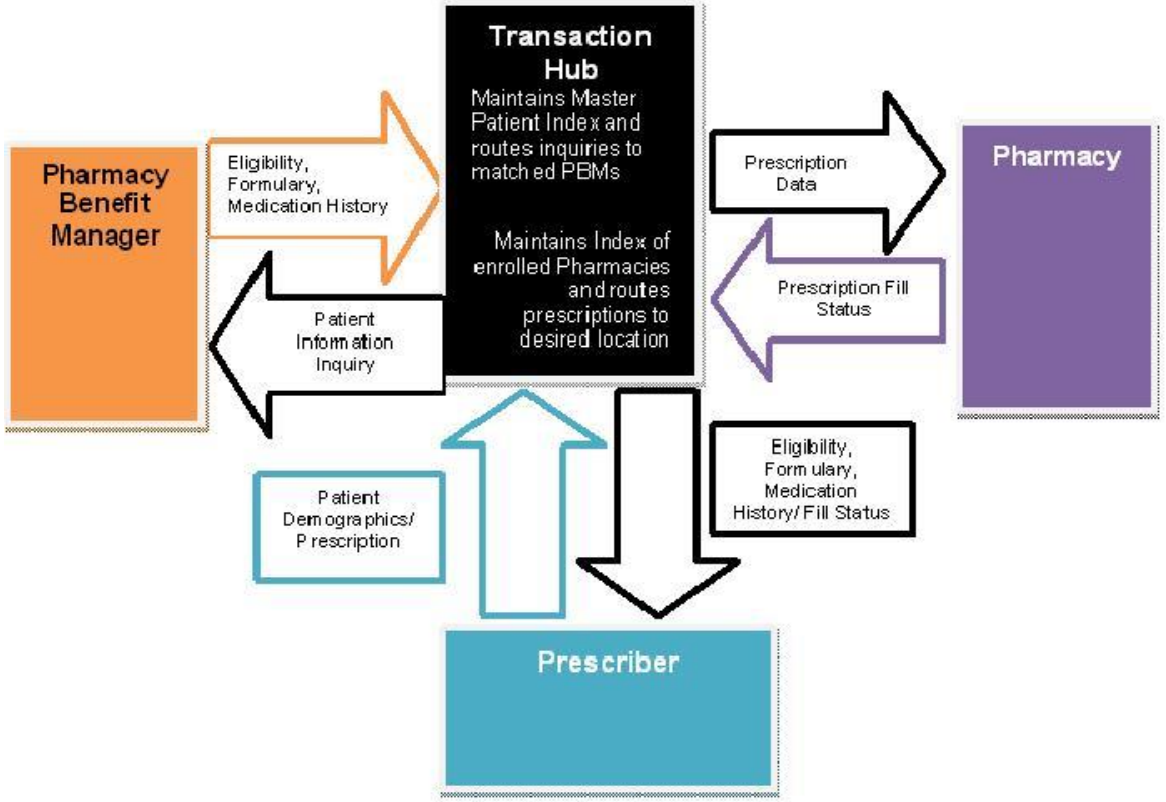
Discontinue messages volume



Rochester and Monroe County- DC message project

- Request from providers for years- when can I stop calling the pharmacy on discontinued medications
  - Patient safety
  - Work around and extra work
  - Patient adherence
- Epic (electronic health record)- EHR is now enabled for sending discontinuation messages
- More community pharmacy systems have the ability to accept the messages in a place where pharmacists can use the data
- Working with MCMS and community pharmacies on a communication plan
- As of Sept 1 > 50% of pharmacies can support these messages and are acting on them

Electronic Prescription Workflow



Medication History Information

- Poor communication of information when patients transition levels of care
- Accuracy of medication information is an important piece of patient safety
- Good medication history information from PBM claims and pharmacy dispense data and can result in a decrease in inpatient medication order errors when available and used in the current provider workflow
- Using medication history tools can improve medication adherence

Dataflow for Medication History

How hospitals get electronic medication history using Surescripts

Hospital
- Admit patient and request medication history (MH)

EMR Vendor
- Request/receive MH for specified patients from Surescripts

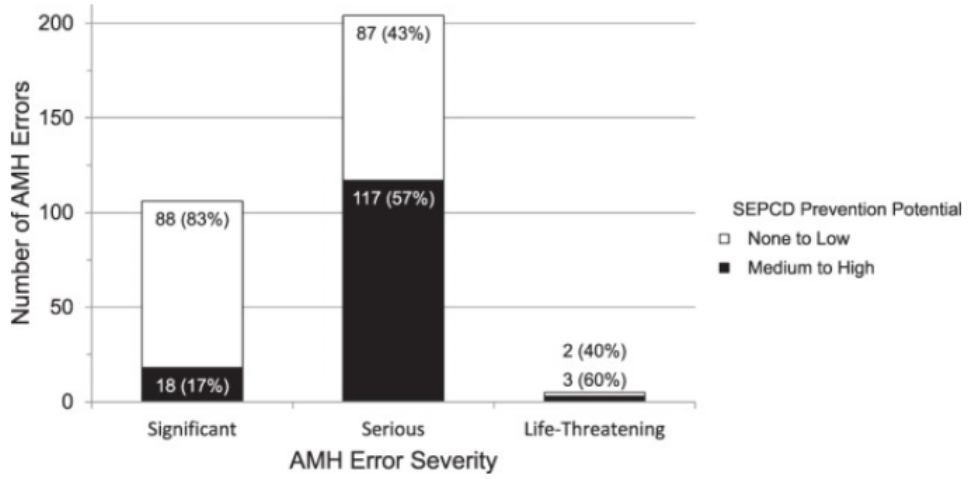
Surescripts
- Request, receive, and aggregate MH for specified patients from PBMs and pharmacies

PBMs & Pharmacies
- Pharmacy data latency of 36 to 48 hours
- PBM data is real-time

Medication History Information and Medication error potential

PMC full text: J Am Med Inform Assoc. 2016 Sep; 23(5): 942–950.
Published online 2016 Jan 17. doi: [10.1093/jamia/ocv171]

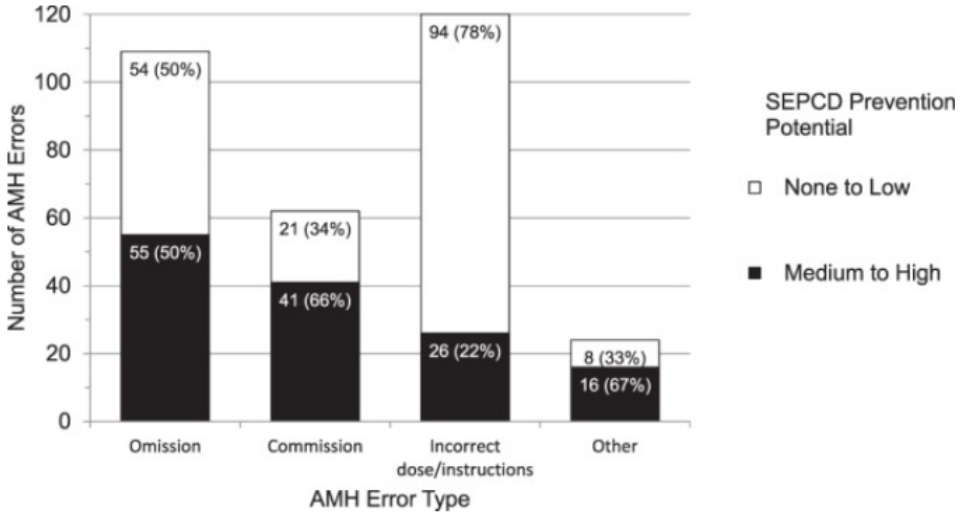
Figure 2



SEPCD potential to prevent admission medication history (AMH) errors by severity.

Medication History Information and Medication error potential

Figure 4



SEPCD prevention potential of admission medication history (AMH) errors by type.

Challenges with Medication History

- Inconsistent Medication History Information
- Pharmacy benefits management (PBM) does not equal pharmacy dispense data
- Change management with workflow with medication history information
  - Accepting information into the record
  - Duplicate information
  - Patient mismatches – no Master Patient index (MPI)

Wouldn’t it be great if:

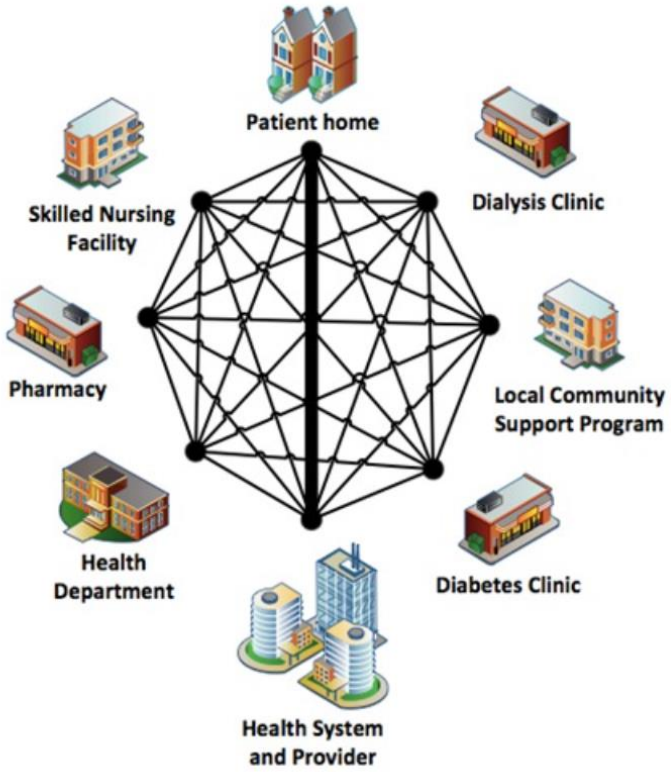
Interoperable drug knowledge (including cross references to RxNorm) is of vital importance to EHR adoption and effective EHR use as it supports the portability of patient medication, immunization, and allergy history among disparate healthcare information systems. Use of interoperable drug knowledge enables clinical information exchange, electronic prescribing, the calculation of clinical quality measures, immunization and medication allergen decision support, and streamlines clinical information reconciliation.

Interoperability

Medication Adherence and Technology

- In some studies up to 50% of patients with chronic conditions are not compliant with their medication regimen
- Continual patient engagement can enhance medication adherence
- Medication non-adherence is an important public health consideration, affecting health outcomes and overall health care costs
- In addition to traditional methods of patient recall and questionnaires, using patient reminders, social media, patient portal options and patient centered medical home

Interoperability



Innovation with Interoperability

- Telemedicine with pharmacists under medication therapy management protocols engaging with patients and their families
- Heart failure patients with integrated scales that will promote clinical decision support for daily weights changes
- Blood pressure integration through a patient portal and intranet
- Patient refill reminders based on medication history data and notification from data coordinators

Improvement with Text messages

- Prayaga et al looked at non-adherent and partially adherent Medicare patients with chronic disease at Kaiser Permanente Southern California
- 13,000 patients received text messages compared to 76,000 patients who did NOT received TEXT messages from December 2016 to February 2017
- There was a significant difference in medication refill rates between the 2 groups, with a 14.07 percentage points higher refill rate in the text messaging group (*P*<.001)
- Both groups were exposed to refill and adherence reach out including phone calls, secure emails and robo calls

Improvement with Text messages

- Medication refill rates went up 14% among text message users
- It is estimated that 77% of Americans own a smartphone, up from 35% in 2011
- Next study will look at social determinants such as income level, The researchers plan to incorporate interventions that would account for rural dwellers, income and financial issues, or language and cultural barriers
- The team likewise plans on altering the text messaging system for non-English-speakers and those with lower levels of health literacy

New Technology

- Apps can emit a sound when it's time to take a medication, reminding patients when to do so. Oftentimes, patients may not remember if they took a dose or not, but smartphone app alerts eliminate this uncertainty by having tracking functions
- Smart pills are tablets containing tiny ingestible sensors that can detect when a person has swallowed the medication. Built-in Bluetooth technology relays the data to a smartphone app, which can be shared with family, caregivers, and the patient's doctor
- Eye drops in particular have a lower adherence rate, a small sensor installed in an eye drop medication container can detect when the bottle is opened and closed, when drops leave the container, and how many are administered. The sensor integrates with an analytics platform and offers various ways for patients and clinicians to act upon the data.

New technology

- In 2013 the FDA, began regulating apps but even 5 years later there are very few that are fully approved and endorsed HIPPA requirements and sharing patient data is still a major challenge
- Point of service education tools and patient portals are the most common apps that are in the market place
- A combination of inpatient interaction plus technological reminders can lead to both increased medication adherence and an improvement in clinical outcomes at a decreased cost

Questions

References:

1. Dhavle et al. **Analysis of Prescribers' Notes in Electronic Prescriptions in Ambulatory Practice** JAMA Intern Med. 2016 Apr;176(4):463-70. doi: 10.1001/jamainternmed.2015.7786.
2. Pernik JM et al. **Potential benefit of electronic pharmacy claims data to prevent medication history errors and resultant inpatient order errors.** J Am Med Inform Assoc. 2016 Sep;23(5):942-50. doi: 10.1093/jamia/ocv171. Epub 2016 Jan 17
3. Surescripts.com
4. Bosworth et al. **Health Information Technology: Meaningful Use and Next Steps to Improving Electronic Facilitation of Medication Adherence** JMIR Med Inform. 2016 Mar 15;4(1):e9. doi: 10.2196/medinform.4326
5. Aurel O Iuga and Maura J McGuire **Adherence and health care costs.** Risk Manag Healthc Policy. 2014; 7: 35–44.
6. Prayaga et al. **Improving Refill Adherence in Medicare Patients With Tailored and Interactive Mobile Text Messaging: Pilot Study** JMIR Mhealth Uhealth 2018;6(1):e30

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MEDICINE of THE HIGHEST ORDER

Improving Medication Safety- The Pharmacy Now and in the Future

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Associate Director of Operations

MEDICINE *of* THE HIGHEST ORDER

UR MEDICINE

Objectives

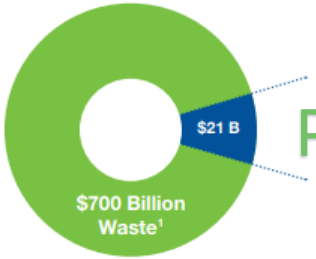
1. Introduction to medication error
2. Role of the Pharmacist as part of the solution
3. Role of technology as part of the solution
4. Controlled substances and patient safety
5. The highest risk and the Pharmacy of the future

Introduction

Introduction

Emily Jerry
foundation
Let The Healing Begin

...healthcare community
...medication practices
Acute Care
...SafetyAlert!®
...voluntary manslaughter. The pharmacist
...aces up to 5 years in prison.



Preven…on Error Waste

Healthcare Waste [1]

…nissions and 3.3 million outpatient
…reventable medication error

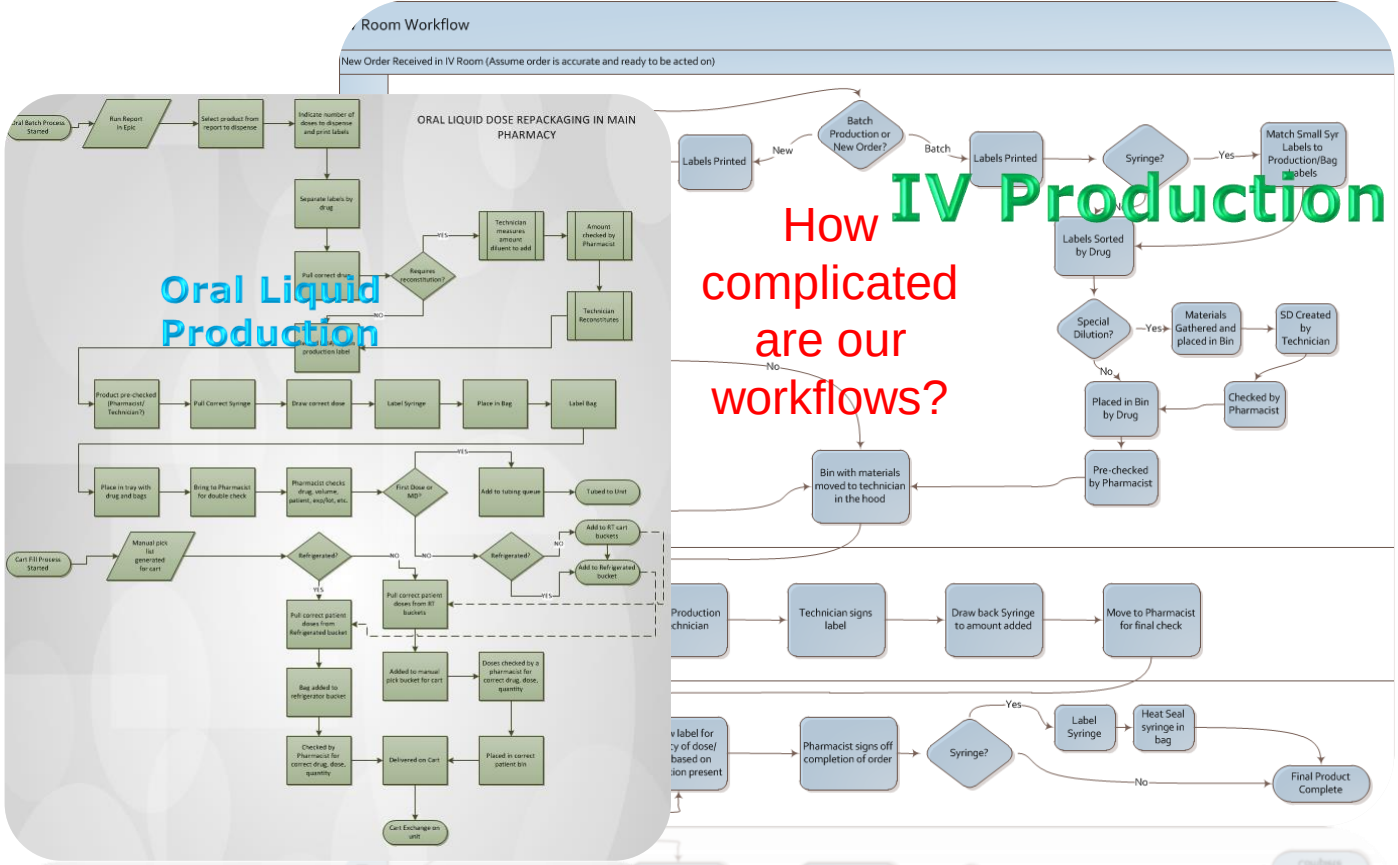
…tient and $4.2 billion outpatient cost of
…cation errors [3]

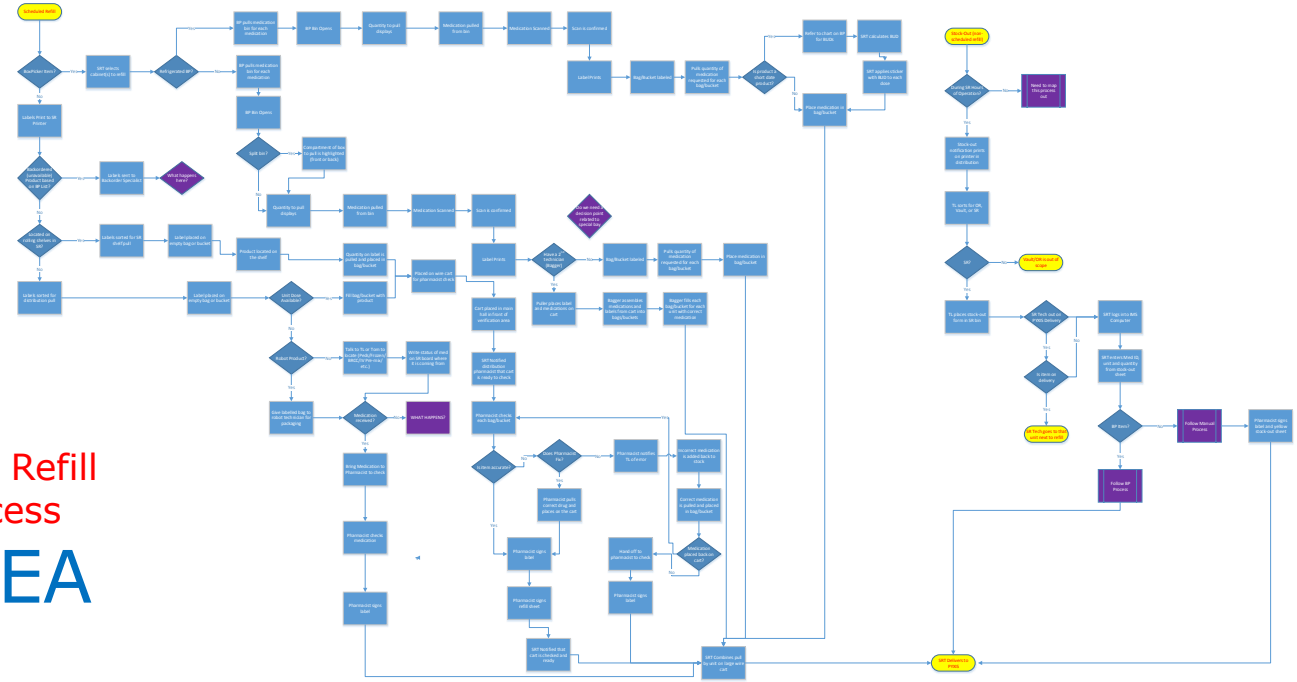
1 NEHI. (2008). How Many More Studies Will It Take? A Collection of Evidence That Our Health Care System Can Do Better.

2 Massachusetts Technology Collaborative and NEHI. (2008). Saving Lives, Saving Money: The Imperative for CPOE in Massachusetts.

3 Burton, M.M., Hope, C., Murray, M.D., et al. (2007). The cost of adverse drug events in ambulatory care. AMIA Annu Symp Proc, 90-93

Introduction



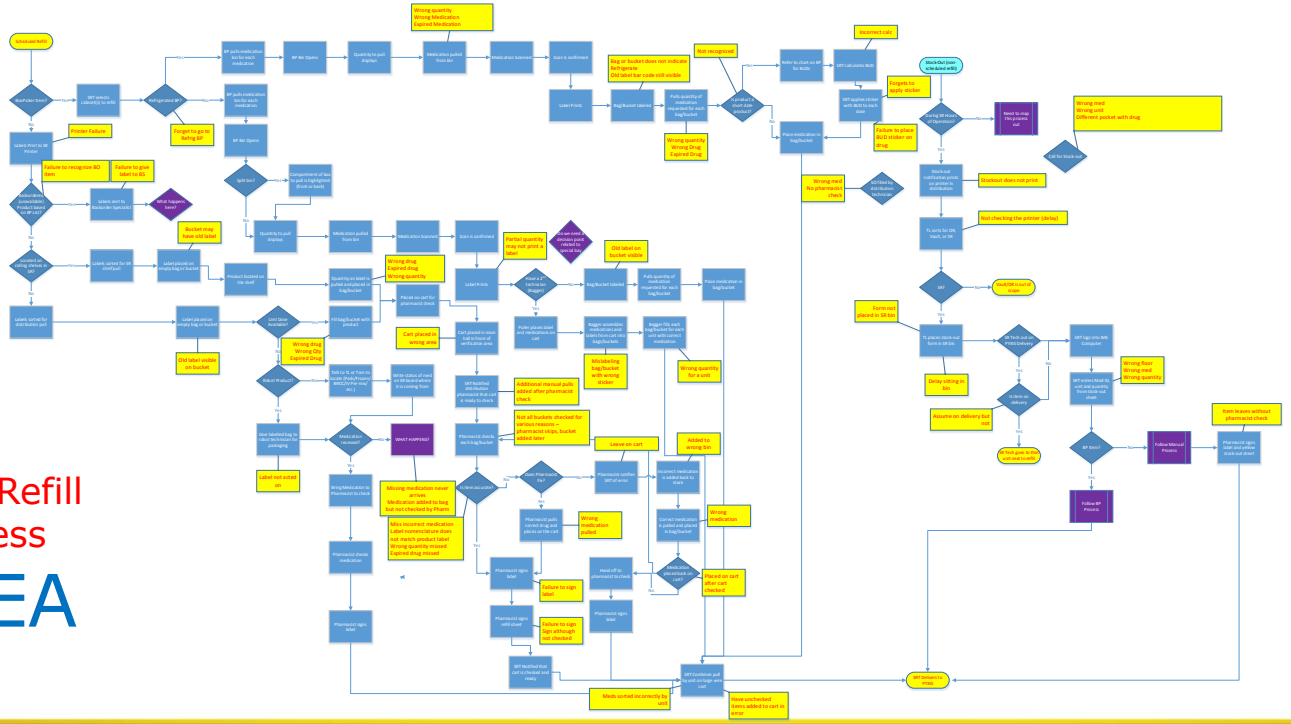


PYXIS Refill Process

FMEA

PYXIS Refill Process

FMEA



healthcare community about safe medication practices

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ISMP Medication Safety Alert! Acute Care

November 29, 2012 ■ Volume 17 Issue 24

Sterile compounding safety guidelines

ISMP has finalized the **Proceedings from the**

response to frequent sterile compounding adverse events reported to the ISMP National Medication ...ors Reporting Program and other reporting pro-

Side tracks on the safety express

Interruptions lead to errors and unfinished… Wait, what was I doing?

PROBLEM: If you're a health professional, and the nurse—who often had a cup of

- Clinical Staff are interrupted once every 2-5 minutes
- Nurses – error risk increases by 12.7% with each interruption
- Errors doubled when interrupted 4 times during drug administration; tripled when interrupted 6 times

ISMP Medication Safety Alert!, January 24th, 2013; Volume 18 Issue 2

minutes![1-2] Physicians are interrupted, too—about once every 5 minutes in an academic emergency department (ED)

deferred.[1] When a person forms an intention, their memory establishes a specific cue to remind them to act. If the task is

Proprietary Name	Generic Name	Available Strengths	Labeled Dosing Frequency	Labeled Meaning of Suffix[a]	Product Characteristic[b]	Manufacturer
Tegretol XR	carbamazepine extended release	100 mg 200 mg 400 mg	Twice daily	Extended release	Modified-dosage formulation	Novartis Pharmaceuticals Corp.
Tenoretic 50	atenolol and chlorthalidone	50 mg/25 mg	Please refer to full prescribing information	Atenolol 50 mg and chlorthalidone 25 mg	Strength of an active ingredient	Astrazeneca LP
Tenoretic 100	atenolol and chlorthalidone	100 mg/25 mg	Please refer to full prescribing information	Atenolol 100 mg and chlorthalidone 25 mg	Strength of an active ingredient	Astrazeneca LP
Terazol 3	terconazole	0.8% cream 80 mg suppository	Once daily	3 day treatment	Therapy duration	Ortho-McNeil Pharmaceuticals
Terazol 7	terconazole	0.4% cream	Once daily	7 day treatment	Therapy duration	Ortho-McNeil Pharmaceuticals
Teveten HCT	eprosartan and hydrochlorothiazide	600 mg/12.5 mg 600 mg/25 mg	Once daily	Hydrochlorothiazide	Other (Inclusion of active ingredient)	Abbott Laboratories
Timentin (ADD)	ticarcillin disodium and clavulanate potassium	3 g/0.1 g Add-Vantage vial	Varies	Unknown	Packaging configuration	GlaxoSmithKline
Toprol-XL	metoprolol succinate	25 mg 50 mg 100 mg 200 mg	Please refer to full prescribing information	Extended release	Modified-dosage formulation	Astrazeneca LP
Transderm scop	scopolamine	1.5 mg	One transdermal disc every 3 days	Scopolan		
Trelstar Depot	triptorelin pamoate	3.75 mg	Once per month	Depot inje		
Trelstar LA	triptorelin pamoate	11.25 mg	Once every 84 days	Long act		
Triaminic AM	pseudoephedrine and dextromethorphan	15 mg/2.5 mg	Every 6 hours	Non-dro		
Tums EX	calcium carbonate	750 mg	As needed	Extra stre		
Ultram ER	tramadol	100 mg 200 mg 300 mg	Once daily	Extended r		
Uro-Mag	magnesium	140 mg	Varies	Magnesi		
Ventolin HFA	albuterol sulfate	108 mcg per actuation	Every 4 to 6 hours as needed	Hydrofluour (propellant)		
Vicodin ES	hydrocodone bitartrate and acetaminophen	7.5 mg/750 mg	As needed	Extra strength	Strength of an active ingredient	Abbott Laboratories
Vicodin HP	hydrocodone bitartrate and acetaminophen	10 mg/660 mg	As needed	High potency	Strength of an active ingredient	Abbott Laboratories
Videx EC	didanosine	125 mg 200 mg 250 mg 400 mg	Once daily	Delayed-release capsules Enteric coated beadlets	Modified-dosage formulation	Bristol-Myers Squibb
Vivelle-dot	estradiol	0.1 mg 0.05 mg 0.025 mg 0.075 mg 0.0375 mg	Twice weekly	Smaller than original Vivelle	Other	Novartis Pharmaceuticals Corp.
Voltaren XR	diclofenac sodium extended release	100 mg	Once daily	Extended release	Modified-dosage formulation	Novartis Pharmaceuticals Corp.
Wellbutrin SR	bupropion hydrochloride extended release	50 mg 100 mg 150 mg 200 mg	Twice daily	Sustained release	Modified-dosage formulation	GlaxoSmithKline
Wellbutrin XL	bupropion hydrochloride extended release	150 mg 300 mg	Once daily	Extended release	Modified-dosage formulation	GlaxoSmithKline
Xanax XR	alprazolam	0.5 mg 1 mg 2 mg 3 mg	Once daily	Extended release	Modified-dosage formulation	Pfizer US Pharmaceutical Group
Zithromax IV	azithromycin	500 mg per 10 mL vial	Once daily for 2 days	Intravenous infusion	Route of administration	Pfizer US Pharmaceutical Group
Zofran ODT	ondansetron	4 mg 8 mg	As needed	Orally disintegrating tablets	Delivery mechanism	GlaxoSmithKline
Zomig-ZMT	zolmitriptan	2.5 mg 5 mg	Please refer to full prescribing information	N/A	Other	Astrazeneca LP
Zyprexa Zydis	olanzapine orally disintegrating tablets	5 mg 10 mg 15 mg 20 mg	Once daily	Orally disintegrating tablets	Delivery mechanism	Eli Lilly and Company
Zyprexa IM	olanzapine for injection	10 mg vial	Once daily	Intramuscular	Route of administration	Eli Lilly and Company

Solutions

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Educating the healthcare community about safe medication practices

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ISMP Medication Safety Alert! Acute Care

December 18, 2008 ■ Volume 13 Issue 25

SafetyBriefs

ISMP will provide expert analysis for MEDMARX.

ISMP has entered into a collaborative agreement with Quantros to provide ongoing analysis of MEDMARX data to identify opportunities to guide medication-centric interventions and best practices. Under this agreement, Quantros and ISMP will work together to disseminate key findings. MEDMARX, operated by Quantros, is a national, commercial, Internet-accessible database that hospitals and healthcare systems use to track and trend adverse drug reactions and medication errors. The program was formerly operated by USP; however, the standards setting organization made a decision recently to focus full attention and resources on its core standards setting activities. USP has also transferred the Medication Errors Reporting Program (MERP) to ISMP (formerly known as the USP-ISMP Medication Errors Reporting Program). We are pleased to accept these new responsibilities and remain fully committed to working closely with FDA, USP, the medical products industry, healthcare providers, and consumers to affect changes in

Color-coded syringes for anesthesia drugs: use with care

Chances are you have seen ads, or may even be using, color-coded syringes containing anesthesia drugs that are available from major repackaging companies such as PharMEDium, Ameridose, CAPS, and others (Figure 1). The companies have been marketing them for about a year, and they're now in demand by anesthesia providers who previously had to prepare and label all drug syringes themselves. But a word of caution: we are concerned about risks associated with using these color-coded syringes unless certain actions are taken to prevent syringe mix-ups that could prove harmful to patients.

Figure 1. Color-coded syringes (Ameridose ad).

For many years, rolls of color-coded labels have been available to anesthesia providers. The colors are based upon an American Society for Testing and Materials (ASTM) standard for user-applied labels in the operating room (OR) (ASTM D4774-06 Standard Specification for User Applied Drug Labels in Anesthesiology). The colors aren't used just to differentiate products; they are used to specify a particular drug class. Labels are blue for all opiate

2 on page 2), fluorescent red for n

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agents, orange for tran

violet for vasc

green for ant

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We have p

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among anesthe

viders. But the color-coding system was not designed for commercial product labels. ISMP, ASHP, and pharmaceutical company scientists have opposed color-coding of commercial pharmaceutical products. The American Medical Association (AMA) is also opposed to it, testifying before the FDA in 2005 that scientific research is needed to determine whether such a system is safe (www.fda.gov/CDER/meeting/part15_3_2005/Transcript.pdf).

continued on page 2

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ISMP Medication Safety Alert! Acute Care

June 13, 2013 ■ Volume 18 Issue 12

NANALERT

ISMP and the American Society of Health-

Independent double checks: undervalued and misused

Selective use of this strategy can play an important role in medication safety

Proven Practice:

- Including pharmacist on routine rounds reduced errors by 78%[1]
- Adding a pharmacist to ICU rounds decreased costs by $270,000 annually [2]
- Pharmacist follow up call with patients resulted in 88% fewer preventable medication errors leading to ED visit or hospitalization [3]

1 Kucukarslan, S.N., Peters, M., Mlynarek, M., et al. (2003). Pharmacists on rounding teams reduce preventable adverse drug events in hospital general medicine units. Arch Intern Med, 163(17), 2014-2018.

2 Leape, L.L., Cullen, D.J., Clapp, M.D., et al. (1999). Pharmacist participation on physician rounds and adverse drug events in the intensive care unit. JAMA, 282(3), 267-270

3 Schnipper, J.L., Kirwin, J.L., Cotugno, M.C., et al. (2006). Role of pharmacist counseling in preventing adverse drug events after hospitalization. Arch Intern Med, 166(5), 565-571.

Nicole M. Acquisto, Pharm.D.
Emergency Medicine Clinical Pharmacy Specialist
University of Rochester Medical Center
Rochester, NY

The Outcomes of Emergency Pharmacist Participation during Acute Myocardial Infarction

The Pharmacist

	Median **Door-to-balloon time** (IQR, min)	Median **Adjusted door/ECG-to-balloon time** (IQR, min)	Median **Adjusted door/ECG-to-CCL time** (IQR, min)	p-value*
EPh present (n=68)	59 (48-82)	59 (48-71)	22 (15-36)	<0.001
EPh not present (n=52)	87 (62-116)	77 (59-93)	40 (30-56)	
CCL present (n=52)	58 (45-82)	55 (44-70)	20 (13-35)	<0.001
CCL on-call (n=68)	86 (65-112)	76 (62-92)	38 (32-54)	
Arrival by EMS (n=87)	64 (50-84)	61 (50-78)	29 (16-40)	<0.001
Arrival by self (n=33)	107 (94-134)	89 (71-98)	45 (34-58)	

* Mann Whitney Rank Sum

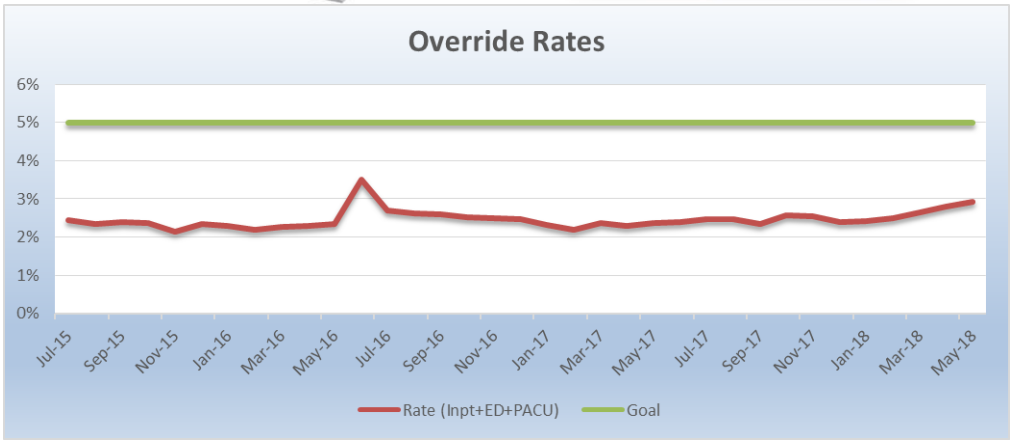
	EPh (n=53)	No EPh (n=67)	p-value*
All events	11 events (9 patients)	37 events (30 patients)	P=0.002
ADEs	2 events (2 patients)	5 events (2 patients)	P=0.6
PADEs	5 events (4 patients)	21 events (18 patients)	P=0.01
Total med errors (inc PADEs)	6 events (1 patient)	23 events (20 patients)	P=0.01
Problem drug orders	3 events (3 patients)	6 events (6 patients)	P=0.6

*Chi-squared analysis

Technology

Technology

ADCs



Technology

Current technology at SMH includes robotic unit dose packaging and product selection directly from eRecord interface

As of May, 2018

20,470,271

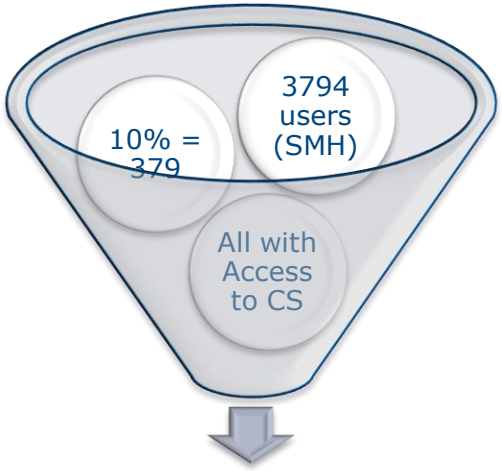
Doses dispensed to patients with **0** incorrect selections

Perfect?

Controlled Substances

Incidence of drug/alcohol abuse

- Health care professionals – 10%-15%* depending on source



Diversion occurs in health care facilities every day

Statistics on Health Care worker diversion unknown (undetected and under-reported)

*2014 National Survey on Drug Use and Health by the Substance Abuse and Mental Health Services Administration

Consequences of Diversion – Who does it affect?

Patient
- Safety
- Infection risk
- Under-medicated

Individual Diverter
- Health
- Personal life
- Legal implications
- Professional/job implications

Co-Workers
- Take on additional burdens
- Peer pressure of reporting friends

Society
- Proliferation of addiction
- Proliferation of criminal activity

Controlled Substances

Taking Action

1 – Establish Oversight Structure

2 – Establish Best Practices

3 – Implement Modern Tools

Controlled Substance Surveillance and Prevention Team (CSSPT)

Controlled Substance Surveillance and Prevention Team (CSSPT)

CSSPT Committee

CSSPT Team

- Program Leader (e.g. Pharmacy Compliance Officer)
- Analysts
  - Pharmacy, Nursing, other?

Support

- SP/Pharmacy Mangers
- Nursing/Program Managers
- Compliance/Legal
- Others prn (e.g. IC, PR, etc.)

Best Practice Strategies

Focus on high-risk areas

- ED
- OR

Focus on high-risk processes

- Compounding
- Waste
- Re-packaging

Best Practice Strategies

Controlled Substances

OR/Anesthesia Process

All CS stored in ADC
- CS are tracked by unit of removal

Removals are patient specific
- No generic ADC accounts or by provider/room

All doses are documented in AR
- If not documented, will create discrepancy in system

All Waste is recorded in ADC and Returned to Pharmacy
- Waste is analyzed quantitatively and qualitatively

Report is generated to compare all removals/wastes/ returns by provider and case
- Auto-generated email to provider and supervisor for any discrepancy

Strategies – Monitoring and Auditing

Evidence based indicators with detailed reports

Prioritize potential diversion investigations

Strategies - Monitoring and Auditing

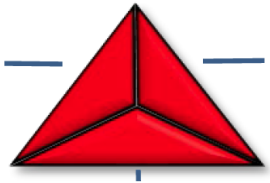
Controlled Substances

Drug Audit
(Station Level)

- ✓ *Specific user comparison*
- ✓ *Station groups are important*
- ✓ *Group stations / users / medications*

Drug Audit
(Hospital Wide)

- ✓ *All user comparison*
- ✓ *Group stations / users / medications*
- ✓ *Risk associated with floaters*



Daily Average Drug Audit
(Station Level)

- ✓ *Specific user comparison*
- ✓ *Group stations / users / medications*
- ✓ *Shifts 7:00AM – 7:00PM / 7:00PM – 7:00AM*

High Risk	Moderate Risk	Low Risk
		

RxAuditor™

RxDiversion Index: Total Count

UR STRONG MEDICINE | MEMORIAL HOSPITAL

February 2017

Statistical Outliers By Station

5.0 or Greater Units of Standard Deviation Above Mean

Station	Med Group	User Name	Count	Mean	Assurance Metrics: UAM	% TDC	TriageRx	TrendRx	ProjectRx
[redacted]	Morphine	[redacted]	40.26	3.887	8.691	4.245%		8.69	
[redacted]	Morphine	[redacted]	31	3.905	7.119	3.138%		7.12	
[redacted]	Benzodiazepine	[redacted]	26	2.630	6.922	10.744%		6.92	
[redacted]	Fentanyl	[redacted]	29	2.235	6.636	25.439%		6.64	
[redacted]	Hydromorphone	[redacted]	77	11.701	6.170	1.970%		6.17	

4.0 - 4.9 Units of Standard Deviation Above Mean

Station	Med Group	User Name	Count	Mean	Assurance Metrics: UAM	% TDC	TriageRx	TrendRx	ProjectRx
[redacted]	Oxycodone	[redacted]	103	17.561	4.993	1.531%		4.38 4.99	
[redacted]	Methadone	[redacted]	38	5.129	4.908	7.336%		4.91	
[redacted]	Morphine	[redacted]	24.33	3.887	4.885	2.565%		4.88	
[redacted]	Morphine	[redacted]	24.27	3.887	4.870	2.559%		3.54 4.87	
[redacted]	Morphine	[redacted]	25	3.318	4.844	17.123%		4.84	
[redacted]	Oxycodone	[redacted]	100	17.561	4.818	1.487%		3.47 4.82	
[redacted]	Morphine	[redacted]	22	3.905	4.754	2.227%		4.75	
[redacted]	Hydromorphone	[redacted]	39	7.658	4.689	1.726%		4.69	
[redacted]	Hydrocodone	[redacted]	25	4.139	4.677	8.380%		4.68	

Medacist
The Key To Healthcare Automation

Diversion Detection Process

RxAuditor™

Strategies - Prevention

- Education
- Transparency
- Learn and adapt

What is the highest risk process in hospital pharmacy?

The Highest Risk

Insight: Red flags ignored for years at firm in meningitis crisis

Recommend 108 people recommend this.

A sample of Aspergillus fumigatus, the first fungus diagnosed in the fungal meningitis outbreak sweeping the United States, in Nashville, Tennessee on October 19, 2012. Credit: Reuters/Harrison McClary

By Toni Clarke and Sharon Begley

BOSTON | Fri Oct 26, 2012 3:41pm EDT

(Reuters) - A cracked vial here, a missing label there. The complaints coming into New England Compounding Center, the firm at the heart of the deadly U.S. meningitis outbreak, were piling up.

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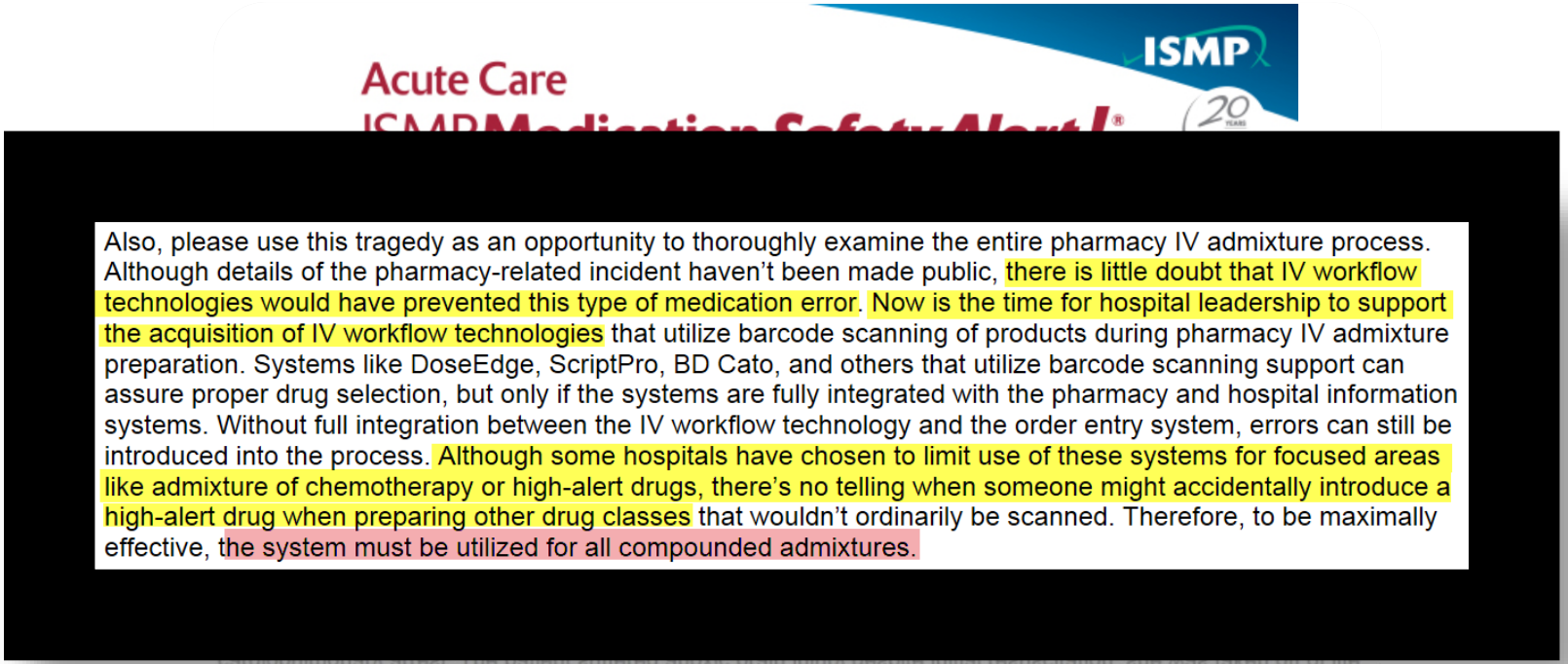
Pharmacy linked to meningitis deaths failed on sterility measures
Wed, Oct 24 2012

Before meningitis outbreak, firm avoided sanctions
Tue, Oct 23 2012

Pharmacy linked to meningitis shipped drugs before steril

Sterile Compounding Risks

The Highest Risk



Also, please use this tragedy as an opportunity to thoroughly examine the entire pharmacy IV admixture process. Although details of the pharmacy-related incident haven't been made public, there is little doubt that IV workflow technologies would have prevented this type of medication error. Now is the time for hospital leadership to support the acquisition of IV workflow technologies that utilize barcode scanning of products during pharmacy IV admixture preparation. Systems like DoseEdge, ScriptPro, BD Cato, and others that utilize barcode scanning support can assure proper drug selection, but only if the systems are fully integrated with the pharmacy and hospital information systems. Without full integration between the IV workflow technology and the order entry system, errors can still be introduced into the process. Although some hospitals have chosen to limit use of these systems for focused areas like admixture of chemotherapy or high-alert drugs, there's no telling when someone might accidentally introduce a high-alert drug when preparing other drug classes that wouldn't ordinarily be scanned. Therefore, to be maximally effective, the system must be utilized for all compounded admixtures.

ISMP Medication Safety Alert, December 18th, 2014; Volume 19 Issue 25

Sterile Compounding Risks

The Highest Risk

January 15, 2015 ■ Volume 20 Issue 1

ISMP

Acute Care
ISMP Medication Safety Alert!®

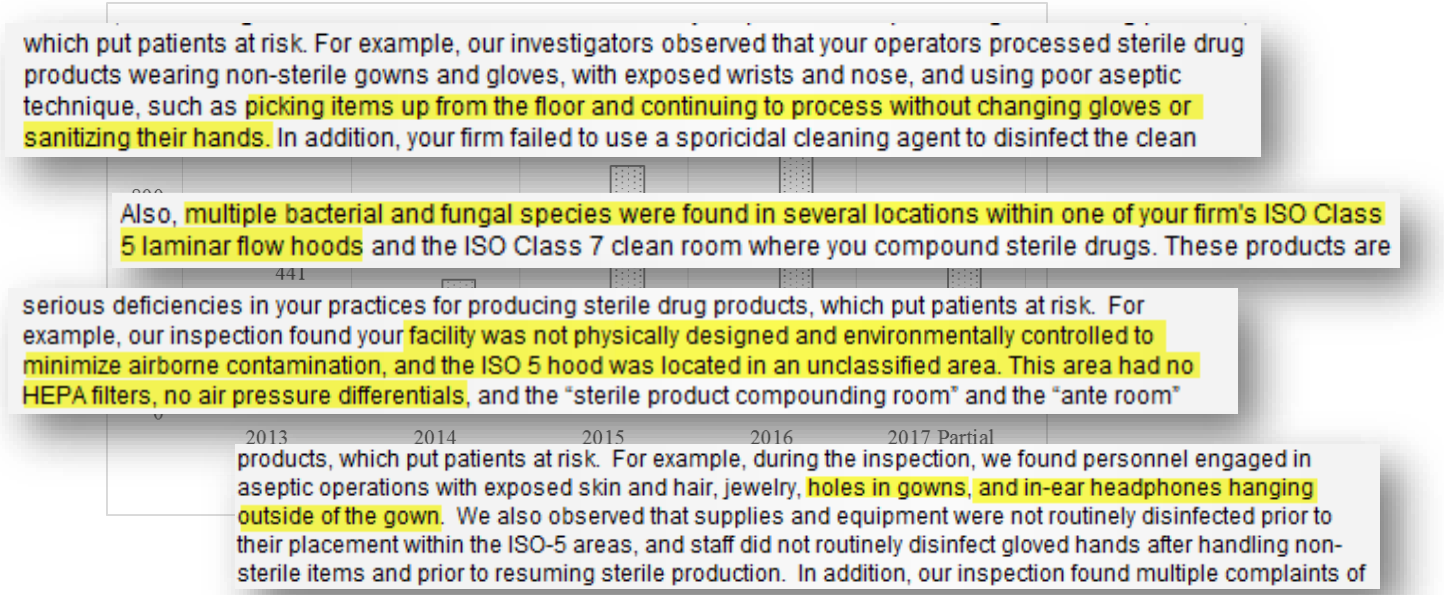
Educating the Healthcare Community About Safe Medication Practices

Technology and error-prevention strategies:
Why are we still overlooking the IV room?

Harmful or fatal errors that have occurred when compounding sterile intravenous (IV) preparations in the pharmacy—including simple IV admixtures—have been fodder for headline news during the past decade.[1] The 2012 meningitis outbreak that led to the death of 64 people from contaminated epidural solutions prepared by the New England Compounding Center (NECC) will long be remembered. There has been no shortage of sterile compounding errors in hospital pharmacies, either—from the accidental chemotherapy compounding error 9 years ago that claimed the life of 2-year-old Emily Jerry and eventually sent pharmacist Eric Cropp to jail, to the recent December 2014 compounding error in which a rocuronium infusion was prepared and dispensed instead of a fosphenytoin infusion, leading to the death of a 65-year-old woman.

Current State of Sterile Compounding

The Highest Risk



http://www.fda.gov/Drugs/GuidanceComplianceRegulatoryInformation/PharmacyCompounding

The Risks of IV Compounding

The Highest Risk

Sterile compounding: Pharmacy profession should take back control

The recent *USA Today* article on hospital I.V. outsourcing and the ongoing patient safety problems it creates for hospitals and the communities they serve is one more call to action for our profession. The concern is that we have not been engaged enough in demanding safety measures or proposing counter measures to outsourced I.V. compounding.

It has been 2 years since the New England Compounding Center disaster, and yet patients continue to be harmed by contaminated sterile products produced by an industry that exists in the gray zone of regulatory oversight and control.

The *USA Today* report highlighted the latest in a continuing succession of quality problems—this time at Specialty Compounding in Texas, which resulted in two deaths and numerous patients sickened due to contaminated products. More importantly, the report reinforced that legislative attempts at control aren't the only solution. FDA had inspected Specialty Compounding about 5 months before the patients received the contaminated products and identified numerous and significant quality problems that were detailed in a formal FDA "483" report. Obviously, follow-up was insufficient at best. Furthermore, during inspections of 150 compounding centers, the FDA found 90% of them had safety and sanitary problems that warranted corrective action. Just in the past year, 28 warning letters have been issued.

We can't accept these conditions. It is time for the pharmacy profession to stand together and take back control of sterile compounding.

We all know that sterile compounding is challenging. It is one of the highest risk areas of pharmacy practice, and yet it has little technology to support safe compounding. Bar code medication preparation is used in less than 10% of hospital clean rooms, and only about one-third of hospital pharmacy directors report that they are truly USP [U.S. Pharmacopeia Chapter] <797> compliant. Since most hospitals and health systems have been unable to meet increasing I.V. output demands without significant investments in facilities and personnel, it's understandable how outsourcing would seem to be a viable option. The American Society of Health-System Pharmacists has developed comprehensive standards for outsourcing, but these are challenging to adopt, and unfortunately it comes at great cost.

Pharmacy needs to continue to build a safer medication system for our patients and staff. Fortunately, technology is catching up with our needs in the I.V. room. Workflow technologies are available that incorporate bar code scanning of the medications and diluents entering the I.V. compounding process. Bar code–enabled I.V. compounding should be the standard rather than the exception, and gravimetric dose verification must be integrated into our admixture processes to ensure accuracy of the end product.

With the recent advances in total robotic I.V. compounding technology, it is time to evaluate compounding robots. Peer-reviewed studies have shown that robotics-based I.V. automation solutions can support in-house compounding by helping pharmacists and technicians to more safely and efficiently produce I.V. medications, while reducing errors, increasing throughput, and lowering costs associated with I.V. compounding and dispensing through risk reduction. Robotics and supportive technology provide a new standard in aseptic compounding as well.

For the first time in decades, there are now tools that can help us automate our I.V. rooms, along with other areas of our pharmacy, and provide the level of safety and productivity we need to take back control of our I.V. compounding.

It is our responsibility to rise to the challenge. Accountability is something we cannot outsource.

MORE ONLINE
■ *USA Today* article: www.usatoday.com/story/news/nation/2014/10/07/compounding-pharmacy-recalls-inspections-contamination/16472741/

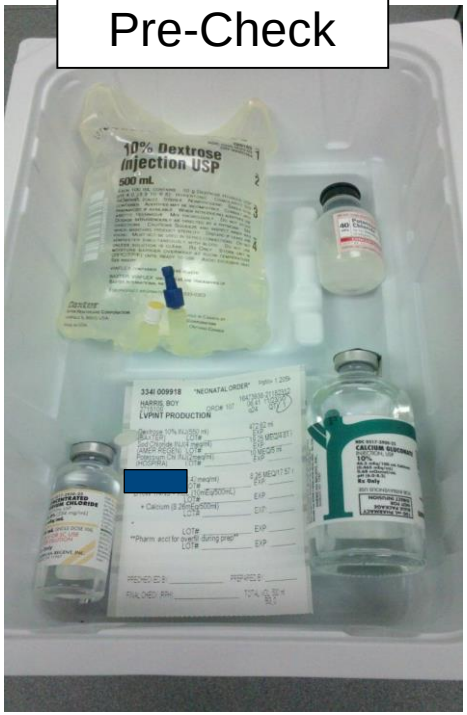
David Webster, BSPharm, MSBA,
Associate Director of Pharmacy Operations, University of Rochester Medical Center, Rochester, NY (dave_webster@urmc.rochester.edu)

The Letters column of ***Pharmacy Today*** provides a forum for APhA members and other readers to discuss current events in pharmacy and health care and comment on articles and columns published in the magazine. Letters should be limited to 250 words in length and are edited and published at the editor's discretion. Send letters to mposey@aphanet.org.

It is our responsibility to rise to the challenge. Accountability is something we cannot outsource.

The Highest Risk

Pre-Check



Post-Check

The Future...Now

Common option in pharmacy information systems or 3rd party workflow systems

Common for 3rd party workflow systems

Not common in systems as an integrated feature

Decision path at URMC to IV Room Technology

- System needs to deliver ***core needs, automated or manual***
  - All sterile compounded products **must incorporate bar code scan** verification of correct ingredients
  - Digital image capture should be available to enhance check processes
  - All sterile compounded products **must incorporate gravimetric checks** for accuracy (where possible)
  - Workflow must be managed through a central hub for distributing tasks
  - Must have integration to eRecord (Epic)
- Space constraints and expandability
- Diverse product line including incorporation of high-hazard production

The Future...Now

The Future...Now

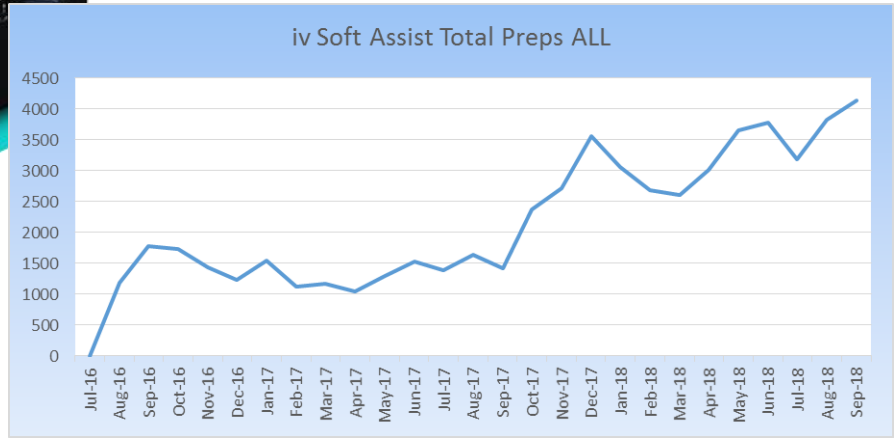
i.v.SOFT®
The Workflow Engine for the
I.V. Room of the Future

i.v.STATION®
The 2nd Generation Robot for Compounding
Non-Hazardous IV Preparations

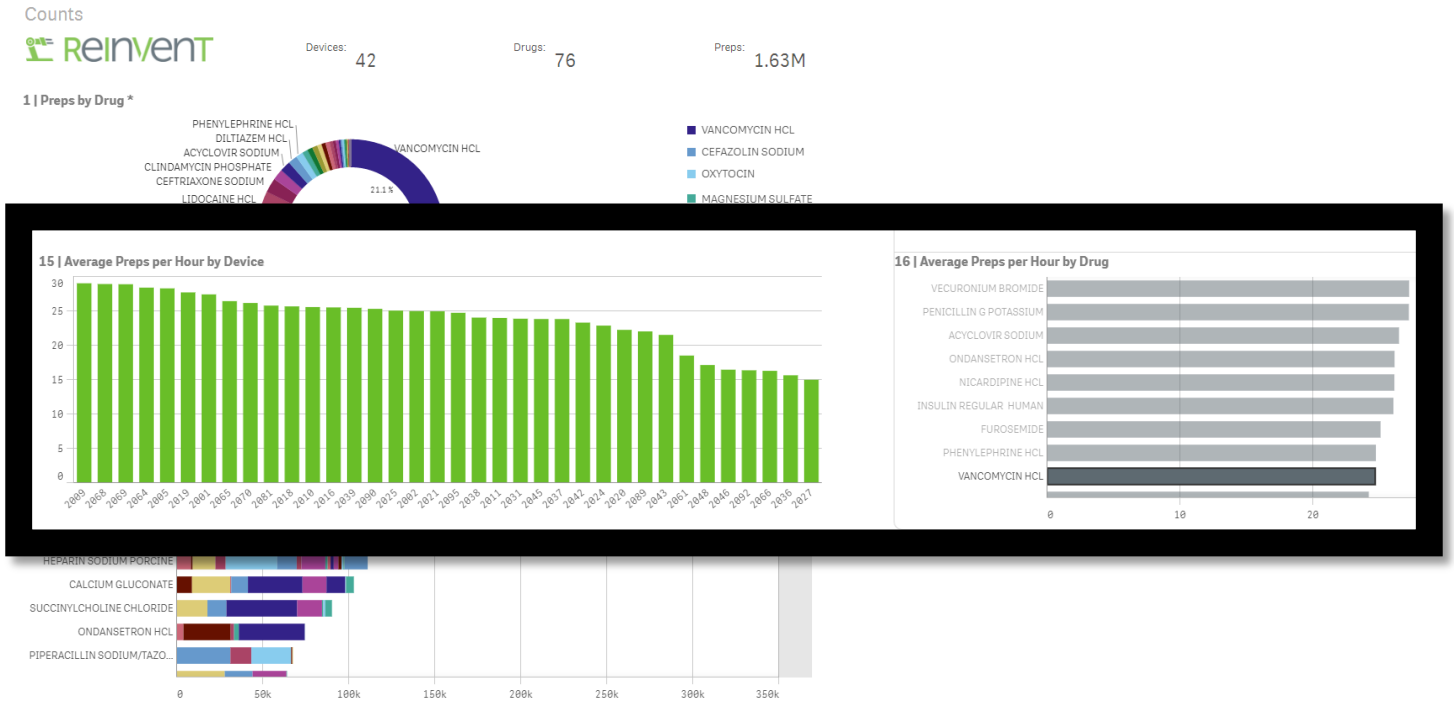
i.v.STATION® ONCO
The 2nd Generation Robot for Compounding
Oncology Sterile Preparations

The Future...Now

The Future...Now



The Future...Now



The Future...Now

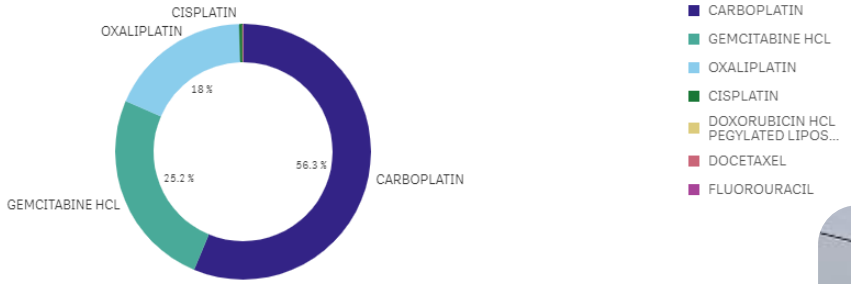
REINVENT

Devices: 1

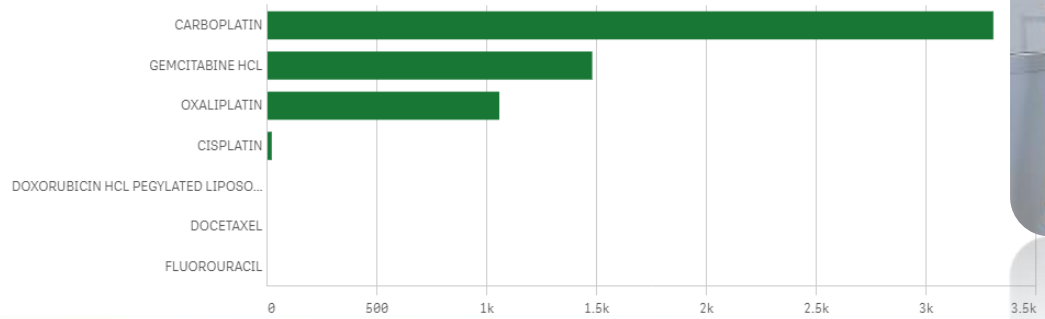
Drugs: 7

Preps: 5.88k

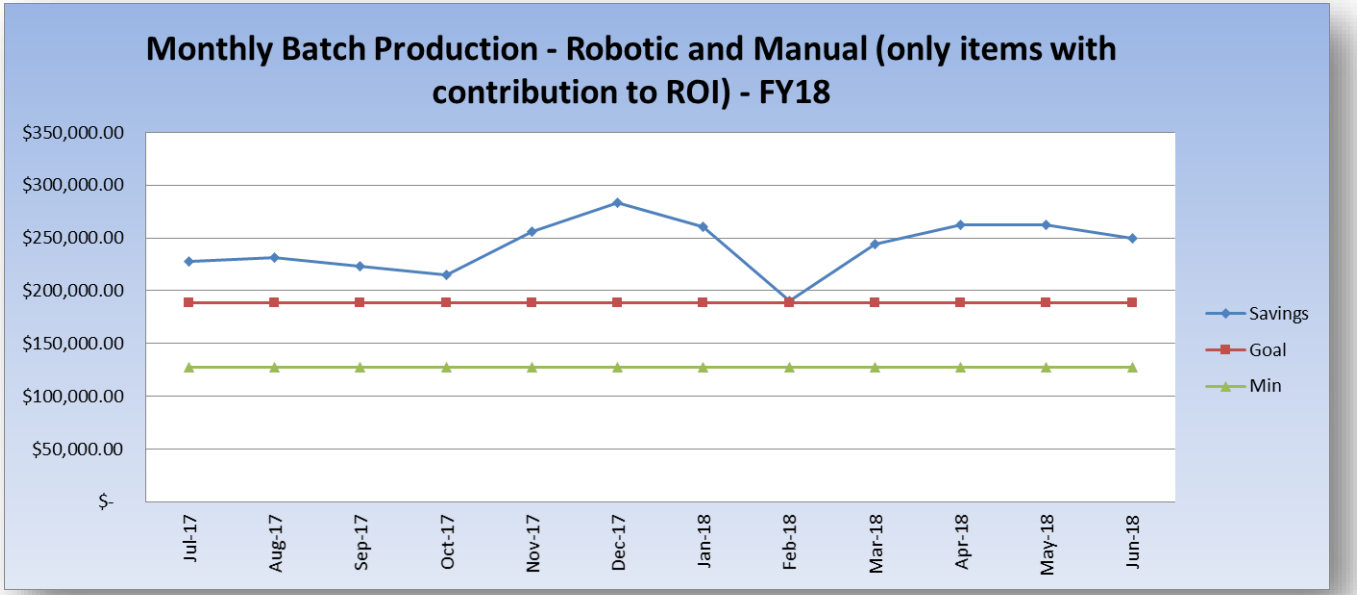
1 | Preps by Drug



3 | Preps by Drug by Device



Can we afford the future?



Questions and Comments

Thank you!