

MSOS Member Briefing

November 2022

MSOS Member Briefing

November 2022

Moderated by: E. Robert Feroli, PharmD, FASHP



1



REMS Medication Infrastructure & Education

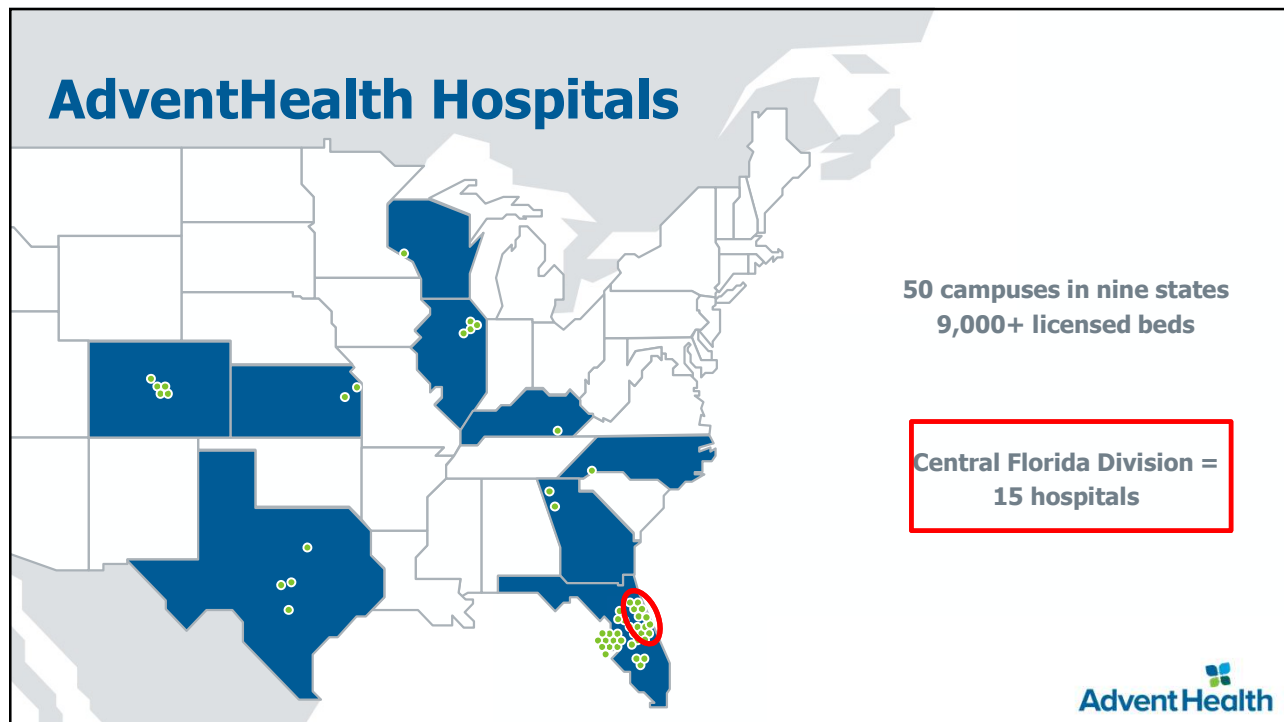
Stacy L. Carson, PharmD, BCPS, FISMP
Medication Safety Officer
AdventHealth

2

2

MSOS Member Briefing

November 2022



3

Historical REMS Process

- Policy and procedures to obtain and document required information for each REMS medication in patient chart
- Developed documentation solution in Cerner
 - Pop-up alert for Providers
 - PowerForm documentation for Pharmacists
 - Education task for Nurses

4

AdventHealth

4

MSOS Member Briefing

November 2022

Cerner PowerForm

- Fires a task with each REMS medication order
- Pharmacists required to fill out PowerForm to document required information
- Based on drug selected, certain fields are required

5

Risk Evaluation and Mitigation Strategy (REMS)																																			
Consult Type <input type="radio"/> New <input checked="" type="radio"/> Follow-up care	Prescriber <input type="text"/>	All Patient's REMS Meds <input type="text"/>																																	
Associated Order Rt Click on Box Below for ReferenceText Hyperlink to FDA REMS website																																			
<table border="0"> <tr> <td><input type="radio"/> Alemtuzumab (Lemtrada)</td> <td><input type="radio"/> Lomitapide (Lomitapide)</td> <td><input type="radio"/> Riociguat (Adempas)</td> </tr> <tr> <td><input checked="" type="radio"/> Ambrisentan (Letairis)</td> <td><input type="radio"/> Macitentan (Opsumit)</td> <td><input type="radio"/> Sodium Oxylate (Xyrem)</td> </tr> <tr> <td><input type="radio"/> Bosentan (Tracleer)</td> <td><input type="radio"/> Metoprolol (Myalept)</td> <td><input type="radio"/> Suboxone/Subutex</td> </tr> <tr> <td><input type="radio"/> Brodalumab (Siliq)</td> <td><input type="radio"/> Mifepristone (Mifeprex)</td> <td><input type="radio"/> Testosterone Undecanoate (Aveed)</td> </tr> <tr> <td><input type="radio"/> Buprenorphine Hydrochloride (Probuphine)</td> <td><input type="radio"/> Mipomersen Sodium (Kynamro)</td> <td><input type="radio"/> Thalidomide (Thalomid)</td> </tr> <tr> <td><input type="radio"/> Clozapine</td> <td><input type="radio"/> Mycophenolate</td> <td><input type="radio"/> Vandetanib (Caprelsa)</td> </tr> <tr> <td><input type="radio"/> Collagenase Clostridium Histolyticum (Xiaflex)</td> <td><input type="radio"/> Natalizumab (Tysabri)</td> <td><input type="radio"/> Vigabatrin</td> </tr> <tr> <td><input type="radio"/> Eculizumab (Soliris)</td> <td><input type="radio"/> Olanzapine (Zyprexa Relprevv)</td> <td></td> </tr> <tr> <td><input type="radio"/> Filgrastim (Aldo)</td> <td><input type="radio"/> Parathyroid hormone (Natpara)</td> <td></td> </tr> <tr> <td><input type="radio"/> Isotretinoin (PLEDGE)</td> <td><input type="radio"/> Phentermine and Topiramate (Qsymia)</td> <td></td> </tr> <tr> <td><input type="radio"/> Lenalidomide (Revlimid)</td> <td><input type="radio"/> Pomalidomide (Pomalyst)</td> <td></td> </tr> </table>			<input type="radio"/> Alemtuzumab (Lemtrada)	<input type="radio"/> Lomitapide (Lomitapide)	<input type="radio"/> Riociguat (Adempas)	<input checked="" type="radio"/> Ambrisentan (Letairis)	<input type="radio"/> Macitentan (Opsumit)	<input type="radio"/> Sodium Oxylate (Xyrem)	<input type="radio"/> Bosentan (Tracleer)	<input type="radio"/> Metoprolol (Myalept)	<input type="radio"/> Suboxone/Subutex	<input type="radio"/> Brodalumab (Siliq)	<input type="radio"/> Mifepristone (Mifeprex)	<input type="radio"/> Testosterone Undecanoate (Aveed)	<input type="radio"/> Buprenorphine Hydrochloride (Probuphine)	<input type="radio"/> Mipomersen Sodium (Kynamro)	<input type="radio"/> Thalidomide (Thalomid)	<input type="radio"/> Clozapine	<input type="radio"/> Mycophenolate	<input type="radio"/> Vandetanib (Caprelsa)	<input type="radio"/> Collagenase Clostridium Histolyticum (Xiaflex)	<input type="radio"/> Natalizumab (Tysabri)	<input type="radio"/> Vigabatrin	<input type="radio"/> Eculizumab (Soliris)	<input type="radio"/> Olanzapine (Zyprexa Relprevv)		<input type="radio"/> Filgrastim (Aldo)	<input type="radio"/> Parathyroid hormone (Natpara)		<input type="radio"/> Isotretinoin (PLEDGE)	<input type="radio"/> Phentermine and Topiramate (Qsymia)		<input type="radio"/> Lenalidomide (Revlimid)	<input type="radio"/> Pomalidomide (Pomalyst)	
<input type="radio"/> Alemtuzumab (Lemtrada)	<input type="radio"/> Lomitapide (Lomitapide)	<input type="radio"/> Riociguat (Adempas)																																	
<input checked="" type="radio"/> Ambrisentan (Letairis)	<input type="radio"/> Macitentan (Opsumit)	<input type="radio"/> Sodium Oxylate (Xyrem)																																	
<input type="radio"/> Bosentan (Tracleer)	<input type="radio"/> Metoprolol (Myalept)	<input type="radio"/> Suboxone/Subutex																																	
<input type="radio"/> Brodalumab (Siliq)	<input type="radio"/> Mifepristone (Mifeprex)	<input type="radio"/> Testosterone Undecanoate (Aveed)																																	
<input type="radio"/> Buprenorphine Hydrochloride (Probuphine)	<input type="radio"/> Mipomersen Sodium (Kynamro)	<input type="radio"/> Thalidomide (Thalomid)																																	
<input type="radio"/> Clozapine	<input type="radio"/> Mycophenolate	<input type="radio"/> Vandetanib (Caprelsa)																																	
<input type="radio"/> Collagenase Clostridium Histolyticum (Xiaflex)	<input type="radio"/> Natalizumab (Tysabri)	<input type="radio"/> Vigabatrin																																	
<input type="radio"/> Eculizumab (Soliris)	<input type="radio"/> Olanzapine (Zyprexa Relprevv)																																		
<input type="radio"/> Filgrastim (Aldo)	<input type="radio"/> Parathyroid hormone (Natpara)																																		
<input type="radio"/> Isotretinoin (PLEDGE)	<input type="radio"/> Phentermine and Topiramate (Qsymia)																																		
<input type="radio"/> Lenalidomide (Revlimid)	<input type="radio"/> Pomalidomide (Pomalyst)																																		
Patient Enrolled in REMS Program <input checked="" type="radio"/> Yes <input type="radio"/> No (contact prescriber to enroll pt) <input type="radio"/> No (patient is male)	"No (patient is male)" Only applies to REMS medications where males have no program requirements. Applies to: ambrisentan, bosentan, macitentan, mifepristone, mycophenolate, phentermine/topiramate, and riociguat.	Enrollment # <input type="text"/>																																	
Pregnant <input type="radio"/> No (verified negative test result) <input type="radio"/> No (nonreproductive potential female) <input type="radio"/> Yes <input type="radio"/> Unknown (contact prescriber) <input type="radio"/> Lab result pending (check daily)		Prescriber Enrolled in REMS Program <input type="radio"/> Yes (called REMS to verify) <input type="radio"/> No (home med) <input type="radio"/> No (contact prescriber)																																	
Female of Nonreproductive Potential (FNRP) Verified (pre-pubertal, post-menopausal, medical reasons for permanent irreversible infertility, or consent form on file w/REMS Program) <input type="radio"/> Verified		If Pregnant, New Start? <input type="radio"/> Yes <input type="radio"/> No																																	
Pharmacist Action (New Start) <input type="radio"/> Rejected order & contacted prescriber		Pharmacist Action (Current Med) <input type="radio"/> Rejected order, contacted prescriber & reported status change on manufacturer website																																	

5

REMS Audits

- Received citations for not having documented education for all required parties after updates made to REMS program
 - Nurses, pharmacists, and providers
- **ACTION:**
 - Develop and launch REMS education to: providers, nurses, and pharmacists to get us into compliance.
 - Add education as a referenced document to REMS Policy and update twice per year

6

MSOS Member Briefing

November 2022

Creation of REMS Education Document

- Contains inpatient formulary REMS medications
- Plan to update twice per year
- Education assigned to nurses, providers, pharmacists initially for full document and then education on changes twice annually thereafter
 - Nurses & Pharmacists: Online learning module with quiz
 - Providers: Official email sent out with attachments
 - Embed into new hire orientation requirement



7

Snapshot of the REMS education document

Generic (Brand) Name	Dosage Form	REMS Purpose	Last Update	REMS Elements to Assure Safe Use (ETASU)	Recent Updates	Notes
ambrisentan	Tablet	Mitigate risks of embryo-fetal toxicity	6/8/21	<ul style="list-style-type: none"> • Prescriber to be registered for all new start patients • Dispensing pharmacy registered by authorized representative • Staff involved in dispensing complete education • Verify the female patient is under the care of a certified prescriber and that she is or will be enrolled to the REMS program prior to discharge • Confirmation of negative pregnancy test • Counsel patient on risk of embryo-fetal toxicity • Do NOT distribute, transfer loan, or sell REMS drug except to certified dispensers 	<div>Provision for prescribers to authorize > 30-day supply for females of reproductive potential due to travel or personal extenuating circumstances</div> <div>No recent updates, refer to Guidance Document (in Notes section) for full information</div> <div>Modified to align inpatient and outpatient pharmacy requirements within Prescriber and Pharmacy guide</div>	<ul style="list-style-type: none"> • Formulary • Shared system REMS • Guidance document

Updates pertaining to:

☐ Physician
 ☐ Nurse
 ☐ Pharmacist



8

MSOS Member Briefing

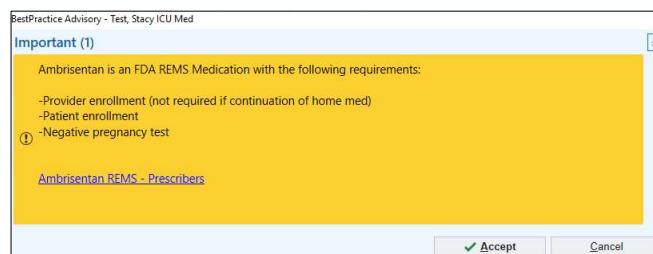
November 2022

Transitioned to Epic EHR in 2022



9

Provider Alerted When Ordering REMS Medication



Pharmacists have note during order verification of REMS medication

- Also, part of clinical monitoring dashboard

Note to pharmacy:
Pharmacist to enter REMS intervention



10

MSOS Member Briefing

November 2022

UPDATED REMS Pharmacist workflow in Epic

Intervention Needed

REMS Patient List Filter

Active REMS Meds

i-Vents

Radarsidebar

Patient List Filters

Open Interventions

UpToDate

11

iVent Smart Text Templates for Pharmacist Documentation

SmartText Lookup

rems

Matches

- ☆ RX REMS AMBRISANTAN (LETAIRIS)
- ☆ RX REMS BOSENTAN (TRACLEER)
- ☆ RX REMS BUPRENORPHINE AND NALOXONE...
- ☆ RX REMS BUPRENORPHINE TRANSMUCOSA...
- ☆ RX REMS CLOZAPINE
- ☆ RX REMS DACLIZUMAB (ZINBRYTA)
- ☆ RX REMS ECULIZUMAB (SOLIRIS)
- ☆ RX REMS IOMITAPIDE (JUXTAPID)
- ☆ RX REMS ISOTRETINOIN (PLEDGE)
- ☆ RX REMS LENALIDOMIDE (REVLIMID)
- ☆ RX REMS MACITENTAN (OPSUMIT)
- ☆ RX REMS MENINGOCOCCAL VACCINE
- ☆ RX REMS MIPOMERSEN SODIUM (KYNAMRO)
- ☆ RX REMS MYCOPHENOLATE
- ☆ RX REMS NATALIZUMAB (TYSABRI)
- ☆ RX REMS POMALIDOMIDE (POMALYST)
- ☆ RX REMS RIOICIGUAT (ADEMPAS)
- ☆ RX REMS SODIUM OXYBATE (XYREM)
- ☆ RX REMS THALIDOMIDE (THALOMID)
- ☆ RX REMS VANDETANIB (CAPRELSA)
- ☆ RX REMS VIGABATRIN (SABRIL)

Preview

Ambrisentan (Letairis) is part of the Risk Evaluation and Mitigation Strategy (REMS). As part of the ordering process, it is required to meet certain requirements.

Is this a new start medication? (New start?:29254)

Patient enrollment in REMS program: (Patient Enrollment:29251)
Enrollment number:

Provider enrollment in REMS program: (Prescriber Enrollment:29252)

Pregnancy

1. Pregnant? (YES NO:27836)
2. Female of Non-reproductive Potential (FNP) Verified (pre-pubertal, post-menopausal, medical reasons for permanent irreversible infertility, or consent form on file w/REMS Program): (YES/NA/NO:23853)
3. If pregnant, pharmacist action (RX REMS Pharmacist Action:29255)

All REMS Requirements Met: (RX REMS Requirements Met:29256)

Aurora, Harley-RX, RPh

☐ Favorites Only

12

MSOS Member Briefing

November 2022

Documented Nurse Education Task (for specific meds)



13

Next Steps

- Resident assigned medication use evaluation on Epic REMS pharmacist documentation for this year
- Roll out to the whole company as Epic is implemented (SOP, education document, and Epic workflow)
- Determine workflow for non-formulary REMS medications, especially for outpatient infusion centers



14

MSOS Member Briefing

November 2022



Thank you!
Questions?

Stacy L. Carson, PharmD, BCPS, FISM
Medication Safety Officer
Stacy.Carson@AdventHealth.com

15

15

Flatlining QT alerts: Tackling the highest firing drug-drug interaction to decrease alert fatigue

Gina Gayed, PharmD, BCPS, CPPS
Medication Safety Officer
Grady Health System – Atlanta, GA

Lucy Von Korff, PharmD
Pharmacy Informatics Specialist
Epic Willow Analyst, Clinical Decision Support IT Lead
Wellstar Health System – Marietta, GA



16

MSOS Member Briefing

November 2022

When the Stars Align...

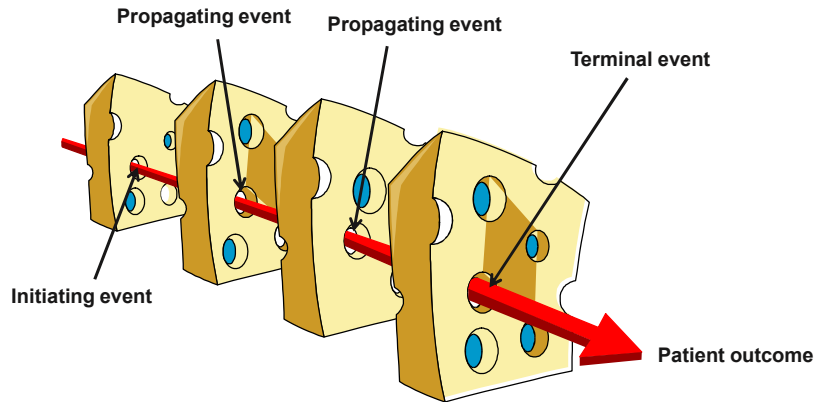


Figure provided courtesy of E. Robert Feroli, PharmD, FASHP, retired Medication Safety Officer, The Johns Hopkins Hospital; MPSC Board of Directors; Faculty Medication Safety, Armstrong Institute for Patient Safety and Quality

17



17

Warnings Report

New Warnings (1 unfiltered, 3 filtered) Show filtered (3)

Drug-Drug: ondansetron (PF) and haloperidol lactate

The use of ondansetron in patients maintained on agents that prolong the QTc interval may result in potentially life-threatening cardiac arrhythmias, including torsades de pointes (1-3)

ondansetron (PF) (ZOFTRAN) injection 2 mg/mL Hospital medication. New. Remove

haloperidol (HALDOL) injection 5 mg/mL Hospital medication. New. Remove

Override reason

How does this medication warning tie back to the patient?



	2/20/2021 2016	2/20/2021 2322	5/26/2021 1429	7/15/2021 1833	7/30/2021 1933
EKG					
Atrial Rate	104 *	84 *	92 *	89 *	101 *
P Axis	80 *	74 *	-11 *	67 *	75 *
PR Interval	158 *	144 *	172 *	172 *	142 *
QRS Duration	112 *	114 *	120 *	116 *	112 *
QT Interval	404 *	482 *	464 *	448 *	418 *
QTc Calculation	531 *	569 *	573 *	545 *	542 *
R Axis	58 *	11 *	43 *	23 *	30 *
T Wave Axis	210 *	197 *	202 *	199 *	-79 *
VENT RATE	104 *	84 *	92 *	89 *	101 *
EKG, 12-LEAD					

	7/13/2021 1011	7/15/2021 1929	7/16/2021 0045	7/16/2021 0616	7/30/2021 2025
CHEM PROFILE					
SODIUM, S	139 *	139		137	134
Potassium	2.6 *	2.8	2.7 *	2.5 *	2.4 *

Problem List [Read-Only]

Problem List is currently read-only.

Diagnosis	Hospital	Print
Non-Hospital (Problems not being addressed during this admission)		
Essential hypertension		
Hypertensive urgency		
Dyslipidemia		
Cardiomyopathy due to hypertension, with heart failure (HCC)		
Dilated cardiomyopathy (HCC)		
Acute systolic congestive heart failure (HCC)		
Hypertensive emergency		
Pneumonia of left lower lobe due to infectious organism		
Shortness of breath		
AKI (acute kidney injury) (HCC)		
Troponin level elevated		
Uncomplicated asthma, unspecified asthma severity, unspecified whether persistent		
Chronic anemia		
Leukocytosis, unspecified type		
VHD (valvular heart disease)		
Myocardial infarction type 2 (HCC)		
Stage 4 chronic kidney disease (HCC)		
Hypokalemia		
Electrolyte imbalance		
Hypomagnesemia		
Hypokalemia (Resolved)		
Chest pain (Resolved)		
Other		
Hypertension (From Ho)		
Asthma (From Ho)		
CHF (congestive heart failure) (HCC) (From Ho)		
Renal disorder (From Ho)		

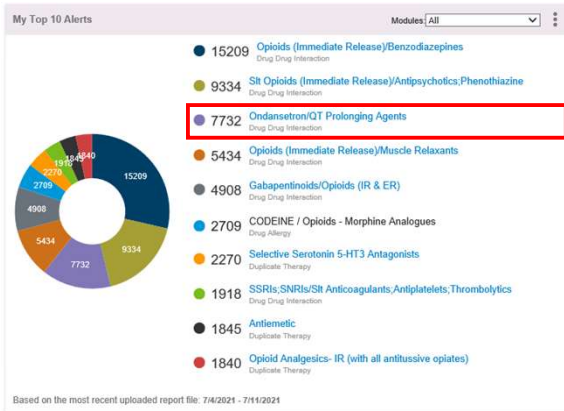
Privileged and Confidential: Peer Review, Medical Review, and/or Patient Safety Work Product protected pursuant to O.C.G.A. §§ 31-7-15, 31-7-130 et seq., 31-7-140 et seq., and the federal Patient Safety and Quality Improvement Act of 2005, 42 U.S.C. §§ 299 et seq.

18

MSOS Member Briefing

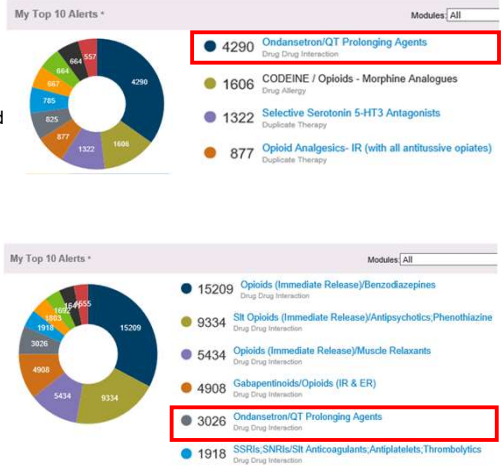
November 2022

Medication Warnings Overview



Providers:
Severe and
contraindicated
DDIs

Pharmacists:
Moderate,
severe and
contraindicated
DDIs



Data from July 4, 2021 – July 11, 2021

Imported from third-party vendor, First Databank (FDB)

Types: Drug-Drug, Duplicate Therapy, Drug-Disease, Dosage Range Check, Geriatric Precautions, Lactation Precautions, Pregnancy Precautions, Pediatric Precautions

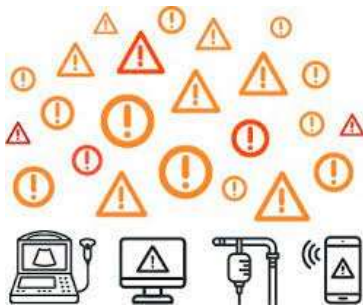
Privileged and Confidential: Peer Review, Medical Review, and/or Patient Safety Work Product protected pursuant to O.C.G.A. §§ 31-7-15, 31-7-130 et seq., 31-7-140 et seq., and the federal Patient Safety and Quality Improvement Act of 2005, 42 U.S.C. §§ 299 et seq.

19



19

Alert Fatigue is Real!



Case A. False alarms & alert fatigue: The hidden cost of bad design on the healthcare system. Available at caseorganic.medium.com/false-alarms-alert-fatigue-the-tragic-design-of-hospital-alerts-8c78dc8bb512. Published Oct 31, 2018. Accessed Sep 14, 2022.

Andrews C. End alarm fatigue with CA application performance management. Available at <https://www.broadcom.com/sw-tech-blogs/alops-blog/end-alarm-fatigue>. Published Dec 5, 2017. Accessed Sep 14, 2022.

20



20

MSOS Member Briefing

November 2022

QTc Prolongation Drug-Drug Interaction Warnings

Previous State

- **Ondansetron QTc prolongation is the top firing drug-drug interaction alert to providers, yet of low clinical relevance**
 - Override reason requirement depends on severity category of alerts
- **Does not take any patient-specific risk factors into account**

Proposed State

- **Goal:** Increase clinical relevance of QTc prolongation alerts, driving the user to take appropriate action based on relevant patient-specific data points
- **“Rights” of decision support:**
 - Right information
 - Right person
 - Right time in the workflow
 - Right action/intervention (alert, order set, etc.)
 - Right context/channel

Osheroff, Teich, Levick et al., 2012. Improving outcomes with CDS: an implementer's guide, Second Edition.

Privileged and Confidential: Peer Review, Medical Review, and/or Patient Safety Work Product protected pursuant to O.C.G.A. §§ 31-7-15, 31-7-130 et seq., 31-7-140 et seq., and the federal Patient Safety and Quality Improvement Act of 2005, 42 U.S.C. §§ 299 et seq.

21



21

Building a Better Mouse Trap

Development and Validation of a Risk Score to Predict QT Interval Prolongation in Hospitalized Patients

James E. Tisdale, PharmD¹, Heather A. Jaynes, MSN¹, Joanna R. Kingery, PharmD¹, Noha A. Mourad, MS¹, Tate N. Trujillo, PharmD¹, Brian R. Overholser, PharmD^{1,2}, and Richard J. Kovacs, MD^{1,3}

¹Department of Pharmacy Practice, College of Pharmacy, Purdue University

²Department of Medicine, School of Medicine, Indiana University

³Department of Pharmacy, Indiana University Health Methodist Hospital

⁴Krannert Institute of Cardiology, Indianapolis, IN

Effect of Replacing Vendor QTc Alerts with a Custom QTc Risk Alert in Inpatients

Steven Stettner¹, Sarah Adie², Sarah Hanigan², Michael Thomas³, Kristen Pogue², Christopher Zimmerman⁴

¹Department of Pharmacy, New York-Presbyterian/Weill Cornell Medical Center, New York, New York, United States

²Department of Pharmacy Services, Michigan Medicine, Ann Arbor, Michigan, United States

³Department of Internal Medicine-Cardiology, Michigan Medicine, Ann Arbor, Michigan, United States

⁴Department of Health Information and Technology Services, Michigan Medicine, Ann Arbor, Michigan, United States

Appl Clin Inform 2022;13:19-29.

Address for correspondence: Christopher Zimmerman, PharmD, Health Information and Technology Services, Michigan Medicine, Suite 500, 510-05, 777 E. Eisenhower Parkway, Ann Arbor, MI 48108-3273, United States (e-mail: chrissim@med.umich.edu).

Effectiveness of a Clinical Decision Support System for Reducing the Risk of QT Interval Prolongation in Hospitalized Patients

James E. Tisdale, PharmD, Heather A. Jaynes, MSN, Joanna R. Kingery, PharmD, Brian R. Overholser, PharmD, Noha A. Mourad, MS, Tate N. Trujillo, PharmD, and Richard J. Kovacs, MD

Department of Pharmacy Practice, College of Pharmacy, Purdue University, Indianapolis, IN (J.E.T., H.A.J., B.R.O., N.A.M.); Department of Medicine, School of Medicine, Indiana University, Indianapolis (J.E.T., B.R.O., R.J.K.); Department of Pharmacy, Indiana University Health Methodist Hospital, Indianapolis (J.R.K., T.N.T.)

22

22

MSOS Member Briefing

November 2022

Risk Score

Risk Factor	Number of Points
Age ≥ 68 years	1
Female gender	1
Loop diuretic	1
Serum potassium ≤ 3.5 mEq/L	2
Admission QTc ≥ 450 ms	2
Acute myocardial infarction	2
Sepsis	3
Heart failure	3
At least one QT prolonging medication	3
Two or more QT prolonging medications	3
Maximum Risk Score	21

Risk Category	Number of Points
Low risk	< 7
Moderate risk	7–10
High risk	≥ 11

Tisdale JE. Circ Cardiovasc Qual Outcomes. 2013;6(4):479-87.

23



23

Risk Score Alert

The alert fires on patients

EITHER

- With a most recent QTc result ≥ 500 ms

OR

- With a QT prolongation risk score of 11 points or greater

QTc Prolongation Alert

This patient **EITHER** has a QTc ≥ 500 ms **OR** is at **HIGH** risk for QTc prolongation (see risk factors below), which may increase their risk for torsades de pointes.
Tisdale JE. Circ Cardiovasc Qual Outcomes. 2013; 6(4): 479-487. **EXAMPLE**

QT prolongation risk factors this patient meets:

High Risk	11 Total Score
1	Loop diuretic active OR given in last 48 hrs
2	Most recent K ≤ 3.5 mEq/L or Mg ≤ 1.8 mg/dL in last 72 hrs
2	Most recent QTc interval ≥ 470 ms
3	At least one QTc prolonging medication active OR given in last 48 hrs
3	2+ QTc prolonging medication(s) active

Most recent labs:

QTC Calculation	Date/Time	Value	Ref Range	Status
	04/10/2022 03:13 PM	475	MS	Final

Potassium	Date/Time	Value	Ref Range	Status
	04/12/2022 02:47 AM	3.7	3.5 - 5.1 mmol/L	Final

Magnesium	Date/Time	Value	Ref Range	Status
	04/12/2022 02:47 AM	1.8	1.6 - 2.6 mg/dL	Final

Active medication(s) with risk of QT prolongation

Start	Stop	Medication
04/08/22 1500	--	nICARDIPINE (CARDENE) infusion 25 mg/250 mL NS (100 mcg/mL)
04/08/22 1500	--	STANDARD 0.15 mg/hr Intravenous, Continuous
04/08/22 1500	--	propofol (DIPRIVAN) 10 mg/mL infusion 0.50 mcg/kg/min, Intravenous, Continuous
04/08/22 1437	--	ondansetron (PF) (ZOFTRAN) injection 2 mg/mL 4 mg, Intravenous, Every 8 hours PRN

Review the MAR for recently administered QT prolonging meds.

Remove the following orders?

Remove	Keep	Order
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ciprofloxacin (CIPRO) IVPB 400 mg/200 mL (premix) 400 mg Intravenous, at 200 mL/hr Every 12 hours, First Dose today at 1300 Reason for Ordering Antimicrobial CAP (ICU) - Community Acquired Pneumonia Expected days of therapy: 3

Apply the following?

Order	Do Not Order	Order
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ECG 12 lead unit performed
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Telemetry monitoring

Acknowledge Reason

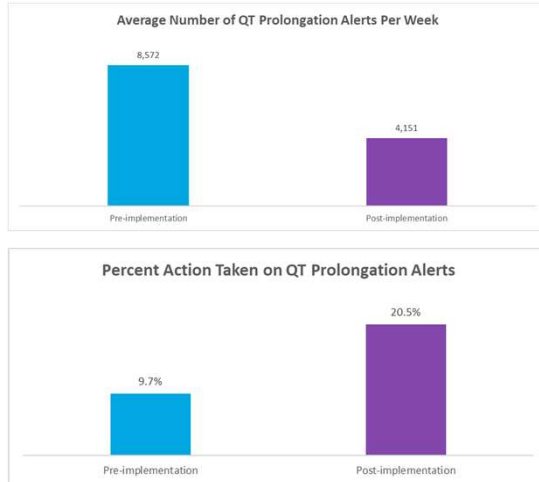
☐ Benefit > risk, will monitor

24

MSOS Member Briefing

November 2022

Preliminary Results



Override Reason	Percent Overrides
Benefit outweighs risk	83.1%
Patient being monitored	9.4%
Previous use tolerated	3.0%
Notified provider, ordered to continue	2.8%
Previously addressed	1.8%

Privileged and Confidential: Peer Review, Medical Review, and/or Patient Safety Work Product protected pursuant to O.C.G.A. §§ 31-7-15, 31-7-130 et seq., 31-7-140 et seq., and the federal Patient Safety and Quality Improvement Act of 2005, 42 U.S.C. §§ 299 et seq.

27



27

Pearls

- Get as close as possible to the workflow with leadership support
- Maximize internal and external collaborations
- Keep detailed and accurate notes on all decisions
- Roll with the curveballs, but be mindful of scope and timeline
- Prepare for the worst
- Develop plans for post-implementation monitoring and sustainable maintenance
- It takes a village!

28



28

MSOS Member Briefing

November 2022

Future Directions

- Review firings for potential optimization opportunities:
 - Top offending medications?
 - Default checked medications in order sets?
 - Lookback times on comorbidities?
 - Other?
- Add most recent QTc result to order composer
- Explore the utility of a MAR infographic for ongoing monitoring
- Evaluate impact on patients' clinical outcomes

29



29

Acknowledgements

- | | |
|---|--------------------------------------|
| • Chris Zimmerman, PharmD – Michigan Medicine | • Brendon Banes, PharmD, BCPS, BCCP |
| • Elena Levenfeld, MSChE, RT(T) | • Kris Bedenbaugh, PharmD |
| • Rayan Rouhizad, DO | • Jenna Sherrer, PharmD |
| • Jeffrey Sacks, MD | • Ashley Hall, PharmD |
| • George Kramer, MD | • Elizabeth McCormick, PharmD, BCPPS |
| • Hardik Bhansali, MD | • Nirali Naik, PharmD, BCPS |
| • Asif Saberi, MD, FCCP | • Shirmil White, PharmD, BCPS |
| • Jody Hughes, MD, FCCP | • Mnesha Patel, PharmD, MBA |
| • John Kueven, FACHE, MBA, MSHA, RN | • Timothy Coyle, PharmD |
| • Bruce Gould, MD | • Leslie Busby, BSN, RN |
| • Maria Paradisis, MD | • Pooja Mistry, RN |

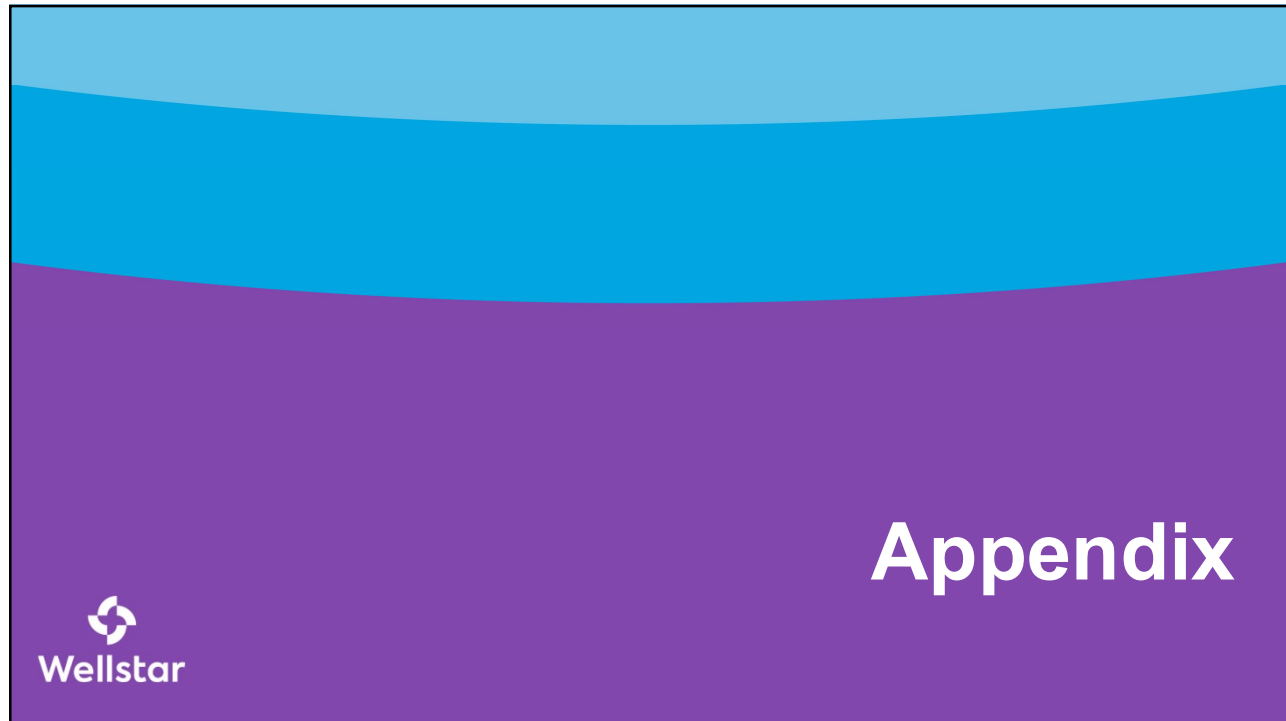
30



30

MSOS Member Briefing

November 2022



31

EXAMPLE

Infographic on MAR

insulin lispro (HumaLOG) (prandial) injection ⓘ Dose: 5 Units : Subcutaneous : 3 Times daily with meals : ⓘ ⓘ

1300 Due

Admin Instructions:
HOLD IF NPO.

Product Instructions:
Place waste in BLACK hazardous container.
Caution: Sound alike/look alike medication.

Ordered Admin Dose: 0.05 mL = 5 Units of 100 Units/mL

Dispense Location: ⓘ

STOP

****Hold dose, patient has active NPO order****

Recent Result Components

GLUCOSE:	200 mg/dL (A) †	collected at 01/26/22 0201
BEDSIDE:	(Final)	
	212 mg/dL (A) †	collected at 01/26/22 0021
	(Final)	
	240 mg/dL (A) †	collected at 01/25/22 1952
	(Final)	

32

MSOS Member Briefing

November 2022

Flatlining QT alerts: Tackling the highest firing drug-drug interaction to decrease alert fatigue

Gina Gayed, PharmD, BCPS, CPPS
Medication Safety Officer
Grady Health System – Atlanta, GA

Lucy Von Korff, PharmD
Pharmacy Informatics Specialist
Epic Willow Analyst, Clinical Decision Support IT Lead
Wellstar Health System – Marietta, GA



33

Inpatient Pharmacist Discharge Order Verification

Geisinger

Sabra Douthit, PharmD
Internal Medicine Pharmacy Coordinator
Geisinger Medical Center
Danville, PA

34

MSOS Member Briefing

November 2022

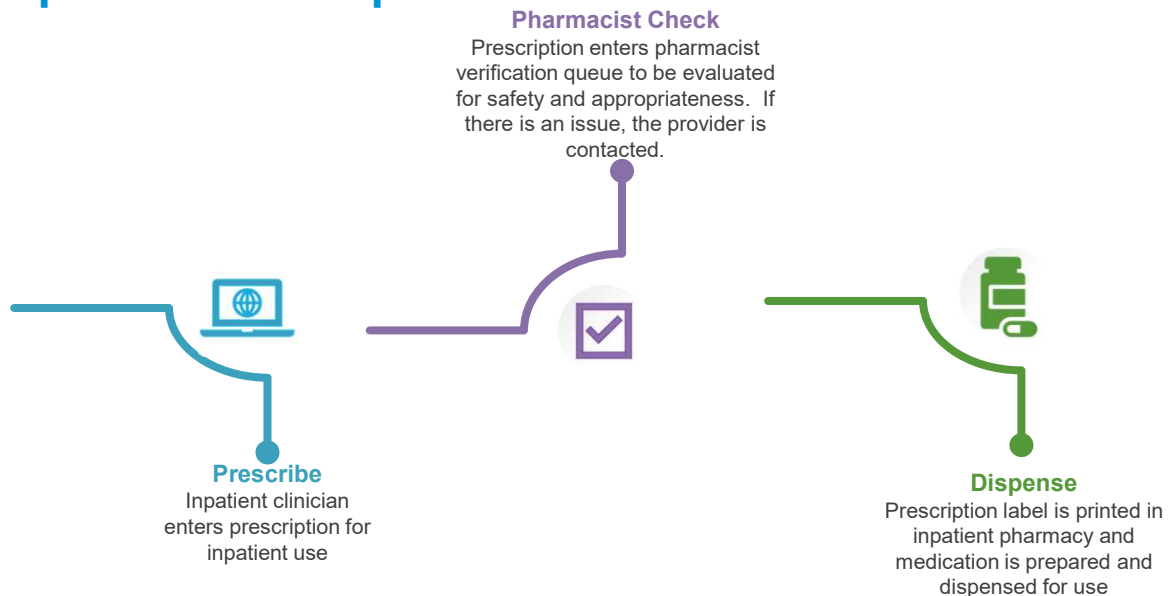
Geisinger



- Geisinger Medical Center
 - 550 bed hospital in Danville, PA
 - Includes Janet Weis Children's Hospital
- Geisinger Shamokin Community Hospital
 - 30 bed hospital in Shamokin, PA

35

Inpatient Prescriptions

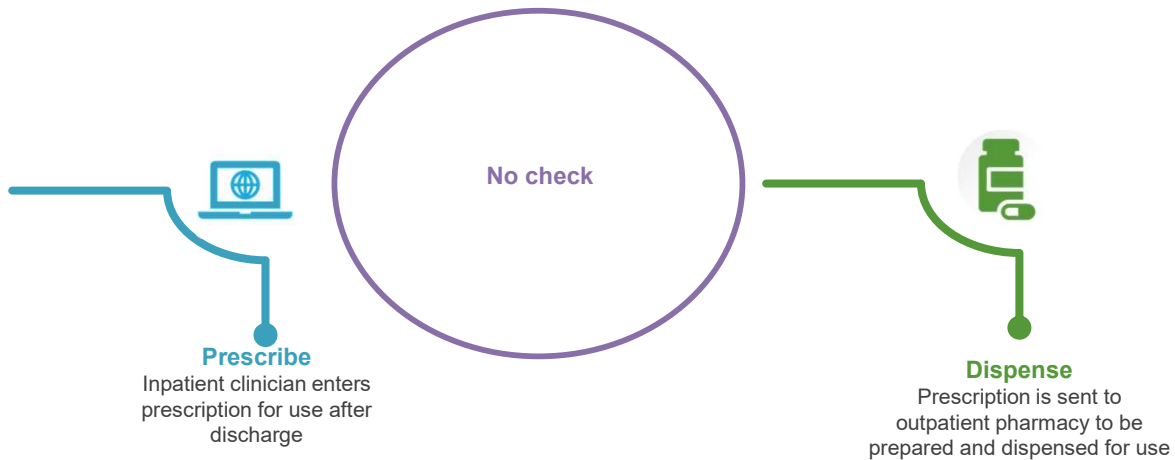


36

MSOS Member Briefing

November 2022

Discharge Prescriptions



37

Problem

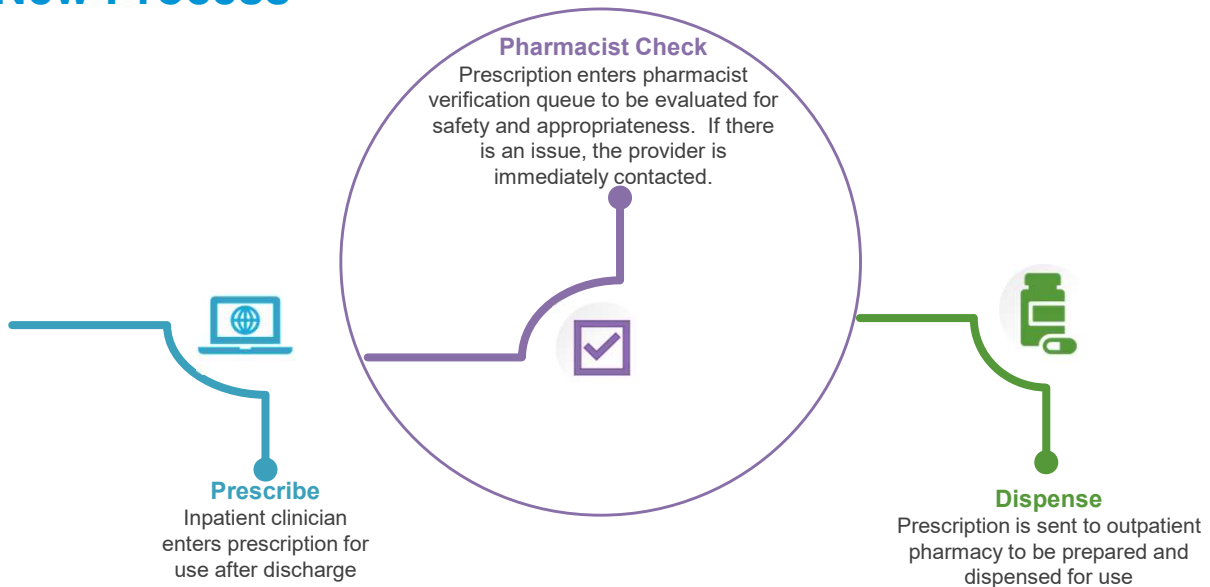
- Receiving reports of inappropriate discharge prescriptions
 - Insufficient quantities (ex. not enough tablets for prednisone tapers)
 - Incorrect packaging (ex. enoxaparin vials vs syringes)
 - Inappropriate tablet strengths (ex. risperidone 4mg tablets sig: Take 3mg (0.75 tablet) by mouth daily)
 - Unnecessarily replacing home medications with hospital formulary products (ex. on Advair (fluticasone/salmeterol) at home, interchanged with Breo Ellipta (fluticasone/vilanterol) during admission, then prescribed Breo Ellipta at discharge)
 - Pediatric dosing errors (ex. sildenafil suspension 50mg by mouth TID for patient who had been receiving 4.2mg during admission. Provider had meant to order 5mg by mouth TID)
- Pharmacists at outpatient pharmacies unable to quickly contact provider to resolve issue

38

MSOS Member Briefing

November 2022

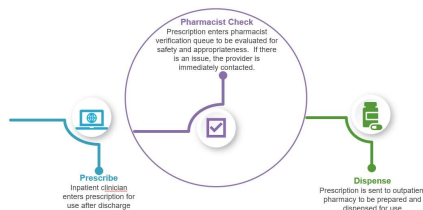
New Process



39

New Process

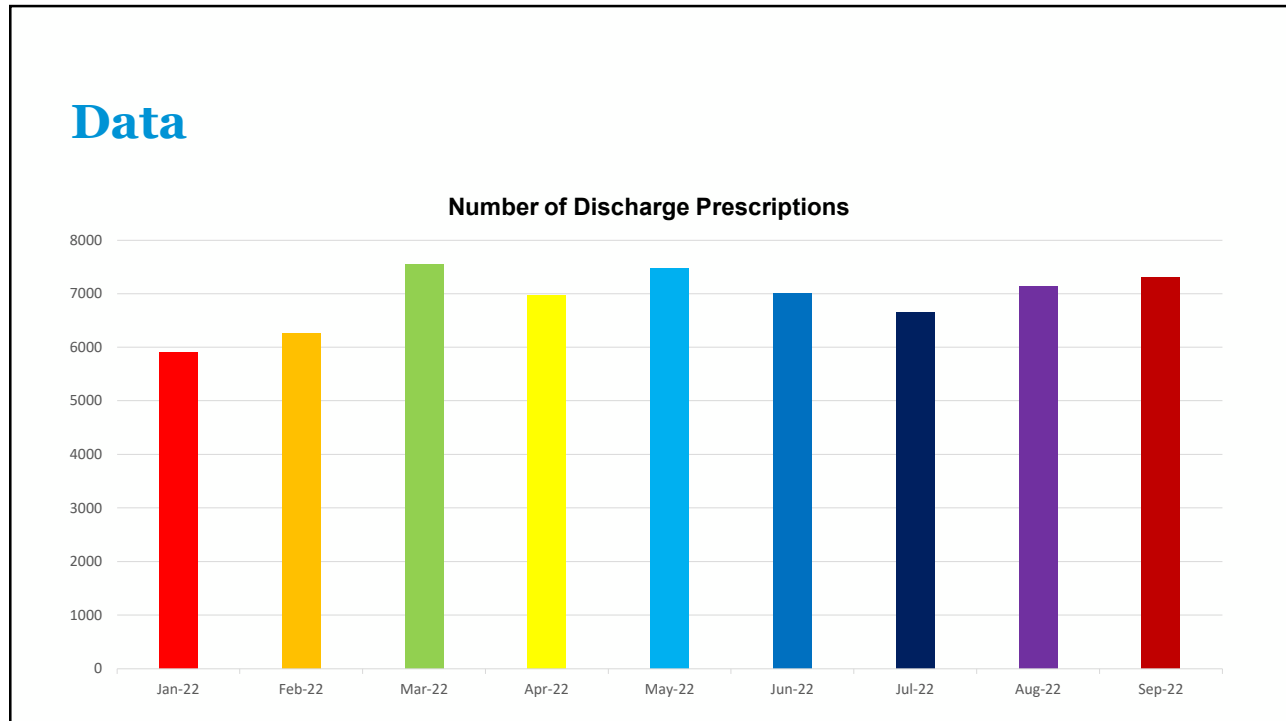
- Phased in on different units throughout 2021
- Included: Adult and pediatric inpatient units
- Excluded: Emergency department and same day surgery units
- Clinicians' discharge prescriptions flow into the same pharmacist verification queue as inpatient prescriptions
- Discharge prescriptions will not e-prescribe or print until pharmacist verification
- Inpatient pharmacist will review new prescriptions and entire discharge medication list
- Pharmacist can text clinician about inappropriate prescriptions and have either the clinician re-write the prescription or take a verbal to re-write it themselves
- Pharmacist places an I-Vent in EPIC to indicate they reviewed the discharge medication list and whether they had to make any changes



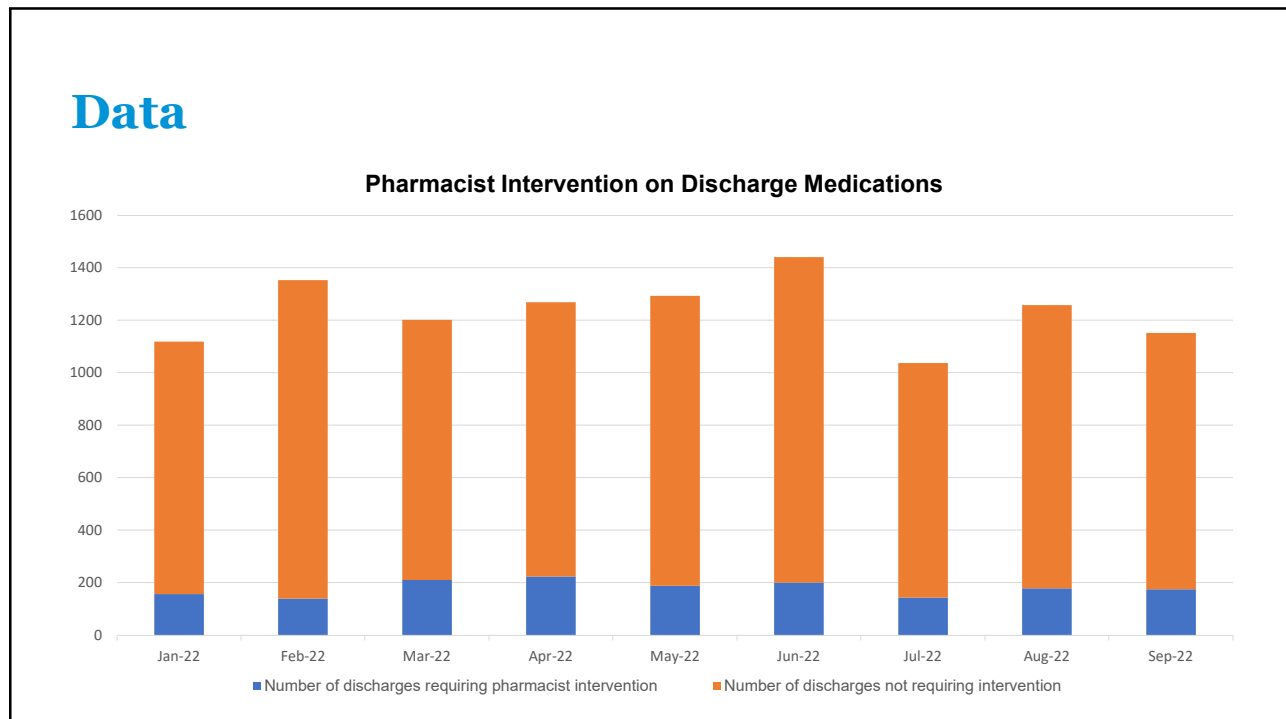
40

MSOS Member Briefing

November 2022



41



42

MSOS Member Briefing

November 2022

Challenges

- No hard stop on printing after visit summaries if the pharmacist hasn't yet verified the prescriptions
 - May lead to incorrect information on medication list
- Team must wait for pharmacy verification to get prescriptions printed
 - May hold up discharge
- Significant number of prescriptions added to pharmacist's workload

43

Great Catches

- Clinician ordered 5 day supply of morphine sulfate extended release (MS Contin) 15mg tablets "take 1 tablet every 8 hours as needed for pain"
 - Pharmacist reached out to confirm formulation and confirmed clinician really meant to order morphine sulfate immediate release tablets
- Clinician ordered sacubitril/valsartan (Entresto) 49-51mg tablets, but left lisinopril on medication list
 - Pharmacist reached out due to duplicate medication therapy and provider discontinued lisinopril prescription
- Clinician ordered cefepime and tobramycin for pediatric patient and had e-prescription destination set for the hospital outpatient pharmacy
 - Pharmacist knew outpatient pharmacy does not dispense IV antibiotics and re-routed prescription to appropriate home infusion pharmacy

44

MSOS Member Briefing

November 2022

Questions?

45



ISMP Update

MSOS Briefing November 2022

Rita K. Jew, Pharm.D., MBA, BCPPS, FASHP
President, Institute for Safe Medication Practices

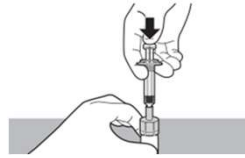
©2022 ISMP | www.ismp.org | 46

46

MSOS Member Briefing

November 2022

Two Components Vaccines to Single Component



Rotavirus Vaccine



Meningococcal Vaccine



©2022 ISMP | www.ismp.org | 47

47

SAFETY briefs

Using VIGIV for monkeypox? The concentration is not as it may seem. A prescriber ordered Vaccinia Immune Globulin Intravenous (Human) (VIGIV) (NDC 60492-0173-1) 6,000 units/kg for a hospitalized 3.49 kg neonate (total dose of 20,940 units) with monkeypox-like symptoms. A single-dose vial arrived from the national stockpile in an unlabeled carton without a package insert. The immediate vial label displayed, "greater than or equal to 50,000 units per vial," without listing a corresponding volume or concentration (Figure 1). When trying to determine how to prepare this product, a pharmacist found the package insert on DailyMed (www.ismp.org/ext/997), which states that VIGIV is provided in a 20 mL single-dose vial containing antibodies to vaccinia virus at greater than or equal to 50,000 units per vial. The package insert states to remove the entire contents of the vial to obtain the labeled dosage of VIGIV. Practitioners might assume the vial contains a total

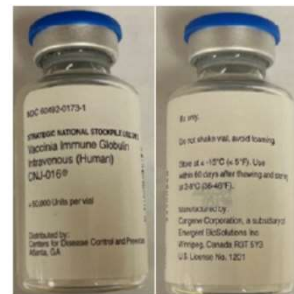


Figure 1. The Vaccinia Immune Globulin Intravenous (Human) CNJ-016 vial label displays greater than or equal to 50,000 units per vial, without a corresponding volume or concentration.



©2022 ISMP | www.ismp.org | 48

48

MSOS Member Briefing

November 2022

Reminders

- It's the season – Safety plan to prevent mix up between COVID-19 and influenza vaccines
- Tall man letters survey – deadline December 2, 2022

[ISMP survey on tall man \(mixed case\) lettering to reduce drug name confusion \(alchemer.com\)](https://www.alchemer.com)



©2022 ISMP | www.ismp.org | 49

49

Specialty Pharmacy Medication Safety Membership

- Basic
 - Specialty Pharmacy Resource page
 - Toolkits on website
- Plus
 - Include all offerings in Basic Membership
 - Additional resources
 - ISMP Community/Specialty Pharmacy Newsletter
 - Bi-monthly Specialty Pharmacy user group meeting
 - Proactive Risk Assessment Tool
- Premium
 - Include all offerings in Advanced Membership
 - Risk assessment of new specialty medications as they become available on market



©2022 ISMP | www.ismp.org | 50

50

MSOS Member Briefing

November 2022

Highlights of the refreshed certificate

- 1 41 CE Hours**
For pharmacists, physicians, nurses, and pharmacy technicians
- 2 Recertification credit for CPPS**
Credits earned can be applied toward maintenance of the Certified Professional in Patient Safety credential
- 3 100% online, self guided program**
Pass a comprehensive exam to earn an ASHP Professional Certificate



©2022 ISMP | www.ismp.org | 51

51

For ISMP Members/MSOS Learners

1. Use code **MSC22MSOS** during checkout on the ASHP Store.
2. MSC22MSOS allows ISMP/MSOS learners to purchase the Medication Safety Certificate at the **ASHP member price of \$445** (\$545 Non-member)
3. The discount code will be active through December 31, 2022.

DISCOUNT CODE:
MSC22MSOS



©2022 ISMP | www.ismp.org

52

MSOS Member Briefing

November 2022



ALERTSABOUTCONTACTNEWSDONATE

Information for consumers

Consulting & EducationTools & ResourcesPublications & MembershipsError Reporting

WEBINARS

Transitioning to Ready-to-Administer IV Medications: Can it be Both Safe and Affordable?

Wednesday, November 30, 2022 - 1:00pm to 2:00pm



Intravenous (IV) therapy is considered an essential component of healthcare delivery, with over 90% of hospitalized patients receiving some form of infusion therapy. Errors involving IV medications can occur in all phases of the medication use process and can be particularly dangerous based on the drug's properties and the complexity of its therapeutic action.







Medication errors associated with the administration of the wrong dose and/or wrong concentration are believed to be more prevalent when frontline practitioners are provided with a parenteral product that requires additional manipulation (partial doses, reconstitution, or dilution) at the bedside. In one study of IV medication administration errors, four error types (wrong diluent mixture, wrong diluent volume, wrong "bolus" rate, and drug incompatibility) accounted for over 91% of the errors; 27% of these errors were considered serious. Many organizations, including ISMP and ASHP have stated that to

Wednesday, November 30, 2022 - 1:00pm to 2:00pm ET

REGISTER NOW



[Transitioning to Ready-to-Administer IV Medications: Can it be Both Safe and Affordable? | Institute For Safe Medication Practices \(ismp.org\)](#)

©2022 ISMP | [www.ismp.org](#) | 53

53



ALERTSABOUTCONTACTNEWSDONATE

Information for consumers

Consulting & EducationTools & ResourcesPublications & MembershipsError Reporting

ASHP SYMPOSIA

Optimizing Sterile Compounding Best Practices: Leveraging Technologies and Removing Barriers to Improve Safety

Monday, December 5, 2022 - 11:30am to 1:00pm



Space is limited, and pre-registration is encouraged. Pre-registration is for planning purposes only and seating will be available on a first-come, first-served basis. Food and beverages are not provided at Midday Symposia. This ASHP policy considers the varied internal policies of commercial supporters related to the Physician Payments Sunshine Act. You are welcome to bring your lunch to the session.







The sterile compounding technology market has widened with more products available and more organizations adopting use of technology solutions in the sterile compounding process. Despite these advancements, an ISMP survey on pharmacy compounding practices revealed that opportunities remain to improve the safety of sterile compounding practices as well as increase and enhance the safe use of technology in the process. This symposium will

Symposium - ASHP - Optimizing Sterile Compounding Best Practices: Leveraging Technologies and Removing Barriers to Improve Safety

Monday, December 5, 2022

11:30 AM - 1:00 PM

Mandalay Bay North Convention Ctr



[Optimizing Sterile Compounding Best Practices: Leveraging Technologies and Removing Barriers to Improve Safety | Institute For Safe Medication Practices \(ismp.org\)](#)

©2022 ISMP | [www.ismp.org](#) | 54

54

MSOS Member Briefing

November 2022



December 1, 2






The screenshot shows the ISMP website with a navigation bar at the top containing links for Alerts, About, Contact, News, and Donate. Below the navigation bar is a header with links for Consulting & Education, Tools & Resources, Publications & Memberships, and Error Reporting. The main content area features a large banner for the "Medication Safety Intensive Workshop" with a background image of a woman working on a laptop. The banner text includes "Maximize your error prevention efforts!" and "Workshop dates now available for 2022!" with a "PICK A DATE" button. Below the banner, there are social media icons for Facebook, LinkedIn, Twitter, and YouTube. The text describes the workshop as a two-day virtual program designed to help practitioners address current medication safety challenges. It mentions that the program faculty will provide specific tools and resources, and that participants will engage in hands-on practice in error analysis, root cause evaluation, and data use. The workshop is for practitioners at all levels, including new roles and those looking to expand their understanding. A note at the bottom states, "This workshop is conducted in English."

©2022 ISMP | www.ismp.org | 55

55




Walk the Red Carpet with Safety Stars
ISMP 25th Annual Cheers Awards

Join Us on Tuesday, December 6, 2022

ISMP is recognizing medication safety leaders at the 2022 Cheers Awards dinner and we would love to see you there.


This is not only the 25th anniversary of the Cheers Awards, but we are also honoring a true medication safety star, **Michael R. Cohen**, who is this year's Keynote Speaker and Lifetime Achievement Award winner.

★ Support Cheers During Our Blockbuster Year! ★



Keynote Speaker and Lifetime Achievement Award Winner:
Michael R. Cohen, RPh, MS, ScD (hon.), DPS (hon.), FASHP

Michael R. Cohen, President Emeritus and co-founder of the Institute for Safe Medication Practices (ISMP), has dedicated his career to advocating for medication error prevention. His passion for medication safety began in 1974 when he saw the value in sharing the story of a serious adverse event that occurred at a local hospital to help prevent the same error from happening again. He founded ISMP in 1994 and launched the first of its newsletters in 1987. ISMP's publications now reach over a million health professionals in the US and over 30 foreign countries. Dr. Cohen also has helped bring about countless changes in clinical practice, public policy, and drug labeling and packaging that have impacted millions of patients and healthcare professionals. He has received numerous awards for his leadership and advocacy in medication safety.



To register to attend or make a donation to show your support, visit: www.ismp.org/node/24185

©2022 ISMP | www.ismp.org | 56

56

MSOS Member Briefing

November 2022

Questions?



- A copy of today's slides will be posted on our website
- Next MSOS Briefing date – January 26, 2022.

https://ecri.zoom.us/webinar/register/WN_Loxe9LQVSXqXesV-X9yfGA

