

## Medication Risk Evaluation and Mitigation Strategies (REMS): What Providers Need to Know

By Lindsey Childs, PharmD, MPH, PGY1 Pharmacy Resident



**What are REMS?** No, not Rapid Eye Movement Sleep. Risk Evaluation and Mitigation Strategies (REMS) are the latest effort by the FDA to identify, prevent, and mitigate the risks associated with medications.

**How long have REMS been around?** REMS were signed into law in 2007 with the Food and Drug Administration Amendments Act (FDAAA). That means that creation of and compliance with REMS is now required by law.

**What is entailed in a REMS?** Any or all of the following four elements may be required to decrease risks associated with medications: Medication Guide, Communication Plan, Elements to Assure Safe Use, and Implementation System.

1. **Medication Guides** are required to be given to the patient to educate him/her on the risks associated with the medication. A common class of drugs that requires medication guides is oral contraceptives.
2. As a prescriber, you may have received a Dear Healthcare Provider letter at some point. This is an example of a **Communication Plan**. Communication Plans are sent from the manufacturers to healthcare providers and/or pharmacists to inform them of medication risks and any Elements to Assure Safe Use and/or Implementation System requirements.
3. **Elements to Assure Safe Use** are designed to ensure that appropriate patient populations use a drug and trained healthcare providers prescribe and dispense them. Some examples of Elements to Assure Safe Use include physician and/or pharmacist training, pharmacy and/or hospital certification programs, and patient registration and/or acknowledgment. Some drugs requiring Elements to Assure Safe Use are Procrit (epoetin) and Suboxone (buprenorphine/naloxone).
4. **Implementation Systems** allow manufacturers to monitor the Elements to Assure Safe Use, so most drugs with Elements to Assure Safe Use require an Implementation System as well. Some examples of Implementation Systems include databases of certified providers and registered patients.

Therefore, the REMS elements that require action on the part of practitioners, hospitals, and pharmacies are Medication Guides and Elements to Assure Safe Use.

**How many drugs have REMS?** There are currently over 140 drugs with FDA approved REMS requirements (see table on page 2); however, only 18 (13%) require prescriber actions for inpatients (see table below).

### Medications With Inpatient REMS Requirements

<b>Aranesp</b> (darbopoetin alfa)	<b>Lotronex</b> (alosetron)	<b>Sabril</b> (vigabatrin)
<b>Butrans</b> (buprenorphine transdermal)	<b>Lumizyme</b> (alglucosidase alfa)	<b>Suboxone</b> (buprenorphine and naloxone)
<b>Entereg</b> (alvimopan)	<b>Nplate</b> (romiplostim)	<b>Sucraid</b> (sacrosidase)
<b>Epogen/Procrit</b> (epoetin alfa)	<b>Onsolis</b> (fentanyl buccal soluble)	<b>Thalomid</b> (thalidomide)
<b>Exalgo</b> (hydromorphone HCl XR tabs)	<b>Promacta</b> (eltrombopag)	<b>Tracleer</b> (bosentan)
<b>Letairis</b> (ambrisentan)	<b>Revlimid</b> (lenalidomide)	<b>Zyprexa Relprevv</b> (olanzapine extended release injection)

(Continued from page 1)

Because the FDA requires each drug manufacturer to create a drug’s specific REMS, there is a lack of standardization of REMS requirements across manufacturers. This has created a challenge to providers and health systems who seek to be compliant with varying REMS requirements.

So what do prescribers need to know and do? For the eighteen medications with inpatient REMS requirements, TGH hospital pharmacists will review orders for these medications and contact you if additional action is needed. If you routinely prescribe items on the list in non-inpatient settings you may want to become familiar with the REMS requirements. If you have any questions about specific REMS or the program in general, please contact the pharmacy department or a unit based clinical pharmacists for the areas where you see patients.

For more information, go to the FDA REMS website:

<http://www.fda.gov/Drugs/DrugSafety/PostmarketDrugSafetyInformationforPatientsandProviders/ucm111350.htm>

### REMS Table (See Story on page 1)

Actemra (tocilizumab)	Edluar (zolpidem tartrate SL tabs)	<b>Letairis</b> (ambrisentan)	Proquin (ciprofloxacin XR)	<b>Tracleer</b> (bosentan)
Actoplus Met (pioglitazone + metformin)	Effient (prasugrel)	Levaquin (levofloxacin)	Provigil (modafinil)	Tranxene (clorazepate)
Actoplus Met XR (pioglitazone + metformin)	Embeda (morphine sulfate + naltrexone HCl XR )	<b>Lotronex</b> (alosetron)	Quaaluan (quinine sulfate)	Treximet (sumatriptan and naproxen)
Actos (pioglitazone)	Enbrel (etanercept)	<b>Lumizyme</b> (alglucosidase alfa)	Rebetol (ribavirin)	Trilipix (fenofibric acid)
Advair Diskus (fluticasone + propionate)	<b>Entereg</b> (alvimopan)	Lyrica (pregabalin)	Reglan (metoclopramide)	Trizivir (abacavir+lamivudine+zidovudine)
Advair HFA Diskus (fluticasone + propionate)	<b>Epogen/Procrit</b> (epoetin alfa)	Metozolv (metoclopramide ODT)	Remicade (infliximab)	Tyzeka (telbivudine)
Ampyra (dalfampridine)	Epzicom (abacavir + lamivudine)	Morphine Sulfate Oral Solution	<b>Revlimid</b> (enalidomide)	Venlafaxine extended release tablets
AndroGel (testosterone)	Equetro (carbamazepine XR caps)	Multaq (dronedaron)	Roferon A Interferon (alfa-2a recombinant)	Vibativ (telavancin)
Apizenzin (bupropion hydrobromide)	<b>Exalgo</b> (hydromorphone HCl XR tabs)	Myobloc (rimabotulinumtoxin B)	Rozarem (ramelteon)	Victoza (liraglutide)
<b>Aranesp</b> (darbopoetin alfa)	Extavia (interferon beta-1b)	Mysoline (primidone)	<b>Sabril</b> (vigabatrin)	Videx (didanosine)
Avandamet (rosiglitazone + metformin)	Factive (gemifloxacin)	Neurontin (gabapentin)	Samsca (tolvaptan)	Vimpat (acosamide)
Avandaryl (rosiglitazone + glimepride)	Forteo (teriparatide)	Noroxin (norfloxacin)	Savella (milnacipran)	Viramune (nevirapine)
Avelox (moxifloxacin)	Gabitril (tiagabine)	<b>Nplate</b> (romiplostim)	Seroquel (quetiapine)	Visicol
Banzel (rufinamide)	Gilenya (fingolimod)	Nuvigil (armodafinil)	Seroquel XR (quetiapine)	Vivitrol (naltrexone XR injection)
Botox (onabotulinumtoxinA)	Halflytely	Olepro (trazodone HCl XR tabs)	Silenor (doxepin)	Votrient (pazopanib)
<b>Butrans</b> (buprenorphine transdermal)	H.P Aethar Gel (respository corticotropin injection)	<b>Onsolis</b> (fentanyl buccal soluble film)	Simponi (golimumab)	Wellbutrin (bupropion)
Byetta (exenatide)	Humira (adalimumab)	Osmoprep	Soliris (eculizumab)	Xenazine (tetrabenazine)
Cambia (diclofenac potassium)	Infergen (interferon alfacon-1)	Oxycodone HCl Oral Solution	Stelara (ustekinumab)	Xeomin (incobotulinumtoxin A)
Celontin (methsuzimide)	Intron A (interferon alfa-2b)	Oxycontin (oxycodone XR)	<b>Suboxone</b> (buprenorphine and naloxone)	Xiaflex (collagenase clostridium histolyticum)
Chantix (varenicline)	Invirase (saquinavir mesylate)	Pancreaze (pancrelipase)	<b>Sucraid</b> (sacrosidase)	Xolair (omalizumab)
Cimzia (certolizumab pegol)	Janumet (sitagliptin + metformin)	Peganon (ethotoin)	Suprep Bowel Kit	Zarontin (ethosuximide)
Cipro (ciprofloxacin)	Januvia (sitagliptin)	Pegasys (peginterferon alfa 2a)	Sutent (sunitinib)	Zenpep (pancrelipase)
Colcrys (colchicine)	Kalbitor (ecallentide)	PegIntron (peginterferon alfa 2b)	Symbicort (budesonide and formoterol)	Ziagen (abacavir)
Copegus (ribavirin)	Kaleta (lopinavir + ritonavir)	PegIntron Rebetol Combopak (Peginterferon alfa 2b and Rebetol ribavirin)	Symbyax (olanzapine and fluoxetine)	Zolpimist (zolpidem oral spray)
Creon (pancrelipase)	Keppra (levetiracetam)	Pennsaid (diclofenac sodium topical solution)	Nucynta (tapentadol)	Zonegran (zonisamide)
Darvocet-N (propoxyphene + apap)	Klonopin (clonazepam)	Pradaxa (dabigatran)	Tasigna (nilotinib)	Zortress (everolimus)
Duetact (pioglitazone + glimepride)	Krystexxa (pegloticase)	Prolia (denosumab)	Testim (testosterone gel)	Zyban (bupropion)
Dulera (mometasone furoate+formoterol fumarate)	Lamictal (lamotrigine)	<b>Promacta</b> (eltrombopag)	<b>Thalomid</b> (thalidomide)	Zyprexa (olanzapine)
Dysport (abobotulinumtoxin A)	Lariam (mefloquine)	Propylthiouracil	Topamax (topiramate)	<b>Zyprexa Relprev</b> (olanzapine extended release injection)

## TGH Research Grant Recipients

Jennifer Cooper, Director, Office of Clinical Research

The Tampa General Hospital Office of Clinical Research is committed to supporting investigators in their research endeavors. The TGH OCR enhances biomedical discovery by facilitating industry sponsored and principal investigator initiated research in conjunction with the University of South Florida and other academic partners, community physicians and industry.

In 2010, with the support of the TGH administration, the TGH Research Steering Committee developed a grant initiative to support research aimed at improving the treatment and quality of life of patients at Tampa General Hospital. There was an overwhelming response of applicants, and selecting grant recipients from such an outstanding group of applicants was a challenging task for the committee.

After thorough review of the applications, the TGH Research Steering Committee awarded grants to the following recipients:

Charlotte Derr, MD: "Determination of Anatomic Variations of Internal Jugular and Femoral Veins Using Ultrasound in the Emergency Department"

Jared Frattini, MD: "Colorectal Disorders Database and Tissue Bank"

Stuart Hart, MD: "Creation of a Novel Technique for Sacral Neuromodulator Lead Placement"

Ivonne Hernandez: "Acculturation, Self Efficacy and Breastfeeding Behavior in a Sample of Hispanic/Latina Women."

Angel Luciano, MD: "In Utero Exposure to Inflammation and Preterm T Cell Maturation"

Scott Stirling, MD: "Sepsis: Predicting a Lactate Level Based on a Combination of Anion Gap and Shock Index"

Raymond Widen, Ph.D: "Evaluation of a Rapid PCR Array for Identification of Bacteria in Blood Cultures"

There will be another grant application process opening in March 2011. The TGH Research Steering Committee and Office of Clinical Research would like to thank the applicants for the time and dedication that went into the development of their proposals, and for their commitment to research and the improvement of patient care.

**If you have questions regarding the grants applications, please contact the Office of Clinical Research at (813)844-4236 or visit our website at <http://health.usf.edu/research/tghocr/index.htm>.**

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## TGH Pharmacy & Therapeutics (P & T) Committee UPDATE: November 2010

Earnest Alexander, PharmD., Manager Pharmacy Services



*\*Please visit "tgh pharmacy" link for more details of the latest formulary decisions and access to the TGH Formulary.*

*"tgh pharmacy" link gives you access to Micromedex and FORMULARY ADVISOR - available on the desktop of any computer in the hospital with an internet browser!*



### • Coral snake antivenin update

- An update on coral snake antivenin shortage indicates that the FDA has approved extension of expiration for currently available lots of coral snake antivenin for an additional year. The Poison Control Center, in conjunction with the pharmacy, is monitoring supply to assure availability.

### • FDA Risk Evaluation Mitigation Systems (REMS) program overview (Note: see story on page 1)

- Lindsay Childs, Pharm.D., PGY-1 Pharmacy Resident, presented a general overview of the FDA Risk Evaluation Mitigation Systems (REMS) and the implications for TGH. Lindsay will be conducting an assessment of TGH compliance with FDA REMS applicable to the inpatient setting. The purpose of REMS is to ensure that the benefit of using the specified medication outweighs the risk. Each manufacturer is required to submit their own REMS for identified drugs to the FDA. This has resulted in lack of standardization in REMS methodology, consequently increasing complexity for physicians, patients and health care systems. Currently there are over 100 medications that have FDA approved REMS.
- The primary objective of Lindsay's research study is to assess compliance with FDA approved REMS at TGH. The secondary objective is to develop an action plan to address the hospital's compliance with targeted REMS.
- The committee will review a follow-up report of study, set to complete in March 2011.

### • Tikosyn order set revision

- Revisions of current order set for dofetilide (Tikosyn), a class III antiarrhythmic with pro-arrhythmic potential and an FDA risk map requirement, are underway. The agent requires increased monitoring of patients who are newly started on therapy. Prescribers and the hospital must be certified to dispense.

### • CRRT pilot results and recommendations

- Summary results of a pilot to change the TGH CRRT protocol to one similar to the Tolwani (University of Alabama Birmingham) protocol were discussed. The pilot was approved in September 2009 and was prompted by our increasing patient volume resulting in compounding volume issues and errors. Pilot units include Surgical/Trauma ICU and Medical ICU.

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- The P & T Committee approved Nephrology Section's recommendation for house-wide implementation of the new CRRT protocol. The education plan is being finalized with a tentative implementation scheduled for January 2011. The roll out will be dependent on completion of nursing education. Revised order sets were reviewed. Calcium, magnesium and potassium replacement protocols were added. Citrate anticoagulation solution was changed from 4% to 0.5% to be infused at a higher rate, thereby exposing the circuit to the same amount of citrate.



#### • **Pharmaceutical Shortage Update**

- As a reminder, you can access the latest information on drug shortages by clicking on the "tgh pharmacy" icon located on any TGH computer in patient care areas. This link takes you directly to this pertinent information. This bypasses the need to go through the Micromedex homepage and navigate to formulary advisor to see TGH specific information.

**Please visit "tgh pharmacy" link on any patient care computer or Micromedex – FORMULARY ADVISOR for a complete and current list of pharmaceutical shortages**

## **The Add-On Non-Emergent, Invasive Procedures/Cases Scheduling at TGH**

### **What is the purpose?**

To enhance the environment of safety for our patients, TGH is creating a standardized process to add-on unscheduled procedures/cases in all its procedural areas: i.e. Operating Rooms, GEC, CVC, Radiology, L&D and the Bronchoscopy Lab.

### **What is the process?**

To be able to accurately and completely schedule add-on, non-emergent, invasive procedures/cases to the daily schedule in all procedural areas during our normal business hours from 0730-1700 Monday thru Friday or after 1700 hours Monday thru Friday and weekends. Physicians or Mid-Level Provider (PA and ARNP) will need to complete the following to initiate this process:

1. Complete and document Consult and/or Procedural Plan in the Progress Notes.
2. Write an order for the procedure/case to be performed in the patient's record including the procedural area or unit where the procedure/case will be performed and laterality (if applicable).



**In addition, procedures to be added-on to the Operating Room schedule must still be communicated telephonically or in person with the staff attending the Operating Room Control Desk as well as complying with requirements 1 and 2 above prior to the patient being transported to the Operating Room.**

**Life-Threatening Emergencies are exempted from this process**



WE'RE ON THE WEB  
WWW.TGH.ORG

# TGH Welcomes our new Physicians



The physicians below were added to TGH staff: 12/31/2010

Sureka Bollepalli, MD	Pediatrics
Jose A. Lopez, MD	General Surgery
Natalie N. Mang, DO	Hospital Medicine
Douglas S. Reintgen, MD	General Surgery
Amarilis Sanchez-Valle, MD	Pediatrics
Wing C. Yeen, MD	Cardiovascular Surgery

This newsletter is produced by Tampa General Hospital's Quality Improvement Department. All comments, responses or suggestions are welcome and should be directed to:

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**KUDOS TO OUR PHYSICIANS!**

Congratulations to the following physicians who were recognized by their patients in the form of personal letters to TGH leadership.



**Dr. Venerando Batas, Dr. Grant Garlick, Michelle Bonfe, ARNP,  
Dr. Carlos Rozas, Dr. Selim Benbadis, Dr. Fernando Vale, Dr. James Norman,  
Dr. Aslam Khan, Dr. Amr Abouzied, Dr. Fadi Matar, Dr. Juan Angel and Dr. Shikha Sharma**