Pharmacy IS Medication Safety

Medication Safety 2017

Stories of
Man, Machines and Money

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Medication Safety 2017: Learning Objectives

- Discuss preventable adverse drug events as a patient care and a public health issue.
- Discuss critical medication safety behaviors, skills and roles of pharmacy staff.
- Discuss emerging medication safety roles for pharmacists and technicians.
- Discuss select medication safety issues.

Medication Safety 2017

Presentation themes

- **Man:** Human performance and behaviors
- **Machine:** Technology and medication safety
- **Money:** Medication safety in turbulent times
A little history…

- 1960s Unit dose and IV preparation in hospital pharmacies
- 1991 Harvard Malpractice Study published (NEJM)
- 1994 ISMP incorporated
- 1990s Regulatory/accreditation standards
- 1999 IOM To Err is Human Report
- 2006 IOM Preventing Medication Errors Report
- 2009 ARRA/ACA drives healthcare IT implementation
- 2012 NECC compounding disaster
- 2017 Opiate crisis addressed…
- **2018 ??? Patients safer??????**

Medication safety 2017

Are we making progress?
Signs of progress!!!

AHRQ: Hospital acquired conditions (HAC)

- 2014 compared to 2010:
  - 840,000 fewer adverse drug effects
  - 16,750 fewer drug related deaths
  - $4 trillion in reduced costs due to ADR


But... not there yet
Getting past the “fog of data”

Medication Safety 2017

• We have the “data”

• We (mostly) have the technologies

• We have the “know – how”

• Errors still occur
Key to leaping forward…
- **Every** error story is told
- **Every** error story is heard by all
- **Everyone is a safety expert!**

Error data informs.. Error “wisdom” saves lives
Using stores to make patients safer

Stories and safety “wisdom”

- Engage and inform us
- Fuller picture and new perspectives
- Easy to remember and apply lessons
My story…

The New York Times

May 25, 1985

VICTIM OF SPINAL INJECTION DIES

AP

ALBANY, May 24 — A 21-year-old woman, paralyzed and comatose after a doctor mistakenly injected an
column, died today, officials at a hospital here said.

Elmer Streeter, a spokesman for Albany Medical Center Hospital, said the woman, Lillian Cedeno of Schen

On Feb. 27 Miss Cedeno, who was then five and a half months pregnant, was given a spinal injection of vinc
intravenous use.

Her baby, a girl, was delivered by Caesarean section on March 16 when the mother developed breathing pro
problems and died April 9.

Since the error was made public, two state investigations into the case have been completed.

Child, 5, dies in second error at Albany Med

Hospital officials say a resident gave Jennifer Martin triple the dose of dextrose, a nutrient.

BY MIKE RUBENS

ALBANY — As the family of a boy named Martin struggled to keep him alive, officials at Albany Medical Center
Hospital were probing the second major mistake involving a patient in the same case.

On Saturday hospital officials confirmed a hospital resident misunderstood the orders and gave her a
bigger than intended dose of the nutrient.

Jennifer's death on Friday occurred the same day hospital officials ordered an elderly man was given the wrong blood in a transfu-

Cuomo, Pataki
Other’s stories can move us

_BMJ_ 2001;322:1013 (28 April)

**News**

**Government to introduce safer administration of cancer drugs after fatal error**

Clare Dyer, legal correspondent, BMJ

The coroner, Nigel Chapman, was told that **14 patients** had died or been left paralysed as a result of **similar errors** in the past 15 years.
Stories put faces behind the statistics..

Colorado 8-year-old dies after pharmacy allegedly gives him 1,000 times his usual medication dosage for sensory processing disorder

The family had sought Good Day Pharmacy in Loveland to fill the syrup-version of the prescription, which should have had .03 mg per 2 milliliters dosage — or about half of a teaspoon, but instead had 30 mg per 2 milliliters, Steinbrecher explained.

Make it better!

Tell your stories
Listen to other’s stories
Change your world
Learning about safety from stories

- Basics theories of error and error prevention
- Role of human behaviors
- Appreciating interconnections/complexities

Human Error

OOPS!

I meant to... I did not know...

Deliberate:
I did (or didn’t) do it because...

Performance ⇛ Knowledge ⇛ Behavior
Preventing an ADE is a complex HUMAN thing...

Learning about safety through stories
Concentrate!....

- Prescriber selects “ICU concentrated” sodium bicarbonate 1 mEq/ml” in CPOE
- Orders at 150 ml/hr
- IV pump “work around”
- Sodium 4 hours later is 164 mEq/L
- Thought to be lab error, bicarb continues…
- 4 hours later sodium is 169 mEq/L....

Concentrate!

- CPOE / Clinical decision support design
- Pharmacist knowledge base
- Bypassing safety steps
- Failure to recognize error is occurring
ASHP Survey Finds Nearly All U.S. Hospitals Use EHRs, CPOE Systems

CPOE only does what it is programmed to.

Figure 1  Radar plot showing mean score for each test scenario across all tested computerised provider order entries in difficulty of entering erroneous orders. To maximise safety, the plot ideally should occupy the most outer grid (score 5); that is, impossible to enter the erroneous orders. For example, greatest protection was against 1000-fold overdose of levothyroxine; however, drug-disease contraindication checking had the lowest mean score indicating least protection, hence making it easier to enter this erroneous order.

Humans ...still the Most Important!

Pharmacy Personnel
Knowledge and Expertise
Bypassing safety

“Well, hey … these things just snap right off.”

“Thank God! Those blasted crickets have finally stopped!”
“Mindfulness” and Safety

Say, what’s a mountain goat doing way up here in a cloud bank?

Lots of Lorazepam…

• 5 kg NICU patient to be sedated
• Attending tells houses staff to order….?
• Order 10 mg PO lorazepam
• Dose alerts “overidden”
• HO tells RPh “that is what the attending wants”
• Tech refuses to dispense unverified order..
Lots of Lorazepam...

- Communication
- Authority gradient
- **Everyone** on the team is critical

Dangers of the Authority Gradient

<table>
<thead>
<tr>
<th>Table 1. Responses to Voiced Concerns Considered “Red Flags”</th>
</tr>
</thead>
<tbody>
<tr>
<td>“The attending told me to order it that way.”</td>
</tr>
<tr>
<td>“The patient says that’s how he takes it at home.”</td>
</tr>
<tr>
<td>“It was published in ... (e.g., JAMA)” (without providing the reference).</td>
</tr>
<tr>
<td>“This is a special case.”</td>
</tr>
<tr>
<td>“The patient’s been titrated up to that dose.”</td>
</tr>
<tr>
<td>“The patient is on a protocol” (without providing the protocol).</td>
</tr>
<tr>
<td>“The dose is the same as listed on the patient’s old chart.”</td>
</tr>
<tr>
<td>“That’s the way the dose is written in the progress notes.”</td>
</tr>
<tr>
<td>“It’s on the list of medications the patient gave me.”</td>
</tr>
<tr>
<td>“We always give it that way.”</td>
</tr>
</tbody>
</table>
A weighty issue…

- Child weighed in ED as 26 kg.
- Phenytoin 20 mg/kg load ordered in CPOE
- 520 mg phenytoin administered
- Phenytoin level 49 mcg/ml
- Pt actual weight is 12 kg

A Weighty issue…

- Units of measure still a problem
- Dose calculations, decimal points
- Limitless sources of errors
  - Technology limits
  - Cultural variation
- Situational awareness
NASA lost its $125-million Mars Climate Orbiter because spacecraft engineers failed to convert from English to metric measurements when exchanging vital data before the craft was launched, space agency officials said Thursday.

A navigation team at the Jet Propulsion Laboratory (JPL) computed its calculations, while Lockheed Martin Aeronautics provided crucial acceleration data in the Earth’s frame of reference.

As a result, JPL engineers mistook acceleration in the Earth’s frame of reference as a metric measure of force called newton-seconds.

In a sense, the spacecraft was lost in translation.

“That is so dumb,” said John Logsdon, director of the Space Policy Institute, Georgetown University.

“There seems to have emerged over the past few years a community of insufficient attention to detail. It wasn’t a giant blunder... It’s just something that was missed.”

A new infographic from the federal Emergency Medical Services for Children (EMS-C) Program demonstrates the importance of weighing children and recording the weight in kilograms. Half of all U.S. hospitals do not weigh and record in kilograms, according to an emergency readiness assessment. This simple patient safety initiative can prevent drug-dosing errors.

**RESEARCH REPORTS**

**Drug Utilization Review**

**Tenfold Medication Dose Prescribing Errors**

Timothy S. Lesar

**Errors in the Use of Medication Dosage Equations**

Timothy S. Lesar, PharmD

**A Standardized Approach to Pediatric Parenteral Medication Delivery**

Amy Mitchell, PharmD, *PharmTech*; Patrick Saccardo, PharmD; Thomas Mousnier, BSN; and Timothy Lesar, PharmD

**Systematic Steps to Diminish Multi-Fold Medication Errors in Neonates**

Jaquelin M. B. Peixoto, MD, MPH1; Amy L. Mitchell, PharmD;2 and Timothy S. Lesar, PharmD

1Department of Pediatrics, Albany Medical College; 2Department of Pharmacy, Albany Medical Center; and Management of Business Services, Albany Medical Center, Albany, New York
“Mindfulness” and Safety

Say, what’s a mountain goat doing way up here in a cloud bank?

It’s in the bag...

• Patient specific labels for metronidazole placed on magnesium minibags in IV room

• Two doses administered before detection

• Not that dangerous of an error … right….?
Same error as "the nightmare"...

A label for phosphenytoin placed on rocuronium bag

Hospital medication error kills patient in Oregon

A hospital in Bend, Oregon, says it administered the wrong medication to a patient, causing her death.

Loretta Macpherson, 65, died shortly after she was given a paralyzing agent typically used during surgeries instead of an anti-seizure medication, said Dr. Michel Boileau, chief clinical officer for St. Charles Health System.
“What the? ...This is lemonade! Where’s my culture of amoebic dysentery?”

Trends in IV Workflow Automation Adoptions

After last year’s jump, IV workflow automation system adoptions remained flat this year.
The “Edge” of Safety…

- Pharmacy tech uses one vial to scan and one for pictures in new IV workflow system

To busy to bar code…

- Pharmacy tech and RN skip scanning when busy
- IV insulin placed in norepinephrine bin
- Insulin hung instead of norepinephrine
- Patient becomes hypotensive
The human limits of safety practices and technologies

“Well, hey ... these things just snap right off.”

Encountering the common perception of safety practices

"Hold still, Carl! ... Don’t ... move ... an ... inch!"
Know when to hold ‘em..

• “Hold” orders for BP meds if SBP<100 or HR <60.

• Poor display of associated orders in E.H.R.

• All of patient BP meds given when SBP<100.

• Patient hypotensive for several hours.
System Design and Safety

Round ‘em up!

- Gentamicin 1.5 mg ordered for a NICU patient
- Policy for “rounding” to “measurable” dose
- Requires “new” entry by RPh, who enter 15.2 mg
- Patient receives overdose for 3 days

<table>
<thead>
<tr>
<th>Ordered Volume</th>
<th>Round to Nearest</th>
<th>Syringe Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.5 mL</td>
<td>0.02 mL</td>
<td></td>
</tr>
<tr>
<td>0.5 - 1.5 mL</td>
<td>0.1 mL</td>
<td></td>
</tr>
<tr>
<td>&gt; 1.5 - 10 mL</td>
<td>0.2 mL</td>
<td></td>
</tr>
<tr>
<td>&gt; 10 mL</td>
<td>1 mL</td>
<td></td>
</tr>
</tbody>
</table>

Exceptions:
- Do NOT round IV Drip Rates/Drip Boluses - IV pumps will automatically calculate
- Do NOT round individual components of IV fluids (e.g., NaCl 3.4% 77mEq = 19.75mL)
- Do NOT round 2.5 mL or 7.5 mL. These are considered standard volumes
Dangerous “safety” practices

"Hold still, Carl! ... Don’t ... move ... an ... inch!"

Safety in 2017: The Human Touch....

Tell stories about technology and safety!
Can we improve our “performance”? 
- Accuracy and Diligence 
- Awareness /Mindfulness 
- Knowledge 
- Communication and teamwork

Human Error

OOPS!
- I meant to...
- I did not know...

Deliberate: I did (or didn’t) do it because...

Performance → Knowledge ← Behavior
Effective if done right

» Separately re-check all steps of the process!
  > 2- person independent
  > 1 person re-check

» Avoid Confirmation bias- (seeing what we expect to see)

https://www.ismp.org/Newsletters/acutecare/showarticle.aspx?id=51
Corbett A. J Health Org Management 2011;25:247

Check it with checklists??
Safety and Communication-
*I said *Bud* Light*!

**Say What?**

- IV Na Phosphate unavailable
- Pharmacist recommends oral “Kphos Neutral”
- Prescriber orders “Neutra Phos”
- Patient potassium increases to 5.9 mEq/L
Big Gulp..

- 87 yo on many meds and overactive bladder
- Drinks 8 ounces of water with each med
- Falls when getting up to urinate at night
And Now, a Warning About Labels

You might see, for example, a red sticker depicting a gushing faucet, with a message in fine print that reads, "MEDICATION SHOULD BE TAKEN WITH PLENTY OF WATER." But, how much is plenty? Would a cup of coffee be acceptable instead? Another common sticker urges,
Simply Complex..

• Patient started on methotrexate for RA.
• Pharmacy label:
  "Take 6 tablets by mouth weekly. Take 3 tabs in AM and 3 Tabs in PM."
• Patient takes 3 tab twice DAILY for 4 days

Lightening strikes more than once
Your Communication skills – critical for safety

Knowledge promotes Safety
A “Val”-uble lesson?

• ValACYclovir suspension to be compounded

• New pharmacist gets valGANciclovir suspension

• Places valACYclovir label on valGANciclovir

• Patient received OD valGANciclovir for 3 days

Heard it through the grapevine..

• Order for 0.6 units insulin in NICU

• CPOE order for *diluted* 1 unit/ml (0.6ml) verified

• Label prints in pharmacy (not IV room)

• RPh had “heard” RNs now dilute insulin

• Places label on vial and sends to NICU

• 0.6 ml of U-100 (60 units) given to neonate
Pharmacy Personnel
Knowledge and Expertise
The Dangers of “willful” ignorance

Ignorance is Bliss

Situational Awareness and Mindfulness

The Far Side
Gary Larson
Andrews McMeel Syndication
“Beat the shot clock”
- TPA ordered “proactively” for acute stroke
- TPA was prepared and sent to ED
- CT scan did not show evidence of a bleed.
- RN instructed not to administer until cleared
- RN administers TPA to “meet care standards”
- Pt discovered to have a contraindication to TPA

Safety and Competing Needs
- Safety not always efficient
- Often “competing” needs
- High workload drives behaviors
- Organizational and personal responsibilities
Staying ahead of the curve..

- ED docs start using “Push Dose Pressors”
- Safety issues predicted
Staying ahead of the curve

- Consensus procedures established
- NO detected safety issues in 4 years

Safety Considerations and Guideline-Based Safe Use Recommendations for “Bolus-Dose” Vasopressors in the Emergency Department

Devin Holden, PharmD, BOPS*; Jessica Ramich, PharmD; Edward Timm, PharmD; Denis Pauze, MD; Timothy Lesar, PharmD

*Corresponding Author. E-mail: holden@mail.amc.edu.

The use of intermittently administered doses of vasopressors to correct hypotension in the emergency department (ED), commonly referred to as bolus-dose pressors, push-dose pressors, Neo-sticks, or phenyl sticks, has been widely advocated outside of the traditional printed medical literature. No autonomous data exist to demonstrate benefits over traditional continuous infusion of vasopressors. Use of bolus-dose vasopressors in the ED setting raises a number of patient safety concerns, and misuse and errors in the preparation and administration of bolus-dose vasopressors may result in patient harm. A systems-based approach should be implemented to maximize safety and patient benefits if bolus-dose vasopressors are used. This article discusses the wide range of issues to consider when evaluating the role of bolus-dose vasopressors in the ED and provides recommendations based on current safe medication practices guidelines. [Ann Emerg Med. 2017;1-10.]

Safety through Rational Therapeutics

“The best doctor gives the least medicines.”

–Benjamin Franklin
Plenty of Room for More..

- 87 yo admitted with new sciatica/back pain
- Gabapentin increased to “help” with back pain
- Metaxalone standing added
- Patient discharged to rehab
- Family reports patient “cloudy” and “not herself”

I felt so much better after I ran out of those 3 months ago

These of will help with your symptoms..
A medication without benefit is simply a safety risk

Reducing Overuse—Is Patient Safety the Answer?
Allison Lipitz-Snyderman, PhD; Deborah Korenstein, MD

Safety Implications of drug overuse
- Not using effective medications
- Patients using effective medications intermittently
- Patients stopping effective medications
- Poor adherence to effective medications
- Switching of medications
- Using less desirable choices
- Less preventative care?
- Increased self care / OTC/ CAMS
- Medication “sharing/borrowing”
“Deprescribing” our way to drug safety

“It is an art of no little importance to administer medicines properly; but it is an art of much greater and more difficult acquisition to know when to suspend them or altogether omit them.”

Phillipe Pinel
French Physician 1745-1826
De-prescribing decision support

- **MedStopper** [http://www.lessismoremedicine.com/blog/medstopper-de-prescribing-online-app-now](http://www.lessismoremedicine.com/blog/medstopper-de-prescribing-online-app-now)

<table>
<thead>
<tr>
<th>Stopping Priority</th>
<th>Medication/ Category/ Condition</th>
<th>May Improve Symptoms?</th>
<th>May Reduce Risk for Future Illness?</th>
<th>Suggested Taper Approach</th>
<th>Possible Symptoms when Stopping or Tapering</th>
<th>BEERS/ STOPP Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED=Highest</td>
<td>citalopram (Celexa) / SSRIs / depression</td>
<td>😞 😞 😞</td>
<td>😞 😞 😞</td>
<td>If used daily for more than 3-4 weeks, reduce dose by 25% every week (i.e. weeks 1-75%, week 2-50%, week 3-25%) and this can be extended or decreased (10% dose reductions) if needed. If intolerable withdrawal symptoms occur (usually 1-3 days after a dose change), go back to the previously tolerated dose until symptoms resolve and plan for a more gradual taper with the patient. Dose reduction may need to slow down as one gets to smaller doses (i.e. ±25% of the original dose). Overall, the rate of discontinuation needs to be controlled by the person taking the medication.</td>
<td>nausea, diarrhea, abdominal pain, sweating, headache, dizziness, cold and flu-like symptoms, anxiety, irritability, trouble sleeping, unusual sensory experiences (e.g. electric shock-like feelings, visual after images), sound and light sensitivity, muscle aches and pains, chills, confusion, pounding heart (palpitations), unusual movements, mood changes, agitation, distress, restlessness, rarely suicidal ideation</td>
<td></td>
</tr>
<tr>
<td>GREEN=Lowest</td>
<td>naproxen (Aleve, Naprosyn, Anaprox) / NSAIDs / general pain/arthritis</td>
<td>😁 😞 😞</td>
<td>😞 😞 😞</td>
<td>Tapering not required</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>amiodipine (Norvasc) / Calcium</td>
<td>😁 😁 😁</td>
<td>😞 😞 😞</td>
<td>If used daily for more than 3-4 weeks. Reduce dose by 50% every 1 to 2 weeks. Once at 25% of the original dose and no withdrawal symptoms</td>
<td>chest pain, pounding heart, heart rate, blood pressure (tension)</td>
<td></td>
</tr>
</tbody>
</table>

**Pharmacy Personnel Knowledge and Expertise**

![RPH logo](image-url)
Shouldn’t pharmacists also be the “No – Drug” experts?

So, you’re recommending tincture of time?

Deprescribing

- Frank C, Weir E. Deprescribing for older patients. CMAJ 2014;186:1369-1376
- MedStopper http://www.lessismoremedicine.com/blog/medstopper-de-prescribing-online-app-now
Medication Safety and You

- We impact BOTH the blunt and sharp ends!
- You are a medication safety expert!
- TELL YOUR STORIES!

Report safety issues
Tell your “story”!
Starting Place for Everything Medication Safety
ISMP.org

Two useful references for understanding Medication safety
Conclusions

Knowledge Assessment

1. Telling stories about medication errors can help foster a culture of safety.  True   False
2. Medication safety technologies are largely “foolproof”       True   False
3. Dosage calculation and decimal errors have been largely eliminated by technologies. True   False
4. Medication errors rarely involve bypassing medication safety procedures. True   False
5. Hearing stories about medication errors is helpful in implementing safety procedures. True   False