DISCLOSURE STATEMENT
Consultant to, speakers bureau for, or advisory board member: Alcon, Allergan, Ametek, B&L, Genentech, Maculogix, OptoVue, SBH, Shire, Zeavision; Stock options – HPO, Zeavision

Course Title: PREVENTION OF MEDICAL ERRORS
LEO SEMES, OD, FAAO

QUIZ TIME
○ The greatest number of deaths annually is highest from which of the following causes?
A. Medical errors
B. Breast cancer
C. AIDS
D. Motor vehicle accidents

QUIZ TIME
○ That number is...
A. 49,000
B. 98,000
C. 7000
D. About 12

QUIZ TIME
○ The percentage of adverse events due to medical errors that were thought to be preventable is about
A. 20
B. 40
C. 60
D. 80

BEFORE WE BEGIN...

AND THIS JUST IN . . . (FROM MD LINX)
https://www.mdlinx.com/article/read/medical-news-article/20161122/09534275/utm_source=MD
MDM&utm_medium=MESSAGE&utm_campaign=MH-FM-NOV16
○ CDC estimates preventable deaths from 5 leading causes 11/23/2016. Not necessarily due to medical errors!
○ New CDC research shows that the number of potentially preventable deaths dropped from 2010 to 2014 for three of the five top causes of death in the United States. The five leading causes of death for people younger than aged 80 years in 2014 were diseases of the heart, cancer, stroke, chronic lower respiratory diseases (CLRD), and unintentional injuries, collectively accounting for 63% of all deaths that year. CDC estimates that 15% of these cancer deaths, 30% of these heart-disease deaths, 43% of these unintentional-injury deaths, 38% of these CLRD deaths, and 28% of these stroke deaths possibly could have been prevented. Compared with 4 years earlier, potentially preventable cancer deaths dropped 23%; potentially preventable deaths from stroke declined 11%; potentially preventable deaths from heart disease decreased 4%; potentially preventable deaths from accidents increased 23%, in large part due to drug poisonings and falls; and potentially preventable deaths from CLRD rose 1%. “Fewer Americans are dying young from preventable causes of death,” said CDC Director Tom Frieden, MD MPH.
ONE MORE TEST...
If quizzes are quizzical, what are tests?

MEDICAL ERROR REPORTING

- Google search November 2016...
  About 32,900,000 results (0.69 seconds)

- Medline citations ("medical errors")
  - 1966-through 1996 (n=188)
    - One of the first citations:
  
  - 1997 through March 25, 2003 (n=1761)
  
  - Order of magnitude increase in 6 years
  
  - 2016 (Nov 22) n = 136,xxx

THIS IS SCARY...

Googling “Pharmacy error”

http://www.sgglaw.com/PracticeAreas/Pharmacy-Error.asp

EFFORTS TO REDUCE ERROR

A pharmacist-led information technology intervention for medication errors (PINCER): a multicentre, cluster randomised, controlled trial and cost-effectiveness analysis.

Avery AJ, et al.
Practices were allocated to either computer-generated simple feedback for at-risk patients (control) or a pharmacist-led information technology intervention (PINCER), composed of
- feedback,
- educational outreach, and
- dedicated support.

Primary outcomes were the proportions of patients at 6 months after the intervention who had had any of three clinically important errors:
- non-selective non-steroidal anti-inflammatory drugs (NSAIDs) prescribed to those with a history of peptic ulcer without co-prescription of a proton-pump inhibitor;
- β blockers prescribed to those with a history of asthma;
- long-term prescription of angiotensin converting enzyme (ACE) inhibitor or loop diuretics to those 75 years or older without assessment of urea and electrolytes in the preceding 15 months.

The cost per error avoided was estimated by incremental cost-effectiveness analysis.

FINDINGS: 72 general practices with a combined list size of 480,942 patients were randomised. At 6 months’ follow-up,
- patients in the PINCER group were significantly less likely to have been prescribed a non-selective NSAID if they had a history of peptic ulcer without gastroprotection (OR 0·58, 95% CI 0·38-0·89);
- a β blocker if they had asthma (0·73, 0·58-0·91);
- or an ACE inhibitor or loop diuretic without appropriate monitoring (0·51, 0·34-0·78).

INTERPRETATION: The PINCER intervention is an effective method for reducing a range of medication errors in general practices with computerized clinical records.

STATE LEVEL - FLORIDA
- Requires reporting of mistakes that lead to serious patient injuries, such as life-threatening situations and epidemic outbreaks
- Also report serious adverse events:
  - wrongful deaths,
  - brain injuries,
  - wrong limb removals,
  - incorrect surgeries

STATE LEVEL - FLORIDA
- Legislation: 456.013
  - requires 2 hour CE course for initial licensure and then biennially for health-care providers

COMMISSION ON EXCELLENCE IN HEALTH CARE
- Established in 2000 by FL legislature
- Chaired by secretaries of:
  - Department of Health
  - Agency for Health Care Administration
COMMITTEE

A body that keeps records in minutes but whose meetings last hours

COMMISSION ON EXCELLENCE IN HEALTH CARE (FL) COMPOSITION

- 42 members
  - Professional associations
  - Health lawyers
  - Medical schools
  - Health insurance carriers
  - Consumer advocates
  - Legislators

OTHER FLORIDA INITIATIVES

- In 2004, legislation was passed requiring the state to inform the public about important performance outcome indicators for healthcare facilities (e.g., volume of cases, average length of stay, complication rates, mortality rates, infection rates for various medical conditions).
- This information became available online in November 2005 at http://www.floridahealthfinder.gov
- This same legislation established the Florida Patient Safety Corporation (FPSC), a voluntary statewide reporting program to track and analyze near misses in healthcare.

MEDICAL ERROR REPORTING

- WOW!!!
- IOM landmark report: To Err is Human: Building a Safer Health System (1999)

MEDICAL ERROR REPORTING

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- IOM landmark report: To Err is Human: Building a Safer Health System (1999)
- Medscape Medical News
- Medical Error Is Third Leading Cause of Death in US
  - Marcia Frellick
  - May 03, 2016

TYPES OF MEDICAL ERRORS

- IOM definition of error:
  “the failure of a planned action to be completed as intended (ie, error of execution) or the use of a wrong plan to achieve an aim (ie, error of planning).”
- Specific topics for today
  - Diagnostic
  - Surgical
  - Prescription
First, some definitions –
Types of medical errors

- An adverse event is an injury caused by medical management rather than the underlying condition of the patient.
  - e.g., unknown allergy to a newly administered drug

- An adverse event attributable to error is a preventable adverse event, also called a sentinel event, because it signals the need to ask why the error occurred and make changes in the system.

Types of human errors

- Active errors tend to occur at the level of the individual, and their effects are felt almost immediately.
  - Wrong sided operation / attributable to human behavior (HB*)

- Latent errors are more likely to be beyond the control of the individual, i.e., errors in system or process design, faulty installation or maintenance of equipment, or ineffective organizational structure.

- System Redesign (SR)

Medical errors - philosophy

- Possibility of their existence pointed out early in career (e.g. optometry school)
- Potential for consequences pointed out early in career (personal or vicarious experience)
- Desire to avoid errors? Yes

- Response at various levels of health care?
  - inconsistent
  - mistakes often superficially addressed or hidden

- Those causing errors are often unaware

- Persons often unjustly blamed [scapegoat]

- Cycle of inaction or nonproductive action

More history

- Neurosurgery subspecialty development (1890-1935)
- Other events
  - Flexner report (1910)
  - Publication of procedures with outcomes
  - Upgrading of Med Schools
  - May have laid to the problem as it exists today??!

World's first delivery of intra-arterial Avastin (November 17, 2009) -- Neurosurgeons have performed the world's first intra-arterial cerebral infusion of Avastin (bevacizumab) directly into a patient's malignant brain tumor. This novel technique may expose the cancer to higher doses of the drug therapy, while possibly sparing the patient common side effects of receiving the drug intravenously or throughout their body...
**Contemporary Headline**

Medical Error - Jessica Santillan (2003)

- Heart-lung transplant patient @ DUMC
- Blood-type mismatch
- How did it happen and how was it handled?
  - Surgery 02/07/03; near conclusion, surgeon realized incompatibility [due to miscommunication. United Network for Organ Sharing]

**How Did It Happen and How Was It Handled?**

- Actions
  - Notify family
  - Explain options -> informed decision; public announcement inappropriate at this point
- Outcome – better communication

**History**

Patient Safety and Quality Improvement Act
(final rule, 2005; [http://www.pso.ahrq.gov/regulations/regulations.htm](http://www.pso.ahrq.gov/regulations/regulations.htm))

- “Fear of lawsuits silences what should be constructive, life-saving dialogue among health providers.
- ‘Creating an environment where information can be shared will benefit all patients.”


**Patient Safety and Quality Improvement Act**

- In July 2005 S.544, the Patient Safety and Quality Improvement Act, became law
- It established a voluntary confidential reporting system to create a national database of medical errors for analysis and development of evidence-based client safety measures.

**But . . .**

- Quaid case

**Reuters. Thu Nov 22, 2007 4:26AM EST**

- Dennis Quaid twins recovering from medical overdose.
**Heparin @ 1000X the intended dose!**

- The two-week-old twins of actor Dennis Quaid were recovering in a Los Angeles hospital on Wednesday after mistakenly being given a massive overdose of a blood thinning drug.

- Cedars-Sinai Medical Center, one of the United States’ leading hospitals, apologized on Wednesday for what it called the “preventable error” that led to the twins and another unidentified child being given 10,000 units of the anti-coagulant Heparin, instead of the normal 10 units given to babies.

**How was it handled?**

- “This was a preventable error, involving a failure to follow our standard policies and procedures, and there is no excuse for that to occur at Cedars-Sinai. Although it appears at this point that there was no harm to any patient, we take this situation very seriously,” Langberg said.

**Quaid twins overdosed w/ Heparin**

- At 11 days of age, stricken with Staph infections and intended to get IV Ab, heparin to flush IV lines to prevent clots in the lines was administered.
  - Heparin was stored in the wrong place
  - Technician was on automatic mode

- **Despite 5 opportunities to check on the dosing.**

WebMD, the magazine Sep/Oct 2008

**Beauty Parlor**

A place to curl up and dye

**Who is watching?**

- The Agency for Healthcare Research and Quality (AHRQ)
  - Medical errors result most frequently from systems errors—the organization of healthcare delivery and the ways that resources are provided in the delivery system.

- Only rarely are medical errors the result of the carelessness or misconduct of a single individual. More on this later

**Error Reporting Issues**

- Is there a system to report errors?
- Are near misses being reported?
- Do workers and patients have a mechanism for suggesting improvements for patient safety?
- Do workers feel their concerns are acted upon?
- Is the system truly non-punitive?
**Some Other Considerations...**

- How can I minimize errors in diagnosis?
- How can I obtain a better understanding of my clinical thinking?
- How can I devise cognitive forcing strategies to help my minimize diagnostic error?


---

**Why Do We Err?**

- Mental functions occur in two modes:
  - automatic
  - problem solving

---

**Classification of Medication Errors Based on Psychological Factors**

- Automatic mode:
  - functions quickly
  - requires little conscious effort
  - draw’s on accumulated learning of situation recognition and response
- Can result in “slips”
  - Distraction
  - Breaks in attention at critical moments
  - More frequent [than “mistakes”]

---

**Automatic Mode - “Slips” Example**

- Driving home from work on Tuesday and went the “regular way” *almost* neglecting to pick up Margaux at the groomer.
  - The distraction of one slip may lead to another...
- . . . Driving through a red light!
- Slips are more frequent w/competing sensory or emotional distractions, fatigue & stress [like in the “normal” office setting]

---

**Here’s one close to home**

---
SEPTEMBER 22, 2015

Improving Diagnosis in Health Care, from the IOM, cited these statistics among the impetus for urgent action:
- 5% of US adults who seek outpatient care each year experience a diagnostic error.
- Diagnostic errors contribute to approximately 10% of patient deaths.
- Diagnostic errors account for 6% to 17% of hospital adverse events.
- Diagnostic errors are the leading type of paid medical malpractice claims, and are almost twice as likely to have resulted in the patient’s death compared with other claims.

Recommendations to Improve Diagnostic Accuracy from the IOM (8 key areas)
- Facilitate teamwork in the diagnostic process among healthcare professionals, patients, and families.
- Enhance healthcare professional education in the diagnostic process.
- Ensure that health information technologies support the process.
- Develop and deploy approaches to identify, learn from, and reduce diagnostic errors and near misses.

Recommendations to Improve Diagnosing from the IOM (8 key areas)
- Establish a work system and culture that supports the diagnostic process.
- Develop a nonpunitive reporting environment and medical liability system that brings improved diagnosis through learning from errors and near misses.
- Design a payment and care delivery environment that supports the diagnostic process.
- Dedicate funding for research on diagnosing and diagnostic errors.

Well, that might just not be new . . .

RECENT REVIEWS OF DIAGNOSTIC ERRORS SUGGEST . . .
- Overconfidence as a source of errors in medicine.
- Extent of incorrect diagnosis (%)
  2nd opinion & Review
  - Dermatology 11% (similar or and and - 1%)
  - Anatomic Pathology 1.5 – 3.8% resulted in a change in treatment or prognosis
  - Radiology <5% (but may be higher for ER vs. specialists)

Berner and Graber Am J Med 121; 2008

RECENT REVIEWS OF DIAGNOSTIC ERRORS SUGGEST . . .
- It may be safer in New Zealand
  65,78 inpatient records examined (1998)
  Diagnostic errors accounted for 8% of adverse events
  11.4% of these were deemed preventable
WHY DO DIAGNOSTIC ERRORS OCCUR?

- Physicians generate hypotheses almost immediately on hearing the patient's chief complaint
- AND follow a pattern based on a "systems" approach
- Additional information when it is sought is to confirm the initial "diagnosis" or other possibilities are often ignored

Berner and Graber Am J Med 121; 2008

WHAT IS THE OUTCOME?

- But what if the doctor never recognizes that the diagnosis was incorrect?
- There is no opportunity for correction
- Systematic approach leads to additional errors

Berner and Graber Am J Med 121; 2008

- It’s a cultural thing – Outliers

SOLUTION?

- If diagnostic processes routinely led to recognized errors...
  - The errors could be corrected by adopting a more contemplative, deliberate approach of alter to strategies to better identify and prevent misdiagnosis

Berner and Graber Am J Med 121; 2008

HOW CONFIDENCE IMPEDES CALIBRATION

Continuous loop based on confidence in diagnostic certainty without updating

R = reinforcing or self-confirming bias

EXAMPLE

- 34 BM presents with history of apparent FB 3 days earlier
- SL: FL staining typical of corneal abrasion
- TX:
  - 
  - 

INTRODUCING OUTCOME FEEDBACK ASSISTS UPDATING AND QUESTIONS SELF CONFIRMATION SCHEME

Continuous loop based on confidence in diagnostic certainty

R = reinforcing or self-confirming bias

Updating is the key to minimizing diagnostic errors.
**FOLLOW-UP**
- 34 BM treated with topical AB (4G FQ)
  - Not better X 1D
  - Seen by resident not improved @ 2 Days
  - Now what?
- “If it’s not getting better in 2 days, you are barking up the wrong tree.” (- J. Toland, MD)

**FOLLOW-UP**
- 34 BM treated with topical AB (4G FQ)
  - Not better @ 2 D
  - Resident stains with RB; dendrite!
  - DX: HSV Keratitis

**MORE ON DIAGNOSTIC ERRORS**
- Misdiagnosis of Acute Conjunctivitis
  - Clinical accuracy of adenoviral conjunctivitis varies: 40 – 75%*
- Clinical vs. Laboratory accuracy
  - Of 143 cases, ONLY 31% of presumed bacterial conjunctivitis were culture positive for pathogenic bacteria (Leibowitz et al. 1976)


**ADDITIONAL INFORMATION ON OPHTHALMIC DIAGNOSTIC ERRORS**
- 67% of adenoviral conjunctivitis examined in a 3-month period presented unilaterally and the MISDIAGNOSIS rate was 42% (Chung 2003)
- This may lead to treatment errors . . .

**BACK TO ACUTE CONJUNCTIVITIS**
- “The risk of developing HSV keratitis makes the wide-spread use of topical combination agents concerning!”

- LL (8 WF; 1/09; T-Dex X 3 days bid by pediatrician)

**MORE ON DIAGNOSTIC ERRORS**
- Traditionally, certain symptoms are presumed to be more likely associated with a viral etiology while others are more likely to be seen with bacterial disease*.

- Like disc hemorrhage in OHT/glaucoma...
MORE ON OPHTHALMIC DIAGNOSTIC ERRORS

(ONH HEMORRHAGE IN OHTS)

“Twenty-one cases (16%) were detected by both clinical examination and review of photographs, and 107 cases (84%) were detected only by review of photographs (P<0.0001).


DISC HEMORRHAGE IN OHTS

& NEW PARADIGMS FOR DETECTION

“Twenty-one cases (16%) were detected by both clinical examination and review of photographs, and 107 cases (84%) were detected only by review of photographs (P<0.0001).

“Review of stereophotographs was more sensitive at detecting optic disc hemorrhage than clinical examination.”


CANNIBAL

One who is fed up with people.

SURGICAL ERRORS

RESOURCE FOR UPCOMING TABLES


Drexel University, Philadelphia, PA
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<td>Written interpretation of intraoperative images by the appropriate specialist should be available at the OR within the time needed to make decisions</td>
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<td>Multiple and auxiliary procedures should be included in the formal time-out process</td>
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A reliable system for assembling transmitting information from the surgeon’s office to the OR nurse should be in place. |
- Review original definitive diagnostic tests and make them available in the OR. |
- Verification should be appropriately phrased questions. Reconciliation should also include schedule, consent, surgeon’s records, and patient’s records. If discrepancies are noted, the nurse should check all original source documents and contact the surgeon. |

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<td>The surgeon’s records relevant to the operation should be available in the operating room for verification against primary sources of information.</td>
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<td>The surgeon should discuss new findings and changes to plans with other members of the operating team.</td>
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<td>The surgeon should participate in written documentation of specimens, including date and site if appropriate.</td>
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<td>Reconciliation of labeling should include both the operating technician and circulating nurse. There should be a chain of custody for replaceable specimens.</td>
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Overall, the researchers reviewed 342 reported events, including 212 adverse events (any surgical procedure performed unnecessarily, such as a procedure performed on the wrong patient or wrong site) and 130 close calls (in which a recognizable step toward an adverse event occurred but the patient was not subjected to the unnecessary procedure).

Of the adverse events, 108 (50.9 percent) occurred in an operating room and 104 (49.1 percent) occurred elsewhere.

When examining adverse events only, ophthalmology and invasive radiology were the specialties associated with the most reports (45 [21.2 %] each), whereas orthopedics was second to ophthalmology for the number of reported adverse events occurring in the operating room.

"Pulmonary medicine cases (such as wrong-side thoracentesis [removing fluid from chest]) and wrong-site cases (such as wrong spinal level) were associated with the most harm.

The most common root cause of events was communication (21.0 %)."

For what advance in glaucoma treatment is Dr. Harbin known?

- Ocusert®
- Harbin drainage valve
- Pioneering work on PGAs
- Development of the device that became the PASCAL tonometer
**SYNOPSIS OF THE FALLOUT**

- **6 settled without details revealed (court ordered)**
- **> $7 Million in damages that were public knowledge.**

**LESSONS LEARNED (?)**

- **Motivation**
  - Patients who question a doctor's advice should be offered a second opinion.
  - Members of an organization should recognize the high cost of remaining silent about wrong-doing

**LESSONS LEARNED (author Harbin)**

- "A significant deficiency in medical training is the lack of any instruction in practical aspects of running a practice or an academic lab. Not surprisingly, young doctors flounder as they evaluate practice opportunities and enter the real world."
- "My hope was to strengthen medicine by having us confront problems."

**MEDICATION ERRORS**

- 500% growth in medications in last decade of the 20th Century

**“PRESCRIPTION ERRORS”**

- Florida – "Lately, there has been a great deal of news coverage about a disturbing problem in our country: an alarmingly high rate of medication errors which have led to serious complications and even death."
- Florida – "Most errors in medicine deal with medication errors. Yet the same safeguards exist with respect to the dispensing of medicine that have been in place for centuries."
- "hundreds if not thousands of times every day."
EXAMPLES OF PRESCRIBING ERRORS

<table>
<thead>
<tr>
<th>Type of error</th>
<th>Example</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge based</td>
<td>Being unaware of the interaction between warfarin and aspirin</td>
<td>Warfarin toxicity</td>
</tr>
<tr>
<td>Rule based</td>
<td>Prescribing and treatment in a patient with chronic kidney disease</td>
<td>Lung injury or failure to treat</td>
</tr>
<tr>
<td>Action based</td>
<td>Taking a patient's dose instead of the ordered dose</td>
<td>Sedation</td>
</tr>
<tr>
<td>Technical</td>
<td>Writing a drug, so that “prosob” (prescription) is dispensed instead</td>
<td>Loss of effect</td>
</tr>
<tr>
<td>Memory based</td>
<td>Forgetting to specify a maximum daily dose for an “as needed” drug</td>
<td>Poisoning or unnecessary treatment</td>
</tr>
</tbody>
</table>

To Err is Human: Building a Safer Health System (IOM)

- 1999 Landmark report
- Report from Institute of Medicine (IOM)
- Brought to center stage risk of medical care in USA

"Simply unacceptable for patients to be harmed by the same system that is supposed to offer healing and comfort."


- Medication errors occur most frequently in prescribing and administering. Including:
  - Omission errors (failure to administer an ordered medication dose)
  - Improper dose/quantity errors (any medication dose, strength, or quantity that differs from that prescribed)
  - Unauthorized drug errors (the medication dispensed and/or administered was not authorized by the prescriber); [includes wrong drug]
**WHAT CONTRIBUTES TO THE ERRORS?**

- According to USP’s frequently asked questions, the primary contributing factors to medication errors were:
  - distractions,
  - workload increases,
  - and staffing issues such as inexperienced or temporary staff and insufficient staffing.

- Many of these factors may have resulted from efforts at cost containment.

**RECALLING IOM STUDY 1999**

In 1999, the Institute of Medicine (IOM) published a landmark report on error in healthcare, concluding that medical care was responsible for 44,000 - 98,000 US deaths annually.

**2016 BMJ STUDY**

- According to a new study, 9.5% of hospitalized patients die annually from medical error, making it the third leading cause of death in the United States.

- The current study looked at other studies since the 1999 IOM report, extrapolating annual inpatient death rates from those reports to the total number of US hospital admissions in 2013. The findings were published in the *British Medical Journal*.

**NOW THE QUESTION BECOMES**

- What steps can be taken to avoid the medication errors?


**INFORMATION TECHNOLOGY**

- Medication administration record (MAR)
- Computerized physician order entry (CPOE)
  - 1.1% in 1999
  - 13% 2002
  - >80% 2010
  - combined with computerized clinical decision support system – 80% reduction in errors
INFORMATION TECHNOLOGY

- PDAs and other electronic resources
- Veterans Affairs
  - Medication errors reduced by 70% with hand-held wireless computer technology and bar-coding
  - Now in all VAs

ACHIEVING BALANCED PRESCRIBING

- The 9 questions to ask yourself
  - Indication, for example
    - Does this patient have glaucoma or OHT and deserves lowered risk for optic nerve and VF damage by decreasing the IOP?

ACHIEVING BALANCED PRESCRIBING (GLAUCOMA MEDICATION SCENARIO)

- Effectiveness, for example
    - Will this medication lower the IOP to my desired target?

ACHIEVING BALANCED PRESCRIBING

- Co-morbidities, for example
    - Does the patient have ocular surface disorders that would result in stinging on instillation that may lead to discontinuance?

ACHIEVING BALANCED PRESCRIBING

- Other similar, for example
  - Is the patient taking an oral beta-blocker that may be lowering IOP?

ACHIEVING BALANCED PRESCRIBING

- Interactions, for example
  - Will that oral beta-blocker produce the IOP-lowering effect that my topical beta-blocker would achieve?
ACHIEVING BALANCED PRESCRIBING
- Dosage, for example
  - If I choose to administer a topical beta-blocker, do I start with 0.25% in the AM and titrate the dose from there based on response?

ACHIEVING BALANCED PRESCRIBING
- Orders, for example
  - When writing the Rx, are the dose, frequency, route of instillation, formulation, timing, prescribed amount and refills specified?

ACHIEVING BALANCED PRESCRIBING
- Period (duration), for example
  - For how long is the patient to continue the drop?

  (in the case of glaucoma, forever. OOPS! Did I tell the patient this?)

ACHIEVING BALANCED PRESCRIBING
- Economics
  - Well, is the drug cost-effective?

DONALD BERWICK, MD, PRESIDENT AND CEO OF THE INSTITUTE FOR HEALTHCARE IMPROVEMENT, (IHI) POINTS OUT:
- Errors are not a "bad apple" problem where a handful of doctors or other medical personnel are the culprits and need to be rooted out or disciplined.
- Rather it is a systemic problem, where healthcare systems actually produce conditions that lead people to make mistakes or fail to prevent them.
- This means that we need rigorous changes throughout the entire healthcare system that will make it harder for people to do something wrong and easier for them to do things right. (IOM, 2005)

TO THAT END, AVOID THESE
- "The patient (or Mom) says that’s how they take it at home"
- "The dose is from the patient’s old chart"
- "It’s on the list of meds the patient gave me"
- "We always do it that way"
- "This is a special case"
- Verify if it doesn’t seem right
PREVENTING PRESCRIPTION ERRORS

- When names are problematic – use both brand and generic name
- Include product’s indication (label ✓)
- Caution patients about error potential when prescribing drugs that have a look-alike or sound-alike counterpart

EARLY APPROACHES TO MEDICAL AND RX ERRORS BEGAN IN PEDIATRICS

- Of 616 medication errors
  - 77.8% occurred at ordering stage
  - Administration 12.8%
  - Transcribing 5.8% (using a CPOE system)

LATENT ERROR: ILLEGIBLE MEDICAL RECORD ENTRIES

- Inaccuracies: A Real Land Mine for Medicare Claims
  - Ophthalmology Times 1999
  - 58% of medical records in any ophthalmic practice have inaccuracies - #1 reason was illegibility

Florida took a simple but important step to improve patient safety on July 1, 2003, when s. 456.42, F.S. went into effect, making handwritten prescriptions illegal.

This law requires physicians in Florida to either print legibly or type prescriptions and to include the name and strength of the drug prescribed, the quantity of the drug prescribed in both textual and numerical formats, and the directions for taking the drug.
MINIMIZING / PREVENTING MEDICATION ERRORS – OTHER STEPS

- The six "rights" followed by nurses when administering drugs:
  - **Right** patient
  - **Right** drug
  - **Right** dose
  - **Right** dosage form
  - **Right** route
  - **Right** time


MEDICATION ERROR PREVENTION RECOMMENDATIONS

1. Provision of sufficient undergraduate learning opportunities to make medical students safe prescribers. TRAINING

2. Provision of opportunities for students to practice skills that help to reduce errors. REINFORCEMENT

3. Education of students about common types of medication errors and how to avoid them. EDUCATION

4. Education of prescribers in taking accurate drug histories. HISTORY

5. Assessment in medical schools of prescribing knowledge and skills and demonstration that newly qualified doctors are safe prescribers. EVALUATION

6. European harmonization of prescribing and safety recommendations and regulatory measures, with regular feedback about rational drug use. FEEDBACK

7. Comprehensive assessment of elderly patients for declining function. EXAMINATION

8. Exploration of low-dose regimens for elderly patients and preparation of special formulations as required. DOSAGE

9. Training for all health-care professionals in drug use, adverse effects, and medication errors in elderly people. ADVERSE EVENT AWARENESS

10. More involvement of pharmacists in clinical practice. CHECK AND BALANCE

11. Introduction of integrated prescription forms and national implementation in individual countries. UNIFORMITY

12. Development of better monitoring systems for detecting medication errors, based on classification and analysis of spontaneous reports of previous reactions, and for investigating the possible role of medication errors when patients die. MONITORING AND FEEDBACK
**Medication Error Prevention Recommendations**

- 13. Use of IT systems, when available, to provide methods of avoiding medication errors; standardization, proper evaluation, and certification of clinical information systems. STANDARDIZATION

- 14. Nonjudgmental communication with patients about their concerns and elicitation of symptoms that they perceive to be adverse drug reactions. COMMUNICATION

- 15. Avoidance of defensive reactions if patients mention symptoms resulting from medication errors. ANALYSIS AND FEEDBACK

**Examples of Error-Prone Drug Information**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Intended Meaning</th>
<th>Misinterpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCT</td>
<td>Hydrocortisone</td>
<td>Hydrochlorothiazide</td>
</tr>
<tr>
<td>mg</td>
<td>Milligram</td>
<td>Milligram</td>
</tr>
<tr>
<td>q.d. or QD</td>
<td>Once daily</td>
<td>Right eye</td>
</tr>
<tr>
<td>TIW or t.i.w.</td>
<td>Three times a week</td>
<td>Three times a day</td>
</tr>
<tr>
<td>q.d. or QD</td>
<td>Every day</td>
<td>Q.i.d.</td>
</tr>
<tr>
<td>qn</td>
<td>Nightly or at bedtime</td>
<td>Qh</td>
</tr>
<tr>
<td>q6PM</td>
<td>Every evening at 6pm</td>
<td>Every 6 hours</td>
</tr>
</tbody>
</table>

**Add the “At” Sign to Dangerous Abbreviations**

- NaHCO3 to run @50 cc/h was misread as 250 mL per hour

**Conventional (Cultural and Confusing) Abbreviations**

- Concentrated liquid medication was prescribed for sublingual administration
- Order was transcribed with the abbreviation “SL”
- A new nurse misinterpreted SL as “saline lock” and administered the oral solution IV!

“Doc, these contacts don’t seem to be any cleaner after using that tablet.”

**Use Caution, Avoid Confusion (“Measure Twice, Cut Once”)**

- May sound alike
- May look alike in print
- May sound alike when orally communicated
- >750 unique drug names reported to cause confusion
  - www.usp.org/reporting/review/rev_76a.htm
Attempts to Cure the Latter (FDA Initiative)

- Xalatan
- Vigomox
- Zymar
- Zymaxid
- Moxeza
- Zylet
- Zirgan
- Durezol
- Zioptan (NOT: Zopitan Sleeping Tablets)

- Xarelto
- Januvia
- Kazano
- Farxiga
- Tanzeum
- Afrezza

And, who has not heard of…

- Xiidra?

What do you call a boomerang that doesn’t come back?

A stick

At last, the end

- Thank you for your attention

- Questions / Comments?