




**One minute to prescribe...
one million minutes to stop**

Geriatric Refresher Day
March 6, 2013

©Allen R. Huang, MDCM, FRCPC, FACP
Division of Geriatric Medicine
allenhuang@toh.on.ca



Regional Geriatric Program of Eastern Ontario
Programme gériatrique régional de l'Est de l'Ontario

I have no conflict of interest to declare

Some of my material is borrowed from my colleague
Louise Mallet PharmD

Learning objectives

- ▶ Review the concepts for appropriate prescribing in older adults
- ▶ Review the lists of potentially inappropriate medications in older adults
- ▶ Propose a framework for the critical evaluation of the medication profile of an older adult
- ▶ Develop strategies for stopping medications



***All prescriptions must
come to an end.***

1,000,000 min = 16,667 hours = 694.4 days = 1.9 years

Clinical Case

An 85-year-old woman presents to the Emergency Department with nausea, vomiting, confusion and general deterioration. Her husband reports that she had been getting progressively worse over the past week. The patient is known to have significant cognitive impairment and her husband assists her with many of her activities of daily living. When she is at her best she is able to walk around their apartment while supervised.

Her known medical conditions include:
 Type 2 diabetes mellitus, hypothyroidism,
 hypertension, congestive heart failure, atrial
 fibrillation, stroke, and a moderate vascular
 dementia (MMSE 18/30).

Weight 49.5kg, BP 90/65mmHg, Pulse 40 irreg, irreg
 Allergy: sulfa drugs

Abnormal labs:
 INR 8.3 (therapeutic range 2.0-2.5)
 serum digoxin level 3.24 nmol/L (toxic > 1.0)
 TSH 0.24 IU
 Calculated creatinine clearance = 21ml/min

Medication list:

warfarin 2.5mg PO daily
 digoxin 0.25mg PO daily
 hydrochlorothiazide 50mg PO daily
 levothyroxine 0.075mg PO daily
 glyburide 10mg PO bid
 metformin 500mg PO tid
 sotalol 80mg PO bid
 alendronate 70mg PO qSunday
 calcium carbonate 500mg PO bid
 pantoprazole 40mg PO daily
 gabapentin 600mg PO tid
 multivitamin i PO daily
 dimenhydrinate 50mg PRN
 lorazepam 1mg PO qHS

Health care goals for older adults

- Maintenance of functional independence
- Preserve cognitive functioning
- Prevent geriatric syndromes
 - Falls
 - Delirium
 - Immobility
 - Incontinence
 - Anorexia and weight loss
 - Fatigue or weakness

Hilmer SN et al. CPT 2009;85:86-8

Sometimes meds do not help

Geriatric syndromes	Drugs
Falls	antipsychotics, antidepressants, benzodiazepines
Delirium	Drugs with anticholinergic properties
Anorexia	Digoxin, metronidazole, angiotensin converting enzyme inhibitors (ACEI), lithium
Urinary incontinence	Diuretics, sedative-hypnotics, cholinesterase inhibitors, ACEI
Dizziness	MANY drugs
Immobility	Side effects of antipsychotics
Orthostatic hypotension	Cardiovascular agents, antipsychotics, benzodiazepines

Emergency Hospitalizations for Adverse Drug Events in Older Americans

Daniel S. Budnitz, M.D., M.P.H., Maribeth C. Lovegrove, M.P.H., Nadine Shehab, Pharm.D., M.P.H., and Chesley L. Richards, M.D., M.P.H.
 N Engl J Med 2011; 365:2002-2012 | November 24, 2011

BACKGROUND

Adverse drug events are important preventable causes of hospitalization in older adults. However, nationally representative data on adverse drug events that result in hospitalization in this population have been limited.

METHODS

We used adverse-event data from the National Electronic Injury Surveillance System-Cooperative Adverse Drug Event Surveillance project (2007 through 2009) to estimate the frequency and rates of hospitalization after emergency department visits for adverse drug events in older adults and to assess the contribution of specific medications, including those identified as high inappropriate by national quality measures.

MEDIA IN THIS ARTICLE

FIGURE 1



Estimated Rates of Emergency Hospitalization for Adverse Drug Events in Older U.S. Adults, 2007-2009.

TABLE 1

Warfarin (33.3%), insulins (13.9%), oral antiplatelet agents (13.3%), and oral hypoglycemic agents (10.7%)

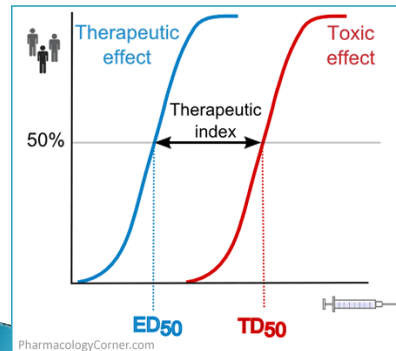
Medication Problems

- ▶ Medication factors
- ▶ Patient factors
- ▶ Process & system factors
- ▶ Prescriber factors

Medication factors

- ▶ Pharmacokinetics
 - what the **body** does to the **drug** (*half life*)
 - Changes significantly with aging
- ▶ Pharmacodynamics
 - what the **drug** does to the **body**
 - **Beneficial & side effects**
 - Minimal to modest changes with aging
- ▶ Narrow therapeutic index drugs
- ▶ Interactions
 - drug–drug, allergy, disease, nutritional status, food, alcohol, herbal products
- ▶ more than 300 “little white pills”

Narrow therapeutic index drugs



Aminophylline	Phenytoin*
Amphotericin B	Prazosin*
Carbamazepine*	Primidone
Cyclosporin*	Procainamide
Clonidine*	Quinidine
Digoxin*	Sirolimus/tacrolimus*
Disopyramide	Theophylline*
5-Fluorouracil	Valproic Acid*
Gentamycin*	Divalproex*
Lithium*	Warfarin*

Patient adherence factors

- ▶ Lack of patient understanding
 - New meds added, complex or frequently changing regimens, comprehension, cognitive problems
 - **Discharge home from hospital is a high risk period**
- ▶ Unable to take
 - Route of administration
- ▶ Conscious nonadherence
 - Side effects
 - Financial

Drug costs & adherence

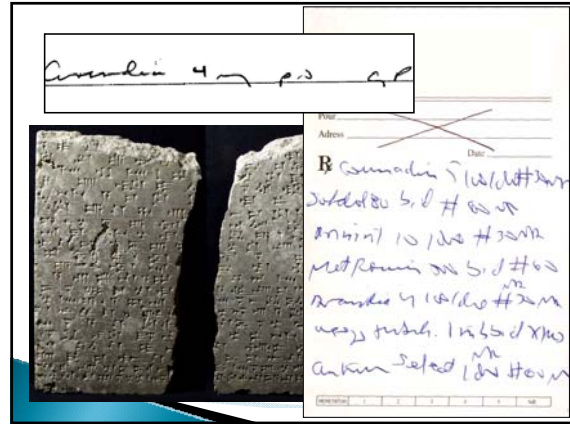


Non-prescription compounds

- ▶ Ethanol
- ▶ nicotine
- ▶ Ginkgo biloba
- ▶ St John's wort

My Doctor said "Only 1 glass of alcohol a day". I can live with that.





Medication Cascades

Start Drug 1
 → Side effect is interpreted as a new condition
 → Addition of Drug 2
 → Side effect is interpreted as a new condition
 → Addition of Drug 3 ...

Rochon, BMJ 1997

Examples of cascades

- Ibuprofen → incr BP → antihypertensive meds
- Metoclopramide → parkinsonism → L-DOPA
- Gabapentin → edema → furosemide
- Ciprofloxacin → delirium → risperidone
- Lithium → tremor → propranolol
- Bupropion → insomnia → mirtazapine
- Donepezil → urinary incontinence → oxybutynin

Anticholinergic Load

- The *cumulative* effect of taking *multiple* medications with anticholinergic properties
- e.g.: amitriptyline, diphenhydramine, hydroxyzine
- Association with anticholinergic load and:
 - Severity of delirium symptoms
Han L. Arch Intern Med 2001;161:1099-1105
 - Cognitive decline and dementia
Carrère I. Arch Intern Med 2009;169:1317-24
 - Decline in physical function
Landi F. Clin Pharm Ther 2007;81:235-41
 - Sitter use for agitation
Rochefort CM. Nurs Res 2011; 60: 221-30

Inappropriate medications

Updating the Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

- Flurazepam and Diazepam → prolonged sedation and higher rates of falls and fractures
- Amitriptyline → risk of falls, anticholinergic load.
- Meperidine → risk of confusion & seizures; normeperidine- inactive metabolite which is excreted renally.
- Fluoxetine → long half-life of 1-3 days and active metabolite norfluoxetine with half-life of 9 days.

STOPP

- Screening Tool of older People's potentially inappropriate Prescriptions (STOPP) 65 criteria, 33 not found in Beers' criteria
- The criteria are arranged according to relevant physiological systems

Gallagher et al. Int J Clin Pharmacol Ther 2008;46:72-83

STOPP

Examples:

Proton-pump inhibitor for peptic ulcer disease at full therapeutic dosage for more than 8 weeks

NSAID with chronic renal failure* (*risk of deterioration in renal function*).

* estimated GFR 20-50ml/min

START

- Screening Tool to Alert doctors to the Right Treatment (START) 22 criteria
- One of the few tools that address the issue of potential *under* prescribing in elderly patients
- Medications that should be considered for people older than 65-years of age with the following conditions, where no contraindication to prescribing exists.

START

Examples:

1. Warfarin in the presence of chronic atrial fibrillation.
2. Antihypertensive therapy where systolic BP consistently >160 mmHg and treatment is not contraindicated

Gallagher et al. Int J Clin Pharmacol Ther 2008;46:72-83

Strategies to safer prescribing

1. Avoid prescribing drugs from the Beers' list
2. Consider safer meds
3. Eliminate therapeutic duplications where possible
4. Does every med have an appropriate indication?
5. Use a minimal effective dose, adjusted to the patient's creatinine clearance and weight
6. Could a medication be responsible for the problem? Recent additions or deletions? Temporal relationship between ADR and medication use; prescription cascade, anticholinergic load

Adapted from George CJ et al. J Am Geriatr Soc 2011;59:138-42

Medication withdrawal considerations

1. Remaining life expectancy estimate
2. Goals of treatment: symptom control *versus* long-term prevention (time-to-benefit)
3. Difficulties with administration
4. Be careful of abrupt cessation of certain drugs
5. Reduce or stop one medication at the time
6. Verify for benefit or harm after each medication has been discontinued

Adapted from O'Mahony D et al. Age and Ageing 2011;40:419-22

How to discontinue

1. Taper down at the same rate as initiation of treatment
2. Medications that require tapering: opioids, β -blockers, clonidine, gabapentin, pregabalin, SSRI, SNRI, TCA, antipsychotics, long-half-life benzodiazepines
3. Monitoring and follow-up plan: project when to expect withdrawal symptoms
4. Be aware of drug interactions that can be affected by discontinuation (e.g. phenytoin & phenobarbital)
5. Engage your pharmacist !

Steinman MA. JAMA 2010;304:1592-1601

Clinical Case redux

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Case analysis & results

Remaining life expectancy = 2 years

Time to benefit
BP, Diabetes → 2-10y
warfarin → 1y
Calcium+Vit D → 10mo(hip)
alendronate → 1-3y

Goals of care
Reduce medication side-effects
Maximize quality of life, symptom control
Return patient home if possible

Treatment targets
Continue: warfarin (with monitoring), levothyroxine
D/C digoxin, pantoprazole, gabapentin, dimenhydrinate, alendronate, MVI
Decrease sotalol 40mg bid, Calcium once daily, Vit D 10,000 units weekly
Lorazepam 0.5mg qHS + further taper if possible
Substitute gliclazide 80mg bid for glyburide + metformin
Substitute furosemide 20mg for hydrochlorothiazide
Optional: quetiapine 12.5mg qHS PRN

For safer prescribing press here



Thank you

allenhuang@toh.on.ca



"I feel a lot better since I ran out of those pills you gave me."