

**Better Prescribing (or at least Less Bad) for Older Adults**

Carolyn K Clevenger, DNP, AGPCNP-BC, GNP-BC, FAANP  
PREPARED FOR  
National Association of Clinical Nurse Specialists  
Pre-Conference 2017

---

---

---

---

---

---

---

---

**Learning Objectives**

1. Describe age-related changes that affect pharmacokinetic properties of medications.
2. Identify best current and updated resources for potentially inappropriate medications
3. Discuss the use of a systematic improvement framework to reduce potentially inappropriate medications for older adults

---

---

---

---

---

---

---

---

**THE SPECIALTY OF GERIATRICS**

---

---

---

---

---

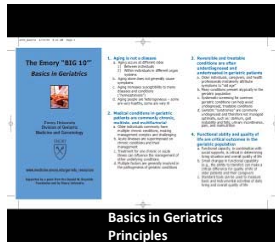
---

---

---

## Quick Study: Geriatrics

- Complexity (#2)
  - Older individuals commonly suffer multiple chronic conditions, making management complex and challenging
- Iatrogenesis (#9)
  - Polypharmacy, adverse drug reactions, drug-disease interactions, drug-drug interactions, inappropriate medications all common




---

---

---

---

---

---

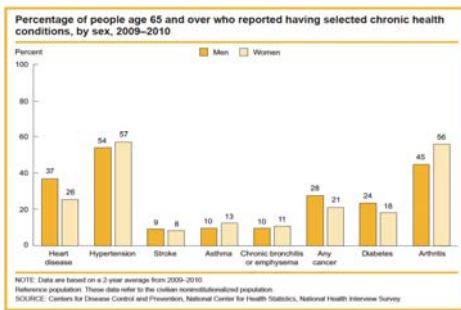
---

---

---

---

## Chronic Conditions are Common




---

---

---

---

---

---

---

---

---

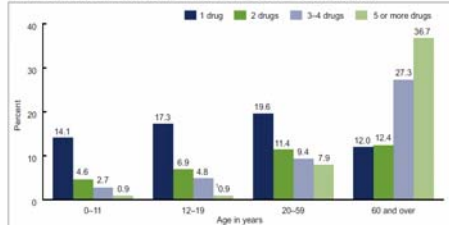
---

## Common Prescriptions are Common

What percentage of Americans used multiple prescription drugs in the past month and how did this vary by age?

The use of multiple prescription drugs in the past month varied by age (Figure 2).

Figure 2. Percentage of prescription drugs used in the past month, by age. United States, 2007-2008



\*Estimate is unstable, the relative standard error is greater than 30%.  
SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey.

---

---

---

---

---

---

---

---

---

---

Aldactone	Spirolactone	Aldosterone Antagonist/ Blood Pressure
Amaryl	Glimepiride	Antidiabetic Agent
Ambien	Zolpidem	Anxiolytics, sedatives, hypnotics
Antivert	Mecizine	Anti-dizziness
Apresoline	Hydralazine	Vasodilator/ Blood Pressure
Aricept	Donepezil	Anti-Alzheimer's
Axarax	Hydroxyzine	Anti-Anxiety, Antihistamine
Alivan	Lorazepam	Anxiolytics, sedatives, hypnotics
Atrovent	Ipratropium	Respiratory Agent
Avandia	Rosiglitazone	Antidiabetic Agent
Cardiem		Calcium Channel Blocker/ Blood Pressure
Cartia, Dilacor	Diltiazem	

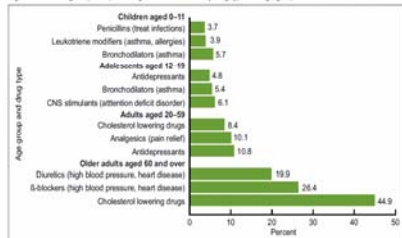
Source: www.homemed.org

#### NCHS Data Brief # No. 42 # September 2010

#### What were the most frequently used types of prescription drugs?

The types of prescription drugs used by Americans varied by age (Figure 5).

Figure 5. Percentage of prescription drugs used most often, by drug type and age group: United States, 2007–2008



NOTES: Primary indication for the use of the drug class is in parentheses. CNS is central nervous system.

SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey.

### Common Presentations and Responses are NOT Common

- Many conditions present **atypically** in older adults
- Potential for paradoxical response to medication
- Age-related changes
- Pathophysiologic-related changes

**PHARMACOKINETICS:  
AGE-RELATED CHANGES**

---

---

---

---

---

---

---

---

**Changes in Absorption**

- Age Effects
  - Unaffected
- Disease, Factor Effect
  - Achlorhydria, concurrent medications, tube feedings
- Prescribing Implications
  - Drug-drug and drug-food interactions are more likely to alter absorption

---

---

---

---

---

---

---

---

**Changes in Distribution**

- Age Effects
  - Increase in fat : water ratio; decreased plasma protein, particularly albumin
- Disease, Factor Effect
  - Conditions that increase body water
- Prescribing Implications
  - Protein-bound drugs have higher concentration (nothing to bind to)

---

---

---

---

---

---

---

---

### Changes in Metabolism

- Age Effects
  - Decreased liver mass and blood flow; decreased drug clearance
- Disease, Factor Effect
  - Lifestyle factors more effect than aging
  - Smoking, other meds, alcohol, caffeine
- Prescribing Implications
  - Lower dosages

---

---

---

---

---

---

---

---

### Changes in Elimination

- Age Effects
  - Decrease in glomerular filtration rate
- Disease, Factor Effect
  - Renal effects from acute and chronic illnesses; decreased muscle mass -> less creatinine production
- Prescribing Implications
  - Serum creatinine unreliable; use formula to estimate

---

---

---

---

---

---

---

---

### Changes in Pharmacodynamics

- Age Effects
  - Less predictable
- Disease, Factor Effect
  - Drug-drug and drug-disease interactions
- Prescribing Implications
  - Prolonged opiate effects; more sedation and postural instability from benzos; high sensitivity to beta blockers

---

---

---

---

---

---

---

---

**OVERVIEW OF BEERS**

---

---

---

---

---

---

---

---

**Potentially Inappropriate?**

- Mark Beer, MD (Geriatrics)
- Beers Criteria for Potentially Inappropriate Medication Use in Older Adults (1991)
  - Nursing home residents
  - Medications whose risk outweighed benefit in specific population/setting

---

---

---

---

---

---

---

---

**Beers Criteria**

- Updated in 1997 and 2003 by Beers et al
  - Expanded to all older adults (65+)
  - Regardless of care setting
- Basis for quality measures
  - National Committee on Quality Assurance
  - Pharmacy Quality Alliance
  - Centers for Medicare and Medicaid Services
    - Part D evaluation of nursing home

---

---

---

---

---

---

---

---

**2012 Beers Criteria**

- Updated by American Geriatrics Society
- Removed medications no longer available
- New medications added
- Evidence sources listed and rated for quality
- Strength of recommendation
- Updates gathered now for 2015

---

---

---

---

---


---

---

---

**2015 Beers Criteria**

- Updates gathered now
- Nurses SIG writing the nonpharmacologic options for a
  - Don't Use This...Try This section



---

---

---

---

---

---

---

---

**Caveats**

- Beers Criteria are NOT
  - Substitution for clinical judgment
  - Designed to meet needs of palliative and hospice care patients
  - Intended to set formulary decisions
  - Intended to punish a prescriber

---

---

---

---

---

---

---

---

**DRUGS TO AVOID**

---

---

---

---

---

---

---

---

**Drugs to Avoid: Anticholinergics**

- First-generation antihistamines (Hydroxyzine, Promethazine, Diphenhydramine\*)
- Antiparkinson (Bentropine, Trihexyphenidyl)
- Antispasmodics (Hyoscyamine, Scopolamine\*\*)

• Risk of confusion, dry mouth, constipation, anticholinergic toxicity

• More effective agents available

\*Except severe allergic reaction; \*\*Except in palliative

---

---

---

---

---

---

---

---

**Drugs to Avoid: Cardiovascular**

- Alpha blockers (Doxazosin, Terazosin)
  - Avoid use as an antihypertensive
  - Too much orthostatic hypotension; there are better alternatives
- Alpha agonists (Clonidine, Methyldopa, Reserpine (>0.1 mg/day))
  - Avoid Clonidine as first-line, avoid others period (.)
  - May cause bradycardia, orthostatic hypotension

---

---

---

---

---

---

---

---



### Drugs to Avoid: Cardiovascular

- Antiarrhythmics (Class Ia, Ic, III) as first-line treatment of atrial fibrillation
  - Amiodarone, Procainamide, Quinidine, Sotalol
  - Rate control shown to be more beneficial than rhythm control for most older adults
- Digoxin >0.125 mg/day
  - No added benefit in HF, risk of toxicity

---

---

---

---

---

---

---

---

### Drugs to Avoid: Central Neurologics

- Tertiary TCAs, alone or in combination
  - Amitriptyline, Imipramine
  - Highly anticholinergic, sedating, orthostatic hypotension
- Antipsychotics, first- and second-generation
  - Avoid for BPSD unless non-pharmacologic options have failed and *patient is threat to self or others*

---

---

---

---

---

---

---

---

### Drugs to Avoid: Benzodiazepines

- Short-acting
  - Lorazepam, Oxazepam
- Long-acting
  - Clonazepam, Diazepam
- Increased sensitivity in older adults, decreased metabolism of long-acting
- May be appropriate for seizure disorders, REM sleep disorders, withdrawal, severe generalized anxiety disorder, end-of-life care

---

---

---

---

---

---

---

---

**Drugs to Avoid: Nonbenzodiazepine**

- Eszopiclone, Zolpidem, Zaleplon
- Avoid chronic use (>90 days)
- Similar adverse effects to benzos (delirium falls, fractures)
- Minimal improvement in sleep latency and duration

---

---

---

---

---

---

---

---

**Drugs to Avoid: Endocrine**

- Insulin, sliding scale
  - Higher risk of hypoglycemia; no improvement in hyperglycemia management
- Sulfonylureas, long duration (Glyburide)
  - Higher risk of prolonged hypoglycemia

---

---

---

---

---

---

---

---

**Drugs to Avoid: Gastrointestinal**

- Metoclopramide
  - Unless for gastroparesis
  - Can cause extrapyramidal effects (tardive dyskinesia)
  - Further risk in frail older adults

---

---

---

---

---

---

---

---

### Drugs to Avoid: Pain

- Non-COX-Selective NSAIDs
  - Aspirin >325 mg/day, Diclofenac, Ibuprofen, Naproxen, Sulindac
  - Increased risk of GI bleed/peptic ulcer in >75 years; use of PPI does not eliminate risk
  - Increased rates of ulcers, bleeding or perforation goes up with longer duration (1% treated 3-6 months; 2-4% treated for 1 year and so on)

---

---

---

---

---

---

---

---

### Drugs to Avoid: Muscle Relaxants

- Cyclobenzaprine, Metaxalone
- Poorly tolerated because of anticholinergic effects, sedation, increased risk of fractures
- Effectiveness questionable

---

---

---

---

---

---

---

---

### DRUG-DISEASE INTERACTIONS

---

---

---

---

---

---

---

---

**Drug-Disease Interactions**

<p><b><u>HEART FAILURE</u></b></p> <ul style="list-style-type: none"><li>• NSAIDs and COX-2 Inhibitors</li><li>• Nondihydropyridine calcium channel blockers (Diltiazem, Verapamil)</li><li>• Rosiglitazone</li></ul>	<p><b>Rationale</b></p> <ul style="list-style-type: none"><li>• Potential to promote fluid retention and/or exacerbate HR</li></ul>
---	---

---

---

---

---

---

---

---

---

**Drug-Disease Interactions**

<p><b><u>SYNCOPE</u></b></p> <ul style="list-style-type: none"><li>• Acetylcholinesterase inhibitors</li><li>• Alpha blockers</li></ul>	<p><b>Rationale</b></p> <ul style="list-style-type: none"><li>• Increases risk of orthostatic hypotension or bradycardia</li></ul>
---	--

---

---

---

---

---

---

---

---

**Drug-Disease Interactions**

<p><b><u>DELIRIUM</u></b></p> <ul style="list-style-type: none"><li>• All TCAs</li><li>• Anticholinergics</li><li>• Benzodiazepines</li><li>• Chlorpromazine</li><li>• H<sub>2</sub>-receptor antagonist</li><li>• Meperidine</li><li>• Sedative hypnotics</li><li>• Thioridazine</li></ul>	<p><b>Rationale</b></p> <ul style="list-style-type: none"><li>• Induced or worsened delirium</li><li>• Taper any discontinuations to avoid withdrawal symptoms</li></ul>
---	--

---

---

---

---

---

---

---

---

### Drug-Disease Interactions

<b><u>HISTORY OF FALLS OR FRACTURE</u></b>	<b>Rationale</b>
<ul style="list-style-type: none"><li>• Anticonvulsants</li><li>• Antipsychotics</li><li>• Benzodiazepines</li><li>• Nonbenzodiazepine hypnotics</li><li>• TCAs/SSRIs</li></ul>	<ul style="list-style-type: none"><li>• Avoid unless safer alternatives are not available</li><li>• Produces ataxia, impaired psychomotor function, syncope, additional falls</li><li>• Shorter-acting benzos no safer than long-acting</li></ul>

---

---

---

---

---

---

---

---

### Drug-Disease Interactions

<b><u>INSOMNIA</u></b>	<b>Rationale</b>
<ul style="list-style-type: none"><li>• Oral decongestants</li><li>• Theophylline</li><li>• Caffeine</li></ul>	<ul style="list-style-type: none"><li>• CNS stimulant effects</li></ul>

---

---

---

---

---

---

---

---

### Drug-Disease Interactions

<b><u>INCONTINENCE</u></b>	<b>Rationale</b>
<ul style="list-style-type: none"><li>• All types<ul style="list-style-type: none"><li>– Estrogen</li></ul></li><li>• Stress or mixed type<ul style="list-style-type: none"><li>– Alpha blockers</li></ul></li><li>• From Benign Prostatic Hypertrophy<ul style="list-style-type: none"><li>– Inhaled anticholinergic agents</li></ul></li></ul>	<ul style="list-style-type: none"><li>• First 2 in WOMEN<ul style="list-style-type: none"><li>– Aggravate incontinence</li></ul></li><li>• Last in MEN<ul style="list-style-type: none"><li>– Decreases urinary flow and cause retention</li></ul></li></ul>

---

---

---

---

---

---

---

---

### Use with Caution

- Aspirin (primary preventive) in >80 years old
- Dabigatran in >75 years
- Prasugrel in >75 years old
- Vasodilators
  - May exacerbate syncope in those with history of syncope

---

---

---

---

---

---

---

---

### Use with Caution: Hyponatremia Risk

- Antipsychotics
- Carbamazepine
- Carboplatin
- Cisplatin
- Mirtazapine
- SNRIs
- SSRIs
- TCAs
- Vincristine

---

---

---

---

---

---

---

---

### OVERVIEW OF START/STOPP

---

---

---

---

---

---

---

---

## STOPP/START Criteria

- Screening Tool of Older Persons' Potentially Inappropriate Prescriptions (STOPP)
- Screening Tool to Alert Doctors to the Right Treatment (START)

---

---

---

---

---

---

---

---

---

---

## STOPP

- Very similar to Beers actually; few additions
  - Proton pump inhibitors
  - Warfarin
  - Anti-muscarinics

---

---

---

---

---

---

---

---

---

---

Table 1  
Screening tool of older people's potentially inappropriate prescriptions (STOPP/START)  
The following prescriptions are potentially inappropriate to persons aged ≥65 years of age

Category	Drug Class	Notes
Cardiovascular agents	Diuretic or long-term beta-blocker	Diuretic with impaired renal function (creatinine $\geq 1.5$ mg/dL) Loop diuretic for ascites with volume only or no clinical signs of heart failure (no evidence of edema; symptoms better easily seen appropriate) Loop diuretic or thiazide diuretic for hypertension only (non-drug measures available) Thiazide diuretic with a history of gout (may worsen gout)
Non-anticholinergic antipsychotics	Atypical antipsychotic (AP) (not of first-generation)	Risperidone in combination with venlafaxine (not recommended for heart failure) Use of APs and anticholinergics to manage behavioral problems (not recommended) except (limited use of haloperidol or risperidone) in patients with dementia
Anticholinergics	Anticholinergic (AChE)	Use of AChEs with antipsychotics to manage behavioral problems (not recommended) Use of AChEs with antipsychotics to manage behavioral problems (not recommended) except (limited use of haloperidol or risperidone) in patients with dementia
Antidepressants	TCAs (with dementia, risk of worsening cognitive impairment)	TCAs with dementia (risk of worsening cognitive impairment)
Antiepileptics	TCAs with cardiac conduction abnormalities (proarrhythmic effect)	TCAs with cardiac conduction abnormalities (proarrhythmic effect)
Anticoagulants	Warfarin	Warfarin with a prothrombin time (PT) or international normalized ratio (INR) $\geq 4.5$ (or $\geq 3.5$ if on warfarin)
Antidiabetics	Insulin	Insulin with a history of hypoglycemia (not recommended)
Antihypertensives	Diuretic, beta-blocker, calcium channel blocker, ACE inhibitor, angiotensin II receptor antagonist, vasopressin receptor antagonist	Diuretic with a prothrombin time (PT) or international normalized ratio (INR) $\geq 4.5$ (or $\geq 3.5$ if on warfarin) Beta-blocker with a history of hypoglycemia (not recommended) Calcium channel blocker (CCB) with a history of hypotension (not recommended) ACE inhibitor with a history of hypotension (not recommended) Angiotensin II receptor antagonist with a history of hypotension (not recommended)
Antipsychotics	Atypical antipsychotic (AP) (not of first-generation)	Atypical antipsychotic (AP) with a history of hypotension (not recommended)
Antipsychotics	Haloperidol	Haloperidol with a history of hypotension (not recommended)
Antipsychotics	Risperidone	Risperidone with a history of hypotension (not recommended)
Antipsychotics	Ziprasidone	Ziprasidone with a history of hypotension (not recommended)
Antipsychotics	Amisulpride	Amisulpride with a history of hypotension (not recommended)
Antipsychotics	Molindone	Molindone with a history of hypotension (not recommended)
Antipsychotics	Sufentanil	Sufentanil with a history of hypotension (not recommended)
Antipsychotics	Propofol	Propofol with a history of hypotension (not recommended)
Antipsychotics	Etomidate	Etomidate with a history of hypotension (not recommended)
Antipsychotics	Propofol	Propofol with a history of hypotension (not recommended)
Antipsychotics	Etomidate	Etomidate with a history of hypotension (not recommended)
Antipsychotics	Propofol	Propofol with a history of hypotension (not recommended)
Antipsychotics	Etomidate	Etomidate with a history of hypotension (not recommended)

---

---

---

---

---

---

---

---

---

---

### START

- What we should be prescribing, according to guidelines
- Caveats available as appropriate

---

---

---

---

---

---

---

---

---

---

### START

**Table 4**  
 Warning list to alert doctors to high (i.e. appropriate) indications (START) (2)

These medications should be considered for people < 65 years of age with the following conditions, when no better indication to prescribe exists

**Cardiovascular system**

- Warfarin in the presence of chronic renal dysfunction
- Aspirin in the presence of chronic renal dysfunction, when warfarin is contraindicated, for non anginal
- Aspirin or thienopyridin with a documented history of gastrointestinal bleeding, cerebral or peripheral vascular disease in patients with slow rhythm
- Antiplatelet therapy when specific blood protein coagulopathy is not needed
- Statin therapy with a documented history of coronary cerebral or peripheral vascular disease, when the patient's functional status remains independent for activities of daily living and life expectancy is > 5 years
- Aspirin/acetaminophen (ASA) tablets with chronic heart failure
- ASA tablets following acute myocardial infarction
- Statins with chronic renal insufficiency

**Respiratory system**

- Aspirin-related beta-2 agonist or anticholinergic agents for mild to moderate asthma or COPD
- Regular inhaled corticosteroid for asthma or severe asthma or COPD when prednisolone (10-15 mg)
- Home continuous oxygen with documented disease type 1 respiratory failure (pO<sub>2</sub> < 80 kPa, pO<sub>2</sub> < 83 kPa) or type 2 respiratory failure (pO<sub>2</sub> < 80 kPa, pO<sub>2</sub> < 83 kPa)

**Central nervous system**

- ASA in idiopathic Parkinson's disease with definite functional impairment and moderate disability
- Anti-depressant drug in the presence of moderate severe depressive symptoms lasting at least 3 months

**Genito-urinary system**

- Phosphodiesterase inhibitor with severe gastro-intestinal and renal disease or prostatic obstruction requiring dilatation
- Fluor supplements for chronic, symptomatic osteoporosis disease with osteoporosis

**Neurological system**

- Disease-modifying anticholinergic drug (DMAD) with acute moderate severe rheumatoid disease lasting > 12 weeks
- High-dose vitamin B<sub>12</sub> supplements in patients taking metformin and oral contraceptives
- Calcium and vitamin D supplements in patients with known osteoporosis (radiological evidence or previous fragility fracture or unexplained bone loss)

**Endocrine system**

- Metformin with type 2 diabetes mellitus, syndrome (in the absence of renal impairment)
- ASA inhibitor or angiotensin receptor blocker in diabetes with nephropathy (to avoid xanthine potassium or mineralocorticoids) (> 30mg/24 hour) or severe functional renal impairment
- Antidiabetic therapy in diabetes mellitus if one or more or existing major cardiovascular risk factor present (hypertension, hypercholesterolemia, smoking history)
- Diuretic therapy in diabetes mellitus if one or more or existing major cardiovascular risk factor present

---

---

---

---

---

---

---

---

---

---

### Beers (USA) vs STOPP (Europe & Canada)

- STOPP was published in 2008
  - Beers was 5 years old at that time
- STOPP has more high-risk medications
- STOPP predicts more acute hospitalizations due to medications
  - Depending on the study reviewers

---

---

---

---

---

---

---

---

---

---



# EVIDENCE FOR "POTENTIALLY INAPPROPRIATE"

---

---

---

---

---

---

---

---

Major Events Related to Prescribing

New England Journal of Medicine 2011;365:2 002-12.

**Emergency Hospitalizations for Adverse Drug Events in Older Americans**

Steven J. Keeler, MD, MSc, MPA, MEd, Robert C. Gompers, MD, PhD, Nathan Gruneir, PharmD, MPA, and Thomas J. Brennan, MD, MPA

**ABSTRACT**

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

**DESIGN:** We used administrative data from the National Electronic Data Interchange System—Composite Adverse Drug Event Surveillance program (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-risk or potentially inappropriate by national quality measures.

**SETTING:** On the basis of 807 cases identified in our sample, there were an estimated 191,626 emergency hospitalizations (95% confidence interval [CI], 153,116 to 349,736) for adverse drug events in U.S. adults 65 years of age or older each year from 2007 through 2009. Most (half) of these hospitalizations were among adults 80 years of age or older (48.7%, 95% CI, 46.6 to 50.8). Most (two thirds) of hospitalizations were due to some limited number (40.7%, 95% CI, 40.2 to 71.5). These medications or medication classes were implicated alone or in combination in 47.9% (95% CI, 46.8 to 74.2) of hospitalizations involving 151,794 hospitalizations (21.0%), and 40% (95% CI, 37.7 to 42.3) of hospitalizations.

**CONCLUSIONS:** Most emergency hospitalizations for targeted adverse drug events in older adults

---

---

---

---

---

---

---

---

Before Prescribing

- Is medication necessary? Maybe nonpharmacologic approach would be effective
- Do you have a diagnosis? Is this medication for the adverse effect of another medication?
- How many medications can patient handle? How much monitoring?
- Do the benefits outweigh the risks?

---

---

---

---

---

---

---

---

### Treatment Decisions

- Prescribing for older adults should be in line with
  - Goals of Care
  - Life Expectancy

[www.eprognosis.com](http://www.eprognosis.com)

*Gait Rate app*
- Primary risk for older adults
  - Falls: #1 cause of accidental death among OA's

---

---

---

---

---

---

---

---

### If You're Going to Prescribe

- Would one medication treat multiple problems?
- What is the fewest number of medications and doses to achieve desired effect?
- Start low and go slow
  - One medication at a time
- Write out changes
  - Start this 😊
  - Change this 😐
  - Stop this ☹️

---

---

---

---

---

---

---

---

### If You're Going to Discontinue

- Medications that can usually be dc'd
  - No identifiable indication
  - Do not seem to have intended response
  - No longer needed
  - Duplicate therapeutic, pharmacologic or adverse event profile
  - Not being taken anyway

---

---

---

---

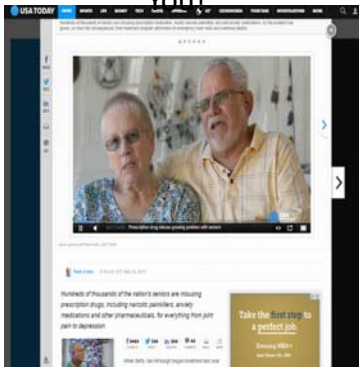
---

---

---

---

## Your Patients May Thank You!



---

---

---

---

---

---

---

---

## Sources

- American Geriatrics Society (2013). Clinical Guideline, "Appropriate Prescribing," in Geriatrics Evaluation and Management (GEM) Tools retrieved from [www.geriatricscareonline.org](http://www.geriatricscareonline.org)
- American Geriatrics Society (2012). "AGS Beers Criteria for Potentially Inappropriate Medication use in Older Adults," retrieved from [www.geriatricscareonline.org](http://www.geriatricscareonline.org)
- O'Mahoney, Gallagher et al (2010). *STOPP & START criteria: A new approach to detecting potentially inappropriate prescribing in old age*. European Geriatric Medicine, 1:45-51.

---

---

---

---

---

---

---

---

## HOW TO DO BETTER?

---

---

---

---

---

---

---

---

“Every system is perfectly designed to get the results it gets”



---

---

---

---

---

---

---

---

### Geriatrify your standard order sets

- Eliminate PIMs
- Add options for renal dosing
- Change standing orders for vitals, activity
- Add options for daily screens for depression, confusion, mental status

---

---

---

---

---

---

---

---

### Make Your EMR Work for You

- Create (recreate) order sets for geriatric syndromes
  - Falls/Hip fractures
  - Delirium
  - Dehydration malnutrition
- Add drug warnings for PIMs
- Create geriatric pharmacy order sets

---

---

---

---

---

---

---

---



---

---

---

---

---

---

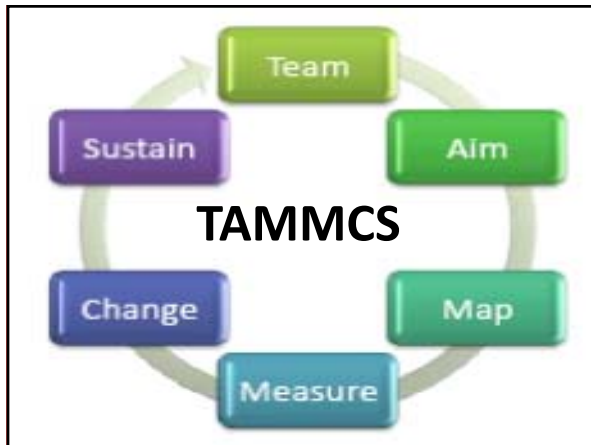
---

---

---

---

---



---

---

---

---

---

---

---

---

---

---

---

- ### Team
- ED collaboration with the GRECC
  - Local team included
    - ED physicians
    - Geriatricians
    - Clinical pharmacists
    - QI Nurses
    - Clinical application coordinator
  - VA Collaborative now at 8 sites

---

---

---

---

---

---

---

---

---

---

---

### Aim

- Reduce proportion of potentially inappropriate medications (PIMs) prescribed to Veterans 65 and older at the time of discharge from the Emergency Department to 5% or less

---

---

---

---

---

---

---

---

---

---

---

---

### Map

- Focus on EMR
- ED discharge medication order sets
- Online resources for geriatric content

---

---

---

---

---

---

---

---

---

---

---

---

Print Dispense by Pharmacy for: Steven, Melissa M. (vista.athens.med.va.gov)

DISPENSE BY PHARMACY		ED MEDS FOR PHARMACY	
Acetaminophen 500mg PO Q6H PRN x 7 Days	Magn Multihealth 1 tab	Metformin 500mg BID	Metoprolol 25mg BID
Acetaminophen 500mg PO Q6H PRN x 15D	Magn Multihealth 1 tab	Metoprolol 25mg BID	Motrin 600mg TID
Acetaminophen 1Gm PO Q6H PRN for 5 Days	Magn Multihealth 1 tab	Motrin 600mg TID	Mycostein 400mg x 5 D
Albuterol MDI	Magn Multihealth 1 tab	Mycostein 400mg x 10d	Nyctene 2 sup PO QID PRN
Albuterol MDI/Albuterol MDI	Magn Multihealth 1 tab	Nyctene 2 sup PO QID PRN	Naproxen 500mg BID x 7D
Amoxicillin 10mg QD	Magn Multihealth 1 tab	Naproxen 500mg BID PRN	NTG sl 1 tab x3 PRN
Amoxicillin 500mg TID	Magn Multihealth 1 tab	NTG sl 1 tab x3 PRN	Orlistat 120mg BID
Anusol HC sups TID x 3 D	Magn Multihealth 1 tab	Orlistat 120mg BID	Percocet V6 500mg
ASA 81mg per Q D x 30 Days	Magn Multihealth 1 tab	Percocet V6 500mg	Phenergan 25mg PO x 10 tabs
ASA 325mg PO QD x 30 Days	Magn Multihealth 1 tab	Phenergan 25mg PO x 10 tabs	Prednisone 60mg x 5d
Atenolol 25mg PO QD x 30 Days	Magn Multihealth 1 tab	Prednisone 60mg x 5d	Robaxon w/Codone 11mg Q6H PRN
Athover MDI	Magn Multihealth 1 tab	Robaxon w/Codone 11mg Q6H PRN	Rogaine 100mg PO Q6H x 7D
Augmentin 875mg x 10d	Magn Multihealth 1 tab	Rogaine 100mg PO Q6H x 7D	Tranex 50mg PO Q6H PRN
Augmentin Ear Drops 2 drops in affected ear	Magn Multihealth 1 tab	Tranex 50mg PO Q6H PRN	Tylenol w/Codone 1 tab PO Q6H PRN
Banidine 10mg PO Q6H PRN	Magn Multihealth 1 tab	Tylenol w/Codone 1 tab PO Q6H PRN	Valium 25mg PO q6h PRN
Banidine 10mg PO Q6H PRN	Magn Multihealth 1 tab	Valium 25mg PO q6h PRN	Zantac 150mg BID
Clonidine 0.1mg BID	Magn Multihealth 1 tab	Zantac 150mg BID	Z Pack
Codone 100mg PO BID x 10 D	Magn Multihealth 1 tab	Z Pack	Zofen or Clarin 1 tab PO x 10 D
Clonidine 0.1mg BID	Magn Multihealth 1 tab	Zofen or Clarin 1 tab PO x 10 D	Zofen 4mg PO Q6H PRN x 7 D
Codone 100mg PO BID x 10 Days	Magn Multihealth 1 tab	Zofen 4mg PO Q6H PRN x 7 D	
Clonidine 0.1mg BID	Magn Multihealth 1 tab		
Diabetic Supplies	Magn Multihealth 1 tab		
Doxycycline 100mg BID	Magn Multihealth 1 tab		
Dulofax sups 1 BID per x 5 D	Magn Multihealth 1 tab		
Dulofax sups 1 BID per x 5 D	Magn Multihealth 1 tab		
Flaxseed 10mg TID	Magn Multihealth 1 tab		
Flaxseed 10mg TID	Magn Multihealth 1 tab		
Fluocinonide Nasal Spray 100mcg BID x 5 D	Magn Multihealth 1 tab		
Fluocinonide Nasal Spray 100mcg BID x 5 D	Magn Multihealth 1 tab		
Genital Wash 1 tab bid x 30 D	Magn Multihealth 1 tab		
Genital Wash 1 tab bid x 30 D	Magn Multihealth 1 tab		
Glaxo 2.5mg BID	Magn Multihealth 1 tab		
Glaxo 2.5mg BID	Magn Multihealth 1 tab		
HCTZ 25MG QD	Magn Multihealth 1 tab		
HCTZ 25MG QD	Magn Multihealth 1 tab		
Hydrocortisone 10 tabs	Magn Multihealth 1 tab		
Hydrocortisone Cream BID x 7 D	Magn Multihealth 1 tab		
Hydrocortisone Cream BID x 7 D	Magn Multihealth 1 tab		
Keflex 500mg x 10d	Magn Multihealth 1 tab		
Keflex 500mg x 10d	Magn Multihealth 1 tab		
KOLIN 40 mg PO QD x 7 D	Magn Multihealth 1 tab		
KOLIN 40 mg PO QD x 7 D	Magn Multihealth 1 tab		
Laxa 40mg BID	Magn Multihealth 1 tab		
Laxa 40mg BID	Magn Multihealth 1 tab		
Lidocaine 25mg PO TID x 3 D	Magn Multihealth 1 tab		
Lidocaine 25mg PO TID x 3 D	Magn Multihealth 1 tab		
Lisinopril 20mg QD	Magn Multihealth 1 tab		
Lisinopril 20mg QD	Magn Multihealth 1 tab		
Lorazepam 1 tab PO Q6 PRN	Magn Multihealth 1 tab		
Lorazepam 1 tab PO Q6 PRN	Magn Multihealth 1 tab		
Lorazepam 25mg BID	Magn Multihealth 1 tab		
Lorazepam 25mg BID	Magn Multihealth 1 tab		
Lorazepam 10mg PO QD X 30 Days	Magn Multihealth 1 tab		
Lorazepam 10mg PO QD X 30 Days	Magn Multihealth 1 tab		
Lorazepam Cream BID x 7 D	Magn Multihealth 1 tab		
Lorazepam Cream BID x 7 D	Magn Multihealth 1 tab		
Lorazepam Cream BID x 10 D	Magn Multihealth 1 tab		
Lorazepam Cream BID x 10 D	Magn Multihealth 1 tab		

OTHER MEDICATIONS  
 INPATIENT MEDICATIONS  
 OUTPATIENT MEDICATIONS

### Measure

- A 2008 study of 942 elderly veterans discharged from the Durham VAMC ED found 11% received potentially inappropriate medications (PIMs)
- PIM use was associated with a 32% greater risk of repeat ED visits, hospitalization or death (p=.10) <sup>1</sup>

---

---

---

---

---

---

---

---

### Measure - Baseline

Meds	ED Staff Providers N=16	Fee Base Providers	Total ED
Avg # Meds per month to pts >64	302.5	342.9	645
Avg # PIMs to pts >64	28.75	35	63.75
Avg % PIMs	9.5%	10.2%	9.9%

---

---

---

---

---

---

---

---

### Change

- 3 Interventions
  - Provider Education
  - Informatics Based Clinical Decision Support
  - Individual Provider Feedback
    - Audit and feedback
    - Academic detailing
    - Peer Benchmarking

---

---

---

---

---

---

---

---

ER Geriatrics Outpatient Pharmacy		
<b>Antibiotics</b> ***Specific Choices if No Culture Data Available*** COPD/Bronchitis Infectious Diarrhea Pneumonia Sinusitis STD Skin/Soft Tissue UTI	<b>GI</b> Constipation Diarrhea GERD/Peptic Ulcer Disease Nausea  <b>Gynecology</b> STD UTI Gynecology Clinic Consult	<b>Pain/Rheumatology</b> Arthritis Chronic Pain Gout Neuropathy  <b>Psychiatry</b> Depression Other  <b>Pulmonary</b> Allergy/Pharitis COPD/Bronchitis Pneumonia Sinusitis Upper Respiratory Infection
<b>Cardiology</b> Antiarrhythmics Anticoagulation Anti-hypertensives Heart Failure Hyperlipidemia	<b>Neurology</b> Dementia/Alzheimer EOH w/Withdrawal Neuropathy Seizures Vertigo	<b>Urology</b> Erectile Dysfunction Incontinence STD Urinary Retention UTI
<b>Dermatology</b> Contact Dermatitis Eczema Poison Ivy Shingles Tinea Urticaria	<b>Diabetes</b> Diabetes Mellitus Drugs/Supplies	

---

---

---

---

---

---

---

---

---

---

---

---

ER Geriatrics UTI Order Set	
<b>UTI Order Set</b> [****Send Urine for Culture****]	
<b>Women: Uncomplicated UTI</b>  <b>First Line ABC:</b> Ciprofloxacin 500MG PO BID for 3 Days CCI <50 Ciprofloxacin 500MG PO QD for 3 Days CCI 30 to 50 Ciprofloxacin 250MG PO QD for 3 Days CCI <30 <b>Second Line ABC:</b> Amoxicillin/Clavulanate 875/125MG PO BID for 3 Days <b>Third Line ABC:</b> Cefpodoxime 200MG PO BID for 3 Days	<b>Men</b>  <b>First Line ABC:</b> Ciprofloxacin 500MG PO BID for 14 Days for CCI <50 Ciprofloxacin 500MG PO QD for 14 Days for CCI 30 to 50 Ciprofloxacin 250MG PO QD for 14 Days for CCI <30 <b>Second Line ABC:</b> Cefpodoxime 200MG PO BID for 14 Days
<b>Women: Complicated UTI</b>  <b>First Line ABC:</b> Cipro 500MG BID for 10 Days for CCI <50 Cipro 500MG QD for 10 Days for CCI 30 to 50 Cipro 250MG QD for 10 Days for CCI <30 <b>Second Line ABC:</b> Cefpodoxime 200MG PO BID for 10 Days	<b>Pharthritis</b> Ciprofloxacin 500MG PO BID for 28 Days for CCI <50 Ciprofloxacin 500MG PO QD for 28 Days for CCI 30 to 50 Ciprofloxacin 250MG PO QD for 28 Days for CCI <30

---

---

---

---

---

---

---

---

---

---

---

---

ER Geriatrics Pain/Rheumatology Arthritis
<ul style="list-style-type: none"> <li>Avoid Toradol (ketorolac) and Indomethacin use</li> <li>Avoid muscle relaxants such as cyclobenzaprine (Flexeril) and methocarbamol (Flexarol)</li> <li>Avoid high dose NSAIDs</li> </ul> <p><b>DRUGS FOR PAIN:</b> Consider co-prescribing PPI with NSAID if patient not already taking and no contraindication.</p> <p>Do not exceed maximum daily dose of 4g acetaminophen being sure to consider all dosage forms.</p> <ol style="list-style-type: none"> <li>Acetaminophen 650mg Q6H PRN</li> <li>Vocadin 1 to 2 tablets Q8H PRN for 3 days</li> <li>Ibuprofen 200mg q6h qd</li> <li>Oxycodone 5mg PO Q6H x3 days</li> </ol> <p><b>DRUGS FOR CONSTIPATION:</b> Consider a bowel regimen (stool softener and stimulant) for ALL patients receiving opioids.</p> <ol style="list-style-type: none"> <li>Docusate w/Senna 2 tabs PO QHS</li> </ol> <p><b>CREAMS:</b></p> <ol style="list-style-type: none"> <li>Capzasin 0.025% TID</li> <li>Capzasin 0.075% TID</li> <li>Thesageic TID</li> </ol> <p><b>Helpful References</b></p> <ul style="list-style-type: none"> <li>WHO Pain Ladder</li> <li>Opioid Conversion Chart</li> </ul>

Courtesy of Nicole Hastings MD - VHA

---

---

---

---

---

---

---

---

---

---

---

---



Outpatient Medications	
BENADRYL <DIPHENHYDRAMINE (diphenhydramine) CAP,ORAL >	
USE WITH CAUTION IN P153-65 YEARS	
Dosage	Complex
25MG	0.0077
75MG	0.0095
100MG	0.019

---

---

---

---

---

---

---

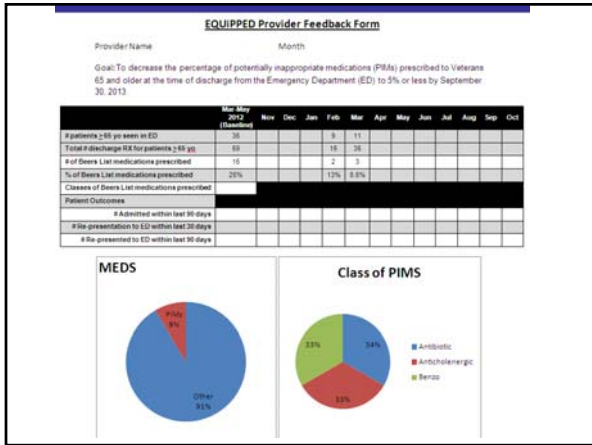
---

---

---

---

---




---

---

---

---

---

---

---

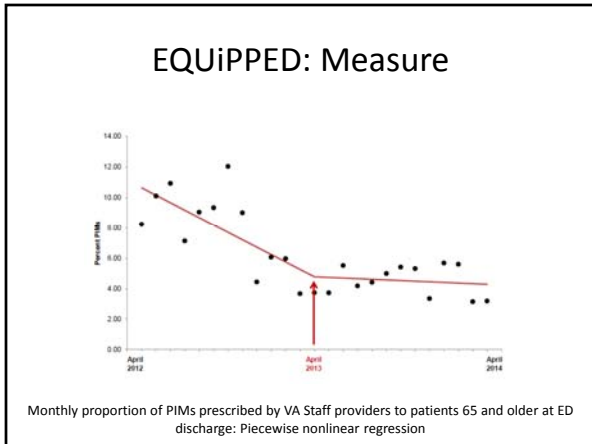
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---

---

---

### Sustain

- Reminder cards in ED
- Continuous performance feedback to providers monthly
- Included geriatric order sets in orientation for all providers
- Monthly education for residents in the ED
- Development of regional dash board for geriatric prescribing

---

---

---

---

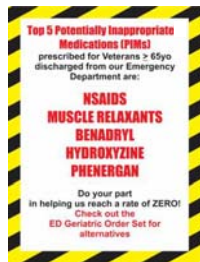
---

---

---

---

### Sustain: Reminder Cards



---

---

---

---

---

---

---

---

### EQUIPPED: Conclusions

- EQUIPPED led to a significant and sustained reduction in the use of PIMs in the elderly at time of discharge from the Atlanta VAMC ED
- Data from 5 additional collaborating VA sites shows similar results
- Additional data on patient outcomes and cost benefit is needed
- EQUIPPED model at non-VA sites

---

---

---

---

---

---

---

---

### Conclusions

- Older patients have MCC and take multiple medications increasing their risk of ADEs
- The use of PIMs in older hospitalized patients remains high
- Geriatrifying standard order sets and modifying the EMR can improve the quality of prescribing for older adults

---

---

---

---

---

---

---

---

### Questions?



---

---

---

---

---

---

---

---