Camille P. Vaughan, MD, MS
Associate Section Chief for Research, Geriatrics & Gerontology
Investigator, Birmingham/Atlanta VA GRECC
Assistant Professor
Division of General Medicine & Geriatrics
Emory University

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## Background


<table>
<thead>
<tr>
<th>Medication</th>
<th>Annual National Estimate of Hospitalizations (N = 99,628)</th>
<th>Proportion of Emergency Department Visits Resulting in Hospitalization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no.</td>
<td>% (95% CI)</td>
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<tr>
<td>Most commonly implicated medications†</td>
<td></td>
<td></td>
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<tr>
<td>Warfarin</td>
<td>33,171</td>
<td>33.3 (28.0–38.5)</td>
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<tr>
<td>Insulins</td>
<td>13,854</td>
<td>13.9 (9.8–18.0)</td>
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<tr>
<td>Oral antiplatelet agents</td>
<td>13,263‡</td>
<td>13.3 (7.5–19.1)</td>
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<tr>
<td>Oral hypoglycemic agents</td>
<td>10,656</td>
<td>10.7 (8.1–13.3)</td>
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<tr>
<td>Opioid analgesics</td>
<td>4,778</td>
<td>4.8 (3.5–6.1)</td>
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<tr>
<td>Antibiotics</td>
<td>4,205</td>
<td>4.2 (2.9–5.5)</td>
</tr>
<tr>
<td>Digoxin</td>
<td>3,465</td>
<td>3.5 (1.9–5.0)</td>
</tr>
<tr>
<td>Antineoplastic agents</td>
<td>3,329‡</td>
<td>3.3 (0.9–5.8)‡</td>
</tr>
<tr>
<td>Antidiuretic agents</td>
<td>2,899</td>
<td>2.9 (2.1–3.7)</td>
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<tr>
<td>Renin–angiotensin inhibitors</td>
<td>2,870</td>
<td>2.9 (1.7–4.1)</td>
</tr>
<tr>
<td>Sedative or hypnotic agents</td>
<td>2,469</td>
<td>2.5 (1.6–3.3)</td>
</tr>
<tr>
<td>Anticonvulsants</td>
<td>1,653</td>
<td>1.7 (0.9–2.4)</td>
</tr>
<tr>
<td>Diuretics</td>
<td>1,071‡</td>
<td>1.1 (0.4–1.8)‡</td>
</tr>
</tbody>
</table>

*Budnitz DS et al. NEJM 2011*
Beers Criteria

- Beers Criteria
  - Developed by Mark Beers, MD in 1991
  - Updated in 2012 with Evidence-based review
  - Initially proposed for long-term care
  - Now promoted for all sites of geriatric care
  - Evaluated as a proxy for quality of prescribing

American Geriatrics Society Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

The American Geriatrics Society 2012 Beers Criteria Update Expert Panel
## Table 2. (Contd.)

<table>
<thead>
<tr>
<th>Organ System or Therapeutic Category or Drug</th>
<th>Rationale</th>
<th>Recommendation</th>
<th>Quality of Evidence</th>
<th>Strength of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin, sliding scale</td>
<td>Higher risk of hypoglycemia without improvement in hyperglycemia management regardless of care setting</td>
<td>Avoid</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td>Megestrol</td>
<td>Minimal effect on weight; increases risk of thrombotic</td>
<td>Avoid</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
</tbody>
</table>
Increasing number of older adults seen in the ED annually

More than 50% discharged, often with a new prescription

A 2008 study of 942 elderly veterans discharged from VA 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)

Pines et al. JAGS 2013
Hastings et al. JAGS 2008
EQUIPPED Team

- Physician lead(s) at each site
- Geriatric Pharmacists
- Behavioral psychologist
- Quality Improvement Nurse Specialist
- Data Analysts
- Health Informatics
- Clinical Applications Coordinators
- Biostatistician
• Primary Goal
  – 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

PEOPLE

Provider unaware of potentially inappropriate medications for elderly (Beers criteria)
Provider unaware of patient age
Mix of staff and fee-based providers in ED

PROCESS

CPRS gives numerous alerts, poss causing “alert fatigue”
No explicit medication reconciliation process
Computer system automatically populates patient’s age so provider does not calculate age
Provider may use either outpatient meds or order sets for prescribing discharge meds

MATERIAL

Triage sheet does not flag patient age
ED whiteboard does not include patient age

POLICY

No policy in place for outpatient prescribing for patients over age 65
No provider feedback on prescribing practices

ENVIRONMENTAL

Busy ER environment
Providers frequently multi-tasking

Patient > 65 yo prescribed a potentially inappropriate medication from the ED
EQUiPPED Interventions

• Education
• Decision Support Tools
  – Geriatric Pharmacy Order Sets for common ED diagnoses
    • Smoothing the workflow in a step
    • Replacing with a better value step
• Academic Detailing/Audit and Feedback
Education

• Didactic lectures
  – Physiologic changes with aging
  – Drug-drug interactions
  – Drug-disease interactions
  – High risk and potentially inappropriate medications

• Journal Club
  – 2012 AGS Update to Beers Criteria
Decision Support Tools

- ED geriatric order sets
- Point of prescribing education
- Links to online content
ER MDS FOR PHARMACY

DISPENSE BY PHARMACY

- Acetaminophen 500mg PO Q6H PRN x 7 Days
- Acetaminophen 500mg PO Q6H PRN x 10D
- Acetaminophen 16g PO Q6H PRN for 5 Days
- Albuterol MDI
- Albuterol MDI/Atovent MDI
- Amoxicillin 500mg TID
- Amoxicillin 500mg TID
- ASA 81mg po q.d. x 30 Days
- ASA 325mg PO QD x 30 Days
- Atorvastatin 20mg PO QD x 30 Days
- Atovent MDI
- Augmentin 875mg x 10d
- Auralgan Ear Drops 2 drops in affected ear
- Bacitracin 10g x 10d
- Benadryl 50mg PO Q6H PRN
- Benadryl 50mg PO Q6H PRN
- Cipro 500mg PO BID x 10 Days
- Clindamycin 300mg TID
- Clonidine 0.1mg BID
- Colace 100mg PO BID x 10 D
- Diabetic Supplies
- Doxycycline 100mg BID
- Dulcolax supp 1 BID prn x 5 D
- Flucial 500mg PO Q6H x 10D
- Flexeril 10mg TID
- Fluconazole 1 tab each month BID x 5 D
- Fluticasone Nasal Steroid Spray Daily
- Gemfibrozil 600mg 1 tab bid x 30 D
- Glibenclamide 2.5mg BID
- HCTZ 25MG QD
- Hydrocodone 15 tabs
- Hydrocortisone Cream BID x 7 D
- Keflex 500mg x 10d
- KDUR 40 Meq PO x 7 D
- Lasix 40mg BID
- Librium 25mg PO TID x 3 D
- Lisinopril 20mg QD
- Loratadine 1 tab PO Q6 PRN
- Loperamide 25mg BID
- Loperamide 10mg PO QD x 30 Days
- Lotrimin Cream BID x 7 D
- Lotrimin Cream BID x 10 D

OTHER MEDICATIONS

INPATIENT MEDICATIONS

OUTPATIENT MEDICATIONS
ER Geriatrics Outpatient Pharmacy

Antibiotics
- Empiric Choices if No Culture Data Available
- COPD/Bronchitis
- Infectious Diarrhea
- Pneumonia
- Sinusitis
- STD
- Skin/Soft Tissue
- UTI

GI
- Constipation
- Diarrhea
- GERD/Peptic Ulcer Disease
- Nausea

Gynecology
- STD
- UTI
- Gynecology Clinic Consult

Neurology
- Dementia/Agitation
- EtOH Withdrawal
- Neuropathy
- Seizures
- Vertigo

Pain/Rheumatology
- Arthritis
- Chronic Pain
- Gout
- Neuropathy

Psychiatry
- Depression
- Other

Pulmonary
- Allergic Rhinitis
- COPD/Bronchitis
- Pneumonia
- Sinusitis
- Upper Respiratory Infection

Urology
- Erectile Dysfunction
- Incontinence
- STD
- Urinary Retention
- UTI

Others
- EtOH Withdrawal
- Tetanus Tntoxoid Inj Once Given in Clinic

Cardiology
- Antiarythmics
- Anticoagulation
- Antihypertensives
- Heart Failure
- Hyperlipidemia

Dermatology
- Contact Dermatitis
- Eczema
- Poison Ivy
- Shingles
- Tinea
- Urticaria

Diabetes Mellitus
- Drugs/Supplies
ER Geriatrics Psychiatry: Depression

The Geriatric Depression Scale
1. Are you basically satisfied with your life?
2. Do you often get bored?
3. Do you often feel helpless?
4. Do you prefer to stay at home rather than going out and doing new things?
5. Do you feel pretty worthless the way you are now?

Two out of five depressive responses (No to question #1 or Yes to questions 2 through 5) suggests the diagnosis of depression.

CONSULTS
Psychiatry Emergency Room
Psychiatry Outpatient General
ER Geriatrics Pain/Rheumatology Arthritis

+ Avoid Toradol (ketorolac) and Indomethacin use
+ Avoid muscle relaxants such as cyclobenzaprine (Flexeril) and methocarbamol (Robaxin)
+ Avoid high dose NSAIDs

DRUGS FOR PAIN: Consider coprescribing PPI with NSAIDs if patient not already taking and no contraindication.

Do not exceed maximum daily dose of 4g acetaminophen being sure to consider all dosage forms.

1. Acetaminophen 650mg Q6H PRN
2. Vicodin 1 to 2 tablets Q6H PRN for 3 days
3. Ibuprofen 200mg Q6H x5 days
4. Oxycodone 5mg PO Q6H x3 days

DRUGS FOR CONSTIPATION: Consider a bowel regimen (stool softener and stimulant) for ALL patients receiving opioids.

5. Docusate w/Senna 2 tabs PO QHS

CREAMS:
6. Capsaicin 0.025% TID
7. Capsaicin 0.075% TID
8. Theragesic TID

Helpful References
- WHO Pain Ladder
- Opioid Conversion Chart
Change
EQUiPPED Interventions

Top 5 Potentially Inappropriately Medications (PIMs)

prescribed for Veterans ≥ 65yo discharged from our Emergency Department are:

NSAIDS
MUSCLE RELAXANTS
BENADRYL
HYDROxyzINE
PHENERGAN

Do your part in helping us reach a rate of ZERO!
Check out the ED Geriatric Order Set for alternatives
<table>
<thead>
<tr>
<th>Dosage</th>
<th>Complex</th>
</tr>
</thead>
<tbody>
<tr>
<td>25MG</td>
<td>0.0027</td>
</tr>
<tr>
<td>50MG</td>
<td>0.0056</td>
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<tr>
<td>100MG</td>
<td>0.019</td>
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</table>

**Use with caution in pts >65 years**
Individual Provider Feedback

- Academic Detailing
- Peer Benchmarking
**EQUiPPED Provider Feedback Form**

Provider Name  

**Goal:** To decrease the percentage of potentially inappropriate medications (PIMs) prescribed to Veterans 65 and older at the time of discharge from the Emergency Department (ED) to 5% or less by September 30, 2013.

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<thead>
<tr>
<th></th>
<th>Mar</th>
<th>May</th>
<th>2012</th>
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<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
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<tbody>
<tr>
<td># patients ≥ 65 yo seen in ED</td>
<td>36</td>
<td></td>
<td></td>
<td>9</td>
<td>11</td>
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<tr>
<td>Total # discharge RX for patients ≥ 65 yo</td>
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<td># of Beers List medications prescribed</td>
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<tr>
<td>% of Beers List medications prescribed</td>
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<td>13%</td>
<td>8.6%</td>
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<td>Patient Outcomes</td>
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<tr>
<td># Admitted within last 90 days</td>
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<tr>
<td># Re-presentation to ED within last 36 days</td>
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<tr>
<td># Re-presented to ED within last 90 days</td>
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</table>

**MEDS**

- PIMs 9%
- Other 91%

**Class of PIMS**

- Antibiotic 33%
- Anticholenergic 34%
- Benzo 33%
• Prior to EQUiPPED, average monthly proportion of PIMs prescribed: 9.4% (SD 1.5)
• Post-intervention: 4.6% (1.0)
• RR 0.48, 95% CI 0.40-0.59, p<0.0001
Atlanta ED – all providers

Atlanta – All

Poisson regression, p-value < 0.0001
• “... I might use the order set as a sort of a mechanism to point out that maybe there is something they should take a look at rather than saying you know for example, “hey, do you really wanna order that medicine on that patient? I am not sure that is a good idea.” Saying, “Oh hey, did you know there are these guides that can help sort of identify the medicines to avoid and medicines that are preferred in geriatric populations.” So it gives me an easier way of highlighting ...” (ED Staff Physician)
• the thing about before the order sets was that the Beers criteria people would come, and then I would have all these things in mind and time would go on and I would forget them. You know I kind of forget about them and I would stop doing some of those things, but once we had the order sets it just made it a lot easier for me to not forget.” (ED Nurse Practitioner)
Sustain

- Continuous performance feedback to providers monthly/quarterly
- Development of regional dash board for geriatric prescribing
- Included geriatric order sets in orientation for all providers
- Monthly education for residents in the ED
Sustain: Dashboard Examples

http://www.dashboardinsight.com/CMS/3f7edc6b-609f-4b54-9e81-8ac7629a2798/Healthcare-performance-dashboard-700.png
• Currently 7 VA EDs are replicating this model with additional funding from VA Central Office
  – Durham and Asheville, NC
  – Tennessee Valley (Nashville & Murfreesboro)
  – Birmingham and Montgomery, AL
  – Bronx

• John A. Hartford Foundation grant awarded for expansion outside of VA
  – Web-based toolkit in development
Durham ED – all providers

Poisson regression, p-value = 0.006
Conclusions

• The EQUiPPED model is associated with a significant reduction in the use of PIMs in the elderly at time of discharge from the ED

• Additional data on patient outcomes and cost benefit are needed

• Evaluation needed in other sites of geriatric care both within and outside of VA
Questions?