

# **Background & Objective**

•Elderly patients (≥65 years of age) are at an increased risk of experiencing adverse events (AEs) due to alterations in pharmacokinetic and pharmacodynamic metabolism, as well as increased number of prescription medications.<sup>1</sup>

•In order to improve the functional outcomes of these patients when hospitalized, an Acute Care of the Elderly (ACE) unit was implemented at our hospital.<sup>2</sup>

•The Beers and STOPP criteria were created to identify medications that are potentially inappropriate (PIMs) in the elderly.<sup>3,4</sup>

•This study evaluates the utilization of Beers and STOPP criteria drugs in the ACE unit and their effects on length of stay (LOS) and likelihood of experiencing an AE.

# Methods

•Retrospective chart review

•Approved by the institutional review boards at Rutgers University and University Medical Center at Princeton.

•Inclusion Criterion: Admission or transfer to the ACE unit between 1/20/11 and 5/20/11

•Exclusion Criteria:

- Age <65 years of age on presentation</li>
- No prescription medication use on admission

•Patients were then divided into four groups:

| Beers Control    | ACE patient, not prescribed a Beers drug |
|------------------|--|
| Beers Experiment | ACE patient, prescribed a Beers drug     |
| STOPP Control    | ACE patient, not prescribed a STOPP drug |
| STOPP Experiment | ACE patient, prescribed a STOPP drug     |
|                  |  |

•Both groups were evaluated from admission to discharge.

#### Disclosures

Author of this presentation has the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.

•Timothy Reilly: Spouse is an employee and shareholder of Johnson and Johnson.

# **Evaluation of Screening Tools to Assess Inappropriate Medication Use in the Elderly**

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### **Baseline Characteristics**

| Table T. Baseline Characteristics |  |   |  |  |
|-----------------------------------|--|---|--|--|
| Control                           | STOPP  | P Value   |  |  |
| 213                               | 127  |   |  |  |
| 131 (61.5)                        | 67 (52.8)  | 0.093   |  |  |
| 82.4±7.86                         | 84.3±7.76  | 0.026   |  |  |
| 5                                 | 6  | 0.007   |  |  |
| 6                                 | 7  | 0.001   |  |  |
| 8                                 | 10   | <0.001  |  |  |
| 12                                | 15   | <0.001  |  |  |
| 8                                 | 10   | <0.001  |  |  |
|                                   | Control<br>213<br>131 (61.5)<br>82.4±7.86<br>5<br>6<br>8<br>8<br>12<br>8 | ControlSTOPP213127131 (61.5)67 (52.8)82.4±7.8684.3±7.7656678101215810 |  |  |

|  | Tabl | e 2. | Resu | ts* |
|--|------|------|------|-----|
|--|------|------|------|-----|

|           |                                  | Control    | Beers         | P Value | ORa                 | Control   | STOPP     | P Value | ORa                  |
|-----------|----------------------------------|------------|---------------|---------|---------------------|-----------|-----------|---------|----------------------|
|           | # of Patients                    | 198        | 142           |         |                     | 213       | 127       |         |                      |
| ents      | LOS<br>[mean±SD]                 | 6.2±5.5    | 8.4±8.4       | 0.004   |                     | 6.8±6.5   | 7.6±7.5   | 0.350   |                      |
| All Patie | # PIMs at<br>Discharge<br>[n(%)] | 10 (5.1)   | 60 (42.3)     | <0.001  | 21.1<br>(10.3,43.1) | 5 (2.3)   | 82 (64.6) | <0.001  | 75.8<br>(29.1,197.7) |
|           | # of AEs<br>[n(%)]               | 37 (18.7)  | 45 (31.7)     | 0.015   | 1.83<br>(1.1,3.1)   | 61 (28.6) | 43 (33.8) | 0.104   | 1.3<br>(0.8,6.3)     |
| nts       | # of Patients                    | 87         | 74            |         |                     | 91        | 69        |         |                      |
| Patie     | LOS<br>[mean±SD]                 | 8.0±6.6    | 11.4±10.2     | 0.011   |                     | 9.1±8.3   | 10.2±8.9  | 0.452   |                      |
| sferred   | # PIMs at<br>Discharge<br>[n(%)] | 7 (8.0%)   | 31<br>(41.9%) | <0.001  | 8.1<br>(3.3,19.8)   | 3 (3.4)   | 43 (62.3) | <0.001  | 48.5<br>(13.9,169.2) |
| Tran      | # of AEs<br>[n(%)]               | 23 (26.4%) | 28<br>(37.8%) | 0.130   | 1.7<br>(0.9,3.3)    | 43 (47.3) | 29 (42.0) | 0.526   | 0.8<br>(0.4,1.5)     |

\*Statistical differences calculated using either Student's t-test or Mann Whitney test, when appropriate;  $\alpha$ =0.05 a Odds Ratio

#### **Beers Criteria**

| <ul> <li>No difference detected in ACE LOS and # of readmissions in either group (p=0.298,0.279 and 0.098,0.501, respectively).</li> <li>Patients taking Beers criteria drugs at any time have a greater number of medications prior to be a greater number of medications.</li> </ul> |
|--|
| have a greater number of medications phot to,  |
| during, and after their hospital stay (p<0.001).   |
| •An increased age was associated with an increased CCI.  |
| •Positive Correlation with LOS: CCI, AEs, # of   |
| Hospital Medications   |
| •Positive Correlation with AEs: LOS, LOS in ACE  |
| unit   |

#### Results

#### **STOPP** Criteria

•No difference detected in ACE LOS and # of readmissions in either group (p=0.813,0.506 and 0.740,0.549, respectively).

 Patients taking STOPP criteria drugs at any time have a greater number of medications prior to, during, and after their hospital stay (p<0.001).

•Patients were more likely to be transferred (p=0.029).

 Positive Correlations with LOS: # of Hospital Medications

 Positive Correlation of AEs: # of Admission and Hospital Medications



University Medical Center at Princeton

Princeton HealthCare System

# Discussion

#### **Beers Criteria**

- •The most frequently prescribed Beers drug was ferrous sulfate (>325mg/day), followed by clonidine and diphenhydramine.
- •Diphenhydramine was almost exclusively prescribed during a patient's hospital stay.
- •If prescribed a Beers drug for a chronic condition, it was seen that patients tend to still take the drugs after discharge (clonidine for HTN, fluoxetine for depression).

#### **STOPP** Criteria

- •The most frequently prescribed STOPP criteria category was aspirin (>81mg/day), followed by an NSAID with CKD and a  $\beta$ blocker with COPD.
- •Although not significant, the STOPP criteria identified more PIMS (prior to admission) that were associated with an AE.

# Conclusion

- •Patients prescribed Beers, not STOPP, criteria drugs were observed to have an increased LOS and likelihood of experiencing an AE.
- •The use of the Beers criteria is a better predictor of characteristics of an ACE hospital stay than the STOPP criteria.
- •Future studies include an evaluation of the STOPP criteria v. the 2012 Beers criteria update, as well as a prospective study evaluating the effect of PIM interventions.

# References

<sup>1</sup> Hilmer SN, Ford GA. General principles of pharmacology. In: Halter JB, Ouslander JG, Tinetti ME, et al: Hazzard's Geriatric Medicine and Gerontology. 6<sup>th</sup> ed. New York:McGraw-Hill;2009. p.103-22.

<sup>2</sup> Landefeld CS, Palmer RM, Kresevic DM, et al. A randomized trial of care in a hospital medical unit especially designed to improve the functional outcomes of acutely ill older patients. New Eng J Med 1995;322:1338-44.

<sup>3</sup> Fick DM, Cooper JW, Wade WE, et al.Updating the Beers criteria for potentially inappropriate medication use in older adults. Arch Intern Med 2003;163:2716-24.

<sup>4</sup> Gallagher P, Ryan C, Bryne S, et al. STOPP (screening tool of older person's prescriptions) and START (screening tool to alert doctors to right treatment) consensus validation. Int J Clin Pharmacol Ther 2008;46:72-83.