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# Where's the Evidence: More on Psychometric Properties of the Beers Criteria

Online-only content for "Monitoring Medication Use in Older Adults," by Sheila L. Molony, PhD, RN, GNP-BC, in the American Journal of Nursing, January 2009, p. 68-78.

The Beers criteria were created by expert consensus that was informed by an extensive literature review.<sup>1</sup> A panel of experts in geriatric care, clinical pharmacology, and psychopharmacology used a modified Delphi technique to reach consensus. For the most recent update, two types of recommendations were made. The first is a list of medications that people ages 65 years and older should generally avoid because they are less efficacious or pose a higher risk for older adults than other, safer alternatives. The second covers medications that should not be used in older adults known to have specific medical conditions. The medications in these lists are considered "potentially inappropriate medications" (often called PIMs).

Evidence supports an association between potentially inappropriate medication use (based on the Beers I) and hospitalization in community-dwelling elderly persons.<sup>2</sup> An association also exists between potentially inappropriate medication use and adverse drug reactions in hospitalized and community-dwelling elders.<sup>3,4</sup> Several studies of community-dwelling older adults have demonstrated an association between potentially inappropriate medication use and lower health-related quality of life (self-perceived health status, diminished physical function, and decreased self-care),<sup>5,6</sup> while other studies have not supported this relationship.<sup>7,8</sup>

A recent study by Fick and colleagues studied a Medicare managed care population to compare outcomes between community-dwelling older adults receiving one or more potentially inappropriate medications (according to Beers I) and older adults not receiving them.9 The prevalence of drug-related problems occurring within 30 days of a new prescription was 14.3% in the group receiving the potentially inappropriate medications and 4.7% in the comparison group (P < 0.01). In addition, health care costs, as well as health care utilization, were significantly correlated with the number of potentially inappropriate medications used. After controlling for age, sex, and comorbidities, inpatient, outpatient, office, and ED visits were higher among those using these medications. Drug-related problems found more commonly in the group receiving potentially inappropriate medications included acute depression (odds ratio [OR] 7.77, confidence interval [CI] 2.26–26.69), femur fracture (OR 6.80, CI 1.95–23.67), dehydration (OR 4.23, CI 2.99–5.96), and bowel hemorrhage (OR 3.98, CI 2.32–6.84). The most common potentially inappropriate medications used were estrogens only; propoxyphene; short-acting benzodiazepines; digoxin in doses exceeding 0.125 mg/day; and long-term, full-dose, longer half-life, non–cyclooxygenase selective nonsteroidal antiinflammatory drugs (NSAIDS).

Part II of the 2002 Beers criteria has not been studied, limiting the empirical evidence available for this instrument. However, there is a great deal of concurrence between Beers II and other drug-disease interaction, consensus-based guidelines.<sup>10, 11</sup> Specific drug-disease interactions between classes of medications listed in Beers II have been documented. For example, recent studies have documented the association between falls and psychoactive medicines, including atypical antipsychotics and benzodiazepines (some of these agents having a short or intermediate half-life).12, 13 NSAIDS have been associated with renal and cardiac toxicities.14, 15 The association between cognitive impairment and medicines with serum anticholinergic activity has also been documented.16-18

Many studies of the Beers criteria have been retrospective and are nonexperimental. Predictive validity for the Beers criteria has not been established, so it cannot be concluded that use of the medications on the list will predict adverse outcomes. It is possible that the health outcomes observed are associated with other, unmeasured variables. A recent study using Beers I found that while potentially inappropriate medications increased the risk of nursing home admission, other medications in the same drug categories (narcotics and antipsychotics) that were not listed in the Beers criteria increased risk to an even greater degree.<sup>19</sup> This suggests that some of the adverse outcomes related to potentially inappropriate medications may be influenced by the underlying condition or reason for the drug prescription.

Dose and duration of use are not always evaluated in adverse drug effect studies, and these factors

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