CHSR Center for Health Services Research
Applying Research to Optimize Care©

Identifying Older Adults with Serious Illness:
A Critical Step toward Improving the Value of Health Care

Take Away Points

- Older adults with serious illness can be identified prospectively using three definitions based upon clinically accessible data: (A) severe medical condition and/or functional limitation, (B) severe condition and/or functional limitation and utilization, (C) severe condition and functional limitation and utilization.
- All three definitions identify persons with high risk of hospitalization, high Medicare costs, and mortality. In all groups, the observed average Medicare spending was similar to hierarchical condition categories (HCC) predicted cost.

The Issue

The seriously ill patient population accounts for nearly 60 percent of overall health care costs, while only 11 percent of these individuals are in the last year of life. The highly concentrated spending is neither easily predictable nor consistent overtime. The most frequently used approach is the Medicare hierarchical condition categories (HCC) which uses diagnostic codes from claims, however diagnoses alone fail to adequately predict cost, utilization and mortality. Identifying methods to prospectively identify the costliest patient population is critical to systematically match resources and services towards appropriate and value-driven care. Functional status measures and prior utilization may add predictive strength but there were no clearly defined criteria. This study aims to create and test three prospective, increasingly restrictive definitions of serious illness among older adults.

Study Methods and Design

Three operationalized definitions: (A) Condition and/or Functional Limitation - one or more severe medical conditions and/or receiving assistance with any of the six basic activities of daily living (ADL); (B) Condition and/or Functional Limitation and Utilization - one or more severe medical conditions and/or receiving assistance with any activity of daily living (ADL) and one or more hospital admission in the last 12 months and/or residing in a nursing home; (C) Condition and Functional Limitation and Utilization - one or more severe medical conditions and receiving assistance with any ADL and one or more hospital admission in the last 12 months and/or residing in a nursing home. In addition to the three candidate definitions, a comparison group was identified that did not meet any of the definitions.

The study data sources included the longitudinal Health and Retirement Study (HRS) Core interview, which is conducted every 2 years, and Medicare claims. Variables were drawn from HRS included age, nursing home residence, and functional status. Medicare claims were used to identify each individual's medical conditions, hospital admissions, and total Medicare spending.

From 2002 to 2010, every HRS Core interview participant with Medicare Parts A and B coverage over the preceding 12 months was eligible to be included in this study (n=11,577). The study enrollment was conducted separately for each definition, but an individual subject could only appear in each group one

time. A cross-sectional approach (2008 interview year) was used to assess each definition's sensitivity and specificity, also used to compare with HCC predicted costs.

Primary outcome measures included hospital admission, total Medicare spending, and mortality, assessed over the 12 months following the date of the interview. Secondary outcomes included 2-year mortality and whether the subject continued to meet the enrollment criteria at the time of the next HRS Core interview. All comparisons are made using t-tests or chi squares, with statistical significance defined as p ≤ .05.

Key Findings
- From 2002 to 2010, 5,297 subjects were enrolled under Criteria A, 3,151 under Criteria B, and 1,447 under Criteria C. The cross-sectional comparison group included 4,841 subjects not meeting any of the definitions.
- Compared to comparison group, the seriously ill populations defined by these criteria were more likely to be female, more racially and ethnically diverse, less likely to be married, less wealthy, less educated, and more likely to self-report poor or fair health (all *p* values < 0.05)

Year 1 outcomes:
- Hospitalization: 33 percent in Criteria A, 44 percent in Criteria B, and 46 percent in Criteria C.
- Average Medicare spending: $20,566 for Criteria A, $26,349 for Criteria B, and $30,828 for Criteria C.
- 1-year mortality: 13 percent for Criteria A, 19 percent for Criteria B, and 28 percent for Criteria C.
- All of these 1-year outcomes were significantly higher than cross-sectional comparison group.
- In cross-sectional dataset, the mean Medicare spending was similar to HCC predicted costs for each of the groups.

Year 2 outcomes – 92 percent had data available at year 2 to assess their serious illness status:
- Criteria A: 51 percent continued to meet the criteria of this definition, 25 percent died, 18 percent lower severity illness, and 6 percent no longer met criteria with undetermined reason.
- Criteria B: 32 percent continued to meet criteria , 35 percent died, 24 percent lower severity illness, and 9 percent no longer met criteria with undetermined reason.
- Criteria C: 28 percent continued to meet criteria, 51 percent died, 18 percent lower severity illness, and 3 percent no longer met criteria with undetermined reason.

Sensitivity and Specificity:
- Criteria A had the highest sensitivity for all three outcomes (0.53, 0.66, 0.73, respectively), but the lowest specificity (0.79, 0.75, 0.75, respectively).
- Criteria C had the lowest sensitivity for all three outcomes (0.15, 0.25, 0.30, respectively), but the highest specificity (0.97, 0.95, 0.96, respectively).
- Patients with either "condition only" or "functional limitation only" had comparable Medicare spending ($18,599 vs. $17,776), while those with both had noticeably higher costs ($28,897).

Limitations
- Because of study design and sampling method, this study was unable to state what proportion of the Medicare population met each definition.
- The diagnostic codes do not effectively capture all severe conditions, nor reflect severity of illness
- Quality of care and the agreement of treatment with individual preferences were unable to be assessed.

Final Thoughts
The inclusion of functional limitations is critical to prospectively identify seriously ill patients mostly likely to benefit from specialized care programs and services. Most seriously ill patients identified are not in the last year of life so offers opportunity for interventions to improve care and the delivery of personalized goal-driven care, thereby maximizing health care value. In all, this study identified far less subjects who moved out of the serious illness group in later years, and offers a substantial improvement to models that only consider retrospective costs.