COMMENTS ON "CHALLENGES IN CONTROLLING MEDICARE SPENDING: TREATING HIGHLY COMPLEX PATIENTS" BY T. MACURDY AND J. BATTACHARYA

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1. A Summary

1.1. Main findings. The paper documents their extremely interesting finding that a small fraction of "complex" patients constitute a major share of Medicare expenses. The authors use the universe of the 2009 Medicare claims to show that patients with 6 or more comorbid conditions (using 44 illness categories they define for this study) constitute about 3% of the service months and 31% of Medicare spending, and patients with 4 or more comorbid conditions constitute about 8% of the service months and 52% of spending.

Patients with 6 or more comorbid conditions suffer from almost 4.2 million combinations of major conditions, and patients with 4 or more comorbid conditions suffer from almost 5.5 million combinations of major conditions over 5 months period.

In annual context for beneficiaries, 18% of Medicare beneficiaries experience 4 or more major health conditions during 2009, and they account for 63% of total Medicare spending, suffering from almost 7.5 million combinations of major health conditions, and about 7% of Medicare beneficiaries experience 6 or more major health conditions and they account for 41% of spending, suffering from more than 6.4 million combinations of major health conditions.

1.2. Implications. The authors argue that "...risk adjustment model currently used by Medicare inadequately compensate for complex patients" because they inadequately take into account the exponential nature of the costs with respect to the number of comorbidity. They also argue that "...it is likely that many health care providers will have limited experience with the precise combination of conditions presented in a given patient, and will face uncertainties in determining the optimal treatment."

1.3. Authors' suggestions. The authors suggest to investigate the effectiveness of an integrated delivery models (e.g. those used by managed care plans). They also suggest to improve sharing information across different specialists "through continued shifts towards electronic recordkeeping" and suggest CMS or the NIH to promote more research on effective disease management models for complicated patients.

2. Comments

2.1. Suggestions for further clarifications of the situation. One of the main difficulties they point out about their findings is the difficulty health care providers will have given that they have limited experience with the precise combination of conditions presented in a given patients. To see if this is really the case, it will be useful to find out whether top X highest frequency cells (say, $X = 10000$ cells) among patients with 4 or more comorbid conditions amount to a large fraction of total spending may be useful. This may give us cases to focus on to medically examine each of the X cases.

Finding out whether cells with more than N patients (say, $N = 1000$ patients) amount to a large fraction of total spending may be useful. This may isolate cells we have some hope of learning something from data.

To understand the source of the high cost, it may be useful to break up the per month spending into different items such as hospital care, physician and clinical services, drugs, etc.

In order to address the coordination issue across specialists/departments, it may be useful to examine comorbidity issue using illness category classification based on relevant departments/specialists. One may redo the two exercises above using the classification.

2.2. **Is the "complexity" issue distinct from the "end of the life" issue?** It may be useful to try to see to what extent the "high comorbidity-high cost" issue is distinct from the "high-cost in the last year of life" issue. A simple measure may be to compute the number of patients who acquired new illness categories within X months prior to their death and have 4 or more major health conditions at death in a given year over the number of patients who die in the given year. One can do the same with spending, instead of numbers.

On a related issue, it will be useful to understand how the complexity develops. To understand this, it may be useful to distinguish patients who come into Medicare with multiple health problems from those who do not have any health problem (for, say, 1 year into the program). Among the latter group, it may be interesting to examine how the number of comorbid conditions progress over time to explore how different combination of illness categories give rise to an additional categories using a hazard function.

2.3. **On the interpretation of Table 4.** Looking at Table 4: 932 out of potential $_{44}C_2 = 946$ combinations are realized. Because of a very large number of observations, this implies a very accurate estimate of a low probability for 14 combinations. Analogously, 10784 out of potential $_{44}C_3 = 13244$ combinations are realized. Because if the only low probability combinations are those 14 cases, then the number of cells with low probability is below 14×44 and we have 2460 cells with very low probability, there seems to be new information from this beyond what is implied by the earlier observation. Analogous observations can be made for other cells, too.

2.4. **Accounting for benefit side.** It may be interesting to take into account the benefit side by defining "recovery" by "no illness in the same category within X years". One simple measure may be the average cost per recovery. A better measure may require to use data that link health data and earnings data, for example. This type of measure may convey even a bleaker picture than that reported in this paper.