

**Supplemental materials for:**

Chi WC, Wolff J, Greer R, Dy S. Multimorbidity and decision-making preferences among older adults. *Ann Fam Med.* 2017;15(6):546-551.

### **Method supplemental Appendix 1: Question for decision-making preference**

Survey respondents were read a statement: “People today are faced with many decisions about their health care—for example whether to start or change a medicine. We want to know how you prefer to have doctors and family or close friends help with decisions. Thinking about your doctors, do you prefer to...”. The response options included: (a) make decisions without much advice, (b) get their advice and then make decisions, (c) make decisions together (subsequently referred to as “share decisions”), and (d) leave decisions up to them. In our study, we categorized the decision-making preferences into two role (1) active role, on which individuals prefer to make decision alone or together with doctors (response option a, b, and c) and (2) passive role, on which individuals prefer to leave decision to doctors (response option d).

### **Method supplemental appendix 2: Multimorbidity measure**

Multimorbidity was examined using a combination of information that included self-reported doctor diagnosis of nine common chronic diseases, self-reported sensory impairment, the 4-item patient health questionnaire (PHQ-4) for depression and anxiety, and the dementia classification using the NHATS method (see below).<sup>1</sup> NHATS respondents were asked if they had been diagnosed by medical doctors with the following diseases: heart attack, heart diseases including angina or congestive heart failure, hypertension, arthritis including osteoarthritis and rheumatoid arthritis, osteoporosis, diabetes, lung disease, stroke,

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and cancer. Survey respondents were considered to have vision impairment if they reported blindness or reported that they do not see well enough, even with glasses or contacts, to recognize someone across the street, to watch television across the room, or to read newspaper print. Older adults were considered to have hearing impairment if they reported deafness, or reported that they do not hear well enough, even with hearing aids, to use the telephone, to hear conversations on the radio, or to carry on a conversation in a quiet room.<sup>2</sup> Depression and anxiety were measured by the PHQ-4, including the two-item patient health questionnaire (PHQ-2) and the two-item generalized anxiety disorder scale (GAD-2), using established cut-off.<sup>3</sup> Response sets used for assessing level of depression and anxiety were “nearly everyday” (3), “more than half the days” (2), “several days” (1), or “not at all” (0). Scores were summed across the four items and then a sum score of 6 or higher was considered to have depression and anxiety.<sup>3</sup>

We adopted the dementia classification developed by the NHATS team.<sup>1</sup> NHATS respondents were classified as none, possible, and probable dementia using a combination of information that included self-reported doctor diagnosis of Alzheimer’s disease or dementia, a score on the AD8 Dementia Screening Interview by proxy respondents, and a cognition battery on older adults’ memory, orientation, and executive function. Survey respondents who scored at or lower than 1.5 standard deviations below the mean score in a given domain in the cognition battery were considered as impaired in that domain. Survey respondents

who reported a diagnosis of dementia either by self or by proxy, respondents whose proxy respondents reported a score of 2 or higher in the AD8 interview, and survey respondents with impairment in at least two domains in the cognition battery were considered to have probable dementia. Impairment in only one domain in the cognition battery was classified as possible dementia in NHATS. NHATS respondents who were classified as possible dementia mostly likely have mild cognitive impairment due to Alzheimer's disease.<sup>1,4</sup> The classification used in NHATS was validated against the diagnosis information in the Aging, Demographics, and Memory Study (ADAMS) Wave E that was conducted in 2010. We used a broad definition of dementia - including both probable and possible- in this study because this definition has good sensitivity (85.7%) and reasonable specificity (61.6%) to a medical diagnosis of dementia.<sup>1</sup>

We adapted a set of condition clusters from a previously published study with one additional cluster for cancer to categorize the thirteen conditions that NHATS collected.<sup>5</sup> The clusters were: (1) cardiopulmonary cluster, including stroke, heart disease, heart attack, diabetes, high blood pressure, and lung disease; (2) sensory-motor cluster, including vision or hearing problems; (3) depression-dementia cluster; (4) arthritis and osteoporosis; and (5) cancer. We chose this set of clusters for analysis as it exhibited good predictability to future health outcomes (i.e. criterion validity) whereas many developed clusters did not assess such

validity.<sup>6-8</sup> Moreover, this set of clusters was developed using a similar list of self-reported diagnoses as NHATS.

## References

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