Concurrent Session 5A: Aging and Changes in Health Status

Discussant: Eric Stallard, ASA, FCA, MAAA, Duke University

Presented at the Living to 100 Symposium

Orlando, Fla.

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Papers presented:

I. "Survival Characteristics of Three Senior Populations, With a Focus on Life Settlements," Vincent J. Granieri and Gregory P. Heck
II. "Modeling Medical Cost Trends for Advancing Age in the Long Run," Thomas E. Getzen
III. "Sex Differences in Predictors of Health Decline: Results From a 16-Year Longitudinal Cohort Study," Steven G. Prus

Introduction

This session presented three innovative papers that addressed three aspects of aging and health. I enjoyed reading the papers and listening to the presentations. My comments focused on four basic questions.

1. What were the goals of the paper?
2. What were the results?
3. What did we learn?
4. What are the implications of this new information?

I. "Survival Characteristics of Three Senior Populations, With a Focus on Life Settlements," Vincent J. Granieri and Gregory P. Heck

The goals of this paper were to analyze the survival differences between the general population, the college-educated population, the life-settlement subpopulation with reported-settled policies and the life-settlement subpopulation with nonsettled policies (insureds who contemplated settling but did not actually do so). The presenting author noted that I was the discussant of his life-settlements paper at the 2011 Living to 100 conference during which I made several suggestions addressed in the current paper. My comments here focus on the results for the life-settlement population.

The issue I raised previously concerned the three levels of selection that occur in the life-settlements process: (1) the original underwriting and issuance of the life insurance policy; (2) the decision to pursue the life-settlement transaction; and (3) the decision by the purchaser to complete the life-settlement transaction. The previous paper addressed the survival of group (2); the current paper stratified that group according to whether or not a life-settlement transaction was completed.

Very little publicly available information existed before this paper on the survival differences between the settled and nonsettled subgroups.

The main results were presented as a series of Kaplan-Meier survival curves, plotted with their associated confidence intervals. The sample sizes were sufficiently large that the confidence intervals were very narrow for almost all of the figures.

Figure 2 showed that the survival curves for the reported-settled and contemplated-settling groups were almost identical, which seemed to run counter to my expectation based on the results in the prior paper. However, the later figures showed there were complex patterns of changes between the two groups that appeared to be tied to the calendar periods in which the decisions to complete the transactions occurred.

For example, males and females reported as settled during 2001–04 each had much higher survival through five years than had males and females who contemplated settling (figures 9 and 12). The difference disappeared for males from 2005–08 and 2009–12 (figures 10 and 11). The survival curve for 2005–08 for reported-settled females was similar to that for females who contemplated settling for the first two years, after which it deviated downward by a statistically significant amount. A similar pattern was noted for 2009–12 but the confidence intervals were too wide to treat the difference as statistically significant.

The finding that the survival advantages for those who were reported settled relative to those who contemplated settling were different by calendar period and also by gender was an important new result not anticipated in my prior comments. I had expected that the survival for the reported settled would be poorer than for the contemplated settling based on the idea that investors would differentially select policies where the insured had poorer survival chances. This seemed to be the case only for the later periods and only for females.

There are no publicly available mortality tables for the life-settlement population. The results in this paper will be of great value to actuaries in pricing and valuation of portfolios of policies based on completed life-settlement transactions.

II. "Modeling Medical Cost Trends for Advancing Age in the Long Run," Thomas E. Getzen

The goal of this paper was to present and describe a macro-economic approach to modeling and forecasting aggregate costs of medical care for the U.S. population over time periods as long as the next 50–75 years or more. A key assumption of this macro-level approach is that aggregate costs, or equivalently aggregate expenditures, result from a complex decision-making process subject to hard budget constraints; the budget constraints mean that the aggregate costs cannot be accurately forecasted by summing the forecasts of the costs for individual members of the targeted population. The paper was organized into five sections, which presented the approach and the arguments supporting the key assumption.

Numerous tables and figures were used to show that the health care system is complex, is slow to adjust and lags changes in overall gross domestic product (GDP) by three to six years or more with some lags extending to 20–30 years. The case was made that health care spending can be usefully examined using three different time scales—months, years and decades—and that different insights can be gained from these different analytic perspectives. Over the long term, the author made the case that the medical share of GDP must converge to a relatively constant value. Given that growth rates in medical care expenditures have recently been 2 to 3 percent faster than overall GDP, this will require that medical growth rates slow down and eventually converge to the same rate as overall GDP. The author offered the prediction that the combination of medical care, long-term care and retirement expenditures will likely consume one-third or more of GDP at some time during this century.

The author compared health care expenditure projections from his approach with corresponding official projections from the Centers for Medicare & Medicaid Services (CMS) Office of the Actuary and the Congressional Budget Office (CBO). The highest costs were projected by the CBO, the lowest by the author, with the CMS projections falling in between but closer to the CBO's. The author presented results supporting the extrapolation of health care expenditure shares of GDP as a logistic curve with an inflection point near 1982, which may in part explain why his projections were lower than the CMS and CBO projections.

The author discussed differences between individual aging and population aging, making the case that population aging is not the cause of increases in aggregate health care costs. Nonetheless, he emphasized that longevity is costly and medical care costs are a major reason why.

III. "Sex Differences in Predictors of Health Decline: Results From a 16-Year Longitudinal Cohort Study," Steven G. Prus

The goal of this paper was to identify factors responsible for sex differences in rates of decline in health status in a large cohort of adult Canadians followed for a period of 16 years.

The study cohort consisted of 3,551 males and 4,513 females who were in good health at the initial interview in 1994, with follow-up interviews performed biennially. Good health was based on self-reports but the quality of the measures were evaluated using an alternative measure, the Health Utility Index. The predictors were measured at the initial interview and covered three domains of social determinants of health: socioeconomic status, behaviors and psychological measures.

The within-sex aggregate level analysis revealed a reversal in the rate of the loss of good health: Compared to females, males age 18–44 at baseline were advantaged at all follow-up times whereas males age 45–64 at baseline were disadvantaged at all follow-up times, except for the final time in 2010.

The analyses of the impact of the covariates in the three domains of social determinants of health were conducted using the Cox proportional hazards regression model, with the time dimension set equal to study follow-up time and age effects represented through attained age at the baseline examination, using three broad age groups: 18–44, 45–64 and 65+ years.

Statistically significant sex-differences were obtained for the effects on health decline of long-term immigration on females and obesity on males.

Other differences were noted in the paper but their standard errors were too large for the effects to be statistically significant. The author indicated that further analyses were being conducted to assess this situation.

I recommended two approaches that might be helpful in this regard.

First, the initial results were obtained from separate analyses of males and females with the standard errors used to construct confidence intervals. A simpler and potentially more powerful approach would use a pooled analysis with dummy variable coding to test sex-specific effects.

Second, the treatment of the time dimension as study follow-up time could be changed to attained age at follow-up, taking account of left-truncation. This would be consistent with the assumption that attained age was the primary determinant of health decline, and would allow the two covariates for ages 45–64 and 65+ to be dropped from the model. To the extent that other predictors were correlated with age, this would reduce their standard errors and potentially yield additional statistically significant sex differences.