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# Articles in the *North American Actuarial Journal* of Interest to Health Actuaries

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The *North American Actuarial Journal (NAAJ)* has recently been publishing an increasing number of health-related articles. The most recent issue (Volume 19, Issue 1) contains two such items: "Multi-State Actuarial Models of Functional Disability" by Michael Sherris et al, and "Anatomy of a Slow-Motion Health Insurance Death-Spiral" by Ted Frech and Michael Smith. The first paper is one of a growing number of applications of relatively new actuarial theory of multi-state (Markov) models that is part of the Life Contingencies exam (MLC). Interested readers may wish to note that I will be moderating a session at the June Health Meeting on applications of newer techniques that will include example of multi-state models. The death-spiral paper may be a timely reminder to actuaries managing exchange products of things that can go wrong with self-paid health insurance.

## Multi-State Actuarial Models of Functional Disability

**Abstract**

Long-term care costs are expected to significantly increase over the coming decades as the baby boom generation nears retirement. Recent policy discussions in the United States have focused on expanding the private long-term care insurance market so as to alleviate some of the pressure on public programs. An important and fundamental input to the pricing of long-term care insurance products is a set of age-and sex-specific functional status transition rates that can flexibly take into account alternative benefit trigger specifications.

We apply generalized linear models to evaluate disability transitions for individuals in old age based on a large sample of U.S. elderly. We estimate a multi-state model for long-term care insurance applications, and find significant differences in disability rate patterns and levels between our set of estimates and those separately estimated using an earlier approach developed by the Society of Actuaries. Our results suggest that the elderly face a 10 percent chance of becoming long-term care disabled only at ages past 90, rather than in their 80s. Furthermore, age patterns of recovery are found to differ significantly between the sexes. We also show that these estimates of transition probability are sensitive to the definition of "long-term care disability," which has implications for the design of benefit triggers for private and public long-term care insurance programs.

## Anatomy of a Slow-Motion Health Insurance Death Spiral

**Abstract**

Adverse selection death spirals in health insurance are dramatic, and, so far, exotic economic events. The possibility of death spirals has garnered recent policy and popular attention because the pricing regulations in the Affordable Care Act of 2010 make health plans more vulnerable to them (though some other aspects of the ACA limit them). Most death spirals tracked in the literature have involved selection against a group health plan that was dropped quickly by the employer. In this paper, we empirically document a death spiral in individual health insurance that was apparently triggered by a block closure in 1981 and developed slowly because the insurer partially subsidized the block. Indeed, we show that premiums rose dramatically from around the time of the block closure to at least 2009 (the last year of available data). By 2009, some, but very few, policyholders remained in the block and premiums were roughly seven times that of a yardstick we developed. The history of this slow-moving event is directly relevant to current policy discussions because of both adverse selection in general and the particular problems induced by closing a block.