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Guest Editorial

Screening for Dementia and the Impact on Mortality and Morbidity in Long-Term Care Insurance

by Marc A. Cohen⁺, Jessica Miller⁺⁺ and Xiaomei Shi⁺⁺⁺

Introduction

Carriers providing long-term care (LTC) insurance have historically invested significant resources in risk management activities designed to ensure that policies are properly priced and that premiums can remain relatively stable for consumers. An important focus of such risk management activities has been the medical underwriting process and more specifically dementia screening. Dementia-related claims continue to present the single largest claim liability to LTC carriers. Moreover, left unmanaged, this potential liability can threaten the long-term stability of premium rates, something that is of particular importance to carriers, policyholders and insurance regulators. Dementia is also related to mortality, which means that as the average age of life insurance applicants increases, the ability to accurately screen for dementia becomes increasingly important.

Over the past decade, there have been significant improvements made in the ability of cognitive screens to identify individuals at the earliest stages of cognitive decline—a state known as “Mild Cognitive Impairment (MCI)”. MCI is a subtle but measurable memory disorder and a person with MCI experiences memory problems greater than normally expected with ageing, but does not show other symptoms of dementia such as impaired judgment or reasoning. Nearly eight years ago, a new cognitive screen was introduced to the market and is now extensively used by LTC carriers. The test called Enhanced Mental Skills Test (EMST) is designed to detect applicants at the very earliest stages of cognitive decline (Shankle *et al.*, 2005). This test generally replaces an earlier cognitive screen called the Delayed Word Recall (DWR) (Knopman and Ryberg, 1989), which was seen as somewhat less effective in capturing people during the MCI stage of decline.

Purpose

The purpose of this article is to report on research that examined the relationship between the very earliest stages of cognitive decline (i.e. MCI) and subsequent mortality as well as evaluate the efficacy of screening on early morbidity experience as measured by the incidence of dementia-related LTC claims. We focus on the screening experience of each of these cognitive screens: (1) the DWR, and (2) the EMST.

⁺ Chief Research and Development Officer, LifePlans, Inc. 51 Sawyer Road, Waltham, MA 02453.

⁺⁺ Director of Research and Client Engagement, LifePlans, Inc. 51 Sawyer Road, Waltham, MA 02453.

⁺⁺⁺ Senior Research Associate, LifePlans, Inc. 51 Sawyer Road, Waltham, MA 02453.

Data and Method

For the mortality study we relied on telephonic and in-person underwriting assessment data—including cognitive classification—which was collected between 1 January 1996 and 31 December 2008. All data was linked to the Security Administration’s Death Master File, which enabled us to determine who died during this roughly 14-year time period and also record their date of death.

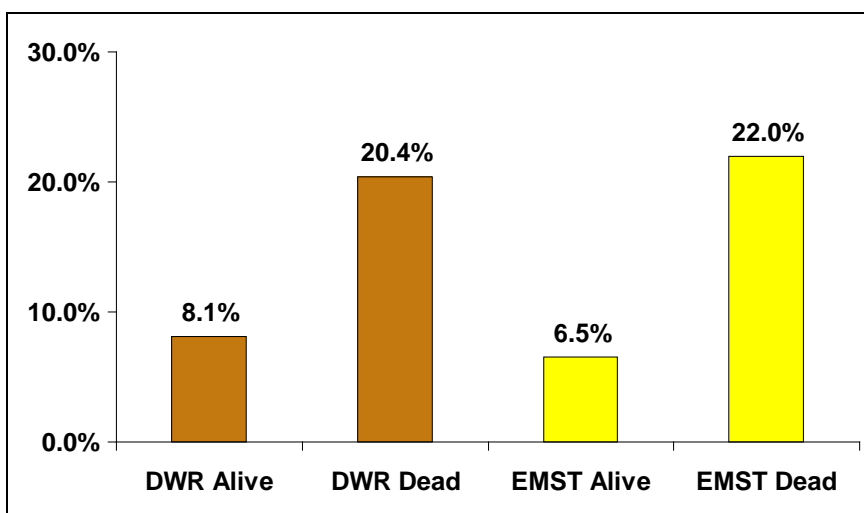
The DWR data comprised 764,037 lives and 160,255 deaths. The EMST data had 132,719 lives and 2,263 deaths. The data set had over 5.8 million exposure years of experience for the DWR sample and roughly 376,000 exposure years of experience for the EMST sample. We employed a number of analytic techniques including descriptive statistics and Survival Analysis based on the Cox Proportional Hazards Model, which is broadly applicable and the most widely used method of survival analysis.¹

For the morbidity study we compared the early claims experience of 54,836 individuals screened with the EMST and 39,735 individuals screened with the DWR. For the most part, we focused on claims experience within the three or first five years of policy issue.

A. Mortality Results

Figure 1 shows that the individuals who were classified as cognitively impaired by either the DWR or the EMST have higher relative mortality compared to those who are classified as cognitively intact.

Figure 1. Mortality status among those classified as cognitively impaired by test type



This analysis does not, however, control for differences that may be attributable to the age and gender distribution among the two samples, or it might be related to whether or not someone has limitations in activities of daily living (ADLs). We use the Cox Proportional Hazards Model to uncover the independent impact of cognitive classification controlling for other variables. What Table 1 shows is that when age, gender and ADL status are held constant, someone who “passes” the DWR has only 0.59 times the death hazard of someone who fails the test. In other words, an applicant classified as cognitively impaired has a death hazard that is 1.69 times greater than someone who is cognitively intact if we hold age and gender constant. Similarly, someone who “passes” the EMST has only 0.66 times the death hazard of someone who fails the test. Each additional year of age increases the death hazard by 11 per cent.

¹ For a more complete description of the study see *The Relationship Between Cognitive Impairment and Mortality Rates Among Long-Term Care Insurance Applicants*, presented at the Living to 100 Symposium Orlando, FL 5–7 January 2011, Society of Actuaries.

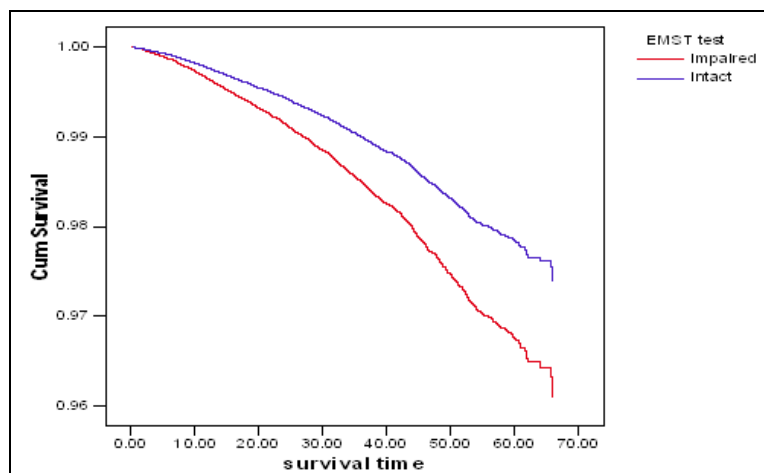
Table 1. Cox proportional hazard results

Characteristics	EMST Results		DWR Results	
	B	Exp(B)	B	Exp(B)
Cognitively Intact	-.411***	.663	-.534***	.586
Age	.102***	1.108	.109***	1.115
Female	-.447***	.64-	-.385***	0.68
Having 1 ADL Limitation	N.A	N.A.	.518***	1.679

Figure 2 shows the survival function pattern for those who passed and those who failed the EMST. A similar pattern exists for the DWR test.

What this analysis shows is the very clear relationship between individuals classified as cognitively impaired and subsequent mortality experience. This relationship holds even when controlling for age, gender and in some cases, ADL status. Few of these individuals expressed outward signs of dementia at the time of application. Experience in the LTC insurance industry suggests that screening for cognitive impairment can be administered successfully as part of the underwriting process and has implications for older age life insurance underwriting.

Figure 2. Survival function for pattern for EMST



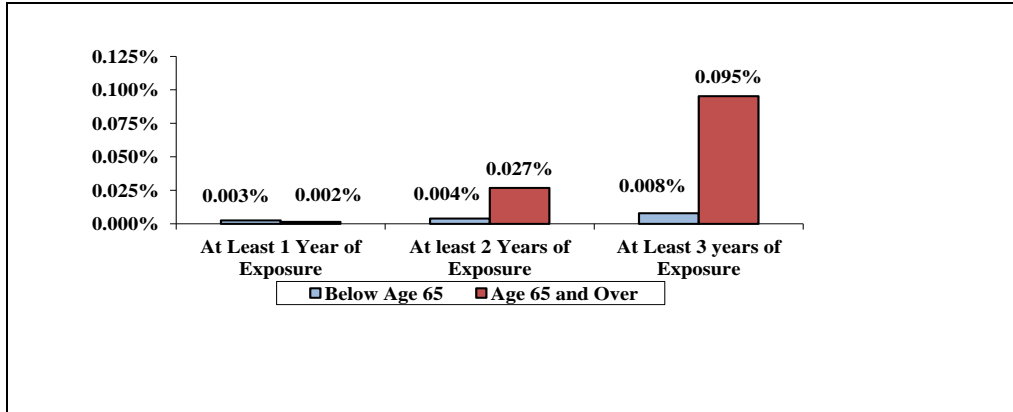
B. Efficacy of Cognitive Screening on Morbidity Experience

As mentioned, cognitive claims are among the most costly, even though they are not the most prevalent claim cause facing LTC insurers. For example, within two years of policy issue cognitive claims comprise 16 per cent of the total claim count whereas by year six, such claims grow to 30 per cent. However, in terms of liabilities, by year six the percentage of claim costs attributable to dementia is 52 per cent. We completed two analyses in order to determine the efficacy of cognitive screening on early claims experience. First, we analysed the claims experience from 209,000 LTC applicants who had held their policies for up to three years. Then we compared this to general population data related to the incidence rate for MCI for the over- and under-65 age groups. Secondly, we compared the effectiveness of the EMST and DWR on a group of applicants by analysing their claims experience over the first five years after policy issue.

The literature on the prevalence of MCI suggests that roughly 7 per cent of individuals age 65 and over and between 0.7 per cent to 1.5 per cent of individuals under age 65 have MCI; the incidence rate is between 0.08 per cent and 5.8 per cent (Margolis, 2007). Figure 3 below shows that the incidence rates of cognitive claims by years of exposure is very small. In fact, out of 209,000 applicants screened with the EMST, only 19 individuals went into claim during the first three years after policy issue. This is an

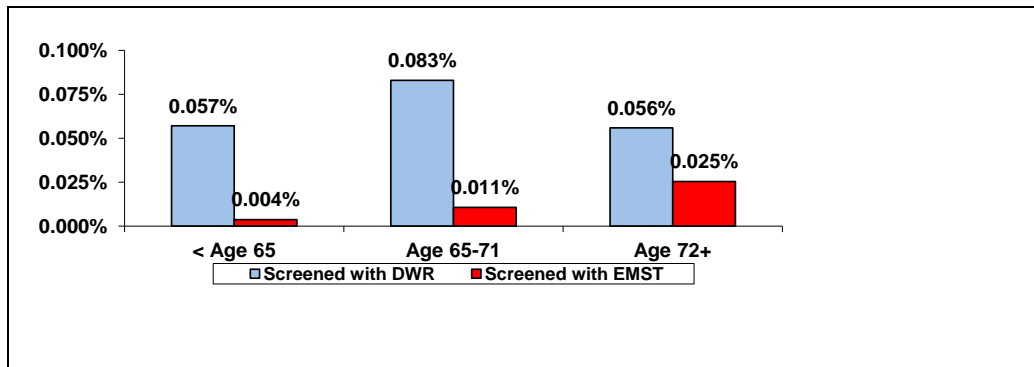
aggregate claims rate of 0.0091 per cent or 1 out of 11,000 individuals. The expected claims rate is closer to 0.39 per cent, which is a conservative estimate of prevalence since we account for the fact that the LTC applicant population is expected to be healthier than individuals in the general population. In essence, the EMST screen has successfully eliminated upwards of 90 per cent of the expected claim prevalence over the period.

Figure 3. Cognitive claim results by year of exposure and age



To compare the relative efficacy of the two tests for the first five years following policy issue, we analysed claim results for 54,836 individuals screened by the EMST and 39,735 individuals screened with the DWR. We controlled for age and exposure years and compared claim rates. Figure 4 shows the difference between the age- and exposure-adjusted claim rates for each of the two tests. On average, claims rates among the population screened with the DWR are five times greater than for the EMST over the study period. Depending on age, the claims rates for the DWR are between 2 and 16 times greater than for the EMST, based on this sample. Thus, the move toward the EMST and away from the DWR has been justified as evidenced by the improved claims experience of the former.

Figure 4. Adjusted claims rates by age and cognitive screen



Summary

These analyses demonstrate that being able to identify whether or not someone is at the earliest stages of cognitive decline can have a significant impact on underlying mortality and morbidity experience. Regarding mortality, not only dementia which is effectively screened for by both the EMST and the DWR, but also earlier forms of cognitive decline like MCI are related to excess mortality. Moreover, effective identification of MCI leads to improved early claims experience, especially when compared with screens that focus more on mild to moderate dementia. Finally, the successful use of these screens in the LTC insurance context suggests that they could be applied to other market segments that are focused on selling to older individuals.

References

- Knopman, D.S. and Ryberg, S. (1989) "A Verbal Memory Test with High Predictive Accuracy for Dementia of the Alzheimer Type", *Archives of Neurology*, Volume 46.
- Margolis, B. (2007) "Cognitive Screening in the LTC Insurance Industry: What's New", *Genworth Financial*, October, based on Ritchie K. *Dialogues Clin Neurosci*. 2004; 6:401.
- Shankle, W.R., Kimball Romney, A., Hara, J., Fortier, D., Dick, M.B., Chen, J.M., Chan, T. and Sun, X. (2005) "Effectiveness of CERAD Wordlist for Discriminating Normal Aging and Mild Cognitive Impairment due to Alzheimer's Disease and Related Disorders", *Proceedings of the National Academy of Sciences*, Volume 102, No. 13. pp. 4919-4924.



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