



**SCREENING FOR DEMENTIA AND THE IMPACT  
ON MORTALITY AND MORBIDITY IN LONG  
TERM CARE INSURANCE**

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# Purpose

- ◆ Present background on cognitive screening in the Long-term Care (LTC) insurance market
- ◆ Understand the relationship between the very earliest stages of cognitive decline - Mild Cognitive Impairment (MCI) -- and subsequent mortality
- ◆ Evaluate the efficacy of screening on early morbidity experience as measured by the incidence of dementia-related LTC claims



# Key Background on Risk and Costs of LTC

- ◆ LTC services are designed to help individuals perform basic living when they can no longer do so because of functional or cognitive limitations.
- ◆ LTC services are delivered in a variety of settings: institutional and home-based.
- ◆ There is a 67% chance that an individual will need LTC in their lifetime
  - There is an 80% chance that care will be needed for less than 2 years
- ◆ LTC Services are costly. Annual costs by service settings can total:

• Nursing home	\$79,000	(Mature Market Cost of Care Survey 2010)
• Assisted Living	\$39,500	
• Home Care	\$30,000	
- ◆ LTC represents the single largest financial risk faced by the elderly and their families

# Current LTC Insurance Industry Parameters

## ◆ Individual market

- Between 5.0 and 6.0 million policies in force.
- Total premium of over \$8 billion.
- Roughly two dozen companies still active in market
- Annual sales growth rate between 2004 and 2009 is -8%.
- Between 2009 and 2010 growth was positive at 15%

## ◆ Group Market

- Between 2.2 and 2.6 million certificates in force.
- Total premium of greater than \$2.0 billion.
- Compound annual sales growth rate between 2005 and 2010 is +5%
- Slightly more than 11,000 employer groups sponsoring coverage

- ◆ Concentration in both markets: Top 10 carriers in individual market and top 5 in group market: 90% of sales



# BACKGROUND ON SCREENING FOR DEMENTIA IN LTC INSURANCE



# Why the Need for Cognitive Screening?

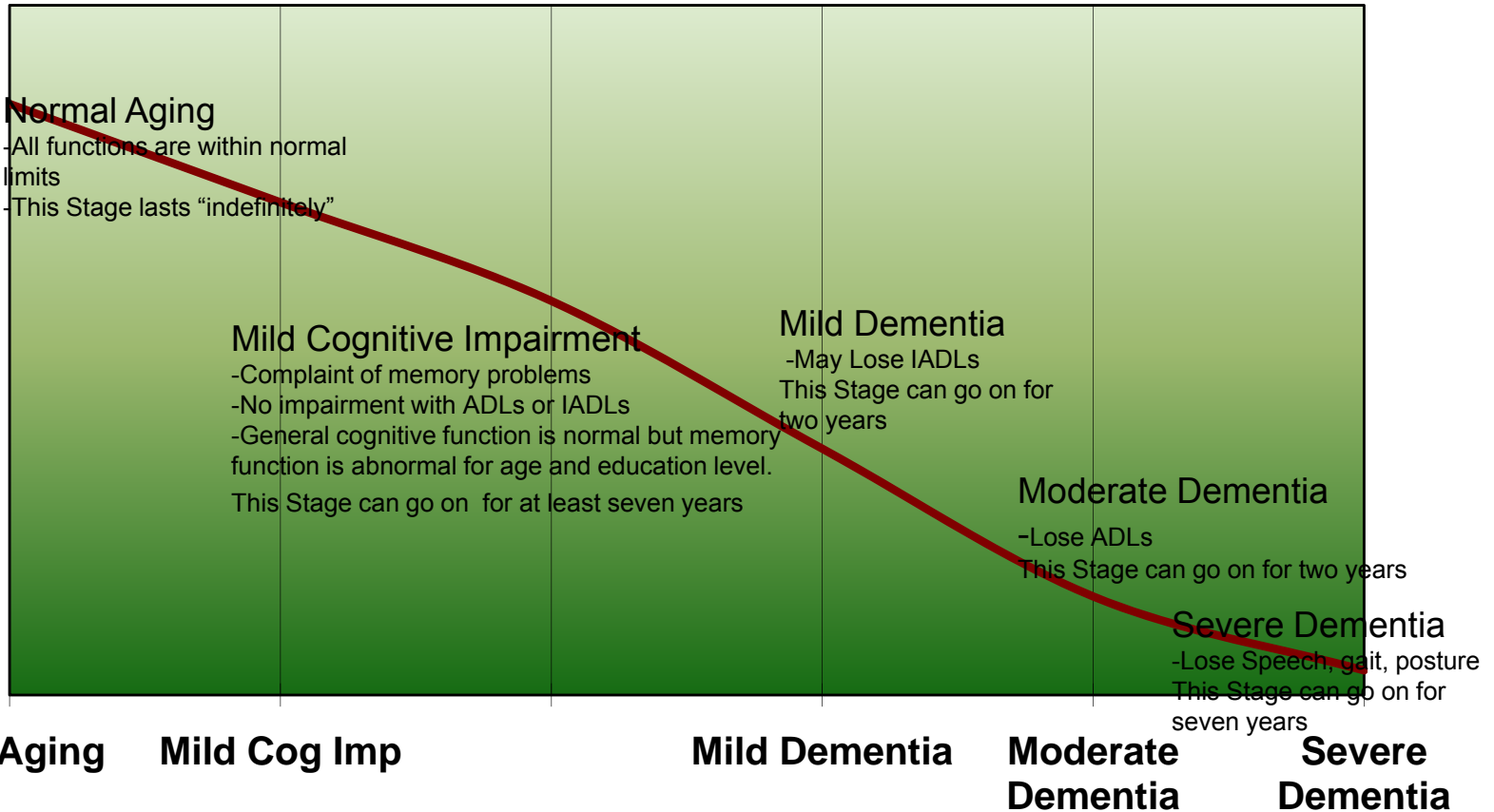
## ◆ The Growing Risk of Anti-Selection

- “...Individuals who learned that they were susceptible to Alzheimer’s were 6 times more likely to increase LTC insurance coverage than were other study participants” (*National Underwriter, April 15, 2005*)
- “In growing numbers, people are turning to brain screening to detect early signs of memory loss” (*Associated Press, on Yahoo, April 25, 2005*)
- “Physicians and psychologists are referring people more frequently for brain screens” (*Associated Press, on Yahoo, April 25, 2005*)

## ◆ One of the Leading and Most Costly Claim Causes

- Single most important claim cause for institutional care;
- Lifetime cost of dementia claim in institutional setting between \$183,000 to \$220,000;
- Roughly 25% of all claims occurring within first five years of issue have dementia.
- Within 2 years of issue Dementia represents 32% of claim dollars and by year 6 this figure has increased to 52%.

# Continuum of Cognitive Decline



The downward trend becomes more observable as impairment increases



# History of Cognitive Screening

- ◆ Prior to 1990: Little to no cognitive screening occurred
- ◆ Early 1990s, the Short Portable Mental Status Questionnaire (SPMSQ) and the Delayed Word Recall were used by the LTC Insurance industry
  - SPMSQ: Designed to identify current dementia status
  - DWR: Designed to be predictive of future (1-2 years) dementia status
- ◆ Late 1990's a variant of the DWR, the Minnesota Cognitive Acuity Screen (MCAS) was introduced
  - Designed to identify the presence of dementia and early symptoms of dementia
- ◆ In 2004 Enhanced Mental Skills Test introduced
  - Designed to identify Mild Cognitive Impairment (MCI) and used exclusively as an underwriting screen



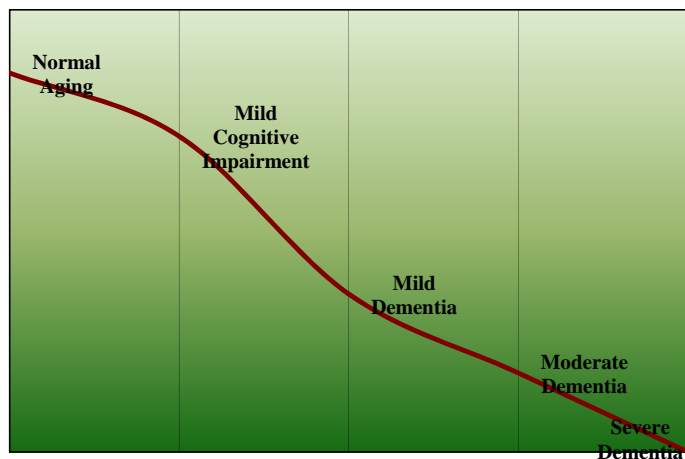
# Relationship between Cognitive Screens and Dementia

Each generation in cognitive testing leads to improved identification of earlier stages of cognitive loss

Subject of this analysis



Stages of Dementia	1st Generation SPMSQ/ MMSE	2nd Generation DWR/ MCAS	3rd Generation Screen EMST
<i>Severe Dementia</i>	X	X	X
<i>Moderate Dementia</i>	X	X	X
<i>Mild Dementia</i>	No	Some	X
<i>Mild Cognitive Impairment</i>	No	Some	X





# Cognitive Screens used in Studies

## ◆ **Delayed Word Recall (DWR)**

- Used by LTC companies throughout the 1990s and into early part of this decade
  - Valuable in identifying individuals with mild to moderate dementia; less sensitive for identifying MCI
  - Recall a given number of words after three trials
  - Administered telephonically or in-person

## ◆ **Enhanced Mental Skills Test (EMST)**

- From 2004 and on, the most widely used screen for cognitive impairment used by the LTC industry
  - Based on CERAD battery of tests, which is the gold standard for Alzheimer's and related dementia
  - A word recall test that takes account of the number of words recalled, which words recalled, order of recall, changes in performance over test trial.
  - Most accurate for identifying individuals at earliest stages of cognitive decline reported in the scientific literature.
  - Administered telephonically or in-person



# Data Collection for Mortality Study

- ◆ Telephonic and In-Person assessment data collected between 1/1/1996 and 12/31/2008.
- ◆ All data linked to the Social Security Master Death File to obtain mortality experience.
- ◆ DWR Data:
  - 764,037 lives
  - 5.8 million exposure years
- ◆ EMST Data
  - 132,719 lives
  - 376,000 exposure years



# Data

Characteristics	DWR Data	EMST Data
Number of lives	<b>764,037</b>	<b>132,719</b>
Years Assessed: 1996-2000	<b>38%</b>	<b>0%</b>
2001-2004	<b>48%</b>	<b>2%</b>
2005-2008	<b>14%</b>	<b>98%</b>
Average age: < age 65	<b>27%</b>	<b>48%</b>
65-74	<b>29%</b>	<b>36%</b>
75+	<b>44%</b>	<b>16%</b>
Gender: Male	<b>43%</b>	<b>45%</b>
Female	<b>57%</b>	<b>55%</b>
Screen Results: Pass	<b>89%</b>	<b>93%</b>
Fail	<b>11%</b>	<b>7%</b>
Deaths: Total Deaths	<b>160,255</b>	<b>2,263</b>
Death Rate	<b>(21%)</b>	<b>(1.7%)</b>

# Characteristics of Samples by Exposure Year and Deaths

Characteristics	DWR Data		EMST Data	
	Exposure Years	Deaths	Exposure years	Deaths
<b>Total</b>	<b>5.8 million</b>	<b>160,000</b>	<b>375,739</b>	<b>2,263</b>
<b>Gender: Male</b>	<b>2.4 million</b>	<b>80,347</b>	<b>168,750</b>	<b>1,281</b>
<b>Female</b>	<b>3.4 million</b>	<b>79,908</b>	<b>206,989</b>	<b>982</b>
<b>Age: &lt;age 65</b>	<b>1.6 million</b>	<b>6,553</b>	<b>185,140</b>	<b>324</b>
<b>65-69</b>	<b>496,402</b>	<b>6,147</b>	<b>79,003</b>	<b>404</b>
<b>70+</b>	<b>3.7 million</b>	<b>147,555</b>	<b>111,950</b>	<b>1,535</b>
<b>Impairment Status:</b>				
<b>Impaired</b>	<b>587,132</b>	<b>32,678</b>	<b>25,647</b>	<b>498</b>
<b>Not-impaired</b>	<b>5.2 million</b>	<b>127,577</b>	<b>350,092</b>	<b>1,765</b>



# Data Scrubbing

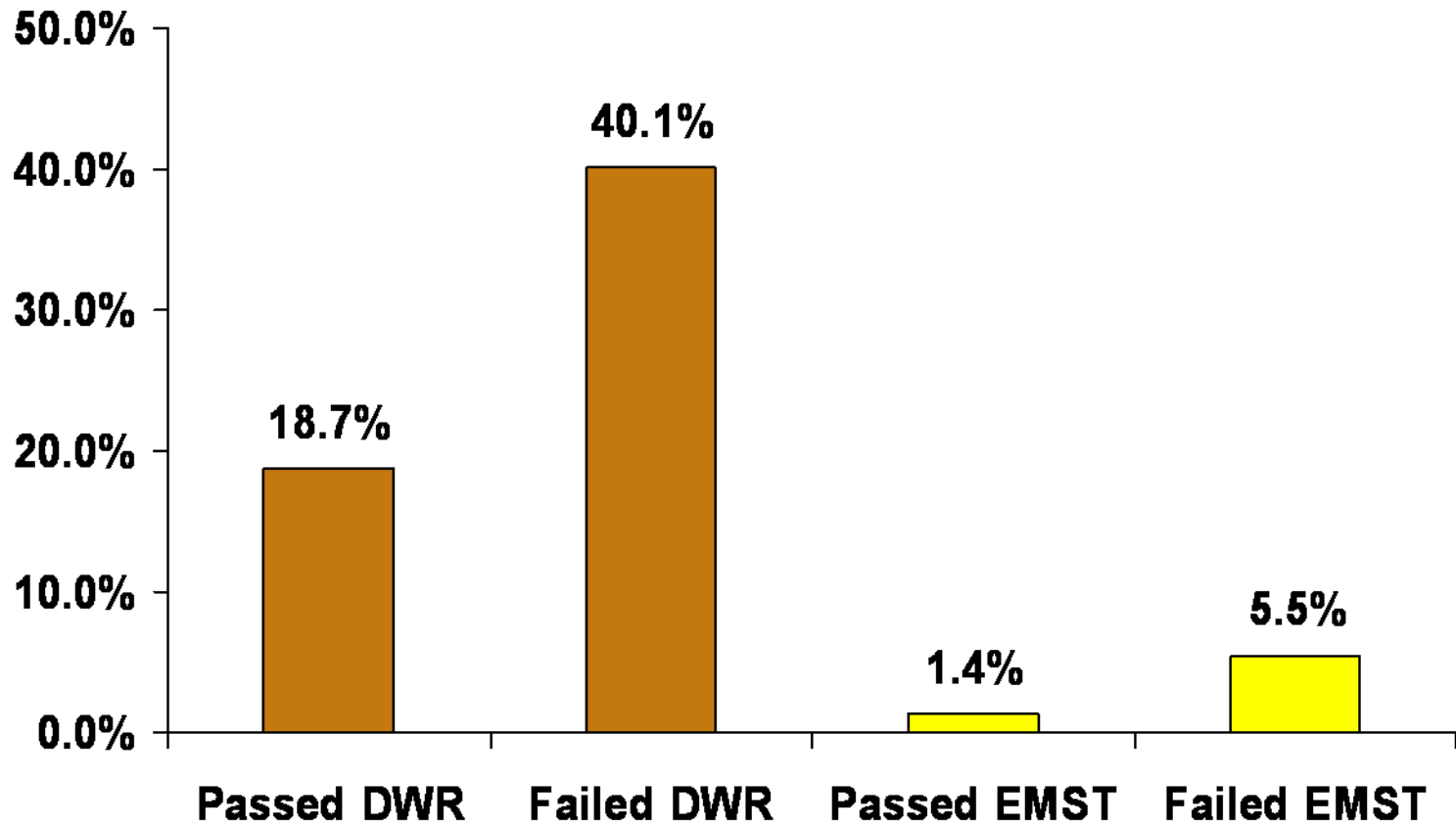
- ◆ Individual Classified as “Dead” if:
  - Match on social security number and
  - Match on Name and
  - Match on birth date
  
- ◆ Incomplete linkages are more likely to occur in recent years because verification process for SSA may take a few years.
  
- ◆ DWR Sample:       764,037 total lives  
                          160,255 confirmed deaths  
                          2,065 incomplete linkages
  
- ◆ EMST Sample       132,719 total lives  
                          2,263 confirmed deaths  
                          376 incomplete linkages



# Analytic Methods

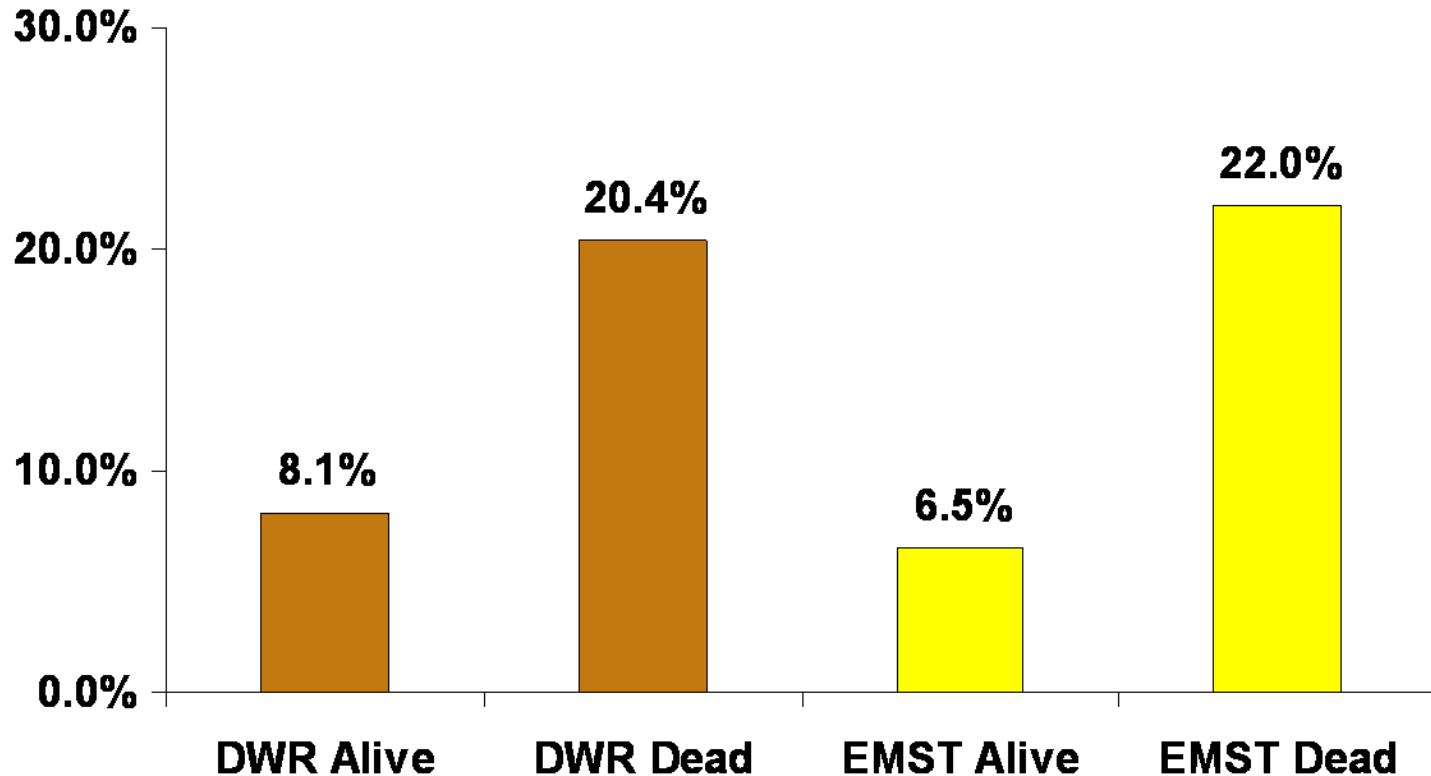
- ◆ Descriptive Statistics
  - Cross-tabulations and Chi Square
- ◆ Survival Analysis: Cox Proportional Hazards Model
  - Multivariate analysis to measure independent effect of variables
  - Accounts for right censored data (not everyone has yet died)
  - Creates hazard rate

# Cognitive Classification Status among Individuals who Died During the Study Period





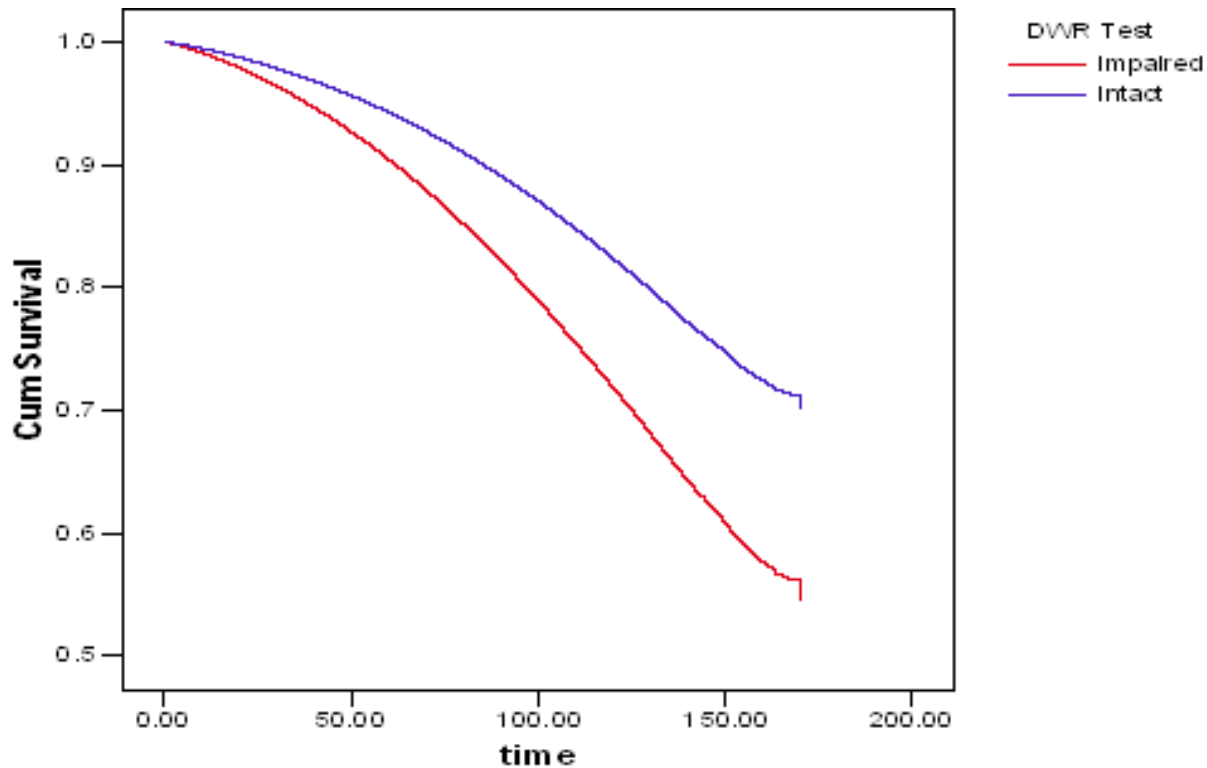
# Mortality Status among those Classified as Cognitively Impaired by Test Type



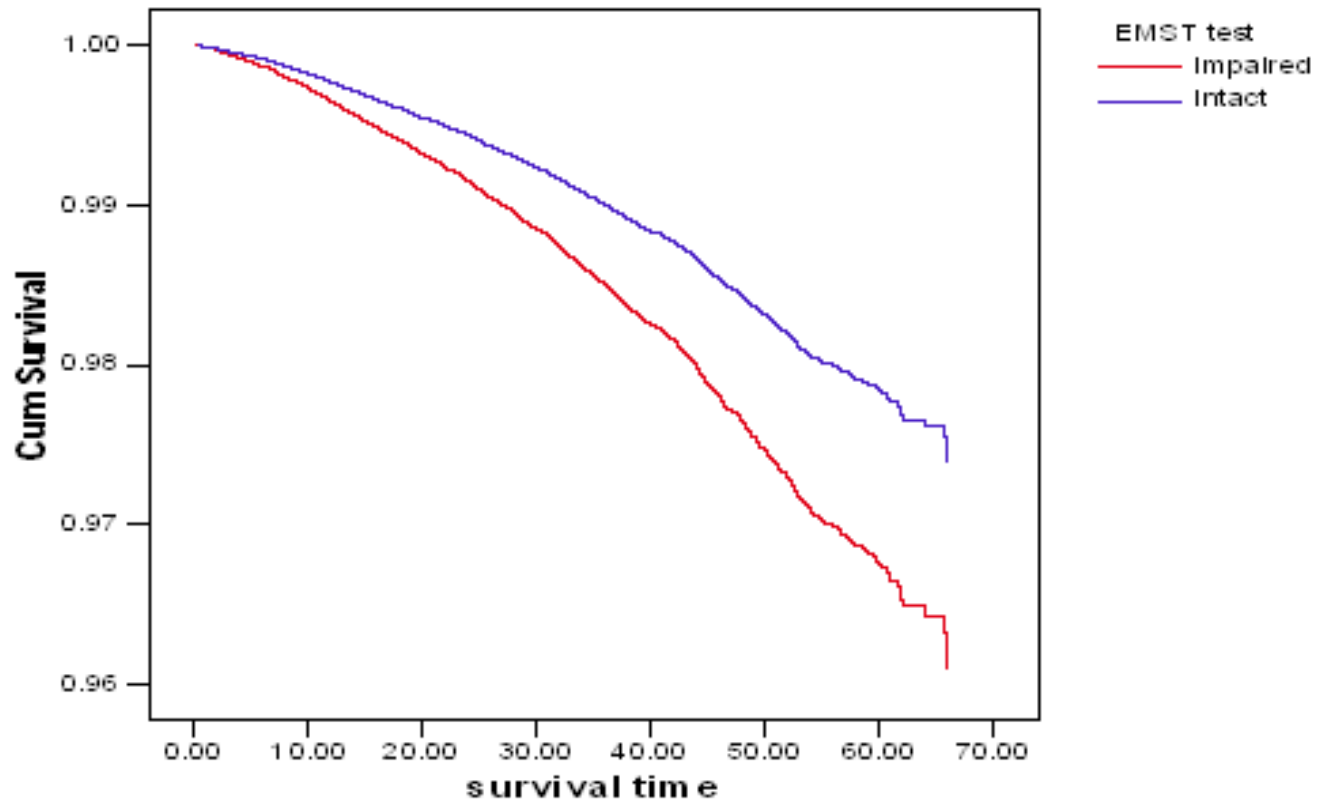
# Cox Proportional Hazard Results

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***	.680
Having 1 ADL Limitation	N.A.	N.A.	.518***	1.679

# Survival Function for patterns for DWR



# Survival Function for Pattern for EMST





# Mortality Study Limitations

- ◆ Applicant information was collected from many carriers and other factors not captured in the data are known to affect mortality
  - Marital status, education level, self-reported health, etc.
- ◆ Those already presenting with dementia were not included in study because screened out by agents.
  - Ability to generalize findings to the general aging public is impeded by pre-selection process that excludes a more representative aging population.
- ◆ We cannot make definitive conclusions about the degree of cognitive impairment in the study population



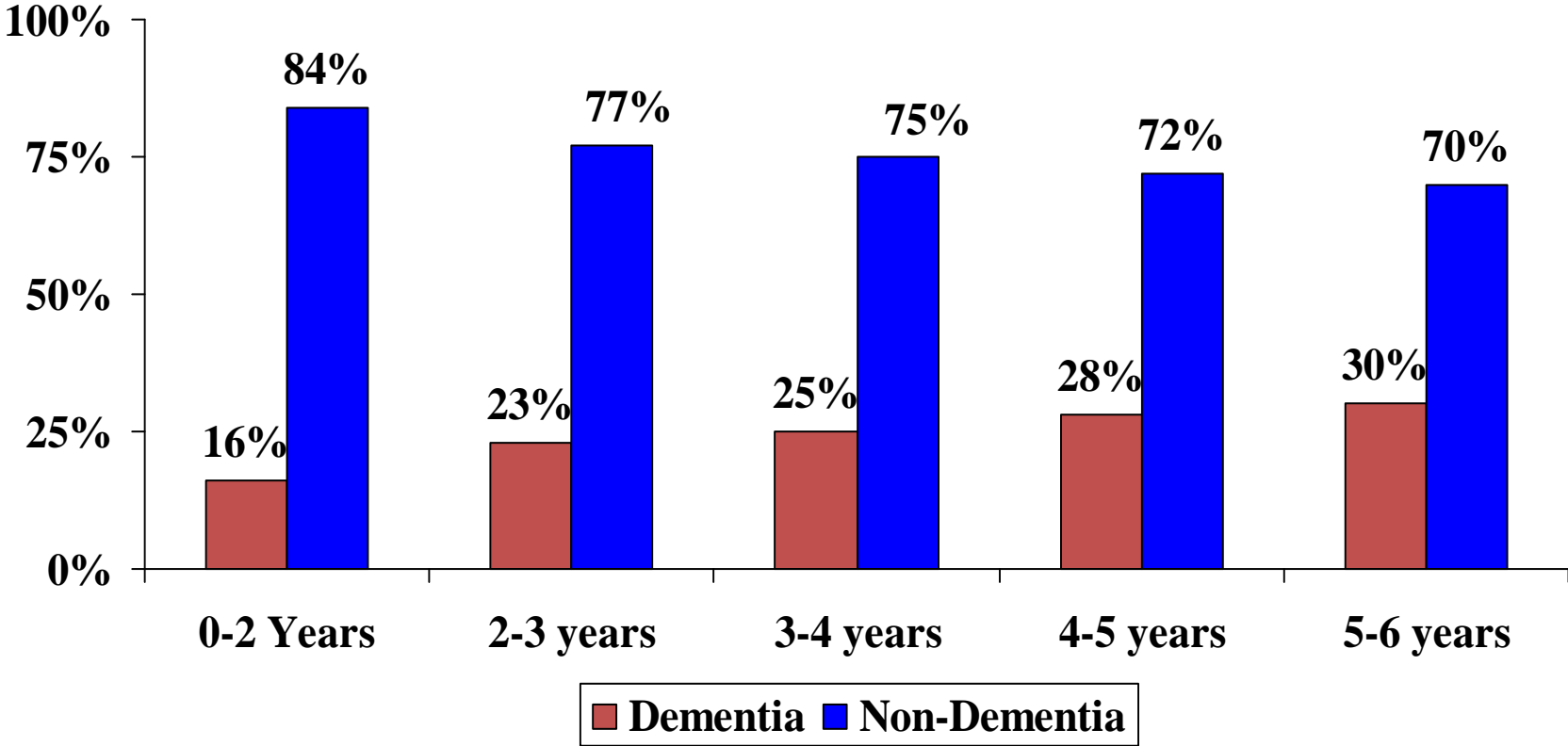
# Conclusions on Mortality Study

- ◆ There is a clear relationship between individuals classified as Cognitively Impaired and mortality status
  - The relationship holds even when controlling for age and gender and for ADL status
- ◆ Experience in the LTC insurance industry suggests that screens for cognitive impairment can be administered successfully as part of the underwriting process.



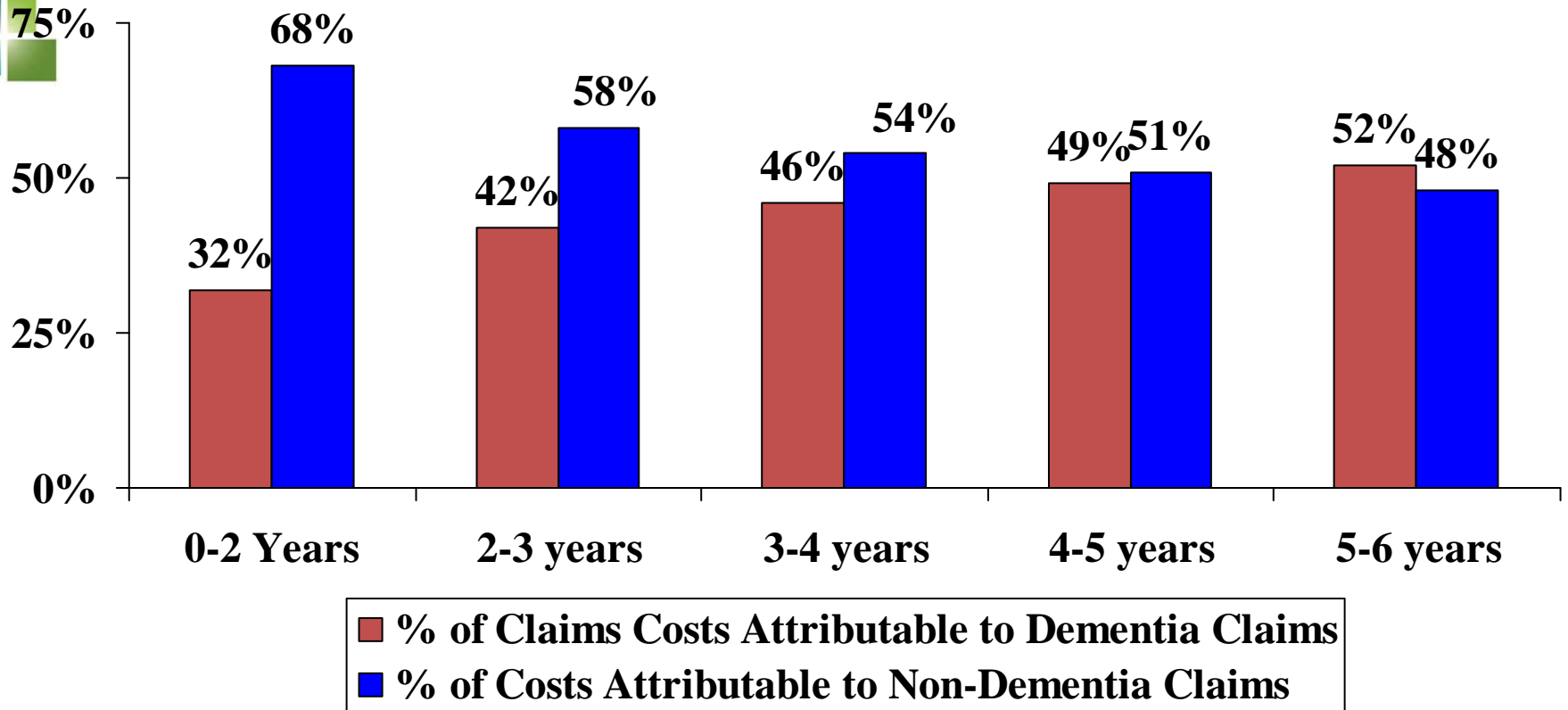
# IMPACT OF COGNITIVE SCREENING ON MORBIDITY EXPERIENCE

# Industry Claims Experience among LTC Insurance Claimants within Six Years of Policy Issue (“Early Claimants”)





# Financial Implications of Dementia Among Claimants within Six Years of Issue (“Early Claimants”)





## Prevalence of Mild Cognitive Impairment (MCI) and Dementia

### ◆ Age 65 and over

- 19% have MCI or manifestations of dementia.
  - 12.8% with dementia
  - 6.7% with mild cognitive impairment

### ◆ Age 45 to 64

- 2% have MCI or manifestations of dementia.
  - 1.3% with dementia
  - 0.7% to 1.5% with mild cognitive impairment

### ◆ Incidence rate between .08% and 5.8% per

**year** (Margolis, B. Cognitive Screening in the LTC Insurance Industry: What's New, Genworth Financial, October 2007 based on Ritchie K. *Dialogues Clin Neurosci.* 2004; 6:401)

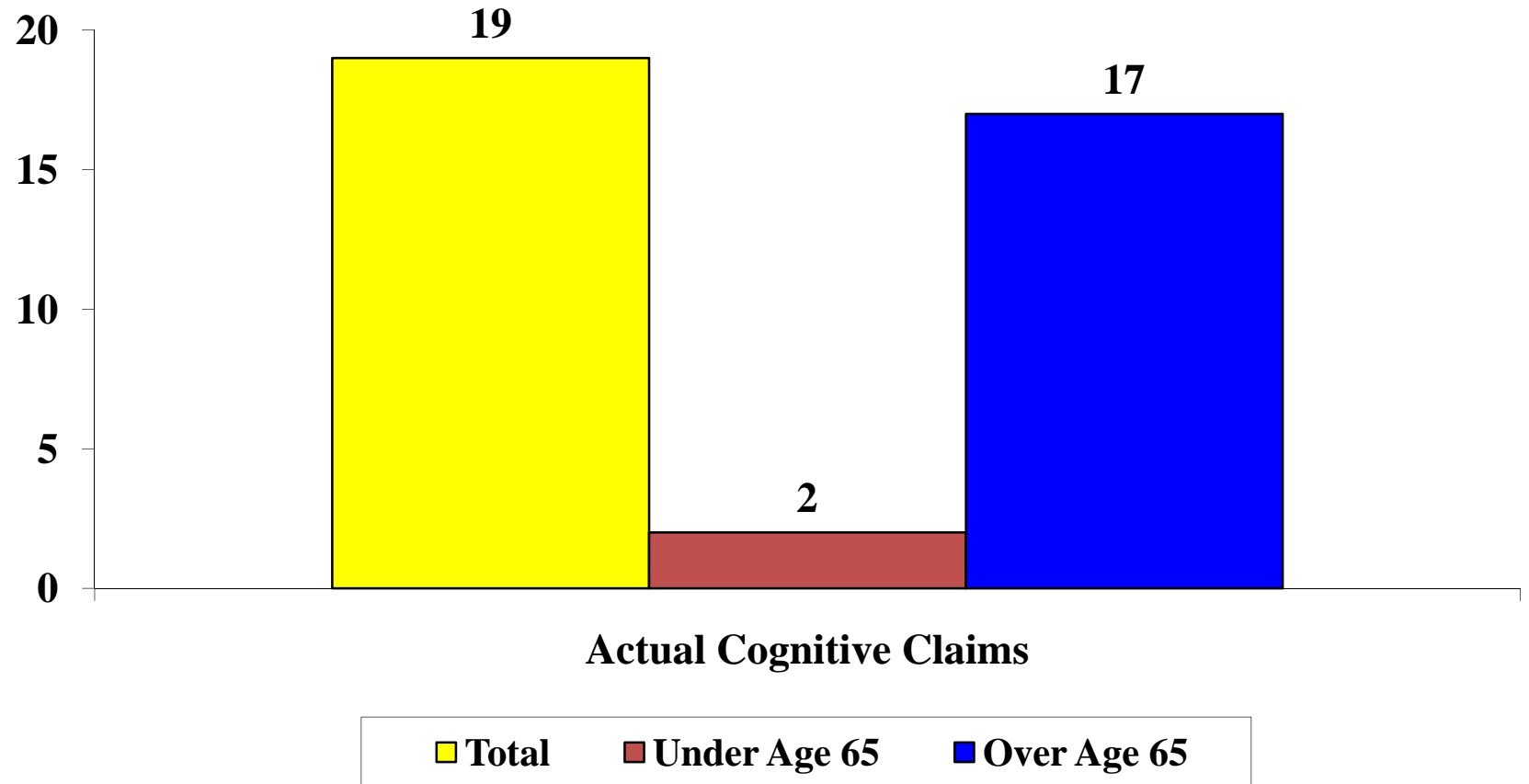


# Study of Cognitive Screening and Morbidity

- ◆ Purpose: To measure the impact of deploying cognitive screening in the underwriting process
  - Study 1: Study of aggregate Experience from 3<sup>rd</sup> generation Cognitive Screen (EMST)
    - Sample: 209,000 applicants from 2005 to 2009
    - Claims rates due to dementia (Alzheimer's and other dementias) within three years of policy issue
  - Study 2: Comparative study of impacts of 2<sup>nd</sup> generation and 3<sup>rd</sup> generation cognitive screen (DWR and EMST) on early claims experience

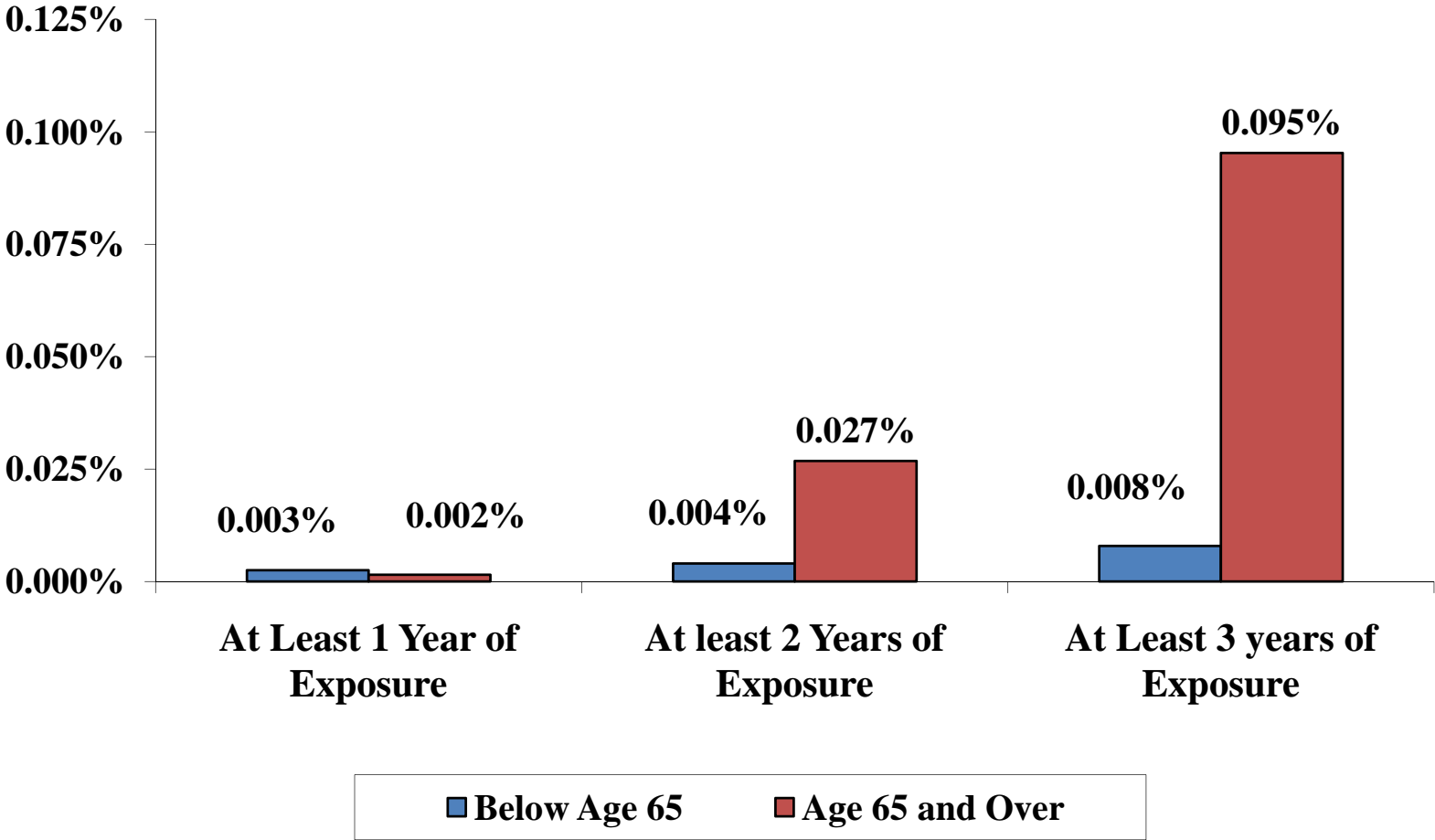
## Findings from Study 1:

Cognitive claim results with in within 3 years of issue for  
209,000 Applicants (Screened by the EMST)



Claims rate of .0091% or 1 out of 11,000 individuals over a 3 year period when expected claims rate is closer to .39%.

# Cognitive Claim Results by year of Exposure and Age



These are extremely low early cognitive claim rates. Published data suggests that for individuals >65, the MCI rate is between 5.6% and 14.2% for individuals and <65 it is roughly 1.0%. The EMST has screened out more than 90% of the prevalence for MCI.

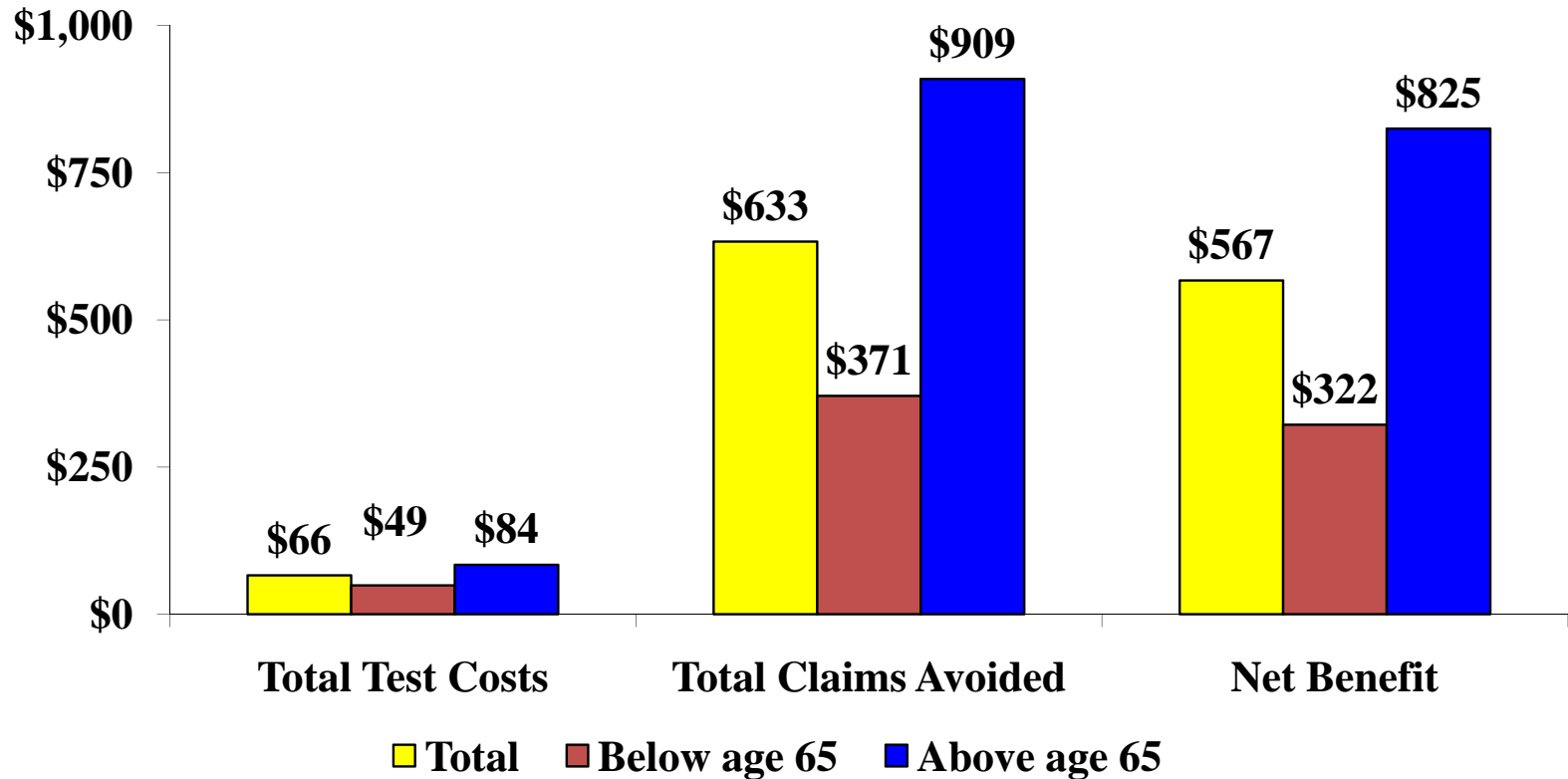


# Return on Investment based on Industry Study

## ◆ Key Assumptions

- Assume incidence rate for dementia over average exposure period to be .39%
  - Assumed to be lower than normal population
- Claims for population of 208,000 applicants:
  - Expected: 824 claims
  - Actual: 19 claims
  - Claims Avoided: 819 claims
- Dollar value per claim: \$164,000
- Weighted cost per cognitive screen: \$66 (telephonic and in-person)

# Net Benefit of Cognitive Screening per Applicant (over a 3 year period)



Note: for each \$1.00 invested in the screen, the ROI is between \$7.60 (under age 65) and \$10.80 (over age 65)



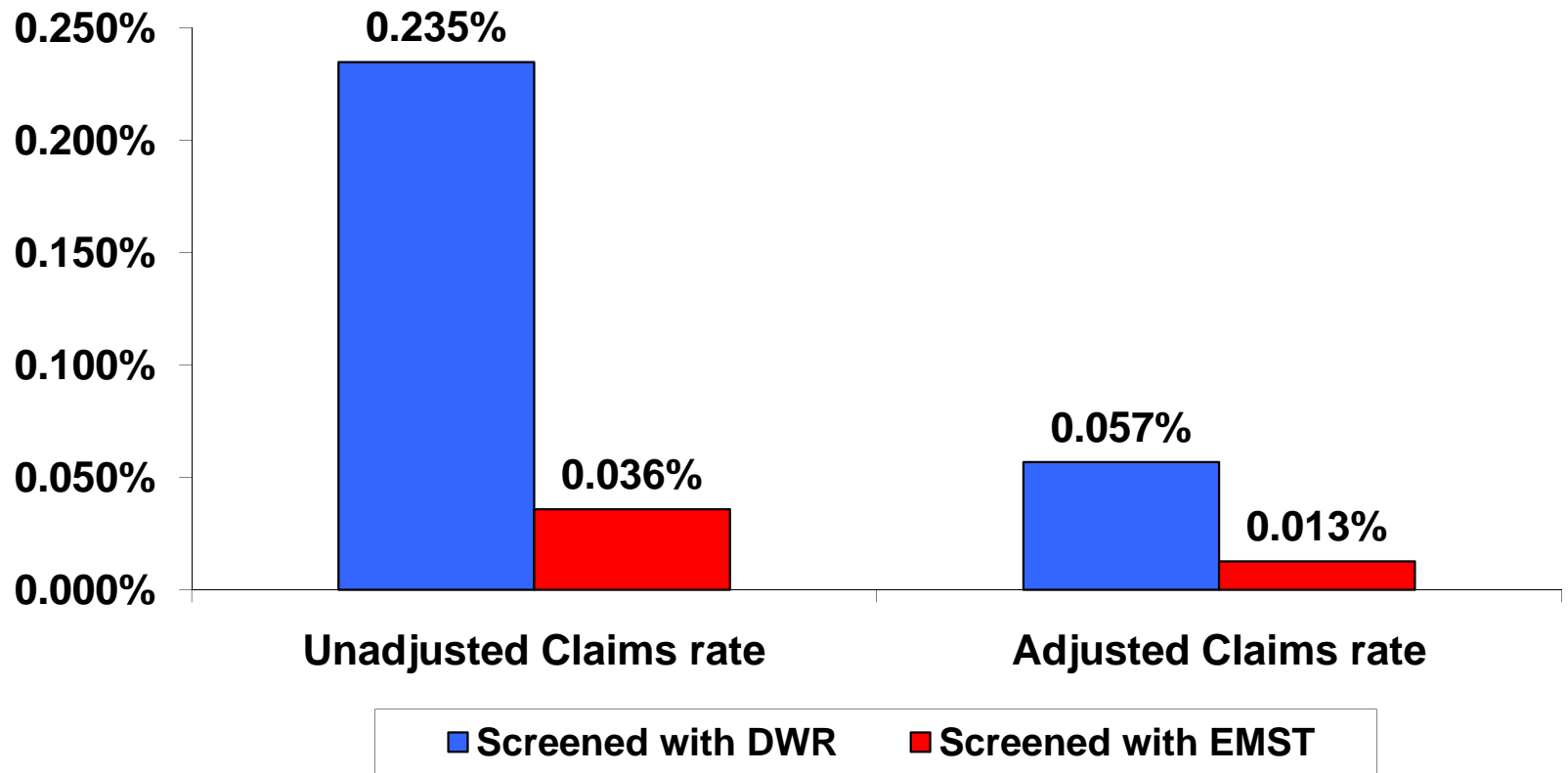
## Study 2: Comparative Analysis of 2<sup>nd</sup> and 3<sup>rd</sup> Generation Cognitive Screens (sample characteristics)

Characteristics	EMST	DWR
Number Cognitive Screens Completed over study period	54,836	39,735
Number of Claims by Cognitive Test	20	93
Average Sample Exposure years	2.82 years	4.13 years
Total exposure years	154,641	164,210
Percent Female	60%	63%
Average Age	64	68

Note: Pooled data

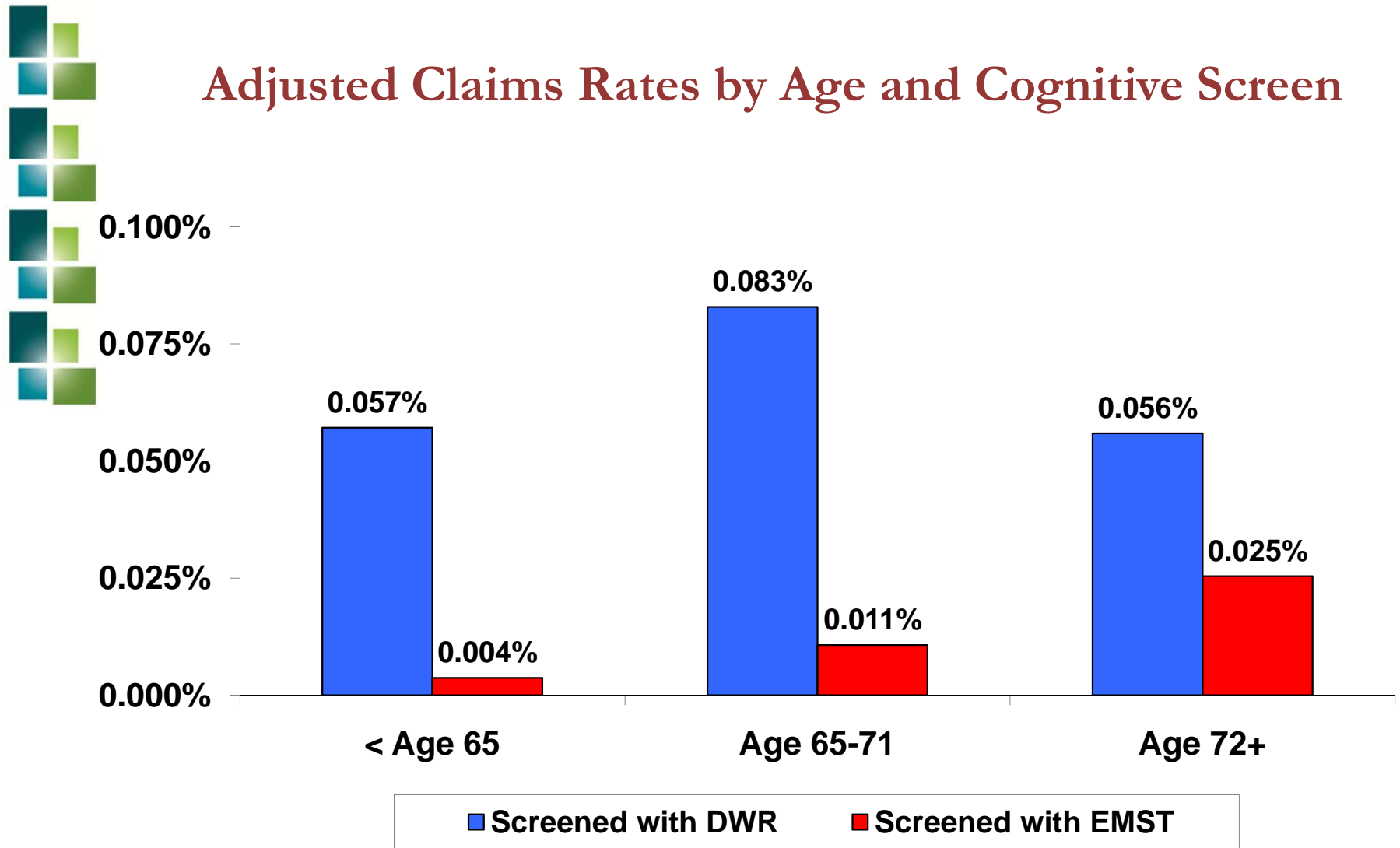


# Exposure-Adjusted and Unadjusted Claims Rates by Cognitive Screen



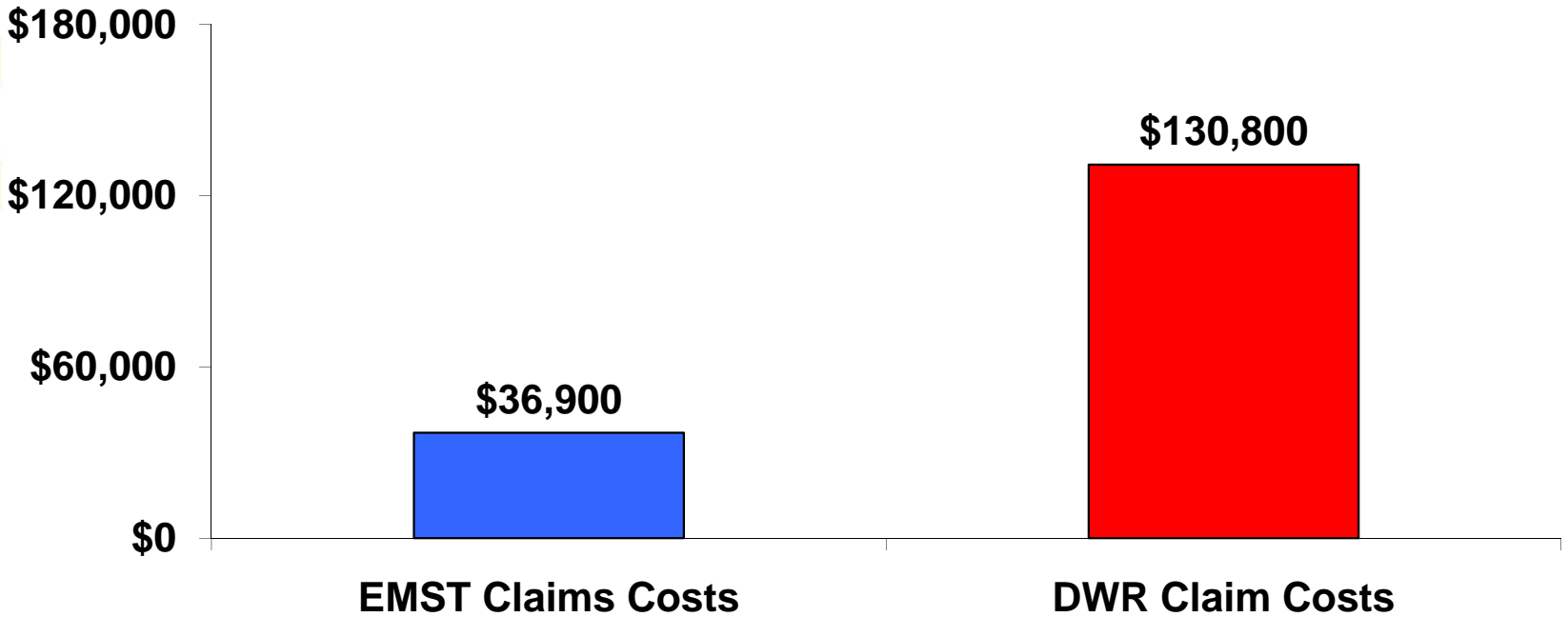
Note: Exposure-adjusted claims rate for the DWR is roughly five times greater than for the EMST over the study period.

# Adjusted Claims Rates by Age and Cognitive Screen



Note: Depending on age, the claims rate for the DWR is between two and 16 times greater than the claims rate for the EMST, based on sub-sample.

## Age and Exposure Adjusted Claims Costs by Cognitive Test over five year period per 1,000 Applicants



Note: Compared to the DWR, the use of the EMST has reduced claims costs by 72%, adjusting for both the age and exposure year distribution of the underlying sample.



# Conclusions

- ◆ Cognitive screening can successfully identify those at high risk for excess mortality and morbidity
- ◆ Not only dementia, but earlier forms of cognitive decline such as Mild Cognitive Impairment, are related to excess mortality
- ◆ Screens that focus on earliest stages of cognitive decline are more effective in screening out dementia-related claims during underwriting select period.
- ◆ Widespread market acceptance suggests that such screens could be applied in other market such as older age life insurance and disability insurance.