



**I'm Older and I Want More Insurance...
But I Can't Remember Why!**

**Cognitive Tests for Elderly Underwriting:
What's Happening in 2008?**

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**SEAC
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Outline

- **Gen Re LifeHealth Elderly Underwriting Practice Survey, January 2008**
- **Alternatives for assessment of cognitive function**
- **Evaluation of tests for use in life insurance underwriting**



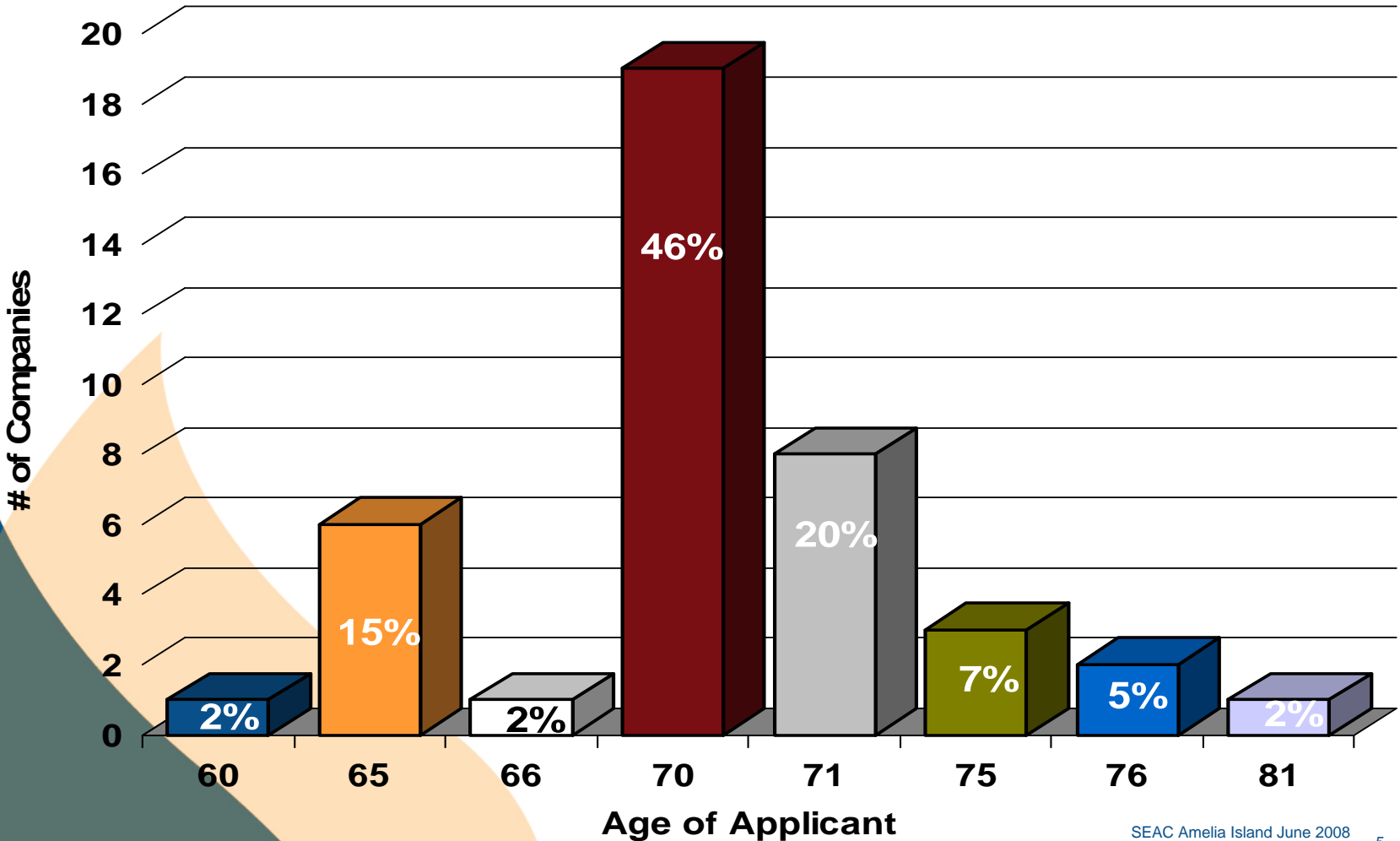
Gen Re LifeHealth Survey

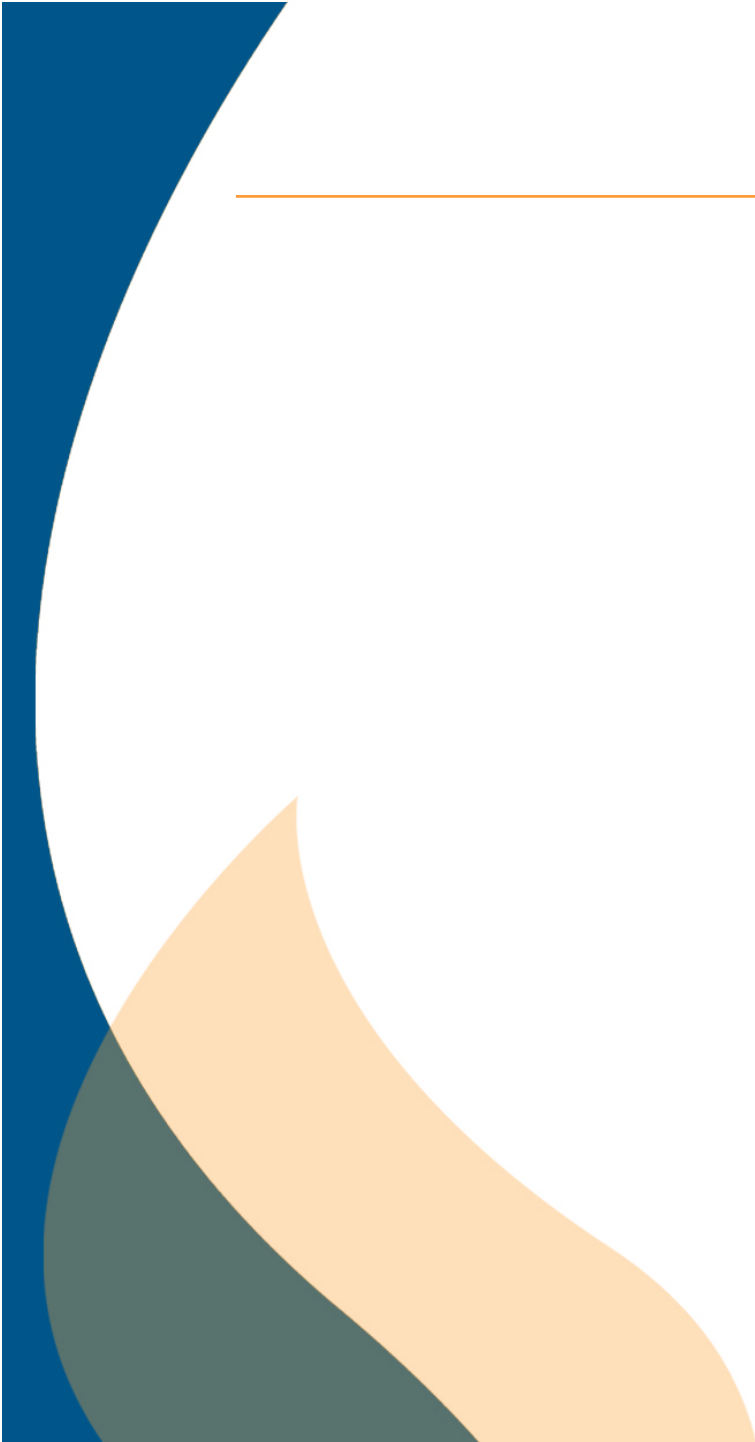
- **Data collection January 2008**
- **41 participating companies**
- **Mixture of large/small, stock/mutual, Gen Re clients/non-clients**
- **Selected results**

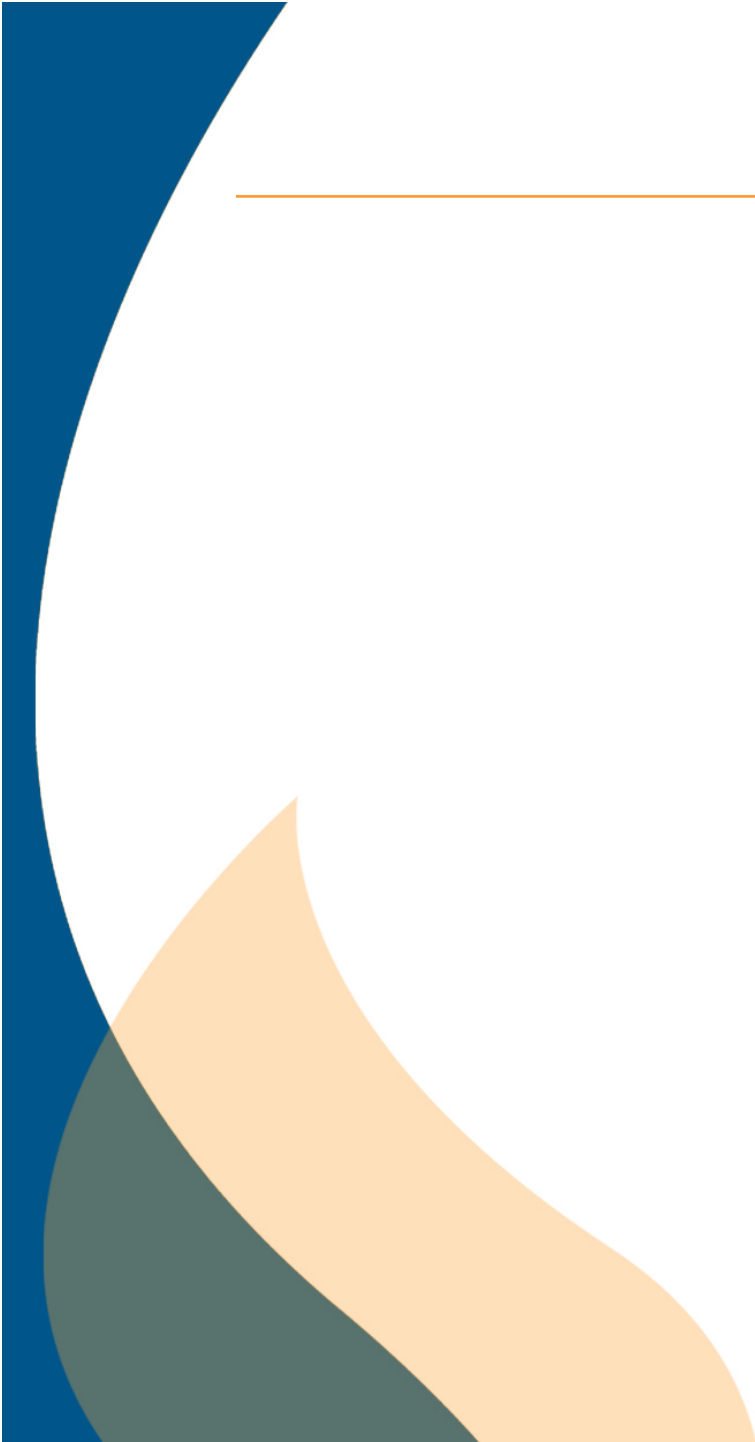


Who is old?

At what age do you classify an applicant as “elderly”?

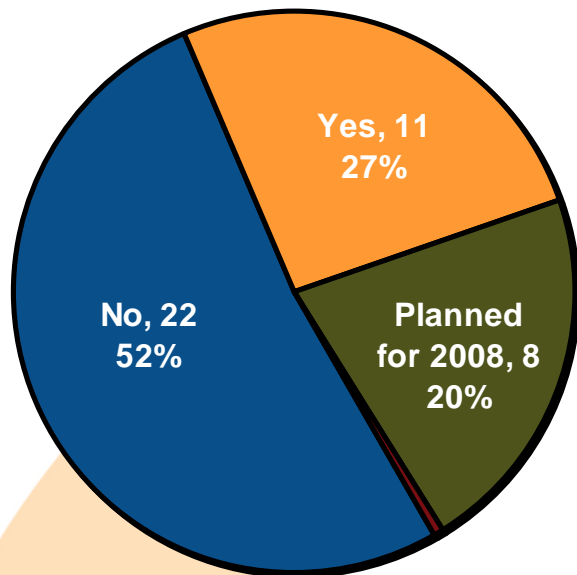






Prevalence of testing and test instrument

Is it your standard practice to test cognitive function in your elderly applicants? If yes, which of the following tests do or will you use?



Type of Tests	Of Companies Who Currently Use	Of Companies Who Are Planning to Add
Delayed Word Recall 10-Word (DWR)	6 (55%)	6 (75%)
Clock Drawing Test (CDT)	6 (55%)	5 (63%)
Mini Mental State Exam (MMSE)	2 (18%)	1 (13%)
Other	2 (18%)	1 (13%)
Enhanced Mental Skills Test (EMST)	1 (9%)	0
Minnesota Cognitive Acuity Screen (MCAS)	0	0

2007 SOA survey (data collection fall 2006): 19% of companies use cognitive test



Rationale

What are your reasons for testing/for not testing cognitive function?

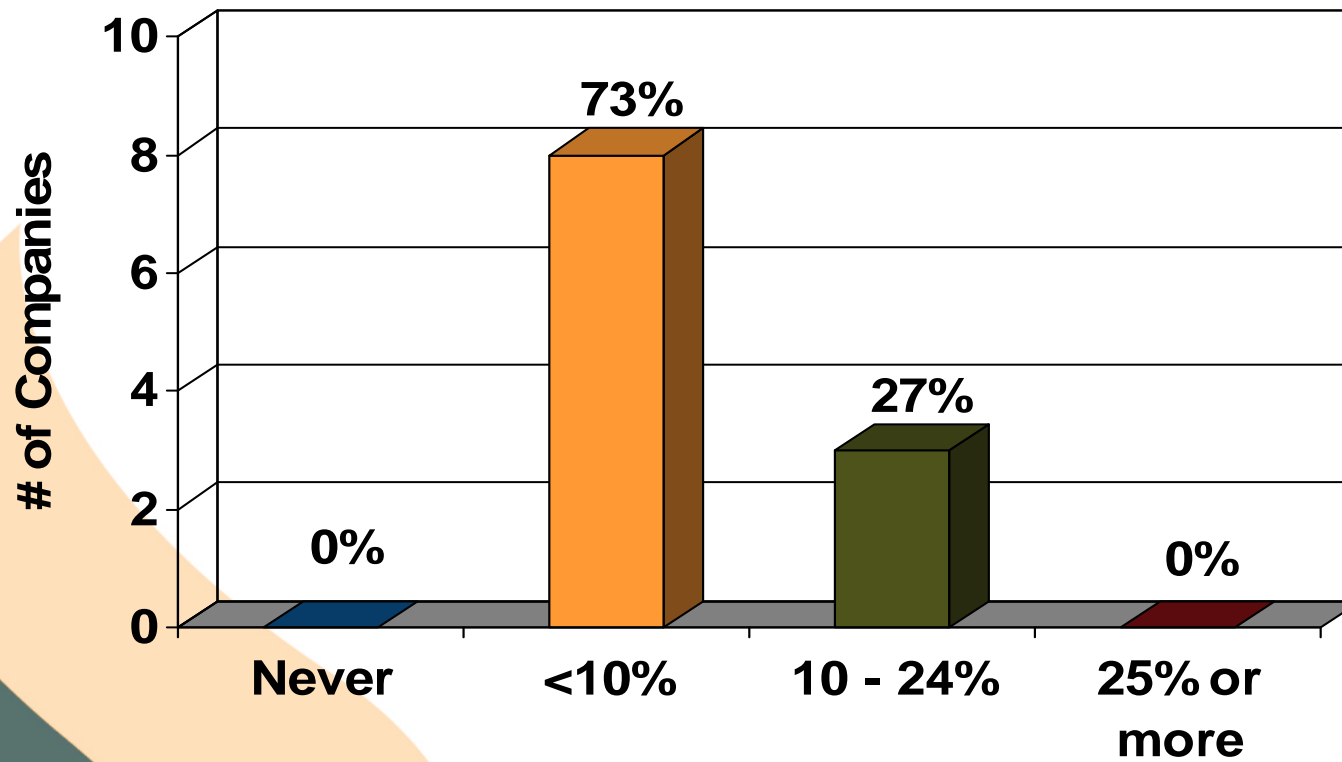
	Number of Companies
Unable to garner relevant information from existing requirements (e.g., attending physician statement)	16 (84%)
Problems are too common to ignore	11 (58%)
Able to offer more competitive premium to those who pass the test	11 (58%)
Adverse selection, because applicant is concerned or may have failed test for another company	10 (53%)
Information is usually evident in other requirements	12 (57%)
Other	10 (48%)
Makes it harder to do business	7 (33%)
Abnormalities discovered in the tests are too rare to justify	3 (14%)
Tests are too expensive	1 (5%)

2007 SOA: cost ranked second as reason not to test



Consequences

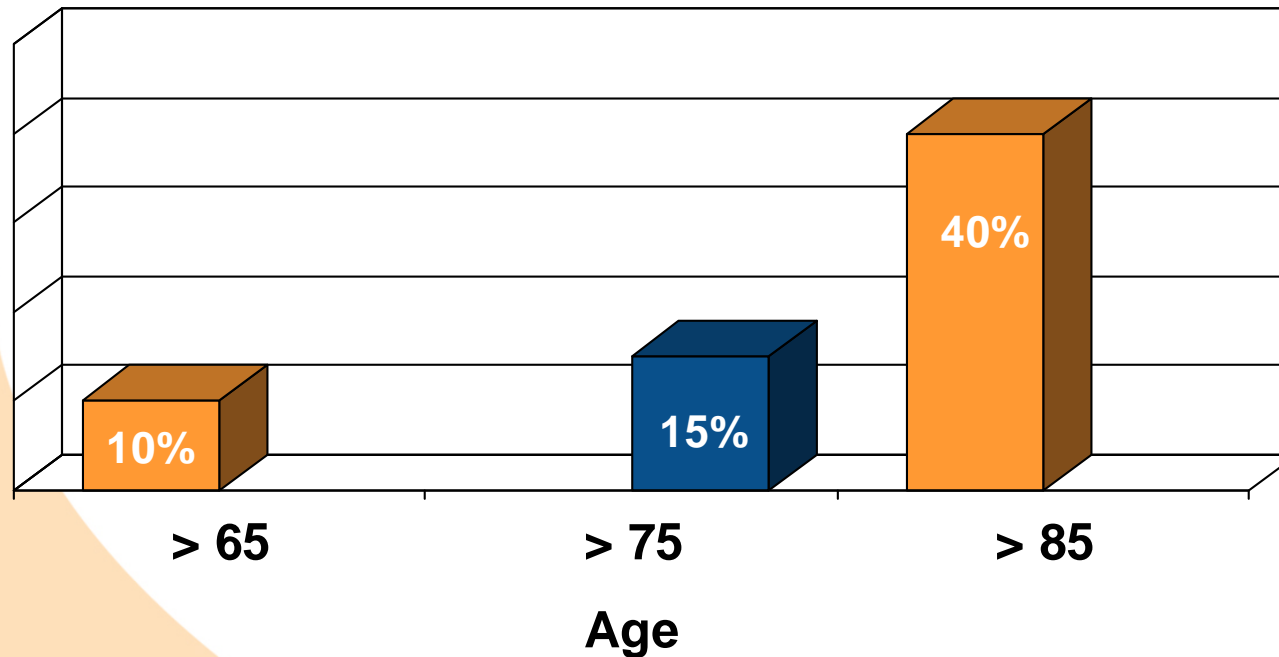
Approximately how often does cognitive function testing result in a risk classification that differs from the assessment you would have made without the test?



Cognitive function in the community

Prevalence (non-institutionalized population)

■ Dementia ■ Mild Cognitive Impairment



Annual rate of progression from MCI to dementia = 7-15%



Mortality

- **Cardiovascular Health Study powerful predictor of elderly mortality was cognitive impairment**
- **Regardless of definition or measurement, consistent result in numerous studies**



Review of Test Instruments

- **Ideal test**

Cost	Clarity	Scoring	Mortality
Quick No fee for use, score	Protocol Scoring Familiarity	Quantitative Objective	Evidence for relationship to outcome



Review of Test Instruments

- **Mini-Mental State Examination**
- **Clock Drawing Test**
- **Minnesota Cognitive Acuity Screen**
- **Enhanced Mental Skills Test**
 - **Delayed Word Recall**

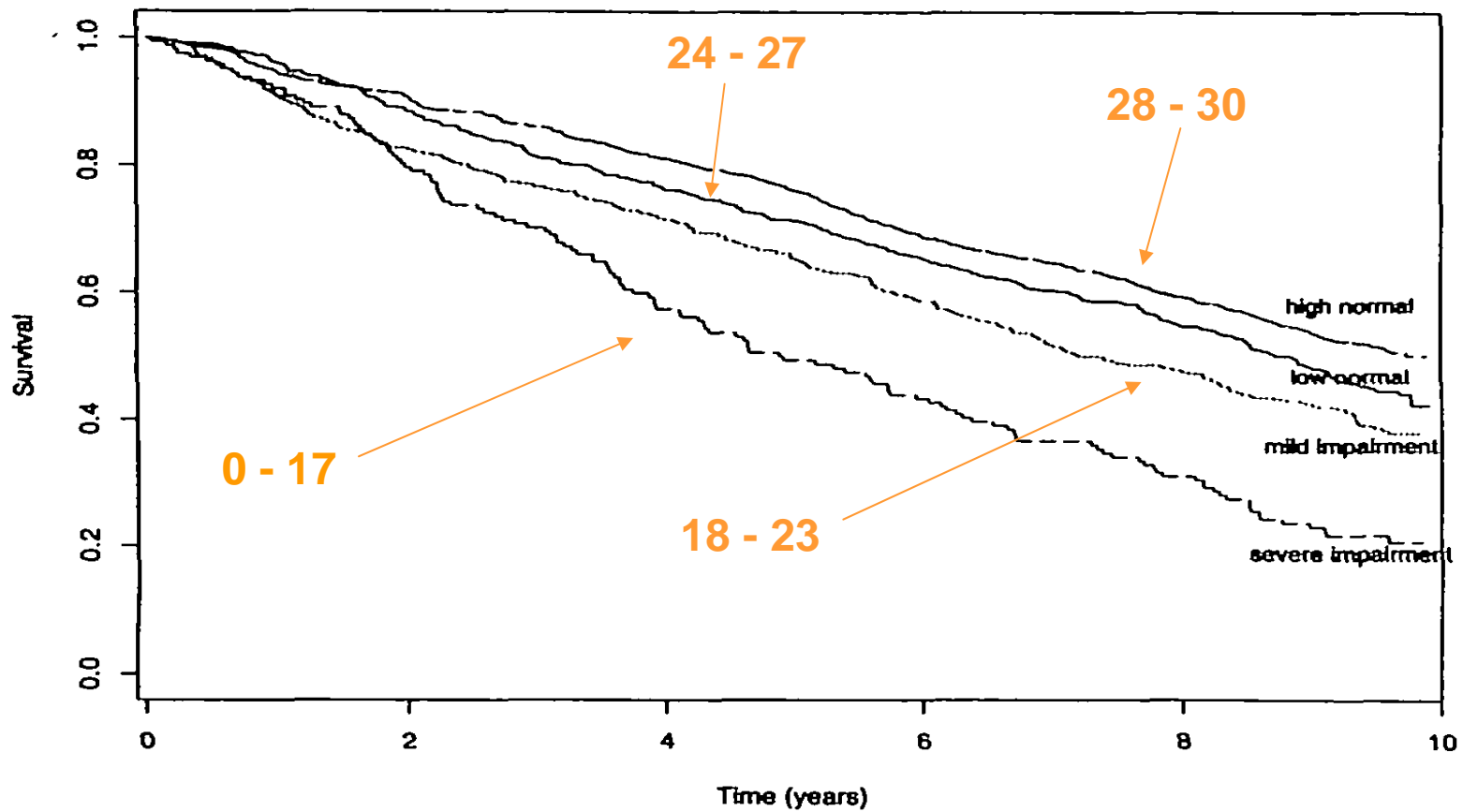


MMSE

- **Widest use, often benchmark to vet other tests**
- **Simple, quantitative, transparent**
- **Multiple cognitive domains**
- **Score range cumulative 0-30**
 - **age 80, > 12 yr education median 28**
 - **< 24 impaired**
- **Numerous points for extremely low-level function**
- **Knock-out answers?**
- **Ceiling effect by IQ, education limits sensitivity**
- **Copyright**
- **Extensive mortality evidence**



MMSE and Mortality



Bassuk SS "Cognitive Impairment and Mortality in the Community-dwelling Elderly"

AM J Epidemiol 2000; 151:676-88



Review of Test Instruments

- **Mini-Mental Status Examination**

Test	Cost	Clarity	Scoring	Mortality	Comment
MMSE	✓	✓	?	✓	Weak on mild disease; image



Clock Drawing Test

- **Executive involved in working memory and planning tasks: problem solving, complex attention, strategy formation, interference control, adaptation to changing environment**
- **Requires visuospatial, construction and executive**
- **Simple, transparent, quantitative (?)**
- **Mortality evidence**

Lavery LL "The Clock Drawing Test is an Independent Predictor of Incident Use of 24-Hour Care in a Retirement Community"
J Gerontol A Biol Sci Med Sci 2005;7:928-932



Clock Drawing Test

- **CLOX protocol CLOX2-CLOX1 scoring for executive function**
- **Executive impairment one of the earliest changes, regardless of etiology. May precede memory in AD.**
- **“Executive function is also adversely affected by poor health, such as falls, pain, certain medications, and hypoxemia. This may explain our finding of an association of the CLOX1 score with mortality.”**

Lavery LL “The Clock Drawing Test is an Independent Predictor of Incident Use of 24-Hour Care in a Retirement Community”
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Review of Test Instruments

- **Clock Drawing Test**

Test	Cost	Clarity	Scoring	Mortality	Comment
MMSE	✓	✓	?	✓	Weak on mild disease; image
CDT	✓	✓	?	✓	Image



Enhanced Mental Skills Test

- **CERAD 10 word lists (3)**
 - 3 trials immediate recall
 - Interference task
 - Delayed recall
 - Score all 4, DWR cutoff for classification
- **Proprietary scoring algorithm uses correspondence analysis to discriminate**
- **Position in list and order of recall**
- **Quantitative**

Shankle R PNAS 2005 www.pnas.org/cgi/doi/10.1073/pnas.0508150102



EMST

- **Statistics for MCI vs normal**
- **Telephone**
- **LifePlans, affiliated with MARC**
- **Will train anyone to administer**
- **Proprietary scoring**

	Sensitivity	Specificity
DWR	82	91
EMST	94	89



Review of Test Instruments

- **Enhanced Mental Skills Test**

Test	Cost	Clarity	Scoring	Mortality	Comment
MMSE	✓	✓	?	✓	Weak on mild disease; image
CDT	✓	✓	?	✓	Image
EMST			✓		Black box



Minnesota Cognitive Acuity Screen

- Includes DWR
- Adds assessment of judgment, reasoning, orientation, comprehension, attention, repetition, naming, fluency, computation
- Telephone capacity
- Nation's CareLink
- Proprietary scoring
- Quantitative



Review of Test Instruments

- **Minnesota Cognitive Acuity Screen**

Test	Cost	Clarity	Scoring	Mortality	Comment
MMSE	✓	✓	?	✓	Weak on mild disease; image
CDT	✓	✓	?	✓	Image
EMST			✓		Black box
MCAS			✓		Black box



Delayed Word Recall

- **Widely used in LTC for years**
- **Registration, memory domains**
- **Earliest deficit in DAT**
- **Simple, quantitative, transparent**
- **Language limitations**

Knopman DS "A verbal memory test with high



Delayed Word Recall

Necessary to follow validated script:

- **Step 1**
 - **“Now I am going to give you a list of 10 words which I will ask you to recall later in the interview. I would like you to repeat each word and use that word in a complete sentence. Again, this needs to be done in your head and you can’t use paper and pencil to write anything down, OK?”**
-
- **Chimney**
 - **Salt**
 - **Harp**
 - **Button**
 - **Meadow**
 - **Train**
 - **Flower**
 - **Finger**
 - **Rug**
 - **Book**

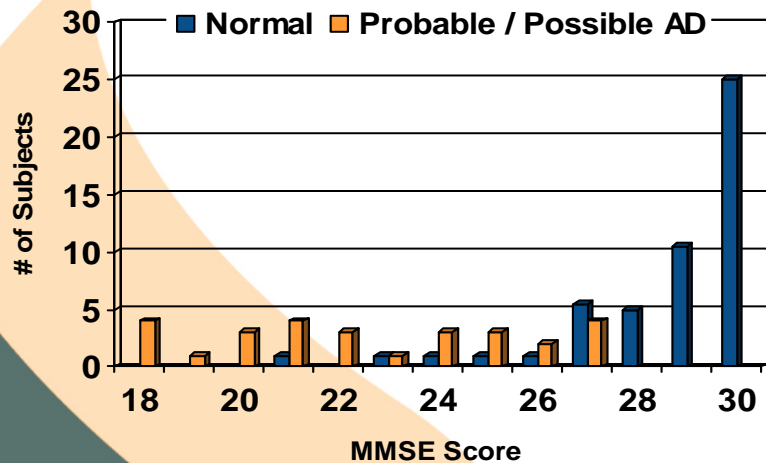
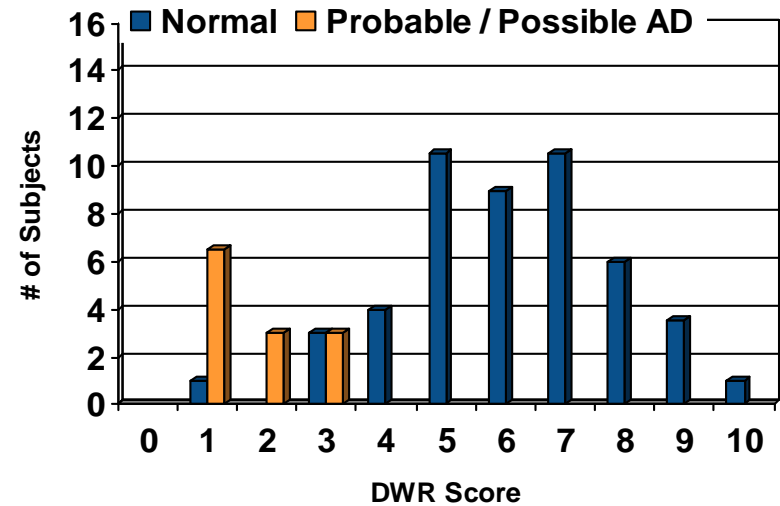
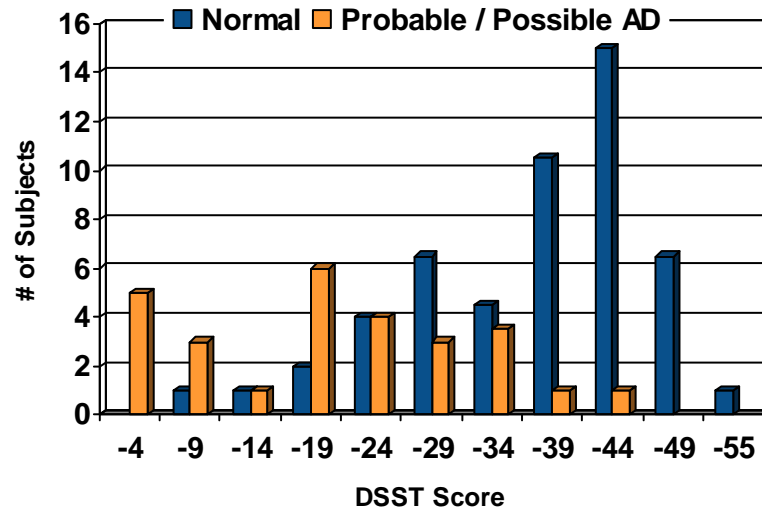


Delayed Word Recall

- **Step 2**
 - Repeat step 1 instructions
- **Step 3**
 - After step 2, tester sets a timer for 5 minutes, and continues other elements of the examination
- **Step 4**
 - When the timer rings, tester asks subject to recall all 10 words, and encourages the subject “until it is clear that subject is unable to continue.”
- **Score = number of words recalled**



Cognitive Test Comparison



Delayed Word Recall Validation

- **Gen Re LifeHealth DWR Mortality Study**
 - **Laura Vecchione, MD**
 - **Eric Golus, FSA**
 - **J Insur Med. 2007;39:264-269**

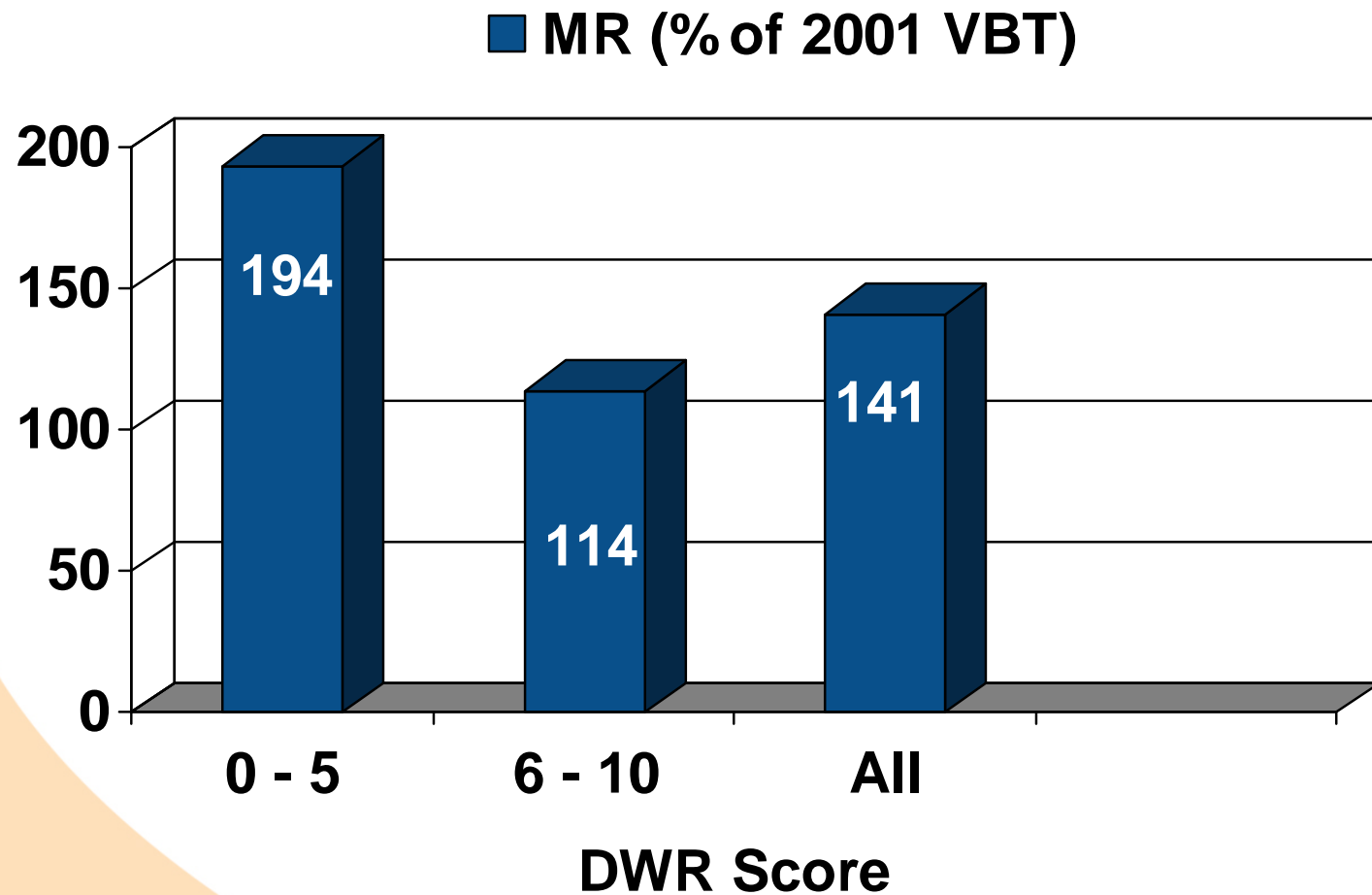


DWR Mortality Study

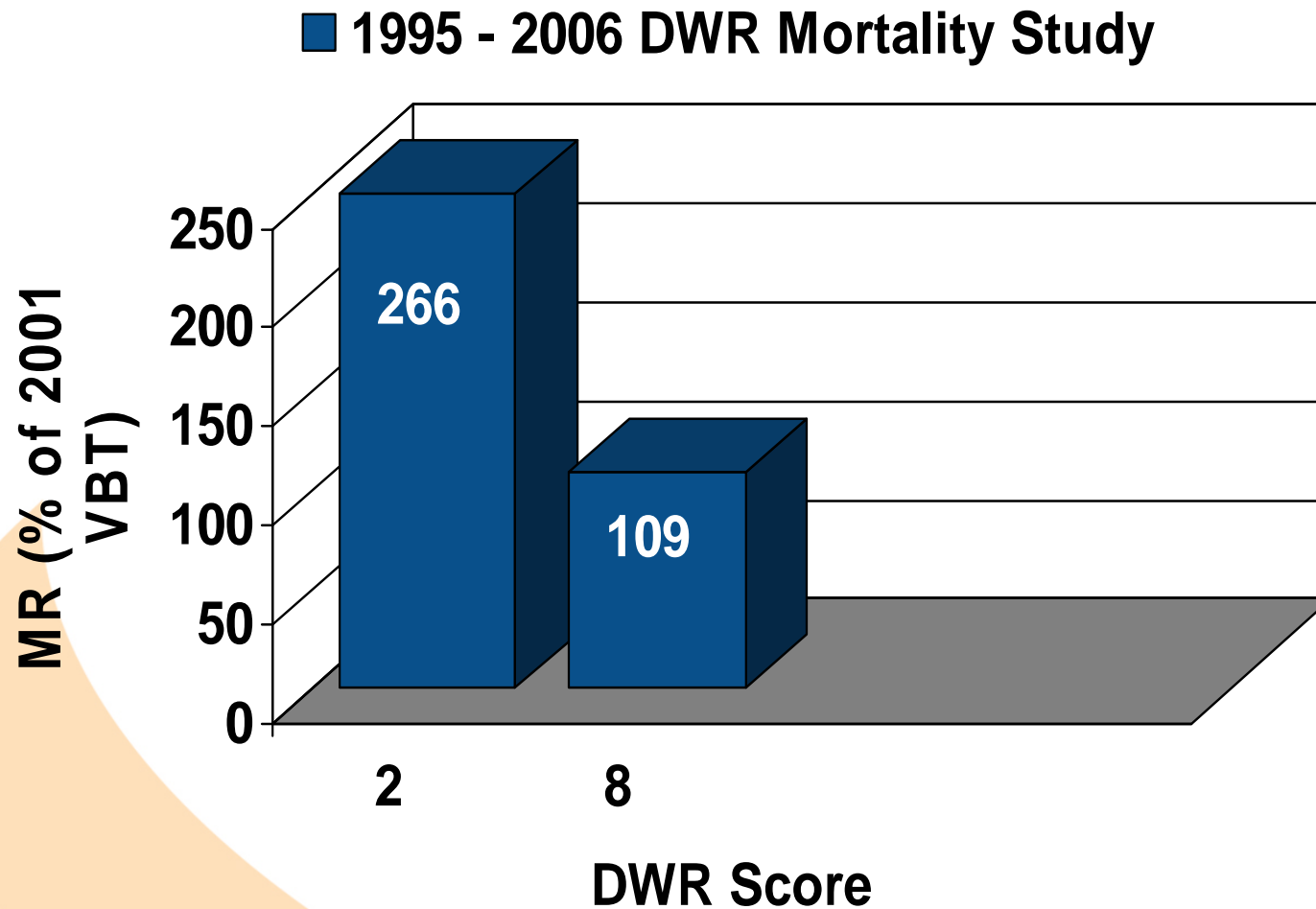
- **Surrogate for elderly life insurance in force, conventional underwriting**
- **Population of LTCI applicants**
 - Age 70 - 99, average 78.5
 - Up to 11.2 years of follow up, average 6.9 yr
 - 14,631 lives, 4,388 deaths
- **LTCI underwriting action:**
 - Issued (12,928)
 - Declined solely due to cognitive impairment (1,703)
- **Mortality determination**
 - Social Security Death Master File: Public record of all deaths
 - Match of applicant to SSDMF determines vital status and date of death
 - Observation period 1995-2006



Gen Re DWR Mortality Study 2006



Gen Re DWR Mortality Study 2006



Review of Test Instruments

- **Delayed Word Recall**

Test	Cost	Clarity	Scoring	Mortality	Comment
MMSE	✓	✓	?	✓	Weak on mild disease; image
CDT	✓	✓	?	✓	Image
MCAS			✓		Black box
EMST			✓		Black box
DWR	✓	✓	✓	✓	



Recommendations for Underwriting

- **Assess cognitive function**
 - 10 word delayed word recall
 - Clock drawing
- **Validate**
 - Instrument
 - Protocol
 - Mortality evidence
 - Appropriate population
- **Make it quantitative**
 - Objective
 - Underwriting performance
- **Don't innovate!**
- **Converge on a common standard**
 - Paramed performance
 - Data analysis
- **Don't go last!!!**

