

# Baylor College of Medicine

# BACKGROUND

Placement of an individual with Alzheimer disease (AD) in a long-term care facility creates a financial burden and may not be associated with improving life satisfaction for spouses and female family caregivers. <sup>1</sup> Treatment with antidementia drugs (cholinesterase inhibitors and/or memantine) is moderately efficacious and several observational studies have reported that time to placement in a long term care facility is favorably impacted by the use of these drugs <sup>2</sup> or a higher doses of a cholinesterase inhibitor. <sup>3</sup> This longitudinal study examined multiple factors including the cumulative use of antidementia drugs that could influence the time to long-term care placement in a cohort of Alzheimer patients followed over two decades.

# METHODS

#### Participants

- The study began in 1989 and enrolled 1833 patients with dementia as of December 31, 2005 (censoring date) in a prospective database at Baylor College of Medicine Alzheimer's Disease and Memory Disorders Center evaluated annually
- 558 probable AD patients [by NINCDS-ADRDA criteria 4] met criteria for inclusion in the analysis
  - o 83/641 were excluded from the analysis due to missing information on long-term care placement

# ANALYSIS

Multivariable Cox proportional hazards regression analysis with stepwise selection process to evaluate the relationship of baseline and time-dependent covariates or risk factors on time to placement. All analyses were performed on SAS version 9.2. Hazard ratios were determined for covariates significantly associated with time to placement (determined by a P value <.05)

# Factors that Influence Long Term Care Placement in an Alzheimer Disease Cohort

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#### **Outcome:** Time to nursing home placement

#### **Baseline variables**

- Age
- Gender
- Mini-mental Status Examination (MMSE) disease severity
- Caregiver relationship (spouse, family member, other)
- Years of formal education
- Medical comorbidities present in the past or currently active
  - o Diabetes, hypertension, hyperlipidemia, coronary disease, cerebrovascular disease
- Preprogression rate (PPR) calculated at the initial visit
- o [MMSE score (expected 30) MMSE score (initial) / physician's estimate of symptom duration (in years)]<sup>5</sup>
- o Patients classified as slow (0-1.9 MMSE points decline per year), intermediate (2-4.9 MMSE points decline per year), or rapid progressors ( $\geq$ 5 MMSE points decline per year)

#### **Time-dependent** variables

- MMSE
- Physical Self Maintenance Scale (PSMS) basic activity of daily living
- Instrumental Activities of Daily Living Scale (IADL) complex activity of daily living
- Clinical Dementia Rating Scale Sum of Boxes (CDR-SB) global functioning
- Psychotic symptoms (hallucinations, delusions)
- Parkinsonism
- Self-reported measure of caregiver stress
- Exposure to antipsychotic and antidementia drugs calculated annually
- o [drug use (years)/duration of symptoms (years)]

### RESULTS

#### Table 1. Population Characteristics of Patients with AD

Variable (N = 558)	Value	Percent	Range
Long-term care placement		87	
Time to long-term placement (years)	7.6 (3.37)		1.9 - 21.7
Age (years)	73.0 (8.56)		43 - 93
Female		68	
Race (white vs. non-white)		87	
Education (years)	13.6 (3.56)		0 - 29
Duration of symptoms before initial visit (years)	3.7 (2.30)		0.5 - 13
Follow-up time from baseline to censoring/death (years)	3.0 (1.85)		0.8 - 11.9
Total number of clinic visits	3.4 (1.59)		2 - 12
MMSE score	19.5 (6.60)		0 - 30
PSMS score	8.0 (3.05)		6 - 24
IADL score	15.5 (6.44)		2 - 30
CDR-SB score	6.6 (3.95)		0.5 - 18
Preprogression rate			
Slow	167	30.0	
Intermediate	254	45.5	
Rapid	137	24.5	

Mean (SD) for all continuous variables.

#### Table 2. Factors Associated with Increased Risk of Placement

Covariates	p Value	HR	(95% CI)
Pre-progression category			
Slow vs. intermediate	.02	0.4	(0.12 - 1.26)
Slow vs. rapid	.01	0.1	(0.02 - 0.54)
Intermediate vs. rapid		0.3	(0.09 - 0.79)
Time-dependent change ADL's or worsening PSMS score	.02	1.2	(1.03 - 1.31)
Time-dependent development delusions	.02	4.0	(1.31 - 12.31)



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# CONCLUSION

- Risk of placement is increased in patients with rapid intrinsic disease progression. The PPR or rate of disease progression is calculated at the initial patient encounter using a physician estimate of the onset of symptoms <sup>6</sup> and baseline MMSE score. We have previously reported there is a survival advantage associated with slower disease progression.<sup>7</sup> The PPR may assist clinicians to identify patients who will likely require additional support and help evaluate long term patient outcomes.
- The development of functional disability in basic activities involving physical self-care (toilet, feeding, dressing, grooming, ambulation, bathing) increases risk of placement. In the early stages of AD performance of complex daily functional activities essential to maintaining independence (IADL) may be altered but this does not seem to increase risk of placement.
- The development of delusions or psychosis significantly increases risk of placement.
- There was no observed relationship between the cumulative exposure to antidementia drugs over the time course of the illness and placement.

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