



Healthcare Resource Utilization Among Veterans with Alzheimer's Disease

Byron J. Aguilar, PhD^{1,2}, Mingfei Li, PhD^{3,4}, Ying Wang, MS^{2,3}, Peter Morin, MD¹, Dan Berlowitz, MPH, MD⁵, Amir Abbas Tahami Monfared, MD, PhD⁶, Quanwu Zhang, PhD⁷ and Weiming Xia, PhD^{1,8}

¹Boston University School of Medicine, Boston, MA, USA, ²Geriatric Research Education and Clinical Center, VA Bedford Healthcare System, Bedford, MA, USA, ³Bentley University, Waltham, MA, USA, ⁴Center for Healthcare Organization and Implementation Research, VA Bedford Healthcare System, Bedford, MA, USA, ⁵Zuckerberg College of Health Sciences, University of Massachusetts Lowell, Lowell, MA, USA, ⁶Eisai Inc., Nutley, NJ, USA, ⁷Alzheimer's Disease Franchise, Eisai, Inc., Nutley, NJ, USA, ⁸Geriatric Research Education Clinical Center, VA Bedford Healthcare System, Bedford, MA, USA

BACKGROUND

- Over 5 million Americans have Alzheimer's disease (AD), and the number is estimated to reach 14 million by 2050.
- The US Department of Veterans Affairs (VA) provides care for Veterans with AD via a variety of services such as home-based primary care, outpatient clinic services, and inpatient hospital services.
- Approximately half of all Veterans are at least 65 years old and are eligible for Medicare.
- Understanding the current and projected healthcare resource utilization (HCRU) related to AD diagnosis/management in the VA Healthcare System may improve quality of care.

METHODS

- This retrospective analysis utilized the electronic patient health records from the VA Corporate Data Warehouse for clinical note search via Text Integration Utilities (TIU).
- An initial sample of 94,786 clinical notes was extracted from April 1, 2008 through October 12, 2020 using the following targeted keyword search for Alzheimer's disease and severity: 'AD' or 'Alzheimer' and 'mild' or 'moderate' or 'severe' within one word distance of one another.
- Patients at least 50 years old at the time of the AD note between April 1, 2009 and October 12, 2019 were included to ensure information is available for 1 Year Pre-Index and 2 Years Post-Index.
- The control group was propensity score-matched to the AD group by age, sex, and race. Matched control patients were assigned the AD index date.
- HCRU was assessed via hospitalization and outpatient records within the 3-year study period.

Patients with AD note: 55,188

Patients ≥50 years old: 32,104

Patients in study period: 21,411

SAMPLE CHARACTERISTICS

Demographic	AD (N=21,441)	Control (N=77,344)
Age (SD)	75 (10.72)	75 (10.75)
Sex		
Male	96.76% (20,746)	96.96% (74,991)
Female	3.24% (695)	3.04% (2,353)
Race		
White	83.09% (17,816)	83.91% (64,898)
Black or African American	10.25% (2,197)	9.55% (7,385)
Other	2.58% (554)	2.56% (1,983)
Unknown	4.08% (874)	3.98% (3,078)
Ethnicity		
Non-Hispanic	89.38% (19,164)	91.21% (70,548)
Hispanic	7.54% (1,617)	3.81% (2,949)
Unknown	3.08% (660)	4.97% (3,847)

Data are presented as % (n) unless otherwise noted. Age is at time of first TIU note establishing AD diagnosis.

Control group is propensity score matched based on sex, age, and race. Matched control patient is assigned the AD index date. Other race includes Native American or Alaskan Native, Asian, and Native Hawaiian or Other Pacific Islander.

RESULTS

AD patients identified via TIU have higher HCRU than matched control patients.

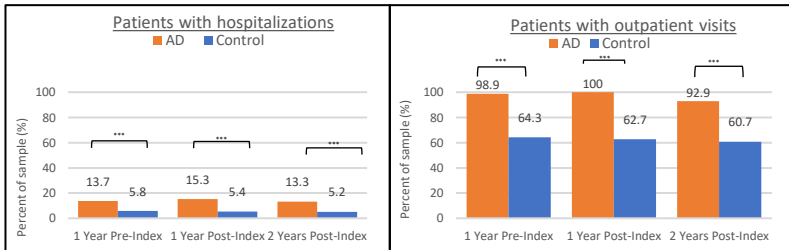


Figure 1: Healthcare resource utilization of TIU-identified AD patients and propensity score-matched control patients.

*** = unadjusted p value < 0.0001.

AD patients identified via TIU have longer LOS than matched control patients.

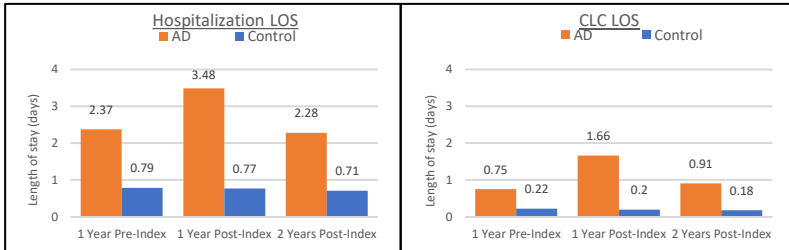


Figure 2: Length of stay for hospitalized patients and patients admitted into CLC.

Values are mean of LOS reported as days. LOS, length of stay; CLC, community living center.

Moderate and Severe AD patients have increased dementia/AD-related hospitalizations.

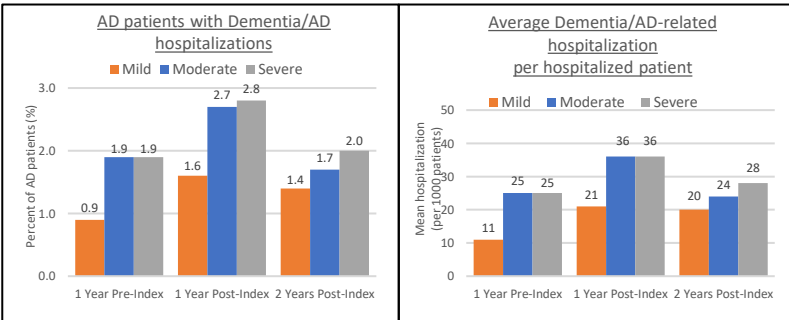


Figure 3: Dementia- and AD-related hospitalizations of TIU-identified AD patients by severity.

Counts for mild, moderate, and severe AD are 15,149, 8,310, and 5,545, respectively. Patients with more than one AD severity note are assigned a new index date

Effect of comorbidities on the number of hospitalizations and outpatient visits.

Parameter	Odds Ratio	STD Error	p value	Odds Ratio	STD Error	p value
Intercept	-2.5751	0.1144	<0.0001	3.2725	0.0072	<0.0001
AD Vs Control	0.6914	0.0194	<0.0001	0.6031	0.0013	<0.0001
Alcohol abuse	0.3528	0.0255	<0.0001	0.1600	0.0018	<0.0001
Alpecia	-0.2533	0.1473	0.0855	0.0893	0.0084	<0.0001
Anxiety Disorder	0.1285	0.0209	<0.0001	0.1554	0.0014	<0.0001
Asthma	0.1323	0.0276	<0.0001	0.0718	0.0019	<0.0001
Bipolar Disorders	0.2396	0.0232	<0.0001	0.1164	0.0016	<0.0001
Coronary Artery Disease	0.1703	0.0206	<0.0001	0.0426	0.0013	<0.0001
Cancer	0.2449	0.0238	<0.0001	0.2857	0.0016	<0.0001
Cardiac Dysrhythmia	0.5365	0.0196	<0.0001	0.3381	0.0013	<0.0001
Celiac Disease	0.6836	0.1410	<0.0001	0.2537	0.0120	<0.0001
Congestive Heart Failure	0.5384	0.0215	<0.0001	0.2399	0.0015	<0.0001
Colitis	0.4428	0.0274	<0.0001	0.1974	0.0021	<0.0001
Crohn's Disease	0.1457	0.0890	0.1014	0.1546	0.0064	<0.0001
Dementia	0.5308	0.0265	<0.0001	0.2711	0.0019	<0.0001
Depression	0.2967	0.0234	<0.0001	0.2818	0.0015	<0.0001
Diabetes	0.1189	0.0218	<0.0001	0.1030	0.0014	<0.0001
Grave's Disease	-0.0992	0.0694	0.1526	0.0560	0.0045	<0.0001
Hyperlipidemia	-0.0948	0.0246	0.0001	0.1895	0.0016	<0.0001
Hypertension	0.4796	0.0307	<0.0001	0.3847	0.0018	<0.0001
Hypothyroid	-0.1474	0.0243	<0.0001	0.0342	0.0016	<0.0001
Chronic Kidney Disease	0.4029	0.0203	<0.0001	0.2101	0.0014	<0.0001
Lewy Body Dementia	0.2146	0.0868	0.0135	0.1611	0.0065	<0.0001
Chronic Liver Disease	0.2889	0.0261	<0.0001	0.1705	0.0019	<0.0001
Chronic Lung Disease	0.389	0.0198	<0.0001	0.2095	0.0013	<0.0001
Lupus	0.1459	0.1208	0.2271	0.1652	0.0083	<0.0001
Multiple Sclerosis	0.2817	0.1045	0.0070	0.4345	0.0066	<0.0001
Obesity	-0.0113	0.0194	0.5597	0.1554	0.0013	<0.0001
Pulmonary Artery Disease	0.2233	0.0201	<0.0001	0.1939	0.0014	<0.0001
Parkinson's Disease	-0.0646	0.0665	0.2535	0.0244	0.0039	<0.0001
Perinuclear Anemia	0.4631	0.0238	<0.0001	0.3309	0.0017	<0.0001
Post-Traumatic Stress Disorder	-0.1357	0.0231	<0.0001	0.0625	0.0015	<0.0001
Rheumatic Fever	0.1842	0.3022	0.5422	-0.0171	0.0239	0.4741
Rheumatoid Arthritis	0.1624	0.0432	0.0002	0.1868	0.0029	<0.0001
Schizophrenia	0.4986	0.0366	<0.0001	0.3637	0.0027	<0.0001
Sleep Disorder	0.1546	0.0217	<0.0001	0.1470	0.0015	<0.0001
Stroke	0.1215	0.0235	<0.0001	0.1080	0.0016	<0.0001
Substance Abuse	0.0265	0.0288	0.3568	0.0401	0.0020	<0.0001
Traumatic Brain Injury	0.5027	0.0391	<0.0001	0.3436	0.0030	<0.0001
Thrombocytopenic	0.3732	0.0407	<0.0001	0.2615	0.0031	<0.0001
Thyroiditis	0.1229	0.1520	0.4187	0.1005	0.0100	<0.0001
Tobacco Use	0.2584	0.0252	<0.0001	0.0659	0.0017	<0.0001
Vitiligo	-0.1628	0.1589	0.3058	0.0091	0.0097	0.3523

Table 1: Generalized linear model for the effect of comorbidities on HCRU at 1 Year Pre-Index

CONCLUSIONS & FUTURE WORK

- AD patients identified via TIU have higher HCRU than propensity score matched control patients. AD severity did not affect HCRU among AD patients.
- AD patients have longer LOS than matched control patients.
- Understanding AD-related HCRU will lead to improved quality of care. Further studies will assess HCRU to understand AD patient journey according to disease severity in the VA Healthcare System.

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