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Trends in Hospitalization Associated with Alzheimer's Disease in the United States

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To the editor

Recent studies of trends in death with dementia within the United States (US). showed marked increases in the number and rate of death since 1999 [1, 2]. Currently, there are few publications that reflect recent trends in hospitalizations for Alzheimer's disease (AD) and Alzheimer's disease related dementias (ADRD). With this in mind, we tested the hypothesis that the trend in hospitalization with AD and ADRD would be similar to that for mortality in the US. Our rationale was centered on the fact that AD and ADRD patients are often hospitalized for acute events that include acute altered mental status, confusion and memory loss, trauma or falls, infections and pressure wounds in the late stages of dementia [3]. We also thought that if these patients were hospitalized, tracking them based on the hospital discharge survey would give us an accurate number of hospitalized patients with the disease.

Examination of data for 1999–2009 from the National Hospital Discharge Survey was performed to find discharges with International Classification of Diseases, Ninth Revision, Clinical Modification codes (ICD-9-CM code) 331.0 which corresponds to Alzheimer's disease and up to seven coded diagnoses and codes 290.0–290.43 which correspond to Alzheimer's disease related dementia (ADRD)[4]. These codes were necessary to include since Alzheimer's disease cannot be definitively diagnosed until autopsy and that clinical diagnoses of ADRD should also be included to get the most accurate number of AD patients. Discharge numbers and rates per 100,000 in the civilian population and average annual percent change (APC) were computed.

The estimated annual number, rate and percent change of hospitalizations for persons with AD and ADRD as all-listed diagnosis at ages 65+yrs is shown in Table 1. In 2009, the estimated number of all-listed diagnoses of AD in the US was 372,000, 259,000 (70%) in

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females, 363,000 (98%) at ages 65+ years. Between 1999 and 2009 at age 65+ years, the rate of hospitalization with AD showed an increase by 1.9% in the years of 1999–2004 with the greatest rate of diagnoses in 2004 and then a subsequent decrease by 4% in 2004–2009. Similarly the rate per year of all-listed ADRD diagnoses at age 65+ years declined in 1999–2009.

In conclusion, in contrast to increasing rates of death with AD, rates of hospital discharge with AD and ADRD decreased slightly between 1999 and 2009. Further investigation may be necessary to determine the reason as to why this trend is present and why discordant trends in mortality and hospitalization with AD exist. Our current hypotheses include more AD and ADRD patients are being cared for in residential aged care facilities. Perhaps there are increasing mortality trends and patients are not being discharged and so the numbers of discharges have decreased due to more deaths in the hospital. Another possibility is a potential for underreporting of dementia in the presence of increased number of chronic disease conditions in these patients.

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Annual Number, Rate^a and Percent Change of Hospitalizations with AD^b and ADRD^c as all-listed Diagnoses by year-National Hospital Discharge Survey, United States, 1999–2009

Year	AD			ADRD		
	N	Rate	APC 1999–04	APC 2004–09	N	Rate
1999	350,000	1022			238,000	695
2000	343,000	995			237,000	687
2001	370,000	1048			214,000	606
2002	376,000	1056			225,000	632
2003	385,000	1072			221,000	615
2004	408,000	1124	2.0%		200,000	551
2005	403,000	1095			184,000	500
2006	378,000	1014			155,000	416
2007	359,000	948			154,000	406
2008	385,000	990			146,000	376
2009	363,000	917		–4.0%	162,000	409
						–6.0%

^aPer 100,000 population. International Classification of Diseases, Ninth Revision, Clinical Modification codes

^b331.0, and

^c290.0–290.43;

AD= Alzheimer’s disease; ADRD= Alzheimer’s disease related dementia; APC= annual percent change