New Mexico Epidemiology

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Alzheimer's Disease in New Mexico, 1995-2004

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Introduction

Alzheimer's Disease (AD) is a neurodegenerative condition of the brain. In 2004, AD was the 8th leading cause of death among New Mexico residents.[1] The disease consists of three main classifications including early-onset, late-onset and familial, defined by age of noticeable symptoms. Early-onset AD affects people prior to the age of 65 and the more rare familial AD can affect persons as early as late thirties and early forties.

The course of the disease has an individual manifestation and runs on average eight years after noticeable symptoms occur. Symptoms often appear after significant brain atrophy has already occurred and can include impaired memory, disorientation, trouble performing familiar tasks, and changes in personality. There is currently no cure for AD and there are minimal treatments to control cognitive symptoms and behavioral problems manifested by the disease.

The primary risk factors for AD include age, sex and family history and genetics. The likelihood of AD developing doubles every five years after the age of 65 (when it affects 1 in ten persons) and the risk of AD after age 85 is considered to be roughly 50%.[2] Having a parent or sibling with AD increases a person's risk by 2 to 3 times. Family genetics play an important role with the discovery of genetic links to AD on 4 different chromosomes. Other risk factors being studied include head injuries, environmental toxins, low education or occupational achievement and increased cholesterol and blood pressure.

The number of Americans living with AD was estimated at approximately 4.5 million persons in the year 2000 (including over 31,000 New Mexicans) and is expected to increase to over 13 million by the year 2050.[3] New Mexico will share this burden, with an estimated 41-70% increase in those affected by AD between 2000 and 2025, mostly due to a changing population structure.[4] This will result in a high degree of economic and emotional burden associated with providing long-term care for these patients. Analysis of data regarding AD may offer better insight into the current and future burden for New Mexico and assist with planning to meet the associated challenges.

Methods

Underlying cause of death files (1995-2004) and multiple-cause of death files (2001-2004) from the Bureau of Vital Records and Health Statistics were analyzed to compile this report.

For each analysis file, deaths caused by AD were selected according to the International Classification of Diseases (ICD-9 331.0; ICD-10 G30.0, G30.1, G30.8, G30.9). Using the underlying cause of death files, decedents of AD were described according by mean age of death, sex, race, education and urbanization level. Three levels of urbanization were classified at the county-level by using geographical definitions for New Mexico metropolitan and micropolitan statistical areas based on 2001–2002 population estimates, according to the Office of Management and Budget.[5,6] These definitions define a metropolitan area as containing at least one urbanized area of $\geq$50,000 population, and a micropolitan area at least one urban cluster of 10,000–49,999 population.

Age-adjusted AD death rates were calculated by sex and race, and age-specific death rates were calculated. The multiple cause death files were used to identify the number of deaths in which AD was listed as any cause of death in comparison to the number of deaths in which it was listed as the underlying cause. This was performed to better assess the true burden of AD in New Mexico.

Results

Underlying Cause of Death 1995-2004

A total of 2,372 deaths with an underlying cause of AD

occurred from 1995-2004. Table 1 shows the demographic information of decedents and the results of a bivariate analysis. As age is such an important risk factor for AD, secondary multivariate analyses controlling for age were conducted. In these models, all the demographic variables remained significant predictors.

Table 1. Association of Covariates of Interest With Death Caused by Alzheimer's Disease, New Mexico, 1995-2004

Covariate of Interest	Alzheimer's n=2372	(%)	Other Cause n=131,688	(%)	χ^2 p-value
Age at death (mean)	85.0 years		69.5 years		<0.0001*
Sex[a]					
Females	1622	(68.4)	61,514	(46.7)	
Males	750	(31.6)	70,174	(53.3)	<0.0001
Race/ethnicity[b]					
White, non-Hispanic	1791	(75.5)	79,646	(60.5)	
Hispanic	502	(21.2)	40,352	(30.7)	
AI/AN	54	(2.3)	8,905	(6.8)	
Black	20	(0.8)	2,174	(1.7)	
Asian/Pac Islander	5	(0.2)	488	(0.4)	
Other	0	---	16	(0.1)	<0.0001
Education[c]					
<=grade school	488	(22.0)	28,414	(23.2)	
high school	949	(42.7)	55,026	(45.0)	
some college	608	(27.4)	30,088	(24.6)	
college grad	176	(7.9)	8,735	(7.2)	0.0024
Urbanization Level[d]					
Rural	124	(5.2)	10,034	(7.6)	
Micropolitan	687	(29.0)	45,243	(34.4)	
Metropolitan	1561	(65.8)	76,412	(58.0)	<0.0001

[a] Missing 4 observations

[b] Missing 111 observations

[c] Missing 9,580 observations

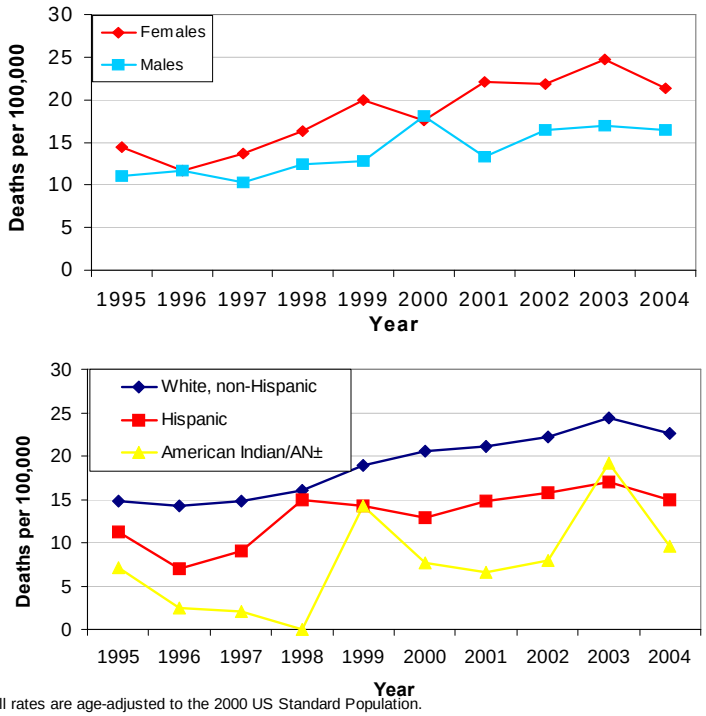
[d] Missing 3 observations

*p value corresponds to Wilcoxon Rank Sum test

The death rate due to AD increased 47.7% during the ten-year period of 1995-2004 (from 13.2 deaths/ per 100,000 persons to 19.5). Beginning in 1996, the rate increased every year until 2004 when it dropped nearly 11% from the year prior. Figure 1 shows the AD death rate in New Mexico in comparison to that of the nation as a whole.

The AD death rate of females increased 47.9% over the period and a 10-year rate of 18.4 deaths/100,000 persons was observed (Figure 2). This exceeded the ten-year rate of males (14.1 deaths/100,000) with a rate ratio of 1.3. Figure 2 also shows that there is a disparity among race/ethnicity in which the rate of death caused by AD is consistently higher for White, non-Hispanics than it is for Hispanics or American Indian/Alaskan Natives.

Figure 2. Alzheimer's Death Rates* for New Mexico Residents, By Gender and Race/Ethnicity, 1995-2004



*All rates are age-adjusted to the 2000 US Standard Population.
For years 2000-2004, NM denominators are from BBER estimates. 1995-1999 NM denominators are NCHS derived population estimates.
± Rates for AI/AN not stable due to small numbers

To evaluate age as a risk factor, age-specific rates were calculated for three different age groups (65-74 years, 75-84, and 85+). The highest age-specific rate was among people aged 85 years and older. The death rate in this age category increased 61% from 1995 (474.5 deaths/100,000 persons to 763.8).

Table 2. Categories of Underlying Cause of Death Among Deaths in Which Alzheimer's Disease Was Listed in the Multiple Causes of Death, 2001-2004

Category of Disease Listed as Underlying Cause of Death	n	Percent of Total
Alzheimer's Disease	1,366	68.1
Heart Disease	308	15.4
Respiratory Diseases	107	5.3
Cancer	58	2.9
Falls	36	1.8
Diabetes-related	34	1.7
Other	97	4.8
Total	2006	100.0

Multiple Cause of Death Files 2001-2004
An analysis of the 2001-2004 multiple cause of death files showed a total of 2,006 deaths in which AD was listed as a cause of death. This represents a 46.9% increase over the number of deaths in the same time period in which AD was listed as the underlying cause of death (n=1,366).

Table 2 shows the most commonly listed disease categories for underlying cause of death among deaths in which AD is listed as a cause of death. Over 20% of deaths in which AD is listed as a cause of death are predominantly attributed to heart and respiratory diseases.

Discussion
Rates of AD are rising in New Mexico. This trend will probably continue upward due to an aging population, enhanced techniques to detect AD, and better treatments for other chronic diseases associated with being elderly. Multiple-cause death informa
tion suggests that the burden of AD is probably much larger than suggested by the underlying cause of death listed on the death certificate. Many deaths caused by AD are being attributed to chronic conditions associated with being elderly, including heart and lung disease.

Of particular interest is the higher death rate among females. As females usually live to a greater age it is likely that they have an increased chance to show symptoms of and be diagnosed with AD. However, as sex remained an important predictor after controlling for age and education level, it appears that there may be a true increased risk of death due to AD for females. While some researchers refute this as a true risk factor, some studies have shown unique risks for AD among older females, including having low bone mineral density and a higher BMI.[7,8]

Given there is no cure for AD and limited medical interventions to alleviate symptoms of AD, prevention and delaying onset are the best forms of addressing the burden level. It is suggested that delaying onset by even 5 years could reduce the prevalence of those living with AD by 50% over a period of 50 years.[9]

There are still many gaps in knowledge regarding AD and the etiology of disease. There is a growing body of research identifying potential synergistic effects of chronic diseases, especially vascular-related diseases, and a person's genetic profile and environment.[10] Another leading hypothesis is that environmental toxins such as mercury, aluminum and zinc play a role in increased risk for AD.

Having no exact known cause for AD provides challenges to the science of prevention. What is known is that this disease will continue to be an emotional, financial and medical burden on New Mexicans and it warrants greater attention from a medical, public health and economic standpoint.

For more information on AD visit the Alzheimer's Association (New Mexico Chapter) website at http://www.nm-alzheimers.org/ .

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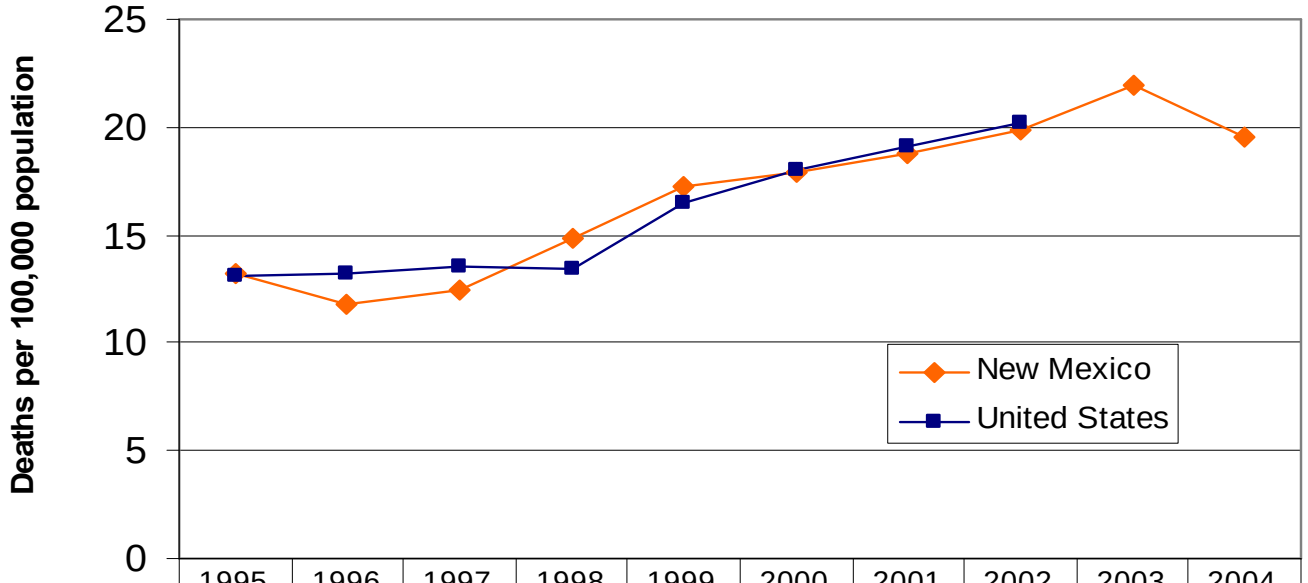
Figure 1. Alzheimer's Death Rates* for New Mexico and U.S Residents, 1995-2004



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
New Mexico	13.2	11.8	12.4	14.8	17.3	17.9	18.8	19.9	21.9	19.5
United States	13.1	13.2	13.5	13.4	16.5	18	19.1	20.2		

*All rates are age-adjusted to the 2000 US Standard Population.
For years 2000-2004, NM denominators are from BBER estimates. 1995-1999 NM denominators and all US denominators are NCHS derived population estimates.
Numerators for US rates are from CDC WONDER. Numerators for 2003-2004 unavailable.