Alzheimer's Disease: Texas Data and Barriers to Population-Level Data Collection

Data Requested by
Texas Council on Alzheimer's Disease and Related Disorders

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Texas Data on Alzheimer's Disease

1) Prevalence

Current and projected prevalence estimates were reported in the *2015 Alzheimer's Disease Facts and Figures* report produced by the Alzheimer's Association.

- In 2015 it was estimated that 340,000 people in Texas age 65 and older have Alzheimer's.
- In 2025 it was projected that 490,000 people in Texas age 65 and older will have Alzheimer's.
- The prevalence change from 2015 to 2025 is a 44.1 percent increase over 10 years in the number of Texans age 65 and older who will have Alzheimer's.
- These state prevalence numbers are based on an analysis of incidence data from the Chicago Health and Aging Project (CHAP), projected to each state's population, with adjustments for state-specific age, gender, years of education, race, and mortality.

2) Hospital Discharge Data

Table 1: Alzheimer's Disease (as Principal Diagnosis) Crude and Age-Adjusted Hospital Discharge Rate Per 10,000 People by Demographics, All Ages, Texas, 2013

				95% CI for Crude Rate			95% CI for Age-adjusted Rate	
Demographics	**Discharges**	**Population**	**Crude Rate**	**Lower CI**	**Upper CI**	**Age-Adjusted Rate**	**Lower CI**	**Upper CI**
Overall	2,266	26,448,193	0.9	0.8	0.9	1.0	1.0	1.1
Sex								
Male	1,016	13,140,348	0.8	0.7	0.8	1.1	1.0	1.2
Female	1,250	13,307,845	0.9	0.9	1.0	1.0	0.9	1.1
Race								
White	1,480	11,460,706	1.3	1.2	1.4	1.0	1.0	1.1
Black	258	3,044,184	0.8	0.7	1.0	1.4	1.2	1.6
Hispanic	252	10,340,413	0.2	0.2	0.3	0.6	0.5	0.6
Other	216	1,602,890	1.3	1.2	1.5	2.9	2.5	3.3
Age (years)								
0-17	*	7,047,199	*	*	*	--	--	--
18-44	*	10,084,129	*	*	*	--	--	--
45-54	*	3,449,342	*	*	*	--	--	--
55-64	96	2,888,786	0.3	0.3	0.4	--	--	--
65-74	425	1,750,938	2.4	2.2	2.7	--	--	--
75+	1,733	1,227,799	14.1	13.5	14.8	--	--	--

Data Source: Texas Health Care Information Collection (THCIC), Inpatient Hospital Discharge Public Use Data File, 2013.
Population Data Source: Center for Health Statistics, Texas Department of State Health Services, 2013.
Includes hospital discharges where Alzheimer's Disease was the principal diagnosis (ICD-9 Code 331.0).
Age-adjusted rates were adjusted to the 2000 U.S. Census population.
"*" indicates fewer than 12 hospital discharges reported.
"--" indicates age-adjusted rates were not calculated.
Results do not include HIV and drug/alcohol use patients.

Table 2: Alzheimer's Disease (Secondary Diagnosis Only) Crude and Age-Adjusted Hospital Discharge Rate Per 10,000 People by Demographics, All Ages, Texas, 2013

Demographics	Discharges	Population	Crude Rate	95% CI for Crude Rate		Age-Adjusted Rate	95% CI for Age-adjusted Rate	
				Lower CI	Upper CI		Lower CI	Upper CI
Overall	32,274	26,448,193	12.2	12.1	12.3	15.3	15.1	15.4
Sex								
Male	11,643	13,140,348	8.9	8.7	9.0	13.2	12.9	13.4
Female	20,628	13,307,845	15.5	15.3	15.7	16.7	16.5	17.0
Race								
White	18,974	11,460,706	16.6	16.3	16.8	13.3	13.1	13.5
Black	3,432	3,044,184	11.3	10.9	11.7	19.7	19.0	20.4
Hispanic	7,388	10,340,413	7.1	7.0	7.3	16.9	16.5	17.3
Other	1,964	1,602,890	12.3	11.7	12.8	27.3	26.1	28.5
Age (years)								
0-17	*	7,047,199	*	*	*	--	--	--
18-44	14	10,084,129	0.01	0.01	0.02	--	--	--
45-54	106	3,449,342	0.3	0.2	0.4	--	--	--
55-64	715	2,888,786	2.5	2.3	2.7	--	--	--
65-74	3,834	1,750,938	21.9	21.2	22.6	--	--	--
75+	27,601	1,227,799	224.8	222.1	227.5	--	--	--

Data Source: Texas Health Care Information Collection (THCIC), Inpatient Hospital Discharge Public Use Data File, 2013.
Population Data Source: Center for Health Statistics, Texas Department of State Health Services, 2013.
Includes hospital discharges where Alzheimer's Disease was any listed secondary diagnosis (ICD-9 Code 331.0).
Age-adjusted rates were adjusted to the 2000 U.S. Census population.
"*" indicates fewer than 12 hospital discharges reported.
"--" indicates age-adjusted rates were not calculated.
Results do not include HIV and drug/alcohol use patients.

Table 3: Alzheimer's Disease (as Principal or Secondary Diagnosis) Hospital Discharges and Total Hospital Charges by Primary Source of Payment, All Ages, Texas, 2013

	Alzheimer's Disease as principal diagnosis			Alzheimer's Disease as secondary diagnosis		
Primary Source of Payment	**Number of Discharges**	**Percent of Discharges**	**Total Charges ($)**	**Number of Discharges**	**Percent of Discharges**	**Total Charges ($)**
Total	2,266	100	62,652,797.73	32,274	100	1,596,788,940.99
Medicaid	29	1.3	1,261,951.72	294	0.9	17,370,333.58
Medicare	1,894	83.6	53,567,500.50	29,686	92.0	1,477,256,662.00
Private Insurance	230	10.2	5,120,192.58	1,729	5.4	75,166,921.11
Uninsured	85	3.8	1,876,506.28	313	1.0	13,739,194.51
Other	28	1.2	826,646.65	252	0.8	13,255,829.79

Data Source: Texas Health Care Information Collection (THCIC), Inpatient Hospital Discharge Public Use Data File, 2013.
The ICD-9 Code for Alzheimer's Disease is 331.0.
"Other" includes missing.
Results do not include HIV and drug/alcohol use patients.

3) Mortality Data

Table 4: Alzheimer's Disease Crude and Age-Adjusted Mortality Rate Per 100,000 People by Demographics, All Ages, Texas, 2012

Demographics	Deaths	Population	Crude Rate	95% CI for Crude Rate		Age-Adjusted Rate	95% CI for Age-adjusted Rate	
				Lower CI	Upper CI		Lower CI	Upper CI
Overall	5,168	26,059,203	19.8	19.3	20.4	25.6	24.9	26.3
Sex								
Male	1,636	12,936,056	12.6	12.0	13.3	19.7	18.8	20.7
Female	3,532	13,123,147	26.9	26.0	27.8	29.6	28.7	30.6
Race								
White	3971	11,552,523	34.4	33.3	35.4	28.7	27.8	29.6
Black	360	2,986,753	12.1	10.8	13.3	22.4	20.1	24.8
Hispanic	787	10,016,357	7.9	7.3	8.4	19.2	17.9	20.5
Other	50	1,503,570	3.3	2.4	4.2	8.1	5.8	10.3
Age (years)								
0-44	*	16,921,133	*	*	*	--	--	--
45-54	*	3,463,445	*	*	*	--	--	--
55-64	55	2,819,158	2.0	1.4	2.5	--	--	--
65-74	302	1,658,427	18.2	16.2	20.3	--	--	--
75+	4810	1,197,040	401.8	390.5	413.2	--	--	--

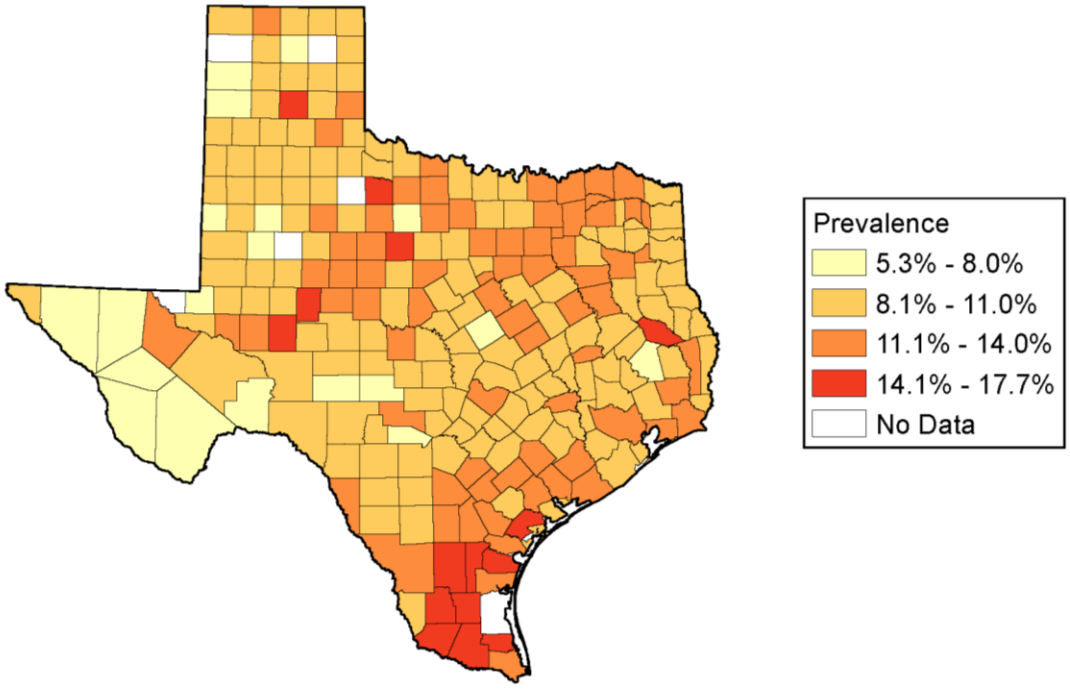
Data Source: Texas Vital Statistics Mortality Data, 2012, Center for Health Statistics, Texas Department of State Health Services.
Population Data Source: Center for Health Statistics, Texas Department of State Health Services, 2012.
Deaths due to Alzheimer's Disease were based on ICD-10 Code G30 listed as the underlying cause of death.
Age-adjusted rates were adjusted to the 2000 U.S. Census population.
"*" indicates fewer than 20 deaths due to Alzheimer's Disease were reported.
"--" indicates age-adjusted rates were not calculated.

According to data from the National Center for Health Statistics, as reported in the *2015 Alzheimer's Disease Facts and Figures* report produced by the Alzheimer's Association:

- In 2013, the unadjusted mortality rate in Texas for Alzheimer's Disease was 20.0 per 100,000 with 5,293 deaths occurring.
- In 2013, the unadjusted mortality rate in the U.S. for Alzheimer's Disease was 26.8 per 100,000 with 84,767 deaths occurring.

4) Medicare Data

Texas
Prevalence of Alzheimer's Disease/Dementia Disorders Among Medicare Fee-For-Service Beneficiaries by County: 2012



Number of fee-for-service beneficiaries in Texas: 2,340,725
Texas Alzheimer's disease/dementia prevalence: 11.5%
National Alzheimer's disease/dementia prevalence: 9.8%

CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES

Table 5. Alzheimer's Disease/Dementia Prevalence (%) By County Among Medicare Fee-For-Service Beneficiaries, All Ages and 65+ Years, 2012

	Alzheimer's Disease/Dementia Prevalence			Alzheimer's Disease/Dementia Prevalence	
County	All Beneficiaries	Beneficiaries Age 65+	County	All Beneficiaries	Beneficiaries Age 65+
NATIONAL	9.8	11.4	Jones	12.6	14.0
TEXAS	11.5	13.1	Karnes	12.7	14.1
Anderson	14.0	16.2	Kaufman	11.4	12.5
Andrews	8.4	9.8	Kendall	9.7	10.0
Angelina	14.5	17.1	Kenedy		
Aransas	9.5	10.5	Kent	13.1	13.8
Archer	11.2	12.5	Kerr	11.3	12.0
Armstrong	15.2	16.1	Kimble	7.5	8.1
Atascosa	11.3	13.2	King		
Austin	9.7	10.4	Kinney	9.2	10.1
Bailey	8.2	8.8	Kleberg	13.8	15.9
Bandera	6.9	7.5	Knox	15.2	15.8
Bastrop	10.0	11.5	La Salle	8.5	10.3
Baylor	13.7	15.4	Lamar	11.2	12.9
Bee	12.5	14.6	Lamb	9.7	10.9
Bell	8.8	11.2	Lampasas	8.8	9.8
Bexar	10.9	12.8	Lavaca	13.4	14.5
Blanco	9.9	10.7	Lee	10.2	11.5
Borden			Leon	9.5	10.4
Bosque	11.5	12.8	Liberty	10.7	12.6
Bowie	11.0	13.2	Limestone	10.4	12.7
Brazoria	10.3	11.5	Lipscomb	9.0	9.9
Brazos	10.7	12.1	Live Oak	12.5	14.0
Brewster	6.9	7.6	Llano	10.7	11.4
Briscoe	8.7	9.4	Loving		
Brooks	17.1	20.2	Lubbock	10.5	12.0
Brown	12.0	13.9	Lynn	7.9	8.8
Burleson	8.7	9.6	Madison	11.9	13.2
Burnet	9.4	10.0	Marion	10.3	12.4
Caldwell	10.5	11.9	Martin	9.4	10.0
Calhoun	9.6	10.6	Mason	10.0	10.4
Callahan	10.4	11.5	Matagorda	13.5	15.0
Cameron	13.7	15.7	Maverick	13.6	16.1
Camp	10.0	11.4	McCulloch	11.9	13.2
Carson	8.6	9.4	McLennan	11.7	14.0
Cass	9.2	10.6	McMullen	11.2	12.3
Castro	9.3	10.1	Medina	10.3	11.8
Chambers	11.8	13.3	Menard	9.8	10.1
Cherokee	10.8	12.5	Midland	10.8	12.1
Childress	9.8	11.5	Milam	10.0	11.7
Clay	10.1	11.6	Mills	9.8	10.5

Table 5. Alzheimer's Disease/Dementia Prevalence (%) By County Among Medicare Fee-For-Service Beneficiaries, All Ages and 65+ Years, 2012 (continued)

County	Alzheimer's Disease/Dementia Prevalence		County	Alzheimer's Disease/Dementia Prevalence	
	All Beneficiaries	Beneficiaries Age 65+		All Beneficiaries	Beneficiaries Age 65+
Cochran	8.3	9.2	Mitchell	12.5	14.4
Coke	11.2	12.2	Montague	11.0	12.0
Coleman	10.1	10.9	Montgomery	10.6	11.6
Collin	11.2	12.1	Moore	8.3	9.0
Collingsworth	11.5	12.3	Morris	11.6	13.4
Colorado	10.3	11.1	Motley	9.0	9.7
Comal	9.1	10.0	Nacogdoches	10.6	12.4
Comanche	11.0	12.2	Navarro	10.5	12.1
Concho	10.6	11.7	Newton	10.0	11.9
Cooke	10.5	11.4	Nolan	11.9	13.5
Coryell	7.0	8.5	Nueces	14.9	17.6
Cottle	10.9	11.8	Ochiltree	9.7	10.7
Crane	12.7	14.6	Oldham	7.2	7.4
Crockett	8.8	9.9	Orange	10.4	12.3
Crosby	9.9	11.1	Palo Pinto	8.5	9.5
Culberson	5.6	6.8	Panola	10.3	11.7
Dallam	9.5	10.3	Parker	12.0	13.0
Dallas	12.9	14.5	Parmer	9.7	10.4
Dawson	7.9	9.0	Pecos	10.3	11.4
De Witt	12.0	13.5	Polk	7.4	8.0
Deaf Smith	7.8	9.1	Potter	9.0	10.5
Delta	13.8	15.3	Presidio	7.7	8.4
Denton	11.0	12.1	Rains	8.4	9.0
Dickens	9.2	10.2	Randall	10.4	11.3
Dimmit	11.0	13.4	Reagan	14.7	15.6
Donley	11.0	12.0	Real	9.6	9.4
Duval	14.1	17.0	Red River	11.4	13.1
Eastland	11.4	12.7	Reeves	12.4	14.4
Ector	10.9	12.6	Refugio	14.7	16.3
Edwards	10.9	11.7	Roberts		
El Paso	11.0	12.7	Robertson	9.9	11.3
Ellis	12.0	13.7	Rockwall	11.1	12.0
Erath	10.8	11.9	Runnels	12.2	13.1
Falls	11.6	14.4	Rusk	10.3	11.7
Fannin	12.5	14.0	Sabine	9.1	10.2
Fayette	10.3	10.9	San Augustine	10.7	12.2
Fisher	11.6	12.9	San Jacinto	10.2	11.6
Floyd	8.5	8.9	San Patricio	12.3	14.4
Foard	10.2	10.7	San Saba	9.3	9.9
Fort Bend	10.1	11.0	Schleicher	10.4	11.0
Franklin	8.2	9.2	Scurry	10.3	11.6

Table 5. Alzheimer's Disease/Dementia Prevalence (%) By County Among Medicare Fee-For-Service Beneficiaries, All Ages and 65+ Years, 2012 (continued)

County	Alzheimer's Disease/Dementia Prevalence		County	Alzheimer's Disease/Dementia Prevalence	
	All Beneficiaries	Beneficiaries Age 65+		All Beneficiaries	Beneficiaries Age 65+
Freestone	13.6	15.2	Shackelford	15.1	15.9
Frio	9.7	11.7	Shelby	10.7	12.4
Gaines	9.4	10.8	Sherman	11.5	12.2
Galveston	10.3	11.7	Smith	11.2	12.6
Garza	9.4	10.1	Somervell	12.6	13.9
Gillespie	10.7	11.1	Starr	17.7	20.7
Glasscock	9.0	9.6	Stephens	10.8	12.0
Goliad	10.5	12.0	Sterling	16.8	17.4
Gonzales	9.7	10.8	Stonewall	10.7	11.1
Gray	9.8	10.6	Sutton	6.9	7.3
Grayson	12.6	14.1	Swisher	8.8	9.7
Gregg	12.2	14.3	Tarrant	13.7	15.5
Grimes	10.0	11.4	Taylor	12.8	14.5
Guadalupe	10.3	11.7	Terrell	5.7	6.6
Hale	10.4	11.6	Terry	8.5	9.6
Hall	12.5	14.1	Throckmorton	8.0	8.7
Hamilton	10.7	11.7	Titus	12.3	14.0
Hansford	10.0	10.7	Tom Green	10.5	11.8
Hardeman	8.3	9.6	Travis	11.4	13.0
Hardin	11.6	13.1	Trinity	9.1	10.5
Harris	11.7	13.1	Tyler	9.7	11.4
Harrison	10.6	12.4	Upshur	10.7	12.2
Hartley			Upton	11.3	12.8
Haskell	11.8	13.1	Uvalde	9.8	11.1
Hays	10.6	11.8	Val Verde	9.1	10.1
Hemphill	10.6	11.2	Van Zandt	10.1	11.1
Henderson	12.5	13.7	Victoria	11.4	13.0
Hidalgo	16.7	19.0	Walker	10.9	12.4
Hill	9.1	10.3	Waller	10.2	11.4
Hockley	9.4	10.8	Ward	8.7	10.2
Hood	9.9	10.4	Washington	11.5	13.0
Hopkins	11.1	12.4	Webb	12.3	13.8
Houston	10.9	12.5	Wharton	11.5	12.8
Howard	9.2	10.9	Wheeler	9.2	9.8
Hudspeth	5.3	6.3	Wichita	12.0	13.9
Hunt	11.1	13.0	Wilbarger	10.8	13.1
Hutchinson	7.3	8.4	Willacy	15.0	17.7
Irion	8.4	8.4	Williamson	9.3	10.3
Jack	12.2	13.1	Wilson	11.7	13.5
Jackson	11.4	12.7	Winkler	7.4	8.8
Jasper	12.2	14.2	Wise	9.7	10.8

Table 5. Alzheimer's Disease/Dementia Prevalence (%) By County Among Medicare Fee-For-Service Beneficiaries, All Ages and 65+ Years, 2012 (continued)

	Alzheimer's Disease/Dementia Prevalence			Alzheimer's Disease/Dementia Prevalence	
County	All Beneficiaries	Beneficiaries Age 65+	County	All Beneficiaries	Beneficiaries Age 65+
Jeff Davis	7.9	8.5	Wood	9.3	10.2
Jefferson	12.7	14.9	Yoakum	6.9	7.9
Jim Hogg	16.5	19.4	Young	12.7	14.4
Jim Wells	17.5	21.5	Zapata	10.6	12.1
Johnson	12.6	14.5	Zavala	9.6	11.8

Data source: Centers for Medicaid and Medicare Services (CMS), CMS Chronic Condition Data Warehouse, 2012.
Note: The Medicare beneficiary population is limited to fee-for-service beneficiaries.
A Medicare beneficiary is considered to have Alzheimer's Disease, Related Disorders, or Senile Dementia ("Alzheimer's Disease/Dementia") if the CMS administrative data have a claim indicating that the beneficiary received a service or treatment for the specific condition within a 3-year time period.
Alzheimer's Disease, Related Disorder, or Senile Dementia was identified with the following ICD-9 codes: DX 331.0, 331.11, 331.19, 331.2, 331.7, 290.0, 290.10, 290.11, 290.12, 290.13, 290.20, 290.21, 290.3, 290.40, 290.41, 290.42, 290.43, 294.0, 294.10, 294.11, 294.20, 294.21, 294.8, 797 (any listed diagnosis on the claim).

Table 6. Medicare Spending and Healthcare Utilization Among Medicare Fee-For-Service Beneficiaries with Alzheimer's Disease/Dementia, All Ages, Texas and Nationwide, 2012

Spending or Utilization	Texas	National
Actual Spending Per Capita ($)	25,510.55	22,211.35
Standardized Spending Per Capita($)	25,700.18	20,958.20
Emergency Department Visits (per 1,000 beneficiaries)	1,314.47	1,341.76
Hospital Readmission Rate (%)	20.2	21.5

Data source: Centers for Medicaid and Medicare Services (CMS), CMS Chronic Condition Data Warehouse, 2012.

Note: The Medicare beneficiary population is limited to fee-for-service beneficiaries.

The Medicare utilization and spending information represents beneficiaries with Alzheimer's Disease/Dementia. The information should not be used to attribute utilization or payments strictly to the specific condition though since beneficiaries with the Alzheimer's Disease/Dementia may have other health conditions that contribute to their Medicare utilization and spending amounts.

Medicare spending includes total Medicare payments for all Medicare covered services in Parts A and B and is presented per beneficiary (i.e. per capita). Both total actual payments and total standardized payments are presented.

Emergency department visits are presented as the number of visits per 1,000 beneficiaries. ED visits include visits where the beneficiary was released from the outpatient setting and where the beneficiary was admitted to an inpatient setting.

Hospital readmissions are expressed as a percentage of all admissions. A 30-day readmission is defined as an admission to an acute care hospital for any cause within 30 days of discharge from an acute care hospital. Except when the patient died during the stay, each inpatient stay is classified as an index admission, a readmission, or both. The numerator is the number of readmissions for beneficiaries with Alzheimer's Disease/Dementia. The denominator is the number of admissions for beneficiaries with Alzheimer's Disease/Dementia. The admission or readmission may or may not be associated with Alzheimer's Disease/Dementia.

Table 7: Prevalence (%) of Alzheimer's Disease/Dementia Among Medicare Fee-For-Service Beneficiaries By Sex, Age Group, and Enrollment, Texas and National, 2012

	Texas			National		
Demographics	**All**	**Male**	**Female**	**All**	**Male**	**Female**
Enrollment in Medicare Only or Medicare & Medicaid						
All Ages	11.6	9.1	13.6	9.8	7.7	11.6
<65 years	4.2	4.0	4.3	2.9	2.9	3.0
65+ years	13.1	10.3	15.2	11.4	9.0	13.2
65-74 years	4.4	4.1	4.7	3.4	3.3	3.6
75-84 years	16.0	14.0	17.5	13.1	11.7	14.1
85+ years	38.4	32.2	41.5	32.7	27.3	35.3
Enrollment in Medicare Only						
All Ages	8.8	7.2	10.2	7.8	6.4	8.9
<65 years	2.3	2.2	2.5	1.7	1.6	1.8
65+ years	9.7	8.1	11.0	8.5	7.2	9.5
65-74 years	2.9	2.7	3.0	2.2	2.2	2.3
75-84 years	12.3	11.3	13.1	10.1	9.5	10.6
85+ years	31.8	28.2	33.8	26.4	23.7	27.9
Enrollment in Medicare & Medicaid						
All Ages	21.4	17.1	24.0	17.4	12.9	20.4
<65 years	6.1	6.4	5.9	4.0	4.2	3.8
65+ years	30.6	26.3	32.8	28.8	24.2	31.0
65-74 years	14.5	15.4	14.0	12.1	13.0	11.6
75-84 years	33.0	30.8	34.0	30.5	29.5	31.0
85+ years	59.9	52.9	62.0	57.7	52.5	59.0

Data source: Centers for Medicaid and Medicare Services (CMS), CMS Chronic Condition Data Warehouse, 2012.
Note: The Medicare beneficiary population is limited to fee-for-service beneficiaries.
Medicare beneficiaries were classified as dual eligible (eligible for both Medicare and Medicaid) if in any month in 2012 they were receiving full or partial Medicaid benefits.
A Medicare beneficiary is considered to have Alzheimer's Disease, Related Disorders, or Senile Dementia ("Alzheimer's Disease/Dementia") if the CMS administrative data have a claim indicating that the beneficiary received a service or treatment for the specific condition within a 3-year time period.
Alzheimer's Disease, Related Disorder, or Senile Dementia was identified with the following ICD-9 codes: DX 331.0, 331.11, 331.19, 331.2, 331.7, 290.0, 290.10, 290.11, 290.12, 290.13, 290.20, 290.21, 290.3, 290.40, 290.41, 290.42, 290.43, 294.0, 294.10, 294.11, 294.20, 294.21, 294.8, 797 (any listed diagnosis on the claim).

Table 7: Prevalence (%) of 5 or More Comorbidities Among Medicare Fee-For-Service Beneficiaries with Alzheimer's Disease/Dementia By Sex, Age Group, and Enrollment, Texas and National, 2012

	Texas			National		
Demographics	**All**	**Male**	**Female**	**All**	**Male**	**Female**
Enrollment in Medicare Only or Medicare & Medicaid						
All Ages	52.6	53.6	52.0	47.0	49.1	45.9
<65 years	49.7	47.3	52.2	40.7	39.5	42.1
65+ years	52.7	54.2	52.0	47.3	49.9	46.0
65-74 years	52.4	51.8	52.8	48.1	48.2	48.1
75-84 years	53.8	54.6	53.2	48.7	50.6	47.6
85+ years	52.0	55.1	44.5	46.0	50.2	50.8
Enrollment in Medicare Only						
All Ages	46.4	48.6	45.0	42.6	45.9	40.6
<65 years	38.9	39.4	38.4	34.4	34.2	34.6
65+ years	46.6	49.0	45.1	42.8	46.3	40.7
65-74 years	41.4	42.5	40.5	39.3	41.0	37.9
75-84 years	47.0	49.5	45.2	43.5	46.7	41.2
85+ years	48.2	51.9	46.4	43.3	48.0	41.0
Enrollment in Medicare & Medicaid						
All Ages	61.8	62.8	61.4	54.0	55.7	53.3
<65 years	54.1	50.9	57.1	43.0	41.5	44.6
65+ years	62.8	65.3	61.8	55.3	58.9	54.0
65-74 years	66.7	65.3	67.3	59.9	59.0	60.5
75-84 years	65.4	66.3	64.9	58.6	60.3	57.9
85+ years	58.4	63.9	57.1	51.0	56.9	49.7

Data source: Centers for Medicaid and Medicare Services (CMS), CMS Chronic Condition Data Warehouse, 2012.
Note: The Medicare beneficiary population is limited to fee-for-service beneficiaries.
Medicare beneficiaries were classified as dual eligible (eligible for both Medicare and Medicaid) if in any month in 2012 they were receiving full or partial Medicaid benefits.
A Medicare beneficiary is considered to have Alzheimer's Disease, Related Disorders, or Senile Dementia ("Alzheimer's Disease/Dementia") if the CMS administrative data have a claim indicating that the beneficiary received a service or treatment for the specific condition within a 3-year time period.
Alzheimer's Disease, Related Disorder, or Senile Dementia was identified with the following ICD-9 codes: DX 331.0, 331.11, 331.19, 331.2, 331.7, 290.0, 290.10, 290.11, 290.12, 290.13, 290.20, 290.21, 290.3, 290.40, 290.41, 290.42, 290.43, 294.0, 294.10, 294.11, 294.20, 294.21, 294.8, 797 (any listed diagnosis on the claim).

In the Medicare Chronic Conditions data there are 17 chronic conditions that may be included as a comorbid condition: Alzheimer's disease, related disorders, or senile dementia; Arthritis (including rheumatoid and osteoarthritis); Asthma; Atrial fibrillation; Autism spectrum disorders; Cancer (breast, colorectal, lung, and prostate); Chronic kidney disease; COPD; Depression; Diabetes (excluding diabetic conditions related to pregnancy); Heart failure; Hyperlipidemia (High cholesterol); Hypertension (High blood pressure); Ischemic heart disease; Osteoporosis; Schizophrenia/Other psychotic disorders; Stroke/Transient ischemic attack.

Barriers to Alzheimer's Disease Population-Level Data Collection

- A diagnosis of AD is not conclusive without an autopsy performed after death. Therefore, misclassification of AD diagnosis is possible in living patients. Also, if an AD case is identified with ICD-9 code 331.0 and/or pharmacy claims for AD-specific medication, undiagnosed cases would not be captured (Zhao et al., 2008). Additional information like duration of disease or severity of disease are often not captured or not able to be captured from hospital or pharmacy claims data.
- AD is likely severely underreported on death certificates (Weuve et al., 2014). Some studies count the number of deaths among patients who were identified as having AD which would be simpler than counting the number of deaths attributed to AD. There is a high likelihood that persons with AD also have comorbid conditions that make choosing a single cause of death more difficult.
- In one study, persons were identified as having AD only if it was indicated as a primary or contributing cause of death on the death certificate. This is a conservative approach since many individuals with AD would not be identified because they were not diagnosed during life or the physician completing the death certificate did not judge AD as leading to death (Kauwe et al., 2013).
- In a major study, estimates of the risk of developing and dying from AD were assumed to be the same for people of Hispanic and non-Hispanic origin. However, if this assumption is not accurate, the current and projected estimated number of deaths among individuals with AD may differ especially in the future in the US (and particularly in Texas) when a larger proportion of the older population will be Hispanic (Weuve et al., 2014).
- A physician's familiarity with their patient's medical history plays an important role in whether AD is identified on the death certificate. Therefore, deaths occurring among individuals from nursing homes or long stay psychiatric hospitals are more accurate than deaths occurring in a hospital (Todd et al., 2013).
- In a paper by Wilson et al. (2011), diagnostic criteria were compared for two studies that estimated the prevalence of Alzheimer's disease in the U.S. The prevalence was estimated to be 2.3 million in 2002 by the Aging, Demographics, and Memory Study (ADAMS) which was nearly 50% less than the estimate of 4.5 million in 2000 derived from the Chicago Health and Aging Project (CHAP). There were several methodological differences between the two studies that could potentially affect AD prevalence estimates, however, the paper focuses on two differences that were likely to account for most of the difference in prevalence estimates.
    - The first is diagnostic criteria for dementia. In ADAMS, the diagnostic criteria were based on Diagnostic and Statistical Manual of Mental Disorders (DSM)III-R and IV, which require that the cognitive decline be of sufficient severity to impair daily function. In CHAP, the diagnostic criteria were based on the National Institutes of Neurological and Communicative Disorders and Stroke and the Alzheimer's Disease and Related Disorders Association (NINCDS-ADRDA) in which cognitive decline was documented by cognitive performance testing. While both criteria require a history of cognitive decline and impairment in multiple cognitive domains, the DSM requirement of functional impairment would identify persons with a greater degree of cognitive impairment and

may miss persons without functional impairment. Therefore, more people would be expected to meet NINCDS-ADRDA criteria for dementia than the DSM criteria.
    - The second is that is it often not always clear where to place the distinction between dementia and normal aging. One response to this problem is to create a new syndrome for individuals with cognitive impairment not severe enough to warrant a diagnosis of dementia. This new syndrome is most commonly referred to as mild cognitive impairment (MCI) or cognitive impairment not dementia (CIND). Within the CIND group, the ADAMS assigned a diagnosis of prodromal AD to what translates to about 1.9 million persons. This is in addition to the 2.3 million persons with AD. The shift in the threshold for dementia towards that of CIND could account for very large differences in AD prevalence between the two studies.
- The AD incidence was estimated from the Chicago Health and Aging Project from 1997 to 2008. In this study, incidence estimation may have been limited by the 3-year data collection cycles in cases with disease onset occurring over an atypically lengthy period of time or cases with death occurring shortly after onset of disease or symptoms. Such cases would be less likely to be identified in the particular study (Rocca et al., 2011).
- Prevalence of dementia was estimated in the Indianapolis-Ibadan Dementia Project comparing 1992 to 2001. In the case of this study and possibly other long-term studies, the recruitment strategy changes in 2001 which resulted in higher refusal rates. Those who refused to participate were significantly older than those who enrolled, which could result in missing cases, leading to an underestimation of prevalence. Differences in participation or differential loss to follow-up in longitudinal studies for persons with and without AD could be problematic for any study on prevalence or incidence of dementia or Alzheimer's Disease (Rocca et al., 2011).
- If physician claims data are used to identify a person as having AD, it is possible that cases will not be identified if only one diagnosis code is allowed per claim. However, if inpatient hospital data are used where up to 25 diagnoses can be listed, it may be more likely that dementia or AD will be listed as one of the codes. In the case of inpatient hospital data, AD may be listed as a primary or one of many secondary diagnoses. There is also a potential to overestimate the number of cases when using hospital data (Kosteniuk et al., 2015).
- AD prevalence is often calculated from incidence data. Estimating AD prevalence from studies that use a variety of study designs, data sources, and diagnostic criteria, and case definitions leads to differences in estimations of AD prevalence (Brookmeyer et al., 2011). In this article, Brookmeyer et al. (2011) describe and compare four methods of estimating prevalence of AD in the U.S. The first two studies statistically derived prevalence estimates using forward calculations based on incidence and survival data. The first study used incidence rates from multiple published studies and the second study applied incidence rates from their own cohort sample. The third and fourth studies were sample surveys conducted in different cities, using very similar sampling techniques but different disease definitions. The third study used direct estimates and relied on probability sampling nationwide. The fourth study relied on localized prevalence estimates which were projected to the national population. The second and fourth studies used similar disease definitions but different calculation methods and still arrived at similar prevalence estimates which were also significantly higher than from the first and third studies. The author concludes that differences in disease definition or threshold appear to explain the difference in prevalence estimates produced by the four studies.

- Alzheimer's Disease has a gradual onset and develops over time. Identifying the onset of disease is often difficult since a person may not show clinical signs of disease during the early stages. Also, choosing a cut point for classifying disease presence may not be consistent across studies (Hebert et al., 2013).
- When assessing trends in disease incidence rates over time which use data from medical claims databases, changes in billing practices and office procedures may affect records (Akushevich et al., 2013). Identified changes in disease incidence over time may not represent true changes in disease incidence, but instead may be a reflection of changes in reporting practices.
- Many people who have Alzheimer's Disease (AD) are not symptomatic yet and may not be clinically diagnosed. Therefore using a standardized neurologic evaluation, as is used in the CHAP study, to identify persons with AD is preferred to using clinical sources (Hebert et al., 2013).
- In studies where non-institutionalized individuals are included in the study population, persons living in long-term care facilities or nursing homes, would not be included (Lönnroos et al., 2013). This could be lead to an underestimation of AD incidence or prevalence, especially if those excluded from the study are more likely than the general population to be older and therefore at higher risk for developing or having AD.
- In the Aging, Demographics, and Memory Study (ADAMS), participation rate was lower than expected, which could result in selection bias. The lack of neuroimaging and other medical tests for all participants may have influenced the accuracy with which non-AD dementias were identified. And grouping those with 'dementia, undetermined etiology' with the AD group may somewhat overestimate the prevalence of AD (Plassman et al., 2007).

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