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# Projected Prevalence and Cost of Dementia: **2022 Update**

Claude Lopez, PhD, and Bumyang Kim, PhD

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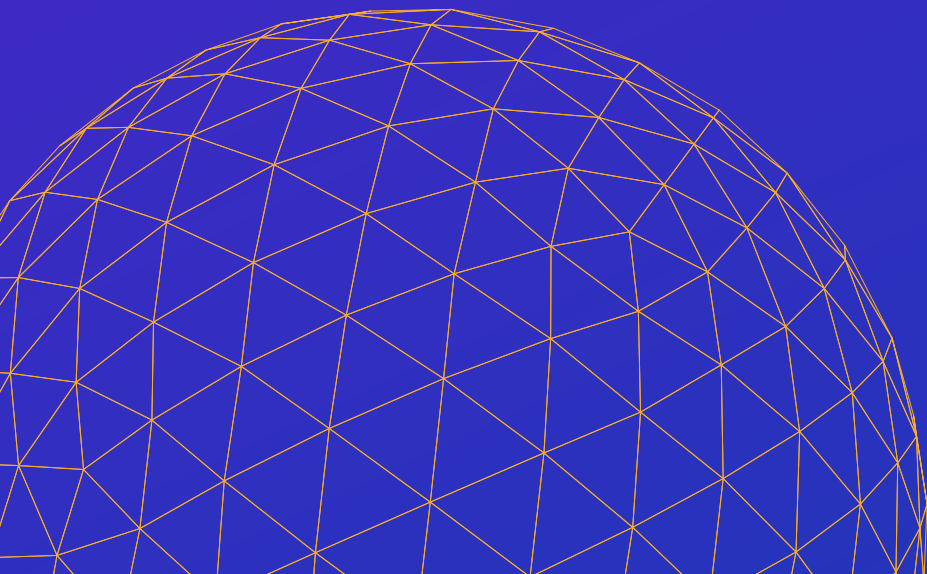
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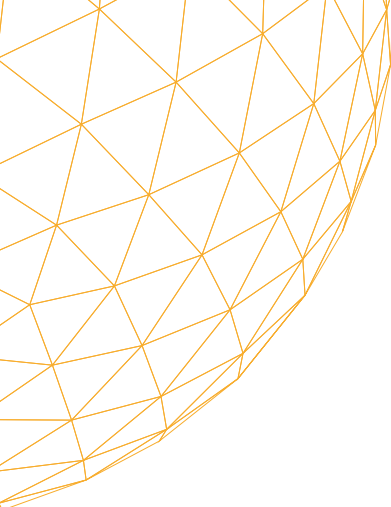
# Highlights

The 2022 update on Alzheimer's disease and related dementias (ADRD) uses the Medical Expenditure Panel Survey (MEPS) 2015–2019 to estimate the latest annual treatment prevalence (reported ADRD cases) and related expenditures among individuals 65 and older in the United States. These estimates are then projected from 2020 to 2060.

**The treatment prevalence and related costs have significantly increased compared to the Milken Institute [2016 report](#) and the [2019 update](#), both using the 2010–2012 MEPS.** The treatment prevalence has increased by 31 percent to 2.43 million. The annual medical expenditures for a person living with ADRD have increased by 13 percent to \$19,956. The latest estimates show that \$47.5 billion are spent on comprehensive medical care and \$12.8 billion on ADRD treatments, an increase of 17 percent and 24 percent, respectively.

**When it comes to ADRD and its treatment costs, age matters.** Eighty-four percent of treated ADRD cases are from age 75 and up. They account for 91 percent of ADRD-treatment expenditures and 83 percent of total medical expenditures. Individuals' annual ADRD-treatment expenditure increases 2.5 times between 65-74 and 85 and older, from \$2,753 to \$6,734.

**The 2022 estimates confirm the gender gap. Yet the cost of treatments for men living with ADRD is catching up with women's.** Women account for about 20 percent more cases than men. More specifically, 1.49 million out of the 2.43 million in treatment prevalence of ADRD and 3.96 million out of the 6.47 million in prevalence of Alzheimer's dementia estimated by the Alzheimer's Association are women. The annual ADRD-treatment expenditures per person are 44 percent higher for women (\$6,132) than men (\$4,267). Women represent about 70 percent, or \$8.8 billion, of total ADRD-treatment expenditures. However, the medical expenditures of all the treatments per man living with ADRD have increased by 37 percent compared to 3 percent for women, over the same period.



**Age worsens the gender gap in ADRD treatment prevalence and its related cost.** Women age 85 and older have a treatment prevalence 37 percent higher than men. The same gap is reflected in the ADRD-treatment expenditures.


**Minorities tend to under-report ADRD.** This update includes, for the first time, the distribution of treatment prevalence by race and ethnicity. It shows how important this factor is in unreported ADRD: Reported ADRD cases are less than six times the estimated prevalence for non-Hispanic Blacks and less than four times for Hispanics compared to three times for non-Hispanic Whites.

**Comorbidity plays a significant role in the overall cost of ADRD treatment.** Total medical expenditures for individuals living with ADRD are almost 3.7 times higher than ADRD-treatment expenditures, implying coexisting medical conditions in addition to ADRD among those 65 and older. Inpatient care, home health care, and medication drive a large part of these expenses, around 75 percent.

**By 2060, the ADRD population and the related treatment expenditure will have more than doubled.** ADRD-treatment expenditures will increase to \$45 billion in 2040 and \$102 billion in 2060. The total expenditures related to ADRD will increase to \$113 billion in 2040 and \$255 billion in 2060. The difference in expenditures between genders will increase to 3.3 times by 2040 and seven times by 2060. The older age group will continue to have the most significant total ADRD-treatment expenditure.

# Our Approach

In this update, we first estimate the annual treatment prevalence and medical expenditures for Alzheimer's and Related Dementia (ADRD) among those 65 and older in the US using the latest Medical Expenditure Panel Survey (MEPS) 2015-2019. We then project the estimates of ADRD cases and expenditures from 2020 to 2060.







# Data

The Medical Expenditure Panel Survey is a set of large-scale surveys of families and individuals, their medical providers, and employers across the U.S. A detailed survey description can be found on the MEPS Website (AHRQ 2021).

The MEPS collects information on medical conditions from respondents. MEPS provides a condition-event link to track specific medical expenditures related to a specific medical condition. Expenditures are defined as payments for health services from Medicare, Medicaid, private insurance, out-of-pocket payments, and other sources. MEPS includes expenditures by a follow-back survey linking to a sample of medical providers, which is more accurate than household surveys. Those are related to medical events such as office visits, medication refills, and hospital visits to outpatient, inpatient, and emergency rooms.

For the analysis, we use:

- **Full-Year Consolidated Data Files to obtain population demographics and expenditures,**
- **Medical Condition Files to identify ADRD conditions, and**
- **Household Component Event Files to link health services sites associated with ADRD treatment expenditures (Appendix A).**

For all estimations, we pool the last five years (2015-2019) of data; see Yu and Machlin (2004) for more details



# Methodology

We estimate the annual treatment prevalence, medical expenditures per person, and total medical expenditures associated with ADRD for gender and age groups. We then project the estimates from 2020 to 2060.

More specifically:

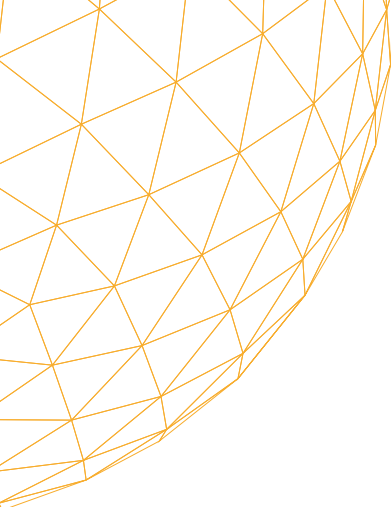
**Treatment Prevalence:** We first identify respondents with ADRD using the International Classification of Diseases (ICD-9-CM or ICD-10-CM) in the Clinical Classification Software system (Healthcare Cost and Utilization Project 2021), see Appendix B. We use the MEPS survey weights to estimate the ADRD population and the average treatment prevalence conditional on age groups (65-74, 75-84, 85-plus), gender (Male, Female), and race/ethnicity (Hispanics, non-Hispanic White, non-Hispanic Black, Asian, Other).

**Prevalence:** The MEPS identifies respondents with ADRD, estimating the annual treatment prevalence. The prevalence differs from the treatment prevalence as the survey data may suffer a downward self-reporting bias (undiagnosed, uninformed, unaware). As a result, we complement our MEPS-based estimates with the estimates from the Alzheimer's Association for the prevalence of Alzheimer's dementia.

- **The results are reported in Tables 1 and 2.**

**Total Expenditures:** We aggregate the weighted medical expenditures for identified respondents with ADRD. Those include total treatment expenditures for all coexisting medical conditions for individuals living with ADRD when multiple conditions are reported.

For the expenditures directly related to ADRD (ADRD treatment only), we identify medical services for ADRD as determined by the condition codes. Unique site events for ADRD are obtained from condition-event



links at inpatient, emergency room, outpatient, office-based, home health, and pharmacy refills. We then apply MEPS survey weights to the sum of expenditures from all sites.

- **The results are reported in Tables 3 and 4.**

**Per Person Expenditures:** Average expenditures related to ADRD are calculated by dividing total expenditure for ADRD treatment by treatment prevalence. We use MEPS survey weights to estimate the average expenditures for all treatments among respondents with and without ADRD.

- **The results are reported in Tables 5.1 and 5.2.**

**Treatment Prevalence Projection:** We project future treatment prevalence by combining the growth rate derived from the Alzheimer's Association's projected prevalence and our estimates from MEPS.

- **The results are reported in Table 6.**

#### **Comparison between the 2019 update/2016 report (MEPS 2010-2012) and the 2022 update (MEPS 2015-2019)**

- **Table 7**

**Expenditure Projection:** We inflate the average expenditures to corresponding years' dollar values using the Consumer Price Index (CPI): All Urban Consumers seasonally adjusted average prices for medical care services (health-care payments from professional, hospitals, and related services, and health insurance). We then project the total ADRD-treatment expenditures from 2020 to 2060 by multiplying the inflated average ADRD-treatment expenditure by the estimated treatment prevalence.

- **The results are reported in Figures 1 and 2.**



# Results

TABLE 1. PREVALENCE BY AGE AND GENDER, MILLIONS

Age	Treatment Prevalence of ADRD			Prevalence** (Alzheimer's Dementia)	Prevalence** (ADRD)
	Male	Female	Total		
65-74	0.22 (24%)	0.19 (13%)	0.41 (17%)	1.75 (27%)	2.19 - 2.92
75-84	0.38 (40%)	0.57 (38%)	0.95 (39%)	2.41 (37%)	3.01 - 4.02
85+	0.34 (36%)	0.73 (49%)	1.08 (44%)	2.31 (36%)	2.89 - 3.85
<b>Total</b>	<b>0.95</b>	<b>1.49</b>	<b>2.43</b>	<b>6.47</b>	<b>8.09 - 10.78</b>

\*Alzheimer's Association's prevalence estimates of Alzheimer's dementia (6.47 million) include 2.51 million (39 percent) males and 3.96 million (61 percent) females in 2022

\*\* Milken Institute's estimates for all ADRD cases include 3.14 million – 4.18 million males and 4.95 million – 6.60 million females.

Source: Alzheimer's Association (Rajan et al. 2021); Alzheimer's Association (2022); Milken Institute (2022)

## Main takeaways:

**Unreported ADRD:** Alzheimer's Association's estimated prevalence of Alzheimer's dementia is more than twice the reported ADRD cases in MEPS, 6.47 million compared with 2.43 million. The estimated prevalence for all ADRD cases (8.09 million to 10.78 million) is more than three times the reported ADRD. Non-reported ADRD conditions, uninformed or unaware of the disease, are well-documented due to undiagnosed conditions (Amjad et al. 2018).

**Gender:** More women have ADRD than men: 1.49 million (61 percent) females compared with 0.95 million (39 percent) males. The gender gap increases to 37 percent for those age 85 and older: 68 percent (0.73 million) vs. 31 percent (0.34 million).

**Age:** The age group 75 years and up represents 84 percent of the treated cases, or 2.03 million.

**TABLE 2. TREATMENT PREVALENCE BY RACE/ETHNICITY AND GENDER, MILLIONS**

Race/ Ethnicity	Treatment Prevalence of ADRD						Prevalence* (Alzheimer's Dementia)		Prevalence** (ADRD)
	Male		Female		Total				
Hispanic	0.08	(8%)	0.17	(11%)	0.25	(10%)	0.79	(12%)	0.99 - 1.32
Non-Hispanic	0.87	(92%)	1.32	(89%)	2.19	(90%)	5.68	(88%)	7.10 - 9.47
White	0.75	(80%)	1.08	(73%)	1.84	(76%)	4.53	(70%)	5.66 - 7.55
Black	0.07	(7%)	0.16	(11%)	0.23	(9%)	1.15	(18%)	1.44 - 1.92
Asian	0.03	(3%)	0.05	(3%)	0.08	(3%)			
Other	0.01	(1%)	0.03	(2%)	0.04	(2%)			
<b>Total</b>	<b>0.95</b>	<b>(100%)</b>	<b>1.49</b>	<b>(100%)</b>	<b>2.43</b>	<b>(100%)</b>	<b>6.47</b>	<b>(100%)</b>	<b>8.09 - 10.78</b>

\*Alzheimer's Association's prevalence estimates of Alzheimer's dementia in 2022.

\*\* Milken Institute's estimates for all ADRD cases

Note: Rounded to the nearest ten thousandths

Source: Alzheimer's Association (Rajan et al., 2021); Alzheimer's Association (2022); Milken Institute (2022)

## Main takeaways:

- **Race/Ethnicity:** 76 percent of ADRD conditions are reported by Non-Hispanic Whites.
- **Unreported ADRD:** The estimated prevalence for all ADRD cases among Non-Hispanic Blacks (1.44 million to 1.92 million) is more than six times the reported ADRD (16 percent, 0.23 million among 1.44 million of estimated prevalence), compared to three times among Non-Hispanic Whites (32 percent, 1.84 million among 5.66 million of estimated prevalence) and four times among Hispanics (25 percent, 0.25 million among 0.99 million of estimated prevalence).

**TABLE 3. TOTAL TREATMENT EXPENDITURES ASSOCIATED WITH ADRD, BILLIONS USD**

Age	Reported ADRD					
	ADRD Treatment Only			All Treatments		
	Male	Female	Total	Male	Female	Total
65-74	0.5	0.7	1.1	4.2	4.1	8.3
75-84	0.8	4.0	4.8	6.0	11.8	17.8
85+	2.8	4.2	6.9	8.1	13.3	21.4
<b>Total</b>	<b>4.0</b>	<b>8.8</b>	<b>12.8</b>	<b>18.3</b>	<b>29.2</b>	<b>47.5</b>

Note: Rounded to the nearest hundred million  
 Source: Medical Expenditure Panel Survey 2015-2019

### Main takeaways:

**Total expenditures:** The annual expenditures for all treatments for individuals living with ADRD are estimated at \$47.5 billion, almost four times the expenditures directly related to ADRD treatment (\$12.8 billion). This is due to the high probability of having comorbidity for individuals living with ADRD (Alzheimer’s Association 2021).

**Gender:** Women’s expenditures are significantly higher than men’s: more than twice for ADRD-treatment only and 1.6 times for all treatments.

**Age:** As expected, being the group with the highest prevalence, the age 75-plus group accounts for most of the expenses related to ADRD: 91 percent of ADRD-treatment expenditures and 83 percent of all treatment expenditures for individuals living with ADRD.

**TABLE 4. TOTAL TREATMENT EXPENDITURES ASSOCIATED WITH ADRD BY HEALTH SERVICE CATEGORY, BILLIONS USD**

Service Category	Reported ADRD, All Treatments				
	Male		Female		Total
<b>All Health Services</b>	<b>18.3</b>	<b>(100%)</b>	<b>29.2</b>	<b>(100%)</b>	<b>47.5 (100%)</b>
<b>Office Visits</b>	3.0	(17%)	3.9	(13%)	6.9 (15%)
<b>Outpatient</b>	1.0	(5%)	0.8	(3%)	1.7 (4%)
<b>Inpatient</b>	4.8	(27%)	7.3	(25%)	12.2 (26%)
<b>Prescription</b>	3.7	(20%)	5.8	(20%)	9.4 (20%)
<b>Home Health Care*</b>	4.5	(24%)	9.4	(32%)	13.8 (29%)
<b>Emergency Room Visits</b>	0.4	(2%)	0.7	(2%)	1.1 (2%)
<b>Others</b>	0.9	(5%)	1.5	(5%)	2.3 (5%)

\*Home Health Care was the sum of home health care by agency-sponsored and non-agency

Note: Rounded to the nearest decimal

Source: Medical Expenditure Panel Survey 2015-2019

## Main takeaways:

**Service Category:** Inpatient (26 percent), home health care (29 percent), and prescription drugs (20 percent) represent 75 percent of the expenditures.

**Gender:** The cost related to home health care accounts for a significantly higher portion of the women’s care than the men’s, with a difference of 8 percent.

## TABLES 5-1 AND 5-2. EXPENDITURES PER PERSON USD

**Table 5-1. Expenditures per Person with and without ADRD, by Gender, USD**

Gender	Reported ADRD		Not Reported ADRD
	ADRD Treatment Only	All Treatments	All Treatments
Male	4,267	19,420	4,863
Female	6,132	20,307	5,912
All	5,394	19,956	5,398

Note: Rounded to the nearest dollar

Source: Medical Expenditure Panel Survey 2015-2019

**Table 5-2. Expenditures per Person with ADRD, by Age, USD**

Age	Reported ADRD	
	ADRD Treatment Only	All Treatments
65-74	2,753	20,130
75-84	5,078	18,945
85+	6,734	20,806
All	5,394	19,956

Note: Rounded to the nearest dollar

Source: Medical Expenditure Panel Survey 2015-2019

### Main takeaways:

- **Expenditure per person:** The annual medical expenditure (\$19,956) for an individual living with ADRD is 3.7 times higher than non-ADRD patients (\$5,398). It is worth noting that the expenditure for only ADRD treatment (\$5,394) is already in line with all treatment expenses for non-ADRD patients.
- **Gender:** Annual ADRD-treatment expenditure is 44 percent higher for a woman (\$6,132) than for a man (\$4,267).
- **Age:** ADRD-treatment expenditures increase 2.5 times with age, from \$2,753 among patients aged 65-74 to \$6,734 among patients aged 85-plus.

**TABLE 6. PROJECTED TREATMENT PREVALENCE FROM 2020 TO 2060, MILLIONS**

	2020	2025	2030	2040	2050	2060
<b>Male</b>	0.95	1.14	1.37	1.79	2.04	2.28
<b>Female</b>	1.49	1.73	2.05	2.69	3.06	3.27
<b>Age 65-74</b>	0.41	0.47	0.50	0.46	0.49	0.59
<b>Age 75-84</b>	0.95	1.21	1.48	1.79	1.73	1.92
<b>Age 85+</b>	1.08	1.20	1.43	2.22	2.88	3.04
<b>Total</b>	<b>2.43</b>	<b>2.87</b>	<b>3.42</b>	<b>4.47</b>	<b>5.10</b>	<b>5.55</b>

Note: Rounded to the nearest ten thousandths

Source: Medical Expenditure Panel Survey 2015-2019; Alzheimer's Association's prevalence estimates (Rajan et al. 2021)



**TABLE 7. CHANGES BETWEEN THE 2019 UPDATE/2016 REPORT (MEPS 2010–2012) AND THE 2022 UPDATE (MEPS 2015–2019)**

	Treatment Prevalence (Millions USD)		
	2019 Update	2022 Update	% Change
Male	0.76	0.95	25%
Female	1.10	1.49	35%
All	1.86	2.43	31%

	Total Expenditures, ADRD-Treatment Only (Billions USD)		
	2019 Update	2022 Update	% Change
Male	2.80	4.0	43%
Female	7.50	8.8	17%
All	10.30	12.8	24%

	Total Expenditures, All Treatments (Billions USD)		
	2016 Report	2022 Update	% Change
Male	12.7	18.3	44%
Female	28.0	29.2	4%
All	40.7	47.5	17%

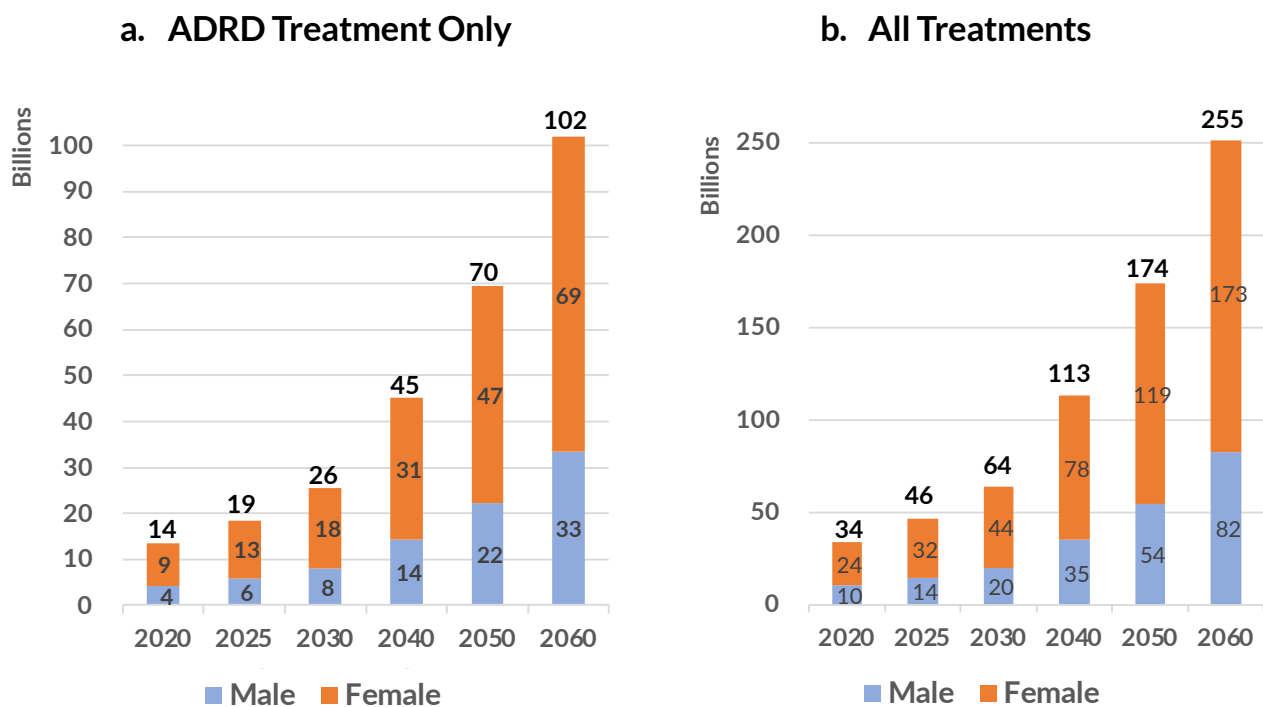
Expenditure per Person, ADRD-Treatment Only (USD)			
	2016 Report	2022 Update	% Change
Male	3,696	4,267	15%
Female	6,769	6,132	-9%
All	5,516	5,394	-2%

Expenditure per Person with ADRD, All Treatments (USD)			
	2016 Report	2022 Update	% Change
Male	14,207	19,420	37%
Female	19,795	20,307	3%
All	17,615	19,956	13%

Expenditure per Person without ADRD, All Treatments (USD)			
	2016 Report	2022 Update	% Change
Male	3,818	4,863	27%
Female	4,424	5,912	34%
All	4,127	5,398	31%

Sources: MEPS (2010–2012); MEPS (2015–2019)

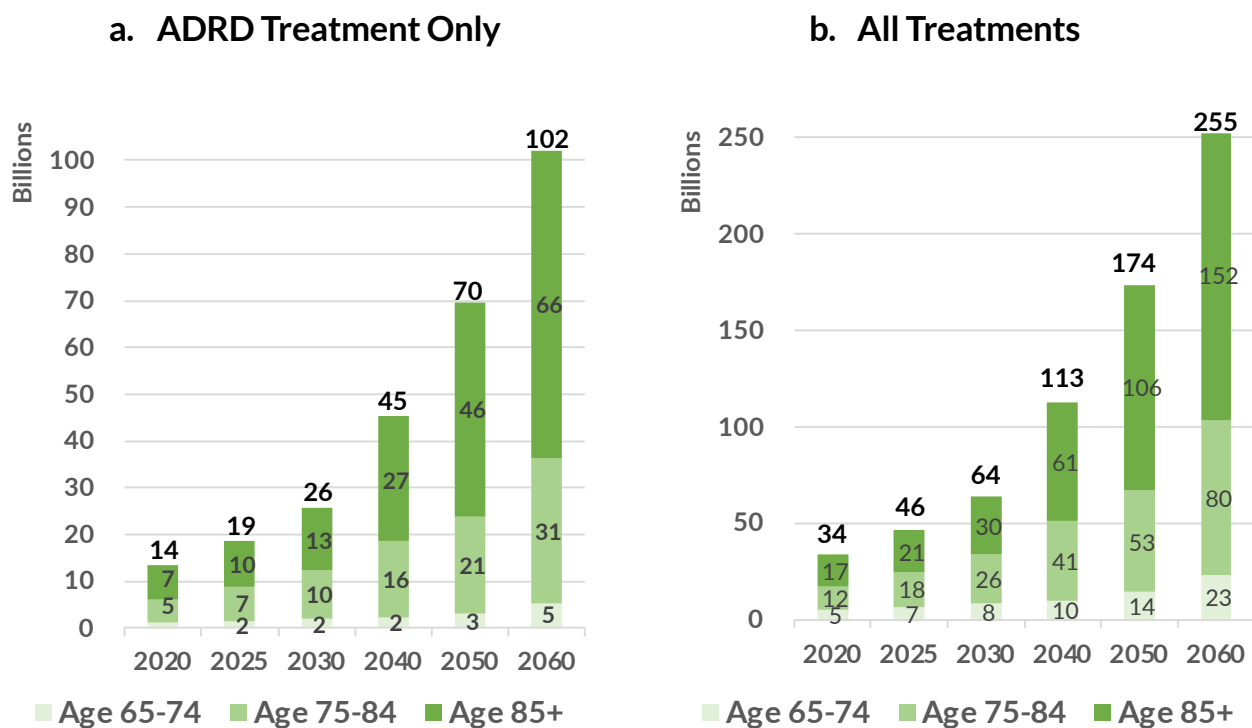
# FIGURE 1. PROJECTED TREATMENT EXPENDITURES ASSOCIATED WITH ADRD BY GENDER, BILLIONS USD



Note: Rounded to the nearest billion

Source: Medical Expenditure Panel Survey 2015-2019; Alzheimer's Association (Rajan et al. 2021); Milken Institute analysis (2022)

## FIGURE 2. PROJECTED TREATMENT EXPENDITURES ASSOCIATED WITH ADRD BY AGE, BILLIONS USD



Note: Rounded to the nearest billion

Source: Medical Expenditure Panel Survey 2015-2019; Alzheimer's Association (Rajan et al. 2021); Milken Institute analysis (2022)

## Main takeaways:

**Unreported ADRD:** Our projections for reported ADRD (treatment prevalence) are 4.47 million in 2040 and 5.55 million in 2060. The Alzheimer’s Association estimates Alzheimer’s dementia prevalence of 11.16 million in 2040 and 13.85 million in 2060, including unreported cases (see Appendix C).

**Total ADRD-treatment expenditures:** \$12.8 billion of ADRD-treatment expenditures (Table 3) will increase to \$45 billion in 2040 and \$102 billion in 2060 (Figures 1 and 2). The 2016 and 2019 Milken Institute reports’ estimates were 34 billion and 35 billion, respectively (Sagynbekov 2019; Kubendran et al. 2016). Our current estimate of \$45 billion is due to the increased treatment prevalence, from 1.86 million in 2012 to 2.43 million in 2015-2019, and the use of adjusted CPI for medical services. One caveat is the impact of drug prices for ADRD on the projected adjusted CPI medical services, depending on whether Medicare Part B would cover a new drug or not (Centers for Medicare & Medicaid Services 2021).

**Total ADRD patients’ expenditures:** \$47.5 billion expenditures (Table 3) are projected to be \$113 billion in 2040 and \$255 billion in 2060 (Figures 1 and 2).

## Gender

The difference in total ADRD-treatment expenditure between genders will increase from \$5 billion in 2020 to \$17 billion (3.3 times) in 2040 and \$35 billion (seven times) in 2060.

## Age

As expected, age 85-plus remains the age group with the most significant total ADRD-treatment expenditure.

# Appendices

## Appendix A. Data Files Used, MEPS 2015-2019

MEPS	Medical Condition Files	Full-Year Consolidated Files	Household Component Event Files
2015	H180	H181	H178*
2016	H190	H192	H188*
2017	H199	H201	H197*
2018	H207	H209	H206*
2019	H214	H216	H213*

Note: To complete the file name, replace \* with a particular source of event files as identified in the following: a, d, e, f, g, h, I stand for Prescribed Medicines File, Hospital Inpatient Stays File, Emergency Room Visits File, Outpatient Visits File, Office-Based Medical Provider Visits File, Home Health File, Event Files, respectively.

Source: MEPS (2015-2019)

## Appendix B. Case Identifiers in Medical Condition Files, MEPS 2015-2019

Year	Variables	Description	Variables
2015	ICD9CODX	ICD-9-CM	290, 294, 330, 797
2016-2019	ICD10CDX	ICD-10-CM	F01, F02, F03, F04, G30, G33, R41

Source: Clinical Classifications Software Refined (Healthcare Cost and Utilization Project 2021)

## Appendix C. The Projected ADRD Population by Alzheimer's Association (Millions)

Year	2020	2025	2030	2040	2050	2060
Female	3.74	4.36	5.17	6.76	7.69	8.22
Male	2.34	2.81	3.37	4.41	5.06	5.64
<b>Total</b>	<b>6.07</b>	<b>7.16</b>	<b>8.53</b>	<b>11.16</b>	<b>12.73</b>	<b>13.85</b>

Note: Rounded to the nearest ten thousandths

Source: Alzheimer's Association (Rajan et al. 2021)



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# About the Authors

**Claude Lopez** is the head of the Research Department at the Milken Institute. She leads data-driven efforts to influence global policy issues on International Finance, Health Economics, and Regional Economics. She is an active member of the T20 task force on international financial architecture for stability and development and a contributor to the W20 (Women 20), two advisory committees to the G20. Lopez has over 20 years of experience in academic and policy research in the US and abroad. Before joining the Institute, Lopez headed multiple research teams at the Banque de France, the nation's central bank, and was professor of economics at the University of Cincinnati. She has an MS in econometrics from Toulouse School of Economics and a PhD in economics from the University of Houston.

**Bumyang Kim** is a health economist at the Milken Institute in the Research Department. He specializes in evidence-based quantitative research by applying real-world data analytics to the health-care delivery system. Prior to joining the Milken Institute, he worked in health economics and outcome research, including the economic evaluation of health interventions, patient-centered outcome research, and geospatial analysis of health resources for the Cancer Economics and Policy Division in the Department of Health Services Research at the University of Texas MD Anderson Cancer Center. He holds a PhD in health economics and health services research from the University of Texas Health Science Center at Houston and a Master in Health Administration from the University of North Carolina at Charlotte.



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