

# Cost of Dementia in Medicare Managed Care: A Systematic Literature Review

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As of 2018, estimates suggest that 5.4 million individuals have Alzheimer disease and related dementias (ADRD) in the United States, of whom 96% are 65 years or older.<sup>1</sup> If current prevalence rates and population trends continue, the number of older Americans with ADRD will more than double by midcentury, with projections of 11 million to more than 13 million<sup>2,3</sup> individuals with diagnosed ADRD by 2050. Ensuring adequate resources for the health and social services required for a growing population with diagnosed and treated ADRD is a priority for the United States and other countries around the world<sup>4</sup>; this has led to a growing demand for analyses of the costs of the social, human, and health services required to provide adequate care for cognitively impaired older adults.<sup>1,4</sup>

Analyses of the direct medical care costs among older adults with ADRD in the United States have relied primarily on diagnostic and healthcare use data from claims submitted by providers and facilities to CMS for services provided through the Medicare and Medicaid programs. This reliance on claims has resulted in most cost evidence for ADRD being based on the experience of the Medicare fee-for-service (FFS) program. Although Medicare beneficiaries have had the option of enrolling in private managed care insurance plans since 1983 when Congress created the Medicare Part C program—later transformed into the Medicare+Choice program, now Medicare Advantage (MA)—relatively little research has been conducted on the costs of ADRD among older adults within these plans.

The limited focus on ADRD costs within managed care plans has been largely driven by 2 factors. First, MA plans were not required to provide detailed diagnostic and health service use information to CMS until 2013,<sup>5</sup> so MA-specific research required investigators to obtain data from individual health plans rather than from a single, national source. Second, enrollment in Medicare managed care plans had been consistently low—between 10% and 15% of eligible adults—for most of the program's first 25 years.<sup>6</sup> Thus, estimates that relied exclusively on data from Medicare FFS were presumed to produce reliable estimates of national care costs because of the relatively small numbers of older adults who chose to enroll in private managed care plans.

## ABSTRACT

**OBJECTIVES:** We conducted a systematic review of studies reporting the direct healthcare costs of treating older adults with diagnosed Alzheimer disease and related dementias (ADRD) within private Medicare managed care plans.

**STUDY DESIGN:** A systematic review of all studies published in English reporting original empirical analyses of direct costs for older adults with ADRD in Medicare managed care.

**METHODS:** All papers indexed in PubMed or Web of Science reporting ADRD costs within Medicare managed care plans from 1983 through 2018 were identified and reviewed.

**RESULTS:** Despite the growth in Medicare managed care enrollment, only 9 papers report the costs of care for individuals with ADRD within these plans, and only 1 study reports data less than 10 years old. This limited literature reports wide ranges for ADRD-attributable costs, with estimates varying from \$3738 to \$8726 in annual prevalent costs and \$8938 to \$38,794 in 1-year immediate postdiagnosis incident costs. Reviewed studies also used varied study populations, case and cost ascertainment methods, and analytic methods, making cross-study comparisons difficult.

**CONCLUSIONS:** The expected continued growth in Medicare managed care enrollment, coupled with the large and growing impact of ADRD on America's healthcare delivery and finance systems, requires more research on the cost of ADRD within managed care. This research should use more consistent approaches to identify ADRD prevalence and provide more detail regarding which components of care are included in analyses and how the costs of care are captured and measured.

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## TAKEAWAY POINTS

- ▶ Despite the growth in Medicare managed care enrollment, only 9 studies have reported the cost of Alzheimer disease and related dementias (ADRD) among private health plans now providing care to one-third of Medicare beneficiaries.
- ▶ Estimates of annual ADRD incremental costs among managed care plans vary widely, with annual prevalent and incident costs ranging from \$3738 to \$8726 and \$8938 to \$39,794, respectively.
- ▶ The extant literature has limited policy relevance to the cost of ADRD among managed care plans due to studies being out of date and reflecting divergent populations and research methods.

The limited attention that the cost of ADRD within Medicare managed care has received in the extant scientific literature was first highlighted by Rice and colleagues in 2001.<sup>7</sup> In discussing the need for private Medicare plans to better understand and develop strategies to address treatment for the growing number of older adults with ADRD, Rice et al<sup>7</sup> identified only 1 published paper that estimated the costs of ADRD within Medicare managed care. At that time, 15% of those eligible for Medicare (or 6.2 million individuals) were enrolled in private managed care plans.<sup>6</sup> In the almost 20 years following the review published by Rice et al, enrollment in Medicare managed care has increased to 33% of all those eligible (or 19 million individuals). Further, Medicare managed care enrollment is forecast to rise to 41% of eligible individuals by 2027, continuing a steady shift away from FFS Medicare.<sup>6</sup>

Considering the impact that ADRD is likely to have as a driver of health service use and cost among older adults, and the increasing role that managed care plays in health service delivery for this population, we conducted a systematic review of the evidence on the direct medical care costs of ADRD within Medicare managed care. Our goal is to document the evidence of the costs of ADRD within Medicare managed care, identify potential gaps in the evidence base, and propose a research agenda to address these gaps.

## METHODS

We conducted a systematic review of the scientific literature that reports the direct medical care costs of ADRD for the United States within Medicare's managed care program based on studies reported in either the PubMed or Web of Science citation indices. We included all studies published in English that reported original empirical analyses of either total healthcare costs or key components of costs (eg, inpatient services, skilled nursing care). Although the Medicare managed care program began in 1983, our search did not restrict the years in which papers were published and included papers published from 1983 through 2018. Candidate papers for this review were identified using search terms used in previous literature reviews of ADRD costs, which included combinations of the following terms: "Medicare and managed care," "Medicare + Choice," "Medicare Part C," or "Medicare Advantage" with "Alzheimer's," "Alzheimer's disease," "dementia," or "ADRD," and "economic," "cost," "expenditures," or "spending." Two members of the study team

reviewed the title of each paper to determine relevance for our analysis and then the abstracts of remaining studies to ensure that each met inclusion criteria before identifying the papers for which full reviews were to be conducted. Finally, we reviewed the citation lists for the papers that met all study inclusion criteria, as well as 2 previously published systematic reviews on ADRD cost,<sup>8,9</sup> to ensure that our search criteria did not overlook any previously cited studies. Disagreements regarding the

set of papers included in the final review were addressed by the entire study team.

We assessed each study based on the following criteria: study design, data source and population studied, number of ADRD cases included in the analysis, case ascertainment method, control identification method, source of health service use or cost data, components of reported health service use and cost, statistical methods, and ADRD-attributable and/or incremental cost.

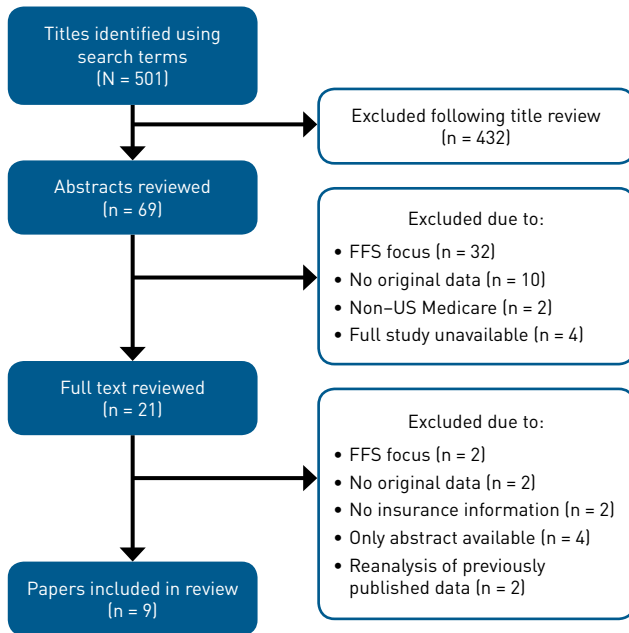
Attributable costs are health service expenditures that are unique to ADRD and are distinct from expenditures that may be incurred by individuals with ADRD. We report costs using 2018 inflation-adjusted US dollars, generated by applying the medical care cost component of the Consumer Price Index to the nominal cost values reported in each paper.

## RESULTS

The **Figure** summarizes the process used to identify the papers included in this review. Our search returned 501 published papers, 432 of which were excluded following an examination of their titles. We reviewed abstracts for the remaining 69 papers, from which we identified 21 for a full-text review. Following this full-text review, we excluded 2 that examined Medicare FFS costs,<sup>10,11</sup> 2 that included no original data,<sup>12,13</sup> 2 that did not address the source of insurance within a specific clinical population,<sup>14,15</sup> and 6 published abstracts for which no full study was available.<sup>10,16-20</sup> We excluded 1 paper<sup>21</sup> following our full-text analysis because the authors updated the analysis with the data source and methods in a subsequent paper that we did include.<sup>22</sup> Nine papers met all inclusion criteria and formed the basis for this review.

**Table 1**<sup>22-31</sup> provides a summary of the study design and approach for each of the 9 papers we reviewed, and each study's cost estimates are reported in **Table 2**.<sup>22-24,26-31</sup> Every paper used a retrospective design, with 2 reporting incident ADRD costs<sup>29,31</sup> and the remainder reporting prevalent costs. Of the 2 incident cost analyses, Joyce et al<sup>29</sup> report costs for only the first year following an incident ADRD diagnosis, whereas Suehs et al<sup>31</sup> report costs for 1 year prior and 2 years following an incident diagnosis. Both papers required that no ADRD diagnosis be present in the data for 12 months prior to the presumed incident diagnosis. The studies by McCormick et al<sup>27</sup> and Suehs et al<sup>31</sup> are the only studies that report costs over

**FIGURE.** Study Flow Diagram: Summary of Article Search and Selection



FFS indicates fee-for-service.

time in their assessment of ADRD-attributable costs in the 3 years preceding death.

Only 3 studies provide specific information about the care setting from which subjects were identified. Richards et al<sup>24</sup> provided the greatest detail regarding where study subjects received healthcare and also had the smallest number of ADRD cases: 150 subjects recruited from 4 care settings. Joyce et al<sup>29</sup> used the PharMetrics database, which includes information about each individual's source of insurance but provides no further details about individuals with the Medicare managed care program, other than that their insurance source is identified as a health maintenance organization. McCormick et al<sup>27</sup> identified subjects participating in the Washington Alzheimer's Disease Patient Registry, all of whom were members of Group Health Cooperative in Washington State (now Kaiser Permanente Washington). The studies by Leon and Neumann<sup>24</sup> and McCormick et al<sup>27</sup> are the only studies that relied on methods other than diagnostic or pharmacy data from claims to identify cases: McCormick et al<sup>27</sup> based ADRD status on a clinical consensus review of the subject's neurological examination and performance on a comprehensive neuropsychological battery; Leon and Neumann<sup>24</sup> used Mini-Mental State Exam (MMSE)<sup>32</sup> outcomes to assess cognitive impairment. Each of the remaining papers used a series of *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)* codes and/or prescription drug fills to establish likely ADRD cases. Within the studies relying on diagnostic codes or prescriptions, each study used a different

**TABLE 1.** Cost Studies of ADRD Within Medicare Managed Care by Publication Year

Reference	Study Design	Years Studied	Population Studied
Gutterman et al (1999) <sup>23</sup>	Retrospective cohort; 1-year prevalent costs	1996-1998	MCO providing care in 4 US regions: Northeast, Southwest, Mid-Atlantic, and Midwest
Leon et al (1999) <sup>24</sup>	Retrospective cohort; 1-year prevalent costs	1996	Enrollees in 1 of 4 managed care plans
Richards et al (2000) <sup>26</sup>	Retrospective cohort; 1-year prevalent costs	1996-1997	Integrated MCO in a mostly rural area of southeastern US
McCormick et al (2001) <sup>27</sup>	Annual costs in each of last 3 years of life	1998	Washington Alzheimer's Disease Patient Registry
Hill et al (2002) <sup>28</sup>	Retrospective cohort; 1-year prevalent costs	1997-1999	MCO in northeastern US
Hill et al (2005) <sup>22</sup>	Retrospective cohort; 1-year prevalent costs	1999-2002	Health Insurance Plan of New York, "group practice model HMO"
Joyce et al (2007) <sup>29</sup>	Retrospective cohort; incident ADRD costs for 1 year post diagnosis	1999-2003	Medicare managed care/PharMetrics database
Frytak et al (2008) <sup>30</sup>	Retrospective cohort; 1-year prevalent costs	2002	"Large, national, geographically diverse, FFS US managed health plan"
Suehs et al (2013) <sup>31</sup>	Longitudinal; 1 year pre-/2 years post incident ADRD diagnosis	2007-2011	Medicare Advantage Prescription Drug Plan members

(continued »)

definition to identify ADRD cases (Table 1<sup>22-31</sup>). None of the papers that relied on diagnostic data to identify both cases and controls provided any information about the number of fields that were available from which to detect the presence of an ADRD diagnosis.

Leon and Neumann<sup>24</sup> did not use controls in their analysis and reported mean costs for older adults with diagnosed ADRD by relative severity based on MMSE scores. McCormick et al<sup>27</sup> assessed relative ADRD costs with a random set of individuals with no dementia without any matching on observable characteristics. Richards et al<sup>26</sup> included every individual who did not meet their ADRD inclusion criteria as controls without considering any demographic characteristics, eventually analyzing 250 cases compared with more than 13,000 controls. The remaining studies matched on age and sex, with 3 additionally matching on geographic region,

**TABLE 1.** (Continued) Cost Studies of ADRD Within Medicare Managed Care by Publication Year

Reference	Number of Cases	Case Ascertainment Method	Control Identification Method	Cost Data Source	Statistical Methods
Gutterman et al (1999) <sup>23</sup>	677	ICD-9-CM 290.xx, 292.82, 294.1, 331.0-331.2, 797	Age, gender, and region matched with no diagnosis; 1:1 ratio	Claims	Analysis of variance adjusting for age, gender, and comorbidity count
Leon et al (1999) <sup>24</sup>	150	Mini-Mental State Examination <sup>25</sup>	No controls	Imputed service use from self-report	Group means
Richards et al (2000) <sup>26</sup>	250	ICD-9-CM 290.0-290.3, 331.0	All individuals with no diagnosis included as controls (n = 13,345)	Claims	Linear regression adjusting for age and sex
McCormick et al (2001) <sup>27</sup>	263 with AD; 133 with other dementias	Clinical evaluation, comprehensive neuropsychological battery, and consensus review with research criteria	100 study participants with no evidence of dementia	Medical records	Multivariate analysis of variance
Hill et al (2002) <sup>28</sup>	3834	ICD-9-CM 290.xx, 291.2, 292.82, 294.1, 294.8, 331.0, 331.2, or 797 and donepezil prescription	Age and gender matched with no diagnosis or prescription fill; 5:1 ratio	Imputed amounts paid providers based on procedure codes	Generalized linear regression adjusting for age, gender, and comorbidities
Hill et al (2005) <sup>22</sup>	3357 divided into subjects with VaD (678), CVD (2718), AD (1722), other dementia (957)	ICD-9-CM 290.xx, 291.2, 292.82, 294.1, 294.8, 331.0, 331.2, or 797 and donepezil prescription	Age and gender matched with no diagnosis; 5:1 ratio	HMO cost of services	Least squares regression adjusting for age, gender, and comorbidities
Joyce et al (2007) <sup>29</sup>	2745	ICD-9-CM 290.xx	Age and gender matched with no diagnosis; 2:1 ratio	Claims	Generalized linear regression adjusting for age, gender, and pre-ADRD abnormal gait
Frytak et al (2008) <sup>30</sup>	4450	ICD-9-CM 331.0 or ADRD prescription	Age, gender, region, and plan enrollment length matched with no diagnosis or prescription fill; 3:1 ratio	Claims	2-part regression model adjusting for age, gender, and comorbidities
Suehs et al (2013) <sup>31</sup>	3374	ICD-9-CM 331.0 from claims with no claim for AD-related prescription	Age, gender, race, and region matched with no diagnosis or prescription fill; 2:1 ratio	Claims	Mixed generalized linear regression adjusting for age, gender, race, geographic location, dual eligibility status, and RxRisk-V case mix instrument

AD indicates Alzheimer disease; ADRD, Alzheimer disease and related dementias; CVD, cerebrovascular disease; FFS, fee-for-service; HMO, health maintenance organization; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification; MCO, managed care organization; VaD, vascular dementia.

to identify non-ADRD controls from the same data source from which cases were identified.

Estimates of total cost and specific cost components (when reported) are shown in Table 2.<sup>22-24,26-31</sup> The variety of data sources, time periods, analytic approaches, and range of cost components for which estimates are provided results in a wide range of ADRD-attributable costs among the 9 studies we reviewed. Five studies<sup>23,24,26,28,30</sup> reported annual prevalent costs, with estimates of total costs ranging from \$9010<sup>30</sup> to \$27,948<sup>23</sup> and of incremental costs ranging from \$3738<sup>30</sup> to \$8726.<sup>23</sup> The 2 papers producing the lowest and highest estimates both used total healthcare use as the basis for cost estimates. Frytak et al<sup>30</sup> distinguished between managed care organization (MCO) and all-payer costs, but it is not

clear from their presentation what distinguishes MCO costs from other sources. Hill et al<sup>22</sup> focused on the costs of different forms of dementia and report the incremental costs of vascular dementia relative to controls; they found increased annual costs of \$16,122 due almost entirely to hospital and skilled nursing facility services, where incremental costs are the marginal or additional expenditures specifically attributable to vascular dementia. Although each study reported statistically significant differences in cost between cases and controls, none of the papers we reviewed provided median costs, which might be a better reflection of the distribution of the underlying data.

An examination of specific cost components reveals that care in institutional settings (ie, hospitals, skilled nursing facilities,

long-term care facilities) is the key driver of greater costs among older adults with ADRD. However, there is little consistency—with respect to both which components of healthcare use are reported and how these components are defined—to support cross-study comparisons. For example, several papers report costs for “inpatient” services, whereas others cite “hospital” costs; however, their Methods sections provide little guidance as to whether these estimates include all facility and professional services or outpatient services provided in hospital settings. Similarly, it is not clear if “physician office”<sup>26,28</sup> and “outpatient”<sup>23</sup> services are measuring the same resources.

Two studies report incident costs. Suehs et al<sup>31</sup> report \$17,712 in total healthcare costs and \$8938 in ADRD-attributable costs in the first year post index. Joyce et al<sup>29</sup> estimate \$48,895 and \$38,794 for total and ADRD-attributable costs, respectively, in the incident year.

The study by McCormick et al,<sup>27</sup> which is the only one that examined end-of-life costs attributable to ADRD within Medicare managed care, is also the only study that found lower healthcare costs for individuals with ADRD relative to controls at both 1 and 3 years before death. The authors found that total healthcare costs in the last 3 years of life were \$50,387 for individuals with Alzheimer disease and \$78,766 for individuals with other dementias compared with \$85,876 for controls, with long-term care costs being the main driver of the higher costs among controls.

We also note that, despite the call of Rice et al<sup>7</sup> for more research on the cost of ADRD within Medicare managed care, the 2 papers reporting the most recent data are by Suehs et al,<sup>31</sup> who published in 2013 using data from 2011, and Frytak et al,<sup>30</sup> who published in 2008 using 2002 data. The remaining literature is based on data that precede the growth in MA enrollment.

## DISCUSSION

The scientific literature examining ADRD-attributable costs among older adults in Medicare managed care programs reports a wide range of estimates of the economic consequences of ADRD to the MA program. Across these studies, the different care settings

**TABLE 2.** Cost Estimates From Reviewed Papers<sup>a</sup>

Reference	Components of Cost Included in Analysis	Cost Estimate [adjusted to 2018 US\$ based on published values]		
		Mild	Moderate	Severe
Leon et al (1999) <sup>24</sup>	Total costs for mild, moderate, and severe ADRD based on MMSE score	12,372	15,788	24,636
		Alzheimer Disease	Other Dementias	Controls
McCormick et al (2001) <sup>27</sup>	Costs in last year of life			
	Total cost	24,523	36,103	45,865
	Pharmacy	1422	2188	2827
	Inpatient	6756	11,670	7721
	Long-term care	10,005	14,122	19,993
	Costs in last 3 years of life			
	Total cost	50,387	78,766	85,876
	Pharmacy	3703	6285	6273
	Inpatient	13,729	20,341	11,936
	Long-term care	18,053	29,229	35,947
<b>Studies Reporting Incremental Prevalent Costs of ADRD Relative to Controls</b>		Case	Control	Difference
Gutterman et al (1999) <sup>23</sup>	Total cost	27,948	19,222	8726
	Pharmacy	1374	1378	-4
	Inpatient	9746	13,215	-3469
	Outpatient	1158	1189	-31
	Office visits	974	1003	-29
	ED	1129	458	671
Richards et al (2000) <sup>26</sup>	Total cost	9334	5906	3428
	Inpatient hospital	4731	1784	2947
	Outpatient hospital	1654	1531	123
	Office visits	2306	2411	-105
	SNF	127	2	125
	ED	268	69	199
Hill et al (2002) <sup>28</sup>	Total cost	13,502	8297	5205
	Hospital	8258	4588	3670
	Office visits	1302	1596	-294
	Outpatient hospital	249	217	32
	Pharmacy	561	557	4
	SNF	2131	5779	-3648
	Home health	611	343	268
	ED	162	83	79
Hill et al (2005) <sup>22</sup> (values reported for cases with vascular dementia)	Total cost	26,082	9660	16,422
	Hospital	17,121	5310	11,811
	SNF	4630	649	3981
	ED	237	102	135
	Outpatient hospital	582	466	116
	Office visits	1391	1838	447
	Home health	1838	364	1474
	Pharmacy	557	749	-192

(continued)



**TABLE 2.** (Continued) Cost Estimates From Reviewed Papers<sup>a</sup>

Studies Reporting Incremental Prevalent Costs of ADRD Relative to Controls		Case	Control	Difference
Frytak et al (2008) <sup>30</sup>	Total cost	9010	5272	3738
	Medical	4741	3292	1449
	Pharmacy	4269	1980	2289
	Acute care	2349	1380	969
Studies Reporting Incremental Incident Costs of ADRD Relative to Controls		Case	Control	Difference
Joyce et al (2007) <sup>29</sup>	Total cost	48,985	10,191	38,794
	Pharmacy	3115	1775	1340
	Outpatient	8453	2856	5597
	Inpatient	37,886	4070	33,816
Suehs et al (2013) <sup>31</sup>	Total	17,712	8774	8938
	Medical	14,417	6690	7727
	Pharmacy	3294	3443	-149

ADRD indicates Alzheimer disease and related dementias; ED, emergency department; MMSE, Mini-Mental State Exam; SNF, skilled nursing facility.

<sup>a</sup>Rounded to nearest dollar.

evaluated, methods for identifying cases, ways in which costs of care are captured and measured, and analytic approaches make it difficult to directly compare and draw conclusions about the impact of ADRD on costs within the MA program.

The extant literature is also too dated to be of much relevance to inform current policy regarding the costs of ADRD within Medicare managed care. Only 1 paper includes data that are less than 10 years old.<sup>31</sup> Older studies do not reflect a series of important changes to Medicare, including the Part D prescription drug program introduced in 2005,<sup>33</sup> a revised payment model for MA plans introduced between 2004 and 2006,<sup>34</sup> and incentives created for older adults to enroll in private health plans created by the Affordable Care Act.<sup>35</sup> Each of these changes to the Medicare program, as well as market forces such as the economic recession of 2008 to 2009, contributed to the enrollment shift from FFS to MA that is not reflected in the current literature.

In addition to the need for more up-to-date research on the economics of ADRD within the MA program, future research should pursue standardized approaches to measuring the prevalence and incidence of ADRD, the selection of non-ADRD comparators, inclusion and measurements of costs included in analyses, and the statistical models used to estimate ADRD-specific costs. In support of this goal, we offer the following 6 suggestions for future research on the cost of ADRD:

**Care settings.** Studies should identify the care setting(s) from which individuals with ADRD are identified to allow the reader to understand the type of managed care setting that they examined. Managed care encompasses an increasingly diverse set of service delivery and financial arrangements that vary from closed model and integrated health systems to preferred provider organizations that may operate similarly to FFS. Although researchers may be constrained with respect to how much information a partner

organization may allow them to share, the reader must know more about the managed care model that is being examined than what is reported by all but 2 of the papers included in this review.<sup>24,27</sup>

**Costs.** More research must be conducted on both the costs of incident ADRD and the way that costs change over time following a diagnosis and continuing until end of life. Several studies have examined these issues within the Medicare FFS program,<sup>36-38</sup> but, as we note in our review, only 2 studies<sup>29,31</sup> examined incident ADRD and only 1 evaluated end-of-life costs.<sup>27</sup>

**Consistency and replicability.** Ongoing research should use consistent and replicable ways to establish both incident and prevalent ADRD. As we highlight in our review, each paper identified cases in different ways. With so much variation in case identification, comparing findings across studies is difficult.

**Case identification.** Similarly, although most studies used ICD-9-CM diagnostic codes or pharmacy fills to identify ADRD cases, this information is only available for individuals accessing health services for whom this information is recorded by a healthcare provider. This case identification method ignores the economic impact of ADRD among those whose cognitive impairment is not yet recognized by the healthcare delivery system and is subject to bias on the basis of where and how individuals access healthcare.

**Cost comparison.** To allow for comparisons between and among different estimates, Methods sections should present clear explanations about which costs are included in analyses, how cost measures are calculated, and from whose perspective costs are being analyzed (eg, payer, provider, society). Similarly, studies should also be clear about which costs are not being included in analyses. ADRD costs are driven by services that are not covered by Medicare or not covered in comprehensive ways—examples of this are long-term and skilled nursing care beyond the postacute care phase. Further, Medicare Part D has made access to prescription drug information easier for researchers to include in analyses, but greater detail is needed about how each component of care is identified, measured, and costed.

**Cost estimates.** Studies should use appropriate econometric methods to generate cost estimates. In addition to addressing the skewed distribution of healthcare costs, analyses must consider the ways in which length of enrollment within an MA plan and mortality affect both the likelihood that we will observe an ADRD diagnosis and estimates of ADRD-attributable costs. For example, previous research on the cost of cancer has explored the challenge of when a cancer episode begins and the degree to which life expectancy should factor into cost estimates.<sup>39</sup> There are likely similarities in the cost trajectories of ADRD and some forms of cancer. Lessons from a more robust literature on the cost of cancer should be applied to analyses of ADRD.

## CONCLUSIONS

We reviewed the extant literature on the cost of ADRD within Medicare managed care. The few studies we examined were based on diverse methods and populations, making it difficult to draw generalizable conclusions about the economic impact of ADRD within Medicare managed care. Further, with 1 exception, these studies were based on relatively older data and, thus, may not be relevant to the current market, which has seen considerable increases in managed care enrollment. More research is needed to provide public and private policy makers with the evidence that they need to adequately prepare for the expected impact of ADRD on the US health economy. ■

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