



Cost of Illness among Alzheimer’s Disease and Related Dementias (ADRD) Medicare Patients in the United States between 2011-2021

Sabrina Wang, PharmD, MS; Bella Vo, PharmD, MS; Kimberly M. O’Malley, MS, PMP; Chintan Dave, PharmD, PhD
Center for Health Outcomes, Policy, and Economics, Rutgers University

Background

- **Alzheimer’s disease and related dementias (ADRD)** affect over 5.7 million U.S. adults and represent a growing public health burden.
- No definitive cure exists, sustaining significant clinical and economic impact:
 - **\$321 billion** in healthcare costs (2022)
 - **>\$1 trillion** projected by 2050
- **Limitations of existing cost-of-illness studies:**
 - Use of outdated data
 - Exclusion of key costs (e.g., out-of-pocket)
 - Focus on patient characteristics over expenditures
- **Gap in the literature:**
 - Lack of recent, comprehensive analyses of ADRD costs using Medicare claims data

Objective

Evaluate temporal trends in all-cause and ADRD-specific direct healthcare costs among Medicare beneficiaries with ADRD (2011 to 2021)

Methods

Design	Serial cross-sectional (prevalence-based); Medicare Parts A, B, D claims
Population	Community-dwelling ≥65-year-old; continuous enrollment; ADRD via annual claims
Perspective	Payer & patient
Years	2011–2021 (annual cohorts)
Costs	Annual total costs (inpatient, outpatient, pharmacy); 2021 USD-adjusted
Categories	Total; out-of-pocket (OOP); ADRD-specific
Cost Modeling	Annual total costs were modeled using a generalized linear model with a log link and gamma distribution; model specification was informed by the modified Park test

Results

Baseline Characteristics

Full Cohort (n = 3,011,012)	
Sociodemographic Characteristics	
Age at diagnosis in years, mean (SD)	81.0 (7.3)
Male, n (%)	1,103,020 (36.6)
Race, n (%)	
Non-Hispanic White	2,394,463 (79.5)
Non-Hispanic Black	236,668 (7.9)
Hispanic	221,755 (7.4)
Asian	158,126 (5.3)
Clinical Characteristics	
Comorbid conditions, n (%)	
Anemia	678,889 (22.6)
CKD	567,668 (18.9)
COPD	502,308 (16.7)
Depression	804,425 (26.7)
Heart Failure	481,954 (16.0)
Hyperlipidemia	2,207,454 (73.3)
Hypertension	2,475,385 (82.2)
Ischemic Heart Disease	894,833 (29.7)
Stroke	573,120 (19.0)

Table 1. Baseline characteristics for all patients identified with ADRD during any calendar years between 2011-2021. CKD = chronic kidney disease; COPD = chronic obstructive pulmonary disease; SD = standard deviation

Adjusted Cost Ratios for Total Healthcare Costs

Sociodemographic Characteristics	Cost Ratio (95% CI)
Male	0.93 (0.92–0.93)
Race	
Non-Hispanic Black	0.98 (0.98–0.98)
Hispanic	1.08 (1.07–1.08)
Asian	1.14 (1.13–1.14)
Clinical Characteristics	
Comorbid conditions	
Anemia	1.57 (1.57–1.57)
CKD	1.30 (1.30–1.31)
COPD	1.38 (1.38–1.38)
Depression	1.38 (1.38–1.38)
Heart Failure	1.51 (1.50–1.51)
Hyperlipidemia	1.07 (1.07–1.08)
Hypertension	1.24 (1.24–1.25)
Ischemic Heart Disease	1.28 (1.27–1.28)
Stroke	1.34 (1.34–1.35)

Table 2. Adjusted Cost Ratios for Total Healthcare Costs. Cost ratios from gamma regression (log link). Reference groups: female, non-Hispanic White, without comorbid condition, non-MCI. Non-positive costs (n=4) excluded. All p<0.001.

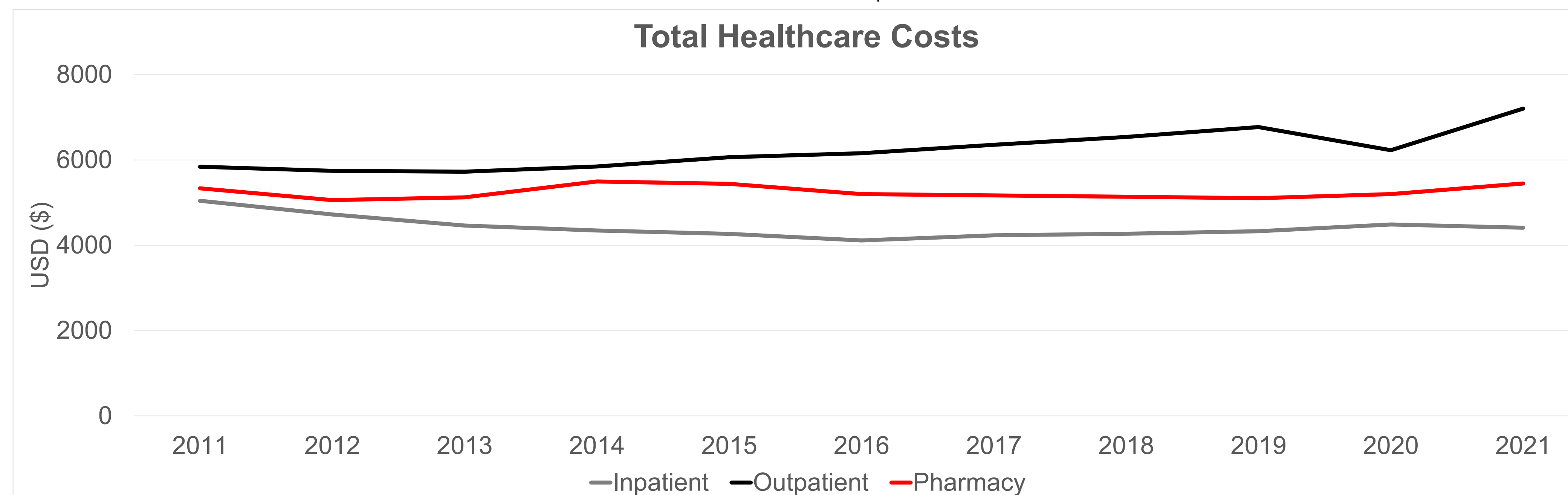


Figure 1A: Overall All-Cause Cost of Illness over time

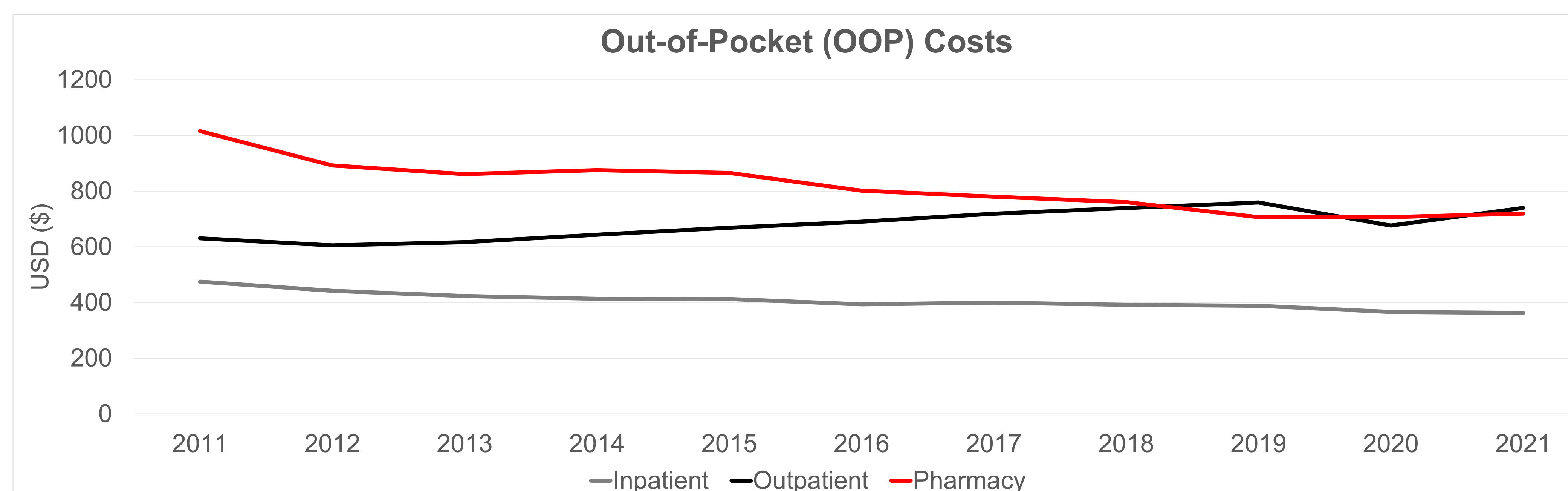


Figure 1B: Overall patient attributable (OOP) Costs over time

Conclusions

- **Total healthcare costs increased modestly over time**, driven primarily by outpatient services, suggesting shift in care away from inpatient settings
- OOP costs declined overall, but outpatient OOP increased steadily, indicating growing financial burden in ambulatory care settings
- Comorbidities were the strongest cost drivers, highlighting importance of managing comorbidities, particularly:
 - Anemia (+57%)
 - Heart failure (+51%)
 - COPD/Depression (+38%)
- **Out-of-pocket cost burden is shifting** toward outpatient care and comorbidity management

Strengths & Limitations

- Comprehensive Medicare dataset capturing Parts A, B, and D
- Includes both total and patient OOP costs
- Limited by claims-based coding and exclusion of long-term care and indirect costs

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Author Contact and Disclosures

Contact: Sabrina Wang (sabrina.wang78@gmail.com)
Sabrina Wang, PharmD, is a postdoctoral HEOR fellow at Daiichi Sankyo.

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