

EPIDEMIOLOGY

Regional variation in diagnostic intensity of dementia among older U.S. adults: a cross-sectional study

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Abstract

Background: Alzheimer's disease and related dementias (ADRD) are known to be underdiagnosed; but little is understood about how the likelihood of obtaining a diagnosis varies across place or demographic subgroups. Using observed diagnosed cases from national billing data, we report variation by region, age, and race/ethnicity in newly diagnosed dementia cases taking into account underlying population risk.

Method: Among a 20% random sample of fee-for-service Medicare beneficiaries, we identified those who received a new ADRD diagnosis in 2019 using billing data. The rate of new ADRD diagnosis was estimated overall and by Hospital Referral Region (HRR) and stratified by age category (65-74, 75-84, ≥ 85) and by race/ethnicity. A measure of ADRD diagnosis intensity across HRRs was calculated as the observed-to-expected ratio (O:E ratio) of new cases; expected new ADRD cases for each HRR were estimated using Poisson regression adjusted for regional measures of education, population health (diabetes, obesity, and smoking), and diagnostic intensity for chronic illness. Among older Americans, the probability of receiving an ADRD diagnosis was estimated according to regional ADRD diagnosis intensity.

Result: 3.0% (143,029 of 4,842,034) of older adults received a new ADRD diagnosis in 2019 and ranged from 1.7-5.4% across HRRs (Figure 1). The unadjusted mean ADRD diagnosis rate was 2.9 per 100 and differed by age (age $\geq 85 = 8.8/100$, 75-84 = 3.4/100, and 65-74 = 1.0/100, $p < .001$) and race (White = 2.9/100, Black 3.4/100, and Hispanic 2.8/100, $p < .001$). Variability across HRRs was largest among the youngest age category, Black, and Latino groups. In adjusted analyses, all the regional characteristics explained 33% of the variation in new ADRD diagnosis (pseudo- $R^2 = 0.33$). Adjusted for regional characteristics, the ADRD diagnosis intensity (i.e., O:E ratio) varied from 0.7 to 1.4 across HRRs overall (Figure 2) and was most variable among the youngest age category (65-74), Black, and Latino groups. These groups also had the greatest difference in the likelihood of diagnosis if residing in low versus high ADRD diagnosis intensity (Figure 3).

Conclusion: The likelihood of receiving an ADRD diagnosis varies across the U.S., particularly among those 65-74 years of age, and Black, and Latino groups.

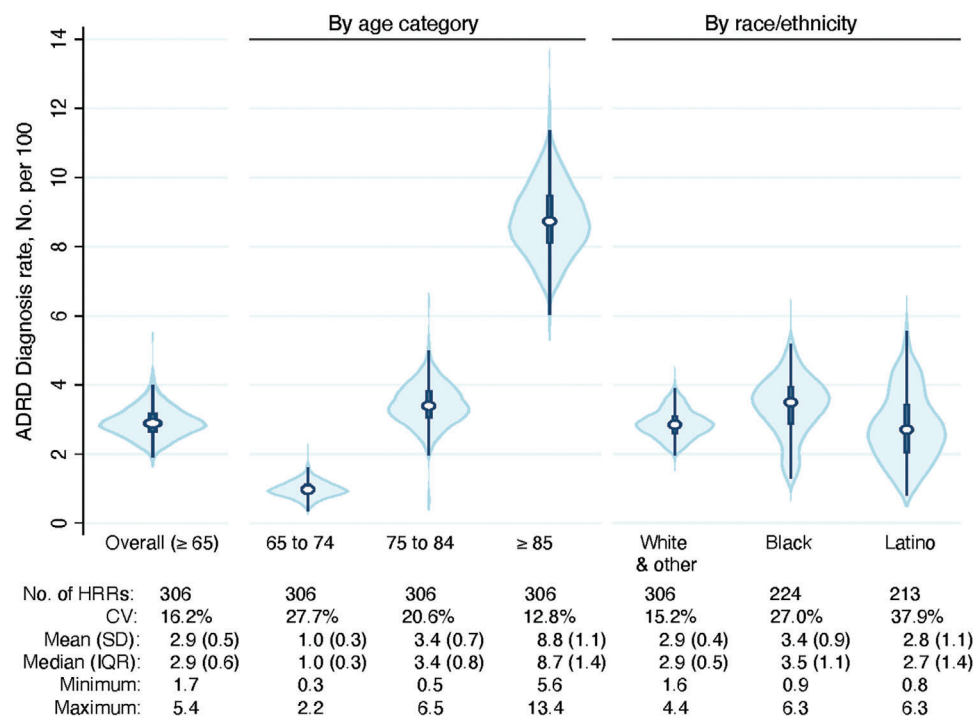


Figure 1. Variation in New AD/DRD Diagnosis Rate across U.S. Hospital Referral Regions among Older Adults (≥ 65) in Fee-For-Service Medicare by Age Category and Race/Ethnicity

Abbreviations: AD/DRD, Alzheimer's disease and other related dementias; HRR, Hospital Referral Region; CV, coefficient of variation; SD, standard deviation; IQR, interquartile range

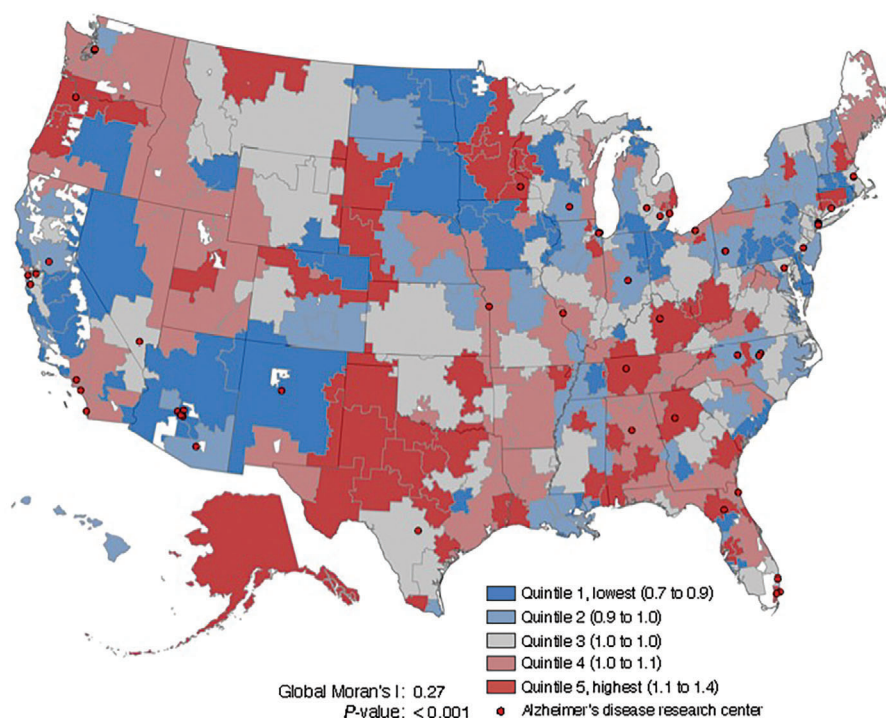


Figure 2. Geographic Distribution in the Observed to Expected Ratio of New AD/AR cases by U.S. Hospital Referral Regions among Older Adults (≥ 65) in Fee-For-Service Medicare

Analyses adjusted for population size, population age (percent ≥ 80 years old), sex composition, race and ethnicity, level of education (percent < high school education), population health (percent obese, diabetes, and smokers), and regional diagnostic intensity

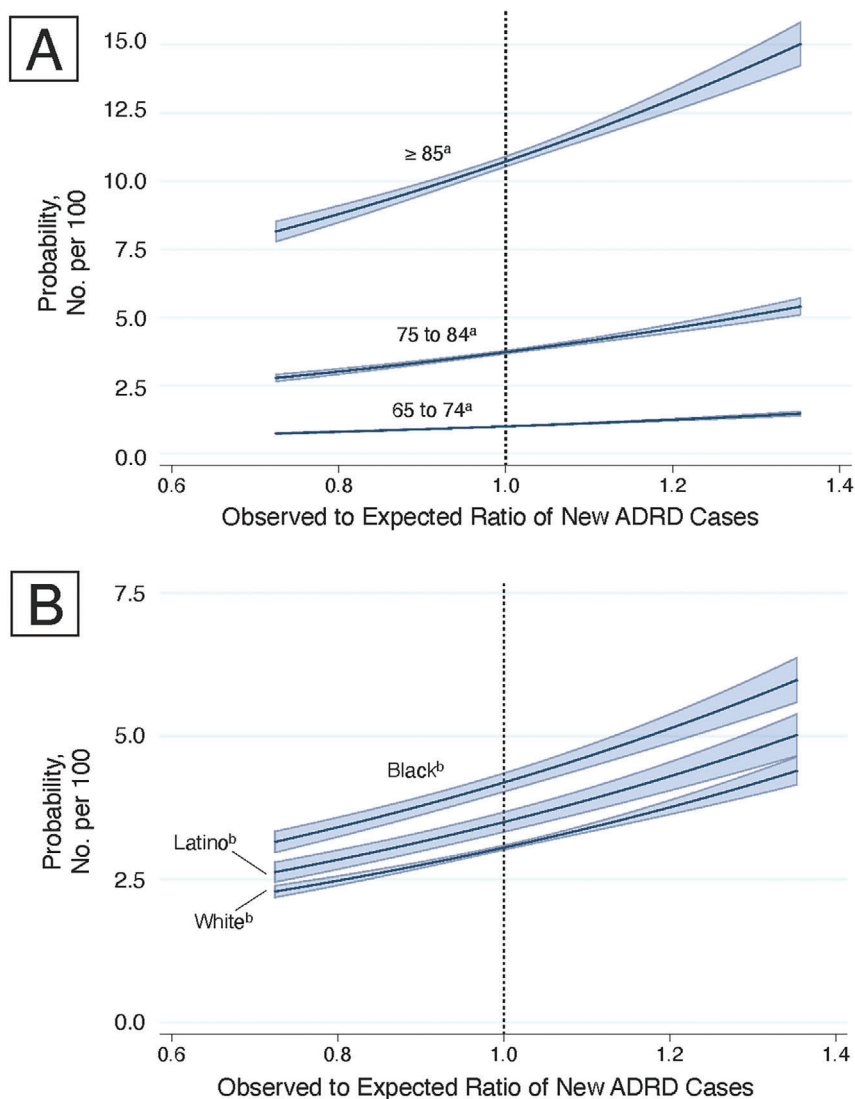


Figure 3. Probability of New ADRD Diagnosis (No. per 100) among Older Adults (≥ 65) in Fee-For-Service Medicare According to Regional ADRD Diagnosis Intensity by Age Category (A) and Race/Ethnicity (B)

Abbreviations: ADRD, Alzheimer's disease and other related dementias

All analyses adjusted for sex and random intercept included for HRR

a: Further adjusted for race and ethnicity

b: Further adjusted for age (continuous)