

CLINICAL INVESTIGATION

Impact of federal antipsychotic use policy in nursing homes on new diagnoses for approved indications in dementia residents

Theresa I. Shireman PhD^{1,2}  | Neto Coulibaly MS² |
Tingting Zhang MD, PhD^{1,2} | Andrew R. Zullo PharmD, PhD^{1,2,3,4}  |
Lauren B. Gerlach DO, MS^{5,6}  | Antoinette B. Coe PharmD, PhD^{5,7}  |
Lori A. Daiello PharmD, ScM^{1,2,8} | Derrick Lo ScM¹ |
Julie P. W. Bynum MD, MPH^{5,9} 

¹Center for Gerontology and Healthcare Research, Brown University School of Public Health, Providence, Rhode Island, USA

²Department of Health Services, Policy, and Practice, Brown University School of Public Health, Providence, Rhode Island, USA

³Department of Epidemiology, Brown University School of Public Health, Providence, Rhode Island, USA

⁴Center of Innovation in Long-Term Services and Supports, Providence Veterans Affairs Medical Center, Providence, Rhode Island, USA

⁵Institute for Healthcare Policy and Innovation, University of Michigan, Ann Arbor, Michigan, USA

⁶Department of Psychiatry, University of Michigan, Ann Arbor, Michigan, USA

⁷Department of Clinical Pharmacy, College of Pharmacy, University of Michigan, Ann Arbor, Michigan, USA

⁸Department of Neurology, Warren Alpert Medical School, Brown University, Providence, Rhode Island, USA

⁹Department of Internal Medicine, University of Michigan, Ann Arbor, Michigan, USA

Correspondence

Theresa I. Shireman, Center for Gerontology and Healthcare Research, Brown University School of Public Health, Room 621, 121 South Main Street, Providence, RI 02903, USA.
Email: theresa_shireman@brown.edu

Funding information

National Institute on Aging, Grant/Award Numbers: K08 AG071856, K23AG066864, P01 AG027296, R01AG065722, R01AG077620

Abstract

Background: Federal policies targeting antipsychotic use among nursing home (NH) residents may have increased reporting of diagnoses for approved uses, including schizophrenia, Tourette's syndrome, and Huntington's Disease (called "exclusionary diagnoses" because they exclude residents from the antipsychotic quality metric). We assessed changes in new exclusionary diagnoses among long-stay NH admissions specifically with dementia following federal policies.

Methods: Retrospective, quarterly, interrupted time-series analysis (2009–2018) of new long-stay NH residents with dementia and no exclusionary diagnoses reported before NH admission. The National Partnership and the addition of facility level antipsychotic use to the Five Star Quality Rating system were key time exposures. Outcome was quarterly facility level predicted percentage of exclusionary diagnoses within 2 years of admission stratified by NH characteristics.

Results: For 264,095 long-stay admissions, mean percentage of new exclusionary diagnoses was 2.2% before the Partnership. After the Partnership, there was an unadjusted increase in the percentage over time (slope change, 0.044, $p = 0.018$), but the percentage never exceeded 2.9%. The Partnership

contributed to a one-time decrease in diagnoses in NHs with an intermediate percentage of Black residents (-1.29% , $p = 0.004$). Before the Partnership, diagnoses were increasing among not-for-profit relative to for-profit NHs (0.044 ; $p = 0.012$), but after the Partnership, the pattern reversed. For-profit NHs saw an increase ($+0.034$, $p = 0.002$); not-for-profit NHs experienced a decrease (-0.014 , $p = 0.039$). Quality Rating modifications had no significant effect.

Conclusions: Exclusionary diagnosis reporting among long-stay NH residents with dementia, the group most at risk from antipsychotics, did not increase in response to federal policies. Evaluation of reasons for the observed increase in exclusionary diagnoses among non-dementia NH residents is warranted along with continued attention to how to incentivize the appropriate use of medications in residents with dementia that is crucial for high-quality NH care.

KEYWORDS

antipsychotics, dementia, exclusionary diagnoses, health policy, interrupted time-series analysis, nursing homes

INTRODUCTION

Antipsychotic prescribing among nursing home (NH) residents has been the subject of significant regulatory focus due to their Black Box Warnings for increased mortality in people with dementia and concerns that such medications may be used as chemical restraints. The Centers for Medicare & Medicaid Services (CMS) created the National Partnership to Improve Dementia Care in Nursing Homes (Partnership) to improve the quality of care for NH residents with dementia nationwide in 2012.¹ The Partnership specifically targeted the reduction of antipsychotic exposure in people with dementia through training for NH staff and surveyors, public reporting on antipsychotic drug use, stakeholder engagement, and emphasis on non-pharmacologic alternatives to antipsychotic medication use. In 2015, CMS incorporated antipsychotic use into the Five Star Quality Rating system, in which higher levels of antipsychotic use result in lower NH facility quality ratings. These policies likely contributed to declines in antipsychotic use in long-stay NH residents from 23.9% at the end of 2011 to 14.1% in the second quarter of 2020.²

Despite the declines in antipsychotic use over time, news reports and peer-reviewed publications have called out rising rates of diagnoses for approved uses, including schizophrenia, Tourette's syndrome, and Huntington's Disease, as an unintended consequence of these federal policies because prescribers might assign these diagnoses to justify antipsychotic therapy under the strong regulatory environment and public quality reporting in NHs.^{3–7} This set of diagnoses are called “exclusionary diagnoses” because residents with these diagnoses are excluded from the antipsychotic prescribing quality measure, thereby

Key points

- Federal antipsychotic use policy in nursing homes specifically excludes individuals with conditions for which antipsychotic use is appropriate, including schizophrenia, Tourette's syndrome, and Huntington's disease.
- Literature has identified rising rates of these exclusionary diagnoses in nursing homes as an unintended consequence of federal antipsychotic policies.
- Our findings indicate that federal policies were not responsible for the increased exclusionary diagnoses in long-stay nursing home residents with dementia.

Why does this paper matter?

Gaining insight into the unintentional consequences of federal policies is essential for future efforts to improve NH care quality. Regulators' attention to NHs with higher-than-expected rates of antipsychotic use and exclusionary diagnoses (schizophrenia, Tourette's syndrome, and Huntington's Disease) should direct attention toward drivers of those phenomenon beyond the previous concern for gaming quality metrics and continue to focus on appropriateness of care for NH residents with dementia.

potentially improving NH quality ratings for facilities.⁸ Although the black box warning for antipsychotics applies only to people with dementia, it is important to

note that the CMS antipsychotic reports and quality measures include all NH residents, not only persons with dementia who are presumably at the greatest risk of adverse consequences from antipsychotic exposure. Although peer-reviewed reports suggest an increased prevalence of exclusionary diagnoses in NH residents, these reports are not always limited to residents with dementia.^{3–5} There is one study, Winter et al., that did report a 40% increase in exclusionary diagnoses among NH residents with dementia in Virginia, driven by a near doubling in schizophrenia prevalence (0.7% to 1.3%).⁵ In response to seemingly inappropriate exclusionary diagnoses, the Biden-Harris administration asked for greater efforts to mitigate antipsychotic use during the 2023 State of the Union address,⁹ and CMS has consequently updated their monitoring of NHs through audits.⁸

The prior research was provocative and policy response strong, yet research to date has not established if these exclusionary diagnoses were truly new because researchers have not assessed whether diagnoses predated the NH admission. For a new exclusionary diagnosis to be causally attributed to coding that occurs during residence in a NH, researchers need to determine if the diagnosis existed before *NH admission* to verify its absence. For instance, Moyo et al. examined the probability of a new exclusionary diagnosis in Veterans Administration long-stay NH residents after removing residents who had an exclusionary diagnosis at the time of admission based on the Minimum Data Set (MDS) assessment; their work, however, was not limited to residents with dementia, for whom the antipsychotic Black Box Warnings specifically apply.¹⁰

Additional considerations for unintended consequences of federal policies for antipsychotic use are related to persistent concerns about structural racism and resource constraints in the NHs setting, which could create additional pressure for facilities to focus on disease coding. Black residents tend to be disproportionately concentrated in NHs with lower quality and limited clinical and financial resources.^{3,11,12} However, studies have found contradictory associations between racial segregation among NHs and inappropriate antipsychotic use for black residents.^{13,14} NH residents' experience and outcomes also vary by financial resource availability as measured by the proportion of Medicaid-enrolled residents and facility ownership profit status.^{12,14–16} With the documented increase in the assignment of exclusionary diagnoses resulting from the Partnership,⁵ examining the incidence of those diagnoses in NHs with high- versus low-proportion of Black residents and markers of resource constraints is important.

Given that prior studies were unable to determine if exclusionary diagnoses were present before admission and assuming that these conditions are unlikely to be

newly diagnosed in older adults, our primary objective was to determine how often these conditions first appeared after NH admission and if that rate changed after the initiation of the Partnership (2012) and subsequent Five Star Quality Rating changes (2015). Furthermore, we focus specifically on the subgroup of residents with dementia who are at the highest risk of adverse outcomes. Given prior research on differential effects across racial and ethnic minority residents, NH profit status, and Medicaid payer mix,^{12,15,17} we examined changes in exclusionary diagnoses among NHs according to these factors.

METHODS

Study design

We observed exclusionary diagnoses that first appeared in claims or as an MDS checkbox among NH residents with dementia after they met the definition for long-stay resident between 2009 and 2018. Observations were clustered at the NH level and analyzed according to key facility characteristics—the proportion of non-Hispanic Black residents, facility ownership, and the percentage of people on Medicaid—using interrupted time-series analyses.

Data sources

We used the following data sources to build files for this study (2007–2018): the MDS (Versions 2.0 & 3.0) resident assessments, NH quarterly Certification and Survey Provider Enhanced Reporting (CASPER) and the Online Survey Certification and Reporting (OSCAR), the Medicare Beneficiary Standard File (MBSF), the Chronic Condition Warehouse, and fee-for-service Medicare Part A, Part B, and Part D claims. We also used our Residential History File to identify beneficiary setting and establish long-stay status.¹⁸ The data years exceeded the period of cohort definition to verify inclusion criteria and follow-up time.

Study cohort

We included residents when they met the definition for long-stay (>100 days in the NH with no more than 10 days outside of a NH and no long stay in the previous 2 years). We constructed quarterly cross-sections of NH residents who met the long-stay definition from January 2009 to June 2018. Residents with multiple eligible NH stays had only their first stay included in the sample. In addition, we included residents who were 65 years or

older, were continuously enrolled in Medicare fee-for-service Parts A/B/ D for 12 months before NH admission, and had a dementia diagnosis based on either an MDS assessment or a previously validated, claims-based algorithm.^{19,20} We excluded residents who had preexisting exclusionary diagnoses in the year preceding their long-stay admission date. We did not apply any exclusion criteria related to antipsychotic use before admission.

Dependent Variables

The outcome variable was the presence of an exclusionary diagnosis within 2 years of the long-stay admission. We searched medical claims (inpatient and outpatient services) for International Classification of Diseases Versions 9 and 10 diagnosis codes for the presence of an exclusionary diagnosis in any position on the claim: Huntington's Disease, 334.4 or G10; Tourette's Syndrome, 307.23 or F95.2; and schizophrenia, 295.xx, F20 (extensions 0, 1, 2, 3, 5, 81, 89, 9), F25 (extensions 1, 8, 9). We also included the associated active diagnosis check boxes (MDS Section I, 5250, 5350, 6000) from the MDS.

Independent variables

Facility characteristics were documented in CASPER or OSCAR on July 1 each year. The primary independent variable of interest was the percent of residents who were non-Hispanic Blacks in the NH facility categorized into three mutually exclusive levels: less than 5% (low, reference group), 5%–15% (intermediate), and greater than 15% (high). As secondary characteristics, facility ownership was dichotomized as nonprofit NHs or for-profit NHs (reference group was for-profit NHs), and the percentage of residents in the facility enrolled in Medicaid categorized as either less than or equal to 62.5% or greater than 62.5%.¹⁶

Resident covariates

We incorporated measures from the MDS or claims expected to capture changes in secular trends for NH admissions and clinical conditions potentially associated with changes in mental health status. We examined NH residents' demographics and clinical characteristics by year of long-stay admission, using the MDS assessment closest to July 1 of each year as the reference date. Measures included age, sex, race, dual-eligibility status, geographic residence, activities of daily living (ADL, functional status scale ranging from 0 to 28, where 0 signifies complete independence),²¹ physical aggression,

verbal aggression, and the presence of anxiety, depression, bipolar disorder, and a disease burden measure, the Combined Comorbidity Score.²²

Analytic approach

We modeled the predicted percentage of new exclusionary diagnoses using a two-step process. Our approach assumed that in the absence of the federal initiatives, the rate of exclusionary diagnoses would have remained constant. For the first step, we used a logit model standardized to the covariate distribution of the overall population and the margins command to generate predicted probabilities for the binary outcome, new exclusionary diagnosis. Predicted probabilities were multiplied by 100 to obtain predicted percentages. We plotted the predicted percentages by quarter for the overall population and for each set of NH characteristics. For step two, the predicted percentage of new exclusionary diagnoses served as the dependent variable in the three-phase interrupted time-series regression model: (1) before the 2012 CMS Partnership; (2) when the Partnership was implemented (2012–2015), and (3) after the Five Star Quality Rating System went into effect (2015). The interrupted time-series model was constructed based on observed linear trends and previous research^{23–25} that assumed the absence of lagged effects after careful examination of plots and considering the existing literature. We ran the interrupted time-series model for the entire population and then stratified for each set of NH characteristics. Each model included an intercept to indicate pre-policy period percentage, a linear time trend variable, indicator variables for each policy period, and variables indicating the differences in the linear time trend between the study periods.

Statistical analyses under the first step were carried out using STATA 18.0, College Station, TX, and the analyses under the second step were executed using SAS 9.4, Cary, NC. A significance level (alpha) of 0.05 was set using two-sided tests. This study received ethical approval from the institutional review board at Brown University.

RESULTS

Study cohort and nursing facility characteristics

The numbers of NH residents with dementia meeting inclusion criteria each year were fairly consistent from 2010 to 2016, dropping slightly in 2017, and there were 16,276 NHs represented across the study years (Table 1).

TABLE 1 Resident and NH characteristics.

Resident characteristic	Admission year							
	2010	2011	2012	2013	2014	2015	2016	2017
Number of residents	29,665	26,856	26,456	26,140	26,230	24,209	21,263	18,194
Age, mean (SD), years	84.0 (7.7)	84.0 (7.7)	84.2 (7.7)	84.4 (7.8)	84.4 (7.8)	84.5 (7.9)	84.4 (7.9)	84.4 (8.0)
Female, <i>N</i> (%)	22,592 (76.2)	20,510 (76.4)	20,108 (76.0)	19,651 (75.2)	19,648 (74.9)	17,831 (73.7)	15,271 (71.8)	12,666 (69.6)
Race/Ethnicity, <i>N</i> (%)								
Non-Hispanic White	24,924 (84.0)	22,667 (84.4)	22,416 (84.7)	22,320 (85.4)	22,615 (86.2)	21,108 (87.2)	18,472 (86.9)	15,702 (86.3)
Non-Hispanic Black	3266 (11.0)	2810 (10.5)	2632 (10.0)	2496 (9.6)	2444 (9.3)	2089 (8.6)	1866 (8.8)	1659 (9.1)
Hispanic	643 (2.2)	587 (2.2)	595 (2.3)	499 (1.9)	396 (1.5)	351 (1.5)	318 (1.5)	287 (1.6)
Other/missing	832 (2.8)	792 (3.0)	813 (3.1)	825 (3.2)	775 (3.0)	661 (2.8)	607 (2.9)	546 (3.0)
Full dual-eligible, <i>N</i> (%)	12,159 (41.0)	8255 (30.7)	7630 (28.8)	7210 (27.6)	6309 (24.1)	5307 (21.9)	4797 (22.6)	4230 (23.3)
Geographic residence, <i>N</i> (%)								
Northeast	7031 (23.7)	5982 (22.3)	5866 (22.2)	5936 (22.7)	6024 (23.0)	5776 (23.9)	5126 (24.1)	4414 (24.3)
South	11,313 (38.1)	10,305 (38.4)	10,150 (38.4)	9939 (38.0)	9836 (37.5)	9186 (37.9)	7892 (37.1)	6791 (37.3)
Midwest	8188 (27.6)	7592 (28.3)	7565 (28.6)	7531 (28.8)	7766 (29.6)	6969 (28.8)	6061 (28.5)	5068 (27.9)
West	3131 (10.6)	2976 (11.1)	2872 (10.9)	2731 (10.5)	2603 (9.9)	2278 (9.4)	2183 (10.3)	1920 (10.6)
Combined comorbidity Score, mean (SD)	4.16 (3.4)	4.31 (3.6)	4.52 (3.6)	4.31 (3.6)	4.49 (3.6)	4.67 (3.6)	5.73 (3.8)	5.91 (4.0)
Anxiety, <i>N</i> (%)	17,898 (60.3)	17,782 (66.2)	17,956 (67.9)	18,183 (69.6)	18,491 (70.5)	17,550 (72.5)	15,434 (72.6)	13,222 (72.7)
Depression, <i>N</i> (%)	24,654 (83.1)	22,613 (84.2)	22,168 (83.8)	21,724 (83.1)	21,788 (83.1)	19,938 (82.4)	17,248 (81.1)	14,637 (80.5)
Bipolar disorder, <i>N</i> (%)	3319 (11.2)	3000 (11.2)	2953 (11.2)	3013 (11.5)	2949 (11.2)	2685 (11.1)	2355 (11.1)	1926 (10.6)
Physical aggression, <i>N</i> (%)	3728 (12.6)	3494 (13.0)	3630 (13.7)	3690 (14.1)	3721 (14.2)	3329 (13.8)	3061 (14.4)	2781 (15.3)
Verbal aggression, <i>N</i> (%)	4941 (16.7)	4654 (17.3)	4927 (18.6)	4839 (18.5)	5042 (19.2)	4722 (19.5)	4159 (19.6)	3654 (20.1)
Activities of daily living score, mean (SD)	16.41 (6.8)	16.38 (6.5)	16.70 (6.2)	16.80 (5.9)	16.95 (5.7)	17.08 (5.5)	17.11 (5.4)	17.18 (5.3)
NH characteristics	2010	2011	2012	2013	2014	2015	2016	2017
Number of NHs	13,579	13,596	13,424	13,420	13,588	13,621	13,331	13,008
Nonprofit or government, <i>N</i> (%)	4217 (31.1)	4164 (30.6)	4077 (30.4)	4045 (30.1)	4100 (30.2)	4179 (30.7)	3987 (29.9)	3861 (29.7)
Urban location, <i>N</i> (%)	9288 (68.4)	9370 (68.9)	9274 (69.1)	9274 (69.1)	9400 (69.2)	9392 (69.0)	9203 (69.1)	9082 (69.9)
Number of beds, Mean (SD)	110.97 (63.2)	111.24 (64.5)	111.82 (80.3)	110.80 (64.4)	110.88 (63.7)	111.08 (63.5)	110.85 (61.8)	111.13 (61.3)
Percentage of residents identified as Black, Mean (SD)	8.79 (18.7)	8.69 (18.3)	8.80 (18.3)	8.69 (18.2)	8.98 (18.3)	9.34 (18.6)	9.17 (18.3)	9.85 (18.8)

TABLE 1 (Continued)

NH characteristics	2010	2011	2012	2013	2014	2015	2016	2017
Percentage of residents on Medicaid, Mean (SD)	59.68 (22.8)	59.68 (22.8)	59.99 (22.6)	59.44 (22.9)	59.06 (23.0)	58.52 (23.0)	58.64 (23.1)	9.29 (23.1)
RN hours per resident-day, Mean (SD)	0.47 (0.75)	0.49 (0.80)	0.51 (0.79)	0.53 (0.84)	0.55 (0.78)	0.54 (0.76)	0.52 (0.74)	0.49 (0.53)
LPN hours per resident-day, Mean (SD)	0.87 (0.80)	0.86 (0.74)	0.86 (0.76)	0.86 (0.67)	0.86 (0.66)	0.87 (0.79)	0.87 (0.70)	0.87 (0.58)
CNA hours per resident-day, Mean (SD)	2.37 (0.87)	2.38 (0.82)	2.38 (0.80)	2.39 (0.89)	2.39 (0.83)	2.38 (0.86)	2.38 (0.90)	2.35 (0.79)

Characteristics determined on July 1 each year: data for 2009 not shown for table fit. Each resident only included in the first quarter they met long-stay definition.

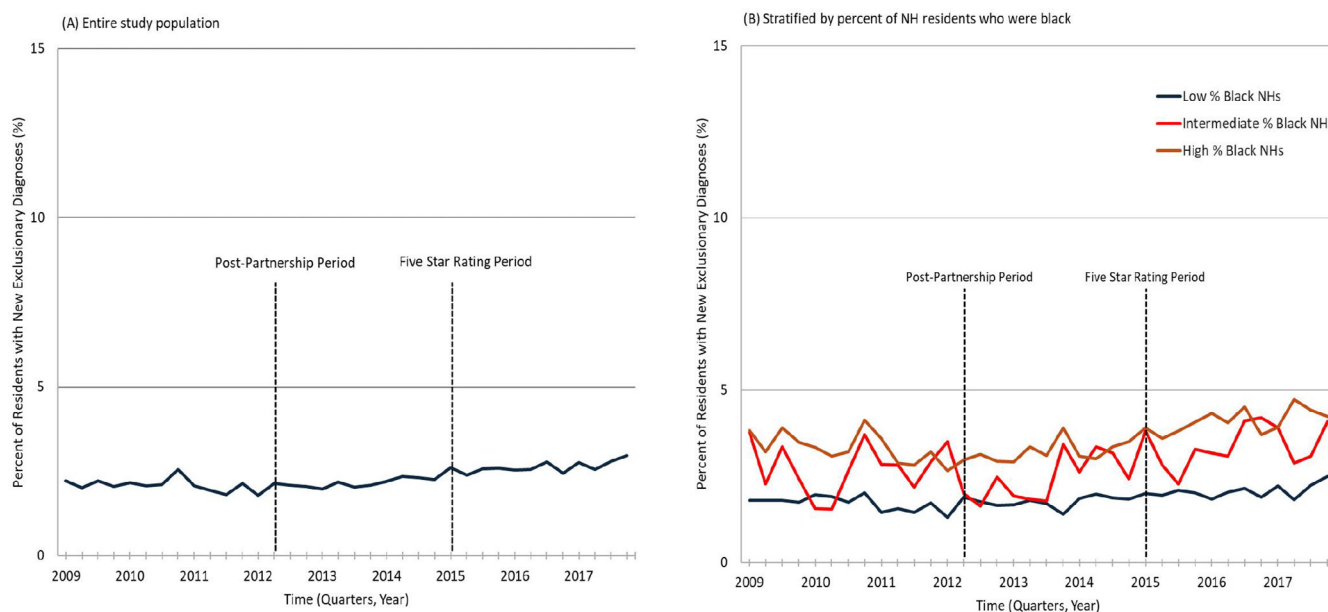


FIGURE 1 Percentage of NH residents with new exclusionary diagnoses by quarter (2009–2018) for (A) overall study population and by (B) percent of NH residents who were Black.

Overall predicted percentage of new exclusionary diagnoses

The percentage of new exclusionary diagnosis at the NH level was 2.2% in the first quarter of 2009 and increased to 2.8% in the middle of 2018. In the Interrupted time series analysis (ITSA) results, a slightly negative slope in the rate of new exclusionary diagnoses before the Partnership (pre-slope = -0.020 , $p = 0.086$) shifted to a positive slope after the Partnership (change in slope = $+0.044$, $p = 0.022$) resulting in a rate of 0.024% increase in the percentage per quarter (Figure 1A; see Supplemental Table S1). There were no significant changes associated with the Five Star Rating change.

NHs with varying percentage Black residents

Across quarters, exclusionary diagnosis percentages were lowest for the low percent Black NHs and highest for the high percent Black NHs (Figure 1B). Percentages were less stable over time for the intermediate percent Black NHs, but never exceeded 5% for any group.

At baseline in the unadjusted ITSA model (see Supplemental Table S2), the percentage of diagnoses was lowest (2.23% per quarter) for NHs with low percent Black residents and 0.55% higher for NH with intermediate percent Black residents (2.78%; $p = 0.062$). For NHs with high percent Black residents, new diagnoses were 2.10% higher than the lowest NHs (4.33%; $p < 0.001$).

TABLE 2 Interrupted time-series analysis results for predicted percentage of new exclusionary diagnoses for long-stay NH residents.

Model	Intercept ^a	Partnership (2012)			Five star rating change (2015)	
		Pre-slope ^a	Change at implementation	Post- slope change ^b	Change at implementation	Post- slope change ^b
Percent of Black residents in NHs						
Low, <5% (referent)	1.081***	−0.019	0.177	0.032	0.079	0.014
Intermediate, 5%–15%	0.539	0.061	−1.292**	0.058	−0.339	−0.065
High, >15%	1.744***	−0.023	−0.155	0.055	0.212	0.019
NH ownership						
For-profit (referent)	2.545***	−0.029*	0.126	0.063**	0.170	0.019
Nonprofit and government owned	1.133***	0.044*	−0.319	−0.058*	−0.200	−0.026
Percent of residents on Medicaid in NHs						
Low, <=62.5%	1.426***	0.001	0.025	0.018	0.123	0.008
High, >62.5%	1.478***	−0.037	0.135	0.053	0.068	0.003

^aIntercept and pre-slopes are compared to zero for each model's referent group and then relative to the referent group for the other categories.

^bPost-slope change relative to pre-policy slope.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

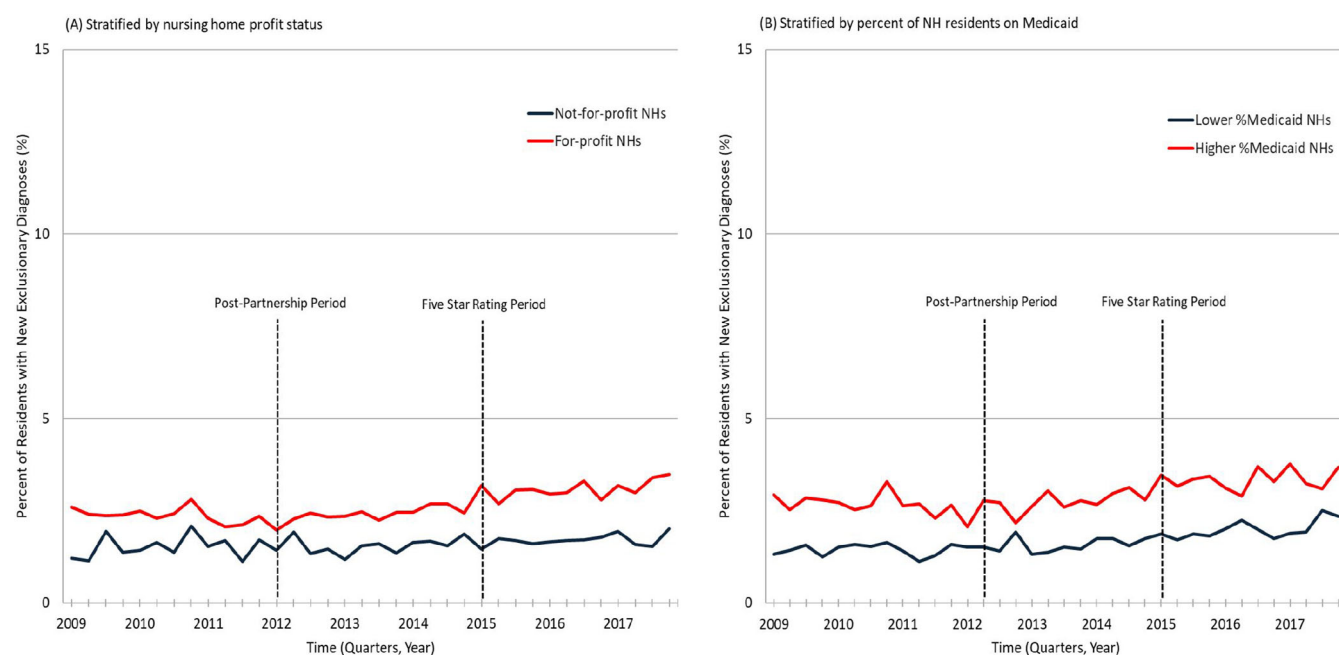


FIGURE 2 Percentage of NH residents with new exclusionary diagnoses by quarter (2009–2018) by (A) nursing home ownership and (B) percent of NH residents on Medicaid.

After the Partnership, there was a significant decline (-1.59% , $p < 0.001$) in new exclusionary diagnoses only for the intermediate percent Black NHs. In the adjusted ITSA model (Table 2), the percentage of diagnoses was lowest (1.80% per quarter) for NHs with low percent Black residents and 0.54% higher for NH with intermediate percent Black residents (2.34% ; $p = 0.080$). For NHs

with high percent Black residents, new diagnoses were 1.74% higher than the lowest NHs (3.54% per quarter; $p < 0.001$). After the Partnership, there was a significant decline (1.29% , $p = 0.004$) in new exclusionary diagnoses only for the intermediate percent Black NHs. There were no other significant changes in levels or slopes related to the Partnership or the Five Star Quality Rating changes.

NH ownership

Predicted percentages among for-profit NHs were consistently higher than not-for-profit/government NHs, but values never exceeded 4% (Figure 2A). In the unadjusted ITSA (see Supplemental Table S2), the baseline percent of new exclusionary diagnoses was 3.15% ($p < 0.001$) in for-profit NHs and was 1.46% lower in nonprofit NHs ($p < 0.001$). After the Partnership, the percent of new exclusionary diagnoses increased in for-profit NHs (slope = 0.075, $p = 0.004$) but declined in nonprofit NHs (slope = -0.081 , $p = 0.027$). After adjustment, the baseline incidence of new exclusionary diagnoses was 2.55% among for-profit NHs and significantly lower (-1.13% , $p < 0.001$) for nonprofit NHs (Table 2). The incidence of exclusionary diagnoses in for-profit NHs had been declining before the Partnership (-0.029% per quarter, $p = 0.019$), but after its implementation, the slope shifted by $+0.063$ ($p = 0.002$). In the nonprofit NHs, the incidence of exclusionary diagnoses was increasing (0.044% , $p = 0.012$) but after the Partnership, the slope shifted to a significant decline (-0.058% , $p = 0.039$) relative to the for-profit NHs. There were no significant changes to incidences or slopes associated with the Five Star Quality Rating changes.

NH percent Medicaid residents

Predicted percentages of incident exclusionary diagnoses for NHs with higher Medicaid covered populations were consistently higher than for NHs with lower Medicaid coverage, and values never exceeded 4% in any given quarter (Figure 2B). In the unadjusted ITSA (see Supplemental Table S2), the baseline percent of new exclusionary diagnoses was 1.78% ($p < 0.001$) in NHs with $<62.5\%$ residents on Medicaid and was 1.72% higher in NHs with $\geq 62.5\%$ residents on Medicaid ($p < 0.001$). After the Partnership, the percent of new exclusionary diagnoses did not change for either category of Medicaid coverage. Likewise, for the adjusted ITSA (Table 2), the percent of new exclusionary diagnoses for NHs with Medicaid coverage above 62.5% was 1.48% ($p < 0.001$) higher than those below or at 62.5%. There were no significant changes over time according to Medicaid coverage.

DISCUSSION

We examined whether a possible unintended consequence of the CMS National Partnership to Improve Dementia Care and subsequent changes to the Five Star Quality Ratings was an increase in new exclusionary

diagnoses (schizophrenia, Tourette's syndrome, and Huntington's Disease) among long-stay NH residents with dementia. We found that following these federal policies there was a small increase in the incident of new exclusionary diagnoses which is unlikely to be clinically or policy meaningful. There were no significant differences between NHs with a low, intermediate, or high percentage of Black residents. Similarly, the percentage of new exclusionary diagnoses did not change over time for NHs on the basis of Medicaid coverage. There was not only a significant, but also small increase in exclusionary diagnoses among for-profit NHs after the Partnership, in contrast to nonprofit NHs where incidences declined. Although new exclusionary diagnoses remained consistently below 5%, it is concerning that for-profit and not-for-profit NHs had divergent diagnosis reporting behavior, behaviors which impact quality reporting and payment.

Prior research and public reports suggested that changes to NH policies addressing the potentially inappropriate use of antipsychotics have resulted in substantially increased assignment of exclusionary diagnoses to permit prescribing of these agents without worsening quality scores.³⁻⁵ Our results encourage different inferences for the NH residents most vulnerable to the adverse consequences of antipsychotics—those with dementia. The practice of any potentially inappropriate assignment of an exclusionary diagnosis has not changed with recent federal policies for those residents. In addition to focusing on NH residents with dementia, our result is most likely different from prior studies because we use an improved methodological approach that ascertains “new” diagnoses since nursing home admission rather than prevalent diagnoses among nursing home residents. Specifically, we removed individuals with a preexisting exclusionary diagnosis before NH admission, and we considered only new long-stay residents. We also tracked whether an exclusionary diagnosis emerged within 2 years post-admission. Prior reports differed in several other ways which may also contribute to the different result: inclusion of all NH residents rather than only those with dementia, using cross-sectional measures of exclusionary diagnoses among prevalent (i.e., not newly admitted) residents; using diagnoses from MDS assessments only; not adjusting for important resident and facility characteristics.³⁻⁵ In our own prior analysis of MDS assessments from a sample of prevalent NH residents, we also found a higher likelihood of Black NH residents with dementia with a documented schizophrenia diagnosis,⁴ but this finding appears to have been driven by the inclusion of preexisting exclusionary diagnoses (before NH admission) rather than newly acquired diagnoses post-admission. It is important to acknowledge that

any new diagnosis of schizophrenia, Tourette's syndrome or Huntington's Disease among adults over 65 years of age is questionable as these conditions are typically diagnosed in earlier decades of age.

Because quality ratings are assigned at the facility level, we examined how facility characteristics influenced the emergence of exclusionary diagnoses. In keeping with prior research, we also hypothesized that there would be a greater increase in exclusionary diagnoses for NHs with a higher proportion of Black residents.^{3,4,12,13,17,26–30} There was not. The Partnership led to a significant, one-time decrease in exclusionary diagnoses for intermediate percent Black NHs but no subsequent changes to the slope or rate. We also considered two other sets of NH characteristics that have previously been associated with care quality: percent of residents on Medicaid and ownership.^{12,15,16,29} Although the percent of residents on Medicaid was not associated with new exclusionary diagnosis across the policy periods, for-profit NHs did experience a statistically significant increase after the Partnership. Changes were small and percentages remained <5% across all quarters. Erroneous coding of exclusionary diagnoses has been a focus of CMS investigation since 2016 and ongoing concerns have led to further changes to public reporting of deficiency citations and deductions to star ratings with financial implications.⁸ Because we do not see systematic changes stimulated by the Partnership and Five Star Rating System, the ongoing CMS investigations will hopefully identify a circumscribed set of specific NHs that require improvement.

Limitations

There are several important potential limitations to consider when interpreting these results. First, we employed a one-year wash-out period before admission to establish new, exclusionary diagnoses. Because their presence depended upon medical insurance claims, it is possible that providers did not document the diagnosis during that period. In preliminary work, we examined a two-year wash-out window, and the differences in exclusionary diagnoses before admission comparing a 12-month and 24-month look back period averaged 0.2% (range, 0–0.6%) across study quarters (see Supplemental Figure S1). Second, we limited observation for new exclusionary diagnoses to 2 years after long-stay admission and would have missed diagnoses that occurred later. Because the average length of NH stay is just over 1.3 years (485 days),³¹ our two-year follow-up should have covered most NH residents. Still, it is reasonable to assume that more agitated behaviors will occur over time in people with dementia,³² and some NH residents

may accrue diagnoses later in their stays. Third, we did not adjust for antipsychotic use before NH admission because the NH policies do not take prior use into account in their measures. Fourth, we conducted a facility-level analysis because that is how the CMS quality measures are applied. Experiences at the person level may be different, as suggested in the news media.⁶ Finally, we did not control for antipsychotic prescribing at the facility level, another important factor that could drive exclusionary diagnosis reporting. If we were to adjust for antipsychotic prescribing, then our estimates would most likely be attenuated further toward the null and our conclusions would remain unchanged or even strengthened.

CONCLUSION

Gaining insight into the unintentional consequences of federal policies is essential for future efforts to improve care quality, particularly in NH settings, where CMS has tremendous sway. In addition, the changes in new exclusionary diagnoses in relation to the Partnership and Five Star Quality Rating are important for determining how we measure and interpret the overall trend in inappropriate antipsychotic usage among residents with dementia in NHs. With a renewed emphasis on diagnostic accuracy, continued vigilance to optimizing appropriate medication use for NH residents with dementia is required for ongoing improvement in their quality of care.

AUTHOR CONTRIBUTIONS

All authors meet the criteria for authorship stated in the Uniform Requirements for Manuscripts Submitted to Biomedical Journals. TIS, NC, ABC, TZ, ARZ, LBG, LAD, and JPWB contributed to study concept and design, interpretation of data analysis, and preparation of manuscript. DL contributed to analysis and interpretation of data. TIS and JPWB contributed to acquisition of study funding and data.

CONFLICT OF INTEREST STATEMENT

ARZ receives grant funding from Sanofi paid directly to Brown University for research on infection and vaccine use in nursing homes. All other authors had no potential financial or personal conflicts of interest.

SPONSOR'S ROLE

The National Institute on Aging did not participate in design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

FINANCIAL DISCLOSURE

This study was funded by the National Institute on Aging (P01 AG027296). Dr. Coe is supported by the National Institute on Aging (K08 AG071856). Dr. Gerlach is supported by the National Institute on Aging (K23AG066864). Dr. Zullo was also supported, in part, by grants R01AG065722 and R01AG077620. The funders did not participate in the design, methods, data analysis, or preparation of paper.

ORCID

Theresa I. Shireman  <https://orcid.org/0000-0001-6846-8783>

Andrew R. Zullo  <https://orcid.org/0000-0003-1673-4570>

Lauren B. Gerlach  <https://orcid.org/0000-0003-1943-0150>

Antoinette B. Coe  <https://orcid.org/0000-0002-5723-0443>

Julie P. W. Bynum  <https://orcid.org/0000-0003-1481-4462>

REFERENCES

1. National Nursing Home Quality Improvement Campaign. Healthcare quality improvement campaign. February 27, 2019. <https://www.nhqualitycampaign.org/>
2. Centers for Medicare & Medicaid Services (CMS). National Partnership to Improve Dementia Care in Nursing Homes: Antipsychotic Medication Use Data Report (April 2022). Updated July 29, 2022. Accessed July 25, 2023. <https://www.cms.gov/files/document/antipsychotic-medication-use-data-report-2021q4-updated-07292022.pdf>
3. Cai S, Wang S, Yan D, Conwell Y, Temkin-Greener H. The diagnosis of schizophrenia among nursing home residents with ADRD: does race matter? *Am J Geriatr Psychiatry*. 2022;30(5):636-646. doi:10.1016/j.jagp.2021.10.008
4. Fashaw-Walters SA, McCreedy E, Bynum JPW, Thomas KS, Shireman TI. Disproportionate increases in schizophrenia diagnoses among black nursing home residents with ADRD. *J Am Geriatr Soc*. 2021;69(12):3623-3630. doi:10.1111/jgs.17464
5. Winter JD, Kerns JW, Winter KM, Sabo RT. Increased reporting of exclusionary diagnoses inflate apparent reductions in long-stay antipsychotic prescribing. *Clin Gerontol*. 2019;42(3):297-301. doi:10.1080/07317115.2017.1395378
6. Thomas K, Gebeloff R, Silver-Greenberg J. Phony diagnoses Hide high rates of drugging at nursing homes. *NY Times* September 11, 2021. <https://www.nytimes.com/2021/09/11/health/nursing-homes-schizophrenia-antipsychotics.html>
7. Chen AC, Grabowski DC. Nursing homes underreport antipsychotic use but overreport diagnoses qualifying for appropriate use. *Health Aff Scholar*. 2023;1(2):1-8. doi:10.1093/haschl/qxad022
8. Updates to the Nursing Home Compare Website and Five Star Quality Rating System: *Adjusting Quality Measure Ratings Based on Erroneous Schizophrenia Coding, and Posting Citations under Dispute* (Centers for Medicare & Medicaid Services) (2023).
9. Biden-Harris Administration Takes Additional Steps to Strengthen Nursing Home Safety and Transparency. Centers for Medicare & Medicaid Services January 18, 2023. Accessed July 25, 2023. <https://www.cms.gov/newsroom/press-releases/biden-harris-administration-takes-additional-steps-strengthen-nursing-home-safety-and-transparency>
10. Moyo P, Corneau E, Cornell PY, et al. Antipsychotic initiation and new diagnoses excluded from quality-measure reporting among veterans in community nursing homes contracted by the veterans health Administration in the United States. *Int J Methods Psychiatr Res*. 2022;31(1):e1898. doi:10.1002/mpr.1898
11. Li Y, Yin J, Cai X, Temkin-Greener J, Mukamel DB. Association of race and sites of care with pressure ulcers in high-risk nursing home residents. *JAMA*. 2011;306(2):179-186. doi:10.1001/jama.2011.942
12. Mor V, Zinn J, Angelelli J, Teno JM, Miller SC. Driven to tiers: socioeconomic and racial disparities in the quality of nursing home care. *Milbank Q*. 2004;82(2):227-256. doi:10.1111/j.0887-378X.2004.00309.x
13. Miller SC, Papandonatos G, Fennell M, Mor V. Facility and county effects on racial differences in nursing home quality indicators. *Soc Sci Med*. 2006;63:3046-3059. doi:10.1016/j.socscimed.2006.08.003
14. Fashaw S, Chisholm L, Mor V, et al. Inappropriate antipsychotic use: the impact of nursing home socioeconomic and racial composition. *J Am Geriatr Soc*. 2020;68(3):630-636. doi:10.1111/jgs.16316
15. Weech-Maldonado R, Lord J, Davlyatov G, Ghiasi A, Orewa G. High-minority nursing homes disproportionately affected by COVID-19 deaths. *Front Public Health*. 2021;9:606364. doi:10.3389/fpubh.2021.606364
16. Weech-Maldonado R, Lord J, Pradhan R, et al. High Medicaid nursing homes: organizational and market factors associated with financial performance. *Inquiry*. 2019;56:46958018825061. doi:10.1177/0046958018825061
17. Fashaw SA, Thomas KS, McCreedy E, Mor V. Thirty-year trends in nursing home composition and quality since the passage of the omnibus reconciliation act. *J Am Med Dir Assoc*. 2020;21(2):233-239. doi:10.1016/j.jamda.2019.07.004
18. Intrator O, Hiris J, Berg K, Miller SC, Mor V. The residential history file: studying nursing home residents' long-term care histories(*). *Health Serv Res*. 2011;46(1 Pt 1):120-137. doi:10.1111/j.1475-6773.2010.01194.x
19. Grodstein F, Chang CH, Capuano AW, et al. Identification of dementia in recent Medicare claims data, compared to rigorous clinical assessments. *J Gerontol A Biol Sci Med Sci*. 2021;77:1272-1278. doi:10.1093/gerona/qlab377
20. McCarthy EP, Chang CH, Tilton N, Kabeto MU, Langa KM, Bynum JPW. Validation of claims algorithms to identify Alzheimer's disease and related dementias. *J Gerontol A Biol Sci Med Sci*. 2021;77:1261-1271. doi:10.1093/gerona/qlab373
21. Wysocki A, Thomas KS, Mor V. Functional improvement among short-stay nursing home residents in the MDS 3.0. *J Am Med Dir Assoc*. 2015;16(6):470-474. doi:10.1016/j.jamda.2014.11.018
22. Gagne JJ, Glynn RJ, Avorn J, Levin R, Schneeweiss S. A combined comorbidity score predicted mortality in elderly patients better than existing scores. *J Clin Epidemiol*. 2011;64(7):749-759. doi:10.1016/j.jclinepi.2010.10.004
23. Gerlach LB, Fashaw S, Strominger J, et al. Trends in antipsychotic prescribing among long-term care residents receiving hospice care. *J Am Geriatr Soc*. 2021;69(8):2152-2162. doi:10.1111/jgs.17172

24. Maust DT, Kim HM, Chiang C, Kales HC. Association of the Centers for Medicare & Medicaid Services' National Partnership to improve dementia care with the use of antipsychotics and other psychotropics in long-term Care in the United States from 2009 to 2014. *JAMA Intern Med.* 2018;178(5):640-647. doi:[10.1001/jamainternmed.2018.0379](https://doi.org/10.1001/jamainternmed.2018.0379)
25. Shireman TI, Fashaw-Walters S, Zhang T, et al. Federal Nursing Home Policies on antipsychotics had similar impacts by race and ethnicity for residents with dementia. *J Am Med Dir Assoc.* 2023;24(9):1283.e4-1289.e4. doi:[10.1016/j.jamda.2023.03.027](https://doi.org/10.1016/j.jamda.2023.03.027)
26. Choi MR, Eun HJ, Yoo TP, et al. The effects of sociodemographic factors on psychiatric diagnosis. *Psychiatry Investig.* 2012;9(3):199-208. doi:[10.4306/pi.2012.9.3.199](https://doi.org/10.4306/pi.2012.9.3.199)
27. Li Y, Cai X, Harrington C, et al. Racial and ethnic differences in the prevalence of depressive symptoms among U.S. Nursing Home Residents. *J Aging Soc Policy.* 2019;31(1):30-48. doi:[10.1080/08959420.2018.1485394](https://doi.org/10.1080/08959420.2018.1485394)
28. Olbert CM, Nagendra A, Buck B. Meta-analysis of black vs. white racial disparity in schizophrenia diagnosis in the United States: do structured assessments attenuate racial disparities? *J Abnorm Psychol.* 2018;127(1):104-115. doi:[10.1037/abn0000309](https://doi.org/10.1037/abn0000309)
29. Rahman M, Foster AD. Racial segregation and quality of care disparity in US nursing homes. *J Health Econ.* 2015;39:1-16. doi:[10.1016/j.jhealeco.2014.09.003](https://doi.org/10.1016/j.jhealeco.2014.09.003)
30. Sink KM, Covinsky KE, Newcomer R, Yaffe K. Ethnic differences in the prevalence and pattern of dementia-related behaviors. *J Am Geriatr Soc.* 2004;52(8):1277-1283. doi:[10.1111/j.1532-5415.2004.52356.x](https://doi.org/10.1111/j.1532-5415.2004.52356.x)
31. Sengupta M, Lendon JP, Caffrey C, Melekin A, Singh P. Post-acute and long-term care providers and services users in the United States, 2017–2018. *Vital Health Stat.* 2022;3(47):1-83.
32. Castillo-Garcia IM, Lopez-Alvarez J, Osorio R, Olazaran J, Ramos Garcia MI, Aguera-Ortiz L. Clinical trajectories of neuropsychiatric symptoms in mild-moderate to advanced dementia. *J Alzheimers Dis.* 2022;86(2):861-875. doi:[10.3233/JAD-215133](https://doi.org/10.3233/JAD-215133)

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Supplemental Table S1. Overall interrupted time-series analysis for new exclusionary diagnoses among long-stay NH residents with dementia.

Supplemental Table S2. Unadjusted interrupted time-series analysis results for predicted percentage of new exclusionary diagnoses among long-stay NH residents with dementia.

Supplemental Figure S1. Percent of NH residents with dementia who had an exclusionary diagnosis in the 1- and 2-year periods before admission.

How to cite this article: Shireman TI, Coulibaly N, Zhang T, et al. Impact of federal antipsychotic use policy in nursing homes on new diagnoses for approved indications in dementia residents. *J Am Geriatr Soc.* 2024;72(12):3742-3752. doi:[10.1111/jgs.19129](https://doi.org/10.1111/jgs.19129)