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Assessment #2

Effects of CMS' Measure of Antipsychotic Prescribing Practices for Nursing Facilities on Utilization of Antipsychotic Medications and Changes in Diagnostic Patterns

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Highlights:

- Population data from the MDS Version 3.0 were used to identify trends in the proportion of individuals in nursing facilities who received antipsychotic medications between 2011 and 2017.
- Rates of antipsychotic use among nursing facility residents fell markedly from 25.8% to 19.3% between 2011 and 2017; however, the proportion of nursing facility residents receiving antipsychotics that had a diagnosis of schizophrenia increased during the same time.
- Schizophrenia diagnoses, which are qualifying diagnoses for antipsychotics under the Center for Medicare and Medicaid Services' (CMS's) Five Star Quality Rating system, also significantly increased among nursing facility residents between 2011 and 2017.
- Further research is needed to understand why changes in overall antipsychotic use and schizophrenia diagnoses are occurring, and if they are associated with improvement in prescribing practices and the diagnostic mix of nursing facility residents.

Objective: In 2015, the CMS updated its Five-Star Quality Rating System for nursing facilities with the goal of reducing inappropriate antipsychotic use. The purpose of this study is to determine if the inclusion of a measure of antipsychotic prescribing practices in the Five-Star Quality Rating System is associated with changes in schizophrenia diagnoses and prescribing practices in nursing facilities.

Methods: The Minimum Data Set version 3.0 (MDS) was used to develop prevalent and admissions samples from 2011 to 2017. The MDS was used to determine the proportion of the population that received antipsychotic medications, as well as demographic and diagnostic information. The proportions were compared and the trends over time were analyzed using logistic regression models.

Results: There were approximately 1.2 million nursing facility residents in 2017. The rate of antipsychotic use fell markedly from 25.8% to 19.3% in the population. Concurrently, the percentage of residents with schizophrenia alone and in combination with Alzheimer's increased, while the percentage of residents with Alzheimer's alone declined in both the prevalent and admission populations. The proportion of the nursing facility population receiving antipsychotics that have schizophrenia (with or without an Alzheimer's or non-Alzheimer's dementia diagnosis) increased since 2011. All trends were statistically significant.

Conclusions: Antipsychotic use for nursing facility residents decreased, as intended by the CMS policy change. However, the reasons for the increase in schizophrenia diagnosis are not clear. It is possible that nursing facilities are incentivized to assign schizophrenia diagnoses to residents previously diagnosed with dementia to improve the facilities' CMS Five Star Quality ratings. Further research is needed to review records and qualitatively examine how reductions in antipsychotics were achieved.

In 2017, approximately 1.2 million individuals resided in nursing facilities across the United States, of which 49.9% had a diagnosis of Alzheimer’s disease or other dementias (1). Individuals residing in nursing homes may experience behavioral and psychological symptoms of dementia (BPSD), which are similar to symptoms of psychosis, and may include agitation, delusional beliefs, repetitive questioning, hallucinations, and wandering. The severity of BPSD has led to an informal consensus among treating physicians that antipsychotic medications may be appropriate as a first-line treatment for some individuals with dementia (2).

The U.S. Food and Drug Administration (FDA) has not approved the use of any antipsychotics for the treatment of BPSD. Despite this restriction, 15.7% of long-stay nursing facility residents with dementia lacking any other qualifying diagnoses, were prescribed atypical, or second generation, antipsychotics in 2017 (3). The potential severity of side effects associated with the use of antipsychotic medications among older adults led the FDA to institute a “black-box warning” in 2005 for atypical antipsychotics, which it expanded to include all antipsychotic medications in 2008 (4, 5). Even with this warning, in 2011 the rate of off-label prescribing of antipsychotics for long-stay nursing facility residents with dementia was 23.9% (3). This prompted the Centers for Medicare and Medicaid Services (CMS) in 2012 to introduce the National Partnership to Improve Dementia Care in Nursing Homes, a campaign to reduce off-label use of antipsychotic medications to treat individuals with dementia in nursing facilities (3).

CMS’s Five Star Quality Rating System evaluates all CMS-certified nursing facilities and assigns each facility an overall rating based on three dimensions: health inspections, staffing levels, and resident-level quality measures (5). Ratings are published on the Nursing Home Compare website, incentivizing facilities to achieve higher ratings to increase business through improved public perception. In 2015, CMS also updated its Five Star Quality Rating System to include measures monitoring antipsychotic prescribing practices for nursing facility residents, allowing the use of antipsychotics only for those individuals with a diagnosis of schizophrenia, Tourette syndrome, and Huntington’s disease (6).

On the surface, these initiatives appear effective at reducing antipsychotic use to treat residents in nursing facilities. According to MDS data, the prevalence of antipsychotic use for long-stay residents in nursing facilities has decreased steadily across all regions of the U.S. since 2011, with the nursing facility industry decreasing its use of antipsychotics by 34.1% between the fourth quarter of 2011 and the first quarter of 2017 (3). Industry leaders indicate that the decline in antipsychotic use is due primarily to caregivers being more engaged with patients, family members, and other staff (7). However, citing data from the 2018 MDS Q2 Frequency Report and other studies, policy makers are concerned the decrease may be due to the underreporting of antipsychotic medication use, replacing antipsychotic medications with other mood stabilizers, and assigning inappropriate qualifying diagnoses to individuals to allow the prescribing of antipsychotics under CMS’s Five Star Quality Rating System (8, 9).

These issues were highlighted in a joint summary statement issued by The Society for Post-Acute and Long-Term Care Medicine and nine other organizations (8), as well as in a January 2019 letter from the U.S. House of Representatives Committee on Ways and Means to the Administrator of CMS (9). In this letter, the Committee’s Chairman expressed concern that the reduction in the use of antipsychotics may not be “the result of changed prescribing behavior but, instead, stems from some [nursing facilities] falsifying psychosis diagnoses, making incidence of this contra-indicated prescribing appear improved when it is, in fact, not” (9).

Existing literature on the frequency of incorrectly assigning schizophrenia diagnoses to individuals with dementia in order to prescribe antipsychotic medications and circumvent CMS's Five Star Quality Rating System is limited. To our knowledge, just two studies have identified or explored this issue. Winter and colleagues conducted a retrospective analysis of Virginia Medicaid claims data to identify annual rates of psychiatric diagnoses for long-stay older adults on antipsychotics in nursing facilities. Recognizing that the combined rates of schizophrenia, Tourette syndrome, and Huntington's disease diagnoses, for which the prescription of antipsychotics is excluded from Quality Measure auditing, increased during the two years after CMS launched its National Partnership. They found that, comparing 2011 and 2013 data, diagnoses of schizophrenia, Tourette syndrome and Huntington's disease increased by 40%, primarily because incidence of schizophrenia nearly doubled (10). Increased prevalence rates of schizophrenia in older adults is unlikely; when symptoms occur after the age of 65, they can usually be attributed to very-late onset schizophrenia-like psychosis, which is not a formal diagnosis of schizophrenia, but is secondary to general medical conditions, such as dementia or other neurodegenerative disorders. Individuals with late-onset schizophrenia tend to have fewer severe positive symptoms and require lower daily doses of antipsychotics than their younger counterparts (11).

CMS relies on state-contracted surveyors to evaluate the regulatory compliance of nursing facilities by reviewing annual survey data for each facility and conducting unannounced site visits. According to a 2013 study by Urick, Kaskie, and Carnahan, nearly 40% of state surveyors identified a new, but incorrect, diagnosis of psychosis in nursing facility residents. They hypothesize that since "residents with diagnoses of selected psychotic disorders are excluded in the antipsychotic quality metric," that individuals with a diagnosis of psychosis may "receive less scrutiny from state surveyors" because they are essentially exempt from the CMS Quality Measure, and ultimately "serve to improve a facility's standing on the metrics reported by Nursing Home Compare" (12).

While initial findings suggest the new CMS measures are successful in decreasing off-label uses of antipsychotics for individuals with dementia, a thorough examination of the changes may show increased rates of initial and subsequent secondary schizophrenia diagnoses among older adults, a diagnosis for which CMS allows the use of antipsychotics. The purpose of this study is to determine if corrective policy measures, such as inclusion of a measure of antipsychotic prescribing practices in CMS's Five Star Quality Rating System, inadvertently influence inappropriate diagnostic and prescribing practices for nursing facility populations.

Methods

Data

Data came from the Minimum Data Set (MDS) version 3.0, a federally mandated, standardized resident assessment instrument required to be reported by CMS-certified nursing facility for every resident receiving care in the facility, regardless of payer. The MDS captures basic demographic information, including date of birth, sex, and race, as well as measures and information relevant to the care of the resident, such as active diagnoses, functional status, and treatments received by the resident. Residents are evaluated at admission and discharge, at regular intervals thereafter (*e.g.*, quarterly), and at significant events, such as transfer to an acute hospital or a change in health status. Healthcare professionals and direct-care staff evaluate residents, and the completed assessments are submitted directly to CMS. The measures collected in the MDS were initially developed for care planning, but are also used by CMS to calculate reimbursement under the

Skilled Nursing benefit, and to monitor nursing facility quality measures. CMS releases the resident-level assessment data for research studies; the MDS version 3.0 used in this study has been validated extensively (13-20).

Study Samples

Prevalent Sample. The MDS was used to identify all individuals residing in a nursing facility on the first Thursday of April (measurement date) from 2011–2017, in order to avoid seasonal and day of the week fluctuations in nursing facility census. The MDS assessment just prior to the measurement date was used to capture patient characteristics and measures. The first MDS assessment after the measurement date was used for those admitted on the first Thursday in April. This sample is a point-in-time, cross-sectional look at the population of nursing facilities every year, which is comprised of both short and long-stay residents. More than 80% of the prevalent sample is considered long-stay, making it difficult to determine if any change in diagnostic mix is associated with changes in post-acute and short-stay residents or with long-stay residents. An admissions sample was constructed to look into characteristics of those who are entering the nursing facility throughout the year.

Admissions Sample. The MDS was used to capture all new admissions and readmissions to a nursing facility during the calendar year. The first five-day Skilled Nursing Facility Prospective Payment System (PPS), or admission assessment, for an entry date was used to calculate patient characteristics and measures. This sample captures all admissions throughout the year over the study period and can show whether any demographic or diagnostic changes may be due to changed admission characteristics.

Measures

Patient demographics were captured using MDS 3.0 Section A: Identification Information. Diagnostic information was captured using the Section I: Active Diagnosis check boxes and disease classification (ICD) fields. Although Huntington's disease and Tourette syndrome are excluded diagnoses under CMS's Five-Star Quality Measures, the focus of this analysis was on the change in schizophrenia diagnoses during the study period. The number of individuals with Huntington's disease or Tourette syndrome comprised less than 0.25% of the prevalent sample, and less than 0.1% of the admission sample, and were not significantly impacted by the introduction of the quality measure. Similar changes in bipolar disease diagnoses over time were not analyzed, as it is not excluded from the fidelity measures, even though, in some instances, antipsychotics are an appropriate intervention. Use of antipsychotics in the prior week is recorded in Section N: Medications. A resident is classified as having received antipsychotics if an assessment indicates an antipsychotic was administered in at least one of the previous seven days.

Analysis

The proportion of the overall sample reported to have received antipsychotics was calculated, as well as the proportion diagnosed with schizophrenia without an Alzheimer's or non-Alzheimer's dementia diagnosis, Alzheimer's or non-Alzheimer's dementia without schizophrenia, and both schizophrenia and Alzheimer's or non-Alzheimer's dementia who are receiving antipsychotics. Logistic regression models were run to test the trend over time, comparing 2011 data to 2017 data.

The dependent variable was the receipt of an antipsychotic at least once in the previous seven days. The models were clustered by nursing facility to control for the facility effect on antipsychotic use. Analyses were conducted using the SAS 9.4 Platform (SAS Institute, Cary NC).

Results

Table 1 shows the demographics and characteristics of the prevalent nursing facility population. The number of nursing facilities in the prevalent sample was 15,823, from the 50 states and the District of Columbia. Overall, the number of residents declined from 2011 (N=1,260,093) to 2017 (N=1,185,898), and the prevalent population became slightly younger. The population sample included an increasing proportion of males and a declining proportion of white residents over the seven years. Fewer people were admitted from the community over time, while admissions from acute hospitals increased. The prevalent population diagnosed with schizophrenia without an Alzheimer's or non-Alzheimer's dementia diagnosis increased almost 12.9% over time, from 4.04% in 2011 to 4.56% in 2017. The prevalent population diagnosed with Alzheimer's or non-Alzheimer's dementia without schizophrenia decreased from 49.38% to 46.35%, a 6.1% reduction. However, the percent of people with both schizophrenia and Alzheimer's or non-Alzheimer's dementia increased 53.1%, from 2.41% in 2011 to 3.69% in 2017.

Table 2 shows the demographics and characteristics of nursing facility admissions from 2011 to 2017. The number of nursing facilities in the admission sample was 15,836, from the 50 U.S. states and the District of Columbia. While the number of admissions increased over time, the changes in demographics is consistent with the changes in the prevalent population: the patient population was younger in the later years, with a greater proportion of males and a lower proportion of white residents. The percent of readmissions ranges from 12.1% to 16.2% across the study years. There was very little change in where residents were admitted from, with the majority coming to the nursing facility from an acute hospital event. Similar to the prevalent population, the population admitted with schizophrenia without an Alzheimer's or non-Alzheimer's dementia diagnosis increased from 1.77% to 2.19%, a 23.7% increase. The number of people admitted with Alzheimer's or non-Alzheimer's dementia without schizophrenia dropped by 11%, from 25.52% in 2011 to 22.80% in 2017. The percent of people with both schizophrenia and Alzheimer's or non-Alzheimer's dementia increased more than 39%, from 0.66% to 0.92%.

The proportion of the prevalent and admission samples that received antipsychotics by diagnosis is displayed in Table 3. The percent of the overall prevalent nursing facility population receiving antipsychotics declined 25% from 2011 to 2017 (26.06% to 19.62%, OR* (95% CI): 0.6927 (0.6851, 0.7003)). A similar reduction was seen in those with Alzheimer's or non-Alzheimer's dementia without schizophrenia, with almost 38% fewer people receiving antipsychotics in 2017 (9.01%) compared to 2011 (14.65%) (OR (95% CI): 0.8858 (0.8777, 0.8939)). While the overall rate declined in the population, the proportion of residents with schizophrenia without an Alzheimer's or non-Alzheimer's dementia diagnosis who also received antipsychotics increased 8.3%, from 3.6% in 2011 to 3.90% in 2017 (OR (95% CI): 1.0872 (1.0538, 1.1217)). The same trend is seen in those with both Alzheimer's or non-Alzheimer's dementia and schizophrenia, who

* The odds ratio (OR) measures the association between an exposure and an outcome. It represents the odds that an outcome will occur given a particular exposure, compared to the odds of the outcome occurring in the absence of that exposure. Source: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2938757/>

had a 45.4% increase in antipsychotic use between 2011 (1.98%) and 2017 (2.88%) (OR (95% CI): 1.4678 (1.4326, 1.5039)).

The number of admissions receiving antipsychotics remained relatively stable, decreasing 11% over the seven years (14.06% to 12.50%, OR (95% CI): 0.8734 (0.8637, 0.8831)). Similar to the prevalent population, there was also a decline in the number of admissions with Alzheimer's or non-Alzheimer's dementia without schizophrenia receiving antipsychotics, a 26% reduction from 6.84% to 5.04% (OR (95% CI): 0.8621 (0.8538, 0.8705)). Comparable increases in antipsychotic use was also found in the admissions sample, with a 20% increase in use among those with schizophrenia without Alzheimer's or non-Alzheimer's dementia (1.50% to 1.80%, OR (95% CI): 1.2026 (1.1602, 1.2466)) and a 38% increase in those with non-Alzheimer's dementia and schizophrenia (0.54% to 0.74%, OR (95% CI): 1.3792 (1.3337, 1.4263)).

Discussion

To better understand how the diagnostic mix among nursing facility residents has changed since the implementation of CMS's Five Star Quality Rating System, this study examined prevalence and admission data from MDS, version 3.0 of individuals in nursing facilities receiving antipsychotics. Our analysis shows that the overall use of antipsychotics for individuals in nursing facilities decreased significantly between 2011 and 2017 while the number of nursing facility residents with schizophrenia receiving an antipsychotic increased during the same time. In addition, the number of nursing facility residents with both schizophrenia and Alzheimer's or non-Alzheimer's dementia significantly increased as well, while the number of those with dementia fell. Possible reasons for these shifts could be changes in the diagnostic practices of nursing facility physicians as a result of the Five Star Quality Ratings, or changes in the population being admitted to nursing facilities.

To put these empirical findings into context, researchers sought to understand if schizophrenia diagnoses were being added to the charts of patients with dementia and, in fact, learned of instances of schizophrenia and other behavioral health diagnoses being added by facility staff without corresponding physician documentation / concurrence. Data from Texas suggested that, in some facilities, "prescribers add[ed] new diagnoses, such as schizophrenia, to residents' clinical records to justify antipsychotic use – even in residents without a history of mental illness." (21).

History has shown that this type of provider behavior is not uncommon when regulatory practices or policy shifts occur. For example, diagnosis-related group (DRG) creep, or "up-coding," occurs when hospitals alter "record-keeping practices to increase case mix and reimbursement" (22). This practice began to occur in some facilities in the early 1980s when Medicare implemented the Prospective Payment Systems (PPS), a type of fee-for-service reimbursement system requiring providers to bill a fixed amount based on the classification of service and diagnosis (23, 22).

Alternatively, the shift in diagnoses in the nursing facility population may be due to actual changes in the incidence of mental disorders and/or changes in the treatment settings of individuals with schizophrenia who have co-morbid physical health conditions. Within the United States, approximately 5.7 million people are living with dementia (24, 25). Alzheimer's disease accounts for approximately 60% to 70% of these cases, followed by vascular dementias (26, 27). A 2017 study by Langa, *et al.*, found that the number of new cases of dementia in adults 65 years and older in the United States fell by 24% in a 12-year period—from 11.6% in 2000 to 8.8% in 2012 (28). A corresponding decrease in the number of adults aged 65 and older living with dementia in the

United States (from 12.0% in 2000 to 10.5% in 2012) was reported in a 2018 study by Hudomiet and colleagues (29).

Regardless of the reason for the shifts in the diagnostic mix, CMS and state agencies must address inappropriate diagnostic practices and the prescribing of antipsychotics to nursing facility patients. In this regard, some behavioral interventions may be effective alternatives to pharmacological interventions.

Behavioral interventions to address BPSD include caregiver education and staff training; and interventions used directly with the individual with dementia, which include activity interventions and sensory stimulus. Burgio and colleagues (2002), studied a comprehensive behaviors management training skills program for staff in nursing facilities, and found a decreased use of ineffective caregiver behavior, such as arguing, decreased patient disruptive vocalization, restlessness, and physical aggression. Results were sustained for six months post-study (30).

Caregiver education has also resulted in positive outcomes. In a randomized clinical trial with 95 community-residing individuals with dementia complicated by behavioral disturbances that included patient family caregivers, caregivers received either behavior therapy, or routine medical care. The frequency, severity, and caregiver reactions to behavioral disturbances were significantly decreased, and care recipients' quality of life was significantly better than in the group receiving routine medical care (31).

BPSD interventions for use directly with individuals with dementia include sensory stimulation (*e.g.*, music, aromatherapy, art, therapeutic touch, and bright light therapy), behavioral interventions, reality-orientation interventions, activity therapy, and physical exercise – all of which reduce BPSD, especially the reduction of agitation. Livingston, *et al.*, (2005) found that agitation in dementia is associated with poorer quality of life and impairs engagement in daily activities and relationships (32). In addition to causing distress in family members and caregivers, it may precipitate institutionalization in nursing facilities.

Studies of non-pharmacological interventions have shown significant improvements in the reduction of symptoms of BPSD, demonstrating that these interventions have important and significant efficacy. Reis, *et al.*, found that although non-pharmacological interventions are available and effective, training manuals and resources are not easily accessible, and the level of professional expertise for trainers is not always clearly stated (33). These trainings are critical, as nursing staff often have limited expertise in behavioral health, and evidence-based approaches for behavioral health are often not well-integrated into medically focused inpatient care settings (34).

A compounding challenge is high turnover rates among clinical care staff at nursing facilities across the U.S., which ranges between 55% and 75% in any given year (35). High turnover often results in a decrease in the quality of care provided by the nursing facility, and necessitates frequent training and re-training of caregivers, which can be time-consuming and costly (36). In a 2012 survey of nursing facility staff in the U.S., caregivers cited having little control in treatment, and insufficient role clarity as contributing factors to dissatisfaction and burnout (35). Training nursing facility staff to accurately identify BPSD and effectively deliver non-pharmacological interventions can result in a feeling of greater autonomy, and a sense of personal accomplishment with improved client outcomes. Through these efforts, staff burnout and turnover can decrease, resulting in cost savings to the nursing facility and a higher quality of care.

In addition to efforts at the nursing facility or individual level, several states, including Maine and Texas, have made efforts to reduce antipsychotic prescriptions for individuals with dementia. In response to CMS's 2012 National Partnership to Improve Dementia Care in Nursing Homes, the State of Maine brought together the state's Ombudsman Program, the Maine Alliance for Resident Center Care, and the Maine Health Care Association to form the Maine Partnership to Improve Dementia Care in Nursing Homes ("the Partnership"). This initiative has been successful at reducing the use of antipsychotics in nursing facilities by more than 38% between 2011 and 2016 (37) through statewide training of physicians and direct-care staff, and family education initiatives. Texas's Health and Human Services Commission (HHS) established the Quality Monitoring Program (QMP) to identify potential health and safety issues in Texas nursing facilities that could be harmful to residents' welfare (38). The goal of the Texas program is to improve nursing facility care, rather than penalize providers for deficient practices (38). As part of this initiative, QMP staff provides information about evidence-based practices by educating nursing facility staff during site visits and through in-service events.

In 2016, Texas selected more than 100 nursing facilities that still showed high use of antipsychotic medications to receive resources related to the use of antipsychotic medications. These materials were sent directly to medical directors, attending physicians, and psychiatrists at the selected nursing facilities. Texas's Long-Term Care Ombudsman Office developed materials to inform patients and their families to raise awareness of potential quality issues related to inappropriate prescribing practices (Figure 1, 39). Texas's efforts have been effective at reducing the use of antipsychotics in nursing facilities. In 2013, Texas was scored 51st in the U.S. for the appropriate use of antipsychotics in nursing facilities. It had moved up to 10th place by 2018; the largest reduction in inappropriate use of antipsychotics of any state in the nation (40).

This research has several limitations. The prevalent and admission study samples used in our analysis were cross-sectional and can only be used to examine overall trends in reporting on the MDS. The duration of the antipsychotic medication is not specified and in many instances could be for a single prescription fill. Our analyses are limited by the quality of the data captured by the MDS, which has been shown to vary by facility and state (41).

Relatedly, there has been no examination of how changes in schizophrenia diagnosis between the DSM-IV diagnostic tool and the DSM-V tool (42) may have affected the MDS data. MDS data could be linked with Medicare and Medicaid claims data to follow cohorts of individuals and monitor temporal changes in diagnosis and prescribing practices. This would provide greater insight into whether diagnostic changes occurred for people with dementia who had been on an antipsychotic as a result of the 2015 Star ratings.



Figure 1: *The Wrong Diagnosis: Did it Happen to You? Information for Families in Texas.*

Conclusions

Although the use of antipsychotic medication in nursing facilities has been decreasing since 2011, 19.5% of residents still received antipsychotic medications in 2017. Only eight percent had a diagnosis of schizophrenia alone or in combination with dementia. The majority of those receiving antipsychotic medications have a diagnosis of dementia, often with behavioral and psychological symptoms that include agitation, delusional beliefs, repetitive questioning, hallucinations, aggression, wandering, and various socially inappropriate behaviors. Although antipsychotic medications are not necessarily the recommended first line of treatment, there is a perceived lack of alternatives that often result in the off-label use. These include the lack of sufficient staffing, lack of staff training to work with people with cognitive impairment, and aggressive marketing of antipsychotics by the pharmaceutical industry.

Recognizing the high use of antipsychotic medications by individuals with dementia, and the adverse effects that result, CMS included in their “Five Star” rating system for nursing facility quality a measure of use of antipsychotic meds by persons without a diagnosis of schizophrenia. This measure appears to have contributed to a reduction in the prescribing of antipsychotic medications to individuals without a schizophrenia diagnosis. However, several observers and states have identified a risk that nursing facilities may maintain use of antipsychotic medications by adding a new, unfounded diagnosis of schizophrenia to patients with dementia, thus avoiding adverse 5-Star ratings. This issue has also come to the attention of the House Committee on Ways and Means. In January 2019, Richard E. Neal, the Chairman of the House Committee on Ways and Means, submitted to the Administrator of CMS a letter expressing his concerns over the misuse of antipsychotics in nursing facilities.

However, there is little quantitative analysis nationwide of whether this suspected adverse impact is occurring, how widespread it is if it is occurring, and whether it varies by state or facility. This paper is an initial step for the field to determine whether nursing facilities are inappropriately assigning a diagnosis of schizophrenia to residents with dementia to bypass CMS’s Five Star Quality Rating system. The analysis results supports our hypothesis that there is a change in diagnosis patterns with fewer patients receiving a dementia-only diagnosis and more receiving a schizophrenia or combination schizophrenia diagnosis, even though there is a marked decrease in the percent of residents that are being referred from psychiatric hospitals (Table 2).

Alternatively, it may be that there are fewer people with dementia entering nursing facilities. This trend may, in part, be due to higher education levels (of both nursing facility residents and their families/caregivers), better access to health care, increase in community resources for maintaining individuals in their homes and communities.

Future research should explore existing data and incorporate facility site visits and record audits to more fully understand these issues and potential solutions. The MDS data is an excellent database to use to determine if and when unfounded diagnostic changes are being made by providers and facilities. If some nursing facilities are manipulating the rating system by inappropriately assigning schizophrenia diagnoses, this needs to be identified and addressed for CMS’s monitoring system to be effective and for appropriate care to be provided to nursing home residents. Additionally, policy solutions such as the initiatives in Texas to alert nursing facility residents and their families of the potential adverse effects of improperly prescribing antipsychotic medications can be identified and shared with relevant federal and state agencies.

The overall rate of antipsychotic use among individuals residing in nursing facilities has steadily decreased since 2011. However, the rate of antipsychotic use among individuals with schizophrenia, including those with a comorbid diagnosis of Alzheimer's or non-Alzheimer's dementia, has increased. Concurrently, the percentage of individuals with any dementia in nursing facilities who are assigned a schizophrenia diagnosis after admission has significantly increased. This suggests that some nursing facilities may be inaccurately diagnosing individuals with a severe mental illness. Further research is needed to determine if this practice is occurring as a result of policy changes such as the implementation of the antipsychotic measure in CMS's Five Star Quality Rating system.

Future research could also look at which individuals received schizophrenia diagnoses after admission into the nursing facility, and when antipsychotics were prescribed. This research could explore the level of agreement and consistency between schizophrenia diagnoses and Pre-Admission Screening and Resident Review (PASRR) assessments, which are required by CMS at admission to a nursing facility and upon a significant change in diagnosis, as a way to understand whether schizophrenia diagnoses are accurate. Further research could also examine if states that implement person-centered care options realize actual drops in the use of antipsychotics among residents in nursing facilities. Conversely, a hypothesis could be examined that nursing facilities with lower ratings are more likely to incorrectly diagnose individuals due to a lack of caregiver education.

Our initial research suggests that the required use of Five Star Quality Rating Measures is a good start, but likely not enough. A multi-faceted approach needs to be used to effectively curb the inappropriate use of antipsychotics, and avoid inappropriate diagnostic practices. Further research can help the field better determine the extent of the issue, and identify opportunities for improvement.

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Table 1: Demographics and Characteristics of Prevalent Nursing Facility Population

	2011	2012	2013	2014	2015	2016	2017
Prevalent Population (N)	1,260,093	1,258,812	1,245,483	1,245,100	1,228,408	1,210,833	1,185,898
Demographics (%)							
Age, Mean (SD)	79.7 (13.6)	79.7 (13.7)	79.5 (13.6)	79.4 (13.7)	79.2 (13.7)	79.1 (13.7)	78.9 (13.7)
Age, 65+	85.25	85.11	84.82	84.56	84.31	84.21	83.97
Female	68.32	67.91	67.35	66.81	66.19	65.73	65.08
American Indian or Alaska Native	0.43	0.42	0.43	0.44	0.44	0.46	0.45
Asian	1.63	1.68	1.76	1.78	1.9	1.96	2.07
Black or African American	13.34	13.55	13.73	13.88	14.08	14.3	14.66
Hispanic or Latino	4.6	4.79	4.98	5.04	5.17	5.26	5.43
Native Hawaiian or Pacific Islander	0.26	0.27	0.29	0.3	0.31	0.34	0.35
White	77.88	77.66	77.31	76.59	75.98	75.7	75.1
Characteristics (%)							
Admitted from community	12.25	11.83	11.25	11.2	10.88	10.83	10.59
Admitted from another nursing home or swing bed	7.04	7.14	7.34	7.53	7.43	7.58	7.53
Admitted from acute hospital	75.5	76.52	76.98	76.97	77.59	77.58	77.98
Admitted from psychiatric hospital	2.12	2.15	2.25	2.3	2.27	2.21	2.16
Long Stay	40.34*	69.24	83.61	84.06	83.36	84.17	84.13
Schizophrenia diagnosis without Alzheimer's or Non-Alzheimer's Dementia	4.04	3.99	4.16	4.24	4.35	4.41	4.56
Alzheimer's or Non-Alzheimer's Dementia without Schizophrenia	49.38	49.33	48.38	48.01	47.13	48.54	46.35
Alzheimer's or Non-Alzheimer's Dementia and Schizophrenia diagnosis	2.41	2.57	2.68	2.83	2.98	3.41	3.69

*This is an underestimation resulting from the transition from MDS version 2.0 to version 3.0 that occurred in the fourth quarter of 2010.

Table 2: Patient Demographics and Characteristics of Nursing Facility Admissions

	2011	2012	2013	2014	2015	2016	2017
Total Admissions (N)	3,210,228	3,197,561	3,235,200	3,300,829	3,508,186	3,418,105	3,357,114
Demographics (%)							
Age, Mean (SD)	77.9 (12.6)	77.7 (12.7)	77.5 (12.7)	77.3 (12.7)	77.3 (12.6)	77.1 (12.6)	77.2 (12.6)
Age, 65+	85.17	84.89	84.61	84.11	84.27	83.98	84.28
Female	62.24	61.78	61.16	60.66	60.04	59.5	59.02
American Indian or Alaska Native	0.37	0.37	0.37	0.38	0.39	0.4	0.42
Asian	1.41	1.45	1.53	1.54	1.65	1.71	1.78
Black or African American	10.77	10.82	10.92	11.18	11.64	11.96	12.15
Hispanic or Latino	4.25	4.36	4.4	4.5	4.53	4.66	4.76
Native Hawaiian or Pacific Islander	0.26	0.26	0.28	0.3	0.32	0.33	0.32
White	81.09	80.44	79.56	78.33	78.15	77.61	77.11
Characteristics (%)							
Type of Entry: Reentry	14.63	12.76	12.07	13.18	16.23	16.09	15.81
Admitted from community	5.33	5.29	5.17	4.98	4.69	4.69	4.63
Admitted from another nursing home or swing bed	3.34	3.44	3.46	3.35	3.2	3.26	3.32
Admitted from acute hospital	89.03	88.81	88.81	89.2	89.75	89.72	89.82
Admitted from psychiatric hospital	0.98	0.95	0.95	0.88	0.81	0.78	0.72
Schizophrenia diagnosis without Alzheimer's or Non-Alzheimer's Dementia	1.77	1.82	1.84	1.86	1.9	2.08	2.19
Alzheimer's or Non-Alzheimer's Dementia without Schizophrenia	25.52	23.98	23.33	22.5	22.56	22.93	22.8
Alzheimer's or Non-Alzheimer's Dementia and Schizophrenia diagnosis	0.66	0.65	0.66	0.67	0.73	0.87	0.92

Table 3: Proportion of Residents in Facility Receiving Antipsychotic in Last 7 Days

	Proportion of Residents Receiving Antipsychotic in Last 7 Days							Test of Trend: 2011 to 2017
	2011	2012	2013	2014	2015	2016	2017	Odds Ratio* (95% CI)
Prevalent Sample								
Nursing Facility Overall	26.06	25.92	24.11	22.67	21.88	20.65	19.62	0.6927 (0.6851, 0.7003)
Schizophrenia diagnosis without Alzheimer's or Non-Alzheimer's Dementia	3.60	3.56	3.68	3.73	3.80	3.80	3.90	1.0872 (1.0538, 1.1217)
Alzheimer's or Non-Alzheimer's Dementia without Schizophrenia	14.65	14.60	12.88	11.60	10.80	10.04	9.01	0.8858 (0.8777, 0.8939)
Alzheimer's or Non-Alzheimer's Dementia and Schizophrenia diagnosis	1.98	2.13	2.18	2.28	2.37	2.69	2.88	1.4678 (1.4326, 1.5039)
Admissions Sample								
Nursing Facility Overall	14.06	13.69	13.16	12.81	12.45	12.51	12.50	0.8734 (0.8637, 0.8831)
Schizophrenia diagnosis without Alzheimer's or Non-Alzheimer's Dementia	1.50	1.52	1.53	1.54	1.57	1.71	1.80	1.2026 (1.1602, 1.2466)
Alzheimer's or Non-Alzheimer's Dementia without Schizophrenia	6.84	6.30	5.84	5.46	5.17	5.19	5.04	0.8621 (0.8538, 0.8705)
Alzheimer's or Non-Alzheimer's Dementia and Schizophrenia diagnosis	0.54	0.53	0.54	0.54	0.59	0.70	0.74	1.3792 (1.3337, 1.4263)

*Odds Ratio is clustered on nursing facility ID to account for facility effects on antipsychotic use. No other numbers in this table are adjusted.