MILLIMAN REPORT

Health Outcomes of Medicare Beneficiaries with Antipsychotic Medication Use in Residential Nursing Homes

A claims-based analysis

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Milliman

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Executive Summary

BACKGROUND

Antipsychotic medication (AP) use in nursing homes is heavily scrutinized, with prominent research on adverse events following inappropriate use and concerns over the misuse of these medications as chemical restraints (Simmons, Bonnett, Hollingsworth, et al.2018). In 2012, the Centers for Medicare and Medicaid Services (CMS) introduced new quality metrics related to AP use in nursing homes, including skilled nursing facilities (SNFs) which are part of the Minimum Data Set (MDS), part of a federally mandated process for clinical assessment of nursing home residents, and which contribute to nursing homes' Five-Star Quality Rating.

STUDY PURPOSE

There is a paucity of literature evaluating outcomes of patients in nursing homes taking APs with conditions for which AP use is indicated. Additionally, the literature is limited regarding changes in AP use in patients transitioning from the community setting to a nursing home with conditions for which AP use is approved by the US Food and Drug Administration (FDA). Most studies evaluating AP use and health outcomes in a long-term care population have focused on patients with Alzheimer's disease or dementia, conditions for which APs are used off-label. This study also considers more recent research focused on potential unintended consequences, such as drug substitution, in nursing homes following policy interventions aimed at reducing AP use (Harris et al.2022).

SUMMARY OF FINDINGS

Average AP use decreased among patients with condition(s) meeting the FDA-approved label use after transitioning from a community setting to a nursing home. We did not find a consistent relationship between change in AP use and changes in the frequency of acute adverse events – myocardial infarctions, acute strokes, transient ischemic attacks, acute coronary ischemia, and bone fractures. In both increased and decreased AP use cohorts we observed decreases in the frequency of all acute events. For some acute events, the group of patients with the largest decrease in the frequency of the event was the group with stable AP use pre and post transition. These findings were unexpected given previous literature associating increased AP use with an increase in these acute events, although none of the studies we reviewed restricted their analysis to patients with FDA-approved conditions (Hartikainen et al. 2007; Huybrechts et al. 2012; Jeste et al. 2008; Vigen et al. 2011).

Our analysis identified an inconsistent correlation in usage between medications – patients with decreased AP use experienced decreased use in all other concomitant drug classes while those with increased AP use experienced increased use of half of the concomitant drug classes.

- AP use (as measured by average days' supply per 30 days) decreased by 21% after transition for patients with an FDA-approved condition transitioning from a community setting to a nursing home (28.1 to 22.2).
- The change in myocardial infarction rates among transitioning patients was lower in the "Increased AP Use" group than in the "Decreased AP Use" group (-22% v. -10%).
- The frequency of all acute events measured decreased for both the "Decreased AP Use" and "Increased AP Use" groups.

These finding suggest that decreases in AP use by patients with FDA-approved conditions who transition from a community setting to a nursing home may not contribute to the observed reduction in select acute adverse events.

METHODOLOGY

This paper is based on an analysis of the 100% Medicare fee-for-service (FFS) research identifiable files administrative claims data from 2016-2018. We assessed whether transitioning from a community setting to a residential nursing home resulted in a shift in AP use among patients with an FDA-approved condition and evidence of AP use prior to entering the nursing home. Additionally, we evaluated the relationship between changes in AP use following transition to the nursing home and changes in the frequency of acute adverse events that could be associated with AP use. An administrative claims database was chosen to identify antipsychotic medication use and measure health outcomes. This contrasts to the MDS data set used by CMS; the patient survey and patient assessment methodology of the MDS is limited in its ability to capture the more comprehensive healthcare resource use integral to this analysis.

Appendix A provides additional details on the data source. Appendix B provides additional details on key methodological components of the analysis. Appendices C and D (supplemental material) provide diagnosis code lists, National Drug Code (NDC) lists and methodology for identifying acute events measured in this analysis

CAVEATS

This report was commissioned by Otsuka America Pharmaceutical, Inc. The findings reflect the research of the authors; Milliman does not intend to endorse any product or organization. Otsuka America Pharmaceutical, Inc. did not author this paper or influence the findings.

If this report is reproduced, it should be reproduced in its entirety, as pieces taken out of context can be misleading. Our analysis is based on historical practice patterns and treatments which may change over time. Actual experience may vary from the estimates presented in this report for many reasons. As with any economic or actuarial analysis, it is not possible to capture all factors that may be significant. Further, no algorithm for identifying acute health outcomes and medication utilization based on administrative claims data alone will be perfect. We made no attempt to verify the validity or consistency of diagnosis codes or patient residence indicators that appeared in the Medicare data. Because we present average data from a three-year sample, the findings should be interpreted carefully before they are applied to other situations.

Guidelines issued by the American Academy of Actuaries require actuaries to include their professional qualifications in all actuarial communications. Bruce Pyenson is a member of the American Academy of Actuaries and meets the qualification standards for performing the analyses in this report and rendering the actuarial opinions contained herein. The authors thank their Milliman co-worker Jared Hirsch for his assistance

Background

In the early 2000s public health experts expressed concern that antipsychotic medications (APs) were being prescribed inappropriately in the residential nursing home (NH) setting (Briesacher et al. 2005; Mott et al. 2005). Concerns over inappropriate use of APs in NHs were included in the initial 1991 publication of what would go on to be known as the Beers Criteria (Beers et al. 1991). The Beers Criteria, which provide guidance to prescribers and patients on safe drug selection and dosing, recommend avoiding APs in patients who are experiencing behavioral issues associated with delirium or dementia, except when patients have failed to respond to non-pharmacological interventions and are at significant risk of harming themselves or others (American Geriatrics Society Expert Panel 2019).

A primary concern was that APs, some of which have sedative effects, were being used as chemical restraints to more easily "manage" residents, including those with disruptive or aggressive behaviors (Lövheim et al.2006). A study of patients ages 66 and older who were newly admitted to an NH with no history of major psychosis or neuroleptic drug use in the year prior to admission, found that 17% of these patients received an AP within 100 days of admission and 24% received an AP within one year of admission (Bronskill et al.2004). A 2005 study found that 29% of all adverse events for patients with AP use in long-term care facilities were considered potentially preventable, highlighting how improper AP use can impact patient morbidity and mortality (Gurwitz et al.2005). Concern about APs is compounded by the fact that elderly populations are more vulnerable to adverse effects from medications (Budnitz et al.2006). Established literature linked AP use to an increase in adverse effects, such as worsening cognitive impairment, increased risk for infection, increased rate of falls, and increased acute cardiovascular events, contributing to premature death among a Medicare population (Hartikainen et al.2007; Huybrechts et al.2012; Jeste et al.2008; Vigen 2011).

In 2005, the Food and Drug Administration (FDA) required package labels of APs to contain a black box warning on using APs in older adults with dementia. The warning states that these patients have an increased risk of mortality when they use either conventional (1st generation) or atypical (2nd generation) APs (Kuehn 2005).

In 2012, the Centers for Medicare and Medicaid Services (CMS) introduced metrics related to AP misuse in an NH as part of the Minimum Data Set (MDS), a component of their Nursing Home Quality Initiative (NHQI). The MDS, to which nursing homes are responsible for ensuring the validity of the information provided, includes two different AP-related quality metrics: one for short stay residents (≤100 cumulative days in an NH) and another for long-stay residents (>100 cumulative days in an NH). For short-stay NH residents, the metric is the percentage of residents who newly received an AP without prior AP usage on their entry assessment. The AP quality metric for long-stay residents reports the percentage of residents receiving APs, regardless of prior AP use on the entry assessment. These metrics, part of the Five-Star Quality Rating System, are publicly reported for each NH and are intended by CMS to be used as indicators of NH quality of care and for comparisons among facilities. Under the current CMS long-stay AP use quality metric, patients identified with schizophrenia, Tourette's syndrome, or Huntington's disease are not included in the metric because these conditions are recognized as approved use indications for many APs. However, bipolar disorder and major depressive disorder, conditions also FDA-approved for many APs, particularly second generation APs, are included in the long-stay metric.

Methodology and Data Sources

Our study population consisted of Medicare fee-for-service (FFS) beneficiaries with at least one condition which APs are FDA-approved to treat (e.g., schizophrenia, Tourette's syndrome, Huntington's disease, bipolar disorder, and/or major depressive disorder) and at least one targeted AP prescription (see Appendix C) filled through Medicare Part D within the last 12 months of community living (identified with a patient residence code of "1-Home") before transitioning to an NH. All patients in our study moved from a community setting (such as a traditional home) to an NH between July 1, 2016, and June 30, 2018. Condition identification used ICD-10-CM diagnosis codes appearing on qualified claims (see Appendix B), which were incurred while the patient was living in a community setting. Patients who received APs via long-acting injections (LAIs) were excluded from the study population. Patients without Part A,

Part B, and Part D continuous coverage for the entire study duration were excluded from the study population, since these coverages were used to determine AP use and adverse events. Patients with an AP supply per 30 days above 90 were excluded from our analysis. These patients were above the 99th percentile of the AP use distribution and represented less than 1% of the eligible study population. The NH setting was confirmed by a plurality of Part D prescription fill dates (regardless of drug class) with a patient residence code of “3-Nursing Facility”.

For relatively complete patient characterization, beneficiaries were required to have a minimum of 180 cumulative days in the community setting without any evidence of prior residential NH experience in an additional 6-month clean period prior to the start of a patient’s community setting study period. Additionally, patients were required to have a minimum of 180 cumulative days (excluding SNF and hospice) in the NH setting. The exception to the 180-day NH requirement was for patients who died, as the acute events included in our analysis are correlated to mortality.

We tabulated events (see Supplemental Appendix C) in both a community setting (prior to transition) and NH (post-transition). The percent change in frequency of acute events was used to compare changes across AP use cohorts. The acute medical events included in our analysis were chosen based on a review of the current literature, which linked AP use to increases in bone fracture, myocardial infarction, acute myocardial ischemia, transient ischemic attack, and acute stroke. Acute events occurring during a covered SNF stay during a patient’s NH experience are included in the calculation.

We also evaluated potential medication usage switches for concomitant non-AP medications of interest, including medications for the treatment of dementia, hypnotics, antidepressants, antiepileptics, benzodiazepines, and opioids to evaluate potential substitution effects among the AP use cohorts.

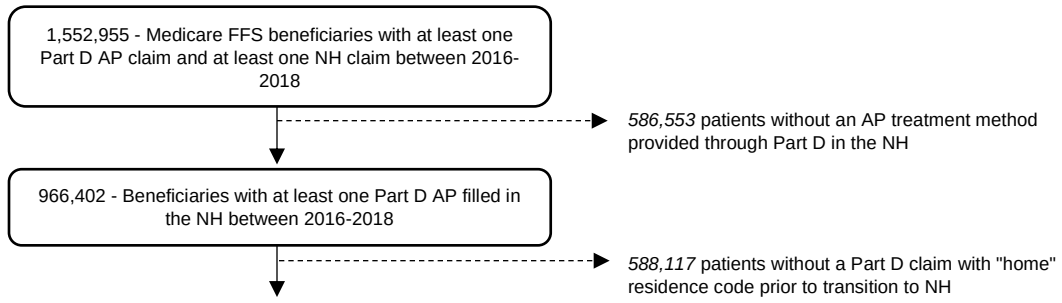
All drug utilization was calculated using an average days’ supply per 30 days (excluding covered SNF, inpatient acute stays, and hospice days from both numerator and denominator). As a result, a patient would be considered to have stable AP use between a community setting and NH if the days’ supply remained consistent even if the AP medication dose strength changed. Shifts in medication utilization were measured by the difference between average days’ supply per 30 days in a community setting and in the NH. Patients were placed into one of three AP use cohorts based on their shift in AP utilization between settings. Patients were classified as “Decreased AP Use” if the change in AP use post-transition was less than -2.8. “Increased AP Use” was classified as a change in AP use post-transition greater than 2.8. Patients with a change in AP use post-transition greater than or equal to -2.8 and less than or equal to 2.8 were classified as “Stable AP Use”. Cut points for the AP use cohorts were determined using a 10% band around the average days’ supply in a community setting.

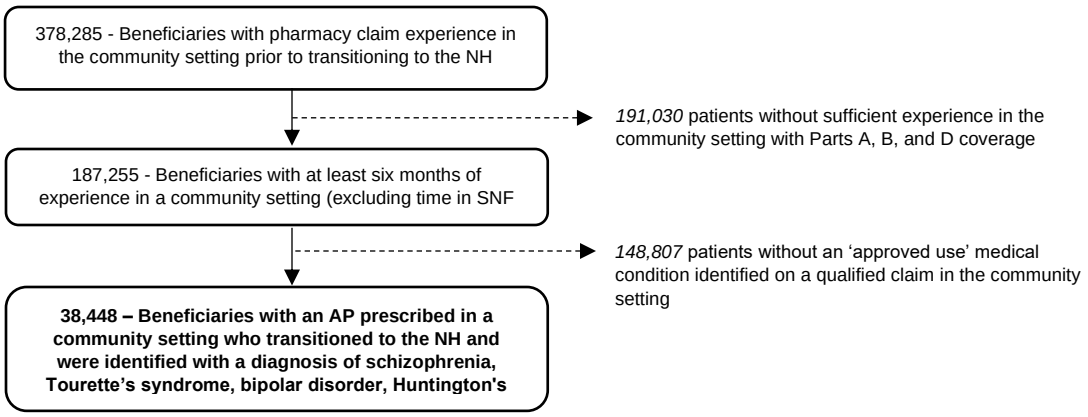
Results

ANTIPSYCHOTIC MEDICATION THERAPY SHIFT POST-TRANSITION TO NURSING HOME

We identified 38,448 patients meeting the study criteria (see Methodology above) who transitioned from a community setting to an NH between 2016 and 2018. Figure 1 outlines the study population waterfall.

FIGURE 1: POPULATION WATERFALL





The final sample population (38,448 patients) had an average age of 68 years and 64% were female. NH patients had on average 21.6 months of combined community and NH experience in our analysis. The most common approved-use condition was major depressive disorder (72%), followed by bipolar disorder (33%). Patients who transitioned from community living to an NH experienced higher AP use in a community setting (28.1 / 30 days) compared to the NH (22.2 / 30 days) as measured by average days' supply (Figure 2).

Approved-use patients with established AP use prior to transitioning to an NH experienced a 21% decrease in AP use following transition.

The decrease in AP use between a community setting and NH setting was evaluated using an unequal variance t-test and the difference in means was found to be statistically significant.

FIGURE 2: ANTIPSYCHOTIC MEDICATION THERAPY SHIFT POST TRANSTION TO NURSING HOME

TABLE HEADING	NURSING HOME (N = 38,448)
Demographics	
Age (SD)	68.2 (14.5)
Female (%)	24,639 (64)
Risk Score (SD)	2.89 (2.09)
Patients with Condition(s) Identified[1] (%)	
Major Depressive Disorder	27,608 (72)
Bipolar Disorder	12,817 (33)
Schizophrenia	9,158 (24)
Huntington's Disease	212 (1)
Tourette's Syndrome	63 (<1)
Average Length of Stay in Each Setting[2] (Months)	
Community Setting (SD)	10.8 (1.8)
NH Setting (SD)	10.8 (8.0)
Average Days' Supply per 30-day Month - Targeted Antipsychotic Medications[3]	
Community Setting (95% CI)	28.1 (27.9, 28.2)
NH Setting (95% CI)	22.2 (22.0, 22.4)
Statistical Evaluation of Difference in Means - Targeted Antipsychotic Medications	Pr > |t|
T-Test Pooled Method	< 0.0001

Note: Data are mean ± SD unless otherwise indicated

1. Condition identification is not mutually exclusive; patients can be identified with multiple conditions
2. Average length of stay excludes experience during a covered skilled nursing facility stay, inpatient acute admissions, and hospice stay
3. See Supplemental Appendix C for complete NDC list used to identify APs. Data are means and (95% CI)
4. Statistical significance determined with p-value < 0.05

BASELINE DEMOGRAPHICS

Patients were classified into three cohorts based on whether they had decreased, stable or increased AP use post transition. Figure 3 shows characteristics of each cohort, including average age, and CMS hierarchical condition categories (HCC) risk adjustment factor. Under the CMS risk adjustment model a risk score of 1.0 represents a beneficiary expected to incur average expenditures for Parts A and B services – a risk score above 1.0 represents patients likely to have increased expenditures due in part to increased disease burden. The average risk score for all NH patients was 2.89.

Patients with increased AP use who transitioned to an NH were younger and more likely to have a diagnosis of schizophrenia than patients with decreased AP use.

The two most common conditions identified across all three cohorts were major depressive disorder and bipolar disorder. Neither of these conditions are reasons for exclusion from the CMS long-stay nursing home AP use metric, although they are considered on-label conditions for some APs by the FDA.

FIGURE 3: PATIENT DEMOGRAPHIC AND CLINICAL CHARACTERISTICS

PARAMETER	DECREASED AP USAGE (N = 21,152)	STABLE AP USAGE (N = 5,841)	INCREASED AP USAGE (N = 11,455)
Age (SD)	69.9 (14.0)	67.2 (14.2)	65.7 (15.1)
Female (%)	13,787 (65)	3,836 (66)	7,016 (61)
Risk Score (SD)	3.05 (2.16)	2.82 (2.04)	2.66 (1.95)
Patients with Condition(s) Identified[1] (%)			
Major Depressive Disorder	15,968 (75)	4,004 (69)	7,636 (67)
Bipolar Disorder	6,393 (30)	1,973 (34)	4,451 (39)
Schizophrenia	4,172 (20)	1,477 (25)	3,509 (31)
Huntington's Disease	91 (<1)	35 (1)	86 (1)
Tourette's Syndrome	29 (<1)	<11 (<1)	28 (<1)
AP Average Days' supply per 30 Days			
Community Setting (SD)	32.0 (15.8)	23.3 (13.6)	22.4 (13.2)
NH Setting (SD)	12.1 (14.3)	25.1 (14.0)	39.5 (15.1)

Note: Data are mean ± SD unless otherwise indicated. CMS prevents reporting on any population with fewer than 11 beneficiaries, where applicable these summaries will be presented as estimates

1. Condition identification is not mutually exclusive; patients can be identified with multiple conditions

CHANGE IN FREQUENCY OF ACUTE EVENTS POST TRANSITION TO NURSING HOME

We examined the relationship between AP use cohorts and acute events as measured by the percent change in adverse event frequency between a community setting and NH setting. The frequency of acute events is presented as the annualized event rate per 1,000 beneficiaries. We annualized frequencies to allow for varying length of exposure in each setting. In NH patients, bone fractures were the most common acute event measured with an average event rate range of 49.9 – 61.6 in the NH setting (Figure 4). While past studies of AP use in long-term care residents identified an increased risk of falls and fractures with increased AP use (Fraser, Liu, Naylor, et al.2015), our analysis found that bone fractures decreased by 3% for the increased AP use cohort (the decreased AP use cohort experienced a 7% decrease in the rate of bone fractures).

In all instances in which a decrease in AP use was associated with a decrease in the frequency of an acute event, a similar or larger decrease was observed with increased AP use.

Patients with stable or increased AP use post transition to the NH experienced a larger decrease in three of the five acute events measured (coronary ischemia, myocardial infarction, and bone fractures). There was no consistent relationship between the change in AP use and change in frequency of the acute event, suggesting that a change in event frequency appears unrelated to an increase or decrease in a patient's AP use.

FIGURE 4: RELATIONSHIP BETWEEN ACUTE EVENTS[1] AND AP USE

	DECREASED AP USAGE	STABLE AP USAGE	INCREASED AP USAGE	DECREASED AP USAGE	STABLE AP USAGE	INCREASED AP USAGE
	COMMUNITY SETTING (NH SETTING)			% CHANGE BETWEEN SETTINGS		
PARAMETER	**(N = 21,152)**	**(N = 5,841)**	**(N = 11,455)**			
Avg. Days' supply / 30 Days						
Antipsychotic Medications	31.9 (12.1)	25.3 (25.1)	22.4 (39.5)	-62%	-1%	76%
Coronary Artery Events						
Acute Coronary Ischemia	11.7 (7.4)	10.2 (6.6)	13.1 (7.9)	-37%*	-36%	-39%*
Myocardial Infarction	14.9 (13.4)	14.4 (9.5)	10.8 (8.4)	-10%	-34%	-22%
Cerebrovascular Events						
Transient Ischemic Attack	15.7 (6.7)	11.1 (7.0)	10.6 (7.1)	-57%*	-37%*	-32%
Acute Stroke	23.4 (16.2)	17.7 (12.1)	19.2 (14.8)	-31%	-32%	-23%
Skeletal Events						
Bone Fractures	61.6 (57.1)	52.5 (49.9)	54.1 (52.7)	-7%	-5%	-3%
All-Cause Mortality						
Study Cessation (death) %	- (34%)	- (21%)	- (17%)	-	-	-

Note:

1. Acute events are annualized per 1,000 members
2. "*" Indicates statistically significant difference in mean using a Welch's TTest with an α = 0.05

RELATIONSHIP BETWEEN AP USE AND OTHER MEDICATIONS

We also examined the relationship between shifts in AP use and six concomitant drug classes — hypnotics, antidepressants, antiepileptics, medications for the management of dementia, benzodiazepines, and opioids (for complete list of NDCs see Supplemental Appendix C). The objective was to identify whether any of these classes of medications appeared to be used as substitutes for APs such that we would see an increase in average days' supply per 30 days for the concomitant drugs among the "Decreased AP Use" cohort, or a corresponding decrease among the "Increased AP Use" cohort. All of these other drug classes are included in the Beers List as potentially harmful drugs in the elderly. The use of the two most commonly prescribed classes of medications in conjunction with APs in our study (antidepressants and antiepileptics) varied with AP use. Use of antidepressants decreased 23% in the NH for the patients with decreased AP use; however, patients with increased AP use experienced an increase in antidepressants of 16% in NH (see Figure 5).

We found no evidence that patients on APs switched to concomitant drugs such as hypnotics when their AP use decreased after transitioning to an NH.

A notable exception to the observed direct relationship found in our study was in three other classes of medication that have received high levels of attention for potential misuse harmful for the elderly: hypnotics, benzodiazepines, and opioids (Fain et al.2017). For these classes of medications regardless of shift in AP use we observed a decrease in use following transition to the NH.

FIGURE 5: CHANGE IN CONCOMITANT DRUG USE BY AP USE

	DECREASED AP USAGE	STABLE AP USAGE	INCREASED AP USAGE	DECREASED AP USAGE	STABLE AP USAGE	INCREASED AP USAGE
	COMMUNITY SETTING (NH SETTING)			% CHANGE BETWEEN SETTINGS		
PARAMETER	**(N = 21,152)**	**(N = 5,841)**	**(N = 11,455)**			
Avg. Days' supply / 30 Days						
Antipsychotic Medications	31.9 (12.1)	25.3 (25.1)	22.4 (39.5)	-62%	-1%	76%
Antidepressant Medications	26.8 (20.7)	25.2 (24.1)	23.2 (26.9)	-23%	-4%	16%
Antiepileptic Medications	21.1 (18.2)	21.0 (22.3)	19.7 (25.5)	-14%	6%	30%
Medications for Dementia	7.9 (5.7)	5.6 (5.4)	5.9 (6.8)	-28%	-4%	15%
Hypnotic Medications	3.0 (1.7)	2.8 (1.8)	2.7 (2.1)	-45%	-37%	-23%
Benzodiazepines	3.2 (1.8)	2.7 (1.9)	2.9 (2.3)	-43%	-30%	-20%
Opioids	9.0 (6.8)	8.5 (7.5)	7.0 (6.8)	-24%	-12%	-4%

Discussion

To our knowledge, this is the first study to follow patients using APs with a condition meeting the FDA approved-use indication for AP use who transition from community living to an NH setting. We examined Medicare beneficiaries using APs who had conditions for which APs are approved and observed changes in AP use and the frequency of potentially related adverse events after these patients moved to an NH. While there is literature on new AP use in NH settings, there are few studies focused on patients with prior AP use in a community setting.

We observed that AP use decreased when patients moved from a community setting to an NH. The two most common conditions in our study population were major depressive disorder and bipolar disorder, and the FDA has approved APs for both conditions, yet neither are recognized as appropriate exclusions from the long-stay residents on an antipsychotic medication quality metric by CMS.

Our examination of the frequency of adverse events that have previously been associated with AP use produced unexpected results. While adverse event rates decreased for NH patients with decreased AP use across all of the five adverse events we measured, a similar or greater decrease was also found in NH patients with increased AP use. This raises a question about whether efforts to further reduce AP use can achieve reductions in the adverse events we examined. While there has been some concern of a substitution effect—use of concomitant drugs may be increased or decreased if AP use is decreased or increased—we found no clear substitution pattern. Further research is needed to better understand the interactions of conditions and therapies associated with the transition of patients from a community setting to NH.

Caveats and Limitations

AP use and subsequent shifts in AP use were determined using changes in average days' supply per 30 days. Increases or decreases in dose are not considered under this methodology. Additionally changes in medications that require different dosing patterns to achieve comparable results e.g., moving from a daily medication of one dose to a twice a day of the same medication with a half dose would under this methodology be identified as an increase in AP use. Our review of AP use found relatively consistent NDC use for patients in the study population although potential biases from our definition of changes in AP use should be considered by the reader. Our analysis evaluated only oral AP use, and it is possible that other AP treatment modalities (e.g., injectables) may produce different outcomes or results. Our analysis was limited to members with prior AP use in the community setting prior to transition to a residential long-term care facility. As such our findings may not be generalizable to other kinds of patients, our source of prescription information, Medicare Part D claims, does not contain information on drug use during a Medicare-paid

stay in a skilled nursing facility, so our analysis does not consider events or treatments that NH patients may have received during such stays.

Patient characteristics other than those we measured may play a significant role in the change in AP use following transition from a community setting to NH. Clinicians may be able to identify patients who are unlikely to experience increased risks of adverse events from the use of APs and, if so, may choose therapy to avoid adverse events. These considerations are not reflected in our model and should be considered in interpreting results.

Models developed by Milliman to identify acute events in this report, including all diagnosis codes, calculations, and outputs, may not be appropriate for other purposes. We have reviewed the acute event identification models used in this report, including their inputs, calculations, and outputs for consistency, reasonableness, and appropriateness to the intended purpose and ensured compliance with generally accepted actuarial practice and relevant actuarial standards of practice (ASOP). These models depend on valid data and information within the Medicare 100% Research Identifiable Files. To the extent that the data and information provided in this source is not accurate, or not complete, the values provided in this report may likewise be inaccurate or incomplete.

Appendix A: Data Sources

CMS 100% RESEARCH IDENTIFIABLE FILES 2016-2018

The Medicare 100% Research Identifiable Files contain all Medicare Parts A, B, and D paid claims for all Medicare fee-for-service (FFS) beneficiaries in the United States. Information includes county of residence, diagnosis codes, procedure codes, and diagnosis-related group (DRG) codes, along with site of service information including provider IDs. The data also provides monthly eligibility data for each beneficiary including demographics, eligibility status, and an indicator for health maintenance organization (HMO) enrollment. This data is released on an annual basis.

Appendix B: Methodology (Additional Detail)

TARGETED ANTIPSYCHOTIC MEDICATIONS (AP)

APs include both conventional (1st generation) and atypical (2nd generation) antipsychotic medications used in this analysis with a full list of NDCs available in Supplemental Appendix C. These were commercially available between January 1, 2016, and December 31, 2018, with an oral route of administration. Similar antipsychotic medications with other routes of administration (e.g., intramuscular injections) were excluded as they are less commonly used for regular ongoing management of a condition and may instead be used for cases of acute agitation. As this study is focused on pattern changes of AP use and adverse events by AP pattern change it was important to the study design that our population be one that was on APs for regular management and not for acute intervention.

APPROVED DRUG USE INDICATOR

Approved use for our APs were based on the indications section of the FDA label (https://www.accessdata.fda.gov/) for each of the APs. See Supplemental Appendix C for the mapping of AP generic drug name to approved conditions (e.g., schizophrenia, bipolar disorder, etc.) identified under the “indications” portion of the FDA label. Beneficiaries included in our analysis were identified with at least one of the approved or star excluded indications (e.g., schizophrenia, bipolar disorder, major depressive disorder, Huntington’s disease and/or Tourette’s syndrome) and at least one fill of an AP for which the approved drug use indication matched the beneficiary’s condition.

BENEFICIARY STUDY WINDOW

The community setting exposure was limited to the twelve consecutive months prior to the last date of a Part D claim (of any class of medication) with a patient residence code of “1-Home”. The use of Part D claims experience to establish a community setting and NH setting in our analysis allows for a designed gap of time between the end of the community setting exposure (last Part D claim with patient residence code of “1-Home”) and beginning of the NH exposure (first Part D claim with a patient residence code of “3-Nursing Facility”). This potential gap excludes any acute event that could have initiated the transition to the NH setting. For example, if a beneficiary experienced an acute inpatient admission for a myocardial infarction followed by a discharge to a skilled nursing facility (SNF) and subsequently a transition to residential long-term care in a nursing home, a Part D claim would be unlikely to occur during either the inpatient admission or SNF stay (as medications would be included in DRG/Per Diem payments under Part A). As a result, the end of the community setting experience would occur prior to the inpatient admission. Additionally, any AP use during the covered SNF stay following that acute inpatient admission would not be included in the NH experience, as it is unlikely, we would see a Part D covered claims during a SNF stay.

QUALIFIED CLAIMS

Qualified claims were identified throughout the analysis using the Current Procedural Terminology (CPT)/Healthcare Common Procedure Coding System (HCPCS) codes and revenue codes found in Supplemental Appendix C. The purpose of limiting medical condition identification to qualified claims is to strengthen the validity of that identification.

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