



Published in final edited form as:

Clin Gerontol. 2022 ; 45(5): 1180–1188. doi:10.1080/07317115.2022.2063777.

Community, Social, and Facility Factors and Long-stay Antipsychotic Use

Jonathan D. Winter, MD^a, J. William Kerns, MD^a, Katherine M. Winter, CFNP^a, Alicia Richards, BS^b, Roy T. Sabo, PhD^b

^aShenandoah Family Practice Residency, Department of Family Medicine and Population Health, Virginia Commonwealth University, Richmond, Virginia, USA;

^bDepartment of Biostatistics, Virginia Commonwealth University, Richmond, Virginia, USA

Abstract

Objectives: Compare Virginia nursing homes in the top- and bottom-quintiles of antipsychotic use for variation in community, social, and facility factors.

Methods: 2018 CMS data ascertained Virginia nursing homes in the top and bottom quintiles for antipsychotic use. The Virginia Health Department provided social determinant of health (SDOH) statistics for each facility's county/city while claims identified facility demographics. Chi square and independent two-sample *t*-tests compared quintiles for regional, social, and demographic differences.

Results: Quintiles averaged 3000 residents and 56 facilities. Facilities with the lowest rates of antipsychotic use were more likely to be privately owned and had fewer African-American and minority residents and more white residents. All 18 SDOH statistics were superior for the communities of facilities with the lowest antipsychotic rates. Nine of these differences were statistically significant, including the aggregated "Health Opportunity Index."

Conclusions: The antipsychotic prevalence rate for facilities in the top-quintile of antipsychotic use is fivefold the bottom-quintile's rate. Antipsychotic prescribing in nursing homes is associated with regional, demographic, and social factors not addressed by existing antipsychotic reduction measures, with vulnerable populations at greatest risk.

Clinical Implications: The efficacy of measures aimed at curbing long-stay antipsychotic prescribing could be improved by addressing SDOH including economic opportunities.

Keywords

antipsychotic; dementia; health opportunities; nursing home; social determinants of health

[✉]CONTACT Jonathan D. Winter jwinter@valleyhealthlink.com VCU-Shenandoah Family Practice Residency, Front Royal, Virginia 22630.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Introduction

Reducing inappropriate overutilization of antipsychotics for the behavioral and psychological symptoms of dementia has been the goal of all stakeholders in dementia care including the Centers for Medicare and Medicaid Services (CMS). In 2012, CMS debuted the *National Partnership to Improve Dementia Care in Nursing Homes* (“CMS Announces National Partnership,” 2012). Since that time, long-stay antipsychotic prevalence (with long-stay defined by CMS as nursing facility care lasting more than 100 days) has been trended and graded in the *Percentage of long-stay residents who got an antipsychotic medication* quality-measure. Over the last decade, antipsychotic prescribing has decreased but pronounced variance in antipsychotic use has emerged among nursing homes (“Interim report on the CMS National Partnership,” 2016). In the face of manifold antipsychotic reduction efforts, some facilities have dramatically decreased their reliance on risky antipsychotics while others – described by CMS as “Late Adopters” – have not (“Late Adopter Data Report,” 2021). Little is known about why this is so, though various elements that potentially influence antipsychotic use have been evaluated and described. These factors include resident attributes, facility characteristics, and location, all of which are believed to affect a facility’s antipsychotic prescribing rate (Fashaw et al., 2020; Hughes, Lapane, & Mor, 2000).

Though research on this topic is scant and results are variable, nursing home residents who are male, African-American, or who have dementia or a psychiatric condition appear to be at increased risk for treatment with an antipsychotic medication (Busch, Cohen, & Konetzka, 2019; Kerns, Winter, Winter, Boyd, & Etz, 2018; Kerns, Winter, Winter, Kerns, & Etz, 2018). Facilities with lower staffing ratios, lower CMS quality scores, and lower rates of payor reimbursement tend to have higher prescribing prevalence (Fashaw et al., 2020). Residents with Medicaid are more likely to receive antipsychotics than the rest of the long-stay population, and facilities with a greater dependency on Medicaid – as opposed to Medicare or private payors – tend to have higher rates of antipsychotic prescribing (Fashaw et al., 2020; Hughes et al., 2000; Stevenson et al., 2010). On the other hand, increased Medicaid reimbursement may be associated with lower antipsychotic use (Castle, Hanlon, & Handler, 2009). Facility prescribing culture also seems to impact prescribing as residing in a facility with a higher antipsychotic prescribing rate is an independent risk factor for receiving an antipsychotic (Chen et al., 2010). Geography and population density also play a role. The antipsychotic prevalence in the central southwest is much higher than the western region of the country, for example (Briesacher, Tjia, Field, Peterson, & Gurwitz, 2013; Chen et al., 2010). In addition, more antipsychotics are prescribed in metropolitan facilities compared to rural facilities (Stevenson et al., 2010). This literature is also far from uniform and while certain themes seem to be consistent, there are also studies that have shown no association between race, gender, staffing, resources, and a facility’s antipsychotic prevalence (Busch et al., 2019; Fashaw et al., 2020).

Though social determinants of health – the conditions in the places where people exist that affect health and life quality – have been shown to impact a diversity of health outcomes, the role of disparities in such factors in long-stay prescribing decisions are unknown (“Health Disparities Data,” 2020; “National Healthcare Quality and Disparities Report,”

2018; “Social Determinants of Health: CDC,” 2022). The objective of this investigation was to compare Virginia nursing homes in the top and bottom quintiles of antipsychotic use for differences in gender, ethnicity, and geography, community demographics, and community social determinants of health.

Methods

All nursing home facilities in Virginia were sorted by their antipsychotic rate as reported by CMS’s *Percentage of long-stay residents who got an antipsychotic medication* quality-measure in the fourth quarter of 2018 (“Antipsychotic Medication Measure Methodology,” 2018). Facilities in the top- and bottom-quintiles for antipsychotic use were identified (“Provider Information,” 2022). Facility addresses were used to extract county or independent city-level social data from the Virginia Health Opportunity Index, a resource of the Virginia Department of Health Office of Health Equity. The Virginia Health Opportunity Index (HOI) is a “group of indicators that provide broad insight into the overall opportunity Virginians have to live long and healthy lives based on the Social Determinants of Health.” The HOI is hierarchical and derived from dozens of social, economic, educational, demographic, and environmental community variables. These factors are combined into 13 reported indicators, the 13 indicators are then grouped into four profiles, and then, finally, the four profiles are aggregated into a single Health Opportunity Index. The four profiles are the Community Environment Profile, the Consumer Opportunity Profile, the Economic Opportunity Profile, and the Wellness Disparity Profile. In total, the HOI provides 18 reported measures, including the 13 community indices, the four community profiles, and the final aggregated Health Opportunity Index. These are outlined in Table 1. Beyond health opportunity statistics, the HOI also provided community demographic data (“Virginia HOI: Health Matters, Place Matters,” 2022).

In addition to community data from the Virginia Health Opportunity Index, de-identified facility demographic data for each quintile were extracted from the Virginia All Payers Claims Database (APCD) using facility NPI numbers. The Virginia APCD is a warehouse of claims submitted by insurance carriers. It currently comprises paid claims data for approximately 4.5 million Virginia residents including the majority of commercially insured Virginia residents as well as all residents with Medicaid and Medicare (“APCD,” 2020). Nursing home residents were identified from claims collected in the APCD via the nursing facility place-of-service and then were confirmed by the presence of long-stay Current Procedural Terminology codes (99301–99318; 99379, 99380) and the absence of an assisted living facility, or adult day facility place-of-service. Since our goal was an evaluation of nursing home residents receiving long-term care, we also excluded residents receiving the more acute, rehabilitation-oriented care under the skilled nursing facility place-of-service.

For each quintile, demographic data for all nursing home residents detected over the six-year study period was extracted. In addition, the claims-based prevalence of the diagnoses of schizophrenia, Tourette’s syndrome, and Huntington’s disease was obtained for each quintile. Diagnosis prevalence was approximated by identifying every unique nursing home resident with a claims-based diagnosis of schizophrenia, Tourette’s, or Huntington’s from among all the unique nursing home residents identified over the study period. Diagnoses

were extracted from claims using ICD-9/10 codes up to the 12th reported diagnosis (schizophrenia: F20–25; Huntington's: G10; Tourette's: F95.1). Facility and community factors for facilities in the top and bottom quintiles of antipsychotic use were then compared.

Patient-level categorical measurements were summarized with frequencies and percentages and were compared between quintile groups with chi-square tests; observed and expected counts were everywhere large-enough to satisfy model assumptions. Facility-level numerical measurements were summarized with means and standard deviations and compared between groups using two-sample, independent *t*-tests; sample sizes were large enough to satisfy model assumptions. A 5% significance level was used for all hypothesis tests. SAS statistical software (version 9.4, Cary, NC, USA) was used for all analyses.

Results

Quintile results are summarized in Table 2. Each quintile averaged 56 long-stay facilities and 3000 residents. Facilities in the top-quintile with the highest rates of antipsychotic use had a mean antipsychotic prevalence rate of 25%, while facilities in the bottom-quintile with the lowest rates of antipsychotic use had a mean rate of 5% ($p < .0001$). Top-quintile facilities had significantly more African-American residents and fewer white residents than bottom-quintile facilities ($p < .0001$). Of note, the communities of top-quintile facilities also had more African-Americans (25.6% vs 20.0%), but this difference was not significant ($p = .0555$). In addition, top-quintile facilities had significantly more male residents than bottom-quintile facilities, though the difference was not great ($p = .0058$). Facilities in the bottom-quintile with the lowest rates of antipsychotic use also had a significantly higher rate of private ownership ($p = .026$), a significantly different regionality with an increased urban presence ($p < .0001$), and a markedly higher reported rate of the exclusionary diagnoses of schizophrenia, Tourette's, and Huntington's – diagnoses that allow antipsychotics to be prescribed without mandatory reporting to the CMS quality-measure (4.8% vs 3.1%, $p < .0001$). The entirety of this variation can be attributed to schizophrenia. Bottom-quintile facilities were larger with more beds reported, though not significantly so ($p = .3745$).

Significant differences in the social determinants of health were also detected between the communities of top- and bottom-quintile facilities. Note that for interpreting findings, a lower profile ranking is superior to a higher profile ranking while a higher index score is better than a lower index score. Facilities in the bottom quintile with the lowest rates of antipsychotic use exist in communities with a superior aggregated Health Opportunity Index Ranking (38.1 vs. 61.3, $p = .0013$). The communities of bottom-quintile facilities also had better rankings for all four of the profiles that comprise the aggregated HOI, though this difference was only significant for the Economic Opportunity Profile ranking ($p = .0006$). Similarly, every 1 of the 13 Indicators that make up the four profiles were superior for the communities of bottom-quintile facilities with the lowest rates of antipsychotic use, but differences were only significant for 7 of the 13. Significant differences were found in the three indicators included in Economic Opportunity Profile: the Employment Accessibility Indicator, the Job Participation Indicator, and the Income Inequality Indicator. Also, statistically significant were differences in the Education (Years of Schooling), Affordability, Population Density, and Walkability Indicators. The Access to Care, Air Quality, Population

Churning, Food Accessibility, Segregation, and Maternal Deprivation Indicators were all better for the communities of bottom-quintile facilities with the lowest rates of antipsychotic use, but these differences did not meet thresholds for statistical significance.

Discussion

In Virginia, the difference in antipsychotic prevalence rates between the top and bottom quintiles for antipsychotic use is enormous. Five times as many antipsychotics are prescribed in facilities in the top-quintile for antipsychotic use as in the bottom-quintile. Virginia is not an outlier in this regard and these results are congruent with national data. A better understanding of what variables and processes distinguish facilities with such radically different rates of risky drug use is critically important to facilitate positive change in dementia care. The explanation for the variation in antipsychotic use between top and bottom quintiles is certainly manifold; however, facility, regional, and community factors appear to play a role.

That there are more African-Americans and men in top-quintile facilities with the highest rates of antipsychotic use is consistent with our past work identifying both variables as independent risk factors for antipsychotic prescribing (Winter, Kerns, Sabo, 2022). In regards to the variation in prescribing between sexes, it is plausible that the manifestation of certain BPSD such as combativeness or aggressive agitation are affected by physiologic sex differences. If certain symptoms are more challenging to control in men than in women without drugs, it might in part explain why medications are more relied upon in this population. This possibility has been rarely explored in the literature (Lackner, Cloyd, Thomas, & Leppik, 1998). In regards to race, we are not the first to note the impact of ethnicity on long-stay antipsychotic prescribing. Though results are mixed, African-Americans and other minorities seem to be at increased risk for all psychoactive prescribing. Race appears to both an independent risk factor for prescribing and to be linked with other factors, such as facility payor mix, resources, staffing, and region, which are also associated with prescribing prevalence (Fashaw et al., 2020). Sadly, racial disparities in health care are not unique to the long-stay environment and minority groups appear to be at increased risk for inferior medical treatment and inferior health outcomes in all locations of care (Mays, Cochran, & Barnes, 2007).

Curiously, this facility-level finding contrasts with community demographic data. Communities of top-quintile facilities with the highest rates of antipsychotic use also had a greater proportion of African-Americans, but lower rates of other minorities. Community demographic data is likely related to regional variation between quintiles, with top-quintile communities being less likely to be urban. In addition, our finding that these top-quintile facilities were more likely to be rural and occur in communities with a lower population density differs with 2010 results suggesting that a metropolitan location was associated with greater antipsychotic use (Stevenson et al., 2010). While we believe that place is important, we can explain neither this outcome nor this discrepancy, though we suspect facility prescribing culture, crowding, resources, staffing, payor mix, and ownership all contribute. It is also fair to recognize that the literature in this area overall is contradictory at times. Social and community variables may be particularly resistant to consistent definition

and vulnerable to confounding. Nonetheless, while acknowledging shortcomings, we believe valuable meaning can still be extracted.

Bottom-quintile facilities with the lowest rates of antipsychotic use are more likely to be privately owned. This is in line with existing research suggesting higher rates of all psychoactives in public facilities, including antipsychotics (Hughes et al., 2000). The explanation for this is unclear. There may be selection bias occurring with more desirable private facilities avoiding challenging patients requiring greater levels of care. In addition, private facilities also generally tend to have a better payor mix and superior rates of reimbursement. Lower reimbursement is negatively associated with all resourcing and has been linked to more risky prescribing (Castle et al., 2009).

The finding of a higher prevalence of schizophrenia, Tourette's syndrome, and Huntington's disease in bottom-quintile facilities with the lowest rates of antipsychotic use is congruent with our own past work. By federal mandate, nursing homes must report all antipsychotic prescribing to CMS's *Percentage of long-stay residents who got an antipsychotic medication* long-stay quality-measure. This measure contributes to CMS's publically available "Stars" rating system, the goal of which is to inform consumers about the quality of care provided at every US nursing facility. Excluded from this mandatory audit however are antipsychotics applied for the diagnoses of schizophrenia, Tourette's, or Huntington's. Antipsychotics prescribed for these three conditions and these three conditions only are not included in CMS quality-measure reporting and their application does not impact a facility's quality-measure score or "Stars" rating ("Antipsychotic Medication Measure Methodology, 2018). Since the quality-measure's debut, facility claims of these diagnoses in the presence of antipsychotic use have rapidly increased, while the prevalence of these conditions in the general population appear to be stable. (Winter, Kerns, Winter, Richards, & Sabo, 2021; Winter, Kerns, Winter, & Sabo, 2019). We have hypothesized, based on mixed-method data, that these increases in exclusionary diagnosis claims represent a purposeful effort to improve antipsychotic quality-measure scores without necessarily reducing antipsychotic utilization (Kerns et al., 2018). We view this potential phenomenon as an unintended, and perhaps even adverse, consequence of CMS's *National Partnership* and the publically available "Stars" system for facility quality ranking. Thus, we were not surprised to find a significantly higher prevalence for claims of these exclusionary diagnoses in facilities with the lowest rates of antipsychotic use (as defined by the quality-measure) compared to those with the highest.

Beyond facility characteristics and community demographics, bottom-quintile facilities with the lowest rates of antipsychotic use are also more likely to occur in communities with superior social determinants of health and better health opportunity statistics. We found the aggregated Health Opportunity Index of a community, which incorporates all the social determinants of health measured by the Virginia Department of Health, to be strongly associated with the antipsychotic rate of nursing facilities within that community. While every measured component of the aggregated Health Opportunity Index trended similarly, of all the social determinants comprising the index, the association between facility antipsychotic utilization and a community's economic opportunities was the most robust. The Economic Opportunity Profile measures the economic resources of a community and the ability of community members to engage in their community's economy. Greater

geographic accessibility to employment, higher levels of income equality and equity in wealth distribution, and a superior rate of employment and participation in paid labor are all qualities of the communities of bottom-quintile facilities with the lowest rates of antipsychotic use. Similarly, a community's Walkability score – which takes into account urban design and public transit resources, – as well as the average level of education of community members were likewise associated with strong statistical significance. While the reason for this is unclear, it is possible that communities with greater economic opportunity, higher levels of education and job participation, and superior infrastructure, are communities better able to provide support and resources to their regional facilities, reducing the need for drugs. Volunteers, complimentary services, grant funded resources, foundation contributions, the availability of a qualified and trained workforce, and a diversity of other supports exist to varying degrees in different communities. Perhaps access to community resources such as these, which may improve dementia care and outcomes, correlate with community social determinants.

In this study, we compare facilities in the top and bottom quintile of antipsychotic use. CMS, a critical stakeholder in facilitating change in long-stay dementia care, also monitors facilities with the highest rates of antipsychotic use. Termed by CMS as “Late Adopters,” facilities in the top quartile for the long-stay antipsychotic use quality-measure and with only small reductions in antipsychotic use since 2011 (<6.47%) are subject to enhanced oversight and enforcement from CMS. Enforcement remedies during enhanced oversight could include discretionary penalties such as Denial of Payments for New Admissions (“Enhanced Oversight and Enforcement of Non-Improving Late Adopters,” 2019).

In order to help Late Adopters improve management, an enriched understanding of what distinguishes these Late Adopter facilities from facilities with lower rates of antipsychotic use is essential. It is possible that that Late Adopters are disadvantaged in some way or experience barriers to positive change that are disproportionate to other facilities. With that assumption, these results begin to hint at what those variations might include. Our results suggest that facilities with the highest rates of antipsychotic use are more prevalent in poorer communities with fewer economic opportunities, inferior social determinants of health, and less health opportunity. They are more likely to have African-Americans and other minorities as residents, an independent risk factor for antipsychotic use. They are more likely to have men as residents, another independent risk factor for antipsychotics. They are also less likely to be privately owned, a quality which has been associated with an inferior payor-mix and lower resources.

All stakeholders in dementia care agree that non-pharmacologic therapies should be first line for managing the behavioral and psychological symptoms of dementia in nursing homes (Alexopoulos et al., 2005). For this to be accomplished, personalized drug-alternatives must be as available and affordable as medications. Unfortunately, these measures are often time consuming, expensive, staffing and resource dependent, reliant on expert application, and rarely covered by insurance. We hypothesize that in the face of antipsychotic reduction efforts, that resource-rich facilities have been more effective in implementing unfunded drug alternatives compared to facilities with less resources. Accordingly, we theorize that “Late Adopter” facilities with high rates of antipsychotic use are on the whole underresourced

relative to facilities with low rates of antipsychotic use. Further, we hypothesize that “Late Adopter” facilities are more likely to occur in communities with fewer supports in place to assist them. If this is true, then it is plausible that “Late Adopter” facilities need extra assistance in addition to the threat of penalties to realize reductions in antipsychotics. Extra supports might include additional funding, staffing, and resources in general, all factors that have been shown to be positively associated with lower rates of antipsychotic use. Clearly further research is necessary to better understand this phenomenon, which we are only just beginning to describe.

We recognize that this was a modest and retrospective inquiry using regional rather than national data. Though all our data consistently trended in the same direction, we acknowledge that given the number of variables we evaluated that the risk for type I error in our results exists. We also only describe associations and are left to only speculate about their etiology and underpinnings. Any explanation of the association between community factors and facility outcomes is purely theoretical. Still, we feel we are touching on something meaningful here. That variation in inappropriate antipsychotic use can be so enormous begs further investigation. This immense disparity remains imperfectly understood and inadequately explained. The finding that the social factors of a community can impact dementia care in the long-stay facilities within that community is a new finding. Addressing these disparities may be a fresh and unexplored opportunity to improve dementia care in nursing homes.

We believe community factors influence nursing home care and outcomes and we believe a better understanding of this process will open doors to improve care and equality in care. Communities matter, even for institutionalized dementia patients. If the social determinants of health of a community impact the care and outcomes of that community’s nursing homes, then, in addition to being patient advocates and facility advocates, nursing home clinicians must also serve as community advocates. In order to accomplish best care in the facilities where they work, nursing home clinicians must become stakeholders in improving the health opportunities of that facility’s community. If certain “Late Adopter” facilities are disadvantaged in their drug reduction efforts due to community factors outside of their control, then perhaps such facilities will need additional support and resources to achieve success beyond simply the threat of penalty. Regardless, prioritizing improving the social determinants of health of communities may be a critical component to reducing the inappropriate use of risky drugs in vulnerable seniors, even institutionalized ones, and also improving all dementia care

Acknowledgments

Supported in part by Commonwealth of Virginia’s Alzheimer’s and Related Diseases Research Award Fund [Awards 15-2, 18-3, 20-6], Virginia Center on Aging, School of Allied Health Professions, Virginia Commonwealth University, and by the Biostatistics, Epidemiology and the Research Design (BERD) core of the C. Kenneth and Dianne Wright Center for Clinical and Translational Research (CTSA award No. UL1TR002649 from the National Center for Advancing Translational Sciences).

Funding

This work was supported by the Alzheimer’s and Related Diseases Research Award Fund [15-2, 18-3, 20-6] and by the National Center for Advancing Translational Sciences [UL1TR002649].

References

- Alexopoulos GS, Jeste DV, Chung H, Carpenter D, Ross R, & Docherty JP (2005). The expert consensus guideline series. Treatment of dementia and its behavioral disturbances. Introduction: Methods, commentary, and summary. *Postgrad Med, Spec No*, 6–22.
- Antipsychotic Medication Measure Methodology. (2018). Retrieved from https://www.cdph.ca.gov/Programs/CHCQ/LCP/CDPH%20Document%20Library/SNF_QASP_AntipsychoticMedicationMeasureMethodology_May%202017.pdf
- APCD. (2020). Retrieved from <http://www.vhi.org/apcd>.
- Briesacher BA, Tjia J, Field T, Peterson D, & Gurwitz JH (2013). Antipsychotic use among nursing home residents. *JAMA*, 309(5), 440–442. doi:10.1001/jama.2012.211266 [PubMed: 23385262]
- Busch SH, Cohen MS, & Konetzka RT (2019). Assessing the relative contribution of resident versus facility characteristics associated with antipsychotic medication receipt among nursing facility residents. *Medical Care*, 57(10), 822–829. doi:10.1097/MLR.0000000000001183 [PubMed: 31415339]
- Castle NG, Hanlon JT, & Handler SM (2009). Results of a longitudinal analysis of national data to examine relationships between organizational and market characteristics and changes in antipsychotic prescribing in US nursing homes from 1996 through 2006. *The American Journal of Geriatric Pharmacotherapy*, 7(3), 143–150. doi:10.1016/j.amjopharm.2009.05.001 [PubMed: 19616182]
- Chen Y, Briesacher BA, Field TS, Tjia J, Lau DT, & Gurwitz JH (2010). Unexplained variation across US nursing homes in antipsychotic prescribing rates. *Archives of Internal Medicine*, 170(1), 89–95. doi:10.1001/archinternmed.2009.469 [PubMed: 20065204]
- CMS Announces National Partnership. (2012). Retrieved from <https://www.cms.gov/Newsroom/MediaReleaseDatabase/Press-Releases/2012-Press-Releases-Items/2012-05-30.html>
- Enhanced Oversight and Enforcement of Non-Improving Late Adopters. (2019). Retrieved from <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertificationGenInfo/Downloads/QSO-19-07-Enhanced-Oversight-and-Enforcement-of-Non-Improving-Late-Adopters.pdf>
- Fashaw S, Chisholm L, Mor V, Meyers DJ, Liu X, Gammonley D, & Thomas K (2020). Inappropriate antipsychotic use: The impact of nursing home socioeconomic and racial composition. *Journal of the American Geriatrics Society*, 68(3), 630–636. doi:10.1111/jgs.16316 [PubMed: 31967325]
- Health Disparities Data. (2020). Retrieved from <https://www.healthypeople.gov/2020/data-search/Search-the-Data?topic-area=3499>
- Hughes CM, Lapane KL, & Mor V (2000). Influence of facility characteristics on use of antipsychotic medications in nursing homes. *Medical Care*, 38(12), 1164–1173. doi:10.1097/00005650-200012000-00003 [PubMed: 11186295]
- Interim report on the CMS National Partnership. (2016). Retrieved from <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertificationGenInfo/Downloads/Survey-and-Cert-Letter-16-28.pdf>
- Kerns JW, Winter JD, Winter KM, Boyd T, & Etz RS (2018). Primary care physician perspectives about antipsychotics and other medications for symptoms of dementia. *Journal of the American Board of Family Medicine: JABFM*, 31(1), 9–21. doi:10.3122/jabfm.2018.01.170230 [PubMed: 29330235]
- Kerns JW, Winter JD, Winter KM, Kerns CC, & Etz RS (2018). Caregiver perspectives about using antipsychotics and other medications for symptoms of dementia. *Gerontologist*, 58(2), e35–e45. doi:10.1093/geront/gnx042 [PubMed: 28402533]
- Lackner TE, Cloyd JC, Thomas LW, & Leppik IE (1998). Antiepileptic drug use in nursing home residents: Effect of age, gender, and comedication on patterns of use. *Epilepsia*, 39(10), 1083–1087. doi:10.1111/j.1528-1157.1998.tb01294.x [PubMed: 9776329]
- Late Adopter Data Report. (2021). Retrieved from <https://www.cms.gov/files/document/late-adopter-data-report-2021q2-updated-01142022.pdf>

- Mays VM, Cochran SD, & Barnes NW (2007). Race, race-based discrimination, and health outcomes among African Americans. *Annu Rev Psychol*, 58(1), 201–225. doi:10.1146/annurev.psych.57.102904.190212 [PubMed: 16953796]
- National Healthcare Quality and Disparities Report. (2018). Retrieved from <https://www.ahrq.gov/research/findings/nhqdr/nhqdr18/index.html>
- Provider Information. (2022). Retrieved from <https://data.cms.gov/provider-data/dataset/4pq5-n9py>
- Social Determinants of Health: CDC. (2022). Retrieved from <https://www.cdc.gov/socialdeterminants/index.htm>
- Stevenson DG, Decker SL, Dwyer LL, Huskamp HA, Grabowski DC, Metzger ED, & Mitchell SL (2010). Antipsychotic and benzodiazepine use among nursing home residents: Findings from the 2004 national nursing home survey. *The American Journal of Geriatric Psychiatry: Official Journal of the American Association for Geriatric Psychiatry*, 18(12), 1078–1092. doi:10.1097/JGP.0b013e3181d6c0c6 [PubMed: 20808119]
- Virginia HOI: Health Matters, Place Matters. (2022). Retrieved from <https://apps.vdh.virginia.gov/omhhe/hoi/>
- Winter JD, Kerns JW, & Sabo R (2022). The impact of social and community factors on inappropriate long-stay antipsychotic use in Virginia nursing homes. *Geropsych*.
- Winter JD, Kerns JW, Winter KM, Richards A, & Sabo RT (2021). Unreported antipsychotic use increasing in nursing homes: The impact of quality-measure exclusions on the percentage of long-stay residents who got an antipsychotic medication quality-measure. *The American Journal of Geriatric Psychiatry: Official Journal of the American Association for Geriatric Psychiatry*, 29(7), 704–708. doi:10.1016/j.jagp.2020.11.008 [PubMed: 33298360]
- Winter JD, Kerns JW, Winter KM, & Sabo RT (2019). Increased reporting of exclusionary diagnoses inflate apparent reductions in long-stay antipsychotic prescribing. *Clinical Gerontologist*, 42(3), 297–301. doi:10.1080/07317115.2017.1395378 [PubMed: 29206577]

Clinical implications

- The enormity of the difference in prescribing rates between the top- and bottom-quintiles for long-stay antipsychotic use hints at the ongoing opportunities to improve care.
- Communities matter even for institutionalized patients and nursing home outcomes may be impacted by community social determinants of health, factors not considered or addressed by existing facility improvement measures, with vulnerable populations being most at risk.
- If nursing home care and outcomes are impacted by community social factors, then nursing home clinicians become community stakeholders and must advocate for the health opportunities of the communities in which their facilities exist.

The Virginia Health Opportunity Index, its 4 community profiles, and 13 community indicators.

Table 1.

Health Opportunity Index (HOI): a hierarchical aggregate that provides insight into the opportunity of Virginians to live long and healthy lives based on social determinants of health. It is derived from dozens of social, economic, educational, demographic, and environmental community variables combined into 13 community indicators that are grouped into four community profiles.

- **Economic Opportunity Profile:** evaluates the capacity of community members to engage in the economy of their community.
 - **Employment Accessibility Indicator:** measures geographical access to paid work.
 - **Job Participation Indicator:** the fraction of adults active in the labor force.
 - **Income Inequality Indicator:** evaluates how wealth and earnings are distributed within a community.
- **Community Environment Profile:** measures a community's "natural, built, and social environment."
 - **Population Density Indicator:** approximates resident density levels as experienced by most inhabitants of a community.
 - **Walkability Indicator:** a measure of how walkable a community is taking into account public transit accessibility, residential and employment density, rationality of street design, and land use diversity.
 - **Air Quality Indicator:** Evaluates a communities risk from pollution and incorporates various EPA measures of pollution and risk for related disease.
 - **Population Churning Indicator:** measures population turnover by assessing the rate that people move into and out of a community.
- **Wellness Disparity Profile:** measures disparity in access to health-related services.
 - **Segregation Indicator:** assesses the racial and ethnic diversity of communities.
 - **Access to Care Indicator:** evaluates the availability of affordable primary care. It adjusts for the number of uninsured residents in a community and also the costs of care.
- **Consumer Opportunity Profile:** measures a community's access to consumer resources.
 - **Education Indicator:** the average years of schooling among community adults.
 - **Affordability Indicator:** The proportion of a community's income that is spent on transportation and housing. This also estimates disposable income left over.
 - **Food Accessibility Indicator:** the proportion of the community with a grocery store within one mile in urban communities or 10 miles in rural communities.
 - **Material Deprivation Indicator:** evaluates the private material resources available to community households. It includes measures for employment, vehicle and home ownership, and overcrowding.

Table 2.

Virginia nursing homes in the top and bottom quintiles for antipsychotic use compared.

Facility factors	Highest quintile of AP use (n = 56)	Lowest quintile of AP use (n = 55)	p-Value
Antipsychotic rate	25.30%	5.00%	<.0001
% Male	35.40%	33.40%	0.0058
% White	22.10%	28.60%	<.0001
% African American	16.10%	12.10%	<.0001
% Asian	0.90%	0.20%	<.0001
% Other	58.00%	54.80%	<.0001
% Unknown	3.10%	4.30%	<.0001
% Schizophrenia	3.10%	4.70%	<.0001
% All exclusionary diagnoses	3.10%	4.80%	<.0001
% Urban	34.00%	67.00%	<.0001
Ownership (% Private)	60.00%	80.00%	0.026
Number of Beds	104	114	0.3745
Facility size quintile	2.8	2.7	0.574
Community factors (for index rankings, lowest rank is best; for indicators, higher score is best)			
Aggregated Health Opportunity Index Ranking	61.3	38.1	0.0013
Economic Opportunity Profile Ranking	72.3	46.4	0.0006
Employment Accessibility Indicator	0.07	0.12	0.0059
Job Participation Indicator	0.61	0.64	0.0014
Income Inequality Indicator	0.43	0.45	0.0199
Community Environmental Profile Ranking	55.9	42.1	0.0524
Population Density Indicator	0.02	0.05	0.0013
Walkability Indicator	0.14	0.19	0.0013
Air Quality Indicator	0.74	0.8	0.0594
Population Churning Indicator	0.82	0.8	0.0919
Wellness Disparity Profile Ranking	60	53.2	0.2941
Segregation Indicator	0.73	0.74	0.6256
Access to Care Indicator	0.4	0.41	0.7886
Consumer Opportunity Profile Ranking	65	60.3	0.551

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Facility factors	Highest quintile of AP use (n = 56)	Lowest quintile of AP use (n = 55)	p-Value
Education Indicator (Years of Schooling)	0.71	0.73	0.0095
Affordability Indicator	0.5	0.52	0.0404
Food Accessibility Indicator	0.07	0.07	0.2587
Material Deprivation Indicator	0.43	0.43	0.8902
Community ethnicity			
% White	64.10%	60.20%	0.0125
% African-American	25.60%	20.00%	0.0555
% Hispanic	5.80%	11.00%	0.004
% Asian	4.40%	8.20%	0.0354
% Other	0.50%	0.70%	0.0031