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Changes over Time in Racial/Ethnic Differences in Quality of Life for Nursing Home Residents: Patterns within and between Facilities

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Abstract

Objectives: To investigate trends in racial/ethnic differences in nursing home (NH) residents' quality of life (QoL) and assess these patterns within and between facilities.

Method: Data include resident-reported QoL surveys ($n = 60,093$), the Minimum Data Set, and facility-level characteristics ($n = 376$ facilities) for Minnesota. Hierarchical linear models were estimated to identify differences in QoL by resident race/ethnicity and facility racial/ethnic minority composition for 2011–2015.

Results: White residents in low-proportion racial/ethnic minority facilities reported higher QoL than both minority and white residents in high-proportion minority facilities. While the year-to-year differences were not statistically significant, the point estimates for white–minority disparity widened over time.

Discussion: Racial/ethnic differences in QoL are persistent and may be widening over time. The QoL disparity reported by minority residents and all residents in high-proportion minority facilities underscores the importance of examining NH structural characteristics and practices to ultimately achieve the goal of optimal, person-centered care in NHs.

Introduction

Nursing homes (NHs) are integral in the provision of long-term care for a growing population of older adults with complex health needs. The quality of services provided by NHs has been a consistent topic of concern for consumers, governmental agencies, and researchers. Major efforts at the federal and state levels have attempted to improve

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NH quality through initiatives such as public reporting of quality, pay-for-performance programs, and minimum nursing staff-level requirements (Bowblis, 2011; Unroe et al., 2018). The majority of these efforts have focused on improving quality of care (QoC), which refers to clinical care processes and outcomes (Cai et al., 2011; Castle & Ferguson, 2010; Hefele et al., 2017). Yet, quality of life (QoL) is a valuable aspect of NH quality and is different from QoC. QoL captures the person-reported aspects of resident well-being and experience of care in NHs and is an essential component in promoting person-centered care (Kane et al., 2003). Moreover, the Centers for Medicare and Medicaid Services (CMS) has increased focus on QoL by making regulatory changes which mandate person-centered care in NHs (42 C.F.R. § 483.24, 2016).

At the same time, as this increasing focus on QoL, another trend in the United States is the changing demographics and steady growth in the number of racially and ethnically diverse residents in NHs. Between 1999 and 2008, the number of older Hispanic, Asian, and black residents living in NHs grew by 54.9%, 54.1%, and 10.8%, respectively, while the number of white residents declined 10.2% (Feng et al., 2011). Complicating this growth are the findings that racial/ethnic minority residents (henceforth, “minority residents”) are more likely to be in NHs that are more reliant on Medicaid funding, have lower staffing levels, have more deficiencies in care, and that are more likely to be terminated from the Medicaid program (Mor et al., 2004; Smith et al., 2008). These are all factors associated with relatively worse QoC, and this combination of individual and facility characteristics has led to concerns that this growth in racial/ethnic minority NH residents could intensify already existing racial/ethnic disparities in NH QoC and QoL (Sharma et al., 2019).

Despite the shift in racial/ethnic minority compositions in NHs, there is a scarcity of studies examining the role of race and ethnicity for NH quality. The few existing studies on disparities in NH quality have focused on QoC (Castle & Ferguson, 2010), examining clinical and care process outcomes, and found that minority residents tend to have lower QoC than their non-Hispanic white counterparts (Hefele et al., 2017). Research on QoL is even more limited. For example a study examining facility-level disparities found that there is a positive association between NH deficiencies for QoL domains and minority resident composition (Campbell et al., 2016; Shippee et al., 2016). Another study using resident-reported QoL data found that while minority residents consistently reported lower QoL compared to their white counterparts, NHs with a high proportion of minority residents were more likely to report lower QoL even after controlling for case mix and facility structural and organizational characteristics (Shippee et al., 2016). Although almost all this work uses cross-sectional data, the findings highlight the need to examine the interaction of individual and contextual factors in shaping the racial/ethnic differences in QoL over time.

To further advance our understanding and insight into possible mechanisms for disparities in QoL in NHs, this study uses multiple years of data (2011–2015) to build a longitudinal dataset to examine racial/ethnic differences in QoL over time using a validated measure of resident-reported QoL. In doing so, we are able to document whether QoL trends worsen, increase, or remain persistent for residents of diverse racial/ethnic backgrounds. We also further advance the work on racial/ethnic disparities in QoL by measuring change in QoL over time within facilities via each resident’s racial/ethnic status versus between facilities

via a measure for an NH's racial/ethnic composition and testing the role of the interaction of the two.

Structural Resources, Social Context, and Stages of Addressing Health Disparities

This study draws on the cumulative inequality (CI) theory (Ferraro & Shippee, 2009) and social ecological theory (Stokols, 1992) to better understand the role of race/ethnicity for QoL at both individual and structural levels. The CI theory posits that inequality is structurally generated, and these stratified structures lead to diverse trajectories over the life course. Building on this concept (Ferraro & Shippee, 2009), we hypothesize that racial/ethnic disparities in NH QoL may result from disparate accumulated risks and available resources between older adults of different racial/ethnic groups. The accumulated risks of minority older adults are reflected by lower socioeconomic status and poorer health status which further impact the accessibility of long-term care, their choices of long-term care options, and a variety of health outcomes. Empirical evidence shows that, indeed, individual differences in physical and cognitive function help explain some of the disparity in QoL among NH residents (Shippee et al., 2016). The CI theory further explains that disadvantage increases exposure to risk, but advantage leads to opportunity. Resources such as higher level of education and higher income can provide for different choices of NHs to white residents, while minority residents are exposed to more health risks in selecting less desirable facilities (Ferraro & Shippee, 2009).

The social ecological theory explains how contextual factors, such as cultural, organizational, physical, environmental, and community factors, may influence individual well-being (McLaren & Hawe, 2005; Stokols, 1992; Taplin et al., 2012). Empirical research has indicated contextual factors, such as activity staff level, minority composition, and number of private rooms, are associated with QoL scores (Shippee et al., 2016). However, no study has investigated the interaction between individual and context factors and its influence on disparities in QoL for NH residents. The social ecological theory is useful here because it not only pinpoints the importance of context factors in individual's well-being but also delineates interrelations between individuals and their environment (particularly the psychosocial or cultural aspect of the environment) in shaping their well-being (McLaren & Hawe, 2005; Stokols, 1992). In this regard, we hypothesized that while resident's individual minority racial/ethnic identity and percent racial/ethnic minority composition are independently associated with lower QoL, the interaction of these two factors will have a significant association with QoL on its own (e.g. minority residents in high-proportion minority NHs vs. lower proportion minority NHs). This hypothesis is based on research which shows that there may be a benefit for residents to live in an NH with others of similar cultural background due to shared cultural preferences and values (Petrov & Arnold, 2000; Runci, Redman, et al. 2005). In addition, the social ecological view also pertains to the influence of broader contextual factors such as political or societal environment on well-being (Stokols, 1992). This perspective necessitates an examination of changes in the disparities over time as NHs face constantly changing regulatory and payment environments.

Therefore, we expected that residents' QoL and racial/ethnic differences in QoL would not be static over time.

Our analytic approach is informed by Kilbourne's framework for addressing healthcare disparities: (a) detecting, (b) understanding, and (c) reducing health disparities (Kilbourne et al., 2006). Progress through these three steps can help identify the interventions most likely to be useful for a particular issue. Thus, the first step is to identify how the prevalence of good QoL varies by race/ethnicity. Healthcare organizations, including NHs, must first detect disparities by *systematically and accurately* identifying the prevalence of racial/ethnic differences to be able to reduce them in the future. To that end, we aim to identify and detect racial/ethnic differences in QoL over time. Second, to understand disparities, it is vital to identify key resident (e.g. mental health status), facility (e.g. payment source), and system-level factors (e.g. racial bias) that affect NH care for minority residents. The long-term goal is to use these findings to influence care delivery for minority NH residents, with special attention to racial/ethnic differences, by providing the evidence necessary to develop a system-level intervention.

Methods

Data

This study combines four data sources from the state of Minnesota from 2011 through 2015: Minnesota Nursing Facility Quality of Life Survey, Minimum Data Set (MDS), Certification and Survey Provider Enhanced Reports (CASPER), and Minnesota Medicaid Cost Reports. Minnesota is one of only two states that routinely collects validated measures of QoL for NH residents and the only one that is currently linkable to the MDS. No other state has the available data to answer the questions of interest of this study.

QoL data on NH residents are obtained from the Minnesota Nursing Facility Quality of Life Survey. The annual survey consists of in-person interviews by an independent survey firm that randomly selects residents from every NH in the state. Therefore, the vast majority of sampled residents are different from year to year. The typical NH has 35 respondents, with a survey rate of about 85% (Vital Research, 2011). MDS is a required assessment of all NH residents upon admission, discharge, and various intervals in between. It contains each resident's demographic, functional status, and medical conditions. To obtain facility-level characteristics, we used CASPER data, which are CMS-mandated inspections of NHs that are conducted by state inspectors on a regulator basis, and the Minnesota Medicaid Cost Reports which are annual reports submitted to the state contain numerous financial and NH characteristics.

In constructing our analytic sample that has a unit of analysis of a resident QoL survey, we linked the QoL survey to each NH respondent's closest assessment in the MDS. We then merged in the CASPER and Medicaid Cost Report data corresponding to the year of the QoL survey. The final sample size for the regressions with no additional covariates includes 60,093 surveys from 376 NHs. When controls are included, the most restricted sample has 59,035 surveys from 375 NHs. By year, the number of surveys included in the most comprehensive regression ranges from 10,834 in 2015 to 12,466 in 2011.

Quality of Life Measures

In the Minnesota QoL survey, residents are asked a series of questions that map into six QoL domains: environmental adaptations, attention (from staff), food enjoyment, engagement (meaningful relationships and activities), positive mood, and lack of negative mood (Shippee et al., 2015). To calculate a QoL summary score, we first calculated domain scores by taking the mean of all questions answered in the domain. We then defined the QoL summary score as the unweighted average of each domain score. To make the summary score easier to interpret, it is standardized to percentage points (i.e. 0–100), with higher values indicating a respondent reported having higher QoL. The Minnesota QoL survey and its domains have demonstrated strong psychometric properties in prior research (Kane et al., 2004; Shippee et al., 2015).

Race/Ethnicity and High-Proportion Minority Facilities

To understand how a resident's race/ethnicity and the facility minority composition impact QoL, we construct two sets of key variables: race/ethnicity of the respondent and the racial/ethnic minority composition of the facility the respondent lives in. The race/ethnicity of the respondent is an indicator variable for self-reported race/ethnicity and whether a resident is a member of a racial/ethnic minority group (aggregated due to small sample size). MDS reports whether a resident is white, Black, Hispanic, Native American, Asian American, other, or missing. Given the small number of minority NH residents in Minnesota, we created an indicator variable that aggregates residents into non-Hispanic white and minority, excluding residents with missing data on race/ethnicity. In sensitivity analyses, we examined differences by individual racial/ethnic group, and the directions of association were all unchanged for those in the minority group versus white respondents.

We used 100% of the MDS data from Minnesota each year to calculate the annual racial/ethnic minority composition of each NH, as measured by the proportion of minority residents. An indicator variable was constructed for whether the facility was a relatively high-proportion or low-proportion racial/ethnic minority facility (henceforth referred to as “high-minority” and “low-minority” facilities). Since the threshold for what is considered a relatively high-minority composition varies across states, we defined a facility as high minority if it was above the 90th percentile in the state of Minnesota for proportion of minority residents within the NH. For Minnesota, the 90th percentile facility had a minority composition of over 14% of nonwhite residents. Using this definition, high-minority facilities had an average of 25.8% minority residents, and low-minority facilities comprised 1.59% of minority residents on average in 2011. We conducted a number of sensitivity analyses to test for different thresholds to define high-minority facilities, in addition to treating the percent of minority residents as a continuous variable with linear and quadratic terms. None of these sensitivity analyses substantively changed our findings.

Control Variables

We identify a number of resident- and facility-level characteristics that are associated with QoL. Resident-level characteristics are from the MDS and include age, gender, length of stay, activities of daily living score (ADL, range 0–28), and a count of chronic conditions (i.e. congestive heart failure, diabetes, hip fracture, paralysis, pressure ulcers, and

stroke). We separately created flags for severe mental illness (SMI, defined as a diagnosis of bipolar disorder, schizophrenia, or other psychotic disorders), behavioral symptoms, dementia diagnosis, and moderate or severe impairment to cognitive performance. Cognitive performance was obtained from the MDS Brief Interview for Mental Status if the resident can respond or the Cognitive Performance Scale if they cannot (Thomas et al., 2017).

Facility characteristics are obtained from CASPER or Medicaid Cost Reports and include geographic location (i.e. Twin Cities metropolitan area, other metropolitan area, micropolitan area, or rural), ownership (i.e. nonprofit, for profit, or government), affiliation with a chain, number of beds, occupancy rate, facility-level acuity (Minnesota Department of Health, 2015), and payer mix. We also included a number of staffing variables. Staffing levels, in hours per resident day, are calculated for registered nurses, licensed practical nurses, certified nursing assistants, activities staff, social workers, and mental health workers. We also included the retention rate for all NH staff and an indicator variable for whether the NHs had a high use of temporary staff from employment agencies. The cutoff used for the high use of temporary staff was the 99th percentile (or 11.1% of all staff hours) for the entire sample.

Analytical Approach

To examine whether there were racial/ethnic disparities in QoL over time, we compare summary statistics for non-Hispanic white (henceforth referred to as “white”) and minority residents. Next, we implement a set of linear mixed-effects models where the dependent variable was the QoL summary score for each respondent. To capture the disparity, we divided NH residents into four groups based on their race/ethnicity and facility minority composition: (1) white, low-minority facility, (2) white, high-minority facility, (3) minority, low-minority facility, and (4) minority, high-minority facility. For all our analyses, we use the first group, white residents in low-minority facilities, as a reference group. To account for variation in time, we also include indicator variable for each year and interact these year indicators with the four groups. By doing this, we are able to identify the average QoL score for respondents in each group in each year.

We consider three specifications for our linear mixed-effects regression models. The first model does not include any additional control variables to calculate unadjusted QoL scores. The second model includes resident-level controls to determine whether the measured disparities are different after accounting for differences in resident characteristics. Finally, a model that includes both resident- and facility-level controls. All regression models are estimated using Stata 13/MP (StataCorp, 2013) and also include a normally distributed random intercept for each facility to account for between-facility heterogeneity and standard errors account for heteroscedasticity. We also fitted GEE models with independence correlation structure, and it did not qualitatively change the results (not shown).

Results

Descriptive Statistics

Table 1 reports descriptive statistics and tests that compare white and minority respondents in 2011 and 2015. QoL summary scores for white respondents were stable at about 80 points but declined for minority respondents from 75.9 points in 2011 to 73.7 points in 2015. More importantly, minority respondents reported lower average QoL in both years. Nearly 9% of white respondents were in high-minority facilities. In comparison, 64.0% of minority respondents were in high-minority facilities in 2011 compared to 57.9% in 2015.

While there were some changes in resident- and facility-level characteristics from 2011 to 2015, the general pattern between white and minority respondents was consistent over time. Minority respondents were on average younger, had shorter lengths of stays, and had more chronic conditions. Minority respondents were also less likely to have age-associated cognitive decline (e.g. dementia) and mental health condition (depression) but were more likely to have serious mental illness and behavioral symptoms. In terms of facility characteristics, minority respondents were more likely to be in larger for-profit NHs in the Twin Cities metropolitan area.

Regression Results

The linear mixed-effects regression results adjusting for varying levels of control variables are reported in Table 2. Most resident-level controls were found to significantly predict QoL. The direction of the effects and statistical significance of resident-level controls was generally similar whether or not facility-level controls were included. Respondents who were older, had longer lengths of stay, and had better physical functional status reported higher QoL. Respondents in smaller, nonprofit facilities located in rural areas reported higher QoL. Interestingly, higher nursing staff level had no statistically significant effect on QoL, but NHs with more activities staff, social service/mental health staff, and those with higher staff retention rates reported higher QoL scores.

Given the complexity of interpreting the interaction terms, reporting the disparity across the four groups and across time is difficult. Therefore, Table 3 reports the size of the disparity in each year relative to white respondents in low-minority facilities. Relative to this group, minority respondents in high-minority facilities had unadjusted QoL scores that were 4.1–5.6 points lower, minority respondents in low-minority facilities had unadjusted QoL scores that were 2.6–4.6 points lower, and minority respondents in high-minority facilities had the largest disparity (5.1–7.0 points). Adjusting for individual covariates did not appreciably reduce the disparity, but including facility characteristics results in narrowing of the disparity. For white respondents in high-minority facilities, the size of the disparity ranged from 2.3 to 3.7 points relative to white residents in low-minority facilities when resident- and facility-level controls were included in the model. This is a reduction of 32–44%. Minorities also experienced narrowing of reported disparities, but the declines were smaller in magnitude. For example the disparity for minority respondents in low-minority facilities declined by 16–28%, and minority respondents in high-minority facilities declined by 19–27%.

To visualize these disparities over time, Figure 1 shows the predicted mean QoL score holding all covariates at the overall sample mean for each race/ethnicity, facility minority composition, and year. Overall, the QoL did not significantly change for white residents in low-minority facilities over time. Regardless of which additional covariates are included in the model, mean QoL scores are declining over time for minority respondents, regardless if they are in a low- or high-minority facility. This finding is an indication that the disparity is increasing over time. However, almost all the interaction terms with year are not statistically significant in Table 2.

Discussion

As the United States has become more ethnically and racially diverse, so have America's NHs. This makes understanding and monitoring of racial and ethnic disparities in the NH setting all the more important. While existing work has established the existence of racial/ethnic disparities (Campbell et al., 2016; Shippee et al. 2016), many of these studies have been cross-sectional and rely on only one year of data. This is the first article to use a multisource longitudinal dataset that provides us with the ability to examine the trends in racial/ethnic disparities in QoL over time.

We find facility characteristics are importantly related to white and minority NH residents' QoL. White residents tend to be more traditional NH residents—older, with dementia, and greater needs in terms of ADLs. In contrast, minority residents tend to be younger, have SMI, and have fewer ADL deficits. This is changing, as minority residents had significant increases in the ADL acuity levels over the study period. Minority residents are more likely to live in for-profit NHs that have fewer activities staff, use more temporary staff, and are located in the most urban areas of the state. All of these are consistent with minority residents being more likely to reside in NHs that have characteristics known to be associated with lower QoC and QoL (Mor et al., 2004). Examination of trends over time showed that the frequency of these factors is increasing. For example NHs that made frequent use of temporary staff, which create the potential for the lack of consistent care—a factor known to be associated with lower quality (Bowblis, 2011)—were classified as having a high proportion of minority residents 15.4% of the time, versus 9.9% of facilities which did not have high temporary staff use.

We found that the unadjusted QoL scores indicate the existence of a disparity between white and minority residents. For the average white NH resident, QoL score was stable between 2011–2015, with a mean score of just over 80 (out of possible 100). Over this same period, minority residents saw a decline in QoL from 75.9 to 73.7. These results clearly indicate the existence of a disparity in 2011, but more importantly, that the disparity was larger by 2015. Moreover, some non-US research has suggested that there may be a benefit for residents to live in an NH with others of similar cultural background (Petrov & Arnold, 2000; Runci, O'Connor, et al., 2005). If this applied to our setting, we would expect that minority residents in facilities with a greater composition of racial/ethnic minorities to have relatively higher QoL scores than minorities in NHs with a low proportion of minority residents. We find that this is not the case for racial/ethnic minority NH residents in our

study and in fact, facilities with a high proportion of minority residents have a negative association with QoL for both minority and white residents.

This difference in findings is likely due to racial segregation of long-term care in the United States, one of the most racially segregated sectors of health care (Rahman & Foster, 2014). System-level disparities in where care can be received and what services are available have resulted in worse outcomes for older adults from minority communities and indigenous people (Mack et al., 2020; Smith et al., 2008) that are not attenuated by greater racial/ethnic diversity of residents in the facility. Moreover, the United States has great diversity within and across minority communities, in terms of cultural, religious preferences, and other factors. Thus, it would be more meaningful to examine not only overall racial/ethnic diversity at the facility but specific presence of those from one's cultural group. The NHs themselves contribute to this picture, as racial and ethnic minorities reside in facilities with characteristics associated with poorer QoL (e.g. activities staffing, larger size, and for-profit status).

Our study was informed by the CI theory (Ferraro et al., 2009) and social ecological theory (Stokols, 1992) to better understand the interaction between individual and context factors for racial disparities in NH residents' QoL. Our findings show that individual's minority race/ethnicity placed them at a systemic disadvantage for receiving higher quality of life in NHs and facility characteristics, such as the use of temporary staff and reliance on Medicaid reflected these disparities. Our finding that racial/ethnic disparity has increased over time speaks to the need of applying Kilbourne's stages of addressing health disparities to this work. The first stage is to identify how the prevalence of good QoL varies by race/ethnicity and trends over time. Indeed, *accurately* identifying the prevalence of racial/ethnic differences is the first step necessary to identify the need for system-level response. Second, we aimed to understand the role of individual and facility factors in these disparities, by examining key resident and facility factors that affect NH care for minority residents. We hope that the findings from this work can lay the foundation for the third stage to ultimately impact policy in Minnesota but also in other states to improve outcomes for minority NH residents.

Indeed, as per Kilbourne's stages, we should not stop at the first two steps because we need to ultimately progress to stage three, which includes a policy response if these disparities are to be reversed. Efforts such as public reporting of quality (Konetzka & Werner, 2009) will help families and policy makers alike recognize under-resourced facilities that may not be able to provide high-quality care. States will also have to consider whether Medicaid payment levels are sufficient to meet the varied needs of contemporary NH residents. Minnesota's Eliminating Health Disparities Initiative is an example of a state effort to address racial/ethnic disparities in NH quality. The program provides grants to programs designed to improve outcomes for populations of color and American Indians. While appealing, thus far, these efforts, in which QoL is not a priority area, do not seem to have been effective in addressing disparities in NH residents' QoL. Finally, both states and the federal government have a role in setting Medicaid policies and broader regulations. Thus, policies focusing on increasing NH quality should focus on addressing the needs of racial/ethnic minority residents.

Our study has many strengths, and the most notable one is the use of a validated, resident-reported measure of QoL that can be linked with MDS to study the racial/ethnic disparities within and between NHs. However, there are some weaknesses we must also acknowledge. We do not know how residents chose their NH residences, or how much information residents have regarding the QoL in the NHs prior to admission, or whether there are other factors that are of sufficient importance to the resident to offset QoL or QoC concerns. While proximity and quality are important factors in NH choice, recent work has found that minority residents are willing to seek care at a facility with residents that better reflect their respective community, even if closer NHs have better clinical quality (Rahman & Foster, 2014).

Finally, the racial and ethnic composition of Minnesota does not allow us to have enough power to study specific racial and ethnic groups, and therefore, associations observed in Minnesota may not apply to other states with different demographic compositions. Yet, it is also likely that findings about racial/ethnic disparities are transferable to other states because Minnesota has a more generous nursing home payment policy (Medicaid equalization rate). In spite of these limitations, we feel the strengths of our study outweigh any limitations.

In conclusion, our study identified racial and ethnic disparities in NH residents' QoL and that the gap has been increasing over time. While this trend is occurring in all NHs, our study highlights the particular role of NHs serving a high proportion of minority residents, as residents in these facilities report worse QoL among all ethnic and racial groups, including white residents. The government has many policy tools available to help reduce disparities, such as overall payment rates and quality improvement bonus payments, mandated staffing level, public quality reporting, and educating consumers. Yet, as a society, if we want to address these issues, we need to tailor policies to the specific needs of minority communities. This study has documented the issue and potential target—NHs with a high proportion of minority resident—but not all these facilities are the same. Given the diversity of minority population, eliminating disparities in NHs is unlikely to come from a one-size-fits-all policy. New policies and resources are needed in order to achieve equitable QoL in long-term care that are culturally sensitive and are based on the needs and input of the communities that these policies are meant to help.

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Appendix A

Table A1.

Summary Statistics by Race/Ethnicity.

	White	Black/African American	American Indian/Alaska Native	All Others	<i>p</i> -Value for Difference
Key variables					

	White	Black/African American	American Indian/Alaska Native	All Others	p-Value for Difference
Quality of life summary score	80.015	72.935	74.435	75.155	<.001
High-minority facility	8.723%	64.337%	50.820%	46.452%	<.001
Resident-level characteristics					
Age (years)	83.118	68.624	69.115	72.561	<.001
Activities of daily living score long-form scale (0–28)	14.670	13.039	11.770	11.226	<.001
Length of stay (years)	2.623	2.897	3.338	3.790	<.001
Married	21.195%	8.437%	8.696%	22.143%	<.001
Count of chronic conditions (0–5)	.699	.795	.926	.865	<.001
Depression diagnosis	50.399%	43.243%	52.542%	49.342%	.040
Anxiety diagnosis	25.031%	14.699%	22.951%	24.516%	<.001
Moderate or severe cognitive impairment	29.460%	30.602%	30.328%	27.742%	.91
Dementia diagnosis	46.694%	41.523%	37.288%	34.868%	.001
Serious mental illness diagnosis	13.288%	28.434%	21.311%	29.677%	<.001
Behavioral symptoms	15.619%	21.446%	27.049%	22.727%	<.001
Facility-level characteristics					
Location					
Twin Cities	37.733%	96.145%	30.328%	76.774%	<.001
Other metro	18.824%	1.687%	9.016%	5.806%	
Micropolitan	20.191%	2.169%	36.885%	8.387%	
Rural	23.252%	.000%	23.770%	9.032%	
Ownership					
Nonprofit	63.577%	40.241%	28.689%	42.581%	<.001
For profit	28.752%	57.590%	40.984%	54.839%	
Government	7.671%	2.169%	30.328%	2.581%	
Chain affiliation	54.012%	58.554%	40.984%	49.677%	.005
Minnesota acuity index	1.015	.996	.960	.948	<.001
Number of beds	88.923	138.761	83.451	113.755	<.001
Occupancy	88.228%	88.417%	82.020%	89.830%	<.001
Medicare resident days	9.027%	7.667%	6.384%	7.504%	<.001
Medicaid resident days	54.056%	65.642%	71.318%	61.490%	<.001
Staffing levels (hours per resident day)					
Registered nurse	.541	.652	.463	.582	<.001
Licensed practical nurse	.692	.694	.756	.640	<.001
Certified nursing assistant	2.168	1.884	1.952	1.706	<.001
Activities	.253	.180	.293	.200	<.001
Social service and mental health staff	.124	.202	.130	.209	<.001

	White	Black/African American	American Indian/Alaska Native	All Others	p-Value for Difference
All staff retention rate	67.443%	67.480%	58.267%	67.423%	<.001
High use of temporary staff	2.162%	.000%	24.590%	3.226%	<.001
N	10,455	415	122	155	

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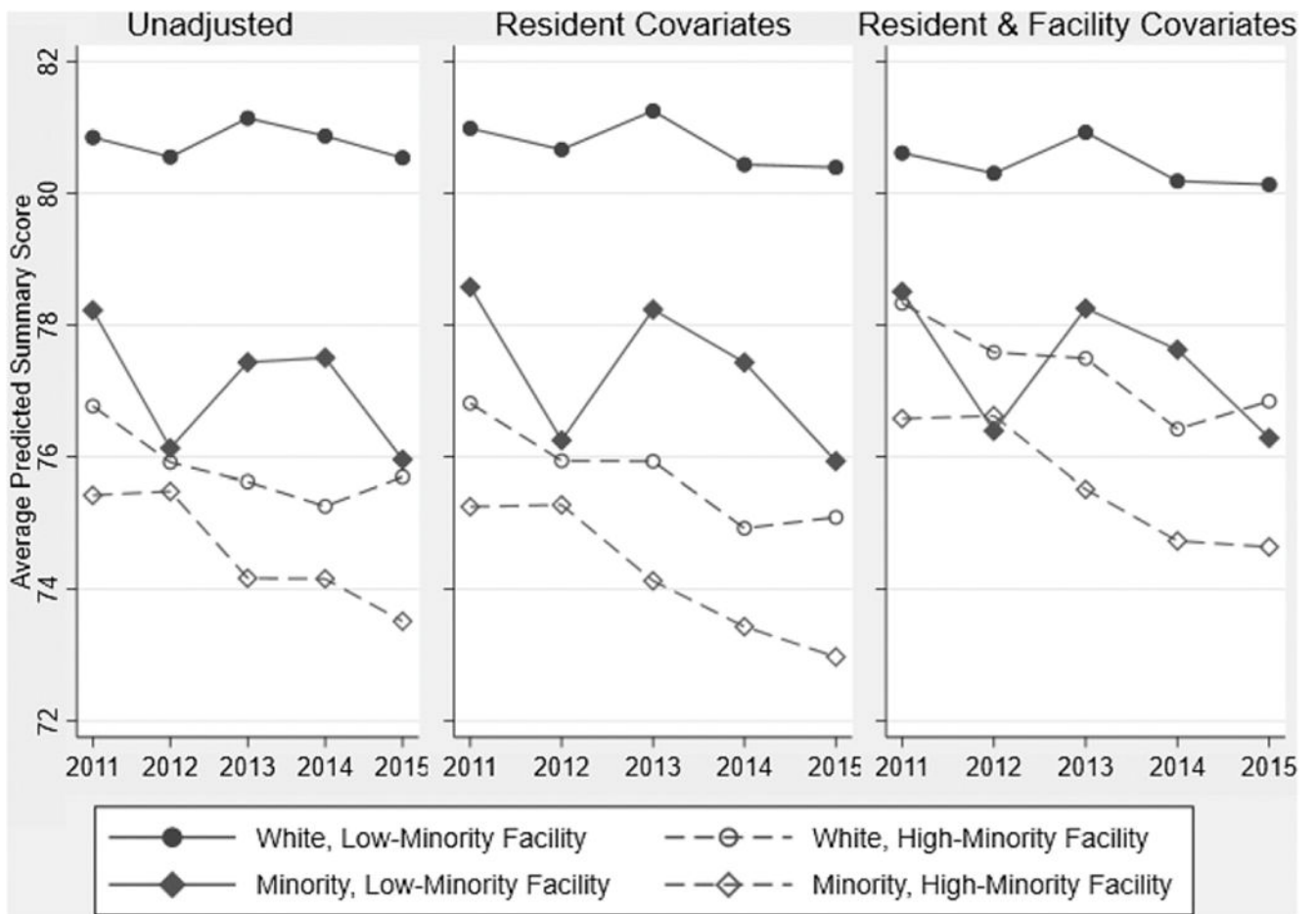


Figure 1. Predicted mean summary scores by race, facility minority composition, and year.
Note. The figure reports predicted mean quality of life scores which hold all covariates except race, facility composition, and year at the overall sample mean and random effects at zero using the regression as reported in Table 2.

Table 1.

Sample by Race/Ethnicity for 2011 and 2015.

Key variables	2011		2015	
	White Resident	Minority Resident	White Resident	Minority Resident
Quality of life summary score	80.324	75.893	80.015	73.691
High-minority facility (%)	9.047	63.975	8.723	57.948
Resident-level characteristics				
Age (years)	82.898	67.615	83.118	69.592
Activities of daily living score long-form scale (0–28)	14.251	10.996	14.670	12.409
Length of stay (years)	1.741	2.199	2.623	3.175
Married	22.305%	12.422%	21.195%	11.398%
Count of chronic conditions (0–5)	.799	.983	.699	.834
Depression diagnosis (%)	52.760	48.240	50.399	46.233
Anxiety diagnosis (%)	23.508	17.805	25.031	18.353
Moderate or severe cognitive impairment (%)	31.835	28.986	29.460	29.913
Dementia diagnosis (%)	43.957	38.095	46.694	39.291
Serious mental illness diagnosis (%)	14.292	24.224	13.288	27.457
Behavioral symptoms (%)	21.099	32.505	15.619	22.721
Facility-level characteristics				
Location				
Twin Cities (%)	37.894	74.741	37.733	80.202
Other metro (%)	18.585	5.797	18.824	3.902
Metropolitan (%)	21.199	12.008	20.191	9.682
Rural (%)	22.322	7.453	23.252	6.214
Ownership				
Nonprofit (%)	64.786	49.275	63.577	38.728
For profit (%)	26.309	47.412	28.752	54.046
Government (%)	8.906	3.313	7.671	7.225
Chain affiliation (%)	54.856	50.932	54.012	53.468
Minnesota acuity index	1.046	1.010	1.015	.979

	2011		2015	
	White Resident	Minority Resident	White Resident	Minority Resident
Number of beds	92,266	104,959	88,923	123,409
Occupancy (%)	90,040	88,805	88,228	87,604
Medicare resident days (%)	8,977	6,749	9,027	7,404
Medicaid resident days (%)	56,701	70,922	54,056	65,756
Staffing levels (hours per resident day)				
Registered nurse	.488	.561	.541	.603
Licensed practical nurse	.722	.725	.692	.693
Certified nursing assistant	2.204	1.859	2.168	1.856
Activities	.242	.211	.253	.204
Social service and mental health staff	.118	.143	.124	.191
All staff retention rate (%)	72.179	74.511	67.443	66.018
High use of temporary staff (%)	.499	.207	2.162	5.058
<i>N</i>	12,015	483	10,455	692

The table reports the means for key variables, resident-level characteristics, and facility-level characteristics for 2011 and 2015 for white and racial/ethnic minority residents.

Table 2. Racial/Ethnic Disparities in Quality of Life Summary Scores: Hierarchical Linear Model Results.

	Unadjusted		Resident Covariates		Resident and Facility Covariates	
	b	se	b	se	b	se
Key explanatory variables						
Group (reference = white, low-minority facility)						
White, high-minority facility	-4.077***	1.013	-4.172***	.85	-2.282**	.779
Minority, low-minority facility	-2.624*	1.323	-2.409	1.323	-2.105	1.300
Minority, high-minority facility	-5.420***	1.294	-5.732***	1.303	-4.033**	1.298
Year (reference = 2011)						
2012	-.296	.204	-.322	.199	-.308	.204
2013	.293	.226	.266	.223	.314	.225
2014	.022	.246	-.549*	.247	-.426	.244
2015	-.311	.257	-.593*	.251	-.480	.252
Group-year interactions						
White, high-minority facility # 2012	-.558	.760	-.552	.732	-.435	.745
White, high-minority facility # 2013	-1.436	.765	-1.147	.668	-1.150	.663
White, high-minority facility # 2014	-1.534	.877	-1.338	.856	-1.481	.855
White, high-minority facility # 2015	-.758	.963	-1.129	.905	-1.006	.849
Minority, low-minority facility # 2012	-1.795	1.977	-2.004	1.901	-1.804	1.886
Minority, low-minority facility # 2013	-1.081	1.944	-.606	1.911	-.568	1.885
Minority, low-minority facility # 2014	-.741	1.718	-.596	1.757	-.455	1.732
Minority, low-minority facility # 2015	-1.954	1.654	-2.050	1.667	-1.741	1.640
Minority, high-minority facility # 2012	.353	1.466	.350	1.460	.353	1.449
Minority, high-minority facility # 2013	-1.553	1.383	-1.390	1.377	-1.376	1.420
Minority, high-minority facility # 2014	-1.292	1.500	-1.270	1.444	-1.418	1.448
Minority, high-minority facility # 2015	-1.602	1.421	-1.686	1.471	-1.455	1.390
Resident-level characteristics						
Age (years)			.057***	.010	.047***	.010
Activities of daily living score long-form scale (0–28)			-.415***	.013	-.404***	.012

	Unadjusted		Resident Covariates		Resident and Facility Covariates	
	b	se	b	se	b	se
Length of stay (years)			.309***	.034	.299***	.034
Married			.173	.192	.111	.191
Count of chronic conditions (0–5)			-.540***	.100	.527***	.099
Depression diagnosis			-2.479***	.162	-2.470***	.161
Anxiety diagnosis			-1.699***	.193	-1.710***	.194
Moderate or severe cognitive impairment			1.840***	.198	1.790***	.197
Dementia diagnosis			1.370***	.178	1.504***	.179
Serious mental illness diagnosis			-1.355***	.286	-1.210***	.286
Behavioral symptoms			-2.675***	.227	-2.748***	.222
Facility-level characteristics						
Location (reference = Twin Cities)						
Other metro					1.349***	.372
Metropolitan					1.585***	.381
Rural					2.514***	.377
Ownership (reference = nonprofit)						
For profit					-1.359***	.361
Government					.412	.433
Chain affiliation					-.127	.273
Minnesota acuity index					-1.676	1.542
Number of beds, each 10					-1.130***	.029
Occupancy, each 10 percentage points					.575***	.153
Proportion of Medicare resident days, each 10 percentage points					.162	.279
Proportion of Medicaid resident days, each 10 percentage points					-2.00	.131
Staffing levels (hours per resident day)						
Registered nurse					.151	.474
Licensed practical nurse					.518	.641
Certified nursing assistant					-.159	.336
Activities					4.040**	1.289

	Unadjusted		Resident Covariates		Resident and Facility Covariates	
	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>
Social service and mental health staff					3.622 *	1.806
High use of temporary staff					1.568 *	.631
All staff retention rate, each 10 percentage points					.389 ***	.099
Random intercept variance	10.381		8.365		5.033	
Residual variance	231.829		219.203		219.203	
Intraclass correlation	.043		.037		.022	
Number of surveys	60,903		59,103		59,035	
Number of NFs	376		376		375	

The table reports the coefficient estimates and standard errors from nested random intercept regression models where the dependent variable is a quality of life summary score. The key variables are indicators for whether the resident is a minority interacted with whether they reside in a high-minority facility. We also fitted GEE models with independence correlation structure, and it did not qualitatively change the results (not shown).

*** $p < .01$,

** $p < .05$,

* $p < .10$.

Table 3.
Disparity in Quality of Life Relative to a White Resident in a Low-Minority Facility.

	Unadjusted	Resident Covariates	Resident and Facility Covariates
White resident in high-minority facility			
2011	-4.077 ***	-4.172 ***	-2.282 ***
2012	-4.635 ***	-4.724 ***	-2.717 ***
2013	-5.513 ***	-5.319 ***	-3.432 ***
2014	-5.611 ***	-5.509 ***	-3.764 ***
2015	-4.835 ***	-5.300 ***	-3.288 ***
Minority resident in low-minority facility			
2011	-2.624 *	-2.409 *	-2.105
2012	-4.419 ***	-4.414 ***	-3.908 ***
2013	-3.705 ***	-3.016 **	-2.673 *
2014	-3.366 **	-3.005 **	-2.559 *
2015	-4.578 ***	-4.459 ***	-3.846 ***
Minority resident in high-minority facility			
2011	-5.420 ***	-5.732 ***	-4.033 ***
2012	-5.066 ***	-5.382 ***	-3.680 ***
2013	-6.973 ***	-7.122 ***	-5.410 ***
2014	-6.711 ***	-7.003 ***	-5.451 ***
2015	7.022 ***	-7.418 ***	-5.488 ***

The table reports the disparity by year for each group listed relative to white residents in a low-minority facility. The disparity and corresponding standard errors for statistical tests were calculated using the regression results from Table 2. Each column reports the disparity with varying number of controls, starting from no additional controls, resident-level controls, and the fully controlled model which includes resident- and facility-level controls.

*** $p < .01$,

** $p < .05$,

* $p < .10$.