Decomposing Racial and Ethnic Disparities in Nursing Home Quality of Life

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Abstract

This study examines the racial/ethnic disparity among nursing home (NH) residents using a self-reported, validated measure of quality of life (QoL) among long-stay residents in Minnesota. Oaxaca-Blinder decomposition techniques determine which resident and facility factors are the potential sources of the racial/ethnic disparities in QoL. Black, Indigenous and other People of Color (BIPOC) report lower QoL than white residents. Facility structural characteristics and being a NH with a high proportion of residents who are BIPOC, are the factors that have the largest explanatory share of the disparity. Modifiable characteristics like staffing levels explain a small share of the disparity. In order to improve the QoL of BIPOC NH residents, efforts need to focus on addressing systemic disparities for NHs with a high proportion of residents who are BIPOC.

Keywords

Quality of Life; Racial/Ethnic Disparities; Nursing Homes; Racial Composition; Decomposition

1. Introduction

Racial and ethnic disparities are particularly acute and persistent in the nursing home (NH) industry. NH residents who are Black, Indigenous and other People of Color (BIPOC) receive poorer quality of care (QoC) than white residents as measured by a number of

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clinical quality indicators (Arling et al., 2007; Cassie & Cassie, 2013; Fennell, Miller, & Mor, 2000; Mor, 2005; Sengupta et al., 2012; Smith et al., 2008; Travers et al., 2017). Quality of life (QoL) is an important aspect of long-term care quality that is often overlooked. QoL captures an individual's overall well-being and satisfaction with their life in the facility. Because the NH is a resident's home, some residents may place more value in QoL than QoC. Moreover, how a facility rates on QoL can be independent of QoC. Just because a facility excels in providing high QoC does not mean it will also rate high for QoL (Williams, Straker, & Applebaum, 2016). An implication of this is the factors that lead to and explain racial/ethnic disparities in QoC may be different from QoL.

One challenge with studying QoL is the lack of validated measures of QoL at the resident-level. Therefore, our understanding of racial/ethnic disparities in QoL developed independently of the literature examining disparities in QoC. Early evidence regarding disparities in QoL comes from qualitative studies that found that BIPOC residents have lower satisfaction with food and activities (Engle, Fox-Hill, & Graney, 1998; Ryvicker, 2011; Wu & Barker, 2008). Early quantitative studies use facility-level QoL metrics, which have not been validated. For example, one study used facility-level deficiencies for violating the Centers for Medicare and Medicaid Services' (CMS) QoL regulations. This study found that facilities with a greater proportion of BIPOC residents received more QoL deficiencies (Li et al., 2015). More recently, studies started to use resident-level QoL data collected by specific states. These studies confirm the existence of racial/ethnic disparities using a resident-level, validated instruments of QoL (Shippee et al. 2016), even going as far to find that white residents report higher QoL than BIPOC residents regardless of the racial/ethnic composition of the facility (Shippee, Ng, Bowblis, 2020). While these studies document the existence of disparity in QoL, they also reinforce that our understanding of the sources of these QoL disparities is limited.

This paper aims to further our understanding of racial/ethnic disparities by examining the disparity in a validated, resident-level measure of QoL using Blinder-Oaxaca decomposition (Blinder, 1973; Oaxaca, 1973). Decomposition techniques are increasingly popular to study various types of disparities in health care settings because they allow researchers to take a documented disparity and identify which factors are significant in explaining the disparity (Bowblis et al., 2013; Bowblis and Yun, 2010; Grabowski & McGuire, 2009; Thomasson, 2006; Zuvekas & Taliaferro, 2003). In our application, by using a unique, resident-level dataset which merges 2015 QoL surveys for individual residents in Minnesota with the Minimum Data Set data, and facility-level data from various sources, we are able to determine which observable resident and facility factors are the potential sources of the racial/ethnic disparity in QoL. To our knowledge, this is the first study to use a validated, resident-level instrument to measure QoL with decomposition techniques to quantify how resident and facility-level factors explain the racial/ethnic disparities in QoL.

2. Conceptual Model

Our conceptual model postulates that QoL in long-term care is determined by a number of resident and facility-level factors and that differences in those factors between BIPOC and white residents potentially explain the racial/ethnic disparity in reported QoL scores

(Zubritsky et al., 2013). At the resident-level, there are significant differences between white residents and residents of color. White residents tend to be older, female, and have diagnoses and other needs that are more consistent with an aging population (e.g. dementia, higher activities of daily living). In contrast, residents of color, particularly, Black and Hispanic residents, tend to be younger, male, have higher prevalence of mental illness diagnoses, and have worse underlying health (e.g. higher rates of hypertension). Therefore, we hypothesize that differences in resident health and needs characteristics will explain a significant proportion of the disparity between BIPOC and white residents in how they rate their QoL in a NH.

Past work has also found relevant facility-level characteristics are influential in reported QoL (Shippee et al 2013). These organizational characteristics may include profit-status, chain membership, facility size, as well as staffing types and levels. One important factor is payer-mix. As noted by Mor and colleagues (Mor et al., 2004), the NH industry is effectively operating in a two-tiered system. In the low tier are NHs that predominately are funded by Medicaid, which reimburses at low rates. In contrast, high tier NHs generate a greater percentage of their revenues from higher-reimbursed Medicare and private pay residents. This implies that high tiered facilities are more likely to have resources to invest in quality, including staffing. Therefore, if BIPOC residents are more likely to be in NHs with fewer financial resources, they are also likely to be in NHs with fewer and less qualified staff, all of which can contribute to the disparity between residents of color and white residents in reported QoL scores.

The last observable factor that may influence the racial/ethnic disparity in QoL is whether a resident is in a facility with a high concentration of BIPOC residents, which we will refer to as a "high BIPOC facility." Past work has found that BIPOC residents tend to concentrate in a few NHs that have a high proportion of residents of color (Howard et al., 2002; Smith et al., 2008). There are two competing hypotheses as to how being in a high BIPOC facility may affect QoL. One hypothesis is this could reduce the disparity between BIPOC and white residents as BIPOC residents may report higher QoL if other residents in the facility share similar culture and experiences. However, an alternative hypothesis is being a high BIPOC facility can lead to worsening of disparities. Residents of color will often seek care at a NH with residents of similar background even if there is a closer facility with higher quality of care scores (Rahman & Foster, 2015). If these facilities with a high proportion of BIPOC residents are lower resourced and cannot invest in quality improvement efforts to the same extent as other NHs, we would expect that QoL would be lower in these facilities for BIPOC residents.

While we focus on observable differences in resident and facility-level characteristics associated with QOL ratings for white and BIPOC residents, the underlying root causes for the documented racial/ethnic disparities are likely due to structural racism (Gee & Ford, 2011; Powell, 2007). In the context of this paper, structural racism is where system factors such as the structure of institutions that deliver social services, education, and health care lead to individuals from communities of color to be admitted to NHs at younger ages with mental health diagnoses and with more comorbid conditions after delaying care (Grabowski and McGuire, 2009). Hence, socioeconomic factors and disparities, cultural norms, and

other societal factors --not the race/ethnicity of an individual resident -- are the primary drivers behind disparities in QoL. This also means that BIPOC residents may be admitted to NHs that have different facility-level characteristics associated with worse quality, such as having a greater proportion of residents on Medicaid or lower nursing staff levels. While our model cannot directly test the root cause of the disparities, it can point to which observable factors are the likely leading factors associated with the disparity.

3.   Method

Data Sources and Study Population

To examine disparities in QoL, we constructed a resident-level dataset of long-stay residents from the state of Minnesota, one of two states to collect such data and the only the only one that currently links it with the Minimum Data Set (MDS). First, we obtained data from an annual survey of long-stay residents (length of stay > 100 days) from all Minnesota NHs for year 2015. This survey gauges how satisfied each resident is with their QoL in the NHs using a validated, 52-item survey that covers 11 different domains (Kane et al., 2003). Randomly selected residents participate in the survey and their responses are collected through in-person interviews conducted by an independent survey firm. Each resident's survey is merged with their closest assessment from the MDS. The MDS is a federally required assessment of all residents in a NH. We utilized MDS to obtain each resident's demographic information, as well as their clinical and functional status. Finally, we merged in facility characteristics obtained from multiple datasets, including: the Certification and Survey Enhanced Provider Reporting (CASPER) data, quality information from the Minnesota Nursing Home Report Card (Minnesota Department of Human Services), and Minnesota's nursing facility cost reports.

After merging all of these data, we reviewed the data for missing values and other potential coding errors. One facility was located on a Native American reservation and had long-stay population that was 100% Native American. We excluded this NH from the analysis because it was not representative in terms of population and other facility characteristics, though a sensitivity analysis that included this facility and identified the facility via an indicator variable found similar results. We also excluded any observations that had missing MDS data (approximately 360 observations). Our final analytic sample included 11,126 unique survey responses of long-stay residents in 355 nursing homes.

Measures of Resident Quality of Life

For this study, we constructed an overall summary score and 6 simplified domains scores of resident QoL. Following past work (Shippee et al 2013), these QoL scores were derived from 31 items from the Minnesota survey and are standardized into a percentage point scale measured from 0 to 100% with higher values indicating greater QoL. In the event that information for one of the 31 item was missing, multiple imputation by chained equations was used to impute the value of a specific item (i.e., *mi estimate* command in Stata, version 14 (StataCorp, 2015)). The domain and summary scores were calculated after the imputation of all items.

While the overall summary score measures general QoL, the six simplified domain scores measure QoL with the facility environment, attention from staff, food enjoyment, engagement, negative mood, and positive mood. Facility environment is a measure of person-environment fit; such as whether the resident can get around his/her room and reach his/her belongings and feels safe. The attention from staff domain encompasses the domain of dignity and the residents' experience with staff, including if they can get the personal assistance they need and whether the staff treat them with dignity. Food enjoyment asks if the residents enjoy the food and mealtimes. The engagement domain contains measures of meaningful activity and meaningful relationships and includes questions that attempt to see if residents and staff get to know the individual as a person. The final two domains, negative and positive mood, measure two dimensions of mood that capture affect and are particularly salient for those with cognitive impairment and dementia. Negative mood is found to correlate strongly with symptoms of depression (Brod, Stewart, Sands, & Walton, 1999).

Racial and Ethnic Composition of Nursing Homes

Although NH population is becoming more diverse (especially among short-stay population), the majority of the current long-stay population is white. This is the case in Minnesota, where the majority of our analytical sample contains non-Hispanic white residents (93.8%), with non-Hispanic black residents the next largest group at 3.7% of the sample. Native Americans make up 1.1% of the sample, and 1.4% of the sample is either Asian American, Hispanic of any race, or any other race or ethnicity. Given the rather small sample sizes associated with some racial and ethnic groups, our definition of BIPOC combines all Black, Indigenous, Asian and Hispanic residents. Therefore, our analysis compares QoL for BIPOC long-stay residents (of any non-white race/ethnicity) to non-Hispanic whites. In our sample, 10,455 residents are white and 671 are BIPOC.

Because we want to determine how much of the disparity can be explained by the racial and ethnic composition of the NH, we also constructed a measure that captures if the NH has a high BIPOC composition. We defined a high BIPOC composition as having a proportion of residents of color above the 90th percentile within the state (>13.6% of BIPOC residents in the context of Minnesota). We refer to these facilities as "high BIPOC facilities" and any facility below the 90th percentile is a "low BIPOC facility." There are a total of 9,859 residents in low proportion BIPOC facilities of which 3.2% were BIPOC residents, while there are 1,267 residents in high BIPOC facilities of which 40.5% are BIPOC residents. This indicates that the composition of NHs are highly skewed. In sensitivity analyses, we also utilized alternative percentiles and found qualitatively similar results.

Additional Explanatory Variables

Following the literature, we include a number of explanatory variables, both resident and facility characteristics that may impact QoL. Resident characteristics were obtained from MDS and can broadly grouped into two types: demographics and clinical/functional status. Demographic characteristics include the age and gender of the resident, as well as whether the resident is currently married. Clinical and functional status variables capture the physical and mental limitations of the resident. To measure a resident's physical limitations and needs we include each resident's activities of daily living (ADL) score and their number of chronic

conditions. The ADL score is a sum of all MDS ADL items and ranges from 0 to 28, with higher values indicating more limitations. The number of chronic conditions is a count the number of active diagnoses for congestive heart failure, diabetes, hip fracture, paralysis, pressure ulcers, and stroke. To measure mental and cognitive status, we include a number of indicator variables that capture the active diagnoses and other cognitive symptoms of the resident. These include indicators for diagnoses anxiety, depression, serious mental illness, and dementia. We also include whether the resident has moderate or severe cognitive impairment based on their Brief Interview for Mental Status or Cognitive Performance Scale (Thomas, Dosa, Wysocki, & Mor, 2017) and whether the resident had behavioral symptoms. The final clinical/functional status variable included is length of stay measured in years within the current facility.

Facility characteristics are broadly divided into four groups: structural facility characteristics, case and payer-mix, staffing, and quality. Structural facility characteristics describe the managerial and physical plant, including: ownership of the facility (i.e., not-for-profit, for-profit, government), whether NH is free-standing or part of a hospital, whether the facility is independent or part of a multi-facility chain, the number of beds, the proportion of rooms that are private, occupancy rate, and location. Location identifies if the facility is located in the Twin Cities of Minnesota, another metropolitan area, a micropolitan city, or a rural area. Case-mix is measured using the proportion of residents aged 65+ and by a facility-level acuity index based on RUG-IV scores indicating residents' average level of functional impairment and need for other services (Minnesota Department of Health, 2015). Payer-mix accounts for differences in the generosity of reimbursement and measured as the proportion of resident days that are reimbursed by Medicare and Medicaid, with a reference group of private payers.

Since NH care is person-intensive, the level and type of NH staff could have a significant impact on QoL. Separate staffing-level variables are constructed for nursing staff (e.g. registered nurses, licensed practical nurses, and certified nurse aides), mental health and social work staff, and activities staff. All staffing levels are measured in terms of hours per resident day (HPRD) which reflects the average amount of staff time each resident could theoretically receive in a day. We also include the overall staff retention rate to capture the ability of staff to develop relationships with their residents.

Being in a facility that is rated with a higher QoC may result in better satisfaction QoL scores. Therefore, we utilized the star rating of the facility from the Minnesota Nursing Home Report Card, which rates NHs from 1 (lowest) to 5 (highest) based on process and outcomes quality measures obtained from MDS for long-stay residents. To capture potential non-linearities, we include a set of indicator variables which measure the number of stars the facility received.

Analytic Methods

The main objective of this paper is to understand the role of resident-level and facility-level structural factors in driving racial/ethnic disparities in QoL scores. To accomplish this goal, we first examine summary statistics for BIPOC and white residents overall, and then examine these summary statistics for BIPOC and white residents in low or high proportion

BIPOC facilities. These comparisons provide a baseline to determine which observable resident and facility characteristics between BIPOC and white residents are different and may be associated the disparity. In other words, we are able to examine whether systemic factors that lead to racial and ethnic disparities are routed more in the observable factors of the resident (e.g. age) or the facility (e.g. staffing level) that the resident resides in.

To quantify how these which characteristics are driving the disparity, Blinder-Oaxaca decompositions are performed that compare BIPOC to white residents (Blinder, 1973; Oaxaca, 1973). Blinder-Oaxaca composition starts with identifying the magnitude of the disparity by starting with a comparison of the average QoL score for white and BIPOC residents. Next, the approach decomposes this disparity into a characteristics effect and coefficients effect. The characteristics effect measures how differences in characteristics of each group affect the disparity. For example, suppose NH residents of color are younger than white NH residents. The characteristics effect would identify how much of the disparity in QoL is due to differences in the average age of BIPOC and white NH residents. In contrast, the coefficients effect measures how much of the disparity is explained by variation in parameter estimates when separate regressions are estimated for each group (e.g. is the effect of age on QoL different for BIPOC residents compared to white residents).[1] Because there is no simple interpretation for why the coefficient estimates may be different for each group, the coefficient effect is sometimes referred to as the unexplained effect. Similar to other studies using decomposition methods (Bowblis et al., 2013), we focus on the characteristics effect because these are more likely to result in identifiable sources of the disparity and may be modifiable. To conduct this analysis we relied on the *Oaxaca* command in Stata (Jann, 2008). This work received IRB approval from the author's institution.

4. Results

Table 1 reports the mean of QoL scores for white and BIPOC residents and if these means are statistically different. The first set of columns report means for all facilities in the sample whereas the final two sets of columns report these results for residents in low and high BIPOC facilities. For the overall score, and five of the six domains, white NH residents tend to report higher scores than BIPOC residents. This pattern exists in all facilities and low proportion BIPOC facilities. In high proportion BIPOC facilities, white residents tend to report higher scores, but not all differences are statistically significant. Furthermore, white residents tend to report lower or similar QoL scores if they reside in a high BIPOC facility. While BIPOC residents are also more likely to report lower QoL scores in high proportion BIPOC facilities, the difference is not as large as for white residents. This implies that the disparity may be somewhat mitigated by the racial and ethnic composition of the facility.

In terms of resident and facility characteristics, there are some significant differences between white and BIPOC residents (Table 2). Overall, BIPOC residents tend to be younger, male, have more chronic conditions, and more likely to be diagnoses with serious mental

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[1]The specific mathematical equation is $E[QoL_W] - E[QoL_m] = Characteristics_{effect} + Coefficients_{effect}$ where $E[QoL_W]$ represents the expected QoL score. The subscripts represent white and BIPOC groups. The characteristics effect is equal to $\{E[X_W] - E[X_m]\} * \beta$ where β is the non-discriminatory coefficient estimate and X are resident and facility characteristics. The coefficients effect is equal to $\{E[X_W] * (\beta_W - \beta) + E[X_m] * (\beta_m - \beta)\}$.

illness. BIPOC residents are also more likely to reside in NHs with lower quality indictor stars that are larger, for-profit, and located in the metro area. There are also major differences between low and high proportion BIPOC NHs. For example, high proportion BIPOC facilities have younger residents that are more likely to be diagnosed with serious mental illness, regardless of race/ethnicity.

To determine what is driving the disparity, Table 3 reports the results of the Blinder-Oaxaca decomposition. The first three rows report the average QoL scores for white and BIPOC residents, as well as the difference in these scores, which we refer to as the unadjusted disparity. All seven measures have positive unadjusted disparities, and all but the environment domain are statistically significant, consistent with the presence of a disparity in QoL between BIPOC and white residents. The next two rows of Table 3 report the aggregate characteristics and coefficients effects of the disparity controlling for all variables in Table 2. The columns labeled "estimate" report the amount of the disparity (in percentage points) that is explained by each effect and the columns labeled "share" reports the corresponding percentage of the unadjusted disparity explained by the effect. For example, for the overall QoL domain, the unadjusted disparity is 6.3 and the characteristics effect is 3.9. The corresponding share of 61.8% is the percentage of the unadjusted disparity (i.e. 3.9/6.3) that is explained by differences in the resident and facility characteristics of white and BIPOC residents.

For the overall score and the domains of attention, food enjoyment, engagement, and positive mood, the characteristics effect explains from 55.7% to 118.6% of the disparity. That is, the majority of the disparity can be explained by differences in the average characteristics of BIPOC and white residents. In the case of negative mood, if BIPOC residents had the same observed characteristics as white residents, it would fully eliminate the disparity. In contrast, the environment domain has a negative characteristics effect, indicating that if BIPOC and white residents had similar characteristics, the disparity would get larger by 54.3%.

To further decompose the characteristics effects into resident and facility variables, the final set of rows in Table 3 report the amount of the disparity explained by differences in resident and facility characteristics. Across most QoL measures, resident characteristics explain less than 25.9% of the disparity, with resident characteristics only explaining 5.0% of the disparity in overall QoL. In contrast, differences in facility characteristics explain between 37.9% to 56.8% of the disparity for overall QoL and four domains. For the two other domains, environment and negative mood, facility characteristics explain over 92.7% of the disparity. This indicated differences in facility characteristics between white and BIPOC residents are more pertinent to explaining racial/ethnic disparities in QoL than differences in resident characteristics.

Finally, to determine if some specific resident and facility characteristics are more important than others, Table 4 reports the detailed composition results for selective characteristics effects. Most of the specific resident characteristics' variables are statistically significant, indicating they are factors that explain the variation in the disparity of QoL scores. However, many individual resident characteristics have negative signs, which cancel out the effect of

other resident characteristics that contribute to the disparity. For example, if BIPOC residents had a similar prevalence rate of dementia as white residents, the disparity in the overall score would decline by 1.5%, but if the prevalence rates of depression were similar, the disparity would increase by 1.7%.

In the case of facility characteristics, two sets of variables are the most important in explaining the disparity: being a high proportion BIPOC facility and the structural facility characteristics. Being a high proportion BIPOC facility is the largest single factor that explains the disparity between white and BIPOC residents. For example, residing in a high proportion BIPOC facility explains 22.1% of the disparity in overall QoL compares to 34.7% for all other facility variables. As for other facility variables, one factor that is statistically significant across multiple satisfaction domains is the number of beds, which explains between 6.1 to 11.6% of the disparity. While staffing levels are highly modifiable, the decomposition analysis finds most staffing levels are not statistically significant. The only exception is activities staff, where if BIPOC and white residents lived in NHs with similar activities staff levels, the disparity would significantly decrease by 2.6% to 14.8% depending on the QoL domain. Interestingly, facility quality indicators as well as case and payer-mix do not statistically explain the disparity.

5. Conclusion

It is well documented that racial and ethnic disparities are common in NHs yet understanding the root causes of these disparities is a complex undertaking. In this paper, we used decomposition methods to understand the observable sources of disparities in a validated, resident-level measure of QoL in NHs, a measure that has been consistently highlighted by policy and stakeholder groups as a key attribute of long-term care quality beyond clinical care alone (Arling et al., 2005; Castle, 2008; Castle & Ferguson, 2010; Kane et al., 2003; Kane et al., 2004). Our results clearly indicate that BIPOC residents report lower QoL than white residents. We also found that just over 50% of the disparity for overall QoL score and most domains can be explained by observable differences in resident and facility characteristics.

For the disparity that is explained by our models, we hypothesized that differences in resident characteristics such as age and underlying health conditions would drive most of the disparity, consistent with QoL being determined by whether an individual's needs and wishes are met. Our finding do not support this hypothesis. Instead, most of the disparity that can be explained by our model is associated with facility characteristics, in particular facility structural characteristics and residing in a facility with a high proportion of BIPOC residents. Moreover, modifiable facility characteristics, such as staffing level, explain only a small proportion of the disparity. These results are consistent with the underlying factors that lead to racial and ethnic disparities being systemic in nature. In other words, disparities in QoL likely result from either BIPOC residents self-selecting based on reasons other than QoL, such as other residents with similar lived experiences or based on where they live, or having limited choices and lack of access to NHs with characteristics associated with higher QoL performance. This is consistent with race/ethnicity not being the underlying cause of racial and ethnic disparities in NHs. Instead, the likely root cause is based on structural

racism that has resulted in inherent inequities built into the systems and institutions that have led to worse outcomes for BIPOC residents from marginalized communities in multiple health care settings compared to their white counterparts (Shippee et al. 2016; Shippee et al., in press). The fact that residing in a facility with a high proportion BIPOC residents explains a significant share of the disparity in NH QoL, points to the disparities found in NHs likely being due to the larger failure of systems and institutions.

Efforts to reduce the disparity in QoL between white and BIPOC residents should acknowledge and address the impact of these systemic factors that have resulted in cumulative inequities for BIPOC over their life course (Ferraro & Shippee, 2009), only to make inequities in later life worse. Addressing racial and ethnic disparities in NHs requires accepting that facilities with a high proportion of residents that are BIPOC are structurally different from other NHs, as we find in this study, and likely need special attention from policymakers and regulators. If high proportion BIPOC facilities are under resourced and cannot invest in important components of NH care than nursing staff levels, such as the competency and retention of direct care staff, activities, and other efforts that are associated with quality improvement efforts, this will only further racial and ethnic inequalities in QoL and QoC.

To ultimately address these disparities, structural changes need to take place before an individual needs NH care thus requiring long-term action (Shippee et al, in press). Yet, some immediate improvements can be made to mitigate some of these disparities. Administrators, social services, and activities staff **could** start by intentionally listening to their BIPOC residents, learning what is important for their residents, and developing culturally relevant programming, with residents' consistent input. A one-size fits all is not consistent with person-centered care, and thus this work **should** reflect the culture and resident needs of individual NHs. Moreover, government policies from how NHs are regulated to reimbursement policies **should** be flexible and more focused on how to help NHs deliver person-centered and culturally centered care that results in interpersonal and organizational changes. However, many state governments fail to provide adequate reimbursement to funding direct care staff, let alone funds to invest in training and time for staff to develop practices on how to listen to all of their residents and develop culturally-relevant programming and care delivery structure that will meet the needs of BIPOC residents.

While our study utilizes a validated, resident-level measure of QoL, this study has some weaknesses. Our study is limited to Minnesota, which has a racial and ethnic composition that does provide enough power to study specific racial and ethnic groups. Furthermore, Minnesota has more generous Medicaid reimbursement (i.e. parity), which may make these results less generalizable to states with less generous reimbursement. We also cannot identify what drives the unexplained proportion of the disparity, as other factors likely play a role, such as racial bias/discrimination, how health status or characteristics of the facility may differently affect a resident's view of their QoL based on their race/ethnicity. We are also limited to observable factors, and other factors that we do not capture in our models. Unobservable factors such as structural racism manifested through different allocation of resources and care pathways, and the demographic composition of the NH staff and administration likely play an important role in explaining disparity in QoL. Finally, the QoL

measure utilized is self-reported, including by those with varying levels of cognitive impairment and mental illness. As with all self-reported measures, this can lead to some bias, but given the large sample and the fact that we find QoL measures to be stable over time when residents are surveyed in multiple years gives us confidence that our results are robust. In spite of these limitations, we feel the strengths of our study outweigh any limitations.

Our study highlights the need to better understand the underlying factors that drive racial and ethnic disparities in NHs. More qualitative work needs to be conducted to provide a starting point to address these issues. For example, family support is likely an important conduit of high QoL and many NH residents from marginalized communities often lack this support. Another aspect that is likely vital to QoL is culturally sensitive care that integrates cultural humility, and includes all aspects of life in the facility, such as food and meal environment, engagement, and meaningful activities, and being treated with dignity and respect by staff. Residents whose care is connected to their cultural values are often found to report higher QoL. Of course, a simple higher concentration of BIPOC residents does necessarily not imply that the facility has the cultural competency and the resources to represent the needs of diverse racial/ethnic groups classified into the broad "BIPOC category." In order to improve QoL, facilities are encouraged to identify the cultural needs of their residents and meaningfully incorporate them into care delivery.

Acknowledgements:

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Table 1:

Average Quality of Life Scores for White and BIPOC Residents by Facility Type

	All Facilities		Low BIPOC Facility		High BIPOC Facility	
	White	BIPOC	White	BIPOC	White	BIPOC
Satisfaction Score						
Overall	79.517	73.203 ***	80.036	73.466 ***	74.022	72.983
Facility Environment	84.469	81.852 ***	84.367	79.056 ***	85.549	84.197
Attention	92.160	84.662 ***	92.772	85.153 ***	85.677	84.250
Food Enjoyment	81.610	69.439 ***	82.400	71.996 ***	73.248	67.295 **
Engagement	78.973	70.730 ***	79.688	71.190 ***	71.400	70.344
Negative Mood	65.269	62.549 ***	65.811	62.511 **	59.533	62.581 **
Positive Mood	75.667	71.248 ***	75.923	72.847 **	72.965	69.908 **
Sample Sizes	10455	671	9553	306	902	365

The following table reports the averages for each dependent variable by racial/ethnic group for all facilities, and those that have a low and high proportion of BIPOC residents. Scores are standardized to percentage points with larger values indicating greater quality of life (i.e., higher negative mood score means residents were lower on negative mood). The stars represent if there is a statistically significant difference between white and BIPOC residents within each facility type using a t-test.

BIPOC = Black, Indigenous and other Persons of Color

*** < 1%

** < 5%

* < 10%

Table 2:

Average Resident and Facility Characteristics by Facility Type

	All Facilities		Low BIPOC Facility		High BIPOC Facility	
	White	Minority	White	BIPOC	White	BIPOC
Resident Characteristics						
Demographics						
Age	83.118	69.492 ***	84.084	73.944 ***	72.887	65.759
Female	0.682	0.537 ***	0.695	0.585 ***	0.547	0.496
Married	0.212	0.118 ***	0.221	0.154 ***	0.112	0.087
Clinical and Functional						
Length of Stay (Years)	2.623	3.138 ***	2.533	2.528	3.579	3.688
ADL Score (0-28)	14.670	12.478 ***	14.985	14.209 **	11.337	10.982
# of Chronic Conditions (0-5)	1.722	1.939 ***	1.727	1.967 ***	1.666	1.943 ***
Anxiety Diagnosis	0.250	0.183 ***	0.248	0.199 *	0.277	0.171 ***
Depression Diagnosis	0.504	0.457 **	0.504	0.465	0.503	0.461 *
Serious Mental Illness Diagnosis	0.133	0.279 ***	0.112	0.160 **	0.350	0.365
Cognitive Impairment	0.295	0.298	0.302	0.340	0.212	0.267 **
Dementia Diagnosis	0.467	0.389 ***	0.476	0.448	0.376	0.350
Behavioral Symptoms	0.196	0.299 ***	0.184	0.223 *	0.324	0.363
Facility Characteristics						
High Minority Facility	0.086	0.544 ***	0.000	0.000	1.000	1.000
Structural Facility Characteristics						
Ownership: Government [†]	0.080	0.034 ***	0.080	0.038 ***	0.065	0.025 ***
Ownership: For-Profit	0.267	0.590	0.262	0.558	0.422	0.671
Ownership: Non-Profit	0.653	0.376	0.658	0.405	0.513	0.304
Chain Affiliation	0.540	0.551	0.539	0.611 **	0.548	0.501
Hospital Affiliation	0.131	0.034 ***	0.140	0.042 ***	0.043	0.027
Number of Beds	88.923	125.800 ***	86.507	129.523 ***	114.512	122.679 **
Occupancy Rate	0.882	0.881 *	0.882	0.884	0.880	0.878
Proportion Private Rooms	0.522	0.350 ***	0.538	0.438 ***	0.355	0.276 ***
Location: Twin Cities Metropolitan [†]	0.184	0.876 ***	0.172	0.850 ***	0.559	0.940 ***
Location: Other Metropolitan	0.364	0.022	0.369	0.030	0.219	0.003
Location: Micropolitan	0.204	0.032	0.207	0.037	0.105	0.022
Location: Rural	0.248	0.069	0.252	0.083	0.118	0.036
Case and Payer Mix						
Acuity Index	1.015	0.984 ***	1.019	1.037 ***	0.970	0.939 **
Proportion of Medicaid Patient-Days	0.539	0.647 ***	0.524	0.572 ***	0.698	0.709
Proportion of Medicare Patient-Days	0.090	0.076 ***	0.093	0.100 **	0.061	0.056 *

	All Facilities		Low BIPOC Facility		High BIPOC Facility	
	White	Minority	White	BIPOC	White	BIPOC
Proportion of Residents Over Age 65	0.912	0.732 ***	0.933	0.868 ***	0.692	0.618 ***
Staffing						
Registered Nurses HPRD	0.541	0.607 ***	0.536	0.610 ***	0.600	0.605
Licensed Practical Nurses HPRD	0.692	0.695	0.692	0.706	0.689	0.686
Certified Nursing Assistants HPRD	2.168	1.864 ***	2.201	2.141 ***	1.810	1.631 ***
Mental Health and Social Workers HPRD	0.124	0.196 ***	0.118	0.130 ***	0.189	0.251 ***
Activities Staff HPRD	0.253	0.191 ***	0.261	0.222 ***	0.177	0.165 **
Staff Retention Rate	0.674	0.670 ***	0.674	0.654 ***	0.682	0.683
Quality Indicators						
1-Star Facility [†]	0.053	0.058 ***	0.053	0.058 ***	0.042	0.058 ***
2-Star Facility	0.216	0.289	0.215	0.283	0.225	0.304
3-Star Facility	0.419	0.340	0.416	0.326	0.516	0.375
4-Star Facility	0.255	0.275	0.258	0.292	0.173	0.233
5-Star Facility	0.058	0.039	0.058	0.042	0.042	0.03
Sample Sizes	10455	671	9553	306	902	365

[†] The following table reports the averages for each variable by racial/ethnic group for all facilities, and those that have a low and high proportion of BIPOC residents. The stars represent if there is a statistically significant difference between white and BIPOC residents within each facility type using t-tests unless specified by †. In these cases, chi-squared tests were performed for the entire category (e.g. ownership, location, and quality indicators).

ADL = activities of daily living; ; BIPOC = Black, Indigenous and other Persons of Color; HPRD = hours per resident day.

*** < 1%

** < 5%

* < 10%

Table 3:

Decomposition of Disparity in Quality of Life Scores

	Overall		Facility Environment		Attention		Food Enjoyment		Engagement		Negative Mood		Positive Mood	
	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)
Average QoL Score														
White Residents	79.517		84.469		92.160		81.610		78.973		65.269		75.667	
BIPOC Residents	73.203		81.852		84.662		69.439		70.730		62.549		71.248	
Unadjusted Disparity	6.314 ***		2.617		7.498 ***		12.172 ***		8.243 ***		2.720 *		4.419 ***	
Aggregate Decomposition of Disparity														
Characteristics Effect	3.899 ***	61.75%	−1.421	−54.30%	5.029 ***	67.07%	7.248 ***	59.55%	5.321 ***	64.55%	3.227 ***	118.64%	2.460 ***	55.67%
Coefficients Effect	2.415 **	38.25%	4.038 ***	154.30%	2.469 *	32.93%	4.924 **	40.45%	2.923 *	35.46%	−0.507	−18.64%	1.959	44.33%
Subaggregate Characteristics Effects														
Resident Characteristics	0.315	4.99%	−4.153 ***	−158.69%	1.586 ***	21.15%	1.398 *	11.49%	0.674	8.18%	0.705	25.92%	0.787	17.81%
Facility Characteristics	3.584 ***	56.76%	2.732 ***	104.39%	3.443 ***	45.92%	5.851 ***	48.07%	4.646 ***	56.36%	2.521 ***	92.68%	1.673 **	37.86%

The table reports the results of the decomposition analysis utilizing all control variables reported in Table 2. The average quality of life scores for white and BIPOC residents, and the unadjusted disparity is reported in the first three rows. The aggregate decomposition of the disparity reports decomposition of the disparity into the characteristics and coefficients effects. The subaggregate characteristics effects row report the decomposition of the characteristics effect for all resident characteristics and all facility characteristics. The "estimate" column reports the change in the disparity in terms of percentage points and the "share" column reports the share of the unadjusted disparity explained by this percentage point change.

BIPOC = Black, Indigenous and other Persons of Color

*** < 1%

** < 5%

* < 10%

Table 4:

Decomposition of Disparity in Satisfaction for Select Subaggregate Characteristic Effects

	Overall		Facility Environment		Attention		Food Enjoyment		Engagement		Negative Mood		Positive Mood	
	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)
Unadjusted Disparity	6.314 ***		2.617		7.498 ***		12.172 ***		8.243 ***		2.720 *		4.419 ***	
Characteristics Effect	3.899 ***	61.75%	-1.421	-54.30%	5.029 ***	67.07%	7.248 ***	59.55%	5.321 ***	64.55%	3.227 ***	118.64%	2.460 ***	55.67%
Resident Characteristics	0.315	4.99%	-4.153 ***	-158.69%	1.586 ***	21.15%	1.398 *	11.49%	0.674	8.18%	0.705	25.92%	0.787	17.81%
Demographics	0.786 ***	12.45%	-1.792 ***	-68.48%	1.487 ***	19.83%	1.641 ***	13.48%	1.117 **	13.55%	0.632	23.24%	1.283 ***	29.03%
Age	0.593 *	9.39%	-1.432 ***	-54.72%	1.270 ***	16.94%	1.637 ***	13.45%	0.574	6.96%	0.814 *	29.93%	0.509	11.52%
Female	0.133 *	2.11%	-0.268 **	-10.24%	0.073	0.97%	-0.042	-0.35%	0.385 ***	4.67%	-0.103	-3.79%	0.676 ***	15.30%
Married	0.061	0.97%	-0.092	-3.52%	0.144 **	1.92%	0.047	0.39%	0.158 **	1.92%	-0.079	-2.90%	0.097	2.20%
Clinical and Functional	-0.471 *	-7.46%	-2.362 **	-90.26%	0.099	1.32%	-0.244	-2.00%	-0.442	-5.36%	0.073	2.68%	-0.496	-11.22%
Length of Stay (Years)	-0.169	-2.68%	-0.112	-4.28%	-0.099	-1.32%	-0.157	-1.29%	-0.222	-2.69%	-0.267	-9.82%	-0.035	-0.79%
ADL Score (0-28)	-0.755 **	-11.96%	-2.826 **	-107.99%	-0.493 **	-6.58%	-0.281 *	-2.31%	-0.344 *	-4.17%	-0.415 **	-15.26%	-0.904 **	-20.46%
# of Chronic Conditions (0-5)	0.109 *	1.73%	0.068	2.60%	0.134 *	1.79%	0.431 ***	3.54%	-0.003	-0.04%	0.108	3.97%	0.136 *	3.08%
Anxiety Diagnosis	-0.132 **	-2.09%	-0.097 *	-3.71%	-0.080 *	-1.07%	-0.150 *	-1.23%	-0.070	-0.85%	-0.302 ***	-11.10%	-0.113 *	-2.56%
Depression Diagnosis	-0.104 *	-1.65%	-0.052	-1.99%	-0.064	-0.85%	-0.090	-0.74%	-0.078	-0.95%	-0.210 *	-7.72%	-0.140 *	-3.17%
Severe Mental Illness Diagnosis	0.169 *	2.68%	0.152	5.81%	0.178	2.37%	-0.490 **	-4.03%	0.053	0.64%	0.634 **	23.31%	0.246 *	5.57%
Cognitive Impairment	-0.007	-0.11%	-0.014	-0.53%	-0.002	-0.03%	-0.028	-0.23%	-0.003	-0.04%	-0.009	-0.33%	0.009	0.20%
Dementia Diagnosis	0.095 *	1.50%	0.286 *	10.93%	0.090	1.20%	0.343 *	2.82%	-0.033	-0.40%	0.113	4.15%	-0.051	-1.15%
Behavioral Symptoms	0.323 **	5.12%	0.233 *	8.90%	0.435 **	5.80%	0.178	1.46%	0.259 *	3.14%	0.422 **	15.51%	0.356 *	8.06%

	Overall		Facility Environment		Attention		Food Enjoyment		Engagement		Negative Mood		Positive Mood	
	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)	Estimate	Share (%)
Facility Characteristics	3.584 ***	56.76%	2.732 ***	104.39%	3.443 ***	45.92%	5.851 ***	48.07%	4.646 ***	56.36%	2.521 ***	92.68%	1.673 **	37.86%
High Proportion BIPOC Facility	1.394 ***	22.08%	0.216	8.25%	1.504 **	20.06%	1.350	11.09%	1.912 **	23.20%	1.389 *	51.07%	1.247 *	28.22%
Structural Facility Characteristics	1.877 ***	29.73%	1.504 **	57.47%	1.949 ***	25.99%	3.635 ***	29.86%	2.448 ***	29.70%	1.117 **	41.07%	0.280	6.34%
Government Ownership (Ref = Non-profit)	0.540 *	8.55%	0.509	19.45%	0.491 *	6.55%	1.448 **	11.90%	0.647	7.85%	0.117	4.30%	0.301	6.81%
For-profit Ownership (Ref = Non-profit)	−0.153	−2.42%	−0.122	−4.66%	0.016	0.21%	−0.945 **	−7.76%	−0.279	−3.38%	0.232	8.53%	−0.131	−2.96%
Number of Beds	0.696 **	11.02%	0.627 *	23.96%	0.868 ***	11.58%	1.276 **	10.48%	0.853 *	10.35%	0.259	9.52%	0.268	6.06%
Proportion Private Rooms	0.124	1.96%	−0.052	−1.99%	0.170	2.27%	0.097	0.80%	0.140	1.70%	0.090	3.31%	0.317	7.17%
Other Metropolitan (Ref = Twin Cities)	0.139	2.20%	0.021	0.80%	0.082	1.09%	0.606 *	4.98%	0.293	3.55%	0.047	1.73%	−0.341	−7.72%
Micropolitan (Ref = Twin Cities)	0.156	2.47%	0.093	3.55%	0.132	1.76%	0.462 *	3.80%	0.254	3.08%	−0.017	−0.63%	0.036	0.81%
Rural (Ref = Twin Cities)	0.310 **	4.91%	0.379 *	14.48%	0.149	1.99%	0.642 **	5.27%	0.432 *	5.24%	0.317 *	11.65%	−0.176	−3.98%
Case and Payer Mix	0.386	6.11%	0.559	21.36%	0.432	5.76%	1.116	9.17%	0.206	2.50%	0.191	7.02%	0.260	5.88%
Staffing	−0.161	−2.55%	0.405	15.48%	−0.539	−7.19%	−0.380	−3.12%	−0.032	−0.39%	−0.229	−8.42%	−0.198	−4.48%
Certified Nursing Assistants HPRD	−0.261	−4.13%	−0.021	−0.80%	−0.326	−4.35%	−0.477	−3.92%	−0.180	−2.18%	−0.429	−15.77%	−0.143	−3.24%
Activities Staff HPRD	0.404 ***	6.40%	0.388 *	14.83%	0.195	2.60%	0.406	3.34%	0.665 ***	8.07%	0.365 *	13.42%	0.138	3.12%
Quality Indicators	0.088	1.39%	0.048	1.83%	0.096	1.28%	0.130	1.07%	0.112	1.36%	0.054	1.99%	0.084	1.90%

The table reports the results of the decomposition analysis utilizing all control variables reported in Table 2. The decomposition identifies how much the disparity would be reduced (e.g. positive numbers) if the average characteristics for minority residents were equal to white residents. The "estimate" column reports the change in the disparity in terms of percentage points and the "share" column reports the share of the unadjusted disparity explained by this percentage point change. Specific control variables are reported if at least one effect was statistically significant at the 10% level.

Ref = reference category; HPRD = hours per resident-day; BIPOC = Black, Indigenous and other Persons of Color

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< 1%

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< 5%

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< 10%