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## Changes over Time in POLST Use and Content by Race and Ethnicity among California Nursing Home Residents

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### Abstract

**Background:** Physician Orders for Life-Sustaining Treatment (POLST) are commonly used for nursing home (NH) residents. Treatment orders differ across race and ethnicity, presumably related to cultural and socioeconomic variation and levels of access to care and trust. Because national efforts focus on addressing the underpinnings of racial and ethnic differences in treatment (i.e. access to care and trust), we describe POLST use and content by race and ethnicity.

**Methods:** California requires NHs to document POLST completion and content in the Minimum Data Set. We describe POLST completion and content for all California NH residents from 2011 to 2016 (N = 1,120,376). Adjusting for resident characteristics, we compared changes in completion rate and differences by race and ethnicity in POLST content—orders for cardiopulmonary resuscitation (CPR), do not resuscitate (DNR), CPR with full treatment, DNR with selective treatment or comfort orders, and if unsigned.

**Results:** POLST completion increased across all racial and ethnic groups from 2011 to 2016; by 2016, NH residents had a POLST two-thirds or more of the time. In 2011, Black residents had a POLST with a CPR order 30.4% of the time, Hispanic residents 25.6% and White residents 19.7%. By 2016, this grew to 42.5%, 38.2% and 28.1%, respectively, with Black and Hispanic residents demonstrating larger increases than White residents (p<0.001). Increases over time in POLST with CPR and full treatment were greater for Black and Hispanic residents compared to White residents. The increase in POLST with DNR and DNR with Selective treatment and

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**Conflict of Interest:** All of the authors declare that they have no conflicts of interest with regard to this manuscript.

### SUPPLEMENTAL MATERIALS

Results on replacement of missing and inconsistent POLST responses and sensitivity analyses.

Comfort orders was greater for White compared to Black patients ( $p<0.001$ ). Unsigned POLST with CPR and DNR orders decreased across all racial and ethnic groups.

**Conclusions:** Racial and ethnic differences in POLST intensity of care orders increased between 2011 and 2016 suggesting that efforts to mitigate factors underlying differences were ineffective. Studies of newer POLST data are imperative.

### Keywords

end-of-life care; nursing home; long-term care; quality improvement; POLST; race disparity

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## INTRODUCTION

Providing healthcare for patients with serious illness or limited life expectancy requires attention to patient goals. These goals emanate from the individual's innate inner sense and values, and develop in the context of the illness experience. Factors such as gender, age, race and ethnicity, and culture also contribute to patients' goals and preferences concerning medical care. Clinicians elicit these goals in order to guide patients in evaluation and treatment. Goals are often recorded in advance directives. For patients with limited prognosis, patient goals are often translated into provider orders in Physician Orders for Life Sustaining Treatment (POLST) documents.<sup>1</sup> POLST in California captures decisions regarding resuscitation, comfort care, hospitalization, supplemental nutrition and, at times, other treatments.

It has long been recognized that there are differences in intensity of care preferences by patient race and ethnicity.<sup>2,3</sup> Advance care planning occurs less often among racial and ethnic minority communities.<sup>4,5</sup> Black individuals complete advance directives about half as often as White individuals.<sup>6</sup> Early work focusing on in-hospital Do Not Resuscitate (DNR) orders, showed that these orders were far less common among Black<sup>7,8</sup> and Hispanic<sup>9</sup> patients compared to White patients.<sup>10</sup> POLST – which requires formulation of resuscitation preference and other care preferences and ideally occurs before hospitalization – appears to be employed to about the same degree among White, Black and Hispanic nursing home residents.<sup>11</sup> But, fewer Black and Hispanic nursing home residents, compared to White residents, have POLST forms containing DNR orders.<sup>12</sup> Previous research concerning DNR orders in the inpatient setting suggest that racial and ethnic differences have not changed over time.<sup>13,14</sup> However, there is increasing interest in understanding variation in medical decision-making by race and ethnicity. Cardiopulmonary resuscitation (CPR) preferences captured in POLST over time have not been explored. Understanding whether there has been narrowing of differences over time in resuscitation and aggressiveness of care preferences by race and ethnicity among the most vulnerable patients could provide direction for improving end-of-life care in nursing homes.

We examined POLST completion and care intensity preferences by patient race and ethnicity among all nursing home residents in California between 2011 and 2016, adjusting for case-mix severity.

## METHODS

We conducted a retrospective evaluation of all California nursing home residents by race and ethnicity between 2011 and 2016 concerning whether they had a POLST and the content of the POLST. For those years, we obtained the 100% California sample of the Minimum Data Set (MDS) for 2011-2016 from the Centers for Medicare and Medicaid Services (CMS) and the California Section S from the California Department of Public Health, Center for Health Care Quality (CHCQ). The MDS is a standardized, federally mandated health status assessment tool completed for all residents in a Medicare and/or Medicaid-certified long-term care facility. The California MDS Section S reports whether or not a POLST is in the patient's chart and captures elements of the most recently completed POLST, including CPR/DNR orders, preferred medical interventions, and artificially administered nutrition. It includes whether the resident (or a legally recognized decision maker) and physician signed the POLST form, but does not indicate the date of completion. Changes in POLST may occur asynchronously with MDS assessments; in those cases, changes in POLST preferences are captured at the next MDS assessment. Section S records obtained from CHCQ were merged with the MDS by the unique MDS record number.

Resident characteristics were derived from the MDS. These include race and ethnicity (non-Hispanic White [herein termed White], Black, Hispanic, Asian-Pacific Islander and other/unknown), the primary independent variable of interest, as well as gender, age, degree of cognitive impairment (Cognitive Function Scale),<sup>15</sup> degree of functional impairment (MDS ADL Scale)<sup>16</sup> and number of comorbidities.<sup>17</sup> Residents were classified as "long-stay" if they had stayed in a nursing home for greater than 100 days within a 365-day period.<sup>18</sup> If the 100 days total crossed a calendar year, the long-stay definition applied to both calendar years. Once classified as long-stay, individuals were considered long-stay residents in subsequent years. For each resident, we created a longitudinal description of POLST completion and intensity of care preferences from 2011 to 2016. We classified a POLST as valid if a CPR or DNR order was completed and both signatures were present.

We examined whether nursing home residents had a valid POLST (signed CPR or signed DNR) and signature missing POLST (CPR or DNR). Furthermore, we linked resuscitation order with treatment preference to describe the amount of time nursing home residents had a POLST containing "CPR and Full Treatment" and "DNR and Selective Treatment or Comfort Measures Only." We compared POLST completion, resuscitation orders and intensity of care preferences by resident self-reported race and ethnicity. We repeated the analysis for long and short-stay residents. Each POLST observation was weighted by the number of days from that assessment to the next assessment, reflecting the best estimate of the number of days that a POLST was in effect. Where there was more than 100 days between assessments, we assigned a weight of 100 days to that observation. Replacement of assessments with missing Section S and of a subset of POLST results from tracking assessments is described elsewhere<sup>17</sup> and presented in Supplemental Table 1. Assessments with a missing Section S that could not be imputed were excluded from these analyses.

We compared POLST use between 2011 and 2016 by race and ethnicity for the following: valid POLST (CPR or DNR signed), signed CPR POLST, signed DNR POLST, unsigned

CPR POLST, unsigned DNR POLST, signed CPR and Full treatment, signed DNR and Selective treatment/Comfort measures only, unsigned CPR and Full treatment, and unsigned DNR and Selective treatment/Comfort measures only. We used linear regression to estimate the unadjusted relationship of each of these POLST content categories with race and ethnicity for each year.

We performed separate multivariable linear regressions for each POLST variable listed above. Each regression includes interaction terms for each race and ethnicity interacted with year. The regressions also account for the following resident characteristics: age, gender, cognitive function, functional status, and number of comorbidities. To isolate the independent role of race and ethnicity, we report predicted values by race and ethnicity using sample averages for all other characteristics. This approach holds other characteristics constant between racial and ethnic groups and over time.

Because the adjusted findings were very similar to the unadjusted results, (see Supplemental Tables 2-5), we present adjusted data. Due to multiple comparisons, we set statistical significance at  $p < 0.001$ . A Bonferroni correction would involve scaling the significance level by 36 (9 outcomes with 4 comparisons per outcome) such that  $\alpha = 0.05$  would require a threshold of 0.0014, slightly larger than our more conservative threshold.

This study was approved by the UCLA Human Research Protection Program (#17-001534), the California Committee for the Protection of Human Subjects (#2018-216), and the CMS Institutional Review Board (#52277-RSCH). The analytic data sets were created using SAS 9.4 (Cary, NC) and analyses were performed using STATA 15.1 (College Station, PA).

## RESULTS

Between 2011 and 2016, there were 1,120,376 unique individuals appearing in 9,518,801 MDS assessments in California (Table 1). Overall, unique individuals were 65.2% White, 7.2% Black, 13.1% Hispanic, 7.7% Asian/Pacific Islanders and 6.8% other races. Weighted by days within the sample, White residents accounted for 59% of nursing home occupancy time. Black, Hispanic, Asian and Pacific Islander and Other race residents accounted for 11%, 16%, 10%, and 4%, respectively. The sample was predominately female and over 65 years of age. Twenty-two percent of residents (representing 44% of nursing home resident time) had severe or moderate cognitive impairment. Based on duration of stay, 83% of nursing home occupancy time was among long-stay residents, while short-stay residents represented 83% of all unique individuals.

### POLST Completion and Resuscitation Content

Valid POLST completion ranged from 44.5% for Hispanic nursing home residents to 50.0% of White and 55.8% of other race residents in 2011. All groups increased valid POLST completion between 2011 and 2016 with Hispanic residents increasing statistically significantly more than White residents so that by 2016, all race groups had a valid POLST two-thirds of the time or more (Figure 1A).

In 2011, 30.4% of Black residents had a POLST with a CPR order, which was 10.7% higher than White residents. By 2016, this difference grew to 14.4% (Black 42.5% vs. White 28.1%,  $p<0.001$ ). Similarly, Hispanic residents were 5.9% more likely than White residents to have a POLST with a CPR order in 2011 and this difference grew to 10.1% by 2016 ( $p<0.001$ ) (Figure 1B). Differences between Asian/Pacific Islander and White residents and between other race and White residents varied by less than 2% over the six-year period (Supplemental Table 2).

Nursing home residents with a valid POLST with a DNR order in 2011 ranged from 16.6% of Black residents to 30.3% of White residents. All racial and ethnic groups increased in POLST with DNR over the next five years, but the increase was significantly less for Black residents compared to White residents (Figure 1C). By 2016, 41.7% of White residents had a POLST with a DNR order compared to 23.6% of Black residents ( $p<0.001$ ) (Supplemental Table 2).

In 2011, 28.1% of Black nursing home residents had a valid POLST that contained a CPR order and instructions for Full treatment compared to 23.2% of Hispanic and 17.3% of White residents. All racial and ethnic groups increased in the proportion of residents who had a fully-aggressive POLST over the following five years, (Figure 2A) however, Black and Hispanic residents increased more than White residents. In 2016, 40.6% of Black, 36.0% of Hispanic and 26.1% of White residents' time was spent with a POLST calling for Full treatment ( $p<0.001$  for difference in differences comparison between White and Black and White and Hispanic residents) (Supplemental Table 3).

In contrast to fully aggressive POLST completion, in 2011, 15.7% of Black nursing home residents had a valid POLST that contained a DNR order and instructions for Selective treatment or Comfort measures compared to 17.8% of Hispanic and 29.2% of White residents. All racial and ethnic groups increased in the proportion of residents who had such POLST orders over the following five years, (Figure 2B) however, Black and Hispanic residents increased less than White residents. In 2016, 22.2% of Black, 27.3% of Hispanic and 39.4% of White residents' time was spent with a POLST calling for no resuscitation and limited or comfort care ( $p<0.001$  for difference in differences comparison between White and Black and White and Hispanic residents) (Supplemental Table 3).

### Unsigned POLST forms

In 2011, 5.9% of the time White nursing home residents had a POLST containing a CPR that was unsigned, compared to 8.1% of Hispanic and 9.6% of Black residents. The percentage of time with an unsigned CPR order decreased across race and ethnicity without significant differences except that other race decreased more than White residents (Supplemental Table 4). Unsigned POLST with a DNR order ranged from 3.6% of Black residents' time to 5.9% of White residents' time. This decreased more for White compared to Black, Hispanic or Asian/Pacific Islander residents ( $p<0.001$  for all three comparisons) yielding 2.6% to 4.1% of the time spent with an unsigned POLST with a DNR order across race and ethnicity in 2016 (Figure 3). As seen in Supplemental Table 5, nearly all of these unsigned POLST forms also contained directions concerning treatment aggressiveness.

### **POLST content of long-stay versus short-stay residents by race over time**

The pattern of POLST completion for long-stay residents mirrored that of the full sample (Supplemental Figure 1). Among short-stay residents, the pattern differed from the overall sample only in that Hispanic residents had a significantly smaller increase in POLST with DNR from 2011 to 2016 and POLST with DNR and Selective treatment or Comfort care (Supplemental Figure 2).

## **DISCUSSION**

Between 2011 and 2016, POLST completion among residents of California nursing homes increased every year – overall and by racial and ethnic group. By 2016, there was minimal variation in POLST completion by race and ethnicity among nursing home residents. However, POLST content differences widened over this six-year span with Black and Hispanic residents having POLST documents containing orders for even greater intensity of care compared to White nursing home residents. Case-mix did not explain these differences.

The stark differences in planned intensity of care in the setting of future clinical deterioration for nursing home residents in 2016 (41% of Black, 36% of Hispanic and 26% of White residents wanted fully aggressive treatment) demands exploration given that POLST completion occurs outside the hospital and should reflect considered advance care planning. Why do patients and families of different races and ethnicities make such different choices? Considerable research has described many of the underpinnings of these differences. Black<sup>19</sup> and Hispanic individuals<sup>20</sup> access medical care less easily than White people, receiving less primary and preventive care<sup>21</sup> and fewer organ transplants,<sup>22</sup> which translates into poorer health outcomes.<sup>23</sup> Non-white nursing home residents report poorer quality of life.<sup>24</sup> Other factors include historical prejudice, racism, segregation and socioeconomic factors.<sup>25</sup> Families of Black decedents report worse physician communication toward the end of life compared to families of White decedents.<sup>26</sup> Each of these plays a role in Black patients engaging less often in advance care planning with health care providers and receiving more burdensome treatments at the end of life.<sup>27</sup> This is not to say that all racial or ethnic groups should display the same set of attitudes and beliefs such that POLST content should be identical. However, if societal and provider disparities were reduced, one might anticipate a narrowing of variation in POLST orders across race and ethnicity.<sup>28</sup>

Studies identify mistrust that clinicians will not provide all appropriate treatment.<sup>29,30</sup> It is not hard to understand why an individual would be reluctant to complete a document limiting aggressiveness of care if there is concern that all indicated treatments would not be offered. Other salient factors include the importance of spirituality in coping,<sup>31</sup> less prognostic awareness,<sup>32</sup> belief in a higher power controlling health and the timing and nature of death,<sup>33</sup> and the prioritized role of family over personal autonomy in medical decision-making.

While the six-year span presented in this analysis precedes the recent emphasis on equity and justice in American society, recognition that differences in aggressiveness of care plans were becoming more – not less – disparate in nursing homes just six years ago should focus

attention on the predisposing factors driving disparate choices and call for improvement in how clinicians implement advance care planning with Black and Hispanic individuals.<sup>34</sup> A nationally representative study of men with HIV showed that Black (but not Hispanic) men were more willing to tolerate adverse health states than White men, but there was no difference between Black, Hispanic and White men in perspective toward aggressiveness of treatment.<sup>35</sup> POLST content is a valuable window into how vulnerable nursing home residents and their families plan for the future. Because the document requires signatures of both the clinician and the patient (or appropriate proxy), this instrument should reflect a conversation that integrates prognosis, potential outcomes and the patient's goals. Future research should not only track trends in POLST use and content across racial and ethnic groups, but also should explore the underpinnings of these preferences in order to evaluate the degree to which decision-making is encumbered by disparities in trust, access and communication.

### Limitations

This is a retrospective examination of routinely collected POLST data. Health events, patient-physician discussions, and dates and circumstances of POLST completion and intensity of care cannot be determined with these data. As observational data, unmeasured biases and confounding cannot be ruled out. Despite these limitations, this study provides a population-based examination of racial and ethnic differences in care preferences among vulnerable individuals outside of an acute care setting.

### Conclusion

Racial and ethnic differences in POLST intensity of care orders increased between 2011 and 2016. Studies of newer POLST data are imperative to evaluate if we are improving or drifting further in the wrong direction.

### Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

### ACKNOWLEDGEMENTS

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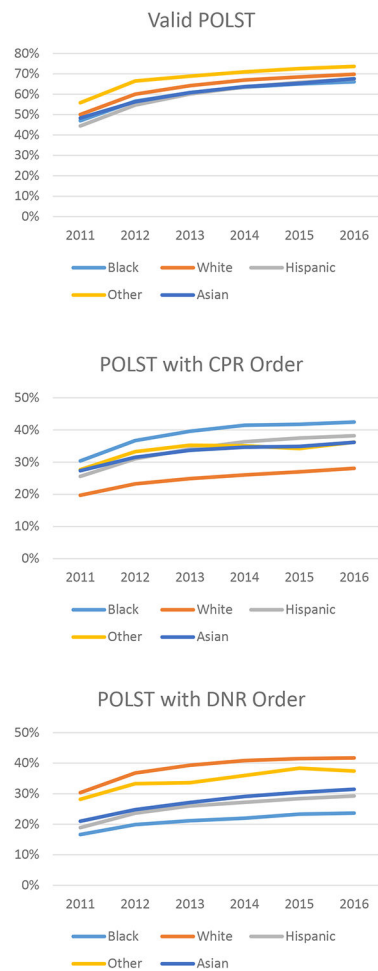
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**Key Points**

Treatment preferences reflected in POLST became more divergent between White nursing home residents and Black and Hispanic residents between 2011 and 2016 in California.

**Why does this matter?**

Because POLST captures decision-making between clinician and patient/family, it may reflect progress toward equity. Divergence across race and ethnicity suggests stagnation; newer data are needed to drive improvement.



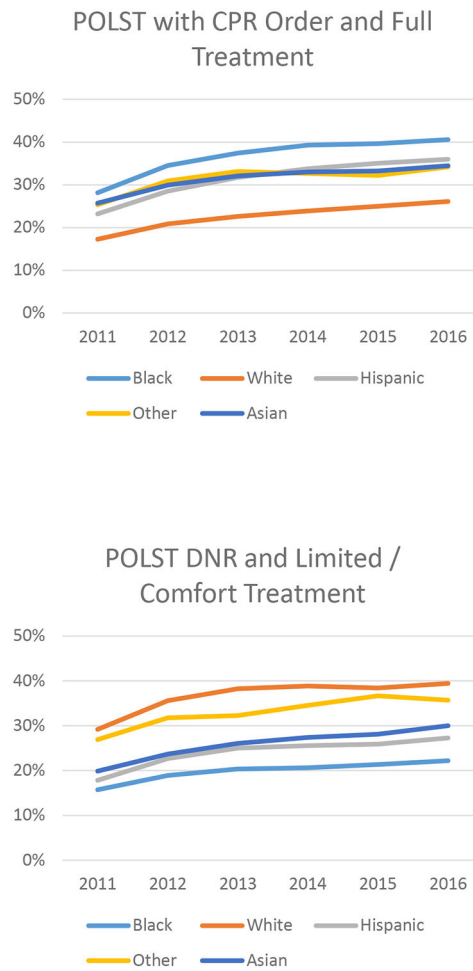
**Figure 1. POLST Completion, POLST with CPR and POLST with DNR, by Race, by Year, Adjusted**

Panel A shows the trend in the percent of valid POLST forms among all California nursing home residents from 2011 to 2016 by racial/ethnic group (adjusted).

Panel B shows the trend in the percent of POLST forms indicating a preference for CPR among all California nursing home residents from 2011 to 2016 by racial/ethnic group (adjusted).

Panel C shows the trend in the percent of POLST forms indicating a preference for DNR among all California nursing home residents from 2011 to 2016 by racial/ethnic group (adjusted).

**Figures 1A-1C:** Note that the y-axis for Valid POLST is 0-80% and for POLST with CPR and DNR is 0-50%. Predicted values adjusted for age, gender, cognitive function, functional status, and comorbidity.

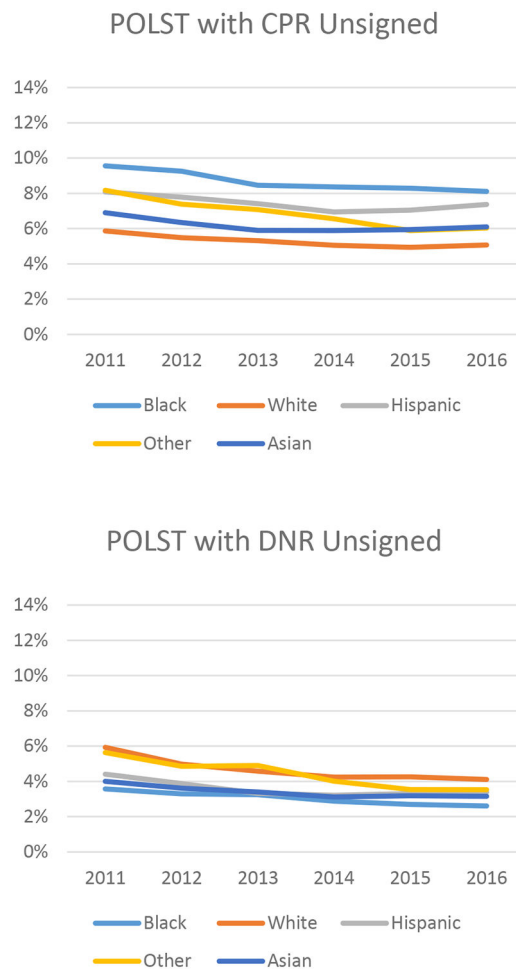


**Figure 2. POLST with CPR and Full Treatment and POLST with DNR and Selective treatment/ Comfort measures only, by Race, by Year, Adjusted**

Panel A shows the trend in the percentage of POLST forms indicating a preference for CPR with full treatment among all California nursing home residents from 2011 to 2016 by racial/ethnic group (adjusted).

Panel B shows the trend in the percentage of POLST forms indicating a preference for DNR and selective treatment/comfort measures among all California nursing home residents from 2011 to 2016 by racial/ethnic group (adjusted).

Predicted values adjusted for age, gender, cognitive function, functional status, and comorbidity.



**Figure 3 –. Unsigned POLST containing a CPR order and Unsigned POLST containing a DNR order, by Race and Year, Adjusted**

Panel A shows the trend in the percentage of unsigned POLST forms indicating a preference for CPR among all California nursing home residents from 2011 to 2016 by racial/ethnic group (adjusted).

Panel B shows the trend in the percentage of unsigned POLST forms indicating a preference for DNR among all California nursing home residents from 2011 to 2016 by racial/ethnic group (adjusted).

Predicted values adjusted for age, gender, cognitive function, functional status, and comorbidity.

**Table 1 –**

Characteristics of Nursing Home Residents by Race and Ethnicity and Length of Stay, N = 1,120,376

| Characteristics or Variables            | White          | Black        | Hispanic       | Asian        | Other Race   |
|---|----------------|--------------|----------------|--------------|--------------|
| Age, mean years                         | 78.0           | 71.9         | 74.0           | 79.9         | 77.0         |
| Age < 65 years, %                       | 17.0           | 30.6         | 23.8           | 13.0         | 18.0         |
| Age ≥ 65 years, %                       | 83.0           | 69.4         | 76.2           | 87.1         | 82.0         |
| Male, %                                 | 35.8           | 43.0         | 45.2           | 36.6         | 38.2         |
| <b>Cognitive Impairment</b>             |                |              |                |              |              |
| Intact                                  | 39.7           | 35.8         | 31.4           | 24.0         | 36.2         |
| Mild                                    | 20.5           | 19.4         | 20.0           | 19.7         | 20.8         |
| Moderate                                | 28.3           | 28.8         | 33.5           | 38.3         | 30.8         |
| Severe                                  | 11.5           | 16.0         | 15.0           | 18.0         | 12.3         |
| Comorbidity Count, mean                 | 4.2            | 4.5          | 4.4            | 4.3          | 4.2          |
| <b>Activities of Daily Living, mean</b> | 17.6           | 18.5         | 18.3           | 18.7         | 18.1         |
| 0-7 (least dependent)                   | 9.9            | 11.4         | 10.0           | 9.9          | 8.5          |
| 8-14                                    | 15.6           | 13.6         | 15.12          | 14.10        | 15.31        |
| 15-21                                   | 50.1           | 38.3         | 43.5           | 40.8         | 49.4         |
| 22-28 (most dependent)                  | 24.3           | 36.6         | 31.4           | 35.2         | 26.8         |
| Long-Stay Residents                     | 80.6           | 88.4         | 86.5           | 87.6         | 77.2         |
| Number of Patients                      | 730,529 (65.2) | 80,981 (7.2) | 146,437 (13.1) | 86,126 (7.7) | 76,303 (6.8) |

All variables are weighted by residents' time in the nursing home except for number of patients.

White = non-Hispanic White, Asian includes Pacific Islander patients

Numbers are percents unless otherwise indicated.