Examining Wage Disparities by Race and Ethnicity of Health Care Workers

Bianca K. Frogner, PhD and Malaika Schwartz, MPH

Background: Prior studies demonstrated that wage disparities exist across race and ethnicity within selected health care occupations. Wage disparities may negatively affect the industry’s ability to recruit and retain a diverse workforce throughout the career ladder.

Objective: To determine whether wage disparities by race and ethnicity persist across health care occupations and whether disparities vary across the skill spectrum.

Research Design: Retrospective analysis of 2011–2018 data from the Current Population Survey using Blinder-Oaxaca decomposition regression methods to identify sources of variation in wage disparities. Separate models were run for 9 health care occupations.

Subjects: Employed individuals 18 and older working in health care occupations, categorized by race/ethnicity.

Measures: Annual wages were predicted as a function of race/ethnicity, age, sex, marital status, having a child under 5 in the household, living in a metro area, highest education attained, and usual hours worked.

Results: Non-Hispanics consistently made more than Hispanic licensed practical/vocational nurses (LPNs/LVNs), aides/assistants, technicians, and community-based workers. Asian/Pacific Islanders consistently made more than Black, American Indian/Alaska Native, and Multiracial individuals across occupations except physicians, advanced practitioners, or therapists. Asian/Pacific Islanders only made significantly less when compared with White physicians, but more than White advanced practitioners, registered nurses, LPNs/LVNs, and aides/assistants. Based on observed attributes, Black registered nurses, LPNs/LVNs, and aides/assistants were predicted to make more than their White peers, but unexplained variation negated these gains.

Conclusions: Many wage gaps remained unexplained based on measured factors warranting further study. Addressing wage disparities is critical to advance in careers and reduce job turnover.

Key Words: health workforce, health professionals, wages, discrimination, race, ethnicity

(Med Care 2021;59: S471–S478)
effort to understand the factors contributing to the lack of diversity within those professions. According to one study, race was not an explanatory factor for wage differentials among physicians. The results have been mixed among PAs where they exist, across multiple occupations using a nationally representative dataset and applying a common wage decomposition method from the labor economics literature developed by Blinder and Oaxaca to identify factors contributing to wage gaps. An additional contribution to the literature, this study examines multiple racial pairings such that White health care workers are not the only reference group. This study includes comparisons between Black and Asian health care workers, for example, which are growing segments of the health workforce and often well-represented in certain occupations such as RNs, nursing assistants, or home health aides. Providing this holistic view of occupations may inform where in the pipeline health care is losing diversity in its workforce and support the development of targeted solutions.

METHODS

Data and Sample

This study pooled 2011–2018 data from the Current Population Survey (CPS), a nationally representative monthly survey of ~60,000 jointly collected by the Bureau of Labor Statistics and US Census Bureau. The year 2011 was chosen as the start date to ensure consistency in occupation codes across subsequent years. We used the Annual Social and Economic Supplement (also known as the March Supplement), which provides detailed data on wages and income, job characteristics, and sociodemographic characteristics, as well as information on an individual’s occupation and industry. The data were extracted from IPUMS.

Our sample included employed individuals 18 years or older working in health care occupations defined by Census occupation codes. We grouped 52 occupation codes into 9 categories based on similarity in title, education, and skill (see Appendix Table A for details, Supplemental Digital Content 1, http://links.lww.com/MLR/C303); (1) physician; (2) advanced practitioner (eg, dentists, pharmacists, physician assistants); (3) advanced practice registered nurse (APRN); (4) RN; (5) licensed practical nurse/licensed vocational nurse (LPN/LVN); (6) aide/assistant; (7) therapist; (8) technician/technologist (Tech); and (9) community-based worker (eg, social workers, counselors) (CBW). We categorized individuals into 1 of 5 racial categories as defined by CPS: (1) White; (2) Black; (3) Asian/Pacific Islander (API); (4) American Indian/Alaska Native (AIAN); or (5) multiracial. Individuals were also categorized by ethnicity: Hispanic or not Hispanic. Our unweighted sample included 76,606 respondents working in 1 of the 9 health care occupations representing 140,871,294 individuals when weighted.

Measures

Our outcome measure was an individual’s self-reported annual pretax wage and salary income (referred hereafter as wages) received within the prior calendar year. Wages were converted to 2018 dollars based on the Consumer Price Index and logged to reduce the influence of outliers. We used binary variables to control for factors that could influence wages including self-identifying as female, being born outside of the United States, having less than a baccalaureate degree as their highest degree, being married, having a child under 5 years old in the household, and living in a metro area. We had a categorical variable for whether the individual worked in 1 of 4 sectors defined by Census industry codes: (1) hospital; (2) ambulatory care (eg, physician offices, outpatient care); (3) long-term care (eg, skilled nursing facilities, home health); and (4) other (including nonhealth care settings). We included continuous variables controlling for the usual hours worked per week, age, and a quadratic term for age given extensive research suggesting a nonlinear relationship between age and wage. We also included year dummies.

Analysis

Descriptive sociodemographic characteristics were calculated within each health care occupation and wages were calculated by race/ethnicity and occupation. We used the Blinder-Oaxaca decomposition method to identify the significant differences in wages and the factors contributing to those difference between race/ethnic groups within each occupation. While extensive literature exists describing the Blinder-Oaxaca method, briefly, we used a 2-fold method to identify the explained and unexplained portion of a wage gap between 2 defined groups (eg, White physicians versus Black physicians) based on a set of observable characteristics. The wage gap is defined as the difference in predicted wages for each group. The explained portion of the gap is the difference between the wages predicted for Black physicians based on their own characteristics versus the wages predicted for Black physicians assuming they had the same attributes as White physicians. For example, Black physicians may be younger with fewer years of experience than White physicians, so the Blinder-Oaxaca method estimates wages assuming Black physicians had the same age distribution as among the White physicians in the sample. The remaining portion of the wage differential is referred to as the “unexplained” portion and is often interpreted as an indicator of discrimination. A variation on the 2-fold model is the 3-fold model that further disaggregates the discrimination factor attributable to each
RESULTS

Characteristics of the Health Workforce

In our pooled weighted sample of 140,871,294 over 8 years, 6.1% were physicians, 9.6% were advanced practitioners, 11.1% were APRNs, 18.4% were RNs, 3.7% were LPNs/LVNs, 27.8% were aides/assistants, 3.7% were therapists, 13.4% were techs, and 16.2% were CBWs (Table 1). The overall sample was 73.3% White, 16.4% Black, 7.8% API, 0.9% AIAN, and 1.6% multiracial. Regarding ethnicity, 11.3% identified as Hispanic with the remaining 88.7% not identifying as Hispanic. About 15% of the sample were not born in the United States, with 10.3% being naturalized citizens and 5.4% not US citizens. Over three-fourths of the sample identified as female. The average age of the sample was 42.5 years old. Over half were married and about 15% had at least one child in the household under the age of 5 years old. Most of the sample lived in a metropolitan area. About half the sample held below a bachelor’s degree, with distribution of education relatively aligned by requirements of the occupation (note that education is self-reported, which may contribute to seemingly inconsistent findings).

Several characteristics varied considerably across health care occupations. Over 80% of advanced practitioners, APRNs, and therapists were White. LPNs/LVNs and aides/assistants had the highest percentage of non-Whites with over a quarter of its workers being Black. Physicians had the highest percentage of API at 20.4%, which was twice the representation as the next occupation—advanced practitioners. Hispanics had the most representation among aide/assistant occupations at 18.1% and least representation among APRN occupations at 4.3%. Physicians had the highest percentage of immigrants (20.3% naturalized and 8.3% not a US citizen) followed by aides/assistants (11.6% naturalized and 9.6% not a US citizen). In our sample, females represented only 38.4% of the physicians responding to the survey while females were nearly 90% of RNs and LPNs/LVNs. Age was relatively similar across the sample with physicians being among the oldest at 46.3 years old and techs being the youngest at 40.1 years old. Physicians and APRNs were most

### TABLE 1. Sociodemographic and Work Characteristics by Health Care Occupation, Pooled 2011–2018

| Characteristics                          | All          | Physician   | Advanced Practitioner | APRN | RN     | LPN/LVN | Aide/Assistant | Therapist | Tech | CBW |
|-----------------------------------------|--------------|-------------|-----------------------|------|--------|---------|---------------|-----------|------|-----|
| Unweighted sample size                  | 76,606       | 4601        | 7384                  | 832  | 14,227 | 2820    | 21,000        | 2726      | 9984 | 13,032 |
| Weighted sample size (thousands)        | 140,871      | 8660        | 13,677                | 1533 | 26,140 | 5269    | 38,483        | 5170      | 18,955 | 22,984 |
| Race (%)                                |              |             |                       |      |        |         |               |           |      |      |
| White                                   | 73.4         | 72.0        | 82.9                  | 84.0 | 77.8   | 65.0    | 63.3          | 81.0      | 78.6 | 75.7  |
| Black                                    | 16.3         | 6.2         | 6.1                   | 8.3  | 11.6   | 27.2    | 26.8          | 8.5       | 11.6 | 17.8  |
| Asian/Pacific Island                    | 7.8          | 20.2        | 9.8                   | 6.4  | 9.0    | 5.1     | 6.6           | 7.6       | 7.3  | 4.0   |
| American Indian/Alaska Native           | 0.9          | 0.3         | 0.3                   | 0.1  | 0.6    | 1.1     | 1.4           | 0.7       | 0.7  | 1.0   |
| Multiracial                             | 1.5          | 1.3         | 0.9                   | 1.3  | 1.0    | 1.6     | 2.0           | 2.2       | 1.9  | 1.5   |
| Hispanic (%)                            | 11.1         | 5.7         | 5.9                   | 4.3  | 6.7    | 10.8    | 17.9          | 9.2       | 11.4 | 10.7  |
| Immigrant status (%)                    |              |             |                       |      |        |         |               |           |      |      |
| Native born                             | 84.3         | 71.4        | 87.4                  | 88.9 | 85.0   | 85.3    | 78.8          | 88.1      | 88.0 | 91.0  |
| Naturalized                             | 10.4         | 20.4        | 9.2                   | 10.0 | 11.4   | 9.7     | 11.8          | 6.9       | 8.2  | 6.6   |
| Not US citizen                          | 5.4          | 8.2         | 3.3                   | 1.1  | 3.6    | 5.0     | 9.5           | 5.0       | 3.8  | 2.4   |
| Female (%)                              | 78.3         | 38.4        | 66.2                  | 85.6 | 90.1   | 89.9    | 87.5          | 77.4      | 71.8 | 73.8  |
| Age (y)                                 | 42.7         | 46.3        | 44.0                  | 45.4 | 43.7   | 43.1    | 40.9          | 41.5      | 40.3 | 44.3  |
| Married (%)                             | 56.4         | 76.2        | 68.6                  | 77.0 | 63.9   | 52.1    | 41.9          | 54.1      | 55.4 | 58.5  |
| Has a child under (%)                   | 14.9         | 19.2        | 17.9                  | 22.2 | 15.0   | 13.9    | 13.9          | 12.9      | 14.8 | 13.1  |
| Lives in a metro area (%)               | 85.8         | 94.4        | 89.8                  | 86.5 | 85.8   | 79.3    | 82.9          | 86.6      | 85.5 | 86.7  |
| Educational degree (%)                  |              |             |                       |      |        |         |               |           |      |      |
| High school or below                    | 17.4         | 0.5         | 3.0                   | 1.5  | 1.4    | 20.7    | 44.5          | 9.3       | 16.2 | 8.0   |
| Post-secondary/associate                | 33.3         | 1.5         | 6.0                   | 2.9  | 35.6   | 70.6    | 44.2          | 40.4      | 51.3 | 17.7  |
| Bachelor’s                              | 25.1         | 2.1         | 20.3                  | 4.1  | 53.3   | 6.7     | 9.2           | 26.6      | 26.6 | 35.5  |
| Master’s and above                      | 24.2         | 95.9        | 70.7                  | 91.6 | 9.7    | 2.0     | 2.1           | 23.7      | 5.9  | 38.8  |
| Part-time (%)                           | 21.2         | 8.0         | 23.1                  | 19.6 | 18.6   | 19.2    | 30.3          | 32.6      | 19.6 | 12.2  |
| Usual hours worked per week (#)         | 38.5         | 50.4        | 37.9                  | 39.3 | 37.6   | 38.1    | 36.0          | 34.7      | 38.6 | 40.3  |

APRN indicates advanced practice registered nurse; CBW, community-based worker; LPN/LVN, licensed practical nurse/licensed vocational nurse; RN, registered nurse; Tech, technician/technologist.
likely to be married (76.1% and 76.7%, respectively) while aides/assistants were least likely to be married at 41.5%. There was little variation in the percent that lived in a metropolitan area.

**Hours Worked and Average Annual Wages**

The average usual hours worked per week was 38.5 hours, ranging from 35 to 40 hours of work per week, which is often defined as full-time work. About one-fifth of the sample worked part-time, defined as 35 hours or less per week (Table 1).  

Physicians reported working the most hours at about 50 hours per week usually and the lowest percentage working part-time at 8.0%. Therapists had the lowest hours per week (34.7 h) and the highest percentage working part-time (32.6%).

Annual wages averaged $56,695 with a wide range from as high as $181,304 among physicians to as low as $24,909 among aides/assistants, an over 7-fold difference (Table 2). Generally, wages were higher among occupations with higher education requirements. Average annual wages varied considerably across race and ethnicity with API health care workers having the highest average annual wage at $76,959 and AIAN workers having the lowest at $40,399. White workers and non-Hispanic workers were nearly on par due to the high degree of overlap in the number of people self-identifying with each of these characteristics. Although wage gaps between races remained consistent over time with API health care workers in aggregate making the highest wage on average per year (Appendix Figure A, Supplemental Digital Content 2, http://links.lww.com/MLR/C304), wages by race/ethnicity varied within occupations. For example, API workers were not the highest earners among physicians or advanced practitioners. Multiracial workers reported the lowest annual wages for 5 out of the 9 occupations (physicians, advanced practitioners, LPNs/LVNs, aides/assistants, and CBWs) while AIANs reported the lowest annual wages for 3 out of the 9 (RNs, therapists, and techs).

**TABLE 2. Average Annual Wages by Race/Ethnicity and Health Care Occupation, Pooled 2011–2018**

| Occupation                              | All Races/Ethnicities | Non-Hispanic | Hispanic | White | Black | Asian/Pacific | American Indian/Alaska Native | Multiracial |
|-----------------------------------------|-----------------------|--------------|----------|-------|-------|---------------|-------------------------------|-------------|
| All health care occupations             | £56,695               | £58,388      | £43,156  | £58,148| £42,295| £76,959       | £40,399                       | £46,183     |
| N = 140,871,294                         | N = 125,212,905       | N = 15,658,388| N = 103,449,634 | N = 22,986,489 | N = 11,033,431 | 1,228,676 | 2,173,064       |
| Physician                               | £181,304              | £182,324     | £164,549 | £186,294| £173,580| £169,208      | £152,056                       | £136,215    |
| N = 8,660,965                           | N = 8,164,141         | N = 496,824  | N = 6,237,760 | N = 53,850       | N = 1,748,104 | 27,654 | 111,591         |
| Advanced practitioner                   | £83,467               | £83,554      | £82,085  | £82,270| £76,864| £98,219       | £92,047                       | £74,911     |
| N = 13,677,023                          | N = 12,867,645        | N = 809,379  | N = 11,343,895 | N = 832,045       | N = 1,336,352 | 44,275 | 120,457         |
| Advanced practice registered nurse      | £90,076               | £90,520      | £80,139  | £92,110| £71,131| £86,792       | £89,356                       | £96,397     |
| N = 1,532,742                           | N = 1,467,164         | N = 65,758   | N = 1,286,828 | N = 127,654       | N = 97,270 | 1,186 | 19,305          |
| Registered nurse                        | £63,283               | £63,300      | £62,629  | £61,765| £60,854| £78,741       | £55,814                       | £74,706     |
| N = 26,139,782                          | N = 24,399,224        | N = 1,740,558| N = 20,332,041 | N = 3,037,409    | N = 2,357,205 | 153,926 | 259,201         |
| Licensed practical nurses/licensed      | £40,557               | £41,150      | £35,662  | £40,560| £39,039| £51,880       | £37,359                       | £32,570     |
| vocational nurse                        | £1,555                | £1,746       | £1,394   | £1,226| £1,002| £1,102        | £1,102                       | £1,432,346  |
| N = 5,268,830                           | N = 4,699,368         | N = 509,462  | N = 2,432,275 | N = 1,432,346    | N = 268,497 | 58,484 | 86,227          |
| Aide/assistant                          | £24,909               | £25,170      | £23,716  | £24,809| £24,775| £26,934       | £24,523                       | £23,491     |
| N = 38,482,761                          | N = 31,594,192        | N = 6,888,565| N = 24,349,841 | N = 10,306,628   | N = 2,532,119 | 532,653 | 761,521         |
| Therapist                               | £39,862               | £39,953      | £38,959  | £38,860| £44,123| £48,361       | £32,173                       | £33,488     |
| N = 5,170,356                           | N = 4,695,495         | N = 474,862  | N = 4,186,833 | N = 439,391       | N = 392,535 | 36,769 | 114,828         |
| Technician/technologist                 | £44,284               | £44,680      | £41,202  | £44,236| £43,890| £47,326       | £35,606                       | £40,235     |
| N = 18,954,857                          | N = 15,904,196        | N = 2,159,018| N = 14,893,105 | 2,194,802       | 1,379,058 | 135,810 | 350,082         |
| Community-based worker                  | £55,030               | £55,658      | £49,778  | £56,407| £47,627| £66,814       | £47,961                       | £46,540     |
| N = 22,983,975                          | N = 20,529,833        | N = 2,454,142| N = 17,396,055 | 4,080,359       | 923,291 | 234,418 | 349,852         |

*Unweighted sample includes only 1 observation.
Wages adjusted for consumer price index to 2018 prices.
TABLE 3. Wage Decomposition by Race/Ethnicity and Health Care Occupation (Non-Hispanic and White as Reference Group)

| Occupation | Non-Hispanic Compared With | White Compared With |
|------------|---------------------------|---------------------|
| Physician  |                           |                     |
| Wage gap   | $13,414                   | $23,889*             | $14,892* | $20,216 | $54,746* |
| Explained  | $7313                     | $14,703*             | $16,088*** | $19,967 | $43,716* |
| Unexplained| $6101                     | $9186                | $11196   | $15,388 | $34,601 |
| Advanced practitioner |               |                     |
| Wage gap   | $60                       | $8658*               | $14,580*** | $15,290 | $923    |
| Explained  | $874                      | $3149               | $4154    | $20      | $386    |
| Unexplained| $813                      | $5,508              | $10,425** | $15,309 | $149,723|
| Advanced practice registered nurse |           |                     |
| Wage gap   | $3247                     | $13,703*             | $1647    | NA      | $1644   |
| Explained  | $7466                     | $7721               | $17,035  | $17,388 | $4412   |
| Unexplained| $8075                     | $5982               | $15,388  | $4125   | $125    |
| Registered nurse |                    |                     |
| Wage gap   | $311                      | $4627***             | $6856*** | $1386   | $1934   |
| Explained  | $3588*                    | $4454***             | $4640*   | $2932   | $14     |
| Unexplained| $3168*                    | $3704**              | $2378    | $2626   | $125    |
| Licensed professional nurse/licensed vocational nurse |   |                     |
| Wage gap   | $3860*                    | $843                | $5449*   | $2071   | $3325   |
| Explained  | $692                      | $2861**              | $3071    | $355    | $4196   |
| Unexplained| $3168*                    | $3704**              | $2378    | $2626   | $125    |
| Aide/assistant |                |                     |
| Wage gap   | $915**                    | $181               | $1447*   | $2310   | $1666   |
| Explained  | $435                      | $1083***             | $1453**  | $1030   | $267    |
| Unexplained| $1350***                  | $903**              | $6       | $1280   | $1399   |
| Therapist  |                           |                     |
| Wage gap   | $819                      | $1226               | $2541    | $7032   | $6958   |
| Explained  | $3950                     | $1287               | $902     | $4681*  | $5211   |
| Unexplained| $3130                     | $2513               | $1640    | $2351   | $1748   |
| Technician/technologist |           |                     |
| Wage gap   | $3211**                   | $1733               | $2516    | $5626*  | $2172   |
| Explained  | $3561***                  | $586               | $4240**  | $1907   | $2606*  |
| Unexplained| $350                      | $2320*              | $1724    | $7532*** | $-434   |
| Community-based worker |             |                     |
| Wage gap   | $5571***                  | $5257***            | $2825    | $1982   | $304*   |
| Explained  | $5380***                  | $1864**             | $984     | $4976*** | $359    |
| Unexplained| $191                      | $3401***            | $1841    | $2994   | $7945** |

Except as noted, models include binary variables for being female, not being born in the U.S., having less than a Baccalaureate as the highest degree, being married, having a child under 5 in the household, living in a metro area; categorical variable for health care sector: hospital [reference], ambulatory care, long-term care, and other; continuous variables of age, age squared, and usual hours of work; and year dummies. In models comparing racial groups, a binary variable for being Hispanic was included. Non-Hispanic versus Hispanic model included race categories as control variables: White [reference], Black, Asian/Pacific Islander, American Indian/Alaska Native, and Multiracial.

¶Advanced Practice Registered Nurse model does not expand race categories.

§Physician model does not expand categories for health care sector; Advanced Practitioner model does not expand health care sector or years; Therapist model excludes not being born in US, having less than a Baccalaureate, and living in a metro area and does not expand categories for health care sector or years.

NA indicates data not available.

*P ≤ 0.05.

**P ≤ 0.01.

***P ≤ 0.001.

Explaining Variation in Average Annual Wages

All professions except therapists had at least 1 race/ethnicity pair with a significant wage gap (Tables 3, 4). Among physicians, White physicians had significantly higher wages than Black ($23,889), API ($14,892), or multiracial ($54,746) physicians. Observable factors such as differences in sex, age, and marital status significantly explained most of the wage gap (Appendix Table B, Supplemental Digital Content 3, http://links.lww.com/MLR/C305). Among advanced practitioners, API advanced practitioners made significantly more than White ($14,580) and Black advanced practitioners ($23,237), and White and AIAN advanced practitioners made significantly more than Black advanced practitioners ($8658 and $23,947, respectively). The gap between AIAN and Black advanced practitioners is mostly explained by measured factors, notably the distribution of Hispanics (as indicated by the negative sign among the significantly contributing explained factors in Appendix Table C, Supplemental Digital Content 4, http://links.lww.com/MLR/C306). Most of the gap between White versus API advanced practitioners as well as Black versus API advanced practitioners was unexplained by the included measures in the study, although advancing age may have been a contributing factor for the difference between Black versus
TABLE 4. Wage Decomposition by Race/Ethnicity and Health Care Occupation (Asian/Pacific Islander, Black, and American Indian/Alaska Native as Reference Group)

| Occupation                        | Black Compared With | American Indian/Alaska Native† | Multiracial‡ | Black Compared With | American Indian/Alaska Native† | Multiracial‡ | Multiracial‡ |
|-----------------------------------|---------------------|-------------------------------|--------------|-------------------|-------------------------------|--------------|--------------|
| Physician                         |                     |                               |              |                   |                               |              |              |
| Wage gap                          | $8997               | $6,782                        | $39,854      | $-2,885           | $30,858                       | $32,917      |
| Explained                         | $-4,472             | $-10,708                      | $21,526      | $-4,066           | $24,880                       | $64,147      |
| Unexplained                       | $13,469             | $17,544                       | $18,329      | $1,181            | $5,978                        | $-31,230     |
| Advanced practitioner             |                     |                               |              |                   |                               |              |              |
| Wage gap                          | $23,237***          | $-710                         | $15,503      | $-23,947*         | $-7775                        | $16,213      |
| Explained                         | $7,558              | $4600                         | $4527        | $-20,562*         | $-212                         | $1853        |
| Unexplained                       | $15,679***          | $-5310                        | $10,975      | $-3385            | $-7522                        | $14,360      |
| Advanced practice registered nurse|                     |                               |              |                   |                               |              |              |
| Wage gap                          | $12,056             | NA                            | $-223        | NA                | $-15,262                      | NA           |
| Explained                         | $-17,706            | $-12,219                      | NA           | $-9,216           | NA                            |              |
| Unexplained                       | $29,762***          | $11,996                       | $-6,046      |                   |                               |              |
| Registered nurse                  |                     |                               |              |                   |                               |              |              |
| Wage gap                          | $11,324***          | $12,882*                      | $13,431*     | $1558             | $2107                         | $549         |
| Explained                         | $1099               | $17,575                       | $5385        | $1156             | $4561                         | $6892        |
| Unexplained                       | $10,225***          | $11,125                       | $8,046       | $402              | $-2454                        | $-6343       |
| Licensed professional nurse/license vocational nurse |               |                               |              |                   |                               |              |              |
| Wage gap                          | $6,291*             | $7,520                        | $11,114*     | $1228             | $4823                         | $3594        |
| Explained                         | $309                | $16,533                       | $2595        | $1582             | $4640*                        | $8130        |
| Unexplained                       | $5,983*             | $5,887                        | $8520        | $-353             | $182                          | $-4535       |
| Aide/assistant                    |                     |                               |              |                   |                               |              |              |
| Wage gap                          | $1,266              | $3,757*                       | $3,113*      | $2,491            | $1,847                        | $-644        |
| Explained                         | $142                | $961                          | $1,997       | $1,678            | $1,404                        | $-71         |
| Unexplained                       | $1,124              | $2,796*                       | $1,116       | $813              | $443                          | $-573        |
| Therapist                         |                     |                               |              |                   |                               |              |              |
| Wage gap                          | $3,767              | $8,823                        | $8,749       | $6,774            | $6,700                        | $-574        |
| Explained                         | $4,581              | $16,035                       | $6,346       | $-49              | $813                          | $-1673       |
| Unexplained                       | $-814               | $-7,212                       | $2,404       | $6,951            | $-1,484                       | $1,599       |
| Technician/technologist           |                     |                               |              |                   |                               |              |              |
| Wage gap                          | $4,249*             | $8,142**                      | $4,689       | $3,893            | $4,39                          | $-3,453      |
| Explained                         | $4,275**            | $-2,028                      | $6,025**     | $-1,443           | $2,007                        | $6,616       |
| Unexplained                       | $-25                | $10,170**                     | $-1,337      | $5,336            | $-1,568                       | $-10,069     |
| Community-based worker            |                     |                               |              |                   |                               |              |              |
| Wage gap                          | $8092***            | $4,808                        | $11,130*     | $-3,284           | $3,038                        | $6,322       |
| Explained                         | $3,275*             | $5,967*                       | $3,979       | $2,294            | $-1,101                       | $-4,439      |
| Unexplained                       | $5,335*             | $-11,160                      | $10,733**    | $-5,578*          | $4139                         | $10,761      |

Except as noted, models include binary variables for being female, not being born in the United States, having less than a Baccalaureate as the highest degree, being married, having a child under 5 in the household, living in a metro area; categorical variable for health care sector: hospital [reference], ambulatory care, long-term care, and other; continuous variables of age, age squared, and usual hours of work; and year dummies. In models comparing racial groups, a binary variable for being Hispanic was included. Non-Hispanic versus Hispanic model included race categories as control variables: White [reference], Black, Asian/Pacific Islander, American Indian/Alaska Native, and Multiracial.

†Physician model excludes having less than a Baccalaureate and does not expand categories for health care sector or years; Advanced Practitioner model does not expand health care sector categories; Advanced Practice Registered Nurse model excludes living in a metro area; Therapist model excludes not being born in US, having less than a Baccalaureate, and health care sector, and does not expand categories for years.

‡Physician model does not expand categories for health care sector; Advanced Practice Registered Nurse excludes Hispanic, not US born, having less than a Baccalaureate, and living in a metro area, and does not expand categories for health care sector or years; Registered Nurse model does not expand health care sector categories; Therapist model excludes not being born in US, having less than a Baccalaureate, and living in a metro area and does not expand categories for health care sector or years.

API advanced practitioners (as indicated by the positive sign on age squared among the unexplained variables in Appendix Table C, Supplemental Digital Content 4, http://links.lww.com/MLR/C306). The difference between White and Black advanced practitioners was not attributable to any of the factors measured in this study.

Among nursing professions, White APRNs made significantly more than Black APRNs ($13,703) due to factors not otherwise measured in the study. The wage gap between API and Black APRNs was not significant. Among RNs, APIs made significantly more ($11,497) than Whites, about half ($6856) of which was explained by differences in observable attributes of self-identifying as female, having less than a bachelor’s degree, working more hours per week, living in a metro area, and working in a non-health care sector widening the wage gap. API RNs also made significantly more ($13,431) than Blacks ($11,324), AIAN ($12,882), and Multiracial ($13,431) RNs, which were largely unexplained or could not
be determined by factors included in the study. Although Black RNs could have made significantly more than White RNs, the difference was negated by unexplained factors.

Among LPNs/LVN, Non-Hispanics made significantly more than Hispanics ($3860), and APIs made more than White ($5449), Black ($6291), and Multiracial ($11,114) individuals, with differences largely unexplained or not able to be determined by factors included in the study. Similar to RNs, Black LPNs/LVN could have made significantly more than White LPNs/LVN, but the difference was negated by unexplained factors. Among aides/assistants, non-Hispanics made significantly more than Hispanics ($915), and APIs made significantly more than White ($14,147), AIAN ($3757), and multiracial ($3113) individuals. While the difference between White and API aides/assistants were largely explained by observed factors, the significant difference among the other pairs were largely unexplained or could not be determined by measured factors. Again, any gains that Black aides/assistants could have made over White aides/assistants were negated by unexplained factors.

As mentioned earlier, there were no significant wage gaps among therapists; White therapists potentially could have made significantly more than AIAN therapists based on observed factors, but the significance did not appear at the aggregated level. Among techs, non-Hispanics made significantly more than Hispanics ($3211), and APIs made more than Blacks, both mostly explained by differences in observed attributes. White and API techs made significantly more than AIAN techs ($5626 and $8142, respectively), though most of the wage gap remained unexplained. Among CBWs, non-Hispanics made significantly more than Hispanics ($5571); Whites and APIs made significantly more than Black ($5275 and $8092, respectively) and Multiracial ($8304 and $11,130, respectively) individuals. The wage gap was largely explained by observed factors between non-Hispanics and Hispanics, but largely unexplained between Whites and APIs versus multiracial individuals. The wage gap between Whites and APIs versus Blacks were each about one-third explained by observed factors with the remaining two-thirds unexplained.

DISCUSSION

Our study found wage gaps that persisted across certain race/ethnic group pairs and across the health professions other than therapists. Notably, no significant wage gaps were identified between multiracial and Black health care workers across occupations, and similarly between multiracial and AIAN workers. Where wage gaps existed, being female, older, and having higher education were often common contributors to expanding wage gaps, which is consistent with other studies of the health professions.19–21,34–38

While a blunt categorization of ethnicity, our study found non-Hispanics consistently made more than Hispanics among LPN/LVN, aide/assistant, tech, and CBW occupations. The majority of these workers had below a bachelor’s degree, which reflects the general education requirement of these occupations. Wage gaps in these low-skilled jobs may be contributing to the lack of diversity at higher skilled occupations such as physicians, advanced practitioner, and RNs: Hispanic health care workers may be left without sufficient financial resources to invest in furthering their education. Of those in the higher-skilled jobs, no significant wage gaps were identified.

APIs consistently made more than Black, AIAN, and multiracial individuals across occupations except physicians, advanced practitioners, or therapists where no significant wage gaps were found. APIs only made significantly less when compared to White physicians, but otherwise made more than White advanced practitioners, RNs, LPNs/LVN, and aides/assistants with the remaining occupations having no significant wage gaps. There were, however, significant unexplained differences between APIs versus White and Black advanced practitioners and RNs, as well as versus Black LPNs/LVN and CBWs. While some of the unexplained variation was related to age (ie, advancing age was related to larger wage gaps beyond what would otherwise be predicted), the variation appeared to be due to unmeasured factors in the study. Despite the relatively large role of immigrants in these jobs, particularly from the Philippines among RNs, immigration status did not appear as a significant factor. Warranting further investigation are attributes not measured in this study (eg, quality of education, soft skills) that may be translating to higher wages. This study raises questions as to whether API should be considered as a reference group rather than or in addition to White, which is a common comparator in health workforce analyses, to improve our understanding of where differences exist between race groups.

For Black RNs, LPNs/LVN, and aides/assistants, based on measured attributes such as sex, age, and education, the regression model predicted they would make more than their White peers. Unexplained variation, however, negated these gains and this study provided limited insight as to which attributes were contributing to the unexplained variation. The finding is consistent with another wage decomposition study of hospital-based RNs.22 As described earlier, the unexplained variation is often interpreted as a measure of discrimination and the finding support studies describing the discrimination that Black nurses face in the hiring process as the quality of their education and experience are questioned.39 Discrimination against Black nurses including nursing assistants in the workplace may lead to fewer promotions and opportunities for career advancement than their White peers, which would otherwise translate to higher wages.40

Among the study’s limitations, we did not address selection into these occupations to start, which could otherwise bias the sample particularly in higher-skilled occupations that have greater barriers to entry such as cost and length of education. Several factors that may influence wage were not available in our data including quality of education, the nature of the work being conducted (including the complexity of the roles and tasks), or detailed work setting. Also, race and ethnicity are social constructs that do not fully capture an individual’s life experience that may influence wages.41 We did not capture any income from self-employment or revenue from being a business stakeholder, which may be common among higher-skilled occupations such as physicians or therapists. We also did not know what portion of wages came from what job for multiple job holders, which may be a concern among lower-skilled occupations such as aides/assistants.

Despite these limitations, our study points to areas where further work is needed to understand wage disparities and the extent to which structural racism may be a contributing factor. Addressing wage disparities is important if our society aims to
improve workforce diversity among higher-skilled jobs. Consistently undervaluing Hispanic, Black, AIAN, and multiracial health care workers diminishes their opportunities to move up the health care ladder by making it difficult to afford tuition to get an advanced degree. Also, low wage is accompanied by having lack of access to benefits such as health insurance and sick leave even when working full-time.\textsuperscript{12,43} Unaddressed health problems and work disabilities as well as job dissatisfaction can contribute to turnover, which hurts the diversity of the health workforce pipeline.\textsuperscript{13,44} Our study suggests that wage disparities are pervasive in health care across the skill spectrum, which can threaten the health system’s ability to deliver high quality care that patients expect and deserve.

REFERENCES

1. Jackson CS, Garcia JN. Addressing health and health-care disparities: the role of a diverse workforce and the social determinants of health. \textit{Public Health Rep}. 2014;129(suppl 2):57–61.
2. Williams SD, Hansen K, Smithey M, et al. Using social determinants of health to link health workforce diversity, care quality and access, and health disparities to achieve health equity in nursing. \textit{Public Health Rep}. 2014;129(suppl 2):32–36.
3. Blanchard J, Nayar S, Turie N. Patient-provider and patient-staff racial concordance and perceptions of mistreatment in the health care setting. \textit{J Gen Intern Med}. 2007;22:1184–1189.
4. Villani J, Mortensen K. Decomposing the gap in satisfaction with provider communication between English- and Spanish-speaking Hispanic patients. \textit{J Immigrant Minority Health}. 2014;16:195–203.
5. Schoenthaler A, Montague E, Manwell LB, et al. Patient-physician racial/ethnic concordance and blood pressure control: the role of trust and medication adherence. \textit{Ethn Health}. 2014;19:565–578.
6. Singh S, Evans N, Williams M, et al. Influences of socio-demographic factors and health utilization factors on patient-centered provider communication. \textit{Health Commun}. 2018;33:917–923.
7. Jang Y, Yoon H, Kim MT, et al. Preference for patient-provider ethnic concordance in Asian Americans. \textit{Ethin Health}. 2018;25:1–12.
8. Zhao C, Dowzicky P, Colbert L, et al. Race, gender, and language concordance in the care of surgical patients: a systematic review. \textit{Surgery}. 2019;166:785–792.
9. Alsan M, Garrick O, Graziani G. Does diversity matter for health? Experimental evidence from Oakland. \textit{American Economic Review}. 2019;109(4):4071–4111.
10. Greenwood BN, Hardeman RR, Huang L, et al. Physician-patient racial concordance and disparities in birthing mortality for newborns. \textit{Proc Natl Acad Sci USA}. 2020;117:21194–21200.
11. Institute of Medicine. \textit{In the Nation’s Compelling Interest: Ensuring Diversity in the Health-care Workforce}. Washington, DC: The National Academies Press; 2004.
12. National Academies of Sciences, Engineering, and Medicine. \textit{The Impacts of Racial and Bias on Black People Pursuing Careers in Science, Engineering, and Medicine: Proceedings of a Workshop}. Washington, DC: The National Academies Press; 2020.
13. Spetz J. The nursing profession, diversity, and wages. \textit{Health Serv Res}. 2016;51:505–510.
14. Snyder CR, Froger BK, Skillman SM. Facilitating racial and ethnic diversity in the health workforce. \textit{J Allied Health}. 2018;47:58–65.
15. Goger A, Jackson L. The labor market doesn’t have a “skills gap”—it has an opportunity gap. 2020. Available at: \url{https://www.brookings.edu/blog/the-avenue/2020/09/09/the-labor-market-doesnt-have-a-skills-gap-it-has-an-opportunity-gap/}. Accessed February 25, 2021.
16. Helland LC, Westfall JM, Camargo CA, et al. Motivations and barriers for recruitment of new emergency medicine residency graduates to rural emergency departments. \textit{Ann Emerg Med}. 2010;56:668–673.
17. Grayson MS, Newton DA, Thompson LF. Payback time: the associations of debt and income with medical student career choice. \textit{Med Educ}. 2012;46:983–991.
18. McHugh MD, Ma C. Wage, Work environment, and staffing: effects on nurse outcomes. \textit{Policy Polit Nurs Pract}. 2014;15:72–80.
19. Ly DP, Seabury SA, Jena AB. Differences in incomes of physicians in the United States by race and sex: observational study. \textit{BMJ}. 2016;353:i483.
20. Smith DT, Jacobson CK. Racial and gender disparities in the physician assistant profession. \textit{Health Serv Res}. 2016;51:892–909.
21. Smith D, Jacobson C. Differences in salaries of physician assistants in the USA by race, ethnicity and sex. \textit{J Health Serv Res Policy}. 2018;23:44–48.
22. Moore J, Continelli T. Racial/ethnic pay disparities among registered nurses (RNs) in the US hospitals: an econometric regression decomposition. \textit{Health Serv Res}. 2016;51:511–529.
23. Blinder AS. Wage discrimination: reduced form and structural estimates. \textit{J Hum Resour}. 1973;8:436–455.
24. Oaxaca R. Male-female wage differentials in urban labor markets. \textit{Int Econ Rev.} 1973;14:693–709.
25. Smiley RA, Lauer P, Bienemy C, et al. 2017 National Nursing Workforce Survey. \textit{J Nurs Res}. 2018;9:s1–s88.
26. Campbell S. Racial disparities in the direct care workforce: spotlight on Asian and Pacific Islander workers. 2018. Available at: \url{https://phinational.org/wp-content/uploads/2018/02/API-Direct-Care-Workers-PH-2018.pdf}. Accessed February 25, 2021.
27. Campbell S. Racial disparities in the direct care workforce: spotlight on Black/African American workers. 2018. Available at: \url{https://phinational.org/wp-content/uploads/2018/02/Black-Direct-Care-Workers-PH-2018.pdf}. Accessed February 25, 2021.
28. Flood S, King M, Rodgers R, et al. Integrated public use microdata series, Current Population Survey; Version 7.0. Minneapolis, MN: IPUMS, 2020.
29. CPI Inflation Calculator. 2020. Available at: \url{https://www.bls.gov/data/inflation_calculator.htm}. Accessed February 25, 2021.
30. Heckman JJ, Lochner LJ, Todd PE. Chapter VII Earnings functions, rates of return and treatment effects: the Mincer equation and beyond. \textit{Handb Econ Educ}. 2006;1:307–458.
31. Cahuc P, Carcillo S, Zylberberg A. Chapter VIII: Decomposition. \textit{Methods: The Case of the Gender Wage Gap Labor Economics}, 2nd ed. Cambridge, MA: MIT Press; 2014.
32. Elder TE, Goddeers JH, Haider SJ. Unexplained gaps and Oaxaca-Blinder decompositions. \textit{Labour Econ}. 2010;17:284–290.
33. Janu B. The Blinder–Oaxaca decomposition for linear regression models. \textit{Stat J}. 2008;8:453–479.
34. Fullpart description. 2021. Available at: \url{https://cps.ipums.org/cps-action variables/FULLPART#description_section}. Accessed February 25, 2021.
35. Lo Sasso AT, Richards MR, Chou CF, et al. The $16,819 pay gap for newly trained physicians: the unexplained trend of men earning more than women. \textit{Health Affairs (Millwood)}. 2015;34:193–2011.
36. Lo Sasso AT, Armstrong D, Forte G, et al. Differences in starting pay for male and female physicians persist: explanations for the gender gap remain elusive. \textit{Health Aff (Millwood)}. 2020;39:256–263.
37. Muench U, Sindelar J, Busch SH, et al. Salary differences between male and female registered nurses in the United States. \textit{JAMA}. 2015;313:1265–1267.
38. Greene J, El-Banna MM, Briggs LA, et al. Gender differences in nurse practitioner salaries. \textit{J Am Assoc Nurse Pract}. 2017;29:667–672.
39. Wingfield AH, Chavez K. Getting in, getting hired, getting sideways looks: organizational hierarchy and perceptions of racial discrimination. \textit{Ann Soc Res}. 2020;85:31–57.
40. Truitt AR, Snyder CR. Racialized experiences of Black nursing professionals and certified nursing assistants in long-term care settings. \textit{Transcult Nurs}. 2020;31:312–318.
41. Gannon M. Race is a social construct, scientists argue. 2016. Available at: \url{https://www.scientificamerican.com/article/race-is-a-social-construct-scientists-argue/}. Accessed February 25, 2021.
42. Froger B, Spetz J. Entry and Exit of Workers in Long-term Care UCSC Health Workforce Research Center on Long-Term Care. San Francisco, CA: UCSC; 2015.
43. Froger BK, Skillman SM, Patterson DG, et al. Comparing the Socioeconomic Well-being of Workers Across Healthcare Occupations Center for Health Workforce Studies. Seattle, WA: University of Washington; 2016.
44. Willard-Grace R, Knox M, Huang B. Burnout and health care workforce turnover. \textit{Ann Fam Med}. 2019;17:36–41.