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RESEARCH ARTICLE

# Discrimination in Medical Settings across Populations: Evidence From the *All of Us* Research Program

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**Introduction:** Discrimination in medical settings (DMS) contributes to healthcare disparities in the United States, but few studies have determined the extent of DMS in a large national sample and across different populations. This study estimated the national prevalence of DMS and described demographic and health-related characteristics associated with experiencing DMS in seven different situations.

**Methods:** Survey data from 41,875 adults participating in the *All of Us* Research Program collected in 2021−2022 and logistic regression were used to examine the association between sociodemographic and health-related characteristics and self-reported DMS among adults engaged with a healthcare provider within the past 12 months. Statistical analysis was performed in 2023−2024.

**Results:** About 36.89% of adults reported having experienced at least one DMS situation. Adults with relative social and medical disadvantages had higher prevalence of experiencing DMS. Compared to their counterparts, respondents with higher odds of experiencing DMS in at least one situation identified as female, non-Hispanic Black, having at least some college, living in the South, renter, having other living arrangement, being publicly insured, not having a usual source of care, having multiple chronic conditions, having any disability, and reporting fair or poor health, $p<0.05$.

**Conclusions:** The findings indicate a high prevalence of DMS, particularly among some population groups. Characterizing DMS may be a valuable tool for identifying populations at risk within the healthcare system and optimizing the overall patient care experience. Implementing relevant policies remains an essential strategy for mitigating the prevalence of DMS and reducing healthcare disparities.



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## INTRODUCTION

Discrimination in medical settings (DMS), defined as unfair treatment that patients experience based on any demographic, socioeconomic, or health characteristic (such as age, race, ethnicity, gender identity, disability status, sexual orientation, socioeconomic status, and clinical diagnosis),[1] contributes to healthcare disparities in the United States (U.S.).[2] DMS is associated with a range of adverse health-related outcomes (e.g., mental health,[3,4] substance use,[5] weight gain,[6] and cardiovascular disease[7]), delays in seeking medical care,[8,9] patient reports of substandard quality of care,[10] and poor adherence to treatments.[11,12] A 2019 study estimated that one of every four adults (21%) in the U.S. reported experiences of DMS in their lifetime.[13] The presence of DMS indicates a lower overall quality of care experience, potentially resulting in suboptimal healthcare and health outcomes. Although eliminating healthcare disparities is a national priority,[14] few studies have examined DMS across different populations at the national level.[13] A recent systematic review of discrimination in healthcare found that most studies on this topic were based on nonprobability samples of fewer than 900 participants.[15] Further, most national studies have focused exclusively on single factors like race- or socioeconomic-based discrimination,[16,17] concentrated on specific subgroups such as racial and ethnic minority populations[18] or older adults with chronic conditions,[19] or used survey questions that reflected the general perception of discrimination rather than personal experiences.[20] The one representative study with a relatively large sample size of over 2,000 participants asked a single question capturing whether participants had ever been discriminated against, hassled, or made to feel inferior during their medical care experiences. Although this is an important dimension of DMS, there are other types of discriminatory incidents that may occur in a medical setting.[13]

Capturing different types of healthcare discriminatory events enables a more comprehensive assessment of the prevalence of DMS among the general population and across specific population groups. Moreover, asking a more comprehensive set of questions about DMS provides insights into the prevalence of various discriminatory experiences and their unique characteristics across different population groups.[4] Adopting this approach can aid in improving healthcare quality by addressing DMS and specific events that affect the healthcare experiences of different populations.

To better contextualize experiences of DMS and estimate their prevalence at the national level, this study uses survey data from the *All of Us* Research Program. *All of Us* is funded by the National Institutes of Health and aims to collect health-related data from at least one million people from a wide coverage of geographic areas.[21] *All of Us* prioritizes recruiting participants that are historically underrepresented in biomedical research and are also more likely to experience discrimination,[22,23] such as racial and ethnic minority groups and those without health insurance coverage.[24,25] This study leverages the large sample size to assess estimates and variations in DMS across sociodemographic characteristics, the intersection of some of these characteristics, and other factors associated with health services use.[26]

## METHODS

### Study Sample

The latest data release of *All of Us* includes participants who enrolled between May 2017 and July 1, 2022 (*All of Us* Dataset v7).[27] Participants were recruited either through one of the healthcare provider organizations—such as academic medical centers or federally qualified health centers—or directly through JoinAllofUs.org or recruiting events in the community. Participants were included in this study if they reported having seen or talked to a doctor or other healthcare provider in the past 12 months ($N$=176,932) and answered DMS questions, which are part of the Social Determinants of Health survey module that became available to participants either in English or Spanish in November 2021.[28] Survey participation is voluntary. *All of Us* participants provided consent to participate in the study, the protocol of which was approved and is actively monitored by the *All of Us* Institutional Review Board. All data from *All of Us* was deidentified; therefore, the requirement for Institutional Review Board review was waived for this study.

### Measures

The DMS measure included in *All of Us* was adapted from a validated scale.[22,23,29] The measure is a seven-item scale, which has been found to better reflect DMS compared to a single-item measure.[30] Respondents were asked how often they experienced any of seven events listed when they visited a doctor's office or other healthcare provider: (1) *You are treated with less courtesy than other people*, (2) *You are treated with less respect than other people*, (3) *You receive poorer service than others*, (4) *A doctor or nurse acts if he or she thinks you are not smart,* (5) *A doctor or nurse acts as if he or she is afraid of you*, (6) *A doctor or nurse acts as if he or she is better than you*, and (7) *You feel like a doctor or nurse is not listening to what you were saying*. For each item, the

responses were recoded from a 5-point Likert scale to a binary variable, where *Never* and *Rarely* corresponded to "No" and *Sometimes, Most of the time,* and *Always* corresponded to "Yes."

The demographic and socioeconomic characteristics considered were age group (18−24, 25−34, 35−44, 45−54, 55−64, 65+), biological sex at birth (female, male), race and ethnicity (non-Hispanic [NH] White, NH Black, NH Asian, Hispanic, NH Other), foreign-born (yes, no), speaking a language other than English at home (yes, no), educational attainment (high school graduate and lower, some college and college graduate), employment status (employed, not employed), marital status (married, not married), annual household income (less than $50,000, $50,000 or more), Census region of residence (Northeast, Midwest, South, West), homeownership (own, rent, other arrangement), health insurance type (private, Medicare, Medicaid, other/not covered), and having a doctor's office, clinic, or health center as a usual source of care (yes, no). Health status of the participants was represented by the status of multiple chronic conditions, disability, and self-reported health (excellent/very good/good, fair/poor). Chronic conditions were identified from the self-reported data in *All of Us* and having multiple chronic conditions was defined as having at least three of the following chronic conditions: chronic obstructive pulmonary disease, congestive heart failure, ischemic heart disease, chronic kidney disease, Alzheimer's disease, depression, hypertension, hyperlipidemia, osteoporosis/rheumatoid arthritis, and diabetes.[31]

### Statistical Analysis

Demographic, socioeconomic, and health-related characteristics of participants overall (i.e., experiencing DMS in any situation) were described and responses within each of the seven situations were compared using $\chi^2$ tests. Eight multivariable logistic regression models were used to estimate the adjusted odds ratios (ORs) and 95% confidence intervals (95% CIs) of association between participant characteristics and any reported DMS and each situation. Statistical significance was assessed at the $p<0.05$ level in 2-tailed tests. Analyses were conducted with survey weights estimated through raking.[32] The survey weights calibrated the sample so that the proportions for age, sex, race and ethnicity, Census region of residence, household income, and home-ownership categories matched the population proportions.

The relative excess risk due to interaction (RERI), an index that captures the negative/positive additive interaction between two binary variables,[33] was calculated to estimate the interactions between race/ethnicity and educational attainment, annual household income, and sex to see their association with DMS. There is some evidence that these intersections may be related to exposure to discrimination.[34−38]

The known population proportions required to calculate the survey weights were obtained from the 2020 National Health Interview Survey using Stata SE (version 18). All data management and analyses using *All of Us* data were performed using Structured Query Language and R (version 4.2.1).

## RESULTS

Table 1 presents the characteristics of the analytic sample ($N$=41,875; 43.70% of survey participants responded in 2021 and 56.30% in 2022). About 36.89% of study participants reported having experienced any DMS. A higher proportion of participants reported that a doctor or nurse was not listening to what they were saying (29.35%) and a lower proportion reported that a doctor or nurse acted as if he or she was afraid of them (2.59%). A quarter of participants were 65 years of age and older (24.91%) and more than half were female (53.44%). Most of the participants were NH White (70.23%), followed by Hispanic (13.35%), NH Black (8.71%), NH Asian (5.12%), and NH Other (2.59%). About one in 10 participants was foreign-born (12.02%) and a higher proportion of them spoke a language other than English at home (17.52%). The majority of the participants had at least some college education (91.56%), were employed (61.73%), were married (58.90%), earned $50,000 or more annually (71.57%), and owned their home (74.56%). Most participants had private health insurance coverage (59.82%) or Medicare (25.92%), had a doctor's office, clinic, or health center as a usual source of care (90.86%), and reported their general health status to be excellent, very good, or good (83.34%). One in five participants reported having any disability (19.90%) and 17.74% of them reported having multiple chronic conditions.

Table 2 presents comparisons of participant characteristics within each DMS situation. The population groups with the highest prevalence in experiencing at least one DMS situation identified as 18−24 years of age (48.3%), female (44.2%), NH Black (48.8%), US-born (37.7%), high school graduate and lower (43.0%), employed (37.9%), not married (43.2%), earning annually less than $50,000 (46.9%), living in the South region (39.2%), having other living arrangement than owning or renting their residence (51.8%), covered by Medicaid for health insurance (56.4%), not having a doctor's office, clinic, or health center as a usual source of care (45.1%), having multiple chronic conditions (42.0%),

**Table 1.** Sample Characteristics: *All of Us* Research Program, 2021–2022 (*N*=41,875)[a,b]

| Characteristic | Respondents, No. (Weighted %) |
|---|---|
| Discrimination in medical settings | |
| A doctor or nurse acts as if he or she is afraid of you | 972 (2.6%) |
| A doctor or nurse acts as if he or she is better than you | 6,803 (16.1%) |
| You are treated with less courtesy than other people | 4,753 (11.8%) |
| You receive poorer service than others | 4,434 (11.0%) |
| You are treated with less respect than other people | 4,948 (12.2%) |
| A doctor or nurse acts if he or she thinks you are not smart | 5,487 (13.1%) |
| You feel like a doctor or nurse is not listening to what you were saying | 12,438 (29.4%) |
| Any of the above | 15,502 (36.9%) |
| Age group, years | |
| 18–24 | 1,941 (12.5%) |
| 25–34 | 4,832 (13.6%) |
| 35–44 | 5,718 (14.4%) |
| 45–54 | 6,553 (16.1%) |
| 55–64 | 9,030 (18.4%) |
| 65+ | 13,801 (24.9%) |
| Sex | |
| Male | 15,167 (46.6%) |
| Female | 26,708 (53.4%) |
| Race and ethnicity | |
| Non-Hispanic White | 33,904 (70.2%) |
| Non-Hispanic Black | 2,731 (8.7%) |
| Hispanic | 3,110 (13.4%) |
| Non-Hispanic Asian | 1,172 (5.1%) |
| Non-Hispanic Other | 958 (2.6%) |
| Foreign-born | 3,582 (12.0%) |
| Speak a language other than English at home | 5,064 (17.5%) |
| Educational attainment | |
| High school graduate and lower | 3,724 (8.4%) |
| Some college and college graduate | 38,151 (91.6%) |
| Employment status | |
| Employed | 22,974 (61.7%) |
| Not employed | 18,901 (38.3%) |
| Marital status | |
| Married | 24,493 (58.9%) |
| Not married | 17,382 (41.1%) |
| Household income | |
| Less than $50,000 | 11,698 (28.4%) |
| $50,000 or more | 30,177 (71.6%) |
| Census region | |
| Northeast | 10,540 (16.66%) |
| Midwest | 14,341 (25.5%) |
| South | 7,715 (37.2%) |
| West | 9,279 (20.7%) |
| Home-ownership | |
| Own | 29,184 (74.6%) |
| Rent | 10,196 (23.5%) |
| Other arrangement[c] | 2,495 (1.9%) |

(*continued on next page*)

**Table 1.** Sample Characteristics: *All of Us* Research Program, 2021−2022 (*N*=41,875)[a,b] (*continued*)

| Characteristic | Respondents, No. (Weighted %) |
|---|---|
| Health insurance coverage | |
| Private | 21,662 (59.8%) |
| Medicare | 14,147 (25.9%) |
| Medicaid | 3,416 (7.1%) |
| Other[d]/not covered | 2,650 (7.2%) |
| Had doctor's office, clinic, or health center as a usual source of care | 38,669 (90.9%) |
| Health conditions (need factors) | |
| Multiple chronic conditions (3+) | 8,860 (17.7%) |
| Any disability[e] | 9,102 (19.9%) |
| Self-reported health status | |
| Excellent/very good/good | 34,640 (83.8%) |
| Fair/poor | 7,235 (16.2%) |

[a]This data was weighted following a raking procedure; participants included in this analytic sample had seen or talked to a doctor or other healthcare provider within the past 12 months.
[b]*All of Us* participants who ever had experience of discrimination in medical settings responded "Always," "Most of the time" or "Sometimes."
[c]Participants that were included under *Other arrangement* for the home-ownership variable selected any of the following options: on a college campus; with a friend/roommate; with family; motel/hotel; hospital, rehabilitation center, drug treatment center, or other temporary institution; in a group home, nursing home, or other residential facility, transitional housing, emergency shelter or homeless shelter; anywhere outside (e.g., street, vehicle, abandoned building); other.
[d]Participants that were included under *Other* for the Health insurance coverage variable selected any of the following options: TRICARE or other military healthcare, veteran's healthcare, state-sponsored, other government insurance, or State Children's Health Insurance Program.
[e]Participants identified as having any disability responded "yes" to any of the following: (1) Are you deaf or do you have serious difficulty hearing? (2) Are you blind or do you have serious difficulty seeing, even when wearing glasses? (3) Because of a physical, mental, or emotional condition, do you have serious difficulty concentrating, remembering, or making decisions? (4) Do you have serious difficulty walking or climbing stairs? (5) Do you have difficulty dressing or bathing? (6) Because of a physical, mental, or emotional condition, do you have difficulty doing errands alone such as visiting doctor's office or shopping?

having any disability (51.1%), or reporting their general health status to be fair or poor (55.8%).

The multivariable logistic regression models (Table 3) suggest that participants who were more likely to experience any DMS were those identifying as female (OR, 1.71, 95% CI, 1.61−1.82 compared with male), NH Black (OR, 1.26; 95% CI, 1.12−1.41 compared with NH White), having at least some college education (OR, 1.17; 95% CI, 1.05−1.31, compared with those with a high school degree or lower), living in the South region (OR, 1.09; 95% CI, 1.00−1.18 compared with Northeast), renting (OR, 1.20; 95% CI, 1.11−1.30) or having other living arrangement (OR, 1.26; 95% CI, 1.07−1.49 compared with owning their home), insured by Medicare (OR, 1.11; 95% CI, 1.00−1.24) or Medicaid (OR, 1.33; 95% CI, 1.17−1.51 compared with privately insured), not having a doctor's office, clinic, or health center as a usual source of care (OR, 1.23; 95% CI, 1.11−1.36), having multiple chronic conditions (OR, 1.35; 95% CI, 1.25−1.45), having any disability (OR, 1.69; 95% CI,1.57−1.82), and reporting fair or poor health (OR, 1.79, 95% CI=1.66−1.94 compared with excellent, very good, or good health). Participants who were less likely to experience DMS were older (ages 45−54 [OR, 0.76; 95% CI, 0.66−0.87], 55−64 [OR, 0.64; 95% CI, 0.56−0.73], 65+ [OR, 0.44; 95% CI, 0.37−0.51] compared with ages 18−24), Hispanic or NH Asian adults (OR, 0.78; 95% CI, 0.69−0.88 and OR, 0.72; 95% CI, 0.60−0.86, respectively, compared with NH White adults), foreign-born (OR, 0.83; 95% CI, 0.74−0.94 compared with U.S.-born), and not employed (OR, 0.93; 95% CI, 0.86−1.00 compared with those employed).

NH Black adults were more likely to experience DMS overall and in most contexts, except for the belief that a healthcare provider acted superior (OR, 0.80; 95% CI, 0.69−0.93) or wasn't attentive (OR, 0.86; 95% CI, 0.77−0.98). Female participants were generally more likely to experience DMS overall compared to male participants, except for the perception that a doctor or nurse was afraid of them (OR, 0.46; 95% CI, 0.39−0.56). Participants with at least some college education were generally more likely to experience DMS compared to those with education up to high school graduate level, except for feeling treated with less courtesy (OR=0.81; 95% CI, 0.70−0.93), less respect (OR=0.85; 95% CI, 0.74−0.98), and being perceived as a threat by a healthcare provider (OR, 0.75; 95% CI, 0.58−0.98).

The multivariable logistic regression models (Table 3) suggest that participants identifying as Middle Eastern or North African, Native Hawaiian or other Pacific Islander, and mixed races (NH Other) were more likely to feel treated with less courtesy (OR, 1.38; 95% CI, 1.09

**Table 2.** Sample Characteristics by Experience of Discrimination in Medical Settings: *All of Us* Research Program, 2021–2022[a,b]

| Characteristics | Any Experience of Discrimination in Medical Settings | | You are Treated With Less Courtesy Than Other People | | You are Treated With Less Respect Than Other People | | You Receive Poorer Service Than Others | | A Doctor or Nurse Acts if He or She Thinks You are Not Smart | | A Doctor or Nurse Acts as if He or She is Afraid of You | | A Doctor or Nurse Acts as if He or She is Better Than You | | You Feel Like a Doctor or Nurse is Not Listening to What You Were Saying | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % | *p* | % | *p* | % | *p* | % | *p* | % | *p* | % | *p* | % | *p* | % | *p* |
| Age group, years | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | 0.11 | | **<0.001** | | **<0.001** |
| 18–24 | 48.3 | | 16.2 | | 17.3 | | 14.3 | | 20.3 | | 2.9 | | 23.5 | | 41.5 | |
| 25–34 | 43.2 | | 13.9 | | 14.9 | | 13.2 | | 18.0 | | 2.9 | | 21.7 | | 36.4 | |
| 35–44 | 43.4 | | 14.8 | | 15.5 | | 13.6 | | 17.3 | | 2.4 | | 20.1 | | 34.2 | |
| 45–54 | 38.5 | | 13.8 | | 14.1 | | 12.7 | | 13.0 | | 3.0 | | 16.5 | | 30.2 | |
| 55–64 | 33.6 | | 10.5 | | 10.5 | | 10.2 | | 9.8 | | 2.5 | | 13.6 | | 25.4 | |
| 65+ | 25.3 | | 6.4 | | 6.1 | | 6.1 | | 6.9 | | 2.2 | | 8.8 | | 18.9 | |
| Sex | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** |
| Male | 28.5 | | 9.9 | | 9.7 | | 8.9 | | 8.6 | | 3.4 | | 11.4 | | 20.7 | |
| Female | 44.2 | | 13.4 | | 14.3 | | 12.8 | | 17.0 | | 1.9 | | 20.3 | | 36.9 | |
| Race and ethnicity | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** |
| Non-Hispanic White | 35.8 | | 9.4 | | 10.0 | | 8.3 | | 12.3 | | 2.2 | | 16.2 | | 29.7 | |
| Non-Hispanic Black | 48.8 | | 25.9 | | 25.1 | | 27.6 | | 17.5 | | 5.4 | | 17.1 | | 32.9 | |
| Hispanic | 36.6 | | 14.2 | | 14.4 | | 13.9 | | 15.4 | | 2.9 | | 16.0 | | 28.2 | |
| Non-Hispanic Asian | 29.6 | | 12.9 | | 12.0 | | 10.9 | | 7.2 | | 1.9 | | 11.7 | | 19.0 | |
| Non-Hispanic Other | 41.8 | | 14.9 | | 16.2 | | 12.7 | | 19.0 | | 3.1 | | 20.1 | | 33.0 | |
| Foreign-born | | **<0.001** | | >0.90 | | 0.20 | | >0.90 | | **<0.001** | | 0.30 | | **<0.001** | | **<0.001** |
| No | 37.7 | | 11.8 | | 12.3 | | 11.0 | | 13.5 | | 2.6 | | 16.7 | | 30.5 | |
| Yes | 30.7 | | 11.8 | | 11.3 | | 11.0 | | 10.2 | | 2.2 | | 11.8 | | 21.3 | |
| Speak a language other than English at home | | 0.40 | | **<0.001** | | **<0.001** | | **<0.001** | | 0.30 | | **0.006** | | 0.30 | | **<0.001** |
| No | 37.0 | | 11.2 | | 11.7 | | 10.4 | | 13.0 | | 2.4 | | 16.3 | | 29.9 | |
| Yes | 36.2 | | 14.6 | | 14.4 | | 13.8 | | 13.7 | | 3.3 | | 15.5 | | 26.9 | |
| Educational attainment | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | 0.057 | | 0.054 |
| High school graduate and lower | 43.0 | | 21.0 | | 20.5 | | 18.3 | | 17.4 | | 4.8 | | 17.7 | | 31.3 | |
| Some college and college graduate | 36.3 | | 10.9 | | 11.4 | | 10.3 | | 12.7 | | 2.4 | | 16.0 | | 29.2 | |
| Employment status | | **<0.001** | | >0.90 | | 0.40 | | 0.50 | | 0.12 | | **0.007** | | **0.001** | | **<0.001** |
| Employed | 37.9 | | 11.8 | | 12.3 | | 10.9 | | 13.4 | | 2.4 | | 16.7 | | 30.1 | |
| Not employed | 35.3 | | 11.7 | | 11.9 | | 11.1 | | 12.7 | | 2.9 | | 15.2 | | 28.1 | |

(*continued on next page*)

**Table 2.** Sample Characteristics by Experience of Discrimination in Medical Settings: *All of Us* Research Program, 2021–2022[a,b] (*continued*)

| Characteristics | Any Experience of Discrimination in Medical Settings | | You are Treated With Less Courtesy Than Other People | | You are Treated With Less Respect Than Other People | | You Receive Poorer Service Than Others | | A Doctor or Nurse Acts if He or She Thinks You are Not Smart | | A Doctor or Nurse Acts as if He or She is Afraid of You | | A Doctor or Nurse Acts as if He or She is Better Than You | | You Feel Like a Doctor or Nurse is Not Listening to What You Were Saying | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % | *p* | % | *p* | % | *p* | % | *p* | % | *p* | % | *p* | % | *p* | % | *p* |
| Marital status | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** |
| Married | 32.5 | | 9.2 | | 9.4 | | 8.8 | | 10.7 | | 2.1 | | 13.9 | | 25.7 | |
| Not married | 43.2 | | 15.5 | | 16.1 | | 14.2 | | 16.6 | | 3.3 | | 19.3 | | 34.6 | |
| Household income | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** |
| Less than $50,000 | 46.9 | | 18.9 | | 18.6 | | 17.1 | | 18.9 | | 3.4 | | 21.0 | | 37.3 | |
| $50,000 or more | 32.9 | | 8.9 | | 9.6 | | 8.6 | | 10.8 | | 2.3 | | 14.2 | | 26.2 | |
| Census region | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | 0.6 | | 20.0 | | 0.8 | | **<0.001** |
| Northeast | 35.3 | | 10.3 | | 10.8 | | 9.8 | | 12.4 | | 2.3 | | 15.7 | | 28.1 | |
| Midwest | 35.3 | | 10.6 | | 11.1 | | 9.9 | | 12.5 | | 2.4 | | 15.3 | | 28.4 | |
| South | 39.2 | | 13.5 | | 13.8 | | 12.5 | | 14.0 | | 2.8 | | 17.1 | | 31.0 | |
| West | 35.9 | | 11.2 | | 11.5 | | 10.7 | | 12.7 | | 2.7 | | 15.9 | | 28.6 | |
| Home-ownership | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** |
| Own | 33.1 | | 9.3 | | 9.7 | | 8.7 | | 10.7 | | 2.2 | | 13.9 | | 26.2 | |
| Rent | 47.8 | | 18.7 | | 19.2 | | 17.6 | | 19.8 | | 3.7 | | 22.4 | | 38.2 | |
| Other arrangement[c] | 51.8 | | 21.6 | | 22.7 | | 17.7 | | 21.7 | | 3.8 | | 24.4 | | 41.9 | |
| Health insurance coverage | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** |
| Private | 37.2 | | 10.9 | | 11.6 | | 9.9 | | 12.9 | | 2.0 | | 16.6 | | 30.2 | |
| Medicare | 29.4 | | 8.6 | | 8.3 | | 8.2 | | 9.1 | | 2.6 | | 11.4 | | 22.8 | |
| Medicaid | 56.4 | | 25.9 | | 25.9 | | 25.2 | | 26.2 | | 5.7 | | 26.2 | | 43.7 | |
| Other[d]/not covered | 42.2 | | 17.0 | | 17.3 | | 15.8 | | 16.6 | | 4.0 | | 19.4 | | 32.2 | |
| Had doctor's office, clinic, or health center as a usual source of care | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** |
| Yes | 36.1 | | 11.3 | | 11.7 | | 10.7 | | 12.6 | | 2.4 | | 15.6 | | 28.6 | |
| No | 45.1 | | 16.1 | | 16.3 | | 14.2 | | 18.5 | | 4.2 | | 22.0 | | 37.0 | |
| Multiple chronic condition (3+) | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | 1.4 | | **<0.001** | | **<0.001** |
| No | 35.8 | | 11.2 | | 11.6 | | 10.5 | | 12.7 | | 2.5 | | 15.6 | | 28.5 | |
| Yes | 42.0 | | 14.2 | | 14.5 | | 13.1 | | 15.0 | | 3.1 | | 18.8 | | 33.4 | |
| Any disability | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** |
| No | 33.3 | | 9.7 | | 10.0 | | 9.2 | | 10.9 | | 2.2 | | 14.0 | | 26.2 | |
| Yes | 51.1 | | 20.1 | | 20.9 | | 18.1 | | 22.1 | | 4.1 | | 24.6 | | 42.0 | |

(*continued on next page*)

**Table 2.** Sample Characteristics by Experience of Discrimination in Medical Settings: *All of Us* Research Program, 2021−2022[a,b] (*continued*)

| Characteristics | Any Experience of Discrimination in Medical Settings | | You are Treated With Less Courtesy Than Other People | | You are Treated With Less Respect Than Other People | | You Receive Poorer Service Than Others | | A Doctor or Nurse Acts if He or She Thinks You are Not Smart | | A Doctor or Nurse Acts as if He or She is Afraid of You | | A Doctor or Nurse Acts as if He or She is Better Than You | | You Feel Like a Doctor or Nurse is Not Listening to What You Were Saying | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % | *p* | % | *p* | % | *p* | % | *p* | % | *p* | % | *p* | % | *p* | % | *p* |
| Self-reported health status | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** | | **<0.001** |
| Excellent/very good/good | 33.2 | | 9.7 | | 10.0 | | 9.2 | | 10.9 | | 2.2 | | 13.8 | | 26.0 | |
| Fair/poor | 55.8 | | 22.4 | | 23.2 | | 20.4 | | 24.4 | | 4.4 | | 28.4 | | 46.9 | |

*Note*: Boldface indicates statistical significance ($p<0.05$).
[a]This data was weighted following a raking procedure; the study sample included *All of Us* participants who reported having seen or talked to a healthcare provider within the last 12 months in 2021−2022.
[b]*All of Us* participants who ever had experience of discrimination in medical settings responded "Always," "Most of the time," or "Sometimes."
[c]Participants that were included under *Other arrangement* for the home-ownership variable selected any of the following options: on a college campus; with a friend/roommate; with family; motel/hotel; hospital, rehabilitation center, drug treatment center, or other temporary institution; in a group home, nursing home, or other residential facility, transitional housing, emergency shelter or homeless shelter; anywhere outside (e.g., street, vehicle, abandoned building); other.
[d]Participants that were included under *Other* for the Health insurance coverage variable selected any of the following options: TRICARE or other military healthcare , VA, state-sponsored, other government insurance, or S-CHIP.

−1.77), less respect (OR, 1.40; 95% CI, 1.10−1.78), receiving poorer service (OR, 1.32; 95% CI, 1.03−1.68), or being perceived by healthcare providers as less intelligent (OR, 1.28; 95% CI, 1.02−1.61) compared to NH White adults. Compared to participants speaking English at home, those speaking a language other than English at home were more likely to feel treated with less courtesy (OR, 1.23; 95% CI, 1.07−1.43), less respect (OR, 1.19; 95% CI, 1.03−1.38), receive poorer service (OR, 1.24; 95% CI, 1.07−1.44), and perceived by healthcare providers as intimidating (OR, 1.63; 95% CI, 1.22 −2.17). Compared to married participants, unmarried participants were more likely to feel treated with less courtesy (OR, 1.11; 95% CI, 1.00−1.22), less respect (OR, 1.14; 95% CI, 1.04−1.26), and perceived by healthcare providers as intimidating (OR, 1.36; 95% CI, 1.12 −1.66). Participants living in the South were more likely to experience DMS overall but only significantly differed in the perception of being treated with less courtesy (OR, 1.14; 95% CI, 1.01−1.29).

Table 4 presents the RERI index results. Additive interactions were present between the following binary variables: NH Black and education (RERI=0.32, 95% CI, −0.02, 0.66), Hispanic and education (RERI=0.25, 95% CI, 0.07, 0.44), and Hispanic and income (RERI=0.29, 95% CI, 0.15, 0.42).

## DISCUSSION

In examining the prevalence of DMS in a large, national sample of U.S. adults, approximately 37% of U.S. adults reported experiencing DMS. Respondents who identified as female, NH Black, NH Other, speaking a language other than English at home, renter, publicly insured and uninsured, not having a usual source of care, having multiple chronic conditions, having any disability, or fair/poor health experienced higher odds of DMS in most situations compared to their counterparts. In addition, findings from RERI suggest that for NH Black and Hispanic adults, the intersection between race/ethnicity and socioeconomic status may shape exposure to DMS. For some populations, experiences of DMS were driven by few situations. For example, people with other living arrangement (not homeowners or renters) were more likely to feel treated with less courtesy or respect than other people; those with at least some college education were more likely to feel that a doctor or nurse acted as if he or she was better or was not listening to what they had to say compared to those with less than some college education.

Findings from this study underscore the widespread nature of DMS in U.S. healthcare settings and provide a detailed understanding of its differential impact across

**Table 3.** Factors associated with discrimination in medical settings: *All of Us* Research Program, 2021–2022[a]

| Characteristic | Any Experience of Discrimination in Medical Settings OR (95% CI) | You are Treated With Less Courtesy Than Other People OR (95% CI) | You are Treated With Less Respect Than Other People OR (95% CI) | You Receive Poorer Service Than Others OR (95% CI) | A Doctor or Nurse Acts as if He or She Thinks You are Not Smart OR (95% CI) | A Doctor or Nurse Acts as if He or She is Afraid of You OR (95% CI) | A Doctor or Nurse Acts as if He or She is Better Than You OR (95% CI) | You Feel Like a Doctor or Nurse is Not Listening to What You Were Saying OR (95% CI) |
|---|---|---|---|---|---|---|---|---|
| Age group, years (ref: 18–24) | | | | | | | | |
| 25–34 | 0.92 (0.81, 1.05) | 1.00 (0.83, 1.20) | 1.00 (0.84, 1.20) | 1.04 (0.86, 1.26) | 0.97 (0.82, 1.14) | 1.08 (0.72, 1.60) | 0.99 (0.85, 1.16) | 0.88 (0.77, 1.01) |
| 35–44 | 0.96 (0.84, 1.10) | 1.14 (0.95, 1.37) | 1.09 (0.91, 1.31) | 1.10 (0.90, 1.33) | 0.95 (0.80, 1.13) | 0.94 (0.63, 1.40) | 0.91 (0.77, 1.06) | **0.81** (0.70, 0.93)** |
| 45–54 | **0.76*** (0.66, 0.87)** | 1.01 (0.84, 1.23) | 0.94 (0.78, 1.14) | 0.99 (0.81, 1.21) | **0.65*** (0.55, 0.78)** | 1.14 (0.76, 1.71) | **0.69*** (0.58, 0.81)** | **0.65*** (0.56, 0.74)** |
| 55–64 | **0.64*** (0.56, 0.73)** | **0.77** (0.63, 0.93)** | **0.70*** (0.58, 0.85)** | **0.81* (0.66, 0.99)** | **0.50*** (0.42, 0.60)** | 0.86 (0.57, 1.29) | **0.56*** (0.47, 0.66)** | **0.52*** (0.45, 0.60)** |
| 65+ | **0.44*** (0.37, 0.51)** | **0.50*** (0.39, 0.64)** | **0.45*** (0.35, 0.57)** | **0.50*** (0.39, 0.65)** | **0.36*** (0.29, 0.44)** | **0.57* (0.36, 0.91)** | **0.33*** (0.27, 0.41)** | **0.35*** (0.30, 0.42)** |
| Sex (ref: Male) | | | | | | | | |
| Female | **1.71*** (1.61, 1.82)** | **1.10* (1.00, 1.21)** | **1.22*** (1.11, 1.34)** | **1.19*** (1.08, 1.31)** | **1.78*** (1.62, 1.95)** | **0.46*** (0.39, 0.56)** | **1.69*** (1.55, 1.83)** | **1.97*** (1.84, 2.10)** |
| Race and ethnicity (ref: Non-Hispanic [NH] White) | | | | | | | | |
| NH Black | **1.26*** (1.12, 1.41)** | **2.39*** (2.08, 2.75)** | **2.17*** (1.88, 2.49)** | **3.17*** (2.76, 3.63)** | 1.12 (0.96, 1.30) | **2.05*** (1.57, 2.68)** | **0.80** (0.69, 0.93)** | **0.86* (0.77, 0.98)** |
| Hispanic | **0.78*** (0.69, 0.88)** | 1.09 (0.92, 1.29) | 1.05 (0.89, 1.25) | **1.24* (1.04, 1.46)** | 0.96 (0.82, 1.12) | 0.90 (0.63, 1.29) | **0.76*** (0.65, 0.89)** | **0.73*** (0.64, 0.83)** |
| NH Asian | **0.72*** (0.60, 0.86)** | **1.38* (1.06, 1.79)** | 1.18 (0.91, 1.54) | 1.27 (0.97, 1.67) | **0.53*** (0.39, 0.71)** | 0.74 (0.40, 1.37) | **0.67** (0.52, 0.85)** | **0.53*** (0.43, 0.65)** |
| NH Other | 1.02 (0.85, 1.23) | **1.38** (1.09, 1.77)** | **1.40** (1.10, 1.78)** | **1.32* (1.03, 1.68)** | **1.28* (1.02, 1.61)** | 1.25 (0.71, 2.20) | 1.01 (0.81, 1.27) | 0.90 (0.75, 1.09) |
| Foreign-born (Ref: No) | | | | | | | | |
| Yes | **0.83** (0.74, 0.94)** | 0.85 (0.72, 1.02) | **0.83* (0.70, 0.99)** | 0.85 (0.71, 1.02) | **0.83* (0.69, 0.99)** | 0.73 (0.50, 1.07) | **0.78** (0.66, 0.92)** | **0.78*** (0.69, 0.89)** |
| Speak a language other than English at home (ref: No) | | | | | | | | |
| Yes | 1.04 (0.93, 1.15) | **1.23** (1.07, 1.43)** | **1.19* (1.03, 1.38)** | **1.24** (1.07, 1.44)** | 1.07 (0.92, 1.23) | **1.63** (1.22, 2.17)** | 1.03 (0.90, 1.18) | 0.99 (0.88, 1.11) |
| Educational attainment (ref: High school graduate and lower) | | | | | | | | |
| Some college and college graduate | **1.17** (1.05, 1.31)** | **0.81** (0.70, 0.93)** | **0.85* (0.74, 0.98)** | 0.92 (0.79, 1.07) | 1.14 (0.99, 1.32) | **0.75* (0.58, 0.98)** | **1.32*** (1.15, 1.52)** | **1.37*** (1.23, 1.54)** |
| Employment status (ref: Employed) | | | | | | | | |
| Not employed | **0.93* (0.86, 1.00)** | 0.94 (0.84, 1.06) | 0.97 (0.87, 1.09) | 0.99 (0.88, 1.11) | 0.99 (0.89, 1.10) | 1.05 (0.85, 1.30) | 0.97 (0.88, 1.07) | 0.97 (0.90, 1.05) |
| Marital status (ref: Married) | | | | | | | | |
| Not married | 1.04 (0.98, 1.11) | **1.11* (1.00, 1.22)** | **1.14** (1.04, 1.26)** | 1.03 (0.93, 1.15) | 1.02 (0.93, 1.12) | **1.36** (1.12, 1.66)** | 1.00 (0.92, 1.09) | 1.01 (0.94, 1.09) |
| Household income (ref: Less than $50k) | | | | | | | | |
| 50k or more | **0.83*** (0.77, 0.90)** | **0.75*** (0.67, 0.84)** | **0.84** (0.75, 0.94)** | **0.85** (0.75, 0.96)** | **0.86** (0.77, 0.95)** | **1.27* (1.02, 1.58)** | 0.91 (0.82, 1.01) | **0.84*** (0.77, 0.91)** |
| Census region of residence (ref: Northeast) | | | | | | | | |
| Midwest | 0.96 (0.89, 1.03) | 1.00 (0.90, 1.12) | 0.99 (0.89, 1.11) | 0.97 (0.87, 1.09) | 0.95 (0.86, 1.06) | 1.03 (0.81, 1.31) | 0.92 (0.84, 1.01) | 0.95 (0.89, 1.03) |
| South | **1.09* (1.00, 1.18)** | **1.14* (1.01, 1.29)** | 1.12 (0.99, 1.26) | 1.05 (0.93, 1.19) | 1.04 (0.92, 1.16) | 1.13 (0.88, 1.47) | 1.06 (0.95, 1.17) | 1.08 (0.99, 1.17) |
| West | 1.06 (0.98, 1.15) | 1.05 (0.92, 1.19) | 1.03 (0.91, 1.16) | 1.04 (0.91, 1.18) | 1.01 (0.90, 1.13) | 1.10 (0.85, 1.42) | 1.04 (0.94, 1.15) | 1.07 (0.99, 1.17) |
| Home-ownership (ref: Own) | | | | | | | | |
| Rent | **1.20*** (1.11, 1.30)** | **1.27*** (1.13, 1.43)** | **1.26*** (1.12, 1.41)** | **1.33*** (1.19, 1.50)** | **1.20** (1.07, 1.34)** | 1.16 (0.92, 1.47) | **1.18** (1.06, 1.30)** | **1.13** (1.03, 1.23)** |
| Other arrangement | **1.26** (1.07, 1.49)** | **1.31* (1.07, 1.61)** | **1.33** (1.09, 1.62)** | 1.17 (0.95, 1.44) | 1.17 (0.96, 1.41) | 0.97 (0.64, 1.47) | 1.18 (0.98, 1.41) | 1.18 (1.00, 1.39) |

(*continued on next page*)

**Table 3.** Factors associated with discrimination in medical settings: *All of Us* Research Program, 2021–2022[a] (*continued*)

| Characteristic | Any Experience of Discrimination in Medical Settings OR (95% CI) | You are Treated With Less Courtesy Than Other People OR (95% CI) | You are Treated With Less Respect Than Other People OR (95% CI) | You Receive Poorer Service Than Others OR (95% CI) | A Doctor or Nurse Acts as if He or She Thinks You are Not Smart OR (95% CI) | A Doctor or Nurse Acts as if He or She is Afraid of You OR (95% CI) | A Doctor or Nurse Acts as if He or She is Better Than You OR (95% CI) | You Feel Like a Doctor or Nurse is Not Listening to What You Were Saying OR (95% CI) |
|---|---|---|---|---|---|---|---|---|
| Health insurance coverage (ref: Private) | | | | | | | | |
| Medicare | **1.11* (1.00, 1.24)** | 1.12 (0.95, 1.33) | 1.04 (0.88, 1.23) | **1.23* (1.03, 1.46)** | 1.13 (0.97, 1.32) | **1.70*** (1.27, 2.27)** | **1.17* (1.01, 1.35)** | **1.13* (1.00, 1.27)** |
| Medicaid | **1.33*** (1.17, 1.51)** | **1.40*** (1.19, 1.64)** | **1.34*** (1.14, 1.57)** | **1.59*** (1.35, 1.88)** | **1.33*** (1.14, 1.55)** | **2.12*** (1.57, 2.86)** | **1.17* (1.01, 1.36)** | 1.13 (0.99, 1.29) |
| Other/not covered | 1.10 (0.98, 1.24) | **1.22* (1.04, 1.44)** | **1.21* (1.02, 1.42)** | **1.28** (1.08, 1.52)** | **1.18* (1.00, 1.38)** | **1.61** (1.18, 2.20)** | 1.16 (1.00, 1.34) | 1.03 (0.91, 1.17) |
| Had doctor's office, clinic, or health center as a usual source of care (ref: Yes) | | | | | | | | |
| No | **1.23*** (1.11, 1.36)** | **1.20* (1.03, 1.39)** | 1.15 (0.99, 1.33) | 1.11 (0.95, 1.29) | **1.27*** (1.11, 1.46)** | **1.50** (1.14, 1.96)** | **1.28*** (1.12, 1.45)** | **1.24*** (1.11, 1.39)** |
| Multiple chronic conditions (3+) (ref: No) | | | | | | | | |
| Yes | **1.35*** (1.25, 1.45)** | **1.23*** (1.10, 1.38)** | **1.26*** (1.13, 1.41)** | **1.20** (1.07, 1.35)** | **1.30*** (1.17, 1.43)** | 1.04 (0.84, 1.29) | **1.36*** (1.24, 1.49)** | **1.34*** (1.25, 1.45)** |
| Any disability | | | | | | | | |
| No | — | — | — | — | — | — | — | — |
| Yes | **1.69*** (1.57, 1.82)** | **1.72*** (1.55, 1.91)** | **1.79*** (1.61, 1.98)** | **1.61*** (1.44, 1.79)** | **1.81*** (1.64, 1.99)** | **1.35** (1.11, 1.64)** | **1.58*** (1.45, 1.73)** | **1.67*** (1.54, 1.80)** |
| Self-reported health status (ref: Excellent/very good/good) | | | | | | | | |
| Fair/poor | **1.79*** (1.66, 1.94)** | **1.67*** (1.50, 1.85)** | **1.71*** (1.54, 1.90)** | **1.63*** (1.46, 1.82)** | **1.75*** (1.58, 1.94)** | **1.44*** (1.17, 1.77)** | **1.83*** (1.66, 2.00)** | **1.87*** (1.73, 2.03)** |

*Note*: Boldface indicates statistical significance (*$p<0.05$, **$p<0.01$, ***$p<0.001$).

[a]This data was weighted following a raking procedure; the study sample included *All of Us* participants who reported having seen or talked to a healthcare provider within the last 12 months in 2021–2022.

**Table 4.** Additive Interaction between Race/Ethnicity and Education, Household Income, and Sex

| Interaction Term | RERI (95% CI) |
|---|---|
| Non-Hispanic Black | |
| Education | **0.32 (−0.02, 0.66)*** |
| Income | 0.19 (−0.06, 0.43) |
| Sex | −0.78 (−1.22, −0.34) |
| Hispanic | |
| Education | **0.25 (0.07, 0.44)**** |
| Income | **0.29 (0.15, 0.42)***** |
| Sex | −0.37 (−0.6, −0.15) |
| Non-Hispanic Asian | |
| Education | −0.26 (−1.27, 0.75) |
| Income | 0.14 (−0.12, 0.39) |
| Sex | −0.31 (−0.63, 0.01) |

*Note*: Boldface indicates statistical significance (*$p$<0.05, **$p$<0.01, ***$p$<0.001).
RERI, relative excess risk due to interaction.

various population groups. The marked disparities observed suggest the need for interventions that specifically address the unique challenges faced by some groups in different situations.

Efforts to address discrimination across the healthcare systems vary widely. healthcare institutions are developing training to address implicit bias that leads to discriminatory behaviors.[39] While implicit bias training has been shown to have modest or no effect in reducing bias,[40] research suggests that coupling bias training with reflective exercises or perspective-taking could increase its efficacy.[41–43] Studies have also shown that physician-patient racial/gender concordance may reduce bias, enhance trust, and improve communication, potentially contributing to an overall improvement in the quality of care provided.[44–46] Policy interventions to promote diversity within the healthcare workforce may hold the potential to address DMS.[47]

At the national policy level, the Centers for Medicare and Medicaid Services requires that hospitals collect data on patient experience using the Hospital Consumer Assessment of Healthcare Providers and Systems survey.[48] Results of Hospital Consumer Assessment of Healthcare Providers and Systems are available to the public[49] as an incentive for hospitals to improve their quality of care. Nevertheless, the survey currently lacks any components of DMS. Incorporating this measure may provide important information to monitor national DMS trends, pinpoint populations experiencing DMS in healthcare facilities, enhance organizational structures contributing to DMS, and support the formulation of strategies to enhance patient-provider relationships for marginalized groups. The results of this study suggest that interventions need to be tailored to address specific experiences of discrimination for different groups.

### Limitations

Data included in this study were from 2021 to 2022 during the coronavirus pandemic, a period when racial/ethnic discrimination was especially intensified. As *All of Us* continues to recruit more participants, future studies can address this variation by examining the same question during a period more distant from the peak of the pandemic.

It is worth noting that the levels of DMS reported in this study most likely underestimated the total discrimination that actually occurred within medical care. This study captured awareness of experiences of discrimination from *All of Us* respondents. First, the scale utilized is an adaptation of the Everyday Discrimination Scale to the healthcare context.[22,23] This scale does not capture all domains of discrimination but focuses on indignities experienced by the target of discrimination. Second, considerable evidence suggests that discrimination occurs in medical care but patients may not be aware of these situations and events.[50] Third, some people may internalize discrimination.[51] The findings reported in this paper must be understood within the larger context of persistence of disparities in care and the need for redoubled efforts to eliminate all discrimination in medical encounters.[52]

## CONCLUSIONS

DMS may be consequential to the patient healthcare experience and healthcare quality. Findings from this study reveal a high prevalence of DMS, with certain population groups demonstrating increased vulnerability. Characterization of DMS can be employed as a valuable tool to identify at-risk populations within the healthcare system, optimize the overall patient healthcare experience, and reduce healthcare disparities.

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