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Authors

Omari, Amel
Boone, Kwanza D
Zhou, Tianyi
[et al.](#)

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Characteristics of the Moveable Middle: Opportunities Among Adults Open to COVID-19 Vaccination



Amel Omari, PhD,^{1,2} Kwanza D. Boone, DrPh,^{3,4} Tianyi Zhou, MPH,^{2,5} Peng-Jun Lu, PhD,² Jennifer L. Kriss, PhD,² Mei-Chuan Hung, PhD,^{2,5} Rosalind J. Carter, PhD,² Carla Black, PhD,² Debora Weiss, DVM,⁶ Nina B. Masters, PhD,^{1,7} James Tseryuan Lee, MD,² Noel T. Brewer, PhD,^{8,9} Peter G. Szilagyi, MD,¹⁰ James A. Singleton, PhD²

Introduction: Focusing on subpopulations that express the intention to receive a COVID-19 vaccination but are unvaccinated may improve the yield of COVID-19 vaccination efforts.

Methods: A nationally representative sample of 789,658 U.S. adults aged ≥ 18 years participated in the National Immunization Survey Adult COVID Module from May 2021 to April 2022. The survey assessed respondents' COVID-19 vaccination status and intent by demographic characteristics (age, urbanicity, educational attainment, region, insurance, income, and race/ethnicity). This study compared composition and within-group estimates of those who responded that they definitely or probably will get vaccinated or are unsure (moveable middle) from the first and last month of data collection.

Results: Because vaccination uptake increased over the study period, the moveable middle declined among persons aged ≥ 18 years. Adults aged 18–39 years and suburban residents comprised most of the moveable middle in April 2022. Groups with the largest moveable middles in April 2022 included persons with no insurance (10%), those aged 18–29 years (8%), and those with incomes below poverty (8%), followed by non-Hispanic Native Hawaiian or other Pacific Islander (7%), non-Hispanic multiple or other race (6%), non-Hispanic American Indian or Alaska Native persons (6%), non-Hispanic Black or African American persons (6%), those with below high school education (6%), those with high school education (5%), and those aged 30–39 years (5%).

Conclusions: A sizable percentage of adults open to receiving COVID-19 vaccination remain in several demographic groups. Emphasizing engagement of persons who are unvaccinated in some racial/ethnic groups, aged 18–39 years, without health insurance, or with lower income may reach more persons open to vaccination.

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From the ¹Epidemic Intelligence Service, Centers for Disease Control and Prevention, Atlanta, Georgia; ²Immunization Services Division, National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia; ³Goldbelt C6, Chesapeake, Virginia; ⁴National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia; ⁵Leidos, Atlanta, Georgia; ⁶Career Epidemiology Field Office, Centers for Disease Control and Prevention, Atlanta, Georgia; ⁷Division of Viral Diseases, National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia; ⁸Department of Health Behavior, Gillings School of Public Health, University of North Carolina,

Chapel Hill, North Carolina; ⁹Lineberger Comprehensive Cancer Center, School of Medicine, University of North Carolina, Chapel Hill, North Carolina; and ¹⁰Department of Pediatrics, UCLA Mattel Children's Hospital, University of California Los Angeles, Los Angeles, California

Address correspondence to: Amel Omari, PhD, National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, 1600 Clifton Road, Mail stop H24-5, Atlanta GA 30329. E-mail: aomari@cdc.gov.

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INTRODUCTION

In April 2022, 11% of U.S. adults remained unvaccinated against coronavirus disease 2019 (COVID-19).¹ Focusing on persons who are unvaccinated and who express intent or ambiguity regarding vaccination (referred to as the moveable middle in the remaining part of this paper) may improve yield to COVID-19 vaccination efforts.^{2–4} As the percentage of adults in the moveable middle declines and inequities in vaccination remain, understanding the sociodemographic characteristics of this group is important to guide strategies to increase vaccine access and acceptance.

METHODS

This study analyzed the National Immunization Survey Adult COVID Module (NIS-ACM) to examine sociodemographic characteristics of the moveable middle and trends monthly between April 22, 2021 (May 2021) and April 30, 2022 (April 2022). Participants were a nationally representative sample of 789,658 U.S. adults aged ≥ 18 years who were contacted using a random-digit-dialed sample of cellphone numbers in a monthly repeated cross-sectional design.^{5–7} Monthly response rates ranged from 17.2% to 23.4%. Data were weighted to represent non-institutionalized U.S. adults and calibrated to state-level vaccine administration data.

NIS-ACM assessed respondents' self-reported COVID-19 vaccination status (0 doses, ≥ 1 dose), COVID-19 vaccination intent, and demographic characteristics. The *moveable middle* is defined as individuals who reported receiving zero doses of COVID-19 vaccine and that they definitely or probably will get vaccinated or are unsure. Reluctant are those who reported that they probably or definitely will not get vaccinated.

Analyses used survey weights to generate weighted percentages; frequencies are unweighted. To understand the demographic distribution within the moveable middle, age, urbanicity, racial/ethnic, and regional composition of this group was evaluated monthly, comparing changes between the first and last month of data collection.

To explore the prevalence of the moveable middle across demographic groups, 10 demographic groups with the largest moveable middles in April 2022 were identified using age, race/ethnicity, urbanicity, educational attainment, income and poverty level, and health insurance status. Within each of these groups, the prevalence of vaccination status and intent over the study period was examined, comparing the first and last months of data collection. Within these 10 groups, the latest data in the study period (collected in February–April 2022) were used to examine the prevalence of vaccination status/intent stratified by age, racial/ethnic category, health insurance status, and urbanicity. This research was conducted consistent with applicable federal law and Centers for Disease Control and Prevention policy (45 C.F.R. part 46, 21 C.F.R. part 56; 42 U.S.C. §241[d]; 5 U.S.C. §552a; 44 U.S.C. §3,501 et seq) and followed the STROBE guidelines.⁸

RESULTS

Adults aged 18–39 years comprised 74% of the moveable middle in April 2022 (Figure 1 and Appendix Table 1, available online), an increase from 55% in May 2021. Their share of those vaccinated and reluctant increased by 7 and 5 percentage points, respectively. Residents of suburban areas were 43% of the moveable middle in April 2022, a decline from 58% in May 2021. Residents of rural areas comprised 19% of this group in April 2022, increasing from 13% in May 2021; their share of the vaccinated was steady, and that of the reluctant increased by 4 percentage points. NH White adults comprised 50% of the moveable middle in April 2022, whereas Hispanic and NH Black adults were 22% and 20%, respectively. Distribution of race/ethnicity within the moveable middle, vaccinated, and reluctant remained relatively stable. Those living in the Southeast, Midwest, and South represented 66% of the moveable middle in April 2022. Their share of the vaccinated, moveable middle, and reluctant increased by 2, 14, and 9 percentage points, respectively. Appendix Table 2 (available online) presents the prevalence ratios for the first and last months of data collection, with reference to the subgroup with the smallest moveable middle.

Prevalence of the moveable middle shrunk in all groups as vaccination uptake increased. Groups with the largest moveable middles in April 2022 included adults with the following characteristics: uninsured (10%), aged 18–29 years (8%), incomes below poverty (8%), NH Native Hawaiian or other Pacific Islander (NH/OPI) (7%), NH multiple or other race (6%), NH American Indian or Alaska Native (AI/AN) (6%), NH Black or African American (6%), below or at high school education (6% and 5%), and aged 30–39 years (5%) (Figure 2 and Appendix Table 3, available online).

Stratification of these groups (Figure 3 and Appendix Table 4, available online) showed that among adults aged 18–29 years, the prevalence of the moveable middle was largest among uninsured (14%), NH NH/OPI (16%), multiple or other race/ethnicity (13%), and AI/AN groups (15%). In all analyzed groups, the prevalence of the moveable middle was larger among persons without insurance than among those insured. The prevalence of the moveable middle in uninsured strata ranged from 7% to 15%. The prevalence of the moveable middle in NH AI/AN adults was largest among those aged 18–29 years (15%). Within NH NH/OPI adults, the prevalence was the largest among those below poverty (16%).

DISCUSSION

The percentage of adults in the moveable middle declined from 26% to 3% over the study period.⁹

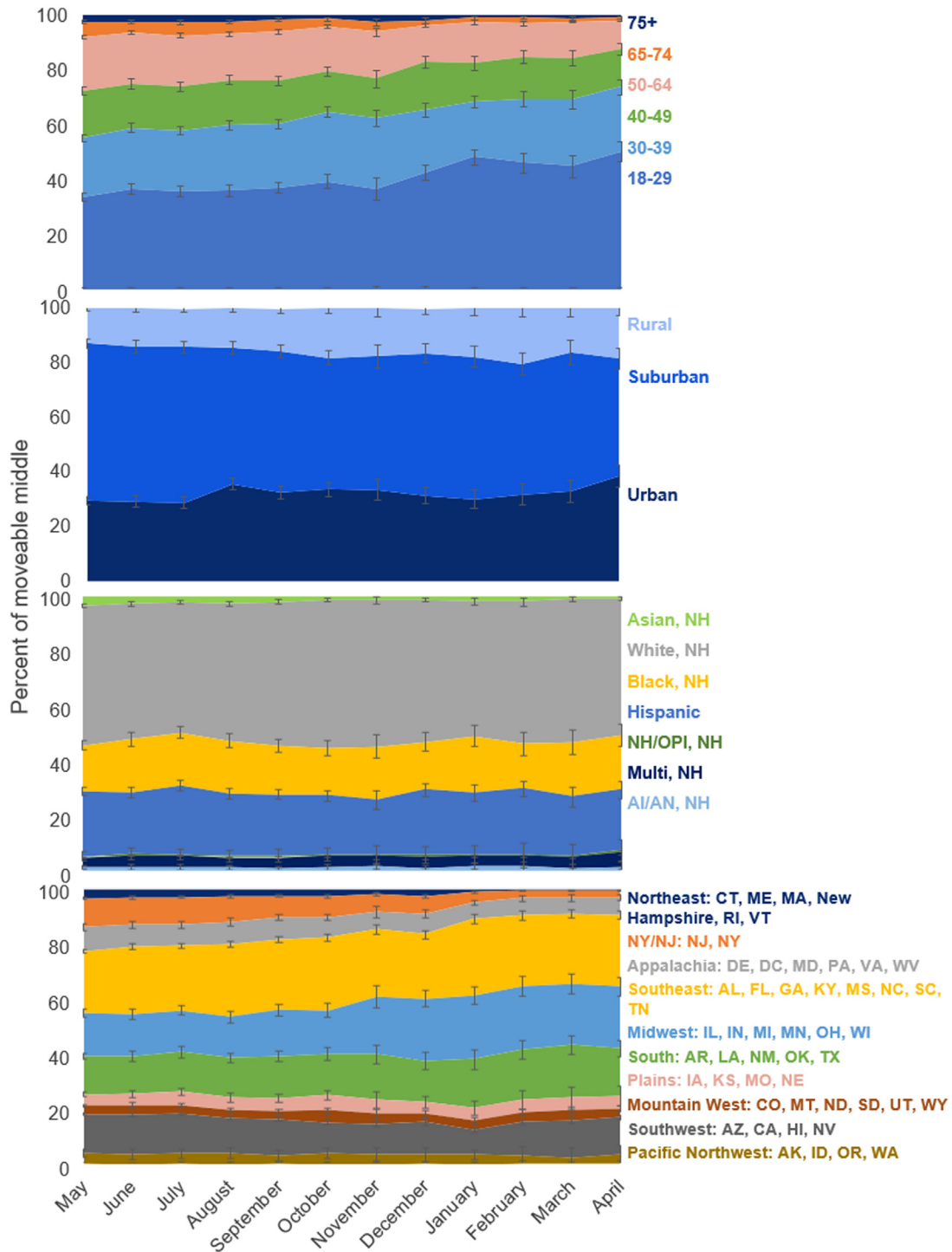


Figure 1. Changes in the demographic makeup of those in the moveable middle monthly from May 2021 to April 2022.

Note: The y-axis represents the percent of all those in the moveable middle, stacked by age, urbanicity, racial/ethnic category, and HHS region. Dark gray bars show 95% CIs for each data point.

AI/AN, American Indian or Alaska Native; AK, Alaska; AL, Alabama; AR, Arkansas; AZ, Arizona; CA, California; CO, Colorado; CT, Connecticut; DC, District of Columbia; DE, Delaware; FL, Florida; GA, Georgia; HI, Hawaii; IA, Iowa; ID, Idaho; IL, Illinois; IN, Indiana; KS, Kansas; KY, Kentucky; LA, Louisiana; MA, Massachusetts; MD, Maryland; ME, Maine; MI, Michigan; MN, Minnesota; MO, Missouri; MS, Mississippi; MT, Montana; NC, North Carolina; ND, North Dakota; NE, Nebraska; NH/OPI, Native Hawaiian/other Pacific Islander; NH, New Hampshire; NJ, New Jersey; NM, New Mexico; NV, Nevada; NY, New York; OH, Ohio; OK, Oklahoma; OR, Oregon; PA, Pennsylvania; RI, Rhode Island; SC, South Carolina; SD, South Dakota; TN, Tennessee; TX, Texas; UT, Utah; VA, Virginia; VT, Vermont; WA, Washington; WI, Wisconsin; WY, Wyoming; WV, West Virginia.

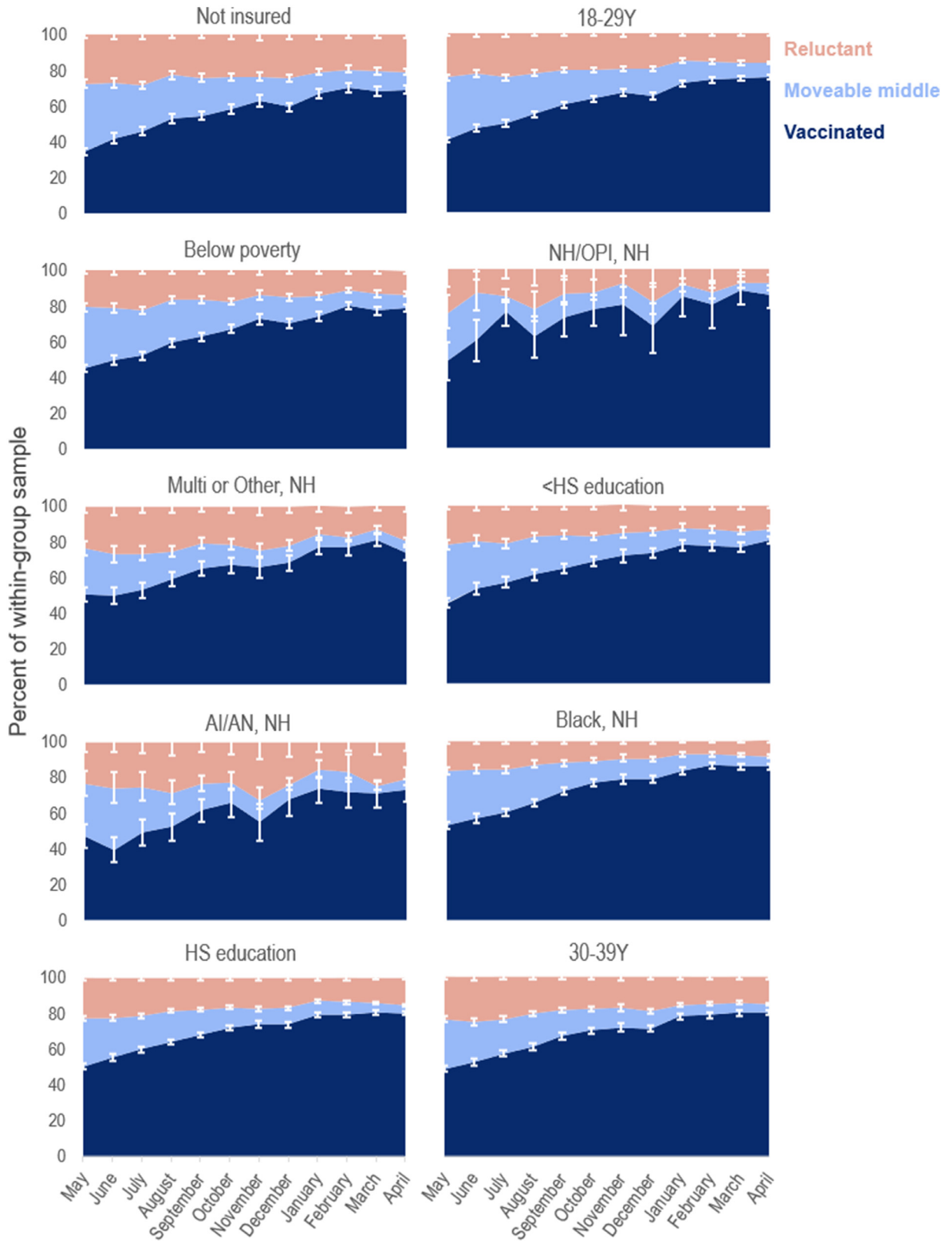


Figure 2. COVID-19 vaccination status and intent monthly from May 2021 to April 2022 for the 10 subgroups with the largest percentages in the moveable middle in April 2022.

Note: White bars show 95% CIs for each data point.

AI/AN, American Indian or Alaska Native; HS, high school; NH/OPI, Native Hawaiian/other Pacific Islander; Y, years.

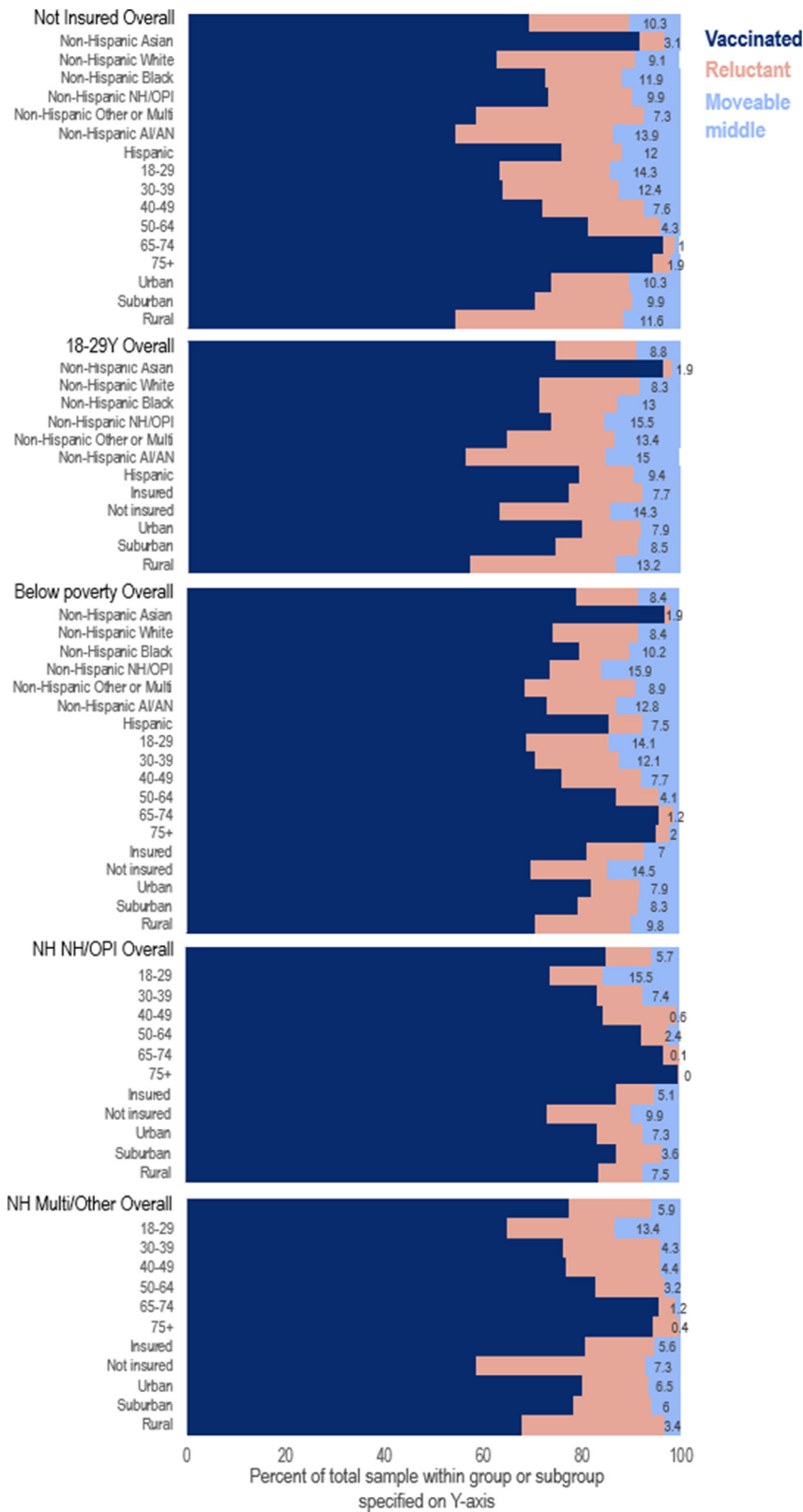


Figure 3. COVID-19 vaccination status and intent for the 10 subgroups with the largest percentages in the moveable middle, using data collected from February to April 2022.

Note: Data were sorted by the group with the largest moveable middle (uninsured) to the group with the 10th largest moveable middle (ages 30–39 years) and stratified by age group, insurance status, racial/ethnic category, and urbanicity.

AI/AN, American Indian or Alaska Native; HS, high school; NH/OPI, Native Hawaiian/other Pacific Islander.

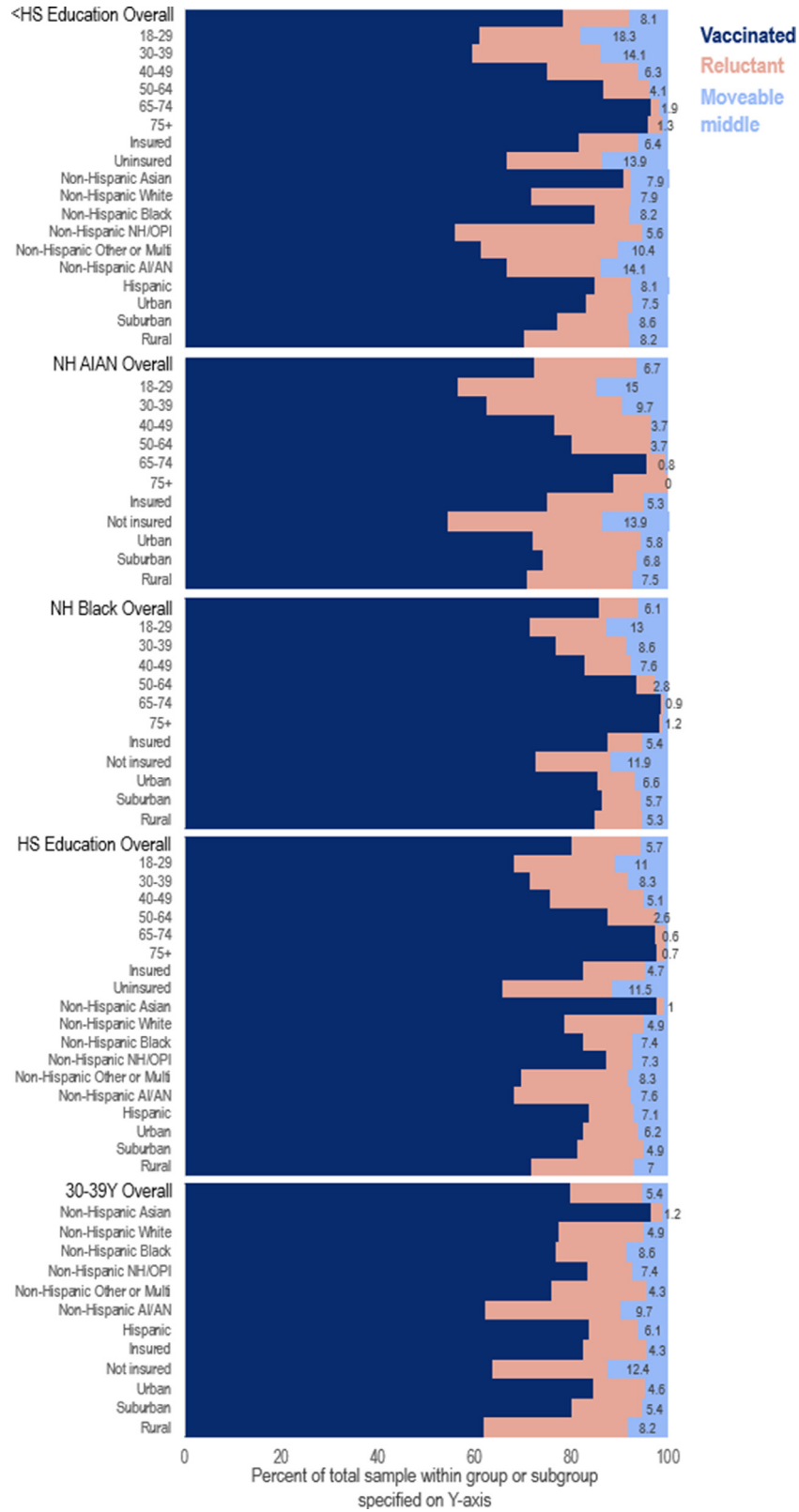


Figure 3 Continued.

Residents of the Southeast, Midwest, and South and of rural areas made up a larger proportion of the moveable middle than they do of the U.S. population.^{10,11} In April 2022, higher percentages of Hispanic and NH Black adults aged ≥ 18 years were in the moveable middle than Census estimates (59% of U.S. adults are NH White, 20% are Hispanic, and 12% are NH Black¹²). Adults aged 18–39 years were a large majority of the moveable middle in April 2022, aligning with findings of lower vaccination uptake in this group.¹³ Strategies to improve vaccination uptake among diverse young adults have been proposed,^{14–16} including messaging that accounts for psychosocial development.

Although this study did not investigate the reasons for remaining unvaccinated, the Behavioral and Social Drivers framework¹⁷ suggests that thoughts, feelings, and social norms influence vaccination intent, which strongly associates with behavior.^{18,19} Studies suggest that effective strategies vary across populations.^{20,21} Trusted messengers, such as healthcare providers for those who have them, may play an important role in reaching the moveable middle.^{22–25} Research providing insights into drivers of COVID-19 vaccination among groups with larger moveable middles could help to develop approaches for reaching these groups. A longitudinal study of the moveable middle's vaccination behavior could assess influences on the hazard of remaining unvaccinated for longer.

Access barriers may moderate the relationship between vaccination intent and behavior.¹⁷ In April 2022, 10% of those who definitely will get vaccinated and 22% of those who probably will or are unsure reported access difficulties.⁹ In all analyzed groups, strata without health insurance had larger moveable middles than the insured. Health Resources and Services Administration stopped accepting claims for reimbursement of costs associated with administering COVID-19 vaccines to uninsured and underinsured individuals on April 5, 2022, potentially compounding access barriers.²⁶ Structural barriers may include poor access and quality of care.¹⁷ Community-centered outreach strategies have shown some success in overcoming barriers.²⁷

Limitations

Low response rates may impact the NIS-ACM's representativeness if respondents and nonrespondents differ. If households without cell phones are less likely to receive vaccination, moveable middle rates may be underestimated. However, weighting to population estimates and the number of persons receiving ≥ 1 dose of COVID-19 vaccine on the basis of jurisdiction-reported administration data were designed to mitigate the biases related to exclusion of households without cellphone access, nonresponse, and errors in self-reported vaccination status.

CONCLUSIONS

There remain adults who are unvaccinated and open to receiving COVID-19 vaccination. Understanding the demographic and structural characteristics of these populations can inform vaccination efforts.

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CREDIT AUTHOR STATEMENT

Amel Omari: Conceptualization, Methodology, Visualization, Writing – original draft, Writing – review & editing. Kwanza D. Boone: Conceptualization, Methodology, Project administration, Writing – original draft, Writing – review & editing. Tianyi Zhou: Formal analysis, Formal acquisition, Writing – review & editing. Peng-Jun Lu: Conceptualization, Funding acquisition, Methodology, Writing – review & editing. Jennifer L. Kriss: Data curation, Supervision, Writing – review & editing. Mei-Chuan Hung: Writing – review & editing. Rosalind J. Carter: Writing – original draft, Writing - review & editing. Carla Black: Conceptualization, Data curation, Methodology, Writing – review & editing. Debora Weiss: Writing – review & editing. Nina B. Masters: Data curation, Writing – review & editing. James Tseruyan Lee: Project administration, Supervision, Writing – review & editing. Noel T. Brewer: Writing – review & editing. Peter G. Szilagyi: Conceptualization, Methodology, Writing – review & editing. James A. Singleton: Conceptualization, Methodology, Writing – review & editing.

SUPPLEMENTAL MATERIAL

Supplemental materials associated with this article can be found in the online version at <https://doi.org/10.1016/j.amepre.2022.11.003>.

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