

Demographic Benchmarks for Equitable Coverage of COVID-19 Vaccination



Kushagra Vashist, BS,¹ Tabia Akintobi, PhD, MPH,² Robert A. Bednarczyk, PhD, MS,^{1,3}
K.M. Venkat Narayan, MD, MSc, MBA,^{1,3} Shivani A. Patel, PhD, MPH^{1,3}

INTRODUCTION

After a year of unprecedented social distancing and >530,000 American deaths due to coronavirus disease 2019 (COVID-19), 3 severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) vaccines are authorized for emergency use. Federal and state authorities based vaccination priorities on employment in high-exposure occupations essential to everyday life and on vulnerability to severe COVID-19 disease.¹ By virtue of employment in high-exposure occupations² and experience of severe COVID-19 disease and death,³ people of color—especially Black, Hispanic, and Native Americans—are expected to be prioritized for early vaccination. Yet, reports suggest that public vaccination sites are less likely to be in communities of color in the South⁴ and that racial and ethnic minorities are overall more hesitant than White Americans to take the vaccine.^{5,6} Understanding the demographic composition of the U.S. population prioritized for vaccination is critical to track equity in vaccine coverage and to better tailor health communication strategies.

The authors report the racial and ethnic, age, sex, and regional distribution of non-institutionalized populations prioritized for COVID-19 vaccination.

METHODS

Classification of Phases 1 and 2 priority populations follow the Advisory Committee on Immunization Practices criteria.¹ The demographic composition of non-institutionalized priority populations was estimated using the nationally representative National Health Interview Survey (N=25,417) conducted in 2018, the most recent data with necessary occupational, medical history, and demographic information. Whereas the Advisory Committee on Immunization Practices recommended essential healthcare workers at high risk of SARS-CoV-2 exposure into Phase 1a, the authors classified all healthcare workers into Phase 1a owing to data constraints. Nonhealthcare essential workers and adults aged ≥75 years were classified into Phase 1b. Essential workers not covered in Phase 1a or 1b, adults aged 65–74 years, and adults aged 18–64 years with a high-risk medical condition for COVID-19

were classified into Phase 1c. All other individuals were classified into Phase 2. Analyses were conducted using SAS, version 9.4.

RESULTS

Approximately 85% of U.S. adults fall into Phase 1, and 15% fall into Phase 2 of the vaccine priority schedule (Table 1). Individuals classified into Phase 1a comprised a larger share of women (74%), non-Hispanic Black individuals (18%), and adults aged 25–44 years (41%) than the U.S. population. Those classified into Phase 1b have a more equal gender balance (49% women), a larger proportion of non-Hispanic Whites (70%), and by design, more adults aged ≥75 years (35%). The demographic distribution of Phase 1c largely follows that of the overall U.S. population. Phase 2 consists of a larger proportion of men (54%), adults aged 18–24 years and 25–44 years, and Hispanic Americans (24%) than the overall U.S. population.

DISCUSSION

A relatively large fraction of individuals prioritized for the earliest distribution of the vaccine are women, non-Hispanic Black individuals, and young to middle-aged adults. Although Black adults are expected to make up 18% of Phase 1a, they comprised only 5.4% of adults vaccinated in the first month of the U.S. vaccination program⁷ and 6.8% of fully vaccinated adults 3 months after authorization.⁸ Furthermore, the proportion of vaccinated Black adults is lower than their share of the

From the ¹Department of Epidemiology, Rollins School of Public Health, Emory University, Atlanta, Georgia; ²Department of Community Health & Preventive Medicine, Morehouse School of Medicine, Atlanta, Georgia; and ³Hubert Department of Global Health, Rollins School of Public Health, Emory University, Atlanta, Georgia

Address correspondence to: Shivani A. Patel, PhD, MPH, Hubert Department of Global Health, Rollins School of Public Health, Emory University, 1518 Clifton Road Northeast, CNR 7037, Atlanta GA 30322. E-mail: s.a.patel@emory.edu.

0749-3797/\$36.00

<https://doi.org/10.1016/j.amepre.2021.04.001>

Table 1. Distribution of the Non-institutionalized Adult COVID-19 Vaccination Priority Populations by Sex, Race/Ethnicity, Age, and Region

Demographics	Total non-institutionalized U.S. population % (95% CI)	Prioritized under Phase 1			Prioritized under Phase 2 ^a % (95% CI)
		Phase 1a ^b % (95% CI)	Phase 1b ^c % (95% CI)	Phase 1c ^d % (95% CI)	
Number of adults	249,455,533	22,074,002	54,313,310	135,955,691	37,112,530
Sex					
Men	48.3 (47.5, 49.0)	26.2 (24.0, 28.4)	51.4 (49.9, 52.9)	49.1 (48.1, 50.2)	53.5 (51.3, 55.7)
Women	51.7 (51.0, 52.5)	73.8 (71.6, 76.0)	48.6 (47.1, 50.1)	50.9 (49.8, 51.9)	46.5 (44.3, 48.7)
Race/ethnicity					
Non-Hispanic White	63.0 (61.5, 64.6)	61.6 (58.7, 64.6)	70.2 (68.1, 72.2)	62.9 (61.2, 64.6)	54.1 (51.3, 56.9)
Non-Hispanic Black	11.7 (10.8, 12.6)	17.5 (15.1, 19.9)	9.7 (8.6, 10.8)	11.6 (10.6, 12.6)	11.3 (9.6, 13.1)
Hispanic	16.3 (15.0, 17.7)	10.6 (8.7, 12.4)	13.5 (11.8, 15.1)	16.2 (14.8, 17.6)	24.1 (21.6, 26.7)
American Indian and Alaskan Native	0.8 (0.4, 1.2)	0.9 (0.2, 1.5)	0.5 (0.09, 1.0)	1.0 (0.5, 1.4)	0.6 (0.2, 1.0)
Asian	6.1 (5.4, 6.7)	7.8 (6.1, 9.4)	4.6 (3.8, 5.4)	5.9 (5.2, 6.6)	7.9 (6.7, 9.1)
Other	2.1 (1.8, 2.3)	1.6 (1.03, 2.3)	1.5 (1.1, 1.9)	2.4 (2.0, 2.7)	2.0 (1.2, 2.6)
Age, years					
18–24	11.7 (11.1, 12.4)	6.7 (5.1, 8.3)	6.3 (5.3, 7.3)	10.5 (9.7, 11.3)	27.1 (25.0, 29.3)
25–44	34.4 (33.5, 35.2)	41.4 (38.9, 43.9)	23.7 (22.3, 25.0)	34.5 (33.4, 35.6)	45.5 (43.3, 47.7)
45–64	33.3 (32.5, 34.0)	34.9 (32.4, 37.4)	24.3 (23.0, 25.7)	38.2 (37.2, 39.2)	27.4 (25.3, 29.4)
65–74	12.4 (11.9, 12.8)	10.7 (9.4, 12.0)	10.3 (9.4, 11.2)	16.8 (16.1, 17.5)	
≥75	8.2 (7.9, 8.7)	6.2 (5.2, 7.2)	35.4 (33.9, 36.9)		
Census region ^e					
Northeast	17.3 (16.5, 18.2)	20.9 (18.7, 23.2)	17.0 (15.6, 18.3)	17.0 (16.0, 18.1)	16.9 (15.1, 18.8)
North Central/Midwest	22.0 (21.1, 22.8)	21.2 (19.2, 23.2)	24.8 (23.3, 26.3)	21.2 (20.2, 22.2)	21.1 (19.1, 23.1)
South	36.9 (35.8, 38.0)	37.4 (34.8, 40.0)	35.8 (34.0, 37.5)	37.6 (36.2, 39.0)	35.5 (33.0, 37.9)
West	23.8 (22.7, 24.9)	20.4 (18.4, 22.5)	22.4 (20.8, 24.1)	24.1 (22.9, 25.4)	26.5 (24.0, 28.9)

Note: Phases are assigned according to CDC COVID-19 Vaccination Program Interim Playbook for Jurisdiction Operations framework. Detailed definitions are provided in the Appendix (available online).

^aComprises all individuals not covered in previous phases.

^bEstimates classified all healthcare workers (regardless of essential status) and did not include institutionalized populations (i.e., long-term care facility residents or incarcerated individuals) into Phase 1a. Note that Advisory Committee on Immunization Practices defined Phase 1a as comprising essential healthcare workers and long-term care residents.

^cEstimates classified individuals aged ≥75 years and nonhealthcare essential workers into Phase 1b. Phase 1b estimates exclude individuals who are prioritized in Phase 1a.

^dEstimates classified essential workers not covered in Phase 1a or 1b, adults aged 65–74 years, and individuals aged 18–64 years with high-risk medical conditions into Phase 1c. Phase 1c estimates exclude individuals who are prioritized in Phase 1a or Phase 1b.¹

^eNortheast includes ME, NH, VT, MA, RI, CT, NY, NJ, and PA; North Central/Midwest includes MI, OH, IN, IL, WI, MN, IA, MO, ND, SD, KS, and NE; South includes DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, MS, AL, TX, AR, OK, and LA; and West includes WA, AK, OR, CA, HI, MT, ID, WY, CO, NM, AZ, UT, and NV.

AK, Alaska; AL, Alabama; AR, Arkansas; AZ, Arizona; CA, California; CDC, Center for Disease Control and Prevention; 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, 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; WV, West Virginia; WY, Wyoming.

population in at least 30 of 44 states reporting vaccination data by race.⁹ Delivering vaccines to priority populations will rely on increased investments in overcoming the barriers to vaccine access (such as transportation to vaccine centers, Internet access to make appointments, and time off of work) and on communication strategies that address vaccine hesitancy in vulnerable groups.

Native Americans—a priority group due to exceedingly high COVID-19 mortality—comprise a greater share of those vaccinated (~1.5%⁸) than their representation in the U.S. population (~0.8%). This success demonstrates that systematic efforts can overcome the challenges in reaching vulnerable communities. Eligibility for vaccination is ultimately determined by states, and

heterogeneity in the timing of eligibility (e.g., teachers, caregivers, and coresidents of the elderly) must be considered for local benchmarking. Beyond national data on vaccination demographics,⁸ state- and county-level data to track and address the demographic gap between those who received the COVID-19 vaccine and those prioritized for vaccination will be critical for an equity-oriented course correction in the U.S. pandemic response.

Limitations

Estimates are based on 2018 data. Data constraints imposed the following additional limitations: Phase 1a estimates included all healthcare workers (irrespective of essential classification), estimates exclude individuals in long-term care facilities and incarcerated populations, and some Phase 1b and 1c occupations and morbidities were not captured.

ACKNOWLEDGMENTS

SAP and KMVN were supported in part by Grant Number 77624 from the Robert Wood Johnson Foundation. SAP, KMVN, and TA were supported in part by Rapid Acceleration of Diagnostics Underserved Populations (P30DK111024-05S1). KMVN, TA, and RAB were supported in part by Georgia CEAL (16-312-0217571-66105).

No financial disclosures were reported by the authors of this paper.

SUPPLEMENTAL MATERIAL

Supplemental materials associated with this article can be found in the online version at <https://doi.org/10.1016/j.amepre.2021.04.001>.

REFERENCES

1. Dooling K, Marin M, Wallace M, et al. The Advisory Committee on Immunization Practices' Updated Interim Recommendation for Allocation of COVID-19 Vaccine - United States, December 2020. *MMWR Morb Mortal Wkly Rep*. 2021;69(5152):1657–1660. <https://doi.org/10.15585/mmwr.mm695152e2>.
2. Hawkins D. Differential occupational risk for COVID-19 and other infection exposure according to race and ethnicity. *Am J Ind Med*. 2020;63(9):817–820. <https://doi.org/10.1002/ajim.23145>.
3. Risk for COVID-19 infection, hospitalization, and death by race/ethnicity. Centers for Disease Control and Prevention. <http://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html>. Accessed 18 March 2021.
4. Across the south COVID-19 vaccine sites missing from Black and Hispanic neighborhoods [transcript]. *Morning Edition*. February 5, 2021 NPR. <https://www.npr.org/2021/02/05/962946721/across-the-south-covid-19-vaccine-sites-missing-from-black-and-hispanic-neighbor>. Accessed February 12, 2021.
5. Hamel L, Kirzinger A, Muñana C, Brodie M. *KFF COVID-19 vaccine monitor: December 2020*. San Francisco, CA: Kaiser Family Foundation; 2020. <https://www.kff.org/coronavirus-covid-19/report/kff-covid-19-vaccine-monitor-december-2020/>. Published 2020. Accessed January 12, 2021.
6. Khubchandani J, Sharma S, Price JH, Wiblishauser MJ, Sharma M, Webb FJ. COVID-19 vaccination hesitancy in the United States: a rapid national assessment. *J Community Health*. 2021;46(2):270–277. <https://doi.org/10.1007/s10900-020-00958-x>.
7. Painter EM, Ussery EN, Patel A, et al. Demographic characteristics of persons vaccinated during the first month of the COVID-19 vaccination program - United States, December 14, 2020-January 14, 2021. *MMWR Morb Mortal Wkly Rep*. 2021;70(5):174–177. <https://doi.org/10.15585/mmwr.mm7005e1>.
8. COVID data tracker. Centers for Disease Control and Prevention. <https://covid.cdc.gov/covid-data-tracker>. Accessed 18 March 2021.
9. Ndugga N, Pham O, Hill L, Artiga S, Alam R, Parker N. Latest data on COVID-19 vaccinations race/ethnicity. San Francisco, CA: Kaiser Family Foundation. <https://www.kff.org/coronavirus-covid-19/issue-brief/latest-data-covid-19-vaccinations-cases-deaths-race-ethnicity/>. Accessed 12 February 2021.