
National Health Statistics Reports

Number 175 ■ September 28, 2022

Experiences Related to the COVID-19 Pandemic Among U.S. Physicians in Office-based Settings, 2020–2021

by Zachary J. Peters, M.P.H., Christopher Cairns, M.P.H., and Danielle Davis, M.P.H.

Abstract

Objective—To assess final estimates of physician experiences related to COVID-19 and to compare preliminary estimates used in NCHS early-release dashboards with final estimates in this report.

Methods—Physicians interviewed in periods 3 and 4 (December 15, 2020, through May 5, 2021) of the 2020 National Ambulatory Medical Care Survey (NAMCS) were asked a series of questions about experiences related to COVID-19 ($n = 422$). This report presents final nationally representative estimates for selected measures of COVID-19-related experiences among physicians in the United States and compares preliminary and final estimates for these measures.

Results—Between September 2020 and May 2021, 31.1% of office-based physicians in the United States experienced shortages of personal protective equipment, and 38.4% of physicians had to turn away COVID-19 patients or refer them elsewhere for care. The percentage of physicians using telemedicine for patient care increased from 43.1% before the pandemic to 88.4% after the start of the pandemic. No statistically significant differences were seen between preliminary and final estimates for the measures assessed in this report.

Conclusions—By making changes to NAMCS partway through the survey year, the National Center for Health Statistics was able to produce nationally representative estimates of physician experiences related to an emerging health threat, the COVID-19 pandemic. Additionally, the similarity between preliminary and final estimates for measures of interest provides evidence of the value of developing preliminary early-release estimates.

Keywords: COVID-19 testing • telemedicine • personal protective equipment (PPE) • National Ambulatory Medical Care Survey (NAMCS)

Introduction

The COVID-19 pandemic introduced many challenges for health care providers and health care settings, contributing to

the overall decline of providers' wellness. Health care settings experienced insufficient supplies of personal protective equipment (PPE) and shortages of staff, while providers were exposed

to and tested positive for COVID-19 (1–6). Research shows that health care providers experienced increased burnout, anxiety, fatigue, and traumatic stress over this time (6–10). Additionally, health care providers adopted new practices to deliver care, such as offering telehealth services (11,12). To assess challenges faced in physician offices in the United States, the National Center for Health Statistics (NCHS) adapted the 2020 National Ambulatory Medical Care Survey (NAMCS) Physician Induction Interview mid-implementation to ask physicians about their work experiences related to the COVID-19 pandemic.

In the 2020 NAMCS, physicians were asked about shortages of PPE, their ability to test for COVID-19, turning away COVID-19 patients or referring them elsewhere, providers in their office testing positive for COVID-19, and their use of telemedicine before and after March 2020. To increase the timeliness of COVID-19 data, NCHS developed and implemented a new weighting scheme to capture nationally representative preliminary estimates using a subset of the 2020 NAMCS sample. These preliminary estimates were previously published in data visualizations on the NCHS COVID-19 website (13). This report uses data from



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Health Statistics



the 2020 NAMCS to both publish final nationally representative estimates of the previously published preliminary output and compare preliminary and final estimates to better understand the utility of publishing early-release data from NAMCS.

Methods

Data were collected from 422 office-based physicians who were interviewed in periods 3 and 4 of the 2020 NAMCS, between December 15, 2020, and May 5, 2021. NAMCS is a nationally representative survey of care delivery and use in office-based settings in the United States, and historically consists of two parts: 1) a Physician Induction Interview with sampled physicians, and 2) abstraction of a sample of visits from each physician's medical records for a specific week in the survey year. Additional details of NAMCS methodology are available elsewhere (14). Due to the COVID-19 pandemic, medical record abstraction was canceled for the 2020 NAMCS. However, for periods 3 and 4, NCHS introduced a

series of questions to the Physician Induction Interview to assess the impact of the COVID-19 pandemic on care delivery in physicians' offices. These questions were used to develop measures of physician experiences related to the pandemic, as described in the Table. The first six measures in the Table assess experiences in the 3 months before physician interviews and, therefore, describe physician experiences between September 2020 and May 2021. The last two measures in the Table describe telemedicine use for patient care before and after March 2020.

Preliminary weights and final weights were used to produce estimates in this report, both of which were created using multipurpose iterative proportional fitting (IPF) (15). Multipurpose IPF is a weighting technique that simultaneously calibrates and trims weights while adjusting for nonresponse. The preliminary weights were originally used to develop early-release dashboards on the NCHS website (13) using only physicians sampled in periods 3 and 4. The final weights were developed using physicians sampled in all four periods

of the 2020 NAMCS. The response rate among eligible physicians was 54.5% in periods 3 and 4 and 50.8% for all four periods.

Using final weights, this report presents percentages, standard errors (SEs), and Korn–Graubard confidence intervals for COVID-19-related measures using the subset of physicians who responded to the COVID-19-related questions in periods 3 and 4 of the 2020 NAMCS. Reliability of percentages was evaluated according to the NCHS Data Presentation Standards for Proportions, and estimates are presented according to this guidance (16). This report also presents comparisons of preliminary estimates and final estimates for COVID-19-related measures. Final and preliminary estimates were statistically compared using a *t* test that accounts for the correlation between the estimates; *p* values are presented for each measure.

All analyses were conducted in SAS-callable SUDAAN 11.0.3 (RTI International, Research Triangle Park, N.C.) to account for the complex sampling design of NAMCS.

Table. List of measures, survey questions, and measure definitions of physician experiences related to the COVID-19 pandemic

| Measure | 2020 NAMCS question | Measure definition |
|---|--|--|
| Shortages of N95 respirators or other approved face masks | 1. During the past 3 months, how often did your office experience shortages of N95 respirators or other approved face masks due to the onset of the coronavirus disease (COVID-19) pandemic? | Percentage of physicians responding "some," "most," or "all of the time" to question 1. |
| Shortages of eye protection, isolation gowns, or gloves | 2. During the past 3 months, how often did your office experience shortages of eye protection, isolation gowns, or gloves due to the onset of the coronavirus disease (COVID-19) pandemic? | Percentage of physicians responding "some," "most," or "all of the time" to question 2. |
| Shortages of any personal protective equipment | <i>Derived from questions 1 and 2 (above).</i> | Percentage of physicians responding "some," "most," or "all of the time" to question 1 or 2. |
| Ability to test for COVID-19 | 3. During the past 3 months, did your office have the ability to test patients for coronavirus disease (COVID-19) infection? | Percentage of physicians responding "yes" to question 3. Those responding "N/A, did not need to test for COVID-19" were excluded from analysis. |
| Turn away or refer elsewhere COVID-19 patients | 4. During the past 3 months, did your office need to turn away or refer elsewhere any patients with confirmed or presumptive positive coronavirus disease (COVID-19) infection? | Percentage of physicians responding "some," "most," or "all patients" to question 4. |
| Any providers at their office test positive for COVID-19 | 5. During the past 3 months, did any of the following clinical care providers in your office test positive for coronavirus disease (COVID-19) infection? Physicians, physician assistants, nurse practitioners, certified nurse midwives, RN/LPNs, or other clinical care providers. | Percentage of physicians responding "yes" to question 5, at least one provider of any type tested positive for COVID-19 at their clinic. |
| Telemedicine use before March 2020 | 6. During January and February 2020, was your office using telemedicine or telehealth technologies (for example, audio with video, web videoconference) to assess, diagnose, monitor, or treat patients? | Percentage of physicians responding "yes" to question 6. Those who responded "don't know" were excluded, as they were not subsequently asked question 7. |
| Telemedicine use during or after March 2020 | <i>Derived from question 6 (above) and question 7 (below).</i> 7. After February 2020, has your office started using telemedicine or telehealth technologies? | Percentage of physicians responding "yes" to question 6 or 7. Those who responded "don't know" to question 6 were excluded, as they were not asked question 7. |

Results

Between September 2020 and May 2021, 31.1% of office-based physicians in the United States experienced a shortage of any PPE; 21.5% experienced a shortage of N95 respirators or other approved face masks; and 24.5% experienced a shortage of eye protection, isolation gowns, or gloves (Table 1). While 40.4% of physicians had the ability to test for COVID-19 at their office during this timeframe, 38.4% had to turn away at least some COVID-19 patients or refer them elsewhere for care. Additionally, 32.1% of physicians had at least one provider at their office test positive for COVID-19 in the 3 months before being interviewed (Table 1).

Changes in telemedicine use before and after the onset of the COVID-19 pandemic were assessed in the 2020 NAMCS. Before March 2020, 43.1% of physicians stated that their office was using telemedicine technologies to assess, diagnose, monitor, or treat patients. After March 2020, 88.4% of physicians were either already using or had started using telemedicine technologies for patient care (Table 1).

When comparing preliminary and final estimates, no statistical differences were found for any of the measures assessed in this report (Table 2).

Discussion

This report presents nationally representative estimates of office-based physician experiences during the COVID-19 pandemic. Nearly one-third of physicians experienced shortages of PPE at their offices between September 2020 and May 2021. During this period, 4 out of 10 physicians had to turn away or refer elsewhere COVID-19 patients, and about 1 in 3 physicians had a provider at their office test positive for COVID-19. Like findings in other settings (11–12), telemedicine use at physician offices increased after the onset of the pandemic. Lastly, this report shows that preliminary estimates were similar to final estimates for all measures assessed, highlighting the value of producing preliminary early-release estimates using NAMCS data.

An important strength of this report is its use of nationally representative data to assess physician experiences during the COVID-19 pandemic. However, findings from this report should be considered within the context of its limitations. First, not all office-based physicians are represented, as the survey sample excludes those in the specialties of anesthesiology, radiology, and pathology and those who were residents, interns, or fellows. Second, COVID-19-related questions were asked of physicians who were interviewed between December 2020 and May 2021, so experiences during the early months of the pandemic were not assessed. Lastly, this sample was underpowered to stratify and compare experiences based on physician and office characteristics.

Estimates in this report describe several challenges faced by office-based physicians in the United States due to the COVID-19 pandemic, and highlight increases in telemedicine use for patient care. As future releases of NAMCS become available, future studies may assess changes over time in physician experiences as well as differences in experiences based on physician and office characteristics.

References

1. Cohen J, Rodgers YVM. Contributing factors to personal protective equipment shortages during the COVID-19 pandemic. *Prev Med* 141:106263. 2020.
2. Lepak AJ, Buys A, Stevens L, LeClair-Netzel M, Anderson L, Osman F, et al. COVID-19 in health care personnel: Significance of health care role, contact history, and symptoms in those who test positive for SARS-CoV-2 infection. *Mayo Clin Proc* 96(9):2312–2. 2021.
3. Monsalud CFL, Lind MFG, Hines CM, Schora D, Grant J, McElvania E, Singh K. Mitigating staff shortages: Risk of permitting healthcare workers to return to work after coronavirus disease 2019 (COVID-19) exposure. *Infect Control Hosp Epidemiol* 43(6):827–8. 2022.
4. Ahmed J, Malik F, Bin Arif T, Majid Z, Chaudhary MA, Ahmad J, et al. Availability of personal protective equipment (PPE) among US and Pakistani doctors in COVID-19 pandemic. *Cureus* 12(6):e8550. 2020.
5. Gray BM, Vandergrift JL, Barnhart BJ, Reddy SG, Chesluk BJ, Stevens JS, et al. Changes in stress and workplace shortages reported by U.S. critical care physicians treating Coronavirus disease 2019 patients. *Crit Care Med* 49(7):1068–82. 2021.
6. Arnetz JE, Goetz CM, Sudan S, Arble E, Janisse J, Arnetz BB. Personal protective equipment and mental health symptoms among nurses during the COVID-19 pandemic. *J Occup Environ Med* 62(11):892–7. 2020.
7. Kannampallil TG, Goss CW, Evanoff BA, Strickland JR, McAlister RP, Duncan J. Exposure to COVID-19 patients increases physician trainee stress and burnout. *PLoS One* 15(8):e0237301. 2020.
8. Sharma M, Creutzfeldt CJ, Lewis A, Patel PV, Hartog C, Jannotta GE, et al. Health-care professionals' perceptions of critical care resource availability and factors associated with mental well-being during Coronavirus disease 2019 (COVID-19): Results from a US survey. *Clin Infect Dis* 72(10):e566–76. 2021.
9. Kelker H, Yoder K, Musey Jr P, Harris M, Johnson O, Sarmiento E, et al. Prospective study of emergency medicine provider wellness across ten academic and community hospitals during the initial surge of the COVID-19 pandemic. *BMC Emerg Med* 21(1):36. 2021.
10. Rodriguez RM, Montoy JCC, Hoth KF, Talan DA, Harland KK, Eyck PT, et al. Symptoms of anxiety, burnout, and PTSD and the mitigation effect of serologic testing in emergency department personnel during the COVID-19 pandemic. *Ann Emerg Med* 78(1):35–43. 2021.
11. Koonin LM, Hoots B, Tsang CA, Leroy Z, Farris K, Jolly T, et al. Trends in the use of telehealth during the emergence of the COVID-19 pandemic – United States, January–March 2020. *MMWR Morb Mortal Wkly Rep* 69(43):1595–9. 2020.
12. FAIR Health. FH® healthcare indicators and FH® medical price index 2022: An annual view of place of service trends and medical

- pricing. A FAIR Health White Paper. 2022. Available from: <https://s3.amazonaws.com/media2.fairhealth.org/whitepaper/asset/FH%20Healthcare%20Indicators%20and%20FH%20Medical%20Price%20Index%202022--A%20FAIR%20Health%20White%20Paper.pdf>.
13. National Center for Health Statistics. Physician experiences related to COVID-19. Available from: <https://www.cdc.gov/nchs/covid19/namcs.htm>.
14. National Center for Health Statistics. 2018 NAMCS micro-data file documentation. Available from: https://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NAMCS/doc2018-508.pdf.
15. Strashny A, Beresovsky V, Schappert S, Santo L. Survey weights in the 2018 National Ambulatory Medical Care Survey (NAMCS) adjusted using iterative proportional fitting (IPF). 2022. [Forthcoming].
16. Parker JD, Talih M, Malec DJ, Beresovsky V, Carroll M, Gonzalez Jr JF, et al. National Center for Health Statistics data presentation standards for proportions. National Center for Health Statistics. Vital Health Stat 2(175). 2017.

Table 1. Physician experiences related to the COVID-19 pandemic: United States, 2020–2021

| Measure | Percent | Standard error | Lower 95% confidence interval | Upper 95% confidence interval |
|---|---------|----------------|-------------------------------|-------------------------------|
| Shortages of N95 respirators or other approved face masks | 21.5 | 2.9 | 16.0 | 27.9 |
| Shortages of eye protection, isolation gowns, or gloves. | 24.5 | 3.2 | 18.5 | 31.4 |
| Shortages of any personal protective equipment | 31.1 | 3.4 | 24.6 | 38.2 |
| Ability to test for COVID-19. | 40.4 | 3.7 | 33.1 | 48.1 |
| Turn away or refer elsewhere COVID-19 patients. | 38.4 | 3.8 | 30.9 | 46.4 |
| Any providers at their office test positive for COVID-19 | 32.1 | 3.3 | 25.7 | 39.0 |
| Telemedicine use before March 2020. | 43.1 | 3.6 | 35.9 | 50.6 |
| Telemedicine use during or after March 2020. | 88.4 | 2.3 | 83.0 | 92.6 |

NOTES: Confidence intervals were calculated using the Korn–Graubard method. Estimates in this table are final. Data are based on interviews with 422 office-based physicians. Physicians were interviewed between December 15, 2020, and May 5, 2021. The first six measures asked about the 3 months before physician interviews and, therefore, represent physician experiences between September 2020 and May 2021.

SOURCE: National Center for Health Statistics, 2020 National Ambulatory Medical Care Survey Physician Induction Interview.

Table 2. Comparison of preliminary and final estimates of physician experiences related to the COVID-19 pandemic

| Measure | Preliminary estimates | | Final estimates | | <i>p</i> value |
|---|-----------------------|----------------|-----------------|----------------|----------------|
| | Percent | Standard error | Percent | Standard error | |
| Shortages of N95 respirators or other approved face masks | 20.7 | 2.9 | 21.5 | 2.9 | 0.2027 |
| Shortages of eye protection, isolation gowns, or gloves. | 23.7 | 3.3 | 24.5 | 3.2 | 0.3219 |
| Shortages of any personal protective equipment | 30.5 | 3.4 | 31.1 | 3.4 | 0.5330 |
| Ability to test for COVID-19. | 41.6 | 3.7 | 40.4 | 3.7 | 0.1829 |
| Turn away or refer elsewhere COVID-19 patients. | 38.5 | 3.9 | 38.4 | 3.8 | 0.8381 |
| Any providers at their office test positive for COVID-19 | 32.5 | 3.4 | 32.1 | 3.3 | 0.6914 |
| Telemedicine use before March 2020. | 42.2 | 3.7 | 43.1 | 3.6 | 0.3580 |
| Telemedicine use during or after March 2020. | 89.9 | 2.1 | 88.4 | 2.3 | 0.3511 |

NOTES: Data are based on interviews with 422 office-based physicians. Physicians were interviewed between December 15, 2020, and May 5, 2021. The first six measures asked about the 3 months before physician interviews and, therefore, represent physician experiences between September 2020 and May 2021. Preliminary estimates use weights that were developed using physicians in periods 3 and 4 of the 2020 NAMCS, whereas final estimates use weights that were developed using physicians in all four periods of the 2020 NAMCS. No statistical differences were found between preliminary and final estimates for any measure.

SOURCE: National Center for Health Statistics, 2020 National Ambulatory Medical Care Survey Physician Induction Interview.

**U.S. DEPARTMENT OF
HEALTH & HUMAN SERVICES**

Centers for Disease Control and Prevention
National Center for Health Statistics
3311 Toledo Road, Room 4551, MS P08
Hyattsville, MD 20782-2064

FIRST CLASS MAIL
POSTAGE & FEES PAID
CDC/NCHS
PERMIT NO. G-284

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300

For more NCHS NHSRs, visit:
<https://www.cdc.gov/nchs/products/nhsr.htm>.



National Health Statistics Reports ■ Number 175 ■ September 28, 2022

Suggested citation

Peters ZJ, Cairns C, Davis D. Experiences related to the COVID-19 pandemic among U.S. physicians in office-based settings, 2020-2021. National Health Statistics Reports; no 175. Hyattsville, MD: National Center for Health Statistics. 2022. DOI: <https://dx.doi.org/10.15620/cdc:120729>.

Copyright information

All material appearing in this report is in the public domain and may be reproduced or copied without permission; citation as to source, however, is appreciated.

National Center for Health Statistics

Brian C. Moyer, Ph.D., *Director*
Amy M. Branum, Ph.D., *Associate Director
for Science*

Division of Health Care Statistics

Carol J. DeFrances, Ph.D., *Acting Director*
Alexander Strashny, Ph.D., M.P.H., *Associate
Director for Science*

For e-mail updates on NCHS publication releases, subscribe online at: <https://www.cdc.gov/nchs/email-updates.htm>.
For questions or general information about NCHS: Tel: 1-800-CDC-INFO (1-800-232-4636) • TTY: 1-888-232-6348
Internet: <https://www.cdc.gov/nchs> • Online request form: <https://www.cdc.gov/info> • CS333505