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Public opinion of resident physician work hours in 2022

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ABSTRACT

Objective: The purpose of this study was to characterize public awareness and opinion regarding resident physician work hours in the United States.
Methods: We conducted a nationally representative cross-sectional survey among adults in the United States. Demographic quota-based sampling was conducted by Qualtrics to match 2020 United States Census estimates of age, sex, race, and ethnicity. Descriptive statistics are presented. Hypothesis testing was conducted to identify characteristics associated with agreement with current resident physician work-hour policies.
Results: 4763 adults in the United States participated in the study. 97.1% of the public believes that resident physicians should not work 24-hour shifts and 95.6% believe the current 80 hours resident work week is too long. 66.4% of the participants reported that the maximum shift duration should be 12 consecutive hours or fewer, including 22.9% who recommended a maximum shift length of 8 hours. Similarly, 66.4% reported that maximum weekly work hours should be 59 or fewer, including 24.9% who recommended a maximum of 40 weekly work hours.
Conclusions: Nearly all US adults disagree with current work-hour policies for resident physicians. Public opinion supports limiting shifts to no more than 12 consecutive hours and weekly work to no more than 60 hours, which is in sharp contrast to current regulations that permit of 28 hours shifts and 80 hours of work per week.

Introduction

Every year, more than 150,000 graduating medical students enter their next phase of training as resident physicians. These individuals provide much of the direct care in teaching hospitals.[1] Although major teaching hospitals account for only 6% of all hospitals, they provide 20% of all hospital care in the US, nearly half of all charity care (ie, care for those who cannot pay), and are more likely to care

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[1] Dr Czeisler's Contribution to the Work.

This public opinion report was inspired by and modeled after Dr. Czeisler's earlier publication on public opinion of resident physician work hours in 2010. This earlier report served as a capstone to a body of evidence accumulated throughout the 2000's by Dr Czeisler's Harvard Work Hours Health and Safety Group (HWHHSG) that demonstrated extended work hours for resident physicians were associated with adverse patient safety events as well as threats to the safety and health of residents themselves. Collectively, these impactful contributions (cited by more than 8000 other publications at the time of this writing) contributed to the body of evidence considered by the National Academy of Medicine (then the Institute of Medicine) in formulating its recommendations regarding proposed limits on resident physician work hours. This work was further recognized by the National Institute for Occupational Safety and Health (NIOSH) Director's Award for Scientific Leadership in Occupational Safety and the National Sleep Foundation's Health Sleep Community Award. The few substantive restrictions on resident physician work hours implemented by the Accreditation Council for Graduate Medical Education, which limited first-year resident physicians to work no more than 16 consecutive hours, have since been lifted. Public awareness of this issue is not known. Dr Czeisler has been a leading voice in including the perspective of patients in work-hour discussions, including advocating for the disclosure of physician sleep deprivation as part of informed consent. This report seeks to inform the medical community of the opinion of adults in the United States, many of whom are or will become patients, regarding their expectations of acceptable work hours for those they rely on for care.

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for the critically ill. These hospitals are also the group most likely to be recognized as leaders in healthcare, and as such, have an outsized role in driving culture and normative practices in medicine. Providing care safely and effectively while supporting the residency training experience is critical to enable the delivery of health care both now, and in the future.

Consequently, resident physician work schedules are critically important and have remained a divisive issue for more than 50 years. From 2003 to 2011, the Accreditation Council for Graduate Medical Education (ACGME) limited first-year resident physicians to work no more than 24 consecutive hours, with extension to 30 hours as needed for continuity of care, broadly defined, and educational activities. In 2001, the Harvard Work Hours Health and Safety Group began a series of studies that demonstrated extended duration shifts (work ≥24 hours) were associated with increased odds of fatigue-related medical errors and preventable adverse events,[2] percutaneous injuries,[3] and motor vehicle crashes.[4] Soon thereafter, in response to a bipartisan Congressional recommendation,[5] the agency for healthcare research and quality commissioned the National Academy of Medicine (formerly the Institute of Medicine) to launch a task force to review the evidence on this issue, resulting in the 2009 report, "Resident duty hours: Enhancing sleep, supervision and safety".[6,7] The report concluded that continuous duty periods *must* not exceed 16 hours unless at least 5 hours of protected time was provided for sleep. The ACGME then issued revised work-hour regulations in 2011 which limited first-year resident physicians to no more than 16 consecutive hours of work and emphasized a commitment to mitigation of fatigue-related risks. Notably, in 2017, the ACGME reversed that decision and increased the work-hour limit of first-year resident physicians to allow them to return to work 24 consecutive hours (with extension to 28 hours) up to twice per week, in the wake of 2 controversial and arguably underpowered studies that reported no change in mortality and complications associated with limiting first-year residents' work hours.[8–10] Weekly hours of work have remained set at an average of 80 hours since 2003. The extent to which extended-duration shifts have been reintegrated into medical education is largely unknown at this time. However, preliminary data suggest they are common for some programs (particularly surgical programs) as well as on intensive care unit rotations (unpublished).

Over a decade has passed since our prior investigation that found overwhelming public support for limiting work hours to no more than 16 consecutive hours.[11] Notably, 4 out of 5 reported wanting a different doctor if their physician had been at work for 24 hours.[11] There have been no updates seeking to characterize public support in the interim. We sought to update this prior effort now that work-hour restrictions have largely returned to 2003 levels and public awareness of this reversal is unknown. The purpose of this study was to characterize public awareness and opinion regarding resident physician work hours in the United States.

Methods

This nationwide cross-sectional survey study was conducted from September 26, 2022, to October 15, 2022. Partners HealthCare and the Centers for Disease Control and Prevention conducted an ethical review and considered the activities to be public health surveillance. Demographic quota-based sampling sought to achieve a respondent sample consistent with 2020 Census estimates of age, sex, and combined race and ethnicity in the United States adult population. Recruitment was conducted by Qualtrics (Qualtrics, Provo, UT) using a mix of existing respondent panels. Participant incentives varied by panel, averaging $4-$8 in reported value.

The overarching purpose of the survey (median duration 40 minutes, interquartile range 28-57 minutes) was to characterize public attitudes, behaviors, and beliefs during the COVID-19 pandemic. Survey items captured demographic information; including age, sex at birth, race, employment, household income, political orientation, and medical history. Specific to this analysis, items were added to characterize public awareness of current resident physician work hours, maximum work hours that would be acceptable to patients, and agreement with current work-hour policies. These items matched the previous public awareness assessment[11] with minimal updates to reflect current policies.

Descriptive statistics are presented. Multivariable logistic regression models were constructed to identify demographic characteristics associated with agreement with current policies. Predictors were selected based on a framework of expected polarity in beliefs surrounding the topic of interest. Potential confounders that were considered for inclusion in the analysis focused on demographic and health characteristics, including current employment and weekly hours of work. Health characteristics were included to examine whether beliefs varied by frequency/likelihood of interaction with the healthcare system (self-assessment of general health and comorbid conditions served as surrogates for this concept). Factors associated with the outcome ($P \leq .20$) in unadjusted models were then included in the final adjusted model. *P*-values from logistic regression models were obtained using likelihood ratio chi-square tests. Respondents who were outside the United States at the time of survey completion were excluded from the study sample. Qualtrics automatically excluded responses that failed internal quality checks prior to sharing the data. Automated quality checks audit the speed and pattern of question completion and filter responses that are suspected to come from a non-human source. Completion of all questions was required to submit the survey, however, "Do not know" and "Prefer not to answer" were often included as response options. Analyses were conducted using StataSE15 (College Station, TX). All tests were two-sided with 95% confidence intervals and alpha set at .05. Supplemental analyses implemented calibration-adjusted sampling weights (specifically raking-ratio-adjusted sampling weights) using the Stata SvyCal survey package to improve the representativeness of the sample with respect to educational attainment. The results of those analyses are similar and are included in the Supplemental Materials (Supplementary Section 3).

Results

The study sample included 4763 adults in the United States. Demographic characteristics are presented in Table 1. Compared to the 2020 census, the demographics of the study sample closely align with the age, sex, and race/ethnicity of the United States population (Supplementary Section 1). Our unweighted sample underrepresents those with a high school education (23.3% vs. 38.9%) and over-represents those with some college or college education (58.1% vs. 49.1%) and graduate education (18.6% vs. 12.0%). Analyses weighing the sample by education are similar and are presented in Supplementary Section 3.

Public understanding of current work hours and work-hour limits. Approximately half (49.3%; 95% CI 47.9-50.8) of the public believes that resident physician work shifts are typically 12 hours or less (Table 2). The most common response was 9-12 hours per shift (37.6%; 95% CI 36.3-39.0), followed by 13-18 hours (22.0%; 95% CI 20.8-23.2), ≤8 hours (11.7%; 95% CI 10.8-12.7), and ≥24 hours (6.8%; 95% CI 6.1-7.6). The 2 most commonly believed weekly work-hour categories were 41-59 hours (28.6%; 95% CI 27.4-29.9) or 60-79 hours (26.0%; 95% CI 24.8-27.3). Fourteen percent believe an average of 80 or more weekly work hours is typical (14.1%; 95% CI 13.1-15.1).

Public opinion on work-hour limits. Only 2.9% (95% CI 2.5-3.4) of the public believes that resident physicians should be allowed to work 24 or more hours for a given shift (Table 2). Similarly, only 4.4% (95% CI 3.9-5.1) believe that resident physicians should be allowed to work 80 or more hours per week. Approximately 2/3 of respondents

Table 1
Characteristics of the study sample

	% (n)
Age	
18-24	11.8% (564)
25-44	33.2% (1579)
45-64	33.8% (1608)
≥65	21.3% (1012)
Race	
White, non-Hispanic	57.4% (2736)
Black, non-Hispanic	11.2% (533)
Asian, non-Hispanic	6.2% (296)
Other, non-Hispanic	4.2% (198)
Multiple race, non-Hispanic	2.1% (100)
Hispanic or Latino, any race or races	18.9% (900)
Sex at birth	
Female	50.4% (2402)
Male	48.1% (2293)
Other or prefer not to say	1.4% (68)
Married or living with partner	58.4% (2782)
Education	
High school diploma or less	23.3% (1111)
Some college or college	58.1% (2765)
Master's, professional, or doctoral degree	18.6% (887)
Employment	
Full-time	39.2% (1865)
Part-time	9.2% (438)
Self-employed	6.3% (301)
Casual/Seasonal or Student	5.1% (242)
Unemployed	15.4% (732)
Retired	24.9% (1185)
Employed in healthcare*	8.4% (224)
Weekly work hours	
40 or less	66.3% (3160)
41-59	27.8% (1325)
60-79	2.8% (132)
80 or more	3.1% (146)
Total household income in 2021	
Less than $25,000	19.4% (923)
$25,000-$49,999	22.5% (1070)
$50,000-$99,999	29.3% (1397)
$100,000-$199,999	20.0% (951)
$200,000 or more	5.2% (246)
Prefer not to say	3.7% (176)
Political orientation	
Slightly liberal or very liberal	34.7% (1575)
Neither liberal nor conservative	30.1% (1365)
Slightly conservative or very conservative	35.3% (1603)
In general, would you say that your health is	
Excellent or Very good	46.8% (2231)
Good	34.2% (1630)
Fair or poor	18.9% (902)
Number of comorbidities**	
0	23.0% (1015)
1	14.9% (656)
2	13.8% (609)
3	12.2% (536)
≥4	36.1% (1590)

The total n for Table 1 is 4763.
* Among the 2654 respondents reporting employment.
** Variable set to missing for those reporting ≥22 comorbid conditions (n=357).

Table 2
Public opinion of resident physician work hours. n, % (95% CI)

How long do you think resident physicians typically work for a given shift?		
8 or fewer hours	558	11.7% (10.8-12.7)
9-12 h	1792	37.6% (36.3-39.0)
13-18 h	1046	22.0% (20.8-23.2)
19-23 h	362	7.6% (6.9-8.4)
24 or more hours	325	6.8% (6.1-7.6)
Don't know	680	14.3% (13.3-15.3)
What is the maximum number of hours that you believe resident physicians should be asked to work for a given shift?		
8 or fewer hours	1090	22.9% (21.7-24.1)
9-12 h	2070	43.5% (42.1-44.9)
13-18 h	637	13.4% (12.4-14.4)
19-23 h	229	4.8% (4.2-5.5)
24 or more hours	139	2.9% (2.5-3.4)
Don't know	598	12.6% (11.6-13.5)
How many hours do you believe that resident physicians work each week on average?		
40 or less	758	15.9% (14.9-17.0)
41-59	1363	28.6% (27.4-29.9)
60-79	1240	26.0% (24.8-27.3)
80 or more	671	14.1% (13.1-15.1)
Don't know	731	15.4% (14.4-16.4)
What is the maximum number of hours that you believe resident physicians should be asked to work each week?		
40 or less	1187	24.9% (23.7-26.2)
41-59	1975	41.5% (40.1-42.9)
60-79	695	14.6% (13.6-15.6)
80 or more	211	4.4% (3.9-5.1)
Don't know	695	14.6% (13.6-15.6)
Medical residents are currently allowed to work up to 28 consecutive hours in patient care. Do you agree with this policy?		
No	2717	57.0% (55.6-58.4)
Neutral	645	13.5% (12.6-14.5)
Yes	707	14.8% (13.9-15.9)
Don't know	694	14.6% (13.6-15.6)
Please rate your level of support for the following policy that would change the work shift requirements for medical residents: Residents would not be allowed to work more than 16 h per shift in patient care.		
Support	3015	63.3% (61.9-64.7)
Neutral	640	13.4% (12.5-14.4)
Oppose	498	10.5% (9.6-11.4)
Don't know	610	12.8% (11.9-13.8)

reported that the maximum shift length should be 12 hours or less, and that weekly work hours should be capped at 60 or fewer hours. Specifically, participants reported that the maximum number of hours for a given shift should be either ≤8 (22.9%; 95% CI 21.7-24.1) or 9-12 (43.5%; 95% CI 42.1-44.9). Respondents also indicated that maximum weekly work hours should be ≤40 (24.9%; 95% CI 23.7-26.2) or 41-59 (41.5%; 95% CI 40.1-42.9).

Disagreement with current work-hour policies is shared across age, sex, race, ethnicity, marital status, education, employment, weekly work hours, income, political orientation, and health status. At least 93% of the adults in every demographic category (Fig. 1) responded less than "24 or more" for the maximum number of resident physicians should be asked to work for a given shift. We sought to identify characteristics associated with agreement that residents should be asked to work 24 or more hours for a given shift (an opinion shared by 3% of the study sample). Unadjusted analyses suggested that those identifying a non-Hispanic Black or Hispanic race, Hispanic and Latino ethnicity, those without college education, those working at least 80 hours per week, and those earning less than $25,000 per year were more likely to agree with current policies (Supplementary Table 2). Adjusted analyses were similar, with those identifying as non-Hispanic Black or Asian race, those of Hispanic and Latino Ethnicity, and those currently working at least 80 hours per week is more likely to agree with current policies after adjustment for potential confounders (Fig. 2).

Discussion

We found that nearly all adults in the United States disagree with current resident physician work-hour policies. Only 3% of the adults believe that shifts should be scheduled for 24 hours or longer and 4% support maximum work hours of 80 or more per week. The majority of the public supports a maximum shift length of 12 or fewer hours and weekly work hours that do not exceed 60 hours per week. These opinions are in contrast to current ACGME guidelines that permit shifts of 24 hours (with up to 4 hours for transitions of care or other

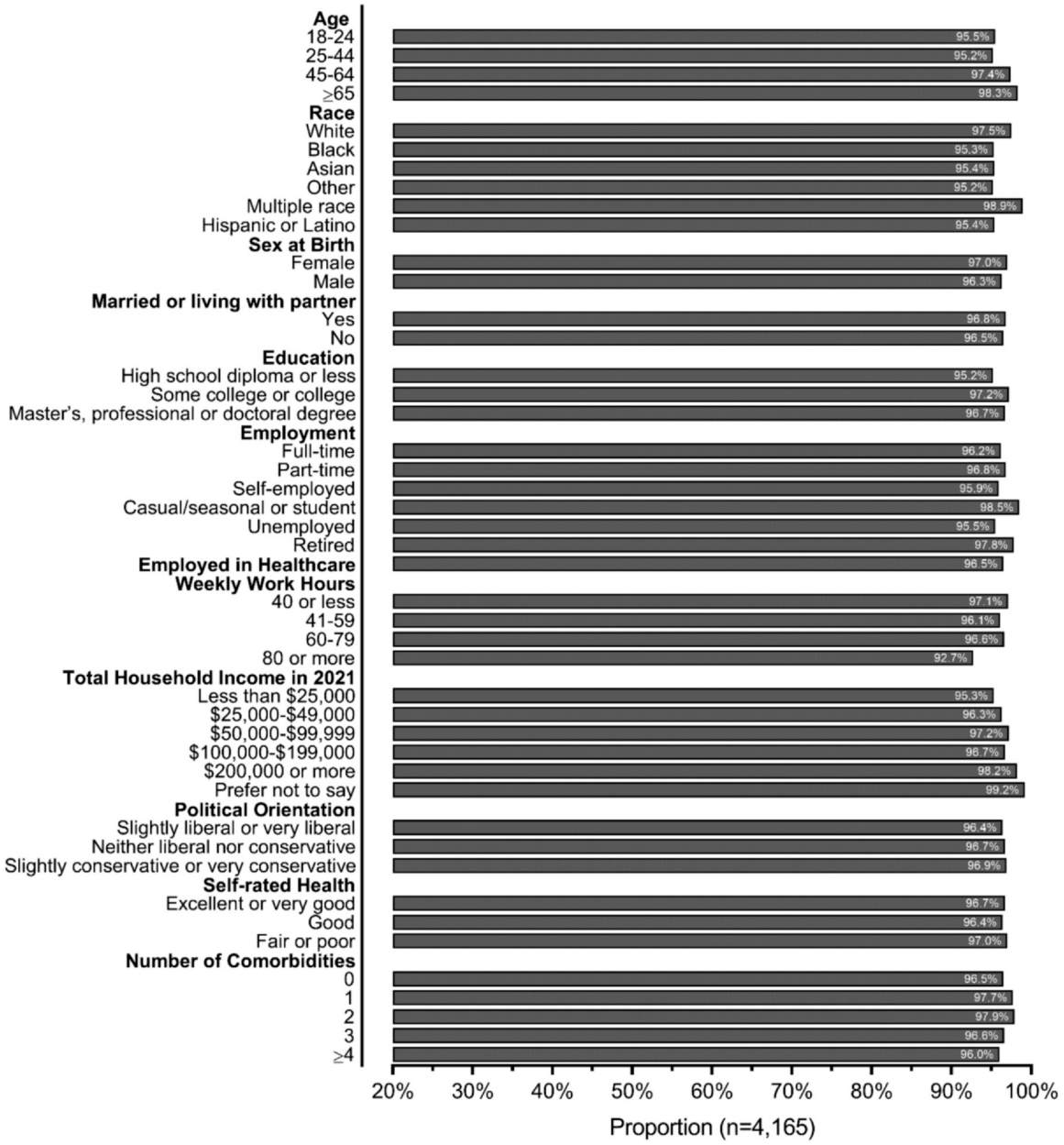

Fig. 1. Proportion of respondents responding less than "24 or more" for the item, "What is the maximum number of hours that you believe resident physicians should be asked to work for a given shift? Note: Those that answered, "Don't know" are excluded (n = 598).

educational activities) and up to 80 weekly work hours (averaged over 4 weeks).

The term resident originates from the historical practice that individuals in these roles resided in the hospital with full responsibility for patients over the entire in-hospital course of injury and illness (under the supervision of faculty). This historical practice may have contributed to the normalization of persistently challenging work hours in this group, which greatly exceed those of more experienced physicians and other healthcare providers.[12] In addition, there are structural incentives that favor extended duration (≥24 hours) of work shifts and prolonged weekly work hours for resident physicians. Residency positions are supported by payments to hospital systems from the Centers for Medicare and Medicaid Services,[13] directly subsidizing the cost of their labor while also indirectly increasing revenue through the value residents add (eg, enabling teaching hospitals to care for high-acuity patients). Some argue that extended work hours are necessary to observe rare cases and satisfy other training requirements on the path to achieving independence as a physician,[14] though other healthcare systems have successfully achieved the training of physicians without these practices.[7,15–17] For example, the European Working Time Directive enforces a limit of 48 hours of work per week and a maximum of 13 hours per shift.[7,15] The country of New Zealand and the province of Quebec limit physicians-in-training to work no more than 16 consecutive hours.[16] The country of France permits no more than 10 consecutive hours per shift.[7]

Resident physician work hours present a sharply divided issue that has been the subject of extensive research efforts. From the perspective of the resident physician, observational evidence consistently demonstrates an increased risk of adverse outcomes as work hours increase, with threats to patient safety (including increases in medical errors and preventable adverse events),[2,18,19] quality of patient care (eg, diminished therapeutic relationships with patients),[20] resident physician safety (including motor vehicle

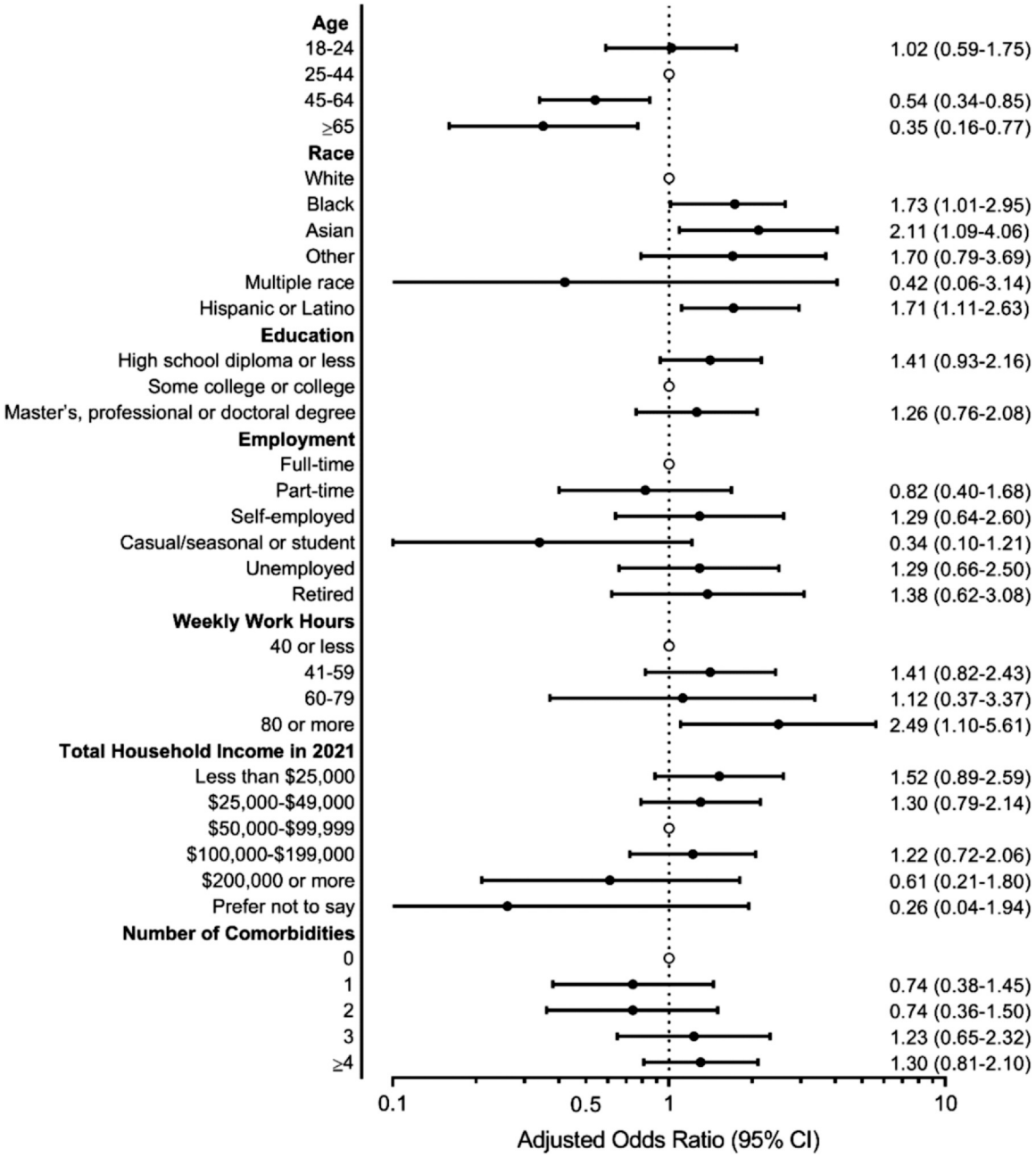

Fig. 2. Adjusted associations with responding "24 or more" for the item, "What is the maximum number of hours that you believe resident physicians should be asked to work for a given shift?". Note: Those that answered, "Don't know" are omitted from models (n = 598).

crashes, percutaneous injuries, and attentional failures),[3,4,19,21] and resident physician health and well-being (including reduced sleep hours, increases in occupational exposures, and adverse mental health).[19,21,22] Other observational efforts focusing on more distant outcomes that are more commonly monitored by hospital leadership, such as in-hospital mortality and 30-day readmission rate,[23–26] need to be designed with adequate precision and power to measure these outcomes accurately, unlike prior studies that found no difference with non-inferiority designs.[10,27] Randomized trials that have focused on resident or unit-level error rates support the need for work-hour restrictions (provided that workload does not concurrently increase),[28,29] consistent with the results of a meta-analysis of mortality and adverse patient safety outcomes that demonstrated a protective effect for patient safety with shorter shifts.[30] However, work-hour restrictions do result in more frequent transitions of care between providers. Structured handoffs have been shown to mitigate risks associated with these care transitions.[31]

Notably, the perspective of the public has been overlooked and undervalued. Our study documents that nearly all disagree with receiving care from providers whose skills and decision-making are compromised by sleep deprivation. Public opinion in the US has changed little since 2010 (Supplementary Section 4),[11] when the public believed shifts should be no more than 10.9 hours in duration and no more than 50 hours per week. Additionally, the 2010 report found that more than 4 in 5 respondents believed they should be informed if their physician had been at work for more than 24 hours, and 80% would then want a different doctor.[11] The perspective of patients in work-hour discussions, including the disclosure of this information as part of informed consent, remains critical for adhering to the ethical principle of autonomy in the care of patients.[32]

Trust is an essential component of healthcare.[33] Mistrust in medical care could increase the likelihood of adverse health behaviors (eg, delaying medical care) and adverse outcomes. A lack of trust may also disproportionately impact the well-being of populations with health disparities.[34] In the US, the cost of graduate medical education is partially supported by taxpayer dollars,[13] yet the public suffers the direct consequences of medical errors and accidents due to long resident work hours. As in other core principles of shared decision-making in medicine, the goal is to make decisions in a manner consistent with the patient's wishes.[35] The public's perspective should be equally valued in the design of resident physician work hours.

Limitations

This cross-sectional survey was conducted among US adults over a 2-week interval from September to October 2022 in English. Limitations of the study design include selection bias and residual confounding. Participants were unaware of the study goals and hypotheses and are representative of the United States adult population by age, sex, and race and ethnicity (Supplementary Section 1). However, those who chose to participate may differ from those who chose not to participate or were not invited to participate by other characteristics. Although we controlled for a variety of potential confounding factors, residual confounding may persist through factors we did not collect or imprecise measurement of the confounders that were collected.[36] Administering the survey only in English may have limited responses from those for whom English is not their primary language. A definition for resident physicians was also not provided. Question prompts and responses are included in full in Table 2.

Conclusion

Adults in the United States do not approve of current work-hour policies for resident physicians. Nearly all disagree with current policies permitting shifts of up to 28 consecutive hours and 80 hours of work per week. Public opinion supports limiting shifts to no more than 12 consecutive hours and weekly work hours to no more than 60 hours per week.

Public health relevance

We report on a nationally representative cross-sectional survey that characterized the opinion of adults in the United States regarding their expectations of acceptable work hours for health care providers. We found that nearly all adults in the United States disagree with current resident physician work-hour policies. Only 3% of the adults believe that shifts should be scheduled for 24 hours or longer and 4% support maximum work hours of 80 or more per week. The majority of the public supports a maximum shift length of 12 or fewer hours and weekly work hours that do not exceed 60 hours per week. These opinions are in direct opposition to current ACGME guidelines that permit shifts of 24 hours (with up to 4 hours for transitions of care or other educational activities) and up to 80 weekly work hours (averaged over 4 weeks).

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CRediT authorship contribution statement

Matthew Weaver: Conceptualization, Methodology, Analysis, Investigation, Writing – original draft. **Laura Barger**: Conceptualization, Writing – review & editing. **Jason Sullivan**: Project administration, Writing – review & editing. **Stuart Quan**: Writing – review & editing. **Rebecca Robbins**: Writing – review & editing. **Christopher Landrigan**: Conceptualization, Writing – review & editing. **Charles Czeisler**: Conceptualization, Methodology, Writing – review & editing, Supervision.

Declaration of Competing Interest

The survey was partially supported through funding to our institution from the Centers for Disease Control and Prevention. MDW reports institutional support from the US Centers for Disease Control and Prevention, National Institutes of Occupational Safety and Health, Delta Airlines, and the Puget Sound Pilots; as well as consulting fees from the Fred Hutchinson Cancer Center and the University of Pittsburgh. LKB reports institutional support from the US Centers for Disease Control and Prevention, National Institutes of Occupational Safety and Health, Delta Airlines, and the Puget Sound Pilots; as well as honorariums from the National Institutes of Occupational Safety and Health, University of Arizona, and University of British Columbia. CPL reports personal fees and other from I-PASS Patient Safety Institute, personal fees from the Missouri Hospital Association and Executive Speakers Bureau, outside the submitted work; and In addition, Dr Landrigan has received monetary awards, honoraria, and travel reimbursement from multiple academic and professional organizations for teaching and consulting on sleep deprivation, physician performance, handoffs, and safety, and has served as an expert witness in cases regarding patient safety and sleep deprivation. Dr Robbins reports personal fees from Savoir Beds Ltd, Oura Ring Inc, Sonesta Hotels International, Castle Hot Springs, With Deep LLC, and One Care Media. Dr Quan has served as a consultant for Best Doctors, Bryte Foundation, Jazz Pharmaceuticals, and Whispersom. CAC serves as the incumbent of an endowed professorship provided to Harvard Medical School by Cephalon, Inc and reports institutional support for a Quality Improvement Initiative from Delta Airlines and Puget Sound Pilots; education support to Harvard Medical School Division of Sleep Medicine and support to Brigham and Women's Hospital from: Jazz Pharmaceuticals PLC, Inc, Philips Respironics, Inc, Optum, and ResMed, Inc; research support to Brigham and Women's Hospital from Axome Therapeutics, Inc, Dayzz Ltd, Peter Brown and Margaret Hamburg, Regeneron Pharmaceuticals, Sanofi SA, Casey Feldman Foundation, Summus, Inc, Takeda Pharmaceutical Co, LTD, Abbaszadeh Foundation, CDC Foundation; educational funding to the Sleep and Health Education Program of the Harvard Medical School Division of Sleep Medicine from ResMed, Inc, Teva Pharmaceuticals Industries, Ltd, and Vanda Pharmaceuticals; personal royalty payments on sales of the Actiwatch-2 and Actiwatch-Spectrum devices from Philips Respironics, Inc; personal consulting fees from Axome, Inc, Bryte Foundation, With Deep, Inc and Vanda Pharmaceuticals; honoraria from the Associated Professional Sleep Societies, LLC for the Thomas Roth Lecture of Excellence at SLEEP 2022, from the Massachusetts Medical Society for a New England Journal of Medicine Perspective article, from the National Council for Mental Well-being, from the National Sleep Foundation for serving as chair of the Sleep Timing and Variability Consensus Panel, for lecture fees from Teva Pharma Australia PTY Ltd and Emory University, and for serving as an advisory board member for the Institute of Digital Media and Child Development, the Klarman Family Foundation, and the UK Biotechnology and Biological Sciences Research Council. CAC has received personal fees for

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.sleh.2023.08.016.

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