

Resident Well-Being Before and During the COVID-19 Pandemic

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ABSTRACT

Background Preliminary studies reveal challenges posed by the COVID-19 pandemic to the well-being of health care workers. Little is known about the effects of the pandemic on the well-being of graduate medical education (GME) residents or about protective factors and post-traumatic growth. Through deeper examination of resident well-being during this unique crisis, we can identify trends and associated lessons to apply broadly to resident well-being.

Objective To characterize resident burnout, resilience, and loneliness before and during the COVID-19 pandemic.

Methods All residents in any specialty at a single institution were anonymously surveyed semiannually for 2 years (2019–2020), including the time period of the COVID-19 pandemic. Surveys included demographics, the 10-item Connor-Davidson Resilience Scale, the Maslach Burnout Inventory, and the UCLA Loneliness Scale.

Results Overall response rates were 53% (508 of 964) in spring 2019, 55% (538 of 982) in fall 2019, 51% (498 of 984) in spring 2020, and 57% (563 of 985) in fall 2020. The overall rates of burnout were stable across all time periods and did not change during the COVID-19 pandemic. Among frontline residents, burnout rates were higher than other resident populations in both the pre- and post-COVID-19 pandemic time periods. Resilience and loneliness measures were similar for frontline and non-frontline residents and remained stable during the pandemic.

Conclusions Initial data from this single institution survey of all GME residents in the first 8 months of the COVID-19 pandemic demonstrated burnout and loneliness did not increase and resilience was preserved.

Introduction

The COVID-19 pandemic has been challenging for health care workers. Early studies demonstrate COVID-19-related PTSD, depression, and anxiety.^{1–4} One survey of residents in New York City during the pandemic identified substantial life stressors and high rates of suicide or self-harm ideation, while a multicenter study of internal medicine residents identified anxiety regarding uncertainty and availability of personal protective equipment (PPE).^{5,6}

Although physician burnout is highest during residency,^{7,8} the impact of the COVID-19 pandemic on resident burnout is unclear. Resilience, the process of adapting well in the face of adversity, may be protective during the pandemic.⁹ Additionally, the nature of the pandemic highlights loneliness as an important measure to consider due to social distancing and quarantine requirements.¹⁰ It is also unclear whether these traditional measures of well-being and their associations have been similar during the pandemic.¹⁰

The objective of this study is to examine the early effects of the COVID-19 pandemic on burnout, resilience, and loneliness levels in residents by comparing measures during the COVID-19 pandemic

to baseline. By examining resident burnout, resilience, and loneliness during the pandemic, we can consider the impact of this crisis on resident well-being and identify trends and lessons learned to apply to future challenges and resident well-being initiatives.

Methods

The University of Chicago conducted a voluntary anonymous resident well-being survey to identify burnout, resilience, and loneliness.^{11–13} The survey was administered pre-COVID-19 in spring 2019 (March–May), fall 2019 (October–December), and post-COVID-19 in spring 2020 (March–May) and fall 2020 (October–December) via MedHub software (www.medhub.com). March 2020 marked the initial surge of COVID-19 cases in Chicago and restrictions on elective surgeries. By fall 2020, full hospital services had returned. Based on programs providing in-person care for COVID-19 patients, we defined frontline specialties as internal medicine, pediatrics, family medicine, general surgery (primary residents for trauma surgery services), emergency medicine, and anesthesiology. For analysis, we also grouped specialties according to Accreditation Council for Graduate Medical Education (ACGME) categories: hospital-based, medical, and surgical.¹⁴

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TABLE 1

Graduate Medical Education Well-Being Survey Sample Demographics

Demographics	Spring 2019, No. (%), N=508	Fall 2019, No. (%), N=538	Spring 2020, No. (%), N=498	Fall 2020, No. (%), N=563
Gender				
Female	234 (46)	239 (44)	229 (46)	261 (46)
Male	257 (51)	273 (51)	254 (51)	281 (50)
PGY of training				
PGY-1	109 (21)	126 (23)	114 (23)	136 (24)
PGY-2	100 (20)	93 (17)	86 (17)	96 (17)
PGY-3	89 (18)	91 (17)	84 (17)	92 (16)
≥PGY-4	188 (37)	194 (36)	196 (39)	210 (37)
ACGME specialty grouping ¹⁴				
Medical	261 (51)	280 (52)	265 (53)	280 (50)
Hospital-based	123 (24)	112 (21)	112 (22)	152 (27)
Surgical	124 (24)	109 (22)	121 (24)	131 (23)
Age				
≤25	0 (0)	6 (1)	3 (1)	4 (1)
26–29	201 (40)	214 (40)	192 (39)	245 (44)
≥30	288 (57)	286 (53)	290 (58)	294 (52)

Abbreviations: PGY, postgraduate year; ACGME, Accreditation Council for Graduate Medical Education.

Note: ACGME Specialty Designations—Hospital-based: anesthesiology, radiation oncology, radiology, emergency medicine, and pathology; Medical: internal medicine, pediatrics, psychiatry, dermatology, family medicine, and neurology; Surgical: general surgery, plastic surgery, thoracic surgery, colon and rectal surgery, neurological surgery, obstetrics and gynecology, ophthalmology, orthopaedic surgery, otolaryngology, and urology.¹⁴

We assessed resilience via the 10-item Connor-Davidson Resilience Scale (CD-RISC 10, scale 0 to 40, and a 5-point difference being meaningful).¹² Burnout was assessed using the Maslach Burnout Inventory (MBI).¹¹ Residents with high scores on the depersonalization (DP) or emotional exhaustion (EE; defined as having DP ≥ 10 or EE ≥ 27) subscales were categorized as having symptoms of burnout as defined by previous studies.^{11,15,16} Loneliness was measured by the UCLA Loneliness Scale (a 3-item scale from 3 to 9 with higher scores indicating greater loneliness and a 1-point difference being meaningful).¹³

Only complete responses to the CD-RISC 10 survey, UCLA Loneliness Scale, and MBI were included; unpaired *t* tests were used to compare group means within time periods since data were unlinked. Categorical variables were analyzed using chi-square tests. Survey measures during the COVID-19 pandemic (2020) were compared to survey measures from the same time period in 2019. Analyses were performed using Stata 15.0 (StataCorp LLC, College Station, TX). The study was granted exemption status by the University of Chicago Institutional Review Board.

Results

Overall response rates were: 53% (508 of 964) spring 2019, 55% (538 of 982) fall 2019, 51% (498 of 984)

spring 2020, and 57% (563 of 985) fall 2020. The overall response rate for frontline residents in spring 2020 was 62% (269 of 434) and 58% (252 of 433) in fall 2020. Respondent demographics were similar regarding gender, postgraduate year (PGY) of training, and ACGME specialty grouping (TABLE 1).

There was no significant difference in the proportion of residents identified as having symptoms of burnout via the MBI pre/post-COVID-19 (TABLE 2). The burnout rates via MBI were similar to the previous year in all ACGME specialty groups (TABLE 2). Frontline residents had a higher rate of burnout compared to non-frontline residents (59% [122 of 207] vs 38% [97 of 252], $P < .001$) in the spring 2020 survey and in the fall 2020 survey (59% [141 of 239] vs 46% [125 of 270], $P = .004$). However, the proportion of frontline trainees with burnout remained stable from the previous year (TABLE 2).

Mean resilience by CD-RISC 10 in respondents ranged from 30.5 to 31.3 and remained constant before and after the pandemic (TABLE 2). Resilience scores in the frontline group in the spring 2020 survey were similar to non-frontline trainees (30.2 ± 6.4 , $n = 211$ vs 30.7 ± 6.8 , $n = 260$, respectively, $P = .41$). Resilience scores in the frontline group were also constant before and after the pandemic.

The mean loneliness scale ranged from 4.4 to 4.7 and remained constant before and after the pandemic (TABLE 2). Loneliness scores in the frontline group

TABLE 2

Graduate Medical Education Well-Being Measures Over Time by Frontline Work and AGME Grouping

Measure	Spring 2019	Fall 2019	Spring 2020 COVID-19	Fall 2020 COVID-19	Spring P Value ^a	Fall P Value ^b
Burnout via MBI: burnout present (EE≥27 or DP≥10) % (x/n)						
All respondents	49 (232/470)	54 (262/481)	48 (219/459)	52 (266/509)	.62	.49
Frontline	57 (128/224)	62 (133/215)	59 (122/207)	59 (141/239)	.71	.53
Hospital-based	41 (48/116)	60 (73/121)	45 (50/110)	56 (75/133)	.54	.52
Surgical	44 (52/117)	51 (61/120)	44 (46/104)	47 (57/122)	.97	.52
Medical	56 (132/237)	53 (128/240)	50 (123/245)	53 (134/254)	.23	.90
Resilience via CD-RISC 10: mean ± SD (n)						
All respondents	31.3±6.3 (473)	30.5±6.2 (497)	30.7±6.8 (471)	30.9±6.2 (537)	.16	.30
Frontline	31.0±5.7 (226)	30.2±5.7 (215)	30.2±6.4 (211)	30.3±6.1 (245)	.17	.86
Hospital-based	31.1±6.3 (115)	30.8±6.5 (127)	31.0±7.3 (111)	30.6±6.8 (141)	.91	.81
Surgical	32.9±6.0 (120)	31.3±6.3 (125)	32.0±5.6 (107)	32.6±5.6 (127)	.24	.08
Medical	30.6±6.3 (238)	30.0±6.0 (245)	30.0±6.9 (253)	30.3±6.0 (269)	.31	.57
Loneliness via UCLA Loneliness Scale: mean ± SD (n)						
All respondents	4.4±1.7 (470)	4.7±1.7 (497)	4.5±1.7 (456)	4.7±1.7 (518)	.37	>.99
Frontline	4.4±1.6 (223)	4.9±1.7 (218)	4.7±1.8 (202)	4.9±1.6 (234)	.07	>.99
Hospital-based	4.5±1.8 (114)	4.8±1.8 (125)	4.5±1.9 (110)	5.1±1.8 (132)	>.99	.18
Surgical	4.4±1.6 (117)	4.7±1.7 (122)	4.5±1.6 (103)	4.3±1.5 (124)	.64	.05
Medical	4.5±1.6 (239)	4.6±1.6 (250)	4.6±1.7 (243)	4.8±1.6 (262)	.51	.16

Abbreviations: ACGME, Accreditation Council for Graduate Medical Education; MBI, Maslach-Burnout Inventory; EE, emotional exhaustion; DP, depersonalization; CD-RISC, Connor-Davidson Resilience Scale.

^a P values were obtained using the chi-square and t tests as appropriate to compare spring 2020 COVID-19 measures to spring 2019 baseline measures.

^b P values were obtained using the chi-square and t tests as appropriate to compare fall 2020 COVID-19 measures to fall 2019 baseline measures.

Note: ACGME Specialty Designations—Hospital-based: anesthesiology, radiation oncology, radiology, emergency medicine, and pathology. Medical: internal medicine, pediatrics, psychiatry, dermatology, family medicine, and neurology. Surgical: general surgery, plastic surgery, thoracic surgery, colon and rectal surgery, neurological surgery, obstetrics and gynecology, ophthalmology, orthopaedic surgery, otolaryngology, and urology.¹⁴

were similar to non-frontline residents (4.7 ± 1.8 , $n = 202$ vs 4.5 ± 1.7 , $n = 254$; $P = .23$). Loneliness scores in the frontline group were also not different before and after the pandemic (TABLE 2). Surgical specialty loneliness scores in the fall 2020 survey were lower than the hospital-based group (4.3 ± 1.5 , $n = 124$ vs 5.1 ± 1.8 , $n = 132$; $P < .001$; TABLE 2).

Discussion

During the COVID-19 pandemic we did not observe changes in burnout, loneliness, or resilience measures among our residents. Even among frontline residents, whose burnout rates were higher pre-pandemic, burnout, loneliness, and resilience rates remained stable.

The stability of resident well-being measures is surprising, given the disruption to education, clinical care, and life overall. We serve a patient population disproportionately affected by the COVID-19 pandemic,¹⁷ and Chicago at one time led in number of COVID-19 cases in the United States.¹⁸ As the COVID-19 surge approached, planning at our institution sought to reduce stressors and increase

support, and so these findings could be explained by our specific institutional response. Reduction in patient care services and reassignment of residents reduced work hours across all groups. The delayed onset of COVID-19 cases in Chicago¹⁸ gave our institution time to maintain, develop, and implement safety and well-being initiatives. PPE supplies were adequate and ventilator stock sufficient. Mental health supports were expanded; communication from all levels of leadership increased. The institution initiated pandemic response training, well-being sessions, care packages, and free meals for frontline residents. In addition, heightened meaning in work, teamwork, and physician appreciation may have preserved well-being and fostered adaptability.⁶ Continued interpersonal interaction due to health care work may have prevented loneliness. Post-traumatic growth—the process of positive psychological change after adversity—may have played a role in maintaining well-being.¹⁹ Many newly instituted centralized well-being efforts will be retained.

The survey was conducted in a single institution, which may limit external validity. The response rate of

54% raises the concern for selection bias due to non-response. The surveys were anonymous and may include different respondents. Studying personal exposure to COVID-19 or to witnessing the effects of COVID-19 on patients could be illuminating. We additionally did not examine respondent use of our COVID-19 support services and association with well-being measures, though this would be an important area for future study. It is possible we measured well-being too soon to capture the full pandemic effects or that surveys were administered too close together to identify differences.²⁰ Well-being can worsen in response to communal trauma after the crisis has ended, and studies during the Severe Acute Respiratory Syndrome epidemic revealed elevated rates of chronic stress 2 years later.^{21,22} Continued longitudinal assessment of burnout, resilience, loneliness, and interventions that bolster post-traumatic growth may further elucidate our findings.¹⁹ It will be important to longitudinally analyze well-being effects of the COVID-19 pandemic and apply lessons learned thereafter.

Conclusions

There were stable rates of burnout, loneliness, and resilience in our GME population early in the COVID-19 pandemic.

References

1. Feingold JH, Peccoraro L, Chan CC, et al. Psychological impact of the COVID-19 pandemic on frontline health care workers during the pandemic surge in New York City. *Chronic Stress (Thousand Oaks)*. 2021;5:2470547020977891. doi:10.1177/2470547020977891
2. Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease. *JAMA Netw Open*. 2020;3(3):e203976. doi:10.1001/jamanetworkopen.2020.3976
3. Que J, Shi L, Deng J, et al. Psychological impact of the COVID-19 pandemic on healthcare workers: a cross-sectional study in China. *Gen Psychiatry*. 2020;33(3):e100259. doi:10.1136/gpsych-2020-10025
4. Rossi R, Soccì V, Pacitti F, et al. Mental health outcomes among healthcare workers and the general population during the COVID-19 in Italy. *Front Psychol*. 2020;11:608986. doi:10.3389/fpsyg.2020.608986
5. Schwartz DA, Connerney MA, Davila-Molina M, Tummalapalli S, Lekha L. Resident mental health at the epicenter of the COVID-19 pandemic. *Acad Med*. 2021;96(5):e16. doi:10.1097/ACM.0000000000003768
6. Wietlisbach LE, Asch DA, Eriksen W, et al. Dark clouds with silver linings: resident anxieties about COVID-19 coupled with program innovations and increased resident well-being. *J Grad Med Educ*. 2021;13(4):515–525. doi:10.4300/JGME-D-20-01497.1
7. Dyrbye LN, West CP, Satele D, et al. Burnout among U.S. medical students, residents and early career physicians relative to the general U.S. population. *Acad Med*. 2014;89(3):443–451. doi:10.1097/ACM.000000000000134
8. Ishak WW, Lederer S, Mandili C, et al. Burnout during residency training: a literature review. *J Grad Med Educ*. 2009;1(2):236–242. doi:10.4300/JGME-D-09-00054.1
9. American Psychological Association. Building Your Resilience. <https://www.apa.org/helpcenter/road-resilience>. Accessed August 24, 2021.
10. Ellinas H, Ellinas E. Burnout and protective factors: are they the same amid a pandemic? *J Grad Med Educ*. 2020;12(3):291–294. doi:10.4300/JGME-D-20-00357.1
11. Maslach C, Jackson SE, Leiter M. *Maslach Burnout Inventory Manual*. 3rd ed. Palo Alto, CA: Consulting Psychologists Press; 1996.
12. Connor KM, Davidson JR. Development of a new resilience scale: the Connor-Davidson Resilience Scale (CD-RISC). *Depress Anxiety*. 2003;18(2):76–82. doi:10.1002/da.10113
13. Hughes ME, Waite LJ, Hawkey LC, Cacioppo JT. A short scale for measuring loneliness in large surveys: results from two population-based studies. *Res Aging*. 2004;26(6):655–672. doi:10.1177/0164027504268574
14. Accreditation Council for Graduate Medical Education. Data Resource Book, Academic Year 2019–2020. https://www.acgme.org/Portals/0/PFAssets/PublicationsBooks/2019-2020_ACGME_DATABOOK_DOCUMENT.pdf. Accessed August 24, 2021.
15. Shanafelt TD, Bradley KA, Wipf JE, Back AL. Burnout and self-reported patient care in an internal medicine residency program. *Ann Intern Med*. 2002;136(5):358–367. doi:10.7326/0003-4819-136-5-200203050-00008
16. Thomas NK. Resident burnout. *JAMA*. 2004;292(23):2880–2889. doi:10.1001/jama.292.23.2880
17. Corley C. Chicago tackles COVID-19 disparities in hard-hit Black and Latino neighborhoods. NPR. Published July 9, 2020. <https://www.npr.org/2020/06/09/869074151/chicago-tackles-covid-19-disparities-in-hard-hit-black-and-latino-neighborhoods>. Accessed August 24, 2021.
18. Hurley C, Price S. Cook County surpasses Queens, NY, as county with most COVID-19 cases in U.S. *Chicago Sun Times*. Published May 14, 2020. <https://chicago>.

suntimes.com/essential-coronavirus-news/2020/5/14/21258470/cook-county-coronavirus-cases-most-queens-new-york. Accessed August 24, 2021.

19. Calhoun LG, Tedeschi RG. *Handbook of Posttraumatic Growth: Research & Practice*. New York, NY: Psychology Press; 2006.
20. Dyrbye LN, Meyers D, Ripp J, Dalal N, Bird SB, Sen S. A pragmatic approach for organizations to measure health care professional well-being. *NAM Perspectives*. Discussion Paper, National Academy of Medicine, Washington, DC. 2018. <https://doi.org/10.31478/201810b>. Accessed August 24, 2021.
21. Maunder RG, Lancee WJ, Balderson KE, et al. Longterm psychological and occupational effects of providing hospital healthcare during SARS outbreak. *Emerg Infect Dis*. 2006;12(12):1924–1932. doi:10.3201/eid1212.060584
22. DeWolfe DJ. Training manual for mental health and human service workers in major disasters U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services. <https://www.hsdh.org/?view&did=4017>. Accessed October 5, 2021.



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