COVID-19 pandemic impacts on mental health, burnout, and longevity in the workplace among healthcare workers: A mixed methods study

Shana A.B. Burrowes [a,1], Sharon M. Casey [b,1], Natalie Pierre-Joseph [c], Simon G. Talbot [d], Taylor Hall [e], Nicole Christian-Brathwaite [f], Marcela Del-Carmen [g], Christopher Garofalo [h,i], Brita Lundberg [j], Pooja K. Mehta [k,1], Julie Mottl-Santiago [k], Elissa M. Schechter-Perkins [m], Ariana Weber [m], Christina D. Yarrington [k], Rebecca B. Perkins [k,*]

[a] Section of Infectious Diseases, Department of Medicine, Boston University Chobanian and Avedisian School of Medicine, Boston, MA, USA
[b] Department of Epidemiology, Boston University School of Public Health, Boston, MA, USA
[c] Department of Pediatrics, Boston University Chobanian and Avedisian School of Medicine and Boston Medical Center, Boston, MA, USA
[d] Division of Plastic Surgery, Brigham and Women's Hospital, Boston, MA, USA
[e] Graduate Medical Sciences, Boston University Chobanian and Avedisian School of Medicine, Boston, MA, USA
[f] Well Minds Consulting Company, Boston, MA, USA
[g] Division of Gynecologic Oncology, Vincent Department of Obstetrics & Gynecology, Massachusetts General Hospital, Boston, MA, USA
[h] Department of Family Medicine and Department of Obstetrics and Gynecology at Sturdy Memorial Hospital, Attleboro, MA, USA
[i] Family Medicine Associates of South Attleboro, South Attleboro, Massachusetts, USA
[j] Lundberg Health Advocates, Brookline, MA, USA
[k] Department of Obstetrics and Gynecology, Boston University Chobanian and Avedisian School of Medicine and Boston Medical Center, Boston, MA, USA
[l] Cityblock Health, Brooklyn, NY, USA
[m] Department of Emergency Medicine, Boston University Chobanian and Avedisian School of Medicine and Boston Medical Center, Boston, MA, USA

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ABSTRACT

To explore the mental health impacts of the COVID-19 pandemic on healthcare workers in Massachusetts and identify potential strategies to maintain the healthcare workforce we conducted a sequential exploratory mixed methods study. Fifty-two individuals completed interviews from April 22nd - September 7th, 2021; 209 individuals completed an online survey from February 17th - March 23rd, 2022. Interviews and surveys asked about the mental health impacts of working in healthcare during the COVID-19 pandemic, burnout, longevity in the workplace, and strategies for reducing attrition. Interview and survey participants were predominantly White (56%; 73%, respectively), female (79%; 81%) and worked as physicians (37%; 34%). Interviewees indicated high stress and anxiety levels due to frequent exposure to patient deaths from COVID-19. Among survey respondents, 55% reported worse mental health than before the pandemic, 29% reported a new/worsening mental health condition for themselves or their family, 59% reported feeling burned out at least weekly, and 37% intended to leave healthcare in less than 5 years. To decrease attrition, respondents suggested higher salaries (91%), flexible schedules (90%), and increased support to care for patients (89%). Healthcare workers' experiences with death, feeling unvalued, and overworked resulted in unprecedented rates of burnout and intention to leave healthcare.

1. Introduction

The COVID-19 pandemic has resulted in over 91 million cases and over one million deaths in the United States (U.S),[1] as well as a substantial burden of long COVID on patients and the healthcare system.[2–7] Healthcare workers have worked throughout the pandemic as essential workers, facing challenges from overwork to unemployment.[8,9] At the start of the pandemic, many healthcare workers were furloughed without pay due to the reduction and cancellation of non-emergent, non-COVID-19 related services.[9] Simultaneously, among those that continued to work, the surges and ongoing pandemic created extraordinary levels of stress on healthcare workers with increased workload

and concern about being exposed to COVID-19.[10,11] A national survey of healthcare workers performed from February 11th to March 7th, 2021 reported that 30% were considering leaving healthcare because of the pandemic,[10] and a report in November 2021 showed a 2.7% decrease in healthcare employment.[9] Issues such as the threat of COVID-19 and dying, Personal Protective Equipment (PPE) shortages, lack of job security, lack of paid sick leave, and lack of childcare created circumstances where workers were required to choose between their jobs and taking care of themselves and their family.[9,11,12]

2. Background

The burden of the pandemic has been associated with a significant rise in reported feelings of burnout; over half (52%) of healthcare workers report feeling burned out.[10] Levels of burnout varied by type of worker: one national study found that 48% of physicians and 63% of nurses reported burnout.[11] Mental health challenges increased as well. Research from past epidemics show higher rates of post-traumatic stress disorder (PTSD) among healthcare workers.[13] During the COVID-19 pandemic, healthcare workers have reported increased stress, depression, anxiety, sleep disturbances, and PTSD,[10,14] conditions that are also associated with burnout.[15] Uncertainty associated with when and if the COVID-19 pandemic will end, as well as what healthcare may look like in the future hinders recovery. Though the specific burden of COVID-19 on the healthcare system has lessened, many healthcare workers are still leaving their jobs, contributing to staffing-related barriers to healthcare services which also increases the burden on those who remain[16]. The objectives of this sequential exploratory mixed methods study were to explore the mental health impacts of the COVID-19 pandemic on healthcare workers in Massachusetts, and to identify potential strategies reported by healthcare workers to help prevent further attrition from the healthcare workforce.

3. Methods

A sequential exploratory mixed-methods study was conducted. The methodology is explained in detail in prior work.[17,18] Briefly, we performed one-on-one qualitative interviews followed by a cross-sectional online survey of personnel who worked in healthcare settings in Massachusetts during the COVID-19 pandemic. Eligible participants were English-speaking and at least 18 years old. Interviews were performed between April 22nd and September 7th of 2021, after the COVID-19 surges associated with the wild-type and alpha variants and shortly after the introduction and availability of vaccines. Surveys were completed between February 17th and March 23rd of 2022, after the Delta surge and first Omicron surge (See Fig. 1).

3.1. Interview guide, participant recruitment, data collection and analysis

A semi-structured qualitative interview guide was developed which included questions related to COVID-19 and attitudes about vaccinations, as well as demographic information.[17,18] This work discusses respondents' answers to questions related to the effect of the COVID-19 pandemic on their daily life and work; many participants noted pandemic-related impacts on mental health, prompting further exploration and analysis. Participants were recruited through professional networks, and included healthcare workers (physicians, advanced practice providers (APPs), nurses) from areas including emergency medicine, family medicine, obstetrics/gynecology, pediatrics as well as ancillary healthcare services (public safety, environmental services, interpreter services etc.). Qualitative interviews occurred between April 22nd and September 7th, 2021 (Fig. 1). Interviews ranged from 30 to 80 min in length, were digitally audio-recorded, transcribed verbatim, imported into NVIVO (version 12, March 2020), and coded in an iterative process. Themes were developed based on responses. Inductive coding using content analysis techniques were used to establish a codebook.

3.2. Survey development, participant recruitment, data collection and analysis

Survey methodology is described in prior work.[17,18] The mental health section of the online survey was developed based on findings from the one-on-one qualitative interviews as well as from direct feedback from a Community Stakeholder Advisory Board. Mental health topics included the development of new or worsening mental health conditions, burnout and workplace support. The survey also asked about contributors to burnout and longevity in healthcare settings, as well as potential solutions to address burnout and attrition. The survey used the REDCap secure survey platform.[19,20] Participants were recruited from professional networks using the snowball sampling method.[21] Surveys were completed between February 17th and March 23rd, 2022 (Fig. 1).
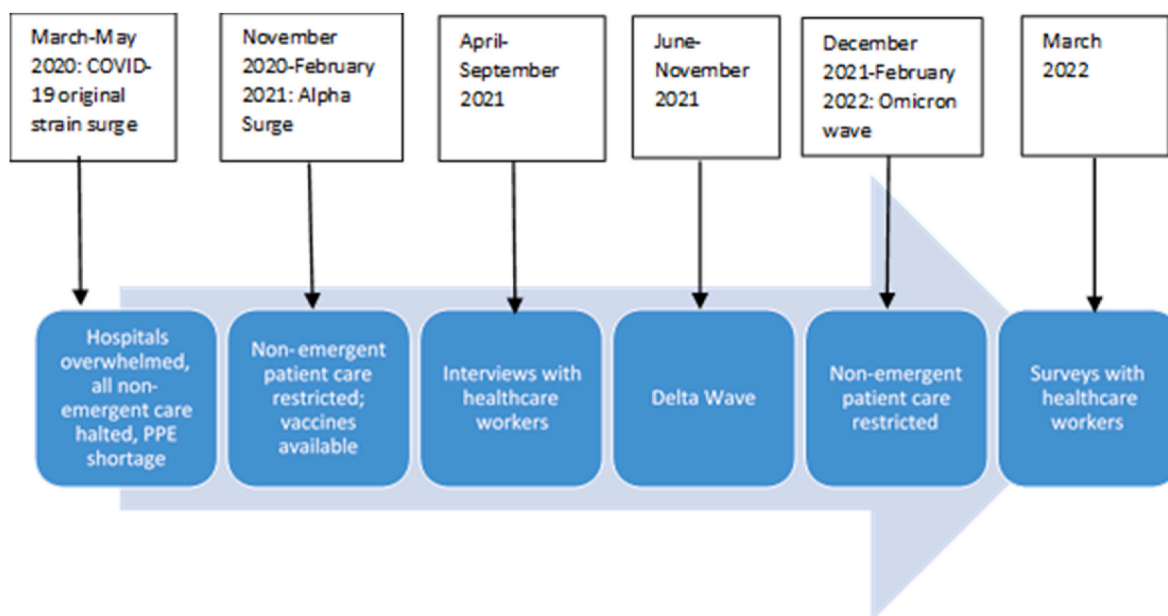

Fig. 1. Timeline of COVID-19 in Massachusetts and research study events.

Anonymous data were exported from REDCap. Descriptive statistics were tabulated. Categorical variables were collapsed. Statistical analyses were conducted using SAS version 9.4 (SAS Institute, Cary, NC, USA).

The institutional review board at Boston University Chobanian and Avedisian School of Medicine and Boston Medical Center approved these studies (H-41166 and H-42339. Interview and survey respondents were compensated for their participation.

4. Results

4.1. Characteristics of interview participants

Socio-demographic information of interview participants (n = 52) is included in Table 1. Participants ranged in age from 22 to 74 years old, were predominantly female, (n = 41, 79%), and White (n = 29, 56%). Most participants were physicians (n = 19, 37%), APPs (n = 8, 15%) or nurses (n = 5, 10%) and primarily worked in hospitals (n = 24, 46%) or outpatient clinics (n = 17, 33%). Participants worked across several different healthcare specialties including obstetrics/gynecology (n = 11, 21%), emergency (n = 9, 17%), ICU/critical care (n = 4, 8%), and several other areas (n = 14, 27%).

4.2. Qualitative interview themes related to pandemic impacts on healthcare workers' mental health

We identified four main themes regarding the mental health impact of the COVID-19 pandemic on healthcare workers in Massachusetts: 1) pandemic-related uncertainty increased stress and anxiety; 2) overwork led to physical and mental exhaustion and burnout; 3) frequent exposure to deaths due to COVID-19 took a toll on healthcare workers' mental health; 4) healthcare workers felt socially isolated during the pandemic (Table 2).

4.2.1. Pandemic-related uncertainty increased stress and anxiety

Healthcare workers reported experiencing persistent high levels of stress, trauma, and anxiety during the COVID-19 pandemic, particularly in the early phases. This was due in part to the uncertainty around the progression of the pandemic and the duration that healthcare workers would have to endure the intense workload that they were experiencing. Additionally, there was ever-changing information regarding COVID-19 transmissibility, limited information on how to effectively treat COVID-19 and the clinical ramifications of infection. As one clinician stated *"it was stressful, it was scary, especially in the beginning, because there was so much uncertainty about what the virus did in different people's bodies." (Physician, Pediatrician)*. With an unfamiliar disease, clinicians did not have evidence-based protocols or treatments with which to treat their patients. In addition, some workers were pulled from their usual clinical duties; for example, some pediatricians we interviewed mentioned the challenges of caring for adults with complex comorbidities. Clinicians faced the additional stress of feeling unable to provide the best care to patients coupled with significant concerns for their own health: *"When we first started, [we had] walkie talkies outside of every room to communicate cause no one even wanted to open a door to say one word … and then how we cared for people in a cardiac arrest situation was very different. People, you know, usually you would have 20 people in the room, and everyone would hop in, and it'd be a line of people to do CPR, whereas [during the pandemic] people are a lot more hands off and didn't want to risk the exposure." (Nurse, ICU/Critical Care)*.

4.2.2. Overwork led to physical and mental exhaustion and burnout

The COVID-19 pandemic resulted in an all-hands-on-deck response in healthcare settings leading to unprecedented increases in work hours under highly stressful conditions: *"… in the beginning, last year it was really crisis management and just day to day exhaustion." (Midwife, Obstetrics)* Some healthcare workers described tension between providing

Table 1
Demographics of interview and survey participants.

	Interviews (N = 52)	Survey (N = 209)
	n (%)	n (%)
Age (years)[a]		
18–35	12 (23)	85 (41)
36–45	11 (21)	58 (28)
46–55	19 (37)	44 (21)
≥56	10 (19)	23 (10)
Gender		
Female	41 (79)	170 (81)
Male	11 (21)	37 (18)
Transgender/non-binary	0	2 (1)
Race/Ethnicity		
Asian	3 (6)	19 (9)
Black/African-American/Haitian	9 (17)	20 (10)
Caucasian	29 (56)	152 (73)
Mixed race	3 (6)	4 (2)
Prefer not to say	8 (15)	14 (6)
Hispanic/Latinx		
Yes	11 (21)	16 (8)
No	29 (56)	186 (89)
Prefer not to say	12 (23)	7 (3)
Healthcare worker role		
Advanced Practice Provider (NP, CNM, PA)	8 (15)	14 (7)
Emergency Medical Technician/Paramedic	6 (11)	18 (9)
Medical or Patient Care Assistant	2 (4)	14 (7)
Nurse (RN, LPN)	5 (10)	38 (18)
Physician	19 (37)	71 (34)
Social worker/Mental health specialist	1 (2)	14 (7)
Other[b]	11 (21)	40 (19)
Healthcare setting		
Ambulance	6 (11)	16 (8)
Hospital	24 (46)	129 (62)
Outpatient clinic	17 (33)	47 (23)
Other[c]	5 (10)	17 (8)
Area of healthcare		
Emergency	9 (17)	27 (13)
Family medicine	6 (11)	10 (5)
ICU/critical care	4 (8)	13 (6)
Internal medicine	3 (6)	18 (9)
Obstetrics/gynecology	11 (21)	23 (11)
Pediatrics	5 (10)	67 (32)
Other[d]	14 (27)	51 (24)
Work location[e]		
Cape and Islands/South Shore	7 (14)	33 (16)
Central MA/Western MA	2 (4)	17 (8)
Greater Boston metropolitan area/North Shore	43 (82)	159 (76)

MA = Massachusetts.

[a] Age; Interviews: 18–25 years (n = 4), 26–35 years (n = 8), 56–65 years (n = 8), ≥66 years (n = 2). Survey:18–25 years (n = 5), 26–35 years (n = 81), 56–65 years (n = 21), ≥66 years (n = 2).

[b] Other healthcare worker role; Interviews: Clinical Support Specialist (n = 1), Community health worker/Wellness advocate (n = 2), Director of Interpreter Services (n = 1), Environmental Services (n = 1), Patient Navigator (n = 1), Public Safety Officer (n = 2), Laboratory director/Research scientist (n = 1), Respiratory Therapist (n = 1). Survey: Dietician (n = 2), Laboratory director/Research scientist (n = 7), Lactation Consultant (n = 1), Pharmacist/Pharmacy technician/Pharmacy liaison (n = 5), Phlebotomist (n = 4), Physical/Occupational therapist (n = 4), Program manager/Administrator (n = 8), Imaging technician (n = 2), Not specified (n = 7).

[c] Other healthcare setting; Interviews: Academic (n = 2), Community (n = 1), Homecare agency (n = 1), Remote (n = 1). Survey: Academic (n = 1), Dental setting (n = 1), Health Department (n = 2), Nursing home/Assisted living facility (n = 2), Remote (n = 2), School health center (n = 2), Multiple (n = 3), Not specified (n = 4).

[d] Other area of healthcare; Interviews: Ambulatory (1), Nursing home/Assisted living facility/Elder care (n = 1), Research (1), Orthopedic Surgical Practice (1), Primary Care (1), Psychiatry (1), Public Health (1), Renal Medicine (1), Social Work (1), Not specified (n = 5). Survey: Administration (n = 2), Anesthesiology/Surgery (n = 6), Behavioral Health (n = 1), Dentistry (n = 1),

Inpatient (n = 5), Laboratory/Research (n = 6), Neurology (n = 1), Nursing home/Assisted living facility/Elder care (n = 1), Public health (n = 3), Radiology (n = 1), Multiple (n = 1), Not specified (n = 23).

ᵉ Work location; Interviews: Cape and Islands (n = 1), Central MA (n = 1), South Shore (n = 6), Western MA (n = 1), Greater Boston metropolitan area (n = 42), North Shore (n = 1). Survey: Cape and Islands (n = 4), South Shore (n = 29), Central MA (n = 11), Western MA (n = 6), Greater Boston metropolitan area (n = 151), North Shore (n = 8).

service and personal exhaustion: *"Being in medicine, on the one hand it really gave me purpose for a long while, some very intense purpose, but then after the while, it was so draining and so exhausting."* (Physician, ICU/Critical Care).

Some healthcare workers noted that the pandemic forced them to reevaluate their career and personal priorities: *"I think COVID definitely made me realize that I was working 70, 80, 90 h a week. I basically went home after work, went to bed, got right back up and was at work for 14 h a day … I feel like my health was horrible for that year … I think it made me focus more on my own well-being, my own mental health probably more so than I would have, had something like this not happened."* (Nurse, ICU/Critical Care).

4.2.3. Frequent exposure to deaths due to COVID-19 took a toll on healthcare workers' mental health

Though many healthcare workers had experienced death during their careers, COVID-19 was a much more difficult situation due to the increased number of deaths: *"We were at the hospital and we could hear the people coding. And … it was very traumatizing those first months of 2020."* (Midwife, Obstetrics) Respondents also explained that patients with COVID-19 often died unaccompanied by family or friends: *"Before this year you were able to come in hold your loved ones …, and it was a soul crushing to see people just like, die alone in a room with therapists, a nurse holding their hand … that was tough to do repeatedly."* (Respiratory Therapist).

4.3. Healthcare workers felt socially isolated during the pandemic

Social distancing was an important public health strategy employed during the pandemic to reduce the transmission of COVID-19. However, as a result, many people felt isolated: *"… in the very, very beginning it was a hard adjustment mentally and socially because you went from going to school every day to being in a house behind a computer."* (Community Health worker, Pediatrics) A participant described her experience: *"Isolation makes it really hard for new moms to adjust [to] new families. It's terrible."* (Midwife, Obstetrics).

4.4. Characteristics of survey respondents

Table 1 provides sociodemographic information of the survey sample. A total of 211 participants who worked in healthcare in Massachusetts during the COVID-19 pandemic completed the online survey; data from two respondents who did not work in healthcare at this time for reasons unrelated to the pandemic were excluded. Most respondents were between 18 and 35 years (n = 58, 28%), female (n = 170, 81%), and White (n = 152, 73%). Respondents were predominantly physicians (n = 71, 34%) or nurses (n = 38, 18%), and worked in hospital settings (n = 129, 62%).

4.5. Survey themes related to the COVID-19 pandemic and resulting impacts on healthcare workers' mental health

Survey findings highlighted the additive impacts of ongoing pandemic-related stress on healthcare workers' mental health: (1) an overall decline in mental health, including diagnoses of new/worsening mental health conditions, (2) insufficient mental health support in the workplace, (3) high levels of burnout and plans to leave healthcare

Table 2
Illustrative quotes describing themes from interviews and surveys.

Interview Themes	Illustrative Quotes
Pandemic-related uncertainty increased stress and anxiety	*"During all of this, let's not overlook the fact that we had a gigantic PPE shortage. I went from wearing very nice gowns and you know, appropriate masks, to wearing rain ponchos because they couldn't, like when I say like trash bags, I mean, we are [] … And this was all within the same month. Surgical masks, we are being told, we need to reuse these masks, we like, things like that, like, and it's, you know it takes some, it was, it was mentally very tough and it's still, it's, it ruined a lot of good providers."* (EMT) *"… I mean if you think about it, it changed the way how you interact with people, and the way you see people, and the trust between people, like if I go to the clinic, am I going to get COVID today or am I coming home safe today, or is today the day or maybe someday next month? You know what I mean? It's fear of what is going to happen tomorrow like you are not sure if tomorrow is going to be the same as today."* (Medical Assistant, Renal Medicine)
Overwork led to physical and mental exhaustion and burnout	*"… it completely consumed me, I mean in ways that I've never, ever in my entire life been consumed by something nor had anticipated, never even thought I would be so consumed."* (Physician, ICU/Critical Care) *"And the whole community was turning to us … reaching out to us and, and looking for guidance which we didn't have. … it was, it was scary and empowering at the same time."* (Nurse, Public Health) *"Honestly, for me it's been exhausting … it's just been utterly exhausting and like at first, I was trying to keep up with it, and I was just like I can't."* (Family Housing Navigator, Pediatrics)
Frequent exposure to death due to COVID-19 took a toll on healthcare workers' mental health	*"… I think that if it was just as busy but it was a disease we understood and we had like, um, pretty much our information up front then I think it would have been very different than what we experienced, because the, the, the deaths were so, you know, frequent and painful, but it was the lack of really knowing if we should have done something differently, or could have done something differently that I think was, was more painful."* (Physician, Internal Medicine) *My sister who's been a nurse for a while, I had this conversation with her I'm like, "I can't believe how many deaths I've seen"* (Respiratory Therapist)
Healthcare workers felt socially isolated during the pandemic	*"And I haven't been to other people's houses since COVID, neither did people come to my house since COVID."* (Medical Assistant, Renal Medicine) *"Well, we did distance, we did distance for a long time, which was like really hard for my mom."* (Clinical Support Specialist, OBGYN)
Survey Themes	**Illustrative Quotes**
Overall decline in mental health, including diagnoses of new/worsening mental health conditions	*"I've lost track of the amount of bodies I put into body bags."* ICU Nurse) *"I have PTSD from the frontlines and working to heal that part of me."* (Nurse)
Social isolation	*"The pandemic has changed my life and shrunk my world"* (Physician, OBGYN) *"Mom who lives alone is getting depressed due to inability to travel and meet people."* (Physician, Internal Medicine) *Daughter was quite depressed due to remote*

Table 2 (*continued*)

Interview Themes	Illustrative Quotes
	learning and lack of socializing. She was 14-15 at that time (Physician, Internal Medicine)
	"Because I was following correct protocols during the duration of COVID, I spent two years going to work then coming home and isolating because I didn't want to get anyone sick." (Social worker/Mental health specialist)
Insufficient mental health support in the workplace	*"We are in crisis, the crisis was already pre-COVID but now we really need to set up measures to train more psychiatrists, psychologists, and make more services available." (Physician, Internal Medicine)*
	"I don't need more 'wellness' at work (e.g., yoga, medication) I need sufficient clinical support to do my job!!" (Physician, Pediatrics)
High levels of burnout and plans to leave healthcare	*"It's been a hard 2 years and we're going just starting to rev up. I just can't give more at this stage. I'm over it. I am overburdened and undervalued. I need a vacation but have no time after needing so many days for my children's runny noses (that never ended up being COVID)" (Advanced Practice Provider)*
	"The pandemic has caused numerous mental health issues for patients and we do not have the resources to care for them. It is very sad and disheartening. The job has become much harder and the work staff is treated so horribly. I have never felt so mistreated as a health care provider in my life." (Physician, Emergency)
	"I literally think about quitting at least once a week and switching fields entirely." (Social worker/Mental health specialist)
	"Not having the resources to care for patients constantly takes a toll on mental health". (Pediatrics Nurse)
	If I found an opportunity to make decent money by not working in healthcare, I would do something else. Life overall feels so much harder since the pandemic and I feel burnt out." (ICU Nurse)
	"The workload for a medical laboratory worker is unreasonable in my current position. Staffing is a huge issue, our equipment is old, our testing is very manual, and we don't have the support from the directors in the "ivory tower". It's all about the financials for them- but we are tired "down here in the trenches." (Laboratory director/Research scientist)

(Table 2).

4.5.1. Overall decline in mental health, including diagnoses of new/worsening mental health conditions

The majority of survey respondents (55%, n = 115) reported their mental health as 'worse' compared to before the COVID-19 pandemic (Table 3). Almost one third (28.7%, n = 60) of respondents reported that either they or a family member had received a new/or worsening mental health condition diagnosis since the beginning of the pandemic. Twenty-two percent (n = 46) of respondents reported that either they, a family member, or a household member had taken time off of work or school for reasons related to mental health since the beginning of the COVID-19 pandemic.

Many survey respondents directly attributed worsening mental health to working in healthcare: *"There have been periods throughout the pandemic where I was mentally exhausted and felt saturated with the pain and hurt of others and had nothing left to give." (Nurse, Pediatrics)* Another

Table 3
Responses to survey questions about mental health of self, family, and household members since the COVID-19 pandemic. (N = 209).

	n	%
How do you consider your mental health now compared to before the pandemic?		
Worse	115	55.0
Same	79	37.8
Better	15	7.2
Have you, a family member, or a household member been diagnosed with a new/or worsening mental health condition since the beginning of the pandemic?		
No	149	71.3
Yes	60	28.7
Self	24	40.0
Family member	37	61.7
Household member	10	16.7
Prefer not to say	5	8.3
Have you, a family member, or a household member taken time off of work or school for mental health reasons since the beginning of the pandemic?		
No	163	77.9
Yes	46	22.1
Self	29	63.0
Family member	20	43.5
Household member	11	23.9
Prefer not to say	2	4.5
Do you think there are sufficient mental health supports for you at your job?[a]		
No	91	43.6
Not sure	59	28.2
Yes	59	28.2

[a] Among those with a new or worsening mental health condition (n = 24), 16 felt that mental health support at work was insufficient, 2 felt that it was sufficient, and 6 were not sure.

participant said: *"What a soul sucking experience it was to care for patients that would die no matter what you did. How traumatic it was to have families say goodbye to loved ones on Zoom or through PPE. How angry I felt that the priest would not go into the room of a COVID patient to give the sacrament of the sick." (EMT, ICU critical care).*

Several respondents reported the negative mental health impacts of social isolation: *"I feel much more socially isolated than prior to the pandemic. I do not spend as much time with friends currently, which definitely takes a toll on my mental health." (Physician, Pediatrics)* Another stated: *"My mental health has significantly declined. I certainly have anxiety and am in therapy. I think I'm becoming agoraphobic and afraid to bring my children around others." (APP)* Other respondents mentioned the toll of isolation on their family members: One participant stated: *"Sister's depression got worse. One sister died of drug use during the pandemic which got worse due to the isolation. Not sure if accidental or intentional." (EMT).*

4.5.2. Insufficient mental health support in the workplace

When asked if there are sufficient mental health supports in their workplace, 71.8% (n = 151) of respondents reported 'No' or 'Not sure' (Table 3). One participant stated: *"We are suffering from PTSD from caring for so many that died, no one wants to hear it." (EMT),* Another added: *"My work does not care. Sending things about taking time to care for yourself or go to lunch yoga when there is zero time in the day to do so and the hours worked even longer is laughable." (APP, Internal Medicine).* A third respondent described feeling unsupported: *"Private EMS management says our mental health is a priority, but that's not true. Profits are the priority and when I did take time off for my mental health I was questioned and made to feel (by management) that it wasn't necessary." (EMT).*

4.6. High levels of burnout

When asked how frequent participants felt 'burned out from work', 18.7% (n = 39) said 'every day', 26.8% (n = 56) reported 'A few times a week', and 13.9% (n = 29) selected 'Once a week' (Table 4). The proportion of clinicians reporting feeling burned out once per week or more was: physician (56%), APP (57%), nurse (60%), medical assistant (71%), EMT (56%), social worker (57%) (data not shown). Healthcare

Table 4

Responses to survey questions about pandemic workload, staff shortages, burnout, longevity (N = 209).

	n	%
Adequate workplace safety protocols (e.g. ventilation, masking, hand washing, patient screening)		
No	28	13.4
Not sure	9	4.31
Yes	172	82.3
Workload during the pandemic		
Continued the same clinical workload as before the pandemic	130	62.2
Decreased weekly hours worked (i.e. full-time to part-time/decreased part-time hours)	20	9.6
Increased weekly hours	59	28.2
Transitioned (partially/fully) from direct patient care to non-patient facing tasks	16	7.7
Transitioned to telemedicine as part of/all of my patient-facing care	36	17.2
Other	17	8.1
Staff shortages		
No	27	12.9
Not sure	16	7.7
Yes	166	79.4
Staff types (respondents could indicate all that applied)		
Advanced practice providers	27	
Emergency Medical Technician/Paramedic	12	
Environmental services	26	
Medical assistants	86	
Mental health professionals	5	
Nurses	108	
Physicians	42	
Reception/other ambulatory support staff	72	
Social worker/Medical case manager/Community Health Advocate	11	
Other staff [a]	18	
Continuing to work in healthcare in your current job/role		
< 2 years	38	18.2
2–5 years	36	17.2
5–10 years	24	11.5
> 10 years	72	34.5
Not sure/It depends	39	18.7
Since COVID-19 started, how often have you felt stigmatized, discriminated against, or abused due to working in healthcare (e.g. not being invited to social events/isolated, mistreatment by patients etc.)?		
Daily	7	3.4
Weekly	12	5.7
Monthly	14	6.7
A few times over the past year	77	36.8
Never	99	47.4
Feeling burned out from work		
Every day	39	18.7
A few times a week	56	26.8
Once a week	29	13.9
A few times a month	47	22.5
≤ Once a month/few times a year	29	13.8
Never	9	4.3
Continuing to work in healthcare in your current job/role		
<2 years	38	18.2
2–5 years	36	17.2
5–10 years	24	11.5
>10 years	72	34.5
Not sure/It depends	39	18.7

[a] Other staff: Imaging technicians (n = 1), Laboratory/Research scientists (n = 3), Patient Transporters (n = 1), Phlebotomists (n = 1), Program manager/Administrators (n = 2). Not sure/not specified (n = 10).

workers described feelings of burnout: *"The work is harder. The hours are longer. There is more pressure."* (Social worker/Mental health specialist), *"I have a number of leadership roles and I have resigned them. I can barely take care of myself much less a team."* (Physician, OBGYN) A mental health professional described additional stress: *"I am a mental health provider. We have been slammed, people are desperate and everywhere you turn is short staffed with waiting lists. The job got harder and is now almost impossible."* (Social worker/Mental health specialist).

Several factors were reported to have contributed to burnout among healthcare workers, including increased workload, lack of staffing,

stigmatization, and inadequate mental health support. Almost one third of respondents (28.2%, n = 59) reported an increase in their workload since the pandemic started. Most respondents 79.4% (n = 166) indicated that they were currently experiencing staffing shortages. Over half of respondents reporting shortages of nurses (52% n = 108), 41% (n = 82) reported shortages of medical assistants, and 32% (n = 76) reported shortages of front desk staff. (Table 4). Many respondents mentioned how staff shortages in healthcare impact both patient care and mental health: *"It feels impossible to provide adequate care because of the shortage of other people. Every day is workarounds and every time a patient is harmed it's hard not to feel solely responsible."* (Physician, OBGYN).

4.7. The impact of COVID-19 on longevity in healthcare

Almost 20% (n = 38) of respondents intended to leave the healthcare field in less than 2 years, and an additional 17% intended to leave within 2–5 years (Table 4). Intention to leave healthcare within 2 years was highest among workers aged 18–35 (27%). Intention to leave within 5 years was highest among those aged 56 and older (55%), followed by those age 18–35 (46%), then age 36–55 (23%). Intention to leave varied by specialty, with 27% of physicians, 29% of APPs, 34% of nurses, 35% of medical assistants, 44% of EMTs, 79% of mental health professionals, and 35% of other roles intending to leave healthcare within 5 years (data not shown). Several participants described their feelings *"COVID-19 has negatively impacted my work personally as well as on my team. We are all burnt out and the majority are looking for positions elsewhere."* (Social worker/Mental health specialist) Another participant stated: *"I want out. I know I am burned out but don't see another job I am easily qualified to do. I also feel guilty leaving other doctors there knowing my leaving will make their jobs harder. I worry about the future and the supply of doctors. Thinking of going back to school to get away from clinical practice."* (Physician, Family Medicine).

4.7.1. Causes of burnout

Survey respondents were asked to rate how important they considered certain workplace conditions in terms of contributing to healthcare

Table 5

Responses to the survey question asking: how important do you think the following are in terms of *contributing to burnout/leaving medicine*? (N = 209).

	Not Important		Somewhat Important		Important/Very Important	
	n	%	n	%	n	%
Insufficient pay/salary	8	3.8	23	11.0	178	85.2
Feeling unable to provide adequate patient care	10	4.8	34	16.2	165	79.0
Lack of support from my supervisors/company/medical institution[a]	13	6.2	32	15.4	163	78.4
Need to care for other family members/frequent school closures/lack of support[a]	22	10.6	24	11.5	162	77.9
Lack of flexibility in terms of personal schedule/inability to work from home	18	8.6	32	15.3	159	76.1
Mental health conditions secondary to the COVID-19 pandemic	15	7.2	41	19.6	153	73.2
Not feeling valued by patients	14	6.7	55	26.3	140	67.0
Lack of autonomy	15	7.2	56	26.8	138	66.0
Inadequate PPE	39	18.7	55	26.3	115	55.0
Racism/structural inequities in the workplace	37	17.7	67	32.1	105	50.2
Burden of electronic medical records (EMR) documentation[a]	53	25.5	52	25.0	103	49.5
Fear of getting COVID-19 at work	41	19.6	81	38.8	87	41.6

[a] n = 208. Insufficient pay/salary was ranked among the top 2 contributors for all clinician types: physicians, advanced practice providers, nurses, medical assistants, EMTs, mental health specialists, others. Importance of other factors varied by clinician type.

worker burnout/leaving medicine (Table 5).

Insufficient pay/salary (n = 178, 85.2%), feeling unable to provide adequate patient care (n = 165, 79%), lack of support from supervisors/ company/medical institution (n = 163, 78.4%) and need to care for other family members/frequent school closures/lack of support (n = 162, 77.9%) were most often considered "Important/Very Important". Half (n = 104, 50%) of respondents felt that racism/structural inequities in the workplace were important/very important causes of burnout, and responses varied little between white (n = 73/152, 48%) and non-white (n = 31/57, 55%) respondents. Fear of getting COVID-19 at work was least often considered to be important (n = 87, 41.6%) (Table 5). One participant shared: *"COVID has made work significantly more stressful by delayed care for patients, having to make more personal sacrifices to maintain work, not feeling appreciated by my hospital."* (Physician) Another respondent described: *"COVID-19 has made it difficult for my patients to receive services that are standard of care to my practice. This has been exacerbated by staffing shortages, incongruent goals of clinical operations teams (see more patients but with less resources), and inappropriate expectations for certain divisions to generate more clinical revenue to make up for COVID-19 related losses."* (Physician, Pediatrics).

Among the 78.4% (n = 163) participants who felt that lack of workplace support was an important contributor to burnout (Table 5), many added open-ended responses that described feeling undervalued and disrespected as a healthcare worker by healthcare leadership and systems. One described their situation: *"My job feels like an abusive relationship."* (Nurse), Another felt *"overworked and massively under appreciated."* (EMT). Another respondent stated: *"I've been caring for sick and well patients throughout the pandemic. During this time, the hospital's "thank you" was to cut matching our retirement contributions and place a salary freeze. We received no holiday gift. Just hollow thank you's."* (Physician).

4.7.2. Strategies to support/maintain the healthcare workforce

Survey respondents rated the importance of different strategies to potentially keep health personnel in the workforce (Table 6). As described below, higher salaries, flexible schedules, and increased

Table 6
Responses to the survey question asking: How important do you think the following are to *keep people working in healthcare*? (N = 209).

	Not Important		Somewhat Important		Important/ Very Important	
	n	%	n	%	n	%
Higher salaries	2	1.0	17	8.1	190	90.9
Allow flexible schedules[a]	3	1.5	19	9.1	186	89.4
Increase support to help clinicians address patient's needs/address backlog of untreated illness/missed preventive care due to COVID-19[b]	3	1.4	20	9.6	184	89.0
Allow telework when possible	12	5.7	28	13.4	169	80.9
Policies ensuring adequate PPE to prevent infection	6	2.9	35	16.7	168	80.4
Address racism/structural inequities in the workplace	17	8.1	26	12.4	166	79.5
Improve electronic medical records (EMR) to streamline documentation	17	8.1	32	15.3	160	76.6
Decrease administrative burden of mandatory trainings/compliance	7	3.4	43	20.6	159	76.0
Ensure healthcare worker compliance with COVID-19 vaccination and boosters	32	15.3	47	22.5	130	62.2
Ensure patient compliance with COVID-19 vaccination and boosters[b]	32	15.4	60	29.0	115	55.6

[a] n = 208.
[b] n = 207. *Higher pay/salary was ranked among the top 2 strategies for workforce retention for all clinician types: physicians, advanced practice providers, nurses, medical assistants, EMTs, mental health specialists, others. Importance of other factors varied by clinician type.*

support to address patient needs were most often felt to be important strategies; while ensuring healthcare worker and patient compliance with COVID-19 vaccinations were considered relatively unimportant.

4.7.2.1. Increased compensation. Higher salaries were most often considered an important factor to increase retention with 91% (n = 190) selecting this option (Table 6). Interestingly, higher salaries were either the first or second most important factor as ranked by all healthcare worker types, including physicians (92%), APPs (93%), nurses (90%), medical assistants (93%), emergency medical technicians (95%), social work/mental health professionals (93%), and others (88%) (data not shown). Higher salaries also remained the most important factor when data were stratified by gender and by race/ethnicity. One respondent explained: *"I think that increased salaries, particularly in primary care and support staff (social work, PT/OT, Dietitians, Respiratory therapists etc.) would go a long way to increasing retention and new interest."* (Dietician).

4.7.2.2. Flexible schedules. Overall, the next factor considered to be 'very important/important' for healthcare worker retention was 'flexible schedules' (n = 186, 89.4%). Respondents explained the benefits of flexible work schedules and telehealth: *"The switch to remote work on my non-clinical days yielded a huge improvement in my quality of life, despite other challenging circumstances."* (Physician, Internal Medicine).

4.7.2.3. Increased clinical support. The third factor considered to be 'very important/important' was 'increase support to help clinicians address patient's needs/address backlog of untreated illness/missed preventive care due to COVID-19' (n = 184, 89.0%). Participants described increased resources dedicated to management but not staffing: *"Many institutions seem to add management to address [clinical staffing] issues when spending money to have more adequate staffing would be much more effective."* (Dietician).

5. Discussion

This sequential, mixed methods study describes the toll of the COVID-19 pandemic on healthcare workers in Massachusetts. Initially, exhaustion, exposure to death and social isolation significantly impacted mental health, as described in our interviews which took place in 2021. By 2022, however, when the surveys were performed, a different picture emerged. At this time, vaccinations were widespread, schools and businesses were open for in person interactions, and society was entering the chronic phase of the pandemic. Yet, nearly one third of healthcare workers reported a new or worsening mental health condition among themselves or their family members. Consistent with other studies, and highly concerning for the future of healthcare, approximately 60% of healthcare workers surveyed felt burned out at least once per week. This is consistent with findings from a survey of US clinicians that reported significant increases in burnout in 2020–2021 compared to pre-pandemic levels in 2019, and noted that burnout levels reached the highest levels in the end of 2021.[22]

We also found that almost 4 in 10 healthcare workers intended to leave healthcare within 5 years.[10,11,22] Particularly worrisome was the finding that one third of healthcare workers aged 18–35 intended to leave their jobs within 2 years, a higher rate of attrition than any other age bracket. Also highly concerning was the intention of nearly 80% of mental health professionals we surveyed to leave healthcare within 5 years. As the COVID-19 pandemic brought unprecedented levels of mental illness, mental health professionals faced the double challenges of a steadily increasing patient load while also dealing with personal pandemic-related challenges. Rates of anxiety, depression, post-traumatic stress disorder, and other mental health conditions continue to rise.[23,24] Although this is a relatively small study, if additional research confirms this finding it will indicate an impending crisis. The National Bureau of Labor Statistics has identified a monthly

quit-rate just shy of 3% in healthcare, which sums to 1.7 million healthcare workers leaving the field in 2022 alone.[25]

Interestingly, although the COVID-19 pandemic spotlighted healthcare worker burnout, by 2022, COVID-19-related conditions were the factors least likely to be cited by healthcare workers as reasons for dissatisfaction with their work. Inadequate compensation was the most frequently cited reason for burnout and improving it was felt to be the most important strategy for retention. This is a departure from prior literature, which indicated that supportive leadership and autonomy were more important than salary in terms of improving healthcare worker retention.[26–28] In addition, salary was the most important factor for all types of healthcare professionals, indicating that workers in all sectors feel undervalued and underpaid.

The new focus on compensation may be related to several factors. Four out of five participants felt unsupported by healthcare leadership, and frontline workers who feel increasingly disconnected from the C-suite and believe their working conditions are unsustainable, may maximize salary to facilitate retirement at an earlier time. Second, when healthcare workers feel that their values are not aligned with leadership, a request for increased compensation is a language both can understand and negotiate, while the less tangible asks of value recognition and alignment are more difficult to request.[29,30] Across the Commonwealth of Massachusetts, many healthcare systems went through a market adjustment of their employees to address this issue.

We posit that the primary contributor to healthcare worker burnout and attrition is moral injury.[31] Moral injury occurs when one witnesses, fails to prevent, or performs an act in opposition to deeply held moral beliefs.[32] While the symptoms are often similar to burnout, the root causes are systemic, rather than individual. Because healthcare workers join the profession out of a desire to improve the lives of others, being unable to provide adequate care to patients due to external circumstances creates moral injury. Early in the pandemic, fear of death, inadequate PPE, and lack of available COVID-19 treatments battered frontline workers as they witnessed unprecedented numbers of deaths they could not prevent. The cause of moral injury in the early phase of the pandemic was extrinsic: a force of nature, a new disease. Two years into the pandemic, the moral distress persists but is now driven by intrinsic factors that are sociological rather than biological. Healthcare workers describe still being unable to care for patients, now due to staffing shortages and lack of clinical support. The causes of moral injury now stem from overtaxed and understaffed healthcare systems. Staffing shortages leave the remaining healthcare workers exhausted and unable to provide the level of care they believe their patients deserve. Burnout and moral injury are not new in healthcare– but our data suggest that the pandemic has accelerated this propagation.[23,32]

Providing an environment where healthcare workers can perform their jobs and care for patients consistent with their professional and personal standards is paramount to maintaining the standard of healthcare we want for ourselves, our families, and our communities. Experienced healthcare staff are critical to good patient care, and high levels of staff burnout negatively impacts patient care quality.[33,34] Providing good patient care is restorative to people in healthcare. Investment in maintaining the workforce is also economically intelligent, as the cost of replacing lost healthcare workers is very high.[35] To maintain an adequate healthcare workforce, several issues require attention. First, hospital leadership must be more responsive to the needs of frontline workers. The finding that only 1 in 5 healthcare professionals felt supported by leadership is highly concerning. Bringing healthcare leadership and frontline workers together is essential if we are to bridge this divide. Healthcare leaders must prioritize the values of healthcare professionals by ensuring that everyone has the tools and support necessary to provide the best care for patients. This includes basic materials like PPE and adequate supplies of clean, sterilized surgical instruments, updated equipment, adequate infrastructure, and, perhaps most importantly in light of the exodus of healthcare workers,

adequate staffing and clinical support to provide high-quality, compassionate care for patients. The primary reasons hospitals defer care right now is not COVID-19, but inadequate staffing levels.[16] Hiring temporary staff to replace permanent losses is both expensive and unsustainable.[36] Third, healthcare systems must make careers sustainable on a personal level. Increased compensation will allow healthcare workers to sustain their quality of life in the setting of inflation and a rising cost of living. Flexible schedules also allow healthcare professionals to care for their patients and their families—a need that is becoming more critical as women hold 76% of all healthcare jobs[37] and do the majority of caregiving for children and other family members.[38,39] Mental health support is also a core requirement for workforce wellbeing. Increasing support for mental health professionals will be critical, as well as continuing to address systems that hinder seeking of mental health support, such as restrictive employer policies, restrictive insurance coverage for mental health problems and the mandatory reporting on professional licensing/credentialing of mental health issues.

6. Limitations

Although we report important findings regarding the impact of the COVID-19 pandemic on the mental health status of healthcare workers, this study has several limitations. First, qualitative interviews and survey participants represent a convenience sample of healthcare workers in Massachusetts and may not be generalizable to healthcare workers in other settings or geographic areas. Additionally, our sample was predominantly white and studies that include and or focus on other racial and ethnic groups are needed. This is particularly important given that a survey from the American Medical Association, conducted in June and July of 2020, found that physicians who identify as two or more races (45%) and Black physicians (37%) reported the highest levels of burnout. Black physicians were also more likely to report being treated with less dignity by their patients because of their race/ethnicity.[40] Finally, due to the fluid nature of the pandemic, there were frequent changes to public health policies and vaccine mandates over the course of the study period. Therefore, our results may not fully represent how these temporal changes impacted healthcare worker views of the COVID-19 pandemic.

7. Conclusions

The COVID-19 pandemic has worsened the mental health of healthcare workers. The combination of increased workload, decreased resources to care for patients and feeling unsupported by leadership has led to unprecedented dissatisfaction, with 40% of healthcare workers intending to leave the industry within 5 years—and nearly one third of those under age 35 intending to do so within 2 years. This represents a crisis in healthcare that must be urgently addressed.

Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declaration of competing interest

The authors report there are no competing interests to declare.

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