

Title: A Prospective Cohort Study of the Psychological Consequences of the COVID-19 Pandemic on Frontline Healthcare Workers in New York City  
 Corresponding Author: Lauren Peccoralo, [lauren.peccoralo@mountsinai.org](mailto:lauren.peccoralo@mountsinai.org)  
 Department of Medicine, Icahn School of Medicine at Mount Sinai, New York, New York  
 Journal: International Archives of Occupational and Environmental Health

Authors: Lauren Peccoralo, Robert H. Pietrzak, Jordyn H. Feingold, Shumayl Syed, Chi C. Chan, James Murrough, Carly Kaplan, Jaclyn Verity, Adriana Feder, Dennis Charney, Steven M. Southwick, Jonathan Ripp

Supplemental Table 1. Variables examined as correlates of longitudinal trajectories of mental health symptoms

<p><b>Demographic and occupational characteristics (T1 and T2)</b></p>	<p><b>Age</b> (&lt;35, &gt;= 35); <b>sex</b> (male, female); <b>reported race/ethnicity</b> (white, non-Hispanic; Black, non-Hispanic, Hispanic, other, prefer not to say) (T2 only); <b>relationship status</b> (single, divorced, widowed; married/partnered); <b>living with children</b> (yes/no); <b>profession</b> [Registered Nurse, Nurse Practitioner or Physician Assistant, Attending MD/DO, House staff, Other (social worker, chaplain, clinical dietitian, psychologist, other)]; <b>years in practice</b> (#); <b>personal medical risk for COVID-19-related complications</b> (low, medium, high); <b>history of a mental disorder</b> (yes/no) (All T1 and T2)</p>
<p><b>Past-year (pre-pandemic) burnout (T1)</b></p>	<p>Experience of Burnout based a rating of &gt;=4 (at least once a week) on either item of 2-item Maslach Burnout Inventory (MBI) specifically worded to ascertain the experience of burnout “before the onset of the COVID-19 pandemic.” Together, questions measure emotional exhaustion and depersonalization [responses ranging from 0 (“Never”) to 6 (“Every day”)]<sup>1</sup>. The 2-item MBI correlates highly with the 22-item MBI, with supporting literature demonstrating its validity (West et al. 2012; West et al. 2009).</p>
<p><b>COVID-19-related variables (T1 and T2)</b></p>	<p><b>Perceived preparedness (T1):</b> Sum of “yes” responses to the following 4 yes/no questions:</p> <ul style="list-style-type: none"> <li>- My work and activities before the coronavirus pandemic provided me with helpful training to perform my current clinical work.</li> <li>- In my current clinical setting, I am adequately informed about my clinical duties and the role I am expected to play.</li> <li>- At present, I have a good idea of how long (weeks) my current level/volume of work will last.</li> <li>- I am adequately trained to perform the professional tasks required of me during this pandemic.</li> </ul> <p><b>Acute (T1) and Post Acute (T2) COVID-related Stressors:</b> A composite measure of the following:</p> <ul style="list-style-type: none"> <li>- Number of hours worked on site (#)</li> <li>- Total estimated number of COVID-19 patients assessed/treated (#)</li> <li>- Have you been re-deployed to another physical location and/or type of practice/service due to COVID-19? (yes/no)</li> <li>- In the last week (T1) [last month (T2)], have you or your team had to make a difficult decision involving prioritizing the health/survival of one patient over another, due to limited equipment/ resources? (yes/no)</li> </ul>

- In the last week (T1) [last month (T2)], how often have you felt torn between your desire/duty to help your patients and your desire/duty to loved ones (family, friends, etc.)? [Responses ranging from 0 (“None of the time”) to 4 (“All of the time”)]
- Number of coworkers infected with COVID-19 (#)
- I know a coworker(s) infected/ hospitalized or in the ICU /died from COVID-19-associated complications (yes/no)
- Today, based on current recommendations, do you feel you have access to enough personal protective equipment supplies on your unit? (yes/no)
- Today, do you have access to sufficient coronavirus testing for staff? (yes/no)
- Today, do you have access to sufficient coronavirus testing for patients? (yes/no)
- Occupational exposures: What's the level of exposure you have had with patients with suspected or confirmed COVID-19? (Select all that apply)
  - o I have not cared for any patients in person or via telemedicine who have gotten sick from the virus.
  - o I care for patients via telemedicine who have gotten sick from the virus.
  - o I care for patients via telemedicine who have died from the virus.
  - o I care for patients in person who have gotten sick from the virus.
  - o I care for patients in person who have died from the virus.
- Personal exposures: Not including patients, which of the following statements apply to you (Select all that apply) (continuous)
  - o I know a friend or colleague who has gotten sick from COVID-19 and required hospitalization.
  - o I know a friend or colleague who has died from the virus.
  - o Someone in my family (who I don't live with) has gotten sick but has not required hospitalization.
  - o Someone in my family (who I don't live with) has gotten sick and required hospitalization.
  - o Someone in my family (who I don't live with) has died from the virus.
  - o Someone I live with has gotten sick but has not required hospitalization.
  - o Someone I live with has gotten sick and required hospitalization.
  - o Someone I live with has died from the virus.
  - o I have gotten sick but not required hospitalization.
  - o I have gotten sick and required hospitalization.
  - o I have gotten sick and required an ICU stay.
- Infection-related concerns (T1):** A composite measure of the following:
  - How much do you currently worry about the following work-related concerns? [Responses ranging from 0 (“Not worried at all”) to 4 (“Worried nearly all of the time”)]
    - o Getting infected with COVID
    - o Infecting patients with COVID
    - o Infecting colleagues with COVID
    - o Infecting family with COVID
    - o Not being able to visit or assist loved ones who are ill or become ill with COVID
- In the last week, how often have you felt that those who live with you are fearful to be near you due to your possible COVID exposure at work? [Responses ranging from 0 (“None of the time”) to 4 (“All of the time”)]
- Family-related concerns (T1):** A composite measure of the following:

	<ul style="list-style-type: none"> <li>- How much do you currently worry about the following personal concerns? [Responses ranging from 0 (“Not worried at all”) to 4 (“Worried nearly all of the time”)] <ul style="list-style-type: none"> <li>o How COVID-19 might affect my personal relationships</li> <li>o How COVID-19 might affect my ability to care or my children/dependents</li> </ul> </li> <li><b>Work competency concerns (T1):</b> A composite measure of the following: <ul style="list-style-type: none"> <li>- How much do you currently worry about the following work-related concerns? [Responses ranging from 0 (“Not worried at all”) to 4 (“Worried nearly all of the time”)] <ul style="list-style-type: none"> <li>o Not having enough knowledge or experience to adequately take care of COVID-19-infected patients</li> </ul> </li> </ul> </li> </ul>
<p><b>Psychosocial characteristics (T1)</b></p>	<p><b>Coping self-efficacy (resilience):</b> Score on the Connor-Davidson Resilience Scale-2 (CD-RISC2)<sup>2</sup> (Responses on 5-point scale ranging from Not true at all to True nearly all the time):</p> <ul style="list-style-type: none"> <li>- I am able to adapt when changes occur<sup>2</sup></li> <li>- I tend to bounce back after illness, injury, or other hardships.<sup>2</sup></li> </ul> <p><b>Positive dispositional characteristics:</b> Factor score of items assessing dispositional gratitude, optimism, curiosity/exploration, purpose in life, and religiosity/spirituality (Responses on 7-point scale ranging from Strongly Disagree to Strongly Agree);</p> <ul style="list-style-type: none"> <li>- I have so much in life to be thankful for.<sup>3</sup></li> <li>- In uncertain times, I usually expect the best.<sup>4</sup></li> <li>- I frequently find myself looking for new opportunities to grow as a person (e.g., information, people, resources)<sup>5</sup></li> <li>- I have discovered clear-cut goals and purpose in my life.<sup>6</sup></li> <li>- In my life, I experience the presence of the Divine (i.e., God).<sup>7</sup></li> </ul> <p><b>Work-related inspiration:</b> Sum of responses to the following questions (Assessed on 3-point scale: Disagree, Neutral, Agree)</p> <ul style="list-style-type: none"> <li>- I have felt more pride than usual to be a healthcare worker</li> <li>- I have derived more meaning from my clinical work than during life as usual.</li> <li>- I have been inspired by colleagues who I consider to be role models.</li> </ul> <p><b>Feeling valued/ supported at work:</b> Sum of standardized scores on the following questions (Assessed on 4-point scale: Not at all valued, Slightly valued, Moderately valued, Very much valued)</p> <p>In your opinion, to what extent do you feel valued by:</p> <ul style="list-style-type: none"> <li>- Your immediate supervisors (team leader, service chief, etc.)</li> <li>- Hospital leadership</li> </ul> <p>In your opinion, what is the current level of (Assessed on 3-point scale: Low, Medium, High)</p> <ul style="list-style-type: none"> <li>- Camaraderie/team spirit among your group of co-workers in your own clinical practice team or setting.</li> <li>- Support from your hospital leadership.</li> </ul> <p><b>Perceived social support:</b> Score on abbreviated 3-item version of the Medical Outcomes Study Social Support Scale.<sup>8</sup> (Assessed on 5-point scale: None of the time, A little of the time, Some of the time, Most of the time, All of the time)</p> <p>How often is each of the following kinds of support available to you if you need it?</p> <ul style="list-style-type: none"> <li>- Someone to love you and make you feel wanted (i.e., emotional support)</li> <li>- Someone to help you if you were confined to bed (i.e., instrumental support)</li> </ul>

	- Someone to give you good advice in a crisis (i.e., appraisal support)
<b>Restorative behaviors (T1)</b>	<b>Sleep hours:</b> Number of hours of sleep on a typical workday <b>Physical Exercise:</b> Number of days that workers reported engaging in physical activity (exercise, sports, yoga, etc.)
<b>Coping Strategies (T1)</b>	<b>Self-sufficient coping:</b> Count of engaging in the following coping strategies to help cope with COVID-19-related experiences (adapted from the Brief COPE: planning (e.g., coming up with a strategy for what to do), active coping (e.g., taking action to make the situation better), positive reframing (e.g., looking for something positive in what happened), acceptance (e.g., accepting the reality that it happened), humor (e.g., trying to find humor in the situation), and religion (e.g., praying, meditating, or finding comfort in spiritual beliefs). <b>Socially-supported coping:</b> Count of engaging in the following coping strategies to help cope with COVID-19-related experiences (adapted from the Brief COPE: use of emotional support (e.g., getting comfort or understanding from others), use of instrumental support (e.g., getting advice from others), venting (e.g., expressing negative feelings). <b>Avoidant coping:</b> Count engaging in the following coping strategies to help cope with COVID-19-related experiences (from the Brief COPE: self-distraction (e.g., turning to work or other activities to get mind off things), denial (e.g., refusing to believe that it happened), substance use (e.g., using alcohol, nicotine, or drugs to help get through it), behavioral disengagement (e.g., giving up in trying to deal with it), self-blame (e.g., blaming or criticizing myself for what happened).

T1=Timepoint 1, T2=Timepoint 2