

# Trends

in Psychiatry and Psychotherapy

## **JOURNAL ARTICLE PRE-PROOF** **(as accepted)**

TRENDS

### **Challenges and Potential Solutions for Physician's Suicide risk factors in the COVID-19 Era: Psychiatric Comorbidities, Medicine Judicialization, and Burnout**

Dante Duarte, Mirret M. El-Hagrassy, Tiago Couto, Wagner Gurgel, Luciano Minuzzi, Karen Saperson, Humberto Corrêa

<http://dx.doi.org/10.47626/2237-6089-2021-0293>

Original submitted Date: 30-Mar-2021

Accepted Date: 03-Aug-2021

This is a preliminary, unedited version of a manuscript that has been accepted for publication in Trends in Psychiatry and Psychotherapy. As a service to our readers, we are providing this early version of the manuscript. The manuscript will still undergo copyediting, typesetting, and review of the resulting proof before it is published in final form on the SciELO database ([www.scielo.br/trends](http://www.scielo.br/trends)). The final version may present slight differences in relation to the present version.

## **Challenges and Potential Solutions for Physician's Suicide risk factors in the COVID-19 Era: Psychiatric Comorbidities, Medicine Judicialization, and Burnout**

Dante Duarte<sup>1,2\*</sup>, Mirret M. El-Hagrassy<sup>1,3\*</sup>, Tiago Couto<sup>4</sup>, Wagner Gurgel<sup>5</sup>, Luciano Minuzzi<sup>2,6</sup>, Karen Saperson<sup>2</sup>, Humberto Corrêa<sup>7</sup>.

1 Spaulding Hospital, Harvard Medical School, Boston, MA, USA

2 Department of Psychiatry and Behavioural Neurosciences, McMaster University, Hamilton, ON, Canada

3 Neurology Department, University of Massachusetts Medical School, Worcester, MA, USA

4 Federal University of Uberlândia, Uberlândia, MG, Brazil

5 University of São Paulo, São Paulo, SP, Brazil

6 Mood Disorders Program and Women's Health Concerns Clinic, St. Joseph's Healthcare Hamilton, ON, Canada

7 School of Medicine, Federal University of Minas Gerais, Belo Horizonte, MG, Brazil.

\*Equally contributing authors

Corresponding author: Mirret M. El-Hagrassy, email: [melhagrassy@neuromodulationlab.org](mailto:melhagrassy@neuromodulationlab.org)

67 Belmont St. - Worcester

Massachusetts

United States

01605-2903

Conflicts of interest? No

**Previous presentation:** none

**Location of work and address for reprints:** UMass Memorial Department of Neurology.

Address: 67 Belmont St., Suite 301, Worcester MA, 01605. USA. Phone: 617-952-6175.

Manuscript's word count: Text 4365; Total 6997

## Abstract

**Introduction** Suicide in physicians outlines a public health problem that deserves more consideration. A recently performed meta-analysis and systematic review evaluated suicide mortality in physicians by gender and investigated several related risk factors. It showed a post-1980 suicide mortality ratio 46% higher in female physicians than women in the general population and a 33% lower risk in male physicians than men in general, despite an overall contraction in physicians' mortality rates in both genders.

**Methods** This narrative review was conducted through a search and analysis of relevant articles/databases to address questions raised by the meta-analysis, and how they may be affected by COVID-19. The process included unstructured searches on physician suicide, burnout, medicine judicialization, healthcare organization and COVID-19 on Pubmed, and Google searches for relevant databases, medical society, expert and media commentaries on these topics. We focus on three factors critical to address physician suicides: epidemiological data limitations, psychiatric comorbidities, and professional overload.

**Results** We found relevant articles on suicide reporting, physician mental health, effects of healthcare judicialization and organization on physician and patient health, and how COVID-19 may impact such factors. This review addresses information sources, underreporting/misreporting of physicians' suicide rates, inadequate diagnosis and management of psychiatric comorbidities and chronic effects on physicians' work capacity, and finally, medicine judicialization and organization failure increasing physician "burnout". We discuss these factors in general and in relation to the COVID-19 pandemic.

**Conclusions** We describe an overview of the above factors, discuss possible solutions, and specifically address how COVID-19 may impact such factors.

**KEYWORDS:** physician suicide; COVID-19; burnout; medicine judicialization; healthcare organization; depression

## 1. INTRODUCTION

Suicide is among the leading causes of mortality worldwide,<sup>1</sup> and the 2018 US age-adjusted suicide rate was the highest since 1941.<sup>2</sup> Suicide in physicians delineates a public health problem, and modifiable risk factors have a clear moderating role. We recently performed a meta-analysis and systematic review evaluating suicide mortality in physicians by gender and investigating several relevant risk factors. Our results showed a post-1980 suicide mortality ratio of 46% higher in female physicians than women in the general population and a 34% lower risk in male physicians than men in the general population.<sup>3</sup>

Psychiatric comorbidities, one of the physician suicide risk factors outlined in our systematic review<sup>3</sup> need further consideration, as do factors that were not addressed: medicine judicialization and organization oversight, and "burnout". Moreover, the COVID-19 pandemic ravaging the world has harmful effects on physicians' mental health, especially frontline physicians<sup>4</sup>. For instance, we found that in China, the first country hit by the pandemic, depression and anxiety symptoms were as high as 50% in 1.257 physicians and healthcare workers; moreover, 70% had distress<sup>5</sup>. In Italy, one of the most affected European countries, a similar trend was observed as nearly 50% of 1.379 healthcare workers reported post-traumatic stress symptoms, and almost 30% reported symptoms of depression and anxiety.<sup>6</sup>

Therefore, in this narrative review we conducted a search and analysis of relevant articles and databases intended to address these risk factors, by investigating its main issues and potential solutions. We then depicted these risk factors considering the current COVID-19 pandemic and how it may impact physicians' likelihood of death by suicide.

The process included unstructured searches on physician suicide, medicine judicialization, healthcare organization oversight, "burnout" and COVID-19 on Pubmed; and Google searches for relevant databases as well as medical society, expert, and media commentaries on these topics. We postulated that these factors may have been worsened by the impact of the COVID-19 pandemic on physician workforces and wellbeing.

## 2. RISK FACTORS

### 2.1 OVERVIEW

#### 2.1.a Psychiatric comorbidities

Most patients who die by suicide suffer from psychiatric comorbidities.<sup>7,8</sup> Physicians, in particular, often have unmanaged (undiagnosed or untreated) psychiatric disorders, primarily depression and substance abuse (alcohol and drugs).<sup>9</sup> Medical practitioners at early stages of their careers already have higher depression levels than the general population.<sup>10,11</sup> A series of recent meta-analyses estimates the prevalence of depression to be 27.2% in medical students and 28.8% in resident physicians, respectively ranging from 9.3% to 55.9% and 20.9% to 43.2% depending on the instrument used.<sup>10,11</sup> Also resident physicians' depression prevalence rates increased by calendar year (0.5% increase per year).<sup>11</sup> If not properly treated, these psychiatric conditions become chronic with potential for significant harm to physicians' practices, reputations, and patient safety.<sup>12</sup> Yet we did not find any meta-analysis regarding practicing physicians' depression symptoms or disorders.

The American Foundation for Suicide Prevention (AFSP) published "Facts about Mental Health and Suicide Among Physicians".<sup>9</sup> One such fact is that of those whose death was by suicide, physicians were less likely to have been receiving mental health treatment than non-physicians, despite similar rates of depression;<sup>13</sup> the same problem was seen in medical students.<sup>10</sup> Without effective long-term therapy for underlying psychiatric issues, physicians are more likely to self-medicate for depression, anxiety, insomnia, etc. This may temporarily alleviate symptoms but can have disastrous long-term consequences. In a retrospective cohort study, among 601 US anesthesiologists who developed substance use disorders, 114 (19%) died from substance use-related factors during the follow-up.<sup>14</sup> The prevalence of physician alcohol and drug abuse may relate to self-medicating symptoms of depression, anxiety, and insomnia, though attempted cognitive enhancement through psychostimulants is also common among medical students and physicians.<sup>15,16</sup> A Swiss study found that regular use of hypnotics and sedatives (mainly benzodiazepines) was significantly higher among doctors than in the general population.<sup>17</sup> Psychiatry is the specialty with the highest

percentage of daily use of such medications.<sup>11</sup> In random US samples of physicians and students, 10% of 337 physicians and 16% of 381 medical students reported psychoactive drug use once a month or more.<sup>18</sup>

Despite substantial psychiatric comorbidities, physicians tend not to seek care for their own health: nearly 40% of 5,829 surveyed physicians reported reluctance to seek formal mental healthcare due to "concerns about repercussions to their medical licensure"; the study found that medical licensure application questions regarding psychiatric conditions were a barrier to physicians seeking help.<sup>19</sup>

Meanwhile, people close to physicians who died of suicide were often unaware of their suffering, possibly due to physicians' pretense of being well-adjusted.<sup>20</sup> Physician personality factors (or fear of being reported as "impaired" by colleagues) may prevent the "cry for help." Furthermore, loved ones often attribute behavioral changes to work-related stress.<sup>21</sup> Many suicides result from acute events aggravating undiagnosed long-standing psychiatric illnesses, highlighting the need to systematically protect physicians from acting on transient suicidal impulses such as those relating to work or life events.<sup>22</sup>

### **2.1.b Medicine judicialization and organization oversight**

Physicians are exposed to an array of stressors relating to medicine judicialization and organization oversight that go beyond the complexity of diseases and clinical cases.<sup>23</sup> The interaction of medicine judicialization and organization (e.g., federal/state levels, medical boards/oversight agencies, etc.) has a negative feedback loop on physician and patient health.<sup>24,25,26</sup>

Judicialization tends to raise costs and patient risks without improving health outcomes and leads to physicians dropping out of the system, sometimes due to suicide.<sup>24</sup> In the UK, despite many physicians being under General Medical Council investigation (2010-2013), only 4.8% of the spiking complaints led to warnings/sanctions - but defensive medicine worsened.<sup>27</sup> Defensive medicine raises US healthcare costs above all UK healthcare costs.<sup>25</sup>

The UK's National Health Service reported that patient safety issues typically result from broad systems and conditions constraining healthcare staff.<sup>28</sup> Malpractice risk increases by high clinical workload, perhaps as there is little time to establish patient relationships and optimal

clinical care;<sup>26</sup> malpractice risk also increases by age and male sex (both suicide risk factors).<sup>29</sup> Yet, specialties at the highest risk of paid claims (mostly surgical specialties) do not have high suicide rates - and vice versa (psychiatry and anesthesiology pay less in claims but have higher suicide rates).<sup>25,30</sup> Work ties strongly into physician self-worth,<sup>21</sup> and judicialization causes widespread stress as even settlements paid to cut insurer losses – irrespective of physician actions - are US National Practitioner Data Bank-reportable, leading to stigma and insurance/employment discrimination.<sup>29</sup>

Meanwhile, punitive organizational barriers regarding licensing, hospital privileges, and career advancement make physicians less likely to seek psychiatric help.<sup>19,31</sup> Physicians seek psychiatric treatment at lower rates than the public, partly due to fears about licensure and being unable to practice if investigated by oversight organizations. This has a compounding effect; e.g., suicides in physicians referred for fitness for duty evaluations (3.5%) were ~175 times higher than those in the general population.<sup>32</sup> Nearly a quarter of the deaths in physicians evaluated for fitness to practice by the General Medical Council (2005-2013) were due to suicide (n=24) or suspected suicide (n=4).<sup>33</sup> Meanwhile, two-thirds of US state medical boards ask overly broad mental health questions on initial/renewal license applications, items that are not "consistent" with recommendations of the American Medical Association, American Psychiatric Association, Federation of State Medical Boards of the United States (FSMB) and the American Disabilities Act. Physicians were less likely to seek help (OR 1.21) in those states,<sup>19,31</sup> and most at-risk physicians are unaware of "safe harbor" provisions.<sup>35</sup> Indeed, job-related problems are 3.12 times more likely to predict that suicides are in physicians vs. non-physicians; physician job satisfaction might be an intermediary in "a causal pathway between depression and suicide".<sup>7</sup>

Medical organizations and their demands can also have major impact on physicians' romantic relationships and families. Our previous systematic review<sup>3</sup> suggested that physician suicide risk increased not only by having relationship problems, being divorced or widowed (risks that may all increase during the pandemic) but also by being single (which may also be exacerbated by heavy workloads and living in smaller towns compounded by social distancing). The risk of divorce was roughly 1.5 times higher in female physicians compared to male physicians in a large survey of US healthcare professionals; furthermore, the divorce risk was higher in female physicians who worked over 40 hours/week compared to under 40 hours/week, and the opposite was seen for male physicians.<sup>35</sup> This may imply a combination of social and

organizational factors – e.g., how supportive a spouse may be of long workhours, stressors due to lack of organizational support for family leave/time off particularly for women whose spouses/families expect them to bear the burden of child and homecare, and stressors to male physicians who want to work fewer hours or whose workhours may be limited by psychiatric comorbidities or other factors.

### **2.1.c "Burnout"**

"Burnout" affects 50% of physicians (being most prevalent in emergency medicine, which has been compared to a warzone),<sup>36</sup> and is a risk factor for medical error and suicide.<sup>37</sup>

Under-recognition of physician needs and challenges by non-clinician administrators lead to systematic stressors, including excessive/misdirected regulations culminating in a "burnout crisis".<sup>36</sup> The NEJM Catalyst survey highlights the disconnect between healthcare executives and clinicians.<sup>37</sup> It suggests that physicians tend to see systematic factors (including documentation/clerical work) they do not directly control as having the most significant impact on "burnout." Yet most anti-"burnout" efforts target personal factors (e.g., physician resiliency), not core systemic problems. "Burnout" is driven by workload and inefficiency, lack of work autonomy and meaning, work-home conflict,<sup>38</sup> negative patient relationships, and clerical tasks – especially those relating to electronic health records (EHRs).<sup>39</sup> On reviewing the National Academy of Medicine Action Collaborative on Clinician Well-Being and Resilience Reference Collection, a recurrent association was found between "burnout," and lack of social connectedness,<sup>40</sup> a loss of belonging. Cornette and colleagues initially suggested the possibility of using the interpersonal psychological theory of suicidal behavior (IPTs) to understand physician suicide better,<sup>41,42</sup> IPTs components being perceived burdensomeness, thwarted belongingness, and acquired capability for suicide.<sup>43</sup>

Burnout was nearly twice as prevalent among physicians as US workers in other fields after controlling for work hours and other factors.<sup>44</sup> Between 2011 and 2014, the prevalence of burnout increased by 9 percent among physicians while remaining stable in other US workers.<sup>44</sup> Several studies have also found a high prevalence of burnout and depression among medical students and residents, with rates higher than those of age-similar individuals pursuing other careers.<sup>44</sup> Cross-sectional studies of physicians have found burnout to be independently



associated with 25% increased odds of alcohol abuse/dependence and 200% increased odds of suicidal ideation among physicians.<sup>44</sup> In a longitudinal study of medical students, burnout predicted development of suicidal thoughts over the ensuing year, independent of symptoms of depression.<sup>44</sup>

Notably, while physician burnout is increasingly addressed in national and regional professional meetings, physician suicides are seldom brought up by professional associations, despite receiving some media attention.<sup>20</sup>

## **2.2. SOLUTIONS**

### **2.2.a Psychiatric comorbidities**

The critical issue is the early detection of psychiatric disorders and the immediate and successful treatment of affected physicians. The Intern Health Study suggests that reaching out for help at the medical training level is more likely to prevent psychiatric conditions from being untreated and eventually affect physicians' practice and reputations.<sup>45</sup> Consider the "stress-vulnerability" model, where vulnerability traits due to several factors (such as psychiatric comorbidities, history of suicide attempt, childhood-maltreatment) overlap with environmental stressors.<sup>46,47</sup> If vulnerability traits are recognized early in training without stigmatizing trainees, and if this information is protected even from subpoenas, then vulnerable students and physicians can be given support and resiliency training early on and can maintain a support network throughout their careers. However, reducing adverse factors during training and practice that may cause negative mood symptoms (e.g., toxic work environments, lack of support, long work hours, sleep deprivation, etc.) may be even more important. Governments and non-governmental organizations should invest in online campaigns regarding alcohol and other "licit drugs" consumption. Professional meetings and social events should avoid serving (especially free) alcohol or hard liquors. Making evidence-based online resources and interventions freely available at scale could benefit physicians' mental health. Virtual meetings and similar resources can and should be used during the pandemic and similar future crises.<sup>48</sup>

Meanwhile, the WHO reports suicide reduction benefits following cognitive and problem-solving therapies, intensive care plus outreach, interpersonal psychotherapy, acceptance, and commitment therapy.<sup>49</sup> Funding and supporting the development of these psychotherapies through telehealth might be an effective way to broaden suicide prevention

during the pandemic and beyond. Many groups' well-established "self-help" formats (Alcoholics Anonymous or Narcotics Anonymous) can be adapted to online activities while preserving anonymity. Widely implemented telepsychiatry or counselling maintaining privacy may be particularly appealing during the pandemic and beyond;<sup>50</sup> physicians may be more likely to seek out such services as they can avoid being seen in the psychiatrist's office and possible job implications. Some initiatives like the Physician Support Line (+1 888 409-0141) (a free and confidential support line launched on March 30, 2020) is already connecting American physicians with volunteer psychiatrists.<sup>51</sup>

Mental health treatment may impact physicians' ability to practice medicine, e.g., due to the cognitive side effects of medications or electroconvulsive therapy. Therefore, it is critical to manage psychiatric comorbidities in early stages, reducing the need for more extreme therapies. One possible option is non-invasive treatments such as repetitive transcranial magnetic stimulation, which is FDA-approved for major depressive disorder (and has early data on improving suicidal ideation and attempts),<sup>52,53</sup> and transcranial direct current stimulation, which showed efficacy in multiple trials;<sup>54</sup> and was considered to be definitely effective (Level A) in depression;<sup>55</sup> they also show promise in substance use disorders.<sup>56</sup> Such non-invasive brain stimulation techniques are relatively safe and typically have only minor transient side effects; physicians may thus be more likely to seek treatment if presented with these options, especially as protocols improving working memory are similar to those used for some psychiatric conditions.<sup>55</sup>

The mandatory disclosure of psychiatric morbidities should be revised by many of the State Medical Boards in the USA, thereby potentially reducing physicians' self-treatment and allowing adequate treatment.

### **2.2.b Medicine judicialization and organization oversight**

Recommendations after the General Medical Council investigation included reducing health examiner assessments, making physicians feel "innocent until proven guilty," having investigational staff exposed to frontline clinical practice, and establishing a National Support Service for physicians.<sup>33</sup> The US FSMB adopted as policy the *Report and Recommendations of the Workgroup on Physician Wellness and Burnout*.<sup>57</sup> However, there is a need for greater

legal,<sup>31</sup> legislative and organizational advocacy led by physicians to protect physician rights, privacy, enforce existing laws (e.g., ADA), and to create a culture of trust and transparency between healthcare workers, patients, and boards/oversight organizations.

Reducing financial incentives for frivolous malpractice lawsuits (e.g., malpractice caps in Texas),<sup>58</sup> providing obligatory standards for employer/insurer/medical board questionnaires, and focusing on measures that genuinely support physicians and healthcare organizations to improve patient care will be essential.

Physicians joining effective inter-professional health care teams and being encouraged to communicate openly may reduce stigmatization of psychological and work-related vulnerabilities, allowing doctors to ask for professional and personal help. Optimizing Suicide Prevention Programs and their Implementation (OSPI-Europe) contributed to reducing suicides in Europe; a similar program may help US suicide prevention.<sup>59</sup>

### **2.2.c "Burnout"**

Training physicians may benefit from “compagnonnage” (an apprenticeship-based system of learning knowledge, skills, attitudes and values within a context of mutual support),<sup>60</sup> and adding "how to deal with future organizations" in formal trainee curricula. Workplaces should use effective strategies to reduce "burnout," such as minimizing clerical tasks, redesigning practice,<sup>36</sup> aligning physicians/organizational values, increasing meaningful work,<sup>61</sup> and finally by providing unforced physician resiliency training.<sup>37,62,63</sup> Furthermore, complementary strategies on "burnout"/suicide prevention for physicians should foster social connectedness.

In their 2019 article, Shanafelt and colleagues emphasize the need for all ethical healthcare organizations to address the issue of physician “burnout”, reinforcing the link between healthcare provider “burnout”, increased costs to the healthcare system, and patient harm including mortality, patient dissatisfaction, medical error, and workforce maintenance.<sup>64</sup> The researchers cite four main drivers motivating healthcare leaders to build sustainable and well-resourced well-being programs: (1) the moral-ethical case (provision of compassionate high quality patient care); (2) the business case (overall costs to the healthcare system); (3) the tragic case (physician suicide); and (4) the regulatory case (lawsuits). They recommend measuring

physician well-being longitudinally using an annual survey or scale, such as the Stanford model for healthcare provider well-being, based on the Professional Fulfillment Index which provides metrics for the healthcare organization and academic leadership on where to focus attention and resources.<sup>65</sup> The metrics of success measured in this scale include three indicators of professional fulfillment: (organizational) culture of wellness, efficiency of practice, and personal resilience.

Additionally, a recently published call to action on physician “burnout” makes specific recommendations reinforcing many of the solutions suggested above,<sup>66</sup> and adds some more. It suggests “improved EHR standards with strong focus on usability and open APIs (Application Programming Interfaces)”. Besides appointing chief wellness officers at the executive level, healthcare organizations should have engagement of key stakeholders (including health plans, insurers, the National Committee for Quality Assurance, state and federal agencies, medical school/residency programs, EHR vendors, healthcare organizations, and medical boards). Finally, it recommends proactive treatment and support for “burned-out” physicians (e.g., using statewide physician health programs (PHPs) such as Physician Health Services, Inc. in Massachusetts).<sup>78</sup>

### **3. COVID-19 considerations**

Effects of different countries' COVID-19 responses on physician and population mental health is beginning to emerge. In China, frontline work was an independent risk factor for all-around worsened mental health; healthcare workers in Wuhan (and especially women and nurses) had more severe symptoms overall.<sup>5</sup> Among young physicians in China, there were significantly worse daily mood symptoms, depression symptoms, anxiety, fear of violence, and observations of violence between Quarters 1 and 2 during the pandemic, unlike the previous year.<sup>67</sup> Likewise, Italy had almost double the number of infected healthcare workers reported in China; with a large elderly population, Italian ICUs and healthcare facilities were under tremendous stress at the height of the pandemic.<sup>68</sup>

Physicians worldwide are often subject to complex/high-volume environments insufficiently supported for their workflow even under normal circumstances. During COVID-19 pandemic many physicians have been deployed (or volunteered) to work in unfamiliar care settings outside their realm of expertise (e.g., radiologists working on medicine wards) and, in

many cases, with insufficient personal protective equipment (PPE) and with the use of PPEs beyond standard recommendations (e.g., reusing single-use masks).<sup>69</sup> On top of all that, many suffer from the financial and moral injury of layoffs and salary cutbacks for physician and healthcare worker salaries,<sup>70</sup> anti-lockdown protests, people refusing to wear masks, and personal attacks.<sup>71</sup>

This pandemic exacerbates the risk of "burnout" and moral injury. It adversely affects physician social support mechanisms with the high workload and fears (for their own lives/health and those of their family, colleagues, and community). Despite the easing of some restrictions during the pandemic, there is tremendous uncertainty as to physician risk of malpractice claims and punitive organizational actions when the pandemic is over, irrespective of physician sacrifices for humanitarian reasons. It is expected that high work volumes, lack of adequate support, and unfamiliar work environments or clinical cases might increase the risk of provider error not only during the pandemic but also afterward when backlogged elective cases might begin to flood the healthcare system.

The pandemic and lockdown may worsen suicide precipitants, e.g., domestic violence, feelings of social isolation, entrapment, loneliness, grief,<sup>50</sup> and alcohol/drug consumption,<sup>72,73</sup> (especially with alcohol sales being treated as "essential services" and sales surging).<sup>74</sup> Prolonged social distancing measures due to fear of transmitting the virus to their families exacerbates loss of belonging.<sup>5</sup> An extra burden of stressors can substantially increase alcohol and substance misuse, relapse, and the potential development of substance use disorders in at-risk individuals.<sup>75</sup>

Additionally, loss of jobs during the lockdown has highlighted the need for universal healthcare as opposed to employer-based plans in countries such as the US, and better mental healthcare. Furthermore, easing licensing requirements across different states or regions while focusing on providing better care can reduce physician burdens and improve patient access to physicians.

The pandemic has also accelerated telemedicine/telehealth delivery and reimbursement, recovering some of physicians' lost incomes and expanding telepsychiatry options for physicians in need. On the other hand, telemedicine best practices have not yet been consolidated, and it will be essential to protect physicians working within reasonable parameters. If the flaws in the

healthcare/financial/organizational structures are reproduced on the online environment, physicians may opt-out of medicine or turn to suicide in disillusionment and despair.

Medical students, trainees, and independent physicians have often demonstrated a strong and sincere desire to help in this pandemic; if adequately supported and if oversight mechanisms can be reorganized during this time of change to truly help physicians and their patients, we may see "post-traumatic growth" rather than stress disorders in physicians and the system as a whole.<sup>76</sup>

Finally, mental health consequences are likely to be present for more extended durations and peak later than the actual pandemic.<sup>50</sup>

### 4. 3. LIMITATIONS

Suicide reports vary by country and location for various reasons;<sup>3,4,77</sup> one reason is that suicide data is collated from multiple incomplete and even overlapping sources.<sup>3,4</sup> Different locations and organizations may have challenges in reporting or identifying suicides, may lack the resources to collect information or the data are not collected systematically and reliably.<sup>78</sup> These data may be incorrectly codified, whether this is due to lack of information availability (e.g., death of unclear intent), negligence, or intentional misrepresentation (e.g., physicians not reporting the death of a colleague as suicide to spare the feelings of the family and for life insurance) or omission (e.g., organizations not reporting suicides to avoid bad publicity). Hence medical schools and healthcare organizations often do not fully record student and physician suicide deaths.<sup>79</sup> The inconsistency and prominent subjectivity of coding race/ethnic data also leads to many challenges in different places. For example, in the US, Middle-Easterners from North Africa and Asia are typically classified as white, while those of mixed race might be classified as black/African American; Hispanics may be either white or black and maybe coded separately, and Latino classifications are unclear. Furthermore, deaths of specific populations are often underreported, e.g., 33% of deaths of non-Hispanic American Indian or Alaska Natives are underreported.<sup>80</sup>

Multiple sources of information are useful to maximize validity within existing systems. For example, France's Information System uses multiple databases to record, monitor and thereby reduce suicides: a medical-administrative database recording data on medical, surgical and obstetrical admissions (PMSI-MCO) and psychiatric care (RIM-P), and the Oscour®

network database that records post-suicide attempt admissions to Emergency Units.<sup>81</sup> Regarding suicide attempts not reaching these systems, solutions include researching Samu-Centres call records to recognize undocumented calls, noting that some requests were instead made to the Fire Brigade or their primary care doctors.

As to US physicians, considering the rather low likelihood of healthcare organizations to report suicide deaths, gathering this information in more systematic ways is essential. Within the US Department of Labor, the Occupational Safety and Health Administration (OSHA) examines workplace fatalities to identify whether safety standards had been violated. Although OSHA does not routinely assess suicides, many suicides occur in the workplace and can be considered workplace fatalities; obligating healthcare facilities to publish anonymous aggregate data on physician suicides or invite families to share this information could highlight this data to OSHA. If OSHA evaluations systematically assessed suicides, the process would help improve workplace suicide estimates and identify risky or hostile working conditions for physicians and other staff in addition to patients.<sup>82</sup>

While the Centers for Disease Control and Prevention gathers annual data from hospitals on self-harm induced non-fatal injuries and collects survey data,<sup>13</sup> it is crucial to improve our identification of suicide attempts as they are much more prevalent than death by suicide and are the most validated predictors of future suicide attempts.

Finally, the suicide-related consequences of the COVID-19 pandemic might vary depending on countries' public health control measures, sociocultural, and demographic structures. For example, suicides by overdose (heavy drinking, or illicit or prescription drugs) in patients who may have been exposed or who tested positive to SARS-CoV-2 may be underreported, as examiners may attribute death to COVID-19 infection rather than suicide. Conversely, in patients with known risk factors for suicide, deaths due to COVID-19 or accidental deaths due to alcohol/drug overdose or aspiration pneumonia may be misattributed to suicide, thereby over-reporting suicide deaths. Physicians may be particularly vulnerable as they are at higher risk of infection and attempting to self-medicate the stress away. Furthermore, insufficient investigations into causes of death are likely in the context of high and/or rising death tolls during the pandemic, with mass graves being used to keep up in many countries and regions, e.g., Brazil,<sup>83</sup> Bolivia,<sup>84</sup> and US.<sup>85</sup>

## 5. CONCLUSION

Medicine used to be a prestigious and respected profession whereby physicians exercised their autonomy both in healthcare approaches as well as in influence on public health authorities. This status is under threat as doctors' mental health seems fragile and under severe pressure in the current system. Systematic and organizational factors – followed by adequate healthcare for physicians and lastly, personal resilience training - should be the priorities to address and reduce modifiable factors contributing to physician suicide.

The pandemic has uncovered a significant capacity for change, and we should use this chance to heal the system and its most skilled workers: physicians.

**Acknowledgments:** There is no grant support or funding for this work.

**Declaration of interest statement:** All authors report no financial relationships with commercial interests.

## 6. REFERENCES

1. World Health Organization (WHO). Suicide data [Internet]. 2018 [cited 2021 Feb 21]. [https://www.who.int/mental\\_health/prevention/suicide/suicideprevent/en/](https://www.who.int/mental_health/prevention/suicide/suicideprevent/en/)
2. Drapeau CW, McIntosh JL. USA suicide 2018: Official final data [Internet]. 2020 [cited 2021 Feb 21]. [https://suicidology.org/wp-content/uploads/2020/02/2018datapgsv2\\_Final.pdf](https://suicidology.org/wp-content/uploads/2020/02/2018datapgsv2_Final.pdf)
3. Duarte D, El-Hagrassy MM, Couto TC, Gurgel W, Fregni F, Correa H. Male and female physician suicidality: a systematic review and meta-analysis. *JAMA psychiatry*. 2020;77:587–97.
4. Duarte D, El-Hagrassy MM, Couto TC, Gurgel W, Frey BN, Kapczinski F, et al. Physician suicide demographics and COVID-19 pandemic. *Br J Psychiatry*. 2021; *in press*.
5. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Netw Open*. 2020;3:e203976–e203976.
6. Rossi R, Socci V, Pacitti F, Di Lorenzo G, Di Marco A, Siracusano A, et al. Mental Health Outcomes Among Frontline and Second-Line Health Care Workers During the Coronavirus Disease 2019 (COVID-19) Pandemic in Italy. *JAMA Netw Open*. 2020;3:e2010185–e2010185.
7. Gold KJ, Sen A, Schwenk TL. Details on suicide among US physicians: data from the



- National Violent Death Reporting System. *Gen Hosp Psychiatry*. 2013;35:45–9.
8. Duarte DG, Maila de Castro LN, Albuquerque MR, Turecki G, Ding Y, de Souza-Duran FL, et al. Structural brain abnormalities in patients with type I bipolar disorder and suicidal behavior. *Psychiatry Res Neuroimaging*. 2017;265:9–17.
  9. American Foundation for Suicide Prevention. Facts about Mental Health and Suicide Among Physicians [Internet]. 2016 [cited 2021 Feb 21]. <https://www.datocms-assets.com/12810/1578319045-physician-mental-health-suicide-one-pager.pdf>
  10. Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, et al. Prevalence of depression, depressive symptoms, and suicidal ideation among medical students: a systematic review and meta-analysis. *JAMA*. 2016;316:2214–36.
  11. Mata DA, Ramos MA, Bansal N, Khan R, Guille C, Di Angelantonio E, et al. Prevalence of depression and depressive symptoms among resident physicians: a systematic review and meta-analysis. *JAMA*. 2015;314:2373–83.
  12. Pereira-Lima K, Mata DA, Loureiro SR, Crippa JA, Bolsoni LM, Sen S. Association between physician depressive symptoms and medical errors: a systematic review and meta-analysis. *JAMA Netw Open*. 2019;2:e1916097–e1916097.
  13. Centers for Disease Control and Prevention (CDC). Data & Statistics Fatal Injury Report for 2017. Atlanta, GA: CDC; 2019.
  14. Warner DO, Berge K, Sun H, Harman A, Wang T. Substance Use Disorder in Physicians after Completion of Training in Anesthesiology in the United States from 1977 to 2013. *Anesthesiology*. 2020;133:342–9.
  15. Emanuel RM, Frellsen SL, Kashima KJ, Sanguino SM, Sierles FS, Lazarus CJ. Cognitive enhancement drug use among future physicians: Findings from a multi-institutional census of medical students. *J Gen Intern Med*. 2013;28:1028–34.
  16. Beyer C, Staunton C, Moodley K. The implications of Methylphenidate use by healthy medical students and doctors in South Africa. *BMC Med Ethics*. 2014;15:1–8.
  17. Domenighetti G, Tomamichel M, Gutzwiller F, Berthoud S, Casabianca A. Psychoactive drug use among medical doctors is higher than in the general population. *Soc Sci Med*. 1991;33:269–74.
  18. McAuliffe WE, Rohman M, Santangelo S, Feldman B, Magnuson E, Sobol A, et al. Psychoactive drug use among practicing physicians and medical students. *N Engl J Med*. 1986;315:805–10.
  19. Dyrbye LN, West CP, Sinsky CA, Goeders LE, Satele DV, Shanafelt TD. Medical licensure questions and physician reluctance to seek care for mental health conditions. *Mayo Clin Proc*. 2017;92:1486–93.
  20. Wible P. What I've learned from my tally of 757 doctor suicides. *Washington Post* [Internet]. 2018 [cited 2021 Feb 21]. [https://www.washingtonpost.com/national/health-science/what-ive-learned-from-my-tally-of-757-doctor-suicides/2018/01/12/b0ea9126-eb50-11e7-9f92-10a2203f6c8d\\_story.html](https://www.washingtonpost.com/national/health-science/what-ive-learned-from-my-tally-of-757-doctor-suicides/2018/01/12/b0ea9126-eb50-11e7-9f92-10a2203f6c8d_story.html)
  21. Gross CP, Mead LA, Ford DE, Klag MJ. Physician, heal thyself?: regular source of care and use of preventive health services among physicians. *Arch Intern Med*. 2000;160:3209–14.
  22. Sansone RA, Sansone LA. Physician suicide: a fleeting moment of despair. *Psychiatry (Edgmont)*. 2009;6:18.
  23. Bilotta C, Zerbo S, Perrone G, Malta G, Argo A. The medico-legal implications in medical

- malpractice claims during Covid-19 pandemic: Increase or trend reversal? *Med Leg J.* 2020;88:35–7.
24. Parisi SG, Viel G, Cecchi R, Montisci M. COVID-19: The wrong target for healthcare liability claims. *Leg Med.* 2020;46:101718.
  25. Studdert DM, Bismark MM, Mello MM, Singh H, Spittal MJ. Prevalence and characteristics of physicians prone to malpractice claims. *N Engl J Med.* 2016;374:354–62.
  26. Hickson GB, Federspiel CF, Pichert JW, Miller CS, Gauld-Jaeger J, Bost P. Patient complaints and malpractice risk. *JAMA.* 2002;287:2951–7.
  27. Bourne T, Wynants L, Peters M, Van Audenhove C, Timmerman D, Van Calster B, et al. The impact of complaints procedures on the welfare, health and clinical practise of 7926 doctors in the UK: a cross-sectional survey. *BMJ Open.* 2015;5:e006687.
  28. Hall LH, Johnson J, Watt I, Tsipa A, O'Connor DB. Healthcare staff wellbeing, burnout, and patient safety: a systematic review. *PloS one.* 2016;11:e0159015.
  29. Jena AB, Schoemaker L, Bhattacharya J, Seabury SA. Physician spending and subsequent risk of malpractice claims: observational study. *BMJ.* 2015; 351:h5516.
  30. Balch CM, Oreskovich MR, Dyrbye LN, Colaiano JM, Satele DV, Sloan JA, et al. Personal consequences of malpractice lawsuits on American surgeons. *J Am Coll Surg.* 2011;213:657–67.
  31. Firth S. Docs' Mental Health: Do State Boards Have a Right to Ask? *MedPage Today* [Internet]. 2018 [cited 2021 Feb 21]. <https://www.medpagetoday.com/publichealthpolicy/generalprofessionalissues/74104>
  32. Iannelli RJ, Finlayson AR, Brown KP, Neufeld R, Gray R, Dietrich MS, et al. Suicidal behavior among physicians referred for fitness-for-duty evaluation. *Gen Hosp Psychiatry.* 2014;36:732–6.
  33. Horsfall S. who commit suicide while under GMC fitness to practise investigation. *General Medical Council* [Internet]. 2014 [cited 2021 Feb 21]. [https://www.gmc-uk.org/-/media/documents/Internal\\_review\\_into\\_suicide\\_in\\_FTP\\_processes.pdf\\_59088696.pdf](https://www.gmc-uk.org/-/media/documents/Internal_review_into_suicide_in_FTP_processes.pdf_59088696.pdf)
  34. Andrew LB. Survey Says: Many EPs Suffer in Silence. *Emergency Physicians Monthly Online* [Internet]. 2006 [cited 2021 Feb 21]. <https://epmonthly.com/article/survey-says-many-eps-suffer-in-silence/>
  35. Ly DP, Seabury SA, Jena AB. Divorce among physicians and other healthcare professionals in the United States: analysis of census survey data. *BMJ.* 2015;350.
  36. Sigsbee B, Bernat JL. Physician burnout: a neurologic crisis. *Neurology.* 2014;83:2302–6.
  37. Swensen S, Shanafelt T, Mohta NS. Leadership survey: Why physician burnout is endemic, and how health care must respond. *NEJM Catalyst.* 2016;2.
  38. Guille C, Zhao Z, Krystal J, Nichols B, Brady K, Sen S. Web-based cognitive behavioral therapy intervention for the prevention of suicidal ideation in medical interns: a randomized clinical trial. *JAMA Psychiatry.* 2015;72:1192–8.
  39. Hawkins M. Survey of America's physicians: Practice patterns & perspectives. *The Physicians Foundation* [Internet]. 2018 [cited 2021 Feb 21]. <https://physiciansfoundation.org/wp-content/uploads/2018/09/physicians-survey-results-final-2018.pdf>
  40. Southwick SM, Southwick FS. The loss of social connectedness as a major contributor to physician burnout: applying organizational and teamwork principles for prevention and recovery. *AMA Psychiatry.* 2020;77:449–450.

41. Fink-Miller EL. An examination of the interpersonal psychological theory of suicidal behavior in physicians. *Suicide Life Threat Behav.* 2015;45:488–94.
42. Cornette MM, deRoon-Cassini TA, Fosco GM, Holloway RL, Clark DC, Joiner TE. Application of an interpersonal-psychological model of suicidal behavior to physicians and medical trainees. *Arch Suicide Res.* 2009;13:1–14.
43. Joiner T. *Why people die by suicide.* Harvard University Press; 2007.
44. Dyrbye LN, Shanafelt TD, Sinsky CA, Cipriano PF, Bhatt J, Ommaya A, et al. Burnout among health care professionals: a call to explore and address this underrecognized threat to safe, high-quality care. *NAM perspectives.* 2017.
45. Coentre R, Góis C. Suicidal ideation in medical students: recent insights. *Adv Med Educ Pract.* 2018;9:873.
46. Duarte DG, de C Neves M, Albuquerque MR, Neves FS, Corrêa H. Sexual abuse and suicide attempt in bipolar type I patients. *Braz J Psychiatry.* 2015;37:180–2.
47. Duarte DG, Neves M de CL, Albuquerque MR, de Souza-Duran FL, Busatto G, Corrêa H. Gray matter brain volumes in childhood-maltreated patients with bipolar disorder type I: a voxel-based morphometric study. *J Affect Disord.* 2016;197:74–80.
48. Substance Abuse and Mental Health Services Administration (SAMHSA). Considerations for the Care and Treatment of Mental and Substance Use Disorders in the COVID-19 [Internet]. 2020 [cited 2021 Feb 21]. <https://www.samhsa.gov/sites/default/files/considerations-care-treatment-mental-substance-use-disorders-covid19.pdf>
49. Fond G, Gaman A, Brunel L, Haffen E, Llorca P-M. Google Trends®: Ready for real-time suicide prevention or just a Zeta-Jones effect? An exploratory study. *Psychiatry Res.* 2015;228:913–7.
50. Gunnell D, Appleby L, Arensman E, Hawton K, John A, Kapur N, et al. Suicide risk and prevention during the COVID-19 pandemic. *Lancet Psychiatry.* 2020;7:468–71.
51. Physician Support Line [Internet]. 2020 [cited 2021 Feb 21] <https://www.physiciansupportline.com>
52. El-Hagrassy MM, Jones F, Rosa G, Fregni F. CNS non-invasive brain stimulation. In: *Adult and Pediatric Neuromodulation.* Cham: Springer; 2018. p.151–84.
53. George MS, Raman R, Benedek DM, Pelic CG, Grammer GG, Stokes KT, et al. A two-site pilot randomized 3 day trial of high dose left prefrontal repetitive transcranial magnetic stimulation (rTMS) for suicidal inpatients. *Brain Stimul.* 2014;7:421–31.
54. Lefaucheur J-P, Antal A, Ayache SS, Benninger DH, Brunelin J, Cogiamanian F, et al. Evidence-based guidelines on the therapeutic use of transcranial direct current stimulation (tDCS). *Clin Neurophysiol.* 2017;128:56–92.
55. Fregni F, El-Hagrassy MM, Pacheco-Barrios K, Carvalho S, Leite J, Simis M, et al. Evidence-based guidelines and secondary meta-analysis for the use of transcranial direct current stimulation (tDCS) in neurological and psychiatric disorders. *Int J Neuropsychopharmacol.* 2020.
56. Alba-Ferrara L, Fernandez F, Salas R, De Erausquin GA. Transcranial magnetic stimulation and deep brain stimulation in the treatment of alcohol dependence. *Addict Disord Their Treat.* 2014;13:159.
57. Hengerer AS, Staz ML, Chaudhry HJ. FSMB efforts on physician wellness and burnout. *J Med Regul.* 2018;104:14–6.

58. Liu J, Hyman DA. The Impact of Medical Malpractice Reforms. *Annu Rev Law Soc Sci.* 2020;16:405–19.
59. Hegerl U, Wittenburg L, Arensman E, Van Audenhove C, Coyne JC, McDaid D, et al. Optimizing suicide prevention programs and their implementation in Europe (OSPI Europe): an evidence-based multi-level approach. *BMC Public Health.* 2009;9:1–8.
60. Thiery G. Burnout and suicide of doctors: the french “compagnonnage” as a solution. *BMJ [Internet].* 2008 [cited 2021 Feb 21]. <https://www.bmj.com/content/337/bmj.a2004/rapid-responses>
61. Rothenberger DA. Physician burnout and well-being: a systematic review and framework for action. *Dis Colon Rectum.* 2017;60:567–76.
62. West CP, Dyrbye LN, Erwin PJ, Shanafelt TD. Interventions to prevent and reduce physician burnout: a systematic review and meta-analysis. *Lancet.* 2016;388:2272–81.
63. Kjeldmand D, Holmström I. Difficulties in Balint groups: a qualitative study of leaders’ experiences. *Br J Gen Pract.* 2010;60:808–14.
64. Shanafelt T, Trockel M, Ripp J, Murphy ML, Sandborg C, Bohman B. Building a program on well-being: key design considerations to meet the unique needs of each organization. *Acad Med.* 2019;94:156–61.
65. Trockel M, Bohman B, Lesure E, Hamidi MS, Welle D, Roberts L, et al. A brief instrument to assess both burnout and professional fulfillment in physicians: reliability and validity, including correlation with self-reported medical errors, in a sample of resident and practicing physicians. *Acad Psychiatry.* 2018;42:11–24.
66. Jha AK, Iliff A, Chaoui AA, Defossez S, Bombaugh MC, Miller YR. A crisis in health care: a call to action on physician burnout. Waltham, MA: Massachusetts Medical Society, MHaHA, Harvard TH Chan School of Public Health, and Harvard Global Health Institute; 2019.
67. Li W, Frank E, Zhao Z, Chen L, Wang Z, Burmeister M, et al. Mental Health of Young Physicians in China During the Novel Coronavirus Disease 2019 Outbreak. *JAMA Netw Open.* 2020;3:e2010705–e2010705.
68. Neto MLR, Almeida HG, Esmeraldo JD, Nobre CB, Pinheiro WR, de Oliveira CRT, et al. When health professionals look death in the eye: the mental health of professionals who deal daily with the 2019 coronavirus outbreak. *Psychiatry Res.* 2020;112972
69. Rodriguez RM, Medak AJ, Baumann BM, Lim S, Chinnock B, Frazier R, et al. Academic emergency medicine physicians’ anxiety levels, stressors, and potential stress mitigation measures during the acceleration phase of the COVID-19 pandemic. *Acad Emerg Med.* 2020;27:700–7.
70. Talbot SG, Dean W. Physicians aren’t ‘burning out’. They’re suffering from moral injury. *Stat.* 2018;7:18.
71. Taylor L. Covid-19 misinformation sparks threats and violence against doctors in Latin America. *BMJ.* 2020;370.
72. Reynolds J, Wilkinson C. Accessibility of ‘essential’ alcohol in the time of COVID-19: Casting light on the blind spots of licensing? *Drug Alcohol Rev.* 2020;39:305–8.
73. Dietze PM, Peacock A. Illicit drug use and harms in Australia in the context of COVID-19 and associated restrictions: Anticipated consequences and initial responses. *Drug Alcohol Rev.* 2020;39:297.
74. Polakovic G. Pandemic drives alcohol sales-and raises concerns about substance abuse. *Business Health USC News [Internet].* 2020 [cited 2021 Feb 21].

- <https://news.usc.edu/168549/covid-19-alcohol-sales-abuse-stress-relapse-usc-experts/>
75. Galea S, Merchant RM, Lurie N. The mental health consequences of COVID-19 and physical distancing: the need for prevention and early intervention. *JAMA Intern Med.* 2020;180:817–8.
  76. Olson K, Shanafelt T, Southwick S. Pandemic-Driven Posttraumatic Growth for Organizations and Individuals. *JAMA.* 2020;324:1829–1830.
  77. WHO. Global Health Estimates 2016: Deaths by Cause, Age, Sex, by Country and by Region, 2000-2016 [Internet]. Geneva: WHO; 2018 [cited 2020 June 4]. [https://www.who.int/healthinfo/global\\_burden\\_disease/estimates/en/index1.html](https://www.who.int/healthinfo/global_burden_disease/estimates/en/index1.html)
  78. Blacker CJ, Lewis CP, Swintak CC, Bostwick JM, Rackley SJ. Medical student suicide rates: a systematic review of the historical and international literature. *Acad Med.* 2019;94:274–80.
  79. Zivanovic R, McMillan J, Lovato C, Roston C. Death by suicide among Canadian medical students: a national survey-based study. *Can J Psychiatry.* 2018;63:178–81.
  80. Arias E, Schauman WS, Eschbach K, Sorlie PD, Backlund E. The Validity of Race and Hispanic Origin Reporting on Death Certificates in the United States. *Vital Health Stat 2.* 2008;148:1-23.
  81. Observatoire National du Suicide. Suicide: Connaître pour prévenir. Dimensions nationales, locales et associatives. 2e rapport / février 2016 [Internet]. 2016 [cited 2021 Feb 21]. [https://drees.solidarites-sante.gouv.fr/sites/default/files/2021-01/ons2016\\_mel\\_220216.pdf](https://drees.solidarites-sante.gouv.fr/sites/default/files/2021-01/ons2016_mel_220216.pdf)
  82. CDC. Violence-Occupational hazards in hospitals [Internet]. 2008 [cited 2021 Feb 21]. <http://www.cdc.gov/niosh/docs/2002-101/>
  83. Al-Arshani, S. Photos of mass graves in Brazil show the stark toll of the coronavirus, as experts predict that it will surpass 125,000 deaths by August. *Business Insider* [Internet]. 2020 [cited 2021 Feb 21]. <https://www.businessinsider.com/photos-brazil-mass-graves-experts-anticipate-covid-19-deaths-2020-5>
  84. Ramos, D. Bolivia digs mass graves as cemeteries fill with coronavirus victims. *Reuters* [Internet]. 2020 [cited 2021 Feb 21]. <https://www.reuters.com/article/us-health-coronavirus-bolivia-cemetery/bolivia-digs-mass-graves-as-cemeteries-fill-with-coronavirus-victims-idUSKBN2442OC>
  85. Anderson, M. Burials on New York Island Are Not New, But Are Increasing During Pandemic. *NPR* [Internet]. 2020 [cited 2021 Feb 21]. <https://www.npr.org/sections/coronavirus-live-updates/2020/04/10/831875297/burials-on-new-york-island-are-not-new-but-are-increasing-during-pandemic>