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## 11.11 Pandemics and Clinical Psychology

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### 11.11.1 Introduction

Pandemics are outbreaks of infectious diseases that spread globally, affecting millions of people. Epidemics, in comparison, are lesser, more localized outbreaks, limited to a few countries. Pandemics and some epidemics arise from emerging infectious diseases; that is, diseases for which most people have no pre-existing immunity. Pandemics are an inevitable part of human existence and likely to become more prevalent in the coming years, given the rapidly growing global population, increasing population mobility due to mass transportation (e.g., air travel), and the likely change in disease dynamics that will come with climate change (e.g., increasing prevalence of tropical diseases in formerly temperate regions).

The psychological footprint of pandemics, particularly the more severe outbreaks, tends to be larger than the medical footprint, in that psychological effects are more pronounced, widespread, and longer-lasting than the purely somatic effects of infection (Taylor, 2019, 2021d). To illustrate, for every COVID-19 fatality, there is an average of five bereaved immediate family members (Verderer et al., 2020). This underscores the fact that pandemics can have wide-reaching effects even on people who may not have been infected.

Historically, the importance of psychological factors in pandemics has been neglected by scientists and health authorities despite evidence that pandemics are, to a large extent, psychological phenomena in which beliefs and behaviors influence the spreading versus containment of infection (Taylor, 2019). Psychological factors are important in determining (a) adherence to pandemic-mitigation methods (e.g., social distancing protocols, mask-wearing, vaccine uptake), (b) pandemic-related socially disruptive events (e.g., panic-buying, protest rallies against social restrictions), and (c) pandemic-related psychopathology such as anxiety or mood disorders, contamination-related obsessive-compulsive disorder (OCD), posttraumatic stress disorder (PTSD), and prolonged grief disorder (Taylor, 2019, 2021b).

Although each pandemic had its characteristic features, such as its sociocultural context and disease characteristics, many of the basic psychological phenomena observed in the COVID-19 pandemic were apparent in past pandemics and other major outbreaks, particularly the more lethal outbreaks, such as the 1889 Russian flu pandemic, the 1918 Spanish flu pandemic, and the 2003 outbreak of Severe Acute Respiratory Syndrome (SARS). Notable similarities include the following: (a) the role of the news media in both calming and alarming the populace; (b) the initial efforts of political leaders to downplay the seriousness of the outbreak so as to calm people and keep the economy running; (c) the rise of anticipatory anxiety ahead of the arrival of infection in one's community; (d) the rise of xenophobia, rumors, and conspiracy theories; panic buying; (e) the new onset of mental disorders and worsening of preexisting ones; (f) protests over social distancing restrictions and related mandates; (g) the rise of quack cures and profiteering; and, (h) the occasional rioting and violent protests but, more commonly, a rise of altruism as people come together to help one another (Taylor, 2019, 2021b).

Important differences between COVID-19 and past pandemics include, for COVID-19, the effects of the 24/7 news cycle and social media, and differences in medical management (e.g., availability of treatments for secondary pneumonia). Not all past pandemics or outbreaks had significant impacts on mental health. Although the Russian flu, Spanish flu, and SARS outbreaks had deleterious effects on mental health (Taylor, 2019), other pandemics such as the 1957 and 1968 influenza pandemics had apparently little impact (Honigsbaum, 2020). Differences can be attributed to a range of factors including disease lethality and contagiousness, whether the disease killed in gruesome or excruciating ways, and the extent to which health authorities and the news media reacted with alarm about the outbreak.

Pandemics are dynamic events, often occurring in waves. These are caused, in part, by fluctuations in patterns of human aggregation. This occurs, for example, as part of seasonal movements of people away from and then into contact with one another, as occurs when schools are closed for the summer and then reopen (Herrera-Valdez et al., 2011). Pandemics are also dynamic in terms of psychological reactions, with anxiety levels rising, for example, as infection rates rise in communities, and anxiety abating as social restrictions are lifted (Asmundson and Taylor, 2020). Psychological reactions may also change as the pandemic progresses, especially if government-mandated restrictions such as social distancing are implemented. With the prolonged stress of rolling lockdowns (i.e., recurrent stay-at-home orders), and other restrictions on social gatherings, a phenomenon known as *pandemic fatigue* can occur, characterized by progressively worsening adherence to social distancing guidelines accompanied by negative emotions such as depression, irritability, and apathy (World Health Organization, 2020).

In summary, pandemics are not simply about some microbe "going viral." Behaviors, emotions, and attitudes play a key role in the spreading versus containment of disease, distress, and societal disruption. Psychology plays a vital role in every aspect of pandemic management, including the development of effective public messaging to encourage adherence to pandemic mitigation measures, and methods for managing pandemic-related mental health problems. Strategies for improving public health messaging have been discussed at length in various publications (e.g., World Health Organization, 2020). The purpose of this chapter is to focus specifically on the role of clinical psychology in pandemics and pandemic management. That is, to (a) review the types of psychopathology arising during pandemics such as COVID-19, (b) discuss the state-of-the-art of clinical services for pandemics, and (c) consider the clinical psychological needs and services for future pandemics. In the following sections, discussion is put in context with a brief review of pandemic-related stressors and how they are linked to psychopathology, along with a summary of contemporary methods of pandemic management.

### 11.11.2 Pandemic-Related Stressors

Uncertainty is a pervasive, abstract stressor during pandemics (Taylor, 2021b). Examples include uncertainties about whether a disease outbreak will become a pandemic, how dangerous it will be, whether there are effective prophylactic measures, how long the pandemic will last, who is infected (e.g., who is an asymptomatic carrier), and whether the pandemic is over or whether there will be another wave of infection. The voluminous amount of pandemic-related news and social media information—the so-called *infodemic*—adds to the uncertainties, including uncertainties about which news stories or rumors are accurate and which are misinformed or even fake. Uncertainties can lead to high levels of worry (as in generalized anxiety disorder; GAD), particularly for people who have high levels of intolerance of uncertainty, as discussed later in this chapter.

In addition to uncertainty-related stressors, there are several other pandemic-related stressors, which are potentially associated with various forms of psychopathology. Examples include (a) the loss of loved ones, potentially leading to prolonged grief disorder, (b) threats to, or loss of, occupation and income (e.g., due to lockdown or economic recession), leading to potential problems

including anxiety and mood disorders, substance use disorders, and suicide (c) trauma exposure (e.g., exposure to death, child or spousal abuse during lockdown, life-threatening infection), and trauma-related disorders, (d) exposure to infection and the development of contamination-related OCD, especially in people with preexisting risk factors for these disorders (e.g., preexisting obsessive-compulsive tendencies), and (e) persistent direct effects of the infection itself such as chronic dyspnea or fatigue (i.e., the stress of chronic disease) (Taylor, 2019, 2021b).

### 11.11.3 Goals of Pandemic Management

There are two broad goals in managing pandemics, of which psychology is central to both: (a) to encourage people to take the pandemic seriously and to adopt the recommended pandemic mitigation practices such as social distancing, and (b) to encourage these practices without precipitating mass panic. Governments and health authorities have long expressed concerns about pandemic-precipitated mass panic or mass hysteria, reflecting the tendency for government leaders to regard crowds as sources of irrational thinking and dangerous behavior (Tomes, 2010). While many people might become highly anxious or engage in panic buying during a pandemic, mass panic tends to be rare (Taylor, 2019). Nevertheless, such episodes have occurred (see Taylor, 2019, for examples). Accordingly, the World Health Organization (WHO) (2005) raised concerns about mass panic during pandemics.

Pandemic mitigation involves risk communication in which health authorities and other community leaders inform the public about the degree of risk posed by the pandemic, and make recommendations or mandates about pandemic mitigation strategies. These involve hygiene practices (e.g., handwashing, covering coughs), social distancing strategies (e.g., remaining six feet apart from strangers when out in public), stay-at-home recommendations or mandates, adherence to mask-wearing and vaccination, and strategic closures of places of congregation such as bars, restaurants, places of amusement (e.g., cinemas), schools, and churches. Clearly, people in the community need to agree to adhere to these behaviors, restrictions, or closures in order for these methods to be effective.

Sometimes, pandemic mitigation methods are more important for calming the public than for reducing the risk of infection. In the early months of 2020 during the COVID-19 pandemic, for example, health authorities emphasized the importance of cleaning and disinfecting surfaces and objects that might be contaminated with the SARS-CoV-2 virus. In later months, as research on the transmission of the virus accumulated, it became apparent that contaminated surfaces or objects were not as important as previously thought, and that infection was spread primarily through droplets and aerosols (e.g., coughing, sneezing) (Goldman, 2020). In fact, the WHO acknowledged that there is limited evidence of SARS-CoV-2 being transmitted via contaminated surfaces (Lewis, 2021). Yet, vigorous cleaning and disinfecting persisted; trains, buses, and public spaces were vigorously washed, restaurant tables were scrubbed, and objects touched by people were assiduously sanitized. This excessive cleaning was dubbed *hygiene theater* (Thompson, 2020), which served more to reassure the public than to reduce the spread of infection. Hygiene theater fostered a sense of control during the pandemic, albeit a largely illusory one. Note that the notion of hygiene theater is not new; a very similar idea was raised in 1918 during the Spanish flu in which some medical authorities believed that facemasks provided a false sense of security, which could nonetheless be useful in alleviating public anxiety (Price, 1919). In other words, donning a mask gave the wearer a false sense of control, which was useful in allaying public anxiety about infection.

### 11.11.4 Pandemic-Related Psychopathology: an Overview

#### 11.11.4.1 COVID-19

Pandemic-related stressors can amplify or exacerbate various types of mental health problems, including anxiety and related disorders, mood disorders, and substance-use disorders. Accordingly, it is not surprising that the severity of these disorders tended to be exacerbated during COVID-19 (Asmundson et al., 2020). During COVID-19, clinically significant anxiety or depression also occurred in some people who had no prior history of anxiety or mood disorders. During the early stages of the pandemic in 2020, for example, there was widespread distress in communities, with about 20% of people having elevated levels of anxiety or depression (Taylor et al., 2020a). Meta-analytic research indicates that the mental health consequences of COVID-19 during the short-term (i.e., during the pandemic) were equally high among countries in which COVID-19 was widespread and equally prevalent across genders (Cénat et al., 2021).

Longitudinal surveys conducted over the course of COVID-19 in 2020 indicated that, on average, there was a progressive deterioration in mental health as pandemic mitigation restrictions were drawn out. This occurred for people of all walks of life including older adults, young adults, and youth (Prati and Mancini, 2021). Although people tend to be resilient, a substantial minority were emotionally affected by COVID-19. Deterioration in mental health mainly involved increases in depression, but also increases in anxiety, insomnia, and substance abuse (Prati and Mancini, 2021). Longitudinal studies during 2020 further found that depressed mood tended to persist or progressively worsen whereas anxiety levels tended to fluctuate; for example, anxiety rose as cases of infection increased and anxiety diminished as infection rates abated and social distancing restrictions were eased (Yarrington et al., 2021).

Deterioration of mental health during 2020 was linked to a range of factors, particularly the restrictions placed by lockdown and associated effects such as reductions in both income and physical activity (Prati and Mancini, 2021). Lockdown required many people to work from home. Working from home can be stressful if the home environment is not conducive to this arrangement, such as when one is working from home while also caring for young children.

After communities were released from lockdown, mental health tended to improve on average, even when other pandemic restrictions (e.g., restrictions on social gatherings) were still in place and vaccines had not yet become available (Richter et al., 2021). However, not all people are likely to recover unaided from pandemic-related stress. Forecasting modeling from England in 2020 suggested that about 20% of the UK population would need either new or additional mental health support as a direct consequence of the COVID-19 pandemic (O'Shea, 2020). The long-term mental health effects of COVID-19 may not become fully apparent until many years after the pandemic is over. This could include the long-term effects of disrupted education and restricted socialization opportunities for children, and job loss for adults. For both children and adults, long-term effects could also include persistent bereavement and lingering health effects of SARS-COV-2 infection.

#### 11.11.4.2 Past Outbreaks

Many past pandemics and outbreaks, such as the Russian flu, Spanish flu, 2009 Swine flu pandemic, and SARS, were associated with community-wide increases in emotional distress (Honigsbaum, 2013; Taylor, 2019). In the years following both the Russian and the Spanish flu pandemics there were increases in first-time admissions to psychiatric hospitals (Mamelund, 2010). In the years following the 2003 SARS outbreak there was a rise in mental disorders in people who had acquired the disease, as compared to those who were not infected (Tzeng et al., 2020). In contrast to these pandemics and outbreaks, other pandemics, such as the 1957 and 1968 influenza pandemics, were apparently associated with very little distress or lingering effects. Compared to the Russian flu, Spanish flu, and COVID-19, the pandemics of 1957 and 1968 were milder. That, along with the lack of government restrictions and the lack of media attention, may account for the relative lack of public anxiety. The pandemics of 1957 and 1968 are instructive because they show that widespread anxiety is not an inevitable reaction to pandemics.

### 11.11.5 Specific Clinical Conditions Associated with Pandemics

#### 11.11.5.1 Fear of Infection

During pandemics, it is expected and reasonable for people to experience some degree of fear or anxiety, especially when infection is serious and widespread. These emotional reactions can be adaptive if they motivate the person to take necessary precautions (e.g., wear a mask, get vaccinated). In comparison, our focus here is on extreme, impairing, and disproportionate levels of fear or anxiety in response to infection. Historical descriptions of pandemic-related excessive fears have, in many ways, resembled contemporary definitions of specific phobias, in which fear, avoidance, and anticipatory anxiety were cardinal features (Taylor, 2019, 2021a). Examples include “flu-phobia” during the Spanish flu pandemic, descriptions of phobic responses during the Zika virus and Swine flu pandemics, and references to “coronaphobia” during COVID-19 (Taylor, 2021a).

During COVID-19, some clinical investigators began questioning the assumption that pandemic-related fears are simple monophobias. There were strong hints from previous outbreaks that fear of infection was part of a broader syndrome or set of syndromes. Research on past pandemics (e.g., Zika, Swine flu) and SARS showed that fear of infection was correlated with obsessive-compulsive contamination symptoms (i.e., health-related checking and reassurance seeking) and with traumatic stress symptoms (i.e., pandemic-related nightmares or intrusive thoughts) (Taylor et al., 2020a). The question remained, however, as to whether some combination of these symptoms co-occurred to form a psychopathologic syndrome.

To investigate the issue further, my colleagues and I developed a battery of scales to assess COVID-19-related anxiety reactions, called the COVID Stress Scales (Taylor et al., 2020b). Through a process of multivariate statistical analyses, involving factor analyses and other methods, we identified a stable, replicable factor structure consisting of five inter-correlated elements that we termed the COVID Stress Syndrome (Taylor et al., 2020a, 2020b). The COVID Stress Syndrome comprises (a) fear of becoming infected with SARS-COV-2 and fear of coming into contact with potentially infected objects or surfaces, (b) COVID-19-related xenophobia (i.e., fear of coming into contact with foreigners for fear that they might be infected), (c) fear of the personal socio-economic consequences of the pandemic (e.g., job loss, financial hardships), (d) compulsive checking and reassurance-seeking about pandemic-related threats (e.g., repetitively checking the news and social media for pandemic-related information), and (e) traumatic stress symptoms about the pandemic (e.g., nightmares, intrusive thoughts pertaining to the pandemic).

The five scales were strongly intercorrelated ( $r$ s ranging from 0.41 to 0.73) and essentially defined a dimensional (rather than present/absent) syndrome (Taylor et al., 2020a). Network analyses indicated that fear of becoming infected was at the core of the syndrome. The severity of the syndrome was correlated with a range of preexisting (pre-COVID-19) emotional vulnerability factors, including intolerance of uncertainty, negative emotionality, obsessive-compulsive symptoms, general anxiety about one's health, and heightened perceived vulnerability to disease (Taylor et al., 2020a, 2020b).

Severe scores on the scales, combined with evidence of functional impairment due to COVID-19-related distress, are indicative of a COVID Stress Disorder (Asmundson and Taylor, 2020). This disorder represents a combination of symptoms that don't neatly fit into diagnostic categories of major anxiety-related disorders because it combines elements of various disorders (e.g., OCD, PTSD, specific phobia). Instead, severe, impairing forms of the COVID Stress Syndrome are best conceptualized as representing an adjustment disorder, where symptoms wax and wane over time in relation to the perceived degree of threat posed by COVID-19. That is, the severity fluctuated in concert with the prevalence of COVID-19 in the community (Asmundson and Taylor, 2020). Adjustment disorders are not trivial conditions and merit serious attention from clinicians, especially because not all adjustment disorders are transient; some evolve into chronic, progressively intensifying psychopathology (Bachem and Casey, 2018). Further research is



needed to investigate the extent to which this occurs for the COVID Stress Syndrome, and whether future pandemics will be associated with similar syndromes. Nevertheless, the findings support the view that pandemic-related fear is more than simply a mono-phobia; instead, fear of infection is an important element of a broader constellation of psychopathology. Accordingly, when assessing patients with pandemic-related anxiety, it is important to conduct a broad assessment of the sources of anxiety or distress in order to identify important targets for treatment.

#### 11.11.5.2 Obsessive-Compulsive Disorder

Research indicates that OCD arises, in part, from gene-environment interactions, where vulnerability genes interact with particular environmental stressors (Taylor, 2011). The specific genes have yet to be delineated, although there are several promising candidate polymorphisms. Pandemics are stressful, protracted environmental events involving uncertainty and the threat of infection and other (e.g., socioeconomic) threats. Pandemic-related stressors are likely to interact with genetic factors for OCD, such as the genetic factors associated with contamination-related obsessions and compulsions (Taylor, 2011). Some forms of contamination-related OCD are associated with fears of becoming infected with pathogens. Such people may have unwanted intrusive thoughts (i.e., obsessions) about becoming infected and may engage in extensive washing or cleaning rituals, and seek out reassurance about their health from loved ones or from medical professionals. These types of OCD symptoms, along with OCD in general, have been exacerbated during the COVID-19 pandemic, leading to heightened anxiety, checking, cleaning, and avoidance of germ-related places or situations (e.g., Taylor et al., 2020a). Contamination-related OCD, in addition to related disorders such as the COVID Stress Syndrome, may also arise *de novo* for people with a genetic predisposition that interacts with pandemic-related stressors.

In addition to giving rise to, or worsening, OCD, pandemics can also interfere with the treatment of the disorder. The effects of cognitive-behavior therapy (CBT) for OCD, involving exposure and response prevention, were attenuated during the COVID-19 pandemic (Storch et al., 2021), likely due to a range of factors, including disruptions in access to treatment and reluctance to engage in exposure therapy (e.g., touching contaminated surfaces) because of fears of becoming infected with SARS-COV-2. Research suggests that the COVID-19 pandemic has not interfered with the effects of pharmacotherapy for OCD (Sharma et al., 2021). Given the problems in administering exposure-based therapies during COVID-19, it has been argued that pharmacotherapy should be the first-line treatment for OCD during the pandemic (Fineberg et al., 2020). This recommendation, based on limited research, requires further evaluation. If CBT involving exposure and response prevention is used, it should take into account guidance from health authorities (e.g., hand-washing and cleaning guidelines from the WHO or the Centers for Disease Control and Prevention) rather than ceasing handwashing altogether. Patients also should be discouraged from exceeding the health guidelines, such as the unnecessary use of disinfectants.

#### 11.11.5.3 Posttraumatic Stress Disorder

PTSD can be triggered by traumatic pandemic-related stressors such as the death of a loved one, exposure to widespread death, or personal life-threatening experiences linked to severe infection (Taylor, 2019). PTSD and posttraumatic stress symptoms have been documented in many studies during outbreaks of SARS, Middle East Respiratory Syndrome (MERS), and COVID-19 (Asmundson and Taylor, 2021). A problem in interpreting the findings is that many of the studies were based on flawed methodology; for example, failing to assess whether the person experienced a traumatic stressor, failing to assess whether the putative PTSD symptoms were linked to a traumatic stressor, and failing to determine whether symptoms had been present for at least a month, as required to diagnose PTSD (Asmundson and Taylor, 2021). Some studies have treated the mere experience of living during COVID-19 as a “traumatic stressor.” This excessively broad definition confuses traumatic stressors with milder stressors and does not meet DSM-5 or ICD-11 criteria for a traumatic stressor.

Some of these problematic studies have been included in PTSD meta-analyses, thereby casting doubt on the validity of the meta-analytic findings (Asmundson and Taylor, 2021). A meta-analysis of survivors of MERS and SARS estimated the rate of infection-related PTSD to be 32% (Rogers et al., 2020). Meta-analytic estimates of PTSD prevalence during COVID-19 have ranged widely from 5% to 50% (Asmundson and Taylor, 2021), with findings suggesting that PTSD during COVID-19 was more prevalent among healthcare workers (HCWs) and COVID-19 patients, as compared to the general population. In light of the aforementioned methodological problems, the validity of these findings remains in question.

Very few studies of COVID-19, SARS, or MERS assessed PTSD using a structured clinical interview, which is the diagnostic gold standard. An exception is an Italian study of patients presenting to a hospital emergency department with COVID-19, most of whom were severely ill and hospitalized (Janiri et al., 2021). During their convalescence from COVID-19, patients were assessed with a diagnostic psychiatric interview. The prevalence of PTSD was 30%. Risk factors for COVID-19-related PTSD were female gender, past history of psychiatric disorders, delirium or agitation during the acute phase of COVID-19 infection, and persistent COVID-19 symptoms (i.e., Long COVID). For the latter, the symptoms were most commonly fatigue and dyspnea. Female gender, delirium, and a past history of psychopathology are all previously established risk factors for PTSD in general (Taylor, 2017).

#### 11.11.5.4 Prolonged Grief Disorder

A likely consequence of the COVID-19 pandemic, and probably other severe pandemics, is an increase in the prevalence of prolonged grief disorder, as diagnosed in ICD-11, also known as persistent complex bereavement disorder in DSM-5. This is a severe, chronic grief reaction characterized by persistent yearning and preoccupation with the deceased, combined with intense emotional

distress about the loss (e.g., sadness, guilt, anger, blame) (Shear and Gribbin, 2016). Research conducted prior to COVID-19 suggested that prolonged grief disorder occurs in about 10% of bereaved people (Lundorff et al., 2017). The percentage might be higher for COVID-19 because the social restrictions of the pandemic curtailed normal expressions of grief and culturally prescribed mourning, with some people dying in hospitals or long-term care facilities, isolated from friends and family, and even funerals were held virtually. Prolonged grief disorder is likely to afflict a large number of people during COVID-19 because of the prevalence of the disorder among the bereaved (10%) and the large number of people bereaved as a result of COVID-19. As mentioned above, for every COVID-19 death there is an average of five bereaved immediate family members (Verdery et al., 2020). Cognitive-behavioral interventions show promise in treating prolonged grief disorder (Iglewicz et al., 2020).

#### **11.11.5.5 Addictive Behaviors**

Substance use and abuse increased substantially during the COVID-19 pandemic. This included increases in alcohol, cannabis, and other drugs such as opiates (Taylor et al., 2020d). To illustrate, in a population-representative sample of over 3000 adults from the US and Canada, for people who reported consuming alcohol prior to COVID-19, 23% reported that their consumption had increased during the pandemic (Taylor et al., 2020d). For people who consumed recreational drugs prior to the pandemic, 31% reported that their consumption had increased (Taylor et al., 2020d). Substance use and abuse were associated with various pandemic-related stressors, including the stress of social restrictions, such as the extremes of crowding or isolation, child care challenges, and pandemic-related socioeconomic stressors. Substance use and abuse were associated with the COVID Stress Syndrome (Taylor et al., 2020d).

Paralleling the pandemic-related increase in substance use and abuse in adults, there was an increase in video gaming disorder and internet gaming disorder among youth, particularly adolescents, likely reflecting an attempt to cope with the stress and boredom of stay-at-home restrictions (Teng et al., 2021). For some people with gambling disorder, their gambling migrated to online gambling when in-person gambling was thwarted due to the pandemic-related closure of casinos (Xuereb et al., 2021). Other problem gamblers reported a shift in addiction from gambling to substance abuse when casinos were closed (Xuereb et al., 2021).

### **11.11.6 Burnout and Moral Injury Among Frontline Workers**

#### **11.11.6.1 Burnout**

Workplace-related burnout, as defined in ICD-11, is a syndrome arising from chronic workplace stress that has not been successfully managed. Burnout is characterized by three features, including (a) feeling depleted of energy and exhausted, (b) diminishing commitment to, or involvement with one's job, or negative or cynical attitudes toward one's job, and (c) a sense of ineffectiveness and lack of accomplishment (WHO, 2019). Workplace-related burnout among HCWs is a longstanding problem that worsens during health crises such as pandemics, especially for frontline HCWs involved in the care of infected patients (Chor et al., 2020). Work-related factors linked to high levels of burnout among HCWs include heavy workload and high job demands, working in unsafe settings (e.g., lack of personal protective equipment), lack of training and experience, limited opportunities for downtime (i.e., limited time for sleep, recreation, or time with friends or family), and lack of support from peers and management (Morgantini et al., 2020).

#### **11.11.6.2 Moral Injury**

A phenomenon related to burnout is moral injury, also known as moral stress. Moral injury involves exposure to events or actions that violate one's moral code or values (Litz et al., 2009). That is, moral injury refers to the psychological, social, and spiritual impact of events involving betrayal or transgression of one's own deeply held moral beliefs and values occurring in high stakes situations (Phoenix Australia, 2020). Moral stressors are an unavoidable part of clinical practice where patients are numerous and resources may be comparatively scarce. Moral transgression events can involve people doing or failing to do something, or witnessing such transgressions unfold without being able to remedy the situation. Severe moral stress can involve, for example, a HCW having to decide which patients receive life-saving resources in limited supply, such as ventilators. Moral injury can involve reactions such as shame, guilt, anger, disgust, sadness, anxiety, self-condemnation, and demoralization (Phoenix Australia, 2020). People experiencing moral injury may lose faith in their profession, workplace, or leaders, and often experience existential or spiritual crises (e.g., loss of previously held religious beliefs, or loss of belief in a just world) (Phoenix Australia, 2020). Moral injury can occur with or without burnout, although the two often co-occur. Moral injury is part of a broader constellation of work-related stressors encountered by HCWs during pandemics, including stigma against HCWs for fear that they are sources of infection (Taylor et al., 2020).

#### **11.11.6.3 Managing Burnout and Moral Injury**

Both burnout and moral injury are risk factors for job turnover and absenteeism, and risk factors for various mental health problems including PTSD, anxiety disorders, mood disorders, and substance-use disorders (Phoenix Australia, 2020). Burnout has also been implicated in HCW suicide. Burnout is also a safety issue for patients in that burnout may undermine the ability of HCWs to provide optimal treatment. Burnout and moral injury involve more than simply a failure to cope with chronic workplace stressors; they involve HCWs being unable to provide the level of care needed by patients (Phoenix Australia, 2020). Treatment of burnout

and moral injury requires both structural resources (e.g., a safe, adequately supplied work environment), along with organizational support, social support (including peer support) and individual-focused interventions. Promising forms of the latter involve forms of CBT, self-care interventions, and stress management (e.g., [Mollica et al., 2020](#)). Organizational changes can help protect HCWs from burnout, such as changes that alleviate various workload burdens; for example, changes that lessen the administrative burdens.

## 11.11.7 Suicide

### 11.11.7.1 Does Suicide Increase During Pandemics?

[Wasserman \(1992\)](#) argued that pandemics involving social restrictions should lead to an increase in suicide because the restrictions decrease social integration, interaction, and support. Accordingly, there has been a great deal of research on whether pandemics and related outbreaks are associated with an increase in attempted or completed suicides. Determining the cause of suicide can be difficult. During COVID-19, for example, there has been an increase in drug overdose deaths ([Centers for Disease Control and Prevention, 2020](#)) and in such cases it can be difficult to determine whether the overdose was deliberate or accidental. In other cases, the intent is clearer, such as when a suicide note is left or when the manner of death clearly involved deliberate self-harm (e.g., use of firearms). The determination of whether a death is suicide is made by coroners and, inevitably, research into pandemic-related suicide largely depends on the accuracy of coroners' reports. Accordingly, the following findings need to be interpreted with caution.

The Russian flu coincided with a reportedly marked rise in suicide rate ([Honigsbaum, 2013](#)). With regard to the Spanish flu, an analysis of US Census data from 1910 to 1920 revealed that suicide rates increased during the Spanish flu, even after controlling for the effects of the coincident World War I ([Wasserman, 1992](#)). An analysis of US Spanish flu data found that social distancing (e.g., school and business closures) predicted suicide rates ([Stack and Rockett, 2021](#)), presumably through lowering social interaction and social support in the context of rising financial hardship. During the SARS outbreak in 2003 in Hong Kong there was an increase in suicides among seniors aged over 65 years ([Yip et al., 2010](#)). Here, the suicide rate of seniors tripled from previous years to 38 suicides per 100,000 people. A spike in suicides coincided with the peak of SARS infection. SARS was also associated with an increase in suicide in Taiwan ([Tzeng et al., 2020](#)). During the 2009 Swine flu pandemic in South Korea, a time series investigation found that the development of influenza-like illness was predictive of suicide mortality ([Jung et al., 2021](#)). Collectively, these findings suggest an increase in suicide during pandemics and related outbreaks.

The relationship between COVID-19 and suicide is less clear because, at the time of writing this article (August 2021) the pandemic was ongoing and most of the relevant research on suicide had been conducted during the early phases (first year) of the pandemic. The research has so far failed to resolve into a clear picture about the relationship between COVID-19 and suicide, with studies reporting either increases, no changes or decreases, or a fluctuating pattern during the first year of the pandemic. Numerous studies reported that suicidal ideation increased in the US and Canada during the first year of COVID-19 (e.g., [Czeisler et al., 2021](#)). Ethnic minorities, younger adults (18–24 years), unpaid caregivers for adults, and essential workers were more likely to report suicidal ideation in these studies. In Nepal, during lockdown early in COVID-19, the rate of suicide increased, as compared to pre-lockdown ([Pokhrel et al., 2021](#)). In Germany, suicide rates in early 2020, as compared to previous years, were unusually high ([Radeloff et al., 2021](#)). In Japan, the suicide rate initially declined early in the COVID-19 pandemic and then rose later in 2020 ([Tanaka and Okamoto, 2021](#)). Many other studies, however, conducted during the first year of COVID-19, found that suicidal ideation or attempted or completed suicide had not increased from previous years (e.g., [Radeloff et al., 2021](#)).

The impact of pandemics on attempted and completed suicides likely depends on a variety of factors, including the suicide prevention measures and other barriers to self-harm that might be put in place. Accordingly, suicide rates may vary across pandemics, across time periods during a given pandemic (e.g., early vs. late), across economic impacts (e.g., suicide increases when there is massive unemployment), and the availability of self-harm mitigation resources (e.g., clinics, helplines). Given these considerations, it is not surprising that inconsistent findings have emerged during COVID-19. A coherent picture of the relationship between COVID-19 and suicide might not be available until some years after the pandemic ends particularly because some of the effects of COVID-19 (e.g., economic effects) might not be fully apparent for some years.

### 11.11.7.2 Healthcare Worker Suicide

Even during non-pandemic times, physicians tend to have higher suicide rates than the general population ([Dutheil et al., 2019](#)). Physicians are often reluctant to seek mental health services out of career concerns, work culture, or a predisposition toward self-reliance ([Duarte et al., 2020](#)). During both COVID-19 and the Spanish flu pandemics there were many cases in which physicians, nurses, paramedics, and other HCWs committed or attempted suicide ([Mortier et al., 2021](#)). Risk factors for suicidal ideation or attempts included (a) being a frontline worker coming in contact with pandemic patients, (b) having suspected or confirmed pandemic infection and fear of transmitting this infection to others, including loved ones, (c) having a preexisting mental disorder, (d) having relationship or career difficulties, and (e) work-related stress, burnout, and moral injury ([Duarte et al., 2020](#); [Mortier et al., 2021](#)). It is unclear whether the suicide rate of HCWs increased during COVID-19, as compared to pre-pandemic periods. Nevertheless, there have been numerous reports of physicians and other HCWs taking their lives because they felt unable to provide adequate care for COVID-19 patients ([Moutier et al., 2021](#)).



### 11.11.7.3 Suicide Mitigation

Suicide mitigation during COVID-19 has involved a variety of methods, including public education, government assistance to offset economic stressors, e-health resources (e.g., internet-based stress management advice, as described below), telephone hotlines, and preemptive approaches targeting at-risk populations, such as resiliency training for HCWs and outreach programs for socially isolated seniors (Moutier et al., 2021). The methods for reducing burnout and moral injury may also reduce HCW suicide.

## 11.11.8 Vulnerability Factors for Pandemic-Related Emotional Disorders

### 11.11.8.1 Biopsychosocial Factors

A range of factors can contribute to pandemic-related worsening or new-onset of psychological problems. Vulnerability factors for pandemic-related psychopathology include the biopsychosocial factors for psychopathology in general (Taylor, 2019). Traumatic stressors during the pandemic (e.g., exposure to death on a wide scale, or personal life-threatening infection) are examples (Taylor, 2017, 2019). In other cases, gene-environment interactions may be at play, as discussed earlier with regard to OCD. Cognitive factors such as dysfunctional beliefs and misinterpretations about health-related stimuli can also play a role in exacerbating pandemic-related negative emotions, including health anxiety. Cognitive-behavioral factors in pandemic-related anxiety are discussed elsewhere (Taylor, 2019, 2021a, 2021c). Personality traits can also pandemic-related emotional disorders, as described below.

### 11.11.8.2 Personality Traits

In the following sections, we focus on pre-pandemic vulnerability traits that may predispose people to experience pandemic-related psychopathology. The list of traits is not exhaustive but focuses rather on the most promising traits for understanding pandemic-related emotional disorders, as suggested by studies before and during COVID-19.

#### 11.11.8.2.1 Negative Emotionality

Negative emotionality (i.e., neuroticism) is the tendency to experience negative emotions in response to all kinds of stressors, large and small. This broad trait is thought to confer vulnerability for many kinds of psychopathology (Brandes et al., 2019). Negative emotionality predicted fears of infection in past pandemics and outbreaks (Taylor, 2019) and was associated with heightened distress levels in the community during COVID-19 (Taylor et al., 2021). Although negative emotionality is composed of narrow traits, research supports a bifactor model of negative emotionality, consisting of a general factor (negative emotionality) in addition to distinct, but correlated, narrow traits (Brandes et al., 2019). Narrow traits include the intolerance of uncertainty.

#### 11.11.8.2.2 Intolerance of Uncertainty

Intolerance of uncertainty is a personality trait characterized by the extent to which a person is anxious about uncertainties in daily life (Birrell et al., 2011). People with high levels of intolerance of uncertainty have a strong desire for predictability and tend to worry about uncertainties (Birrell et al., 2011). Research conducted before COVID-19 shows that a high degree of intolerance of uncertainty is associated with a range of disorders, including GAD, OCD, and other clinical conditions such as severe health anxiety (Rosser, 2018). People with high levels of intolerance of uncertainty try to reduce uncertainty by behaviors such as checking and reassurance-seeking (Dugas and Robichaud, 2007). In the case of health-related uncertainty, this can involve repeatedly checking the Internet for medical information, or persistently seeking reassurance from doctors. The intolerance of uncertainty is likely to be a particularly important contributor to pandemic-related anxiety. This is because pandemics are associated with all kinds of uncertainties, as discussed earlier. People with a high degree of intolerance of uncertainty tend to become highly anxious about the threat of infectious disease, especially if they perceive themselves as having limited control over the threat. The news media can fuel uncertainties with speculative reports about what “might” happen during an outbreak of infectious disease (Taylor, 2019). During COVID-19, high levels of intolerance of uncertainty were associated with the COVID Stress Syndrome, panic buying, maladaptive coping, and high levels of distress during lockdown (Taylor, 2021c; Taylor et al., 2020a). CBT for GAD (Dugas and Robichaud, 2007) can be beneficial because one of the targets of treatment involves improving one’s tolerance for uncertainty.

#### 11.11.8.2.3 Boredom Proneness

Lockdown, quarantine, and other social distancing restrictions in which people are required to remain home for long periods are conducive to boredom. Boredom is an unpleasant state of being weary and restless, where time drags and nothing maintains one’s interest or focus of attention. Boredom motivates people to seek out new experiences, even if those experiences have negative consequences (Bench and Lench, 2019). Boredom proneness is a trait characterized by the tendency to experience boredom in a wide range of situations (Farmer and Sundberg, 1986). Boredom proneness is correlated with (a) the tendency to experience negative emotions such as depression, anxiety, and irritability, (b) substance-use disorders and related conditions such as problem gambling, mobile phone addiction, and internet addiction, (c) low adherence to home-schooling during pandemic-related school closures, and (d) the tendency to disregard social distancing guidelines (e.g., Boylan et al., 2021; Yang et al., 2020). Little is known about the best way to reduce boredom proneness. It is negatively correlated with mindfulness (Regan et al., 2020), which raises questions of whether the two are causally related and whether training in mindfulness might reduce boredom proneness.

#### 11.11.8.2.4 Stress Buffering Traits

Some personality traits are protective, stress-buffering factors that enable the person to cope with life stressors without developing emotional disorders. Trait optimism and trait resilience are buffering factors against stressors in general. Research conducted during COVID-19 suggests that trait optimism and trait resilience modulate (inhibit) the effects of negative emotionality on COVID-19-related distress such as the COVID Stress Syndrome (Taylor et al., 2021).

It could be argued that introversion is a protective factor during lockdown because introverted people, compared to extraverts, may be better able to endure the social isolation of lockdown because introverts do not require or desire high levels of social interaction. However, COVID-19 research conducted during lockdown suggests that introversion/extraversion is not a strong predictor of distress; instead, other personality traits, particularly negative emotionality and intolerance of uncertainty, are more important predictors (Taylor et al., 2021).

#### 11.11.8.2.5 Other Personality Traits

Several other traits have been examined in relation to pandemics and other outbreaks. These include various anxiety-related traits such as trait anxiety, harm avoidance, the overestimation of threat, perfectionism, and anxiety sensitivity (Taylor, 2019). Further research is needed to better understand how these traits are related to pandemic-related distress.

#### 11.11.8.3 The Behavioral Immune System

Pathogens such as viruses are too small to directly observe and so a person's biological immune system is insufficient for avoiding exposure to these threats. It is necessary to use perceptible cues to detect and avoid pathogens. Such cues include noxious smells, visual stimuli, and auditory cues, like the sights and sounds of people coughing. The behavioral immune system (BIS) is conceptualized as a system for detecting such cues (Schaller and Park, 2011). When cues are detected, this triggers an emotional response (e.g., fear, disgust), which motivates the person to avoid or escape the aversive cues. The BIS is biased toward false positives (i.e., false alarms) in detecting pathogens, which is adaptive to the extent that it minimizes exposure to potentially fatal pathogens (Schaller and Park, 2011). Thus, the BIS can be sensitive to cues that only superficially resemble environmental signs of infection; for example, the sight of someone sneezing is a superficial disease cue that could be due to any of a number of things (e.g., allergies, dust exposure, or the common cold).

There are individual differences in BIS sensitivity, known as the perceived vulnerability to disease (Duncan et al., 2009). People who have a high degree of perceived vulnerability to disease tend to be excessively worried about becoming infected during a pandemic such as COVID-19 (Taylor et al., 2020a), and also tend to generally worry about their health (Taylor, 2019). Perceived vulnerability to disease is also tied to racism. A common way of acquiring an infectious disease is from other people, especially when foreign groups intermingle, in which one group introduces a disease that the other group has never encountered and has no immunity against. Given that many infections are transmitted through interpersonal interactions, the BIS is said to have evolved to influence social attitudes and interactions, including ethnocentrism and negative attitudes toward immigrants and other foreigners (Schaller and Park, 2011). Consistent with this, research shows that when people feel threatened about becoming infected with some pathogen, they tend to avoid or stigmatize out-groups (i.e., a group which a person does not belong to, or identify with) (Taylor, 2019). Thus, out-groups are blamed for causing or spreading diseases, such as being blamed for lack of hygiene, education, self-control, or other factors such as cultural practices. Moreover, people who are most frightened of infection are most likely to avoid foreigners and have negative attitudes toward such people (Taylor, 2019; Taylor et al., 2020a).

If a population is threatened with severe infection, the BIS will be activated in almost everyone, with some people having particularly intense levels of activation. This suggests that during times of pandemic there will be a general increase in stigmatization and xenophobia, where foreigners and other out-groups are blamed for being sources of infection. Indeed, racism was a common feature of past pandemics and other outbreaks (Taylor, 2019). Racism and other forms of xenophobia were widely documented during COVID-19, including a number of racist attacks against Asians in the US (Man, 2020). Xenophobic fears that foreigners are spreading SARS-CoV-2 is also a feature of the COVID Stress Syndrome (Taylor et al., 2020a).

### 11.11.9 Long-Term Effects of Infection

#### 11.11.9.1 Long COVID

*Long COVID* was a term coined by people who suffered from persistent COVID-19 symptoms; that is, symptoms persisting even after the person had recovered from the acute phase of infection. The term was created in an effort to raise awareness among members of the medical community and government leaders about persistent COVID-19-related symptoms (Callard and Perego, 2021). The diagnostic criteria for Long COVID are imprecise in terms of the nature and duration of symptoms. There have been efforts at developing specific criteria (National Institute for Clinical Excellence, 2020), but further research is needed. Despite this limitation, the available research provides an approximate indication of the prevalence of various symptoms.

A prospective study of over 4000 cases of COVID-19 found that symptoms persisted for at least 2 months in 5% of patients, and for at least 3 months in 2% (Sudre et al., 2021). Here, Long COVID was characterized by fatigue, headache, dyspnea, and anosmia. The odds of having persistent symptoms were higher with greater age and body mass index, and female gender (Sudre et al., 2021). Other studies reported that a quarter or more of COVID-19 survivors described having at least one persistent symptom for at least 2 months after disease onset (e.g., Carfi et al., 2020). Patients who were hospitalized for COVID-19 were most likely to have

persistent symptoms. More than 75% of hospitalized patients reported symptoms 6 months after getting ill despite having no detectable virus load, and even patients who initially experienced mild symptoms may develop Long COVID (Ludvigsson, 2021). Cases of Long COVID are not restricted to adults. Pediatric cases (ages 9–15 years) have been described, where symptoms persisted for at least 6–8 months after an initial diagnosis of COVID-19 (Ludvigsson, 2021). Common persistent symptoms included fatigue, dyspnea, palpitations, headaches, and concentration difficulties, which were similar to those reported in adults.

Clinical accounts of Long COVID suggest that there may be periods of remission and relapse, along with the emergence of new symptoms (Altmann and Boyton, 2021). In such cases, it can be challenging to determine which symptoms are due to COVID-19 and which are coincidental, perhaps due to some pathophysiology other than that associated with COVID-19. A further issue for investigation is whether there are different pathophysiological types of Long COVID. Long COVID in which fatigue is a central feature has been compared to Chronic Fatigue Syndrome (CFS), also known as myalgic encephalomyelitis. Although Long COVID could be a post-viral form of CFS, it is hazardous to label Long COVID as simply “chronic fatigue”, because such a label could dissuade medical practitioners from adequately investigating the cause of the symptoms. With regard to treatment, aside from medical management, CBT for chronic fatigue has been suggested, although its efficacy in reducing COVID-related fatigue has been questioned (Vink and Vink-Niese, 2020).

### 11.11.9.2 Comparison with Other Outbreaks

Similar to Long COVID, there is evidence of long-term effects of SARS and MERS. For example, there were descriptions of patients assessed 3 months or longer after recovering from acute SARS or MERS who reported persistent fatigue, breathlessness, and other symptoms such as concentration difficulties (Ahmed et al., 2020). Similarly, historical records suggest that there were long forms of the Russian and Spanish flu. Post-infection chronic fatigue was observed in both pandemics. Commenting on patients seen during the Russian flu pandemic, one physician observed that “many patients recovering from a case of influenza which had run a normal unchecked course frequently suffered for six or nine months, or even a year, from pronounced symptoms such as depression, neurasthenia, neuritis, and other ills which we could only describe as ‘nervous’” (Turner, 1919, p. 77).

## 11.11.10 Managing and Treating Pandemic-Related Psychopathology

### 11.11.10.1 Understanding Coping in Order to Enhance Resilience

Resilience is the ability to successfully adapt to stress and adversity. It involves, among other things, the ability to implement adaptive coping skills. Understanding naturally occurring patterns of coping during pandemics is important for understanding how to improve the resilience of communities. Human beings are social creatures and so lockdown and related social distancing interventions can lead to loneliness, depression, and other forms of distress. Not surprisingly, higher levels of social support are associated with lower levels of lockdown-related distress (Taylor et al., 2020a). With regard to coping during COVID-19, several salient findings have emerged. Adaptive coping behaviors, including problem-solving (e.g., trying new activities), adopting a healthy lifestyle, and emotion regulation skills (e.g., limiting exposure to distressing news media), tend to be associated with lower levels of COVID-19-related distress (Fullana et al., 2020). CBT can improve resilience in various ways, such as training people in coping skills (Joyce et al., 2018), including the coping skills associated with lower pandemic-related distress.

### 11.11.10.2 Enhancing the Resilience of Healthcare Workers

During COVID-19, increases in physical activity and exercise were among the most commonly used coping behaviors of HCWs, although many also expressed interest in resiliency training programs (Shechter et al., 2020). Military organizations, such as the US Department of Defense, have developed training programs for enhancing the resiliency of soldiers and medical staff working in theaters of combat. Recently, there have been efforts to adapt these procedures for improving the resiliency of HCWs during COVID-19 (Albott et al., 2020). This involved a combination of educational webinars, skills training, and structural changes to workplace operations. HCWs received education about the nature and risk factors for workplace-related burnout and PTSD. Skills training involved education about simple, practical, readily implemented coping strategies (e.g., reaching out to colleagues, positive self-talk, limiting exposure to disturbing news media, maintaining a healthy lifestyle, and other stress-reducing activities such as yoga or meditation) (Albott et al., 2020). Stress reactions were framed as normal reactions that one should expect and plan to address. In addition, self-assessment tools can be used to improve awareness among HCWs of whether they are developing problems such as burnout and whether they should seek help (Wei et al., 2020).

Structural changes to the workplace can reduce the demands placed on HCWs, thereby reducing workplace stress. Changes to the workplace environment may involve, among other things, the use of peer support groups and other forms of social support, including an on-site mental health consultant, who could facilitate training in stress management, provide additional support, and coordinate referrals for external professional consultation (Albott et al., 2020).

The *Battle Buddies* component of the HCW resiliency training (Albott et al., 2020) is particularly promising because it is simple to implement and likely to be very useful in dealing with workplace stress. It involves HCWs pairing up, such that pairs are similar in demographics, occupational roles, and seniority. Buddies are matched as far as possible on these variables because the nature of occupational stressors can differ considerably across demographics, roles, and seniority (e.g., people in managerial positions face

different stressors than people in junior positions). Members of each pair are able to debrief with one another each day, brainstorming potential solutions to problems and providing mutual support. During daily check-ins, buddies share their reactions to stressors (e.g., “I’m afraid I’m going to bring the virus home”), validate each other’s experiences (rather than debating or arguing), offer their perspectives and discuss possible solutions, and encourage the seeking of additional help if stressors or anxieties escalate (Albott et al., 2020). Battle Buddies are selected specifically not to be close friends or confidantes (or spouses) because sometimes difficult conversations or observations must be made without the fear of jeopardizing close friendships. Further research is needed to evaluate the efficacy of resiliency training programs for reducing burnout and other psychological problems in HCWs.

### 11.11.10.3 Community-wide Interventions: the Rise of E-Health

Pandemics, especially those in which social restrictions are imposed, impact the delivery of mental health services and increase the number of people requiring such services (O’Shea, 2020). Accordingly, there is a need for free, widely available, and remotely accessible mental health services during a pandemic and likely afterward. Face-to-face psychological consultations may not be possible due to social distancing restrictions, and the sheer magnitude of people requiring such services makes one-to-one consultations untenable.

During pandemics, methods are needed for rapidly providing services widely, for a range of psychological problems. For the most part, the development of these during COVID-19 was reactive rather than proactive; that is, programs were not developed in anticipation of the rise of pandemic-related mental health needs but rather arose once it became apparent that there was widespread distress in the community. Such services tended to be piecemeal in nature; that is, the development of a single type of service or intervention (e.g., a phone app for stress management) instead of developing a comprehensive approach to mental health.

Although piecemeal approaches are unlikely to be sufficient in addressing community-wide pandemic-related distress, studies of specific interventions have identified promising interventions for inclusion in broader programs. Research has demonstrated the value of online cognitive-behavioral reappraisal exercises for reducing distress during COVID-19 (Wang et al., 2021). Reappraisal exercises are simple, adaptable, efficient, and among the most effective cognitive interventions for changing emotional responses (Webb et al., 2012). Two types of reappraisal were found to be effective in reducing distress during COVID-19, including reconstrual and repurposing (Wang et al., 2021). Reconstrual involves changing how the situation is construed or mentally represented. For example, instead of saying to oneself, “We will never get through this pandemic”, one could say “I know from world history that keeping calm and carrying on gets us through tough times.” Repurposing involves focusing on potentially positive outcomes of a situation. For example, instead of saying to oneself, “Lockdown is horrible,” one could say, “Lockdown helps me realize the importance of social connections and helps me identify the most important people in my life.”

Simple cognitive restructuring methods, while useful, are not new in their application to pandemic-related distress. During the Spanish flu, simple cognitive strategies were also recommended for anxious people, involving distraction (“Think of something else”) and positive thinking, and reappraisal strategies (e.g., warning people about misinterpreting cold symptoms as indications of a far more serious infection) (Literary Digest, 1918).

Regarding other interventions, research shows that a brief online self-guided cognitive-behavioral intervention is useful in reducing excessive worry about COVID-19 (Wahlund et al., 2020). Mindfulness training, which can be delivered digitally, also shows promise in improving resilience during COVID-19 (Yuan, 2021). Empathy-focused telephone calls delivered by lay counselors reduced loneliness, depression, and anxiety in housebound adults during COVID-19 (Kahlon et al., 2021). Brief CBT, delivered online or as a phone application can improve sleep quality for people suffering from insomnia (Cheng et al., 2020).

Various types of online stress management interventions, as used in non-pandemic times, have been shown to be useful in reducing distress (Amanvermez et al., 2020), and can be adapted for managing distress during COVID-19 lockdown (Jasti et al., 2020). Innovative interventions using online-administered virtual reality are also under development, providing interventions such as imagery-augmented relaxation exercises (Riva and Riva, 2020). Videoconferencing methods can also be used to deliver, for suitable patients, cognitive restructuring and exposure therapies for PTSD (Fina et al., 2020). For people hospitalized for COVID-19 but not on a ventilator, preliminary evidence suggests that either in-person or online CBT can reduce distress (Shaygan et al., 2021).

In summary, there are a number of promising treatment resources that can be accessed by large numbers of people, including those living in remote settings, far from the consulting rooms of major metropolitan areas. Clearly, however, there are limits to e-health and some patients will require inpatient hospitalization, such as for suicidal ideation, severe depression, psychosis, or substance dependence.

### 11.11.10.4 Comprehensive Mental Health Management

During COVID-19, arguably the most comprehensive multicomponent program for pandemic-related mental health problems was developed in Chengdu, China, by He and colleagues (He et al., 2020). This program was rapidly deployed in the early months of COVID-19. Administered by a multidisciplinary team of mental health professionals, the program was designed to reach members of the community as well as at-risk groups. The program had four main components:

- TV and radio programs, broadcast nightly, discussing COVID-19-related psychological problems and offering information and advice. These were supplemented and promoted through Chinese social media platforms (i.e., WeChat, Weibo, and TikTok), drawing the attention of millions of viewers.
- 24-h hotline consultations were provided free through six dedicated hotlines. Complex or urgent cases were referred on for consultation sessions.



- Online video consultation sessions involved the use of psychological interventions and pharmacotherapy. Cases were referred from the hotline or from COVID-19 hospitals.
- On-site (hospital or clinic) crisis intervention for two groups of people: (a) COVID-19 confirmed, suspected, or quarantined cases who showed signs of psychological distress, and (b) frontline HCWs, who were provided with training in stress management.

Preliminary data showed that this rapidly deployed, comprehensive program was feasible, well-received by the community, and attracted large numbers of calls and consultations, sometimes numbering hundreds of hotline calls per day (He et al., 2020). The merits of the program require further evaluation. The program will likely be insufficient for treating all types of pandemic-related psychopathology, particularly for patients requiring inpatient admission and patients requiring specialized psychological services. To illustrate the latter, specialty clinics have emerged, offering CBT for chronic fatigue associated with Long COVID (Vink and Vink-Niese, 2020; and see below). Accordingly, the comprehensive program developed in Chengdu could be augmented in various ways, such as by adding, as needed, specialized treatment services and in-patient psychiatric services.

### **11.11.11 Future Directions for Research and Clinical Practice**

#### **11.11.11.1 COVID-19 as Catalyst**

COVID-19 has served as a catalyst, altering the delivery and scope of clinical psychological services. Regarding delivery, treatment approaches during the COVID-19 pandemic have involved an increasing use of e-health (e.g., cognitive-behavioral programs via phone or internet) as well as interventions to boost the resilience of frontline workers. Psychologists and other healthcare professionals rapidly adapted to the restrictions imposed by COVID-19 by moving their clinical practices to online or telephone formats when face-to-face consultations became impractical during stay-at-home and related restrictions. This enhanced a trend already in place prior to COVID-19 for practitioners to increasingly rely on e-health forms of delivery. The treatment program developed by He and colleagues (2020), as described earlier, serves as an exemplary model of how mental health needs in the community can be rapidly and widely addressed with the aid of e-health. This program highlighted the importance of planning for forthcoming problems, such as planning to deal with a surge in mental health problems; that is, being proactive in order to anticipate and prepare for problems, rather than taking a reactive approach in which problems are not addressed until they become too great to be ignored. Research is needed to evaluate the potential merits of proactive versus reactive approaches to developing clinics and other clinical services.

COVID-19 shifted the scope of clinical practice, with a growing number of patients requiring help for pandemic-related anxiety and for symptoms associated with PTSD, OCD, Long COVID, and prolonged grief disorder. Treatments for these disorders require specialized clinical training. To the extent that there is a shortage of suitably qualified clinicians, there will be a shortfall in meeting the mental health needs of communities. Based on COVID-19 research so far accumulated, there will likely be a strong demand for mental health services during the post-pandemic period. To meet these needs, clinical training programs may need to alter their focus by giving greater emphasis to pandemic-related disorders such as PTSD and prolonged grief disorder.

To better meet the clinical psychological needs of communities, the scope of clinical practice needs to change in other ways, such as in the type and mode of delivery of psychoeducation. Psychoeducation is a key ingredient of clinical practice, in which patients gain, among other things, a better understanding of the nature and treatment of their problems. During pandemics, patients may ask for advice from their treating clinicians about a range of pandemic-related issues, such as issues related to personal safety (e.g., mask-wearing, vaccine uptake), advice on coping (e.g., what to do if there is an outbreak of panic buying in one's community), issues about managing anxieties about returning to work or resuming social recreational activities, and issues about how patients might communicate with friends or family members who subscribe to conspiracy theories or other extreme beliefs. Ideally, clinicians would be informed and able to provide evidence-based advice on these issues, tailored to the specifics of the patient's circumstances. Patients may also benefit from advice about how to manage the infodemic; that is, advice about how to locate and evaluate authoritative, reliable health-related information (see Taylor, 2021b).

With the rise of e-health, the question arises about the best way of delivering psychoeducation in order to address the needs of communities. For issues relevant to many people (e.g., stress management), psychoeducation could be delivered via the news or social media (as per He et al., 2020). During the COVID-19 pandemic, community-wide psychoeducation was implemented on an ad hoc, unsystematic basis, with some psychological organizations producing psychoeducational fact sheets for consumers, and psychologists and other mental health practitioners offering advice to the public via news stories, social media, and other formats. This approach could be refined for future pandemics and other disasters. For example, leading psychological associations could set up an expert panel to provide advice to the public about important psychological matters, with an emphasis on providing practical, evidence-based guidance. That is, moving away from glib, pop psychological pronouncements seen in midday talk shows toward evidence-based advice that is presented in a way that engages the audience without sensationalizing the subject matter.

As part of psychoeducation, communities need to be made aware of online and other mental health resources. Many distressed people during COVID-19 did not make use of mental health resources (e.g., online programs) (Taylor et al., 2020a), possibly because of a lack of awareness of such programs, or difficulty deciding which programs would be useful. Clinical psychologists can address this problem by offering authoritative advice, both in their consultations with patients and in broader community work (e.g., public service announcements, media interviews).

#### **11.11.11.2 Psychological Field Clinics**

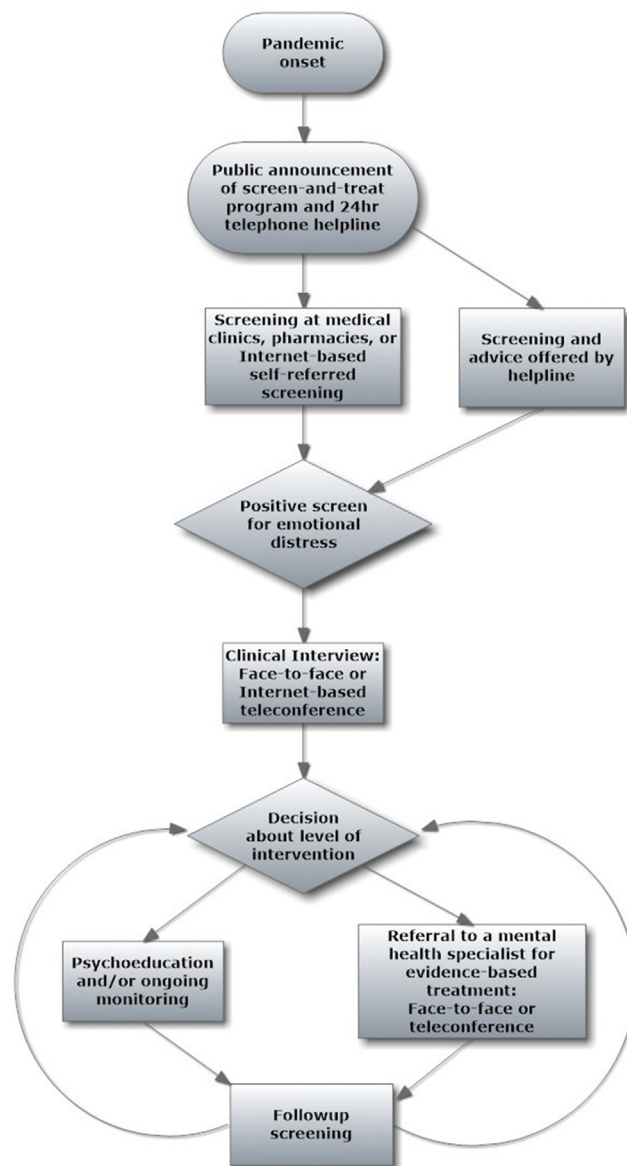
Pandemics, just like natural disasters, require clinicians to be flexible and creative, adapting established treatments in non-traditional ways in order to meet the mental health needs of communities. The rise of e-health is one example. During pandemics such as



COVID-19, there is also a need for psychological field clinics, just like the temporary, “pop-up” testing and vaccination clinics during COVID-19. These clinics were placed throughout communities in order to make them readily available to the public. In a similar way, temporary psychological field clinics could be established to address the mental health needs of any particular widespread emergency, whether it be a pandemic or some other stressor. Such clinics could serve as drop-in resources for people wanting information or advice about psychological issues, including advice about referral resources. To enhance their utilization, psychological field clinics could be integrated into medical clinics; for example, a pandemic testing clinic could have an on-site psychological clinic, offering brief consultations and advice about referrals and other useful resources for people. Research on health anxiety shows that such psychological clinics are more likely to be utilized by people if the clinics are integrated into general medical clinics (Taylor, 2019).

**11.11.11.3 Psychological Triage**

The concept of triage is well-developed in general medicine. Here, the degree of severity and urgency of cases are evaluated in order to determine the course of treatment in circumstances in which the demand for medical resources exceeds their availability. Regarding the triage of psychological services, there are screen-and-treat protocols in which the degree and type of intervention increase with the severity and complexity of the patient’s problems. An example of a pandemic-related screen-and-treat protocol appears in Fig. 1 (Taylor, 2019). Here, interventions may involve some combination of educational online materials, self-help



**Fig. 1** Screen-and-treat flowchart for targeting mental health problems. Source: Taylor (2019), reprinted by permission.

phone apps or internet self-guided cognitive-behavioral programs, and telehealth (e.g., videoconferencing) sessions with a mental health professional. This protocol, which was developed prior to the onset of COVID-19, has many similarities to the protocol independently developed and implemented in Chengdu by He et al. (2020). Details of screen-and-treat approaches, along with a discussion of screening methods and patient handouts, are discussed elsewhere (He et al., 2020; Taylor, 2019). Such protocols can be readily adapted to the specifics of a particular community-wide stressor (e.g., a pandemic), although the protocols may need to be fine-tuned and evaluated to ensure they meet the mental health needs associated with a given stressor.

### 11.11.12 Conclusion

Pandemics are complex, dynamic events involving a range of stressors that can seriously affect mental health. Pandemics tend to be particularly stressful when it becomes necessary for governments to impose social restrictions, such as stay-at-home orders. Those restrictions are necessary to stem the spread of infection, but impact the mental health of many people. Although most people are resilient to stress, a substantial minority are likely to have psychological disorders that may persist if untreated. This includes worsening or new onset of various disorders, including mood and anxiety disorders, substance use disorders, PTSD, OCD, and prolonged grief disorder. Frontline HCWs, compared to the community at large, are especially vulnerable to developing symptoms of these disorders. Additionally, people diagnosed with COVID-19 are at risk for both PTSD and Long COVID. To treat pandemic-related clinical problems, it was necessary for clinicians to adapt existing practices (e.g., face-to-face psychotherapy) to meet the challenges of pandemics; for example, by moving to e-health. COVID-19 served as a catalyst for such developments. Further research is needed to refine and evaluate these methods. Research is needed to evaluate and refine specific interventions and the comprehensive treatment programs that contain these interventions. It is also necessary to identify and overcome potential barriers to mental healthcare, including financial barriers to accessing mental health services. Widespread, freely available e-health services may help offset this problem. Further research is also needed to refine and evaluate mental health services for various vulnerable populations, including the elderly, children, indigent and incarcerated individuals, and ethnic minorities.

### References

- Ahmed, H., Patel, K., Greenwood, D.C., Halpin, S., Lewthwaite, P., Salawu, A., et al. Sivan, M., 2020. Long-term clinical outcomes in survivors of severe acute respiratory syndrome and Middle East respiratory syndrome coronavirus outbreaks after hospitalisation or ICU admission: a systematic review and meta-analysis. *J. Rehabil. Med.* 52 (5), jrm00063. <https://doi.org/10.2340/16501977-2694>.
- Albott, C.S., Wozniak, J.R., McGlinch, B.P., Wall, M.H., Gold, B.S., Vinogradov, S., 2020. Battle Buddies: rapid deployment of a psychological resilience intervention for health care workers during the COVID-19 pandemic. *Anesth. Analg.* 131 (1), 43–54. <https://doi.org/10.1213/ANE.0000000000004912>.
- Altmann, D.M., Boyton, R.J., 2021. Decoding the unknowns in long COVID. *BMJ* 372, n132. <https://doi.org/10.1136/bmj.n132>.
- Amanvermez, Y., Rahmadiana, M., Karyotaki, E., de Wit, L., Ebert, D.D., Kessler, R.C., Cuijpers, P., 2020. Stress management interventions for college students: a systematic review and meta-analysis. *Clin. Psychol. Sci. Pract.* e12342. <https://doi.org/10.1111/cpsp.12342>.
- Asmundson, G.J.G., Paluszek, M.M., Landry, C.A., Rachor, G.S., McKay, D., Taylor, S., 2020. Do pre-existing anxiety-related and mood disorders differentially impact COVID-19 stress responses and coping? *J. Anxiety Disord.* 74, 102271. <https://doi.org/10.1016/j.janxdis.2020.102271>.
- Asmundson, G.J.G., Taylor, S., 2020. Coronaphobia revisited: a state-of-the-art on pandemic-related fear, anxiety, and stress. *J. Anxiety Disord.* 76, 102326. <https://doi.org/10.1016/j.janxdis.2020.102326>.
- Asmundson, G.J.G., Taylor, S., 2021. Garbage in, garbage out: the tenuous state of research on PTSD in the context of the COVID-19 pandemic and infodemic. *J. Anxiety Disord.* 78, 102368.
- Bachem, R., Casey, P., 2018. Adjustment disorder: a diagnosis whose time has come. *J. Affect. Disord.* 227, 243–253. <https://doi.org/10.1016/j.jad.2017.10.034>.
- Bench, S.W., Lench, H.C., 2019. Boredom as a seeking state: boredom prompts the pursuit of novel (even negative) experiences. *Emotion* 19, 242–254. <https://doi.org/10.1037/emo000433>.
- Birrell, J., Meares, K., Wilkinson, A., Freeston, M., 2011. Toward a definition of intolerance of uncertainty: a review of factor analytical studies of the intolerance of uncertainty scale. *Clin. Psychol. Rev.* 31, 1198–1208. <https://doi.org/10.1016/j.cpr.2011.07.009>.
- Boylan, J., Seli, P., Scholer, A.A., Danckert, J., 2021. Boredom in the COVID-19 pandemic: trait boredom proneness, the desire to act, and rule-breaking. *Pers. Individ. Differ.* 171, 110387. <https://doi.org/10.1016/j.paid.2020.110387>.
- Brandes, C.M., Herzhoff, K., Smack, A.J., Tackett, J.L., 2019. The p factor and the n factor: associations between the general factors of psychopathology and neuroticism in children. *Clin. Psychol. Sci.* 7, 1266–1284. <https://doi.org/10.1177/2167702619859332>.
- Callard, F., Perego, E., 2021. How and why patients made Long Covid. *Soc. Sci. Med.* 268, 113426. <https://doi.org/10.1016/j.socscimed.2020.113426>.
- Carfi, A., Bernabei, R., Landi, F., 2020. Persistent symptoms in patients after acute COVID-19. *J. Am. Med. Assoc.* 324 (6), 603–605. <https://doi.org/10.1001/jama.2020.12603>.
- Cénat, J.M., Blais-Rochette, C., Kokou-Kpolou, C.K., Noorishad, P.-G., Mukunzi, J.N., McIntee, S.-E., et al. Labelle, P.R., 2021. Prevalence of symptoms of depression, anxiety, insomnia, posttraumatic stress disorder, and psychological distress among populations affected by the COVID-19 pandemic: a systematic review and meta-analysis. *Psychiatr. Res.* 295, 113599. <https://doi.org/10.1016/j.psychres.2020.113599>.
- Centers for Disease Control and Prevention, 2020. Overdose Deaths Accelerating during COVID-19. <https://www.cdc.gov/media/releases/2020/p1218-overdose-deaths-covid-19.html>. (Accessed 24 April 2021).
- Cheng, P., Casement, M.D., Kalmbach, D.A., Castelan, A.C., Drake, C.L., 2020. Digital cognitive behavioral therapy for insomnia promotes later health resilience during the coronavirus disease 19 (COVID-19) pandemic. *Sleep* 44 (4), zsa258. <https://doi.org/10.1093/sleep/zsa258>.
- Chor, W.P.D., Ng, W.M., Cheng, L., Situ, W., Chong, J.W., Ng, L.Y.A., et al. Lin, Z., 2020. Burnout amongst emergency healthcare workers during the COVID-19 pandemic: a multi-center study. *AJEM (Am. J. Emerg. Med.)* 46, 700–702. <https://doi.org/10.1016/j.ajem.2020.10.040>.
- Czeisler, M.E., Lane, R.I., Wiley, J.F., Czeisler, C.A., Howard, M.E., Rajaratnam, S.M.W., 2021. Follow-up survey of US adult reports of mental health, substance use, and suicidal ideation during the COVID-19 pandemic, September 2020. *JAMA Net. Open* 4 (2), e2037665. <https://doi.org/10.1001/jamanetworkopen.2020.37665>.
- Duarte, D., El-Hagrassy, M.M., Couto, T.C.E., Gurgel, W., Fregni, F., Correa, H., 2020. Male and female physician suicidality: a systematic review and meta-analysis. *JAMA Psychiatr.* 77 (6), 587–597. <https://doi.org/10.1001/jamapsychiatry.2020.0011>.

- Dugas, M.J., Robichaud, M., 2007. Cognitive-behavioral Treatment for Generalized Anxiety Disorder: From Science to Practice. Routledge, New York.
- Duncan, L.A., Schaller, M., Park, J.H., 2009. Perceived vulnerability to disease: development and validation of a 15-item self-report instrument. *Pers. Individ. Differ.* 47, 541–546. <https://doi.org/10.1016/j.paid.2009.05.001>.
- Dutheil, F., Aubert, C., Pereira, B., Dambrun, M., Moustafa, F., Mermillod, M., et al. Navel, V., 2019. Suicide among physicians and health-care workers: a systematic review and meta-analysis. *PLoS One* 14 (12), e0226361. <https://doi.org/10.1371/journal.pone.0226361>.
- Farmer, R., Sundberg, N.D., 1986. Boredom proneness—the development and correlates of a new scale. *J. Pers. Assess.* 50, 4–17. [https://doi.org/10.1207/s15327752jpa5001\\_2](https://doi.org/10.1207/s15327752jpa5001_2).
- Fina, B.A., Wright, E.C., Rauch, S.A.M., Norman, S.B., Acierio, R., Cuccurullo, L.-A.J., Foa, E.B., 2020. Conducting prolonged exposure for PTSD during the COVID-19 pandemic: considerations for treatment. *Cognit. Behav. Pract.* <https://doi.org/10.1016/j.cbpra.2020.09.003>.
- Fineberg, N.A., Van Ameringen, M., Drummond, L., Hollander, E., Stein, D.J., Geller, D., et al. Dell'Osso, B., 2020. How to manage obsessive-compulsive disorder (OCD) under COVID-19: a clinician's guide from the international college of obsessive compulsive spectrum disorders (ICOCOS) and the obsessive-compulsive and related disorders research network (OCRN) of the European college of neuropsychopharmacology. *Compr. Psychiatr.* 100, 152174. <https://doi.org/10.1016/j.comppsy.2020.152174>.
- Fullana, M.A., Hidalgo-Mazzei, D., Vieta, E., Radua, J., 2020. Coping behaviors associated with decreased anxiety and depressive symptoms during the COVID-19 pandemic and lockdown. *J. Affect. Disord.* 275, 80–81. <https://doi.org/10.1016/j.jad.2020.06.027>.
- Goldman, E., 2020. Exaggerated risk of transmission of COVID-19 by fomites. *Lancet Infect. Dis.* 20, 892–893.
- He, Z., Chen, J., Pan, K., Yue, Y., Cheung, T., Yuan, Y., et al. Xiang, Y.-T., 2020. The development of the “COVID-19 Psychological Resilience Model” and its efficacy during the COVID-19 pandemic in China. *Int. J. Biol. Sci.* 16, 2828–2834. <https://doi.org/10.7150/ijbs.50127>.
- Herrera-Valdez, M.A., Cruz-Aponte, M., Castillo-Chavez, C., 2011. Multiple outbreaks for the same pandemic: local transportation and social distancing explain the different “waves” of A-H1N1pdm cases observed in México during 2009. *Math. Biosci. Eng.* 8, 21–48. <https://doi.org/10.3934/mbe.2011.8.21>.
- Honigsbaum, M., 2013. “An inexpressible dread”: psychoses of influenza at fin-de-siècle. *Lancet* 381, 988–989. [https://doi.org/10.1016/S0140-6736\(13\)60701-1](https://doi.org/10.1016/S0140-6736(13)60701-1).
- Honigsbaum, M., 2020. Revisiting the 1957 and 1968 influenza pandemics. *Lancet* 395, 1824–1826. [https://doi.org/10.1016/S0140-6736\(20\)31201-0](https://doi.org/10.1016/S0140-6736(20)31201-0).
- Iglewicz, A., Shear, M.K., Reynolds 3rd, C.F., Simon, N., Lebowitz, B., Zisook, S., 2020. Complicated grief therapy for clinicians: an evidence-based protocol for mental health practice. *Depress. Anxiety* 37 (1), 90–98. <https://doi.org/10.1002/da.22965>.
- Janiri, D., Carfi, A., Kotzalidis, G.D., Bernabei, R., Landi, F., Sani, G., 2021. Posttraumatic stress disorder in patients after severe COVID-19 infection. *JAMA Psychiatr.* 78, 567–569.
- Jasti, N., Bhargav, H., George, S., Varambally, S., Gangadhar, B.N., 2020. Tele-yoga for stress management: need of the hour during the COVID-19 pandemic and beyond? *Asian J. Psychiatr.* 54, 102334. <https://doi.org/10.1016/j.ajp.2020.102334>.
- Joyce, S., Shand, F., Tighe, J., Laurent, S.J., Bryant, R.A., Harvey, S.B., 2018. Road to resilience: a systematic review and meta-analysis of resilience training programmes and interventions. *BMJ Open* 8 (6), e017858. <https://doi.org/10.1136/bmjopen-2017-017858>.
- Jung, S.J., Lim, S.-S., Yoon, J.-H., 2021. Fluctuations in influenza-like illness epidemics and suicide mortality: a time-series regression of 13-year mortality data in South Korea. *PLoS One* 16 (2), e0244596. <https://doi.org/10.1371/journal.pone.0244596>.
- Kahlon, M.K., Aksan, N., Aubrey, R., Clark, N., Cowley-Morillo, M., Jacobs, E.A., et al. Tomlinson, S., 2021. Effect of layperson-delivered, empathy-focused program of telephone calls on loneliness, depression, and anxiety among adults during the COVID-19 pandemic: a randomized clinical trial. *JAMA Psychiatr.* 78 (6), 616–622. <https://doi.org/10.1001/jamapsychiatry.2021.0113>.
- Lewis, D., 2021. COVID-19 rarely spreads through surfaces. *Nature*. <https://www.nature.com/articles/d41586-021-00251-4>. (Accessed 16 February 2021).
- Literary Digest, 1918. How to fight Spanish influenza. *Literary Digest* 13, October 12.
- Litz, B.T., Stein, N., Delaney, E., Lebowitz, L., Nash, W.P., Silva, C., Maguen, S., 2009. Moral injury and moral repair in war veterans: a preliminary model and intervention strategy. *Clin. Psychol. Rev.* 29, 695–706. <https://doi.org/10.1016/j.cpr.2009.07.003>.
- Ludvigsson, J.F., 2021. Case report and systematic review suggest that children may experience similar long-term effects to adults after clinical COVID-19. *Acta Paediatr.* 110 (3), 914–921. <https://doi.org/10.1111/apa.15673>.
- Lundorff, M., Holmgren, H., Zachariae, R., Farver-Vestergaard, I., O'Connor, M., 2017. Prevalence of prolonged grief disorder in adult bereavement: a systematic review and meta-analysis. *J. Affect. Disord.* 212, 138–149. <https://doi.org/10.1016/j.jad.2017.01.030>.
- Mamelund, S.-E., 2010. The impact of influenza on mental health in Norway 1972–1929. In: Paper Presented at the Historical Influenza Pandemics: Lessons Learned Meeting and Workshop, Copenhagen, Denmark.
- Man, S., 2020. Anti-Asian violence and US imperialism. *Race Class* 62 (2), 24–33. <https://doi.org/10.1177/0306396820949779>.
- Mollica, R.F., Augusterfer, E.F., Fricchione, G.L., Graziano, S., 2020. New Self-Care Protocol: Practice Guide for Healthcare Practitioners and Staff. <https://hprselfcare.org/>. (Accessed 16 March 2021).
- Morgantini, L.A., Naha, U., Wang, H., Francavilla, S., Acar, Ö., Flores, J.M., et al. Weine, S.M., 2020. Factors contributing to healthcare professional burnout during the COVID-19 pandemic: a rapid turnaround global survey. *PLoS One* 15, e0238217. <https://doi.org/10.1371/journal.pone.0238217>.
- Mortier, P., Vilagut, G., Ferrer, M., Serra, C., Dios Molina, J., López-Fresneña, N., et al. Alonso, J., 2021. Thirty-day suicidal thoughts and behaviors among hospital workers during the first wave of the Spain Covid-19 outbreak. *Depress. Anxiety* 38, 528–544. <https://doi.org/10.1002/da.23129>.
- Moutier, C.Y., Myers, M.F., Feist, J.B., Feist, J.C., Zisook, S., 2021. Preventing clinician suicide: a call to action during the COVID-19 pandemic and beyond. *Acad. Med.* 96, 624–628. <https://doi.org/10.1097/ACM.0000000000003972>.
- National Institute for Clinical Excellence, 2020. COVID-19 Rapid Guideline: Managing the Long-Term Effects of COVID-19. Author, London.
- O'Shea, N., 2020. Covid-19 and the Nation's Mental Health. Centre for Mental Health. [https://www.centreformentalhealth.org.uk/sites/default/files/publication/download/CentreforMentalHealth\\_COVID\\_MH\\_Forecasting3\\_Oct20\\_0.pdf](https://www.centreformentalhealth.org.uk/sites/default/files/publication/download/CentreforMentalHealth_COVID_MH_Forecasting3_Oct20_0.pdf). (Accessed 5 April 2021).
- Phoenix Australia, 2020. Moral Stress Amongst Healthcare Workers during COVID-19: A Guide to Moral Injury. Author, Melbourne, Australia.
- Pokhrel, S., Sedhai, Y.R., Atreya, A., 2021. An increase in suicides amidst the coronavirus disease 2019 pandemic in Nepal. *Med. Sci. Law* 61 (2), 161–162. <https://doi.org/10.1177/0025802420966501>.
- Prati, G., Mancini, A.D., 2021. The psychological impact of COVID-19 pandemic lockdowns: a review and meta-analysis of longitudinal studies and natural experiments. *Psychol. Med.* 51, 201–211. <https://doi.org/10.1017/S0033291721000015>.
- Price, G.M., 1919. Influenza—destroyer and teacher. *The Survey* 41, 367–369.
- Radeloff, D., Papsdorf, R., Uhlrig, K., Vasilache, A., Putnam, K., von Klitzing, K., 2021. Trends in suicide rates during the COVID-19 pandemic restrictions in a major German city. *Epidemiol. Psychiatr. Sci.* 30, e16. <https://doi.org/10.1017/S2045796021000019>.
- Regan, T., Harris, B., Van Loon, M., Nanavaty, N., Schueler, J., Engler, S., Fields, S.A., 2020. Does mindfulness reduce the effects of risk factors for problematic smartphone use? Comparing frequency of use versus self-reported addiction. *Addict. Behav.* 108, 106435. <https://doi.org/10.1016/j.addbeh.2020.106435>.
- Richter, D., Riedel-Heller, S., Zuercher, S., 2021. Mental health problems in the general population during and after the first lockdown phase due to the SARS-CoV-2 pandemic: rapid review of multi-wave studies. *Epidemiol. Psychiatr. Sci.* 30, e27. <https://doi.org/10.1017/S2045796021000160>.
- Riva, G., Riva, E., 2020. COVID Feel Good: a free VR self-help solution for providing stress management and social support during the COVID-19 pandemic. *Cyberpsychol., Behav. Soc. Netw.* 23 (9), 652–653. <https://doi.org/10.1089/cyber.2020.29195.ccu>.
- Rogers, J.P., Chesney, E., Oliver, D., Pollak, T.A., McGuire, P., Fusar-Poli, P., et al. David, A.S., 2020. Psychiatric and neuropsychiatric presentations associated with severe coronavirus infections: a systematic review and meta-analysis with comparison to the COVID-19 pandemic. *Lancet Psychiatr.* 7 (7), 611–627. [https://doi.org/10.1016/S2215-0366\(20\)30203-0](https://doi.org/10.1016/S2215-0366(20)30203-0).

- Rosser, B.A., 2018. Intolerance of uncertainty as a transdiagnostic mechanism of psychological difficulties: a systematic review of evidence pertaining to causality and temporal precedence. *Cognit. Ther. Res.* 43, 438–463. <https://doi.org/10.1007/s10608-018-9964-z>.
- Schaller, M., Park, J.H., 2011. The behavioral immune system (and why it matters). *Curr. Dir. Psychol. Sci.* 20, 99–103. <https://doi.org/10.1177/0963721411402596>.
- Sharma, L.P., Balachander, S., Thamby, A., Bhattacharya, M., Kishore, C., Shanbhag, V., Reddy, J.Y.C., 2021. Impact of the COVID-19 pandemic on the short-term course of obsessive-compulsive disorder. *J. Nerv. Ment. Dis.* 209, 256–264. <https://doi.org/10.1097/NMD.0000000000001318>.
- Shaygan, M., Yazdani, Z., Valibeygi, A., 2021. The effect of online multimedia psychoeducational interventions on the resilience and perceived stress of hospitalized patients with COVID-19: a pilot cluster randomized parallel-controlled trial. *BMC Psychiatr.* 21 (1), 93. <https://doi.org/10.1186/s12888-021-03085-6>.
- Shear, M.K., Gribbin, C.E., 2016. Persistent complex bereavement disorder and its treatment. In: Casey, P.R., Strain, J.J. (Eds.), *Trauma- and Stressor-Related Disorders: A Handbook for Clinicians*. American Psychiatric Publishing, Arlington, VA, pp. 133–154.
- Shechter, A., Diaz, F., Moise, N., Anstey, D.E., Ye, S., Agarwal, S., et al. Abdalla, M., 2020. Psychological distress, coping behaviors, and preferences for support among New York healthcare workers during the COVID-19 pandemic. *Gen. Hosp. Psychiatr.* 66, 1–8. <https://doi.org/10.1016/j.genhosppsych.2020.06.007>.
- Stack, S., Rockett, I.R.H., 2021. Social distancing predicts suicide rates: analysis of the 1918 flu pandemic in 43 large cities. *Suicide Life-Threatening Behav.* <https://doi.org/10.1111/sltb.12729>.
- Storch, E.A., Sheu, J.C., Guzick, A.G., Schneider, S.C., Cepeda, S.L., Rombado, B.R., Goodman, W.K., 2021. Impact of the COVID-19 pandemic on exposure and response prevention outcomes in adults and youth with obsessive-compulsive disorder. *Psychiatr. Res.* 295, 113597. <https://doi.org/10.1016/j.psychres.2020.113597>.
- Sudre, C.H., Murray, B., Varsavsky, T., Graham, M.S., Penfold, R.S., Bowyer, R.C., et al. Steves, C.J., 2021. Attributes and predictors of long COVID. *Nat. Med.* <https://doi.org/10.1038/s41591-021-01292-y>.
- Tanaka, T., Okamoto, S., 2021. Increase in suicide following an initial decline during the COVID-19 pandemic in Japan. *Nat. Human Behav.* 5 (2), 229–238. <https://doi.org/10.1038/s41562-020-01042-z>.
- Taylor, S., 2011. Etiology of obsessions and compulsions: a meta-analysis and narrative review of twin studies. *Clin. Psychol. Rev.* 31 (8), 1361–1372. <https://doi.org/10.1016/j.cpr.2011.09.008>.
- Taylor, S., 2017. *Clinician's Guide to PTSD*, second ed. Guilford, New York.
- Taylor, S., 2019. *The Psychology of Pandemics: Preparing for the Next Global Outbreak of Infectious Disease*. Cambridge Scholars Publishing, Newcastle upon Tyne.
- Taylor, S., 2021a. COVID stress syndrome: clinical and nosological considerations. *Curr. Psychiatr. Rep.* 23, 19. <https://doi.org/10.1007/s11920-021-01226-y>.
- Taylor, S., 2021b. The psychology of pandemics: lessons learned for the future. *Can. Psychol.*
- Taylor, S., 2021c. Understanding and managing pandemic-related panic buying. *J. Anxiety Disord.* 78, 102364.
- Taylor, S., 2021d. The psychology of pandemics. *Ann. Rev. Clinical Psychol.*
- Taylor, S., Fong, A., Asmundson, G.J.G., 2021. Predicting the severity of symptoms of the COVID stress syndrome from personality traits: a prospective network analysis. *Front. Psychol.* 12, 632227.
- Taylor, S., Landry, C.A., Paluszek, M.M., Fergus, T.A., McKay, D., Asmundson, G.J.G., 2020a. Covid stress syndrome: concept, structure, and correlates. *Depress. Anxiety* 37, 706–714. <https://doi.org/10.1002/da.23071>.
- Taylor, S., Landry, C.A., Paluszek, M.M., Fergus, T.A., McKay, D., Asmundson, G.J.G., 2020b. Development and initial validation of the COVID stress scales. *J. Anxiety Disord.* 72, 102232. <https://doi.org/10.1016/j.janxdis.2020.102232>.
- Taylor, S., Landry, C.A., Rachor, G.S., Paluszek, M.M., Asmundson, G.J.G., 2020c. Fear and avoidance of healthcare workers: an important, under-recognized form of stigmatization during the COVID-19 pandemic. *J. Anxiety Disord.* 75, 102289. <https://doi.org/10.1016/j.janxdis.2020.102289>.
- Taylor, S., Paluszek, M., Landry, C., Rachor, G.S., Asmundson, G.J.G., 2021. Predictors of distress and coping during pandemic-related self isolation: the relative importance of personality traits and beliefs about personal threat. *Pers. Individ. Differ.* 176, 110779.
- Taylor, S., Paluszek, M., Rachor, G.S., McKay, D., Asmundson, G.J.G., 2020d. Substance use and abuse, COVID-19-related distress, and disregard for social distancing: a network analysis. *Addict. Behav.* 114, 106754.
- Teng, Z., Pontes, H.M., Nie, Q., Griffiths, M.D., Guo, C., 2021. Depression and anxiety symptoms associated with internet gaming disorder before and during the COVID-19 pandemic: a longitudinal study. *J. Behav. Addict.* 10, 169–180. <https://doi.org/10.1556/2006.2021.00016>.
- Thompson, D., 2020. Hygiene theater is a huge waste of time. *Atlantic*. <https://www.theatlantic.com/ideas/archive/2020/07/scourge-hygiene-theater/614599/>. (Accessed 30 July 2020).
- Tomes, N., 2010. "Destroyer and teacher": managing the masses during the 1918–1919 influenza pandemic. *Publ. Health Rep.* 125 (Suppl. 3), 48–62.
- Turner, E.B., 1919. Discussion on influenza. *Proc. Roy. Soc. Med.* 12, 76–90. <https://pubmed.ncbi.nlm.nih.gov/19980438>.
- Tzeng, N.-S., Chung, C.-H., Chang, C.-C., Chang, H.-A., Kao, Y.-C., Chang, S.-Y., Chien, W.-C., 2020. What could we learn from SARS when facing the mental health issues related to the COVID-19 outbreak? A nationwide cohort study in Taiwan. *Transl. Psychiatr.* 10 (1), 339. <https://doi.org/10.1038/s41398-020-01021-y>.
- Verdery, A.M., Smith-Greenaway, E., Margolis, R., Daw, J., 2020. Tracking the reach of COVID-19 kin loss with a bereavement multiplier applied to the United States. *Proc. Natl. Acad. Sci. USA* 117, 17695. <https://doi.org/10.1073/pnas.2007476117>.
- Vink, M., Vink-Niese, A., 2020. Could cognitive behavioural therapy be an effective treatment for long COVID and post COVID-19 fatigue syndrome? Lessons from the cure study for Q-fever fatigue syndrome. *Healthcare* 8, 552. <https://doi.org/10.3390/healthcare8040552>.
- Wahlund, T., Mataix-Cols, D., Olfson Lauri, K., de Schipper, E., Ljótsson, B., Aspvall, K., Andersson, E., 2020. Brief online cognitive behavioural intervention for dysfunctional worry related to the COVID-19 Pandemic: a randomised controlled trial. *Psychother. Psychosom.* 90, 191–199. <https://doi.org/10.1159/000512843>.
- Wang, K., Goldenberg, A., Dorison, C.A., Miller, J.K., Uusberg, A., Lerner, J.S., Moshontz, H., 2021. A multi-country test of brief reappraisal interventions on emotions during the COVID-19 pandemic. *Nat. Human Behav.* <https://doi.org/10.1038/s41562-021-01173-x>.
- Wasserman, I.M., 1992. The impact of epidemic, war, prohibition and media on suicide: United States, 1910–1920. *Suicide Life-Threatening Behav.* 22 (2), 240–254.
- Webb, T.L., Miles, E., Sheeran, P., 2012. Dealing with feeling: a meta-analysis of the effectiveness of strategies derived from the process model of emotion regulation. *Psychol. Bull.* 138 (4), 775–808. <https://doi.org/10.1037/a0027600>.
- Wei, E.K., Segall, J., Linn-Walton, R., Eros-Sarnyai, M., Fattal, O., Toukolehto, O., et al. Cho, H.J., 2020. Combat stress management and resilience: adapting department of defense combat lessons learned to civilian healthcare during the COVID-19 pandemic. *Health Security*. <https://doi.org/10.1089/hs.2020.0091>.
- World Health Organization, 2005. *WHO Checklist for Influenza Pandemic Preparedness Planning*. Author, Geneva.
- World Health Organization, 2019. *ICD-11: Burnout*. <https://icd.who.int/browse11/l-m/en/#http://id.who.int/icd/entity/129180281>. (Accessed 25 April 2021).
- World Health Organization, 2020. *Pandemic Fatigue: Reinvigorating the Public to Prevent COVID-19*. <https://apps.who.int/iris/bitstream/handle/10665/335820/WHO-EURO-2020-1160-40906-55390-eng.pdf>. (Accessed 26 January 2021).
- Xuereb, S., Kim, H.S., Clark, L., Wohl, M.J.A., 2021. Substitution behaviors among people who gamble during COVID-19 precipitated casino closures. *Int. Gamb. Stud.* <https://doi.org/10.1080/14459795.2021.1903062>.
- Yang, X.-J., Liu, Q.-Q., Lian, S.-L., Zhou, Z.-K., 2020. Are bored minds more likely to be addicted? The relationship between boredom proneness and problematic mobile phone use. *Addict. Behav.* 108, 106426. <https://doi.org/10.1016/j.addbeh.2020.106426>.
- Yarrington, J.S., Lasser, J., Garcia, D., Vargas, J.H., Couto, D.D., Marafon, T., et al. Niles, A.N., 2021. Impact of the COVID-19 pandemic on mental health among 157,213 Americans. *J. Affect. Disord.* 286, 64–70. <https://doi.org/10.1016/j.jad.2021.02.056>.
- Yip, P.S.F., Cheung, Y.T., Chau, P.H., Law, Y.W., 2010. The impact of epidemic outbreak: the case of severe acute respiratory syndrome (SARS) and suicide among older adults in Hong Kong. *Crisis* 31, 86–92.
- Yuan, Y., 2021. Mindfulness training on the resilience of adolescents under the COVID-19 epidemic: a latent growth curve analysis. *Pers. Individ. Differ.* 172, 110560. <https://doi.org/10.1016/j.paid.2020.110560>.