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Insurance and Care NSW

The effects of public health events (Epidemics and Pandemics) on workforce sustainability

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Executive Summary

Research has shown that whilst the world has endured a number of epidemics and pandemics over the past 100 years, we have never had to accommodate a pandemic of this scale and nature. Historically, health workers have been seen to be the most affected occupation by epidemics or pandemics, and this is evident in the literature which has focused on understanding the impacts on this industry. COVID-19 is the first pandemic that has impacted and mandated social isolation and forced change across the landscape of work across the world. In theory we understand some of the consequences of mandated restrictions. However, when combined with the economic instability that follows it could be possible to underestimate the impact to the sustainability of the workforce of the people of New South Wales (NSW). COVID-19 will reshape our ways of working for years to come and opportunities exist now to mitigate some of the risks.

The following review was conducted to provide icare and its customers with a comprehensive understanding of the impact of a pandemic on the sustainability and recovery of the NSW workforce. The icare Research team reviewed over 400 peer reviewed articles and 87 were determined relevant for the purposes of this paper.

What we have learnt is that any form of recovery or process of reintroduction of the workforce back to a version of 'normal', following a period of quarantine and social isolation, needs to be managed with care and foresight to minimise the potential short-term and long-term health consequences.

We know that the process for icare and its customers will **not** be:

- straightforward
- a one size fits all approach
- fast – it will be an ongoing process of recovery, as in years

Key findings of the review show that the recovery process will be cyclical and contains a combination of risks and protective strategies.
The recovery process will occur in phases:

- pre-return to workplace
- immediate return to the workplace
- mid-term
- long term

It is recommended that protective strategies are re-introduced to the workforce at the implementation of each phase. The best way to do this is through a scaffolding approach where there is ongoing monitoring of health and safety practices that covers the following:

- **timely and accurate information** is provided to staff prior to each stage of the recovery process
- **evidence based best practice support** is delivered to the right people at the right time
- **good leadership skills** that create safe and supportive workplace environments for continued economic survival, the wellbeing of staff and the community at large.

We also know from the literature that there are certain industries that will require specialised support and attention, these are:

- industries across the health care supply chain
- frontline retail workers and their supply chain
- frontline agency workers, such as police and ambulance
- Government front line workers, such as Service NSW

Roles with greater exposure, on a day to day basis, increase the level of perceived risk and has a potential to increase psychological distress, for example Post Traumatic Stress Disorder (PTSD), depression and anxiety.

The literature also highlighted other high-risk groups that should be considered when implementing strategies moving forward, and these are:

- people with large families
- people with any pre-existing mental health conditions
- people from low socioeconomic backgrounds
- people who have low levels of education

Whilst not specific in the literature it can also be inferred that people with compromised immune systems and some injured workers could also be included in the high-risk category.

Even though the world has been through at least 8 epidemics or pandemics over the past 50 years, we have never experienced a disaster of this nature. What we do know is that moving forward it will be critical for icare to continue to monitor the overall wellbeing of the NSW workforce.

To mitigate any risks connected to what we know is likely to impact people following a pandemic, it is important for employers to continually pulse check their employees' perception of workplace health and safety. This will allow employers to identify and address any unforeseen unique effects that are COVID-19 specific.

When communicating with employees it is recommended that information includes:

- awareness of behaviours that can create workplace risks, such as:
  - anxiety
  - stigmatisation
  - discrimination
  - increase substance abuse
  - stress (including the impact of return to work or awareness of financial stress)
- information about workplace support resources
- awareness of disruptions, which can include:
  - physical external disruptions such as transport
  - internal personal disruptions such as presenteeism driven by lack of sleep, worry and how it can increase risk of injury in the workplace
- good news stories and case studies
- clear communications about policy changes due to COVID-19 and the workplace impacts
- importance of personal health behaviours, including nutritious diet and exercise
- tips to staff can include:
  - encouragement to return to work
  - preparing for adjusting to a new environment as change is inevitable
  - understanding the recovery process will take time, and that's ok
  - flexibility with change and realistic expectations
  - stress management and coping
  - non-clinical forums in the community for personal sharing and support
  - communication about survivor's guilt or grief for those who have lost co-workers
  - pandemic planning

It is recommended that interventions address:

- reducing mental health stigma by raising awareness of mental health issues and normalising feelings of trauma and accessing support services
- the provision of psychosocial training packages, including:
  - training in listening skills
  - recognising trauma in others
  - trauma and its effects
  - cumulative stress
- the five pillars of recovery:

From	To
helplessness	efficacy (self and collective; e.g., we are all in this together)
loss	connectedness
fear	calm
risk	safety
despair	hope

At least one of the above factors should underpin intervention design and create a shift from left to right.

- the facilitation of peer support
- stress management and coping
- assessment and triage
- pandemic planning

It is recommended that **leadership** provides:

- clear and consistent information
- training
- work task planning and preparedness (especially on PPE and infection control)
- a focus on increasing employees' feelings of safety and actual safety
- a recognition of the effort that employees are making in their efforts to bring business back to a version of 'normal'
- regular staff meetings to check in with employees
- role clarity, especially if roles have been impacted by infection control or workplace practices
- executive support for leaders for their efforts in recognising the potential stressful impact of bringing the workforce back under new policies and frameworks

Further research is required to answer the following questions:

- What are the specific impacts due to the COVID-19 pandemic on workforce sustainability and the impact to icare customers?
- Outside of healthcare, what are the impacts, risks and protective factors within the various industries?
- What are the impacts of the utilised mitigation strategies in the context of COVID-19?
- What extent of stigmatisation and discrimination will occur due to COVID-19 within the workplace?
- What organisations/industries/businesses were most impacted by COVID-19?

COVID-19

In December 2019, a novel coronavirus exhibited transmission from person-to-person leading to the worldwide spread of the virus from Wuhan, China (1). The worldwide spread of the virus, COVID-19, has led to a pandemic of the respiratory virus, with widespread contagion occurring across most of the world.

COVID-19 is having severe impacts on the workforce, including:

- Unemployment, due to business closures
- Social isolation and a shifting workplace, specifically the formation of work-from-home workplaces
- Restrictions of human face-to-face interactions
- Confirmed cases and those in contact being quarantined
- Increased stress, anxiety, fear and uncertainty within employers and employees.

The pandemic we are facing is currently an ever-changing landscape, as we are within the early stages of social change as well as understanding the virus itself. To understand the effects of the current pandemic, within the early stages, we have reviewed the literature relating to previous epidemics, pandemics, and other globally impacting events (i.e., wars, terrorism, natural disasters, and global financial crises). This literature will be used to guide knowledge on the impacts, potential interventions, and recovery within the workplace.

Methodology

To understand the effects of the current pandemic, within the early stages, we have reviewed the literature relating to previous epidemics, pandemics, and other globally impacting events (i.e., wars, terrorism, natural disasters, and global financial crises) to investigate the impacts, potential interventions, and recovery within the workplace.

The current literature review included peer reviewed journals and systematic reviews and excluded grey literature. The following search terms were utilised:

Event terms used	Key terms
pandemic	interventions
epidemic	Recovery OR recover OR reintegration
COVID-19	Psychological AND psychological impact
H1N1	social connection OR social OR psychosocial
Swine flu	Workplace AND workplace impact
SARS	Impacts AND/OR effects
MERS	Worker OR employee
epidemic	Global trade
Post-pandemic	Health sector OR healthcare worker
Post-outbreak	frontline
9/11 OR September 11	Social distancing OR quarantine OR isolation
terrorism	Stress OR burden
Global financial crisis	Suicide
Economic recession	Posttraumatic growth
Natural disaster	Construction OR education OR retail OR frontline OR manufacturing OR transport OR aged-care OR casual employee
post-disaster	resilience
war	Organisation OR organization
	Workplace injury

Events within our recent history

Three essential epidemiological conditions are necessary for a virus to become pandemic (2):

1) the novel virus emerged from an animal reservoir, with people not having pre-existing immunity
2) the virus is capable of making people sick, and
3) the virus is able to spread efficiently between people through coughing, sneezing or a handshake.

The urbanisation of the world's population, including global travel, has created an environment in which viruses can be transmitted within populations more easily, and spread globally more quickly (2). Our aging population, and increased comorbidities within the population presents further complications with viruses, increasing the potential for more complicated illnesses and deaths to occur from viral outbreaks (2). These factors suggest that viral outbreaks may progress more rapidly and place greater burden on healthcare systems.

Pandemics/epidemics are not a new concept, and at least eight have been experienced worldwide since the 1950s (see Table 1):

Table 1

Pandemics and Epidemics Introduced Since 1950 (3)

Year	Event	Geographical Area Impacted
1957	Asian flu influenza pandemic (H2N2)	Global
1968	Hong Kong flu influenza pandemic (H3N2)	Global
1981	HIV/AIDS pandemic	Global
2003	Severe acute respiratory syndrome (SARS) pandemic	Global
2009	Swine flu influenza pandemic (H1N1)	Global
2012	Middle Eastern respiratory syndrome (MERS) epidemic	22 countries
2013	Ebola virus epidemic	10 countries
2015	Zika virus pandemic	76 countries

It is important to note that whilst each epidemic/pandemic and specific virus has its unique characteristics, factors and complications, research suggests commonalities in the impacts and consequences at a societal level.

Trends in consequences and impacts

Not only does the virus itself impose significant consequences, the mitigating strategies imposed can also result in significant impacts for individuals, workplaces and communities.

Health

Health may be the most evident consequence of pandemics, Specifically, mortality and sickness due to the virus. During pandemics the extreme need placed on the healthcare system can minimise access for those in need, further increasing mortality rates (3).

Infection rates

Vulnerable Populations

Various factors impact the infection rate of viruses, including the virus characteristics itself, however aspects of the community can also impact the spread of viruses. Research highlights the increased risk of pandemic infection in Aboriginal communities, for instance, pandemic influenza clinical attack rate within a remote Western Australian Aboriginal community was 23% higher than the general population (4). Researchers suggest the higher infection rate can be attributed to low vaccination coverage and lack of knowledge.

Workplace environment

Workplace cultures can also have an impact on transmission, specifically the social mixing within workplaces. One study (5) suggests that academic-creative workplace cultures (using common indoor spaces) generate a 12% higher incidence of infection. Whereas, self-employed cultures such as farmers and small-scale businesses, with less worker interactions, have a 20% lower incidence rate. Further simulation analysis conducted suggested that social distancing and hygiene intervention within the academic-creative environment had a 12% reduction in influenza incidence (5).

Similarly, workplace policies can impact the self-report of illness symptoms, leading to greater exposure and transmission. Specifically, higher influenza like illness was related to lack of access to sick leave, suggesting that mandated sick leave may provide a significant reduction in morbidity from influenza-like illnesses (6).

Psychological wellbeing

The impact on health is not limited to mortality, with individuals' mental health and wellbeing also highly impacted during such events. Research shows that individuals contracting the virus report psychological impacts. For example, patients with SARS reported fear, loneliness, boredom and anger, and worry regarding quarantine effects and contagion to family and friends (7). These individuals experience anxiety about fever and effects of insomnia (7). General community members without the illness also report psychological impacts. For instance, 40% of people surveys reported feeling worried and 12% reported difficulty focusing in response to the swine flu pandemic (8).

Comparison of the psychological impact of COVID-19 between medically trained and non-medically trained hospital workers within SARS suggests that non-medical healthcare workers (i.e., allied health, pharmacists, administrators, clerical) had higher prevalence of anxiety than medically trained workers (9). Tan et al. (9) suggests that reasons for greater impact within those non-medically trained staff may be due to

- Reduced accessibility to formal psychological support
- Less first-hand information on the outbreak
- Less intensive training on personal protective equipment (PPE) and infection control measures.

Research also highlights vicarious trauma as a result of COVID-19. Findings assessing vicarious traumatisation in the general public, and nurses, both frontline and non-frontline, suggests the non-frontline nurses' severity of vicarious trauma was no different from that of the general public. Furthermore, the observed severity among the general public and non-frontline nurses was significantly higher than that of the frontline nurses who came in close contact with patients with COVID-19 (10). These findings identify vicarious trauma as a significant implication to be addressed within individuals beyond the frontline healthcare industry.

Health impacts following 9/11 terrorism attacks identified posttraumatic stress symptoms up to 4 years after the event (11). Risk factors for this long-term relationship included pre-event psychopathology, female gender, recent immigration to the USA, and increased hours of viewing event-related media coverage. Panic attacks, loss of possessions, and job loss were significant risk factors for the development of posttraumatic stress disorder. Low social support was identified as a significant risk factor for depression. Direct exposure increased risk factors for psychological impact, and increased substance abuse was evident, including alcohol, tobacco and marijuana, following the attacks (11).

A larger body of research has focused specifically on healthcare workers and the consequences on their health and wellbeing during a pandemic. For instance, Brooks et al. (12) investigated the psychological impact of SARS on healthcare workers. Similar to COVID 19, SARS is reported as an unprecedented crisis due to the infection rate, and high number of healthcare workers contracting the virus. Healthcare workers reported depression, anxiety and posttraumatic stress symptoms in the immediate aftermath (12). The psychological impact was associated with several factors; occupational role and work environment including role-related stressors, training/preparedness, quarantine, social support, social rejection and isolation, and impacts on professional and personal life (12).

Lin et al. (13) reported high perceived life threat and low emotional support to be associated with posttraumatic stress symptoms in emergency department staff. Long term impacts of providing healthcare during a SARS outbreak have been identified as higher levels of burnout, psychological distress and posttraumatic stress (14). Distress experienced in an Ebola outbreak within healthcare providers was identified as caused by distancing within families and communities, strained relationships between providers, and strained patient-provider relationships (15).

These factors will be explored further below.

Psychological impact and occupational factors

Research has identified that the higher the level of possible infection within the workplace, the greater risk of psychological impact. Workers within environments of high infection risk are more likely to feel anxious and exhausted, and report greater event impact (16). For example, healthcare workers more heavily involved in direct patient care, are more likely to suffer from posttraumatic stress, stress and other mental health disorders (12). Research suggests that the emergency department workers are at greater risk of infection (17). Interestingly, healthcare workers with high

availability of PPE were not at a substantially increased risk of contracting swine flu, when compared to nonclinical staff but still had the greatest psychological impact (18). Whereas, having a larger family (increased number of children) and working in an intensive care unit were identified as risk factors for infection.

Cross-sectional research of healthcare workers within China exposed to COVID-19 suggests significant mental health outcomes for those treating patients (19). Specifically,

- 50.4% reported symptoms of depression
- 44.6% reported symptoms of anxiety
- 34.0% reported symptoms of insomnia
- 71.5% reported symptoms of distress

Lai et al.'s (19) research suggests that more severe symptoms are reported for nurses, females, those working in Wuhan, and frontline workers (healthcare workers directly involved in the diagnosis, treatment, and care of patients with COVID-19). Furthermore, being a female and having an intermediate technical title was associated with severe depression, anxiety and distress. While, being a frontline worker was identified as a significant independent risk factor for worse mental health on all measured outcomes (19).

Role-related stressors, including an inability to do one's job and limited job control was associated with poor mental health outcomes (12). Significant predictors of poor psychological wellbeing include (12):

- heavy workloads
- environmental hazards
- deployment
- unclear instruction
- ambiguous infection policy
- lack of feedback and/or appreciation
- being blamed for mistakes

Healthcare worker's individual perceived risk, specifically lack of perceived safety and increased personal vulnerability, is a negative predictor of psychological wellbeing (12, 20, 21). Similarly, 82.7% of healthcare workers surveyed regarding their expectations during the avian influenza pandemic reported work-related concerns due to their job putting them at higher risk of exposure, and 75% were afraid of falling ill (22).

Hospital employees within Beijing facing the SARS outbreak working within higher-risk or relational proximity to the virus were 2-3 times more likely to have high posttraumatic stress symptoms (21). The relationship between posttraumatic stress symptoms and exposure effects were mediated by risk perceptions.

Emergency nurses employed during the swine flu pandemic in Hong Kong indicated the need for improvements in planning the circulation of information, allocation of manpower and utilisation of personal protective equipment (23). The need for increased allocation of staff has been echoed by healthcare workers during the avian flu pandemic with staff reporting increased workload, stress and feelings of inadequate staffing to handle the increased demands (22).

Regardless of the increased risk perceived by healthcare workers, research suggests most staff continue working due to innate professional and ethical obligations (24, 25). For instance, healthcare staff in Saudi Arabia during the MERS epidemic felt fearful (96% felt nervous and scared) during the outbreak and tried to limit their exposure to MERS patients (reported by 95% of respondents) while still working (25). Altruistic acceptance of work-related risks has been negatively related to posttraumatic stress symptoms in healthcare workers (21).

Reluctance to work overtime (93% reported being unhappy having to work overtime), and appreciation of extra financial compensation and recognition of these staff have also been reported (25). Similarly, nurses in Korea during MERS outbreak experiencing conflict due to a mindset of patient avoidance (24). This mindset of patient avoidance was influenced by cognitions of stigmatisation and level of agreement with infection control measures within the hospital.

Job roles assigned to workers and role conflicts can also be a cause of psychological impacts (7, 20, 26). Healthcare workers assigned to gatekeeper roles, controlling patient visitors and staff trafficking, were significantly stressed by the perception of the role, felt inadequately supported, blamed and resentful of the workload assigned (7). In addition, staff deemed as non-essential and were asked to stay at home indefinitely reported feeling isolated and hopeless during the crisis (7). Maunder et al. (7) suggest the non-essential title may have contributed to this sense.

Research has also identified the impact of difficult decision making and extreme workplace pressures faced by healthcare professional during pandemics (27). During pandemics, healthcare professionals are forced to make decisions regarding:

- allocation of scarce resources to needy patients, and how to provide care with limited and inadequate resources and excessive numbers of patients,
- the balance of their own health, physical and mental, and needs, with patient care, and
- alignment of their desire and duty to care for patients, with those to family and friends.

These conflicts can lead to an experience of moral injury, and psychological distress (27). Moral injuries lead to negative thoughts of others and self, and intense feelings of shame, guilt or disgust, which may contribute to the development of mental illnesses (e.g., depression, posttraumatic stress disorder). Researchers posit that moral injury during the current COVID-19 situation should be a focus of attention, with support and preparation for healthcare workers necessary.

Research investigating psychological distress within employees experiencing workplace terror attacks identified key organisational protective factors (26). These factors were identified as protective 10 months after the attack and included:

- low levels of role conflict
- high levels of role clarity
- predictability
- leader support.

Birkeland et al. (26) posits that these factors may increase feelings of safety and provide additional mechanisms to protect against experiences of strain. These mechanisms include providing better information, improve decision making within situation limitations, allow work task planning, and facilitate coping in various circumstances. Leader support is reported to be essential for employee psychological wellbeing, providing key information that may assist employees to cope (26).

Supervisors and leaders are also suggested to be impacted during a pandemic. Research suggests these employees express difficulty in leaving work due to their sense of responsibility to their staff (7). This was also reported in supervisors or leaders who had been instructed to stay home during the pandemic. Managers may find it more difficult to deal with their own emotions while being responsible for simultaneous and effective support of their employees' needs (28). For these reasons, managers and supervisors may require more formal training to prepare for critical incidents. North et al. (28) suggest managers express desire for such training.

Psychological impact and training/preparedness

A review of psychological impacts on healthcare workers identified studies suggesting training to be the only protective factor against anxiety (12, 14). Individual perception of being prepared, and confidence in infection control knowledge and skills is reported to be significantly associated with lower stress levels. Healthcare workers who received less training, were reported to be more likely to experience burnout, posttraumatic stress, and to perceive risk post crisis for longer (12).

Providing of information is suggested to be important in minimising psychological impact of crises. For instance, provision of less frequent information to hospital workers left workers feeling unprotected during the swine flu pandemic, resulting in greater psychological impacts for the workers (16). Maunder et al. (7) reported that uncertainty and fear of staff within hospital units receiving patients with SARS were dispelled with immediate clear information in repeated, succinct messages, staff meetings and provision of appropriate equipment and supplies. The use of pamphlets identifying signs of anxiety and stress and information about support resources was also reported within nursing units (7).

Research also highlights the role of uncertainty regarding the control of the outbreak (25) and concerns regarding insufficient medical supplies (13) to be significant stressors for healthcare workers during outbreaks. Perceived sufficiency of information was significantly and independently associated with degree of worry about the swine flu pandemic in hospital workers (29). Similarly, lack of workplace communication was identified as a risk factor for posttraumatic stress disorder, depression and general psychological distress in social welfare workers following an earthquake (30).

Frequent changes to infection control policies has also been identified as a significant source of stress for healthcare workers during a SARS outbreak (20). Staff safety within the workplace is critical in ensuring staff morale and delivery of quality healthcare services (31). Perceptions of increased control, which may be increased via training, can significantly reduce fear and improve wellbeing following disasters (32).

Research has provided some insight into employee perceptions of disaster training, with employees reporting that the pre-disaster training often focusing purely on the physical components, and failing to address psychological aspects of disasters, such as distress (33). Suggestions from employees raised the need to include psychological preparedness training regarding potential risks, recognising signs of distress and feeling able to admit struggles. Employees reported a failure of pre-disaster training, with suggestions that organisations are better at providing support post-incident.

Psychological impact and quarantine

The experience of quarantine is reported as having negative psychological impacts. Research suggests that having been quarantined, for 9 days, was the most predictive factor of acute stress disorder during the SARS pandemic, and even 3 years on the biggest predictor of posttraumatic stress symptoms (34). Brooks et al. (34) reported that healthcare staff were significantly more likely to report:

- exhaustion
- detachment from others
- anxiety when dealing with febrile patients
- irritability
- insomnia
- poor concentration and indecisiveness
- deteriorating work performance
- reluctance to work or consideration of resignation.

Brooks et al.'s (34) review identified similar distress within other samples, for instance:

- 34% of horse owners in quarantine due to an equine influenza outbreak reported higher psychological distress, compared to 12% of the general Australian population.
- Quarantined children report four times higher posttraumatic stress scores.
- 27% of quarantined parents report sufficient symptoms to warrant a trauma-related mental health disorder, compared to 6% in those not quarantined.
- Hospital staff three years after quarantine, 60% of sample with high depressive symptoms experienced quarantine, but only 15% of sample with low depressive symptoms had been quarantined.
- Those who are quarantined due to close contact with confirmed or suspected cases of SARS reported various negative responses during the quarantine period, including fear, nervousness, sadness, guilt.

Individuals experiencing quarantine are likely to report distress due to fear and risk perceptions (35). Such distress can be amplified with poor and unclear information and communication, which often occurs during early stages of a pandemic.

Research investigating the impact of quarantine on healthcare workers during the MERS outbreaks identified that 64.1% of respondents scores on the Impact of Events Scale -Revised were indicative of posttraumatic stress symptoms, with over 50% exceeding the cut-off for PTSD diagnosis (36). These symptoms remained 6 weeks after the outbreak, with 54.5% with posttraumatic symptoms remaining, and 40.3% remaining qualified for PTSD diagnosis. Healthcare workers performing MERS related tasks had higher total scores, hyperarousal, avoidance, intrusions, sleep and numbness. While home quarantined healthcare workers showed higher scores in sleep issues and numbness than those not quarantined. Lee et al. (36) reported predisposing vulnerability factors including childhood trauma, personality disorder traits, inadequate support, comorbid psychiatric illness and excessive alcohol intake.

Brooks et al. (34) also reviewed the longer-term effects of quarantine, suggesting 3 years after the SARS outbreak, alcohol abuse and dependency symptoms were positively associated with being quarantined in healthcare workers. Specifically, having been quarantined and having worked in a high-risk location were the two types of exposure significantly associated with these negative outcomes. Quarantine was also significantly associated with behavioural avoidance post outbreak (34).

Also, to be noted regarding quarantine, is the impact on available staff, and resulting increased workload for remaining staff. Yin et al. (13) identified healthcare staff isolation to increase concern over anticipated overtime hours in emergency department staff facing SARS.

Quarantine during a crisis negatively impacted the mental wellbeing of healthcare workers (including posttraumatic stress disorder, acute stress and alcohol consumption). Some research posits that healthcare workers experience greater psychological distress (including PTSD symptoms) as a result of quarantine (37). Healthcare workers experiencing quarantine reported feelings of stigma, reluctance to work, intention to resign, and work performance deterioration (12). Brooks et al.'s (12) review suggests the length of quarantine was predictive of anger and avoidance. Brooks et al.'s (34) review identified key stressors during and post quarantine, suggesting these stressors to be associated with poorer outcomes.

Stressors during quarantine:

- longer duration
- fears of infection
- frustrations and boredom including confinement, loss of routine, reduced social and physical contact leading to sense of isolation
- inadequate supplies, including daily and medicinal supplies are a source of frustration and is associated with anger and anxiety 4-6 months post quarantine
- inadequate information, including insufficient clear guidelines about actions to take and confusion about the purpose of quarantine

Stressors post quarantine were identified to include:

- Finances, with quarantine creating serious socioeconomic distress. Financial distress was found to be a risk factor for psychological disorders, anger and anxiety. Research also suggests that often the financial assistance provided is insufficient and delayed.
- Stigma, with quarantined individuals experiencing stigmatisation and avoidance, leading to negative outcomes for the individual.

Compliance with quarantine measures should also be addressed, with research suggesting self-reported compliance to be low (37). Improvements in compliance were reported when the rationale behind quarantine was understood. Perceived difficulty with compliance, being a healthcare worker, longer duration were identified as significant predictors of psychological impact (37). These findings highlight the need to enhance education and support, providing quarantine rationale to minimise psychological impact, and minimising duration of quarantine if possible.

Psychological impact and media exposure

Communication of critical information to the public during an outbreak is essential to provide knowledge of the virus, spread, transmission and also mitigation strategies. Media, including the use of social media platforms, provides opportunity for the sharing of this information quickly to larger populations. However, recent research has identified the potential for such media exposure to cause psychological distress (1, 33). Specifically, repeated media exposure of the outbreak can lead to immediate suffering, in the form of distress and heightened stress responses within the individual. Such stress has the potential for long term adverse physical and mental outcomes. Within the immediate situation, excessive repeated media exposure and subsequent stress responding can also lead to:

- Excessive help-seeking behaviours disproportionate to the real threat. Increased help-seeking behaviours can lead to overcapacity within the health system.
- Excessive health protective behaviours such as panic buying of essential items (e.g., toilet paper, hand sanitiser) leading to global shortages.

It is suggested that individuals' may increase their reliance on media during times of uncertainty such as a pandemic (1). Ambiguity in the information presented by the media can lead to increased threat appraisals, increased stress, anxiety, worry and subsequent behaviour changes, including the spreading of misinformation (1, 7, 38, 39).

Repeated and excessive media exposure (available with the 24/7 news cycle) can also lead to heightened threat appraisal for the individual and their community, leading to increased stress, anxiety, worry and impaired functioning (1). For instance, 9/11 had extreme media coverage in the days following the event, research has identified a significant link between increased media exposure and negative health outcomes, specifically posttraumatic stress 4 years later (11), and new-onset physical ailments 2 to 3 years later (1). Similar relationships have been identified with other events, such as the Boston Marathon bombings, and Ebola.

Garfin et al. (1) posits that the amount of exposure and also the exposure content matters (graphic images associated with more negative outcomes). The negative impact on health and wellbeing seems to be accumulative over time, with increased media exposure causing a cycle of distress, which in turn can lead to greater consumption of the media coverage. Some research also suggests media exposure years later could negatively impact individuals, suggesting media coverage could bring back a lot of horrible memories (33).

Researchers suggest there is a need for community members to limit their exposure to repetitious media coverage of events that provide little new information, while still remaining up-to-date with critical information as it develops. In addition, public health communicators should address the role of social media in risk perceptions of community members (38).

Psychological impact and social factors

Social support is a significant predictor of psychological impact during a pandemic crisis, with sources of support identified as protective and lack of support indicative of poor outcomes (12-15, 20, 30, 33). A lack of organisational support including inadequate insurance, poor feedback receptivity, and poor culture were associated with avoidance and anger within healthcare workers (12). Research investigating protective factors of employee psychological wellbeing following a disaster highlighted the importance of managerial support (approachable and sympathetic leaders). Employees cited appreciation of employers taking the time to check in and viewed managers providing limited communication and lacking acknowledgment of the experience as unsupportive (33). Furthermore, managers utilising proactive approaches were viewed more positively, while reactive responses were viewed negatively (33). Employees also report the need for supportive work environments to foster support between colleagues (33).

A lack of support from friends and family is significantly associated with anxiety, risk of poor mental health, depression and sleep disturbances (12). Some research suggests that healthcare workers were discouraged from interacting during the pandemic, including interactions within the workplace (e.g., meetings), and outside of the hospital with colleagues (7). Healthcare workers during SARS were encouraged to eat and drink alone, outside of the hospital, due to the need to remove their masks, with all face-to-face communication heavily restricted, moving most communication via email (7). These suggestions may add to the lack of social support felt during a pandemic.

Not only is support obtained from family and friends, and organisational, community support should also be increased. Support from the community, and specifically community relationship indicated by collective efficacy during an earthquake in Japan, was negatively associated with posttraumatic stress disorder and symptom severity among social welfare workers (30). Similarly, Perceptions of social rejection and/or isolation is commonly reported during crises and is associated with greater psychological impacts. Healthcare workers perceiving avoidance of themselves or their family members due to interactions with patients reported a greater psychological impact (12, 13). Perceived isolation and discrimination are associated with greater distress, poor mental health and concerns for colleagues (12). In a survey of healthcare workers' expectations during the avian flu pandemic, two-thirds of respondents felt they would be avoided due to their job, and 50% felt this social ostracism would be extended to their family members (22). Many healthcare workers during the SARS pandemic avoided identifying themselves as hospital workers as they felt stigmatised within their communities (7).

Research suggests the mechanistic factors of social network breakdown and limited health care access may be accountable for increases in risk of completed suicide in female elders was reported following the SARS epidemic (40). Additional research identified the increased suicidality due to SARS among elderly of both genders (41). Yip et al. (41) suggests that exceptionally high rate of suicide deaths was evidenced within older adults that were social disengaged, mentally stressed and anxious at the time of the SARS epidemic. Furthermore, the suicide motives among SARS-related suicide deaths more associated with (41):

- Stress over fears of being a burden to their families during the epidemic negative impacts
- Fear of contracting the disease
- Fears of disconnection

Research also highlights the role of work on personal and professional life, with personal and family impacts associated with increased distress, avoidance and hyperarousal (12). Healthcare workers commonly report concerns for their family's health during infection crises, which is confounded by the sense of commitment and professional obligation to their occupation (7, 13, 22, 23, 25, 29). Wong et al. (22) reported that 75% of healthcare workers surveyed during the avian flu pandemic were worried about people close to them being at higher risk of infection. Professional obligation was also reported by 75% of respondents, with healthcare workers accepting the risk of contracting the virus as a part of their job. The conflict between professional obligation and risk of contagion is suggested to be exacerbated for parents, with the fear and guilt of potentially exposing their family to infection (7).

Similarly, Maunder et al. (7) reported that healthcare staff were adversely affected by fear of contagion and of infecting family, friends and colleagues during the SARS pandemic. Healthcare workers required to care for colleagues found the role emotionally difficult. Khalid et al. (25) reported that the factor causing greatest stress within healthcare workers during a MERS outbreak was seeing their colleagues getting intubated and seeing their colleagues displaying symptoms.

It is suggested that provision of psychiatric services reduces psychological impact on healthcare workers (7, 16, 29). Research also posits the need to have alternative sources of support, as some staff may be reluctant to talk to psychiatrists, they have pre-existing working relationships with (7). Therefore, external services should be made available, for example confidential telephone support lines which have been reported to be especially effective for those in quarantine (7). It is also suggested that knowledge of available support alone may be suffice for many staff members, especially those who are already resilient (7, 33). Often employee awareness of services is the primary obstacles to utilisation (33), highlighting the need to increase knowledge regarding available services. Research also highlights the role of workplace culture, specifically attitude within the workplace in reducing workplace stress (25).

Social

Discrimination and Stigmatisation

Epidemics and pandemics often result in increased discrimination and stigmatisation of ethnic minority groups, as they are blamed for the disease and its consequences (3). For instance, Mexican/Latinos were singled out as the "source" of the swine flu, resulting in those stigmatised experiencing social avoidance and/or rejection (42). The mitigations strategies (i.e., quarantine and isolation) used can also lead to discrimination and stigmatisation, especially those utilising exclusionary practices and treatments that may be necessary to control spread (39). These behaviours are most commonly driven by fear.

Fear of SARS arose from the anxiety about an unknown and potentially fatal disease (39). Stigmatisation of SARS patients was evident early within the outbreak, with media exposure suggested as increasing fear and specifying vulnerable groups (39). It is reported that some community members became fearful or suspicious of people who looked Asian during the SARS outbreak, regardless of their nationality or risk factors for SARS and expected them to be quarantined (39). Media communications are required to keep the general public informed during outbreaks. However, caution should be applied as to why affected populations may be vulnerable to attacks (39), as media strongly influences people's risk perceptions (38). Also, to

be noted is findings that suggest when people are unable to access information, they tend to produce information and disseminate it themselves via social media, leading to increased sharing of negative emotions (38).

Within the workplace contagion concerns may also lead to stigma and should be managed. For instance, investigation of public health co-workers attitudes towards a physician returning to work after volunteering in the West African Ebola outbreaks suggests distress with contact of the physician (43). 18% of respondents reported they were uncomfortable with the physician returning to the workplace, with nearly 8% suggesting they would avoid work if the physician returned to work. The study investigated varying levels of contact, increasing the proximity to the target (physician) and duration of contact, with discomfort of the co-workers subsequently increasing. The level of distress was increased if the scenario reported the physician had contact with an Ebola carrier.

Discrimination towards Muslim co-workers within the workplace following 9/11 (44) has been linked with:

- workplace bullying
- collapse of work teams
- low motivation
- high absenteeism and turnover
- low morale
- decreased satisfaction and productivity.

Mental health stigma should also be addressed, with research highlighting employees often feeling their organisations to have poor understanding of psychological issues following an event causing trauma (33). This can lead to employees not seeking help or speaking up due to fears of being seen as weak or being afraid that acknowledging their trauma impact may lead to them being bypassed on jobs. Brooks et al. (33) suggests these concerns most commonly arise from individual's perceptions and expectations of stigma, rather than experiences within the organisation. Hence, it is important to address any employee perceptions of mental health stigma that may prevent engagement with services.

Behavioural Changes

During significant health events, such as a pandemic, community members adjust their behaviours within the workplace and society (7, 8). Often such behavioural changes are driven by fear and uncertainty, and result in avoidance of behaviours associated with possible contamination or transmission. For instance, a study investigating the response of people to the swine flu pandemic, reported that 20% wanted to or bought preparation materials (e.g., facemasks), 20% delayed or cancelled travel plans, and 22% used public transport less frequently (7). The public response to the SARS outbreak also demonstrated the impact of uncertainty on perceptions of personal danger, with day-by-day modifications of infection control procedures and public health recommendations exacerbating the uncertainty (7). Perceptions of personal danger were also increased by the known syndrome lethality and intense media coverage of the outbreaks, including stories regarding lack of supplies (7).

Healthcare workers also report behaviour changes used as strategies to reduce stress including the use of strict personal protective measures, keeping separate clothing for work and using disposable clothing to minimise transmission, considering all patients admitted as infectious and using full protective gear at all times, increasing own knowledge of prevention and transmission and avoiding public places (25). Goulia et al. (29) reported some hospital staff's intended absenteeism and restricted social contact were predicted by their degree of worry of the virus.

Interestingly, one study suggests a quarter of respondents did not have anyone to take care of them if they became ill with the pandemic influenza (45). This could result in increased utilisation of the healthcare system or poor individual recovery, suggesting a need for greater public preparation to prevent burden on healthcare workplaces.

Avoidant behaviours are suggested to last beyond the outbreak. For instance, quarantined healthcare workers exhibited more avoidance behaviours, such as minimising direct contact with patients, and reluctance to report to work (34). People quarantined due to potential SARS contact also exhibited lasting avoidant behaviours:

- 54% avoided people who were coughing or sneezing
- 26% avoided crowded enclosed places
- 21% avoided all public spaces in the weeks following quarantine.

Long-term behavioural changes following quarantine were reported to occur for months and include vigilant handwashing and avoidance of crowds (34).

Outside of healthcare workers, research investigating workplace behaviour change within University faculty members suggests fear to have significant implications on organisational outcomes. More specifically, the study investigated terrorism induced fear on employee job attitudes and absenteeism following an attack in Pakistan (46). Fear of the event had a negative impact on attitudes towards their work organisation, team and job, six weeks after. Furthermore, fear has a direct positive effect on absenteeism, and indirect via job attitude. Malik et al. (46) suggest that employees experiencing strain from external traumatic events may be more likely to absent in the weeks after the event, and to also hold the organisation responsible for any loss of safety they feel. Absenteeism is posited as a coping mechanism in response to fear, providing temporary withdrawal from the fear-inducing stimuli. Perceived organisational support moderated the association between fear and overall job attitude by providing support, including recognition, trust and care (46). When facing unexpected disaster events organisations are recommended to make visible demonstrations that every action possible is being done to assure employee safety. Finally, Malik et al. (46) suggest building and maintaining trust with employees may help organisations mitigate negative emotions and subsequent negative organisational outcomes, following traumatic events.

Schooling

Research suggests that school attendance can be greatly impacted during pandemics. For instance, during the swine flu pandemic school attendance drastically fell before school closure, impacting caregivers' ability to work (47). In response to the swine flu pandemic, Taiwan imposed school closures. Research suggests this led to 60% of children being cared for by their parents, 35% by other relatives, 4% by others and 1% of children stayed home alone (48). As a result, 27% reported workplace absenteeism for a median of 3 days, ranging from 1 to 9 days absent, with subsequent wage losses. Chen et al. (48) also report an increase in school staff working hours due to a need to disinfect the school and contact families to ensure health of students and adherence to recommended isolation.

Research also highlights the lack of adherence to recommendations regarding social isolation during school closures (47). Chen et al. (48) report that despite public place restrictions, 12% of children visited relatives, 13% public places or gatherings and 5% attended their parents' workplaces.

Economic

Research highlights the economic loss due to a health-related event to be significantly impacted by the infection rate (49). Simulation of pandemics suggests global economic activity to be more strongly affected by pandemics with high infection rates (50).

Immediate economic costs are often felt due to lost workdays and worker absenteeism, driven through social distancing, business closure and illness (49-51). Economic effects of illness include (50):

- Increased healthcare expenditures by patients and funders, such as governments and insurers
- Increased workloads for healthcare workers
- Smaller labour supply due to deaths
- Increased absenteeism from work by sick workers and workers concerns with risk of contracting the illness within the workplace.

Individual behaviour change as a result of a pandemic can significantly impact workplace absenteeism and utilisation of services (3, 50, 52). Change in consumer behaviours is driven more so by fear of contagion than budgetary constraints (53). Often these fear-induced behavioural changes lead to:

- Reduction in labour force participation
- Closing of places of employment
- Disruption of transport
- Government restrictions for movement throughout countries, and resulting disruptions in trade, travel and commerce
- Reduction in demand

Reduction in demand is suggested to impose a bigger economic impact than morbidity and mortality associated with workplace absenteeism (3, 54). Fear-induced avoidance of travel, restaurants, public spaces, prophylactic workplace absenteeism resulting in demand reduction has a significant economic impact, with the potential for longer lasting effects (3, 50, 53). For instance, following the swine flu pandemic, Mexican tourism sharply declined, Americans and Canadians spent 5% less on international travel, domestic and international airlines cancelled 35% of their operations, and nearly all flights to Mexican destinations were cancelled, leading to a loss of $US665 million in May 2009 (55). During the same time, pork industry losses were also recorded to be in the order of $US355 million (55).

Similarly, South Korea experienced significant reductions in economic growth, retail and department store sales, and cancelled tourist visits during the MERS outbreak (53). Analysis of card transactions (debit and credit) identified customer expenditure lowered by 7.31% during the outbreak, with reductions on recreation/culture, dining experiences and department stores. The same analysis suggested increase e-commerce during the outbreak, with consumers switching their experiences to channels considered less risky (i.e., online).

The uncertainty and risk associated with a pandemic is suggested to be the most significant driver of economic impacts, with less demand and consumer confidence leading to less spending (50). Regions with greater economic integration to the world economy, via international trade, tend to be the greatest impacted by pandemic events (50).

Economic impacts are also evident due to presenteeism, with research suggesting workers attending work ill (e.g., common cold) to be less productive (56). The literature suggests that presenteeism places a greater economic burden than absenteeism, and that this is particularly problematic for industries and workplaces dominated by casual employees (56).

Research investigating the mitigation strategies imposed during a pandemic, suggests all mitigation strategies (antiviral drugs and school closures, social distancing including community gatherings and workplace attendance reduction) are effective at controlling the spread of infection, with varying costs (51). Social distancing modelling suggests this to be the most costly due to productivity losses, specifically due to adult workplace absenteeism, which is exacerbated by school closures (54). Antiviral drug strategies combined with two weeks of school closures had the lowest cost per case prevented. Models suggest the effectiveness of school closure as a strategy is impacted by timing and duration of closures. The combination of all mitigation strategies is reported as the most effective strategy to minimise spread, but also as the most costly (51). With each viral outbreak different due to severity and transmissibility characteristics of the virus, mitigation strategies may be different for each outbreak. The effectiveness of antiviral drug strategies also depends on the delay of symptom onset and diagnosis, and percentage of cases being diagnoses, with drug resistance an additional factor to consider. In some cases, specifically when antiviral drug strategies may not be feasible or available, social distancing may be appropriate.

Review of the swine flu pandemic on the Australian economy suggests the need for flexible work arrangements and contingency strategies including childcare arrangements in the event of school closure, to minimise the impact on the economy (49).

Individual economic impact

Research highlights the impact of isolation on individual financial distress. For instance, 28% of employed people surveys reported they would likely lose their job or business from isolation of 7-10 days (57). This was further exacerbated for those without paid leave, paid less, within urban areas, and unable to work from home. Self-employed respondents were twice as more likely to experience serious financial difficulties. Similar economic impacts on low income earners were recorded following the global financial crisis, with lower income earners and those reliant on welfare services most adversely affected (58). These individuals reported greater perceived impact, worse subjective wellbeing, greater financial strain and greater deprivation and economic exclusion. It is suggested that events that more adversely impact lower income earners may lead to greater inequality in living standards (58).

Financial distress imposed due to mitigation strategies may result in lower compliance, with mitigation strategies most likely to cause financial distress for people with lower income, and for racial or ethnic minorities (45).

Financial distress and suicide

Unemployment and the increased financial stress, resulting from events such as pandemics, has also been linked to increased suicide (59-61) and increased self-harm (62). For instance, research assessing excess suicides occurring during the 2007 economic crisis within America estimated 4,750 excess suicide deaths (60). Whereby excess suicides are defined as deaths over and above the level that would be expected if historical trends continued. Reeves et al. (60) posits that US unemployment during the recession was associated with a 3.8% increase in suicide rate, corresponding to about a quarter of the excess suicides noted during this time, approximately 1,330 suicides. Similar research assessing the 2008 global economic crisis impact on suicide rates within 54 countries suggests that the increases in suicide mainly occurred in men (59). The increased suicidality is suggested to be associated with the increase in unemployment. The rise in suicide mostly among men is consistent with research findings suggesting a statistical rise in suicide rates among men, not evidenced in women (63). Investigation of economic suicides in the great recession within Europe and North America (61) identified the following trends:

- Europe – 6.5% increase (7,950 suicides) in 2009 and remaining elevated through 2011
- Canada – 4.8% increase (240 suicides) between 2007 and 2009
- USA – 4.8% increase (4,750 suicides) between 2007 and 2010
- Industrialised countries outside of these regions, escaping financial crisis (e.g., New Zealand) avoided rise in suicide rates.

Reeves et al. (61) posits that job loss is a significant risk factor for increased risk of depression and suicide. Protective interventions may include assisting newly unemployed individuals to return to work may demonstrate to be a protective factor, and increased gender equality within the workplace may attenuate economic shock health risks (61). Similarly, Haw et al. (64) suggests the result of recession on unemployment, job insecurity, financial loss, bankruptcy and home repossession leads to mental health concerns, including depression, anxiety and binge drinking. These mental health concerns in turn lead to suicidal behaviour (64).

It is suggested that measures to assist the unemployed, including welfare and job-searching initiatives may reduce the rise in suicide rates. This is evidence by countries with active labour market programmes and sustained welfare during recessions having less suicide rate increases, than countries that cut such spending (64).

Research suggests that increases in suicide rates to not be evident as a result of all events. For instance, following the 9/11 terrorism attacks, while there was well documented psychological distress, there was no association between the event and suicide rates (65). On the other hand, research suggest increased suicidality as a result of SARS (40, 41). Such findings may highlight the disaster itself to not lead to increased suicidality, but in fact the consequences of the disaster.

Policy

Research has explored employers' knowledge and application of infection prevention strategies in the workplace. It was found that small, medium, and large companies lacked formal plans or policies for pandemic influenza (56).Hansen et al. (56) suggest the use of legal obligations and possible penalties for not adhering to standards to be the biggest motivators for risk management.

Smith et al. (66) surveyed businesses regarding pandemic influenza preparedness and general disaster preparedness, identifying that most businesses had started planning. However, findings suggest that most businesses:

- felt the developed pandemic plans would be ineffective in a crisis
- employees had not been educated on the pandemic or pandemic preparedness
- expressed interest in obtaining additional training in pandemic and disaster planning, plan exercising and infection control.

These findings suggest the need for more formularised and applicable planning and policies within businesses.

Research has also identified the openness of individuals to increased surveillance following a public event. For instance, employees were more willing to shift their emphasis from protecting workplace privacy to increasing their security following 9/11 terrorist attack (67).

Research suggests workplaces should form multifaceted crisis teams, develop policy and interface for actively communicating, have a disaster plan and regular rehearsals for events. Schouten et al. (32) suggests that liability claims might arise from the absence of emergency plans, inadequacy of the plan and failure to follow the plan.

Recovery

Posttraumatic growth

While events, such as a pandemic, most commonly have a significant negative impact on individual health and wellbeing, communities, workforces and the economy, these events can also lead to posttraumatic growth. Posttraumatic growth refers to positive change following adverse events. For instance, Brooks et al. (33) found that several participants who had been exposed to an emergency or disaster reported positive psychological outcomes such as:

- increased morale and confidence if they had responded well
- a new appreciation of life
- greater emotional maturity
- compassion, sympathy and understanding of others in difficult situations
- strengthening bonds between colleagues with increased mutual understanding.

Similarly, nurses indicated positive impacts of rescue experiences post-earthquake (68), including:

- recognition of the impermanence of life and subsequent decision to live a more significant life, this was aided by mutual solidarity they experienced from others altruism in helping
- more caring relationships due to the shared experience
- a clearer concept of disaster care and strengthening of individual practical competency
- better appreciation of the value of nursing and self-worth
- enhanced knowledge and skills including survivor needs and factors hindering rescue.

Lessons learnt

Review of the 2009 swine flu pandemic provided key take take-aways to reduce morbidity and mortality of influenza (69). Khanna et al.'s (69) suggest the following key lessons:

- Higher risk groups (e.g., asthma) to be given quicker medical attention on priority, as these vulnerable samples are more prone to secondary bacterial infections. Also taking in consideration pregnant women.
- Reliance on rapid diagnostic testing should be reviewed and utilised cautiously given possible inaccuracies.
- Quick medical response is required, with antiviral therapy most effective within 48 hours of signs and symptoms.
- Need for stringent hospital policies regarding PPE for caring and treating patients, and collection and transportation of suspected cases specimens.
- Social distancing practices used to combat pandemic spread, including cancelling events (i.e., concerts, movies, general public gatherings), closing or restricting access to buildings, schools, gyms, etc., and limiting hospital visitors.
- Eating habits should be reviewed to maximise nutrition and minimise illness
- Public awareness should be increased to educate the public on modes of transmission, methods of prevention and general etiquettes.

Similarly, review of the steps leading to containment of SARS in 2003 (70), suggest that the outbreak peaked in 6 weeks, with the prompt resolution attributed to the rapid adoption of a series of effective controls:

- Increased emergency management, including deployment of local and military health workers, with large quantities of emergency supplies including personal protective equipment. Fever clinics set up in hospitals for screening and triage. Actively ill patients with SARS were concentrated in designated hospital wards.
- Healthcare workers received medical training in the management of patients with SARS, infection control and use of PPE.
- Multiple measures were used to reduce person-to-person transmission, including SARS patient isolation, tracing and quarantine of close contacts, transit site surveillance and closely poorly maintained facilities that could increase viral spread.
- Information dissemination was critical, including timely and accurate reporting of status and scientific guidance on prevention and infection control.
- Containment measures including:
    - animal source containment (via monitoring sources, minimising trade)
    - early detection and diagnosis
    - rigorous infection control- environmental and personal hygiene, contact tracing, strict isolation, quarantine of cases early, training with personal protective equipment, fever clinics and education of the public
    - timely case reporting and rapid clear information dissemination
    - vaccine development

Yang et al. (70) suggests the key to control an outbreak, like SARS lies within prevention, rapid responses, reducing transmission and treatment, recommending quarantine, mobilising resources and disseminating information.

Workplace responses exposed to 9/11 terrorist attack also provide insight into organisational factors of importance; experience of transition back to work, and workplace response to psychological issues (28). Focus groups identified reduced isolation and fostered emotional support and recovery within the return to work transition by:

- the efforts of management to facilitate a timely and healthy return to work
- the facilitation of peer support
- development of an environment of sharing and processing their experiences

Workplace responses to psychological issues identified as beneficial included:

- communication about survival/loss of co-workers
- professional workplace mental health services supplied
- encouragement to return to work
- nonclinical forums for personal sharing and support

Actions to improve recovery

Research suggests that organisational factors can have a positive impact on employee wellbeing prior, during and post incident (33). These factors include:

- good organisational leadership
- supportive work culture
- substantial disaster preparation and planning.

However, there is little empirical evidence on effective interventions to provide guidelines of how best to manage and assist trauma-exposed employees (33). Employees from healthcare, emergency services and commercial sectors interviewed (33) suggested the following improvements to assist recovery:

- reduce mental health stigma by raising awareness of mental health issues and normalising feelings of trauma and needing support
- provision of psychosocial training packages, including training in listening skills, recognising trauma in others, trauma and its effects and cumulative stress. Training delivery methods were also discussed, suggesting that online packages were less favourable as they were seen as less engaging and being completed in a silo.

Specific to healthcare workers and the experience of moral injury, due to difficult decision making and pressured environments, preparation and support of staff is suggested to be integral (27). Actions identified to prepare, and support staff include:

- preparation and awareness of staff regarding the moral dilemmas they are likely to face, with honest assessment of the situation and expectations given in plain English
- team leaders to assist staff to understand the reason behind difficult decisions
- team leaders to engage with staff potentially avoiding (e.g., "too busy" or "not available"), which can be a core symptom of trauma
- support systems should address moral injuries, along with other mental health education and awareness
- support for leaders.

And following the crisis, include:

- time to reflect on and learn from the difficult experiences. Reflection and learning can create meaning to trauma
- active monitoring of staff to identify those requiring care and providing assistance in care access. Care should include evidence-based treatments and address consideration feelings of guilt and shame.

Kay et al. (71) emphasised the importance of human factors to ensure organisational resilience in crisis recovery. Following the earthquakes that occurred in New Zealand, organisations were surveyed and interviewed over a six year period to gain an understanding of how they were affected, adapted, and recovered (71). The top ten lessons learned from this research were:

1) Take care of staff: Be aware that everyone's experience is unique but follows a general pattern. Being aware of these patterns will help to manage and assist staff through the recovery period. The general pattern of disaster recovery is suggested to include both highs and lows, with individuals moving through the following stages:
    - Heroics: feeling of altruism
    - Honeymoon: sense of shared survival, anticipation of help/return of normal
    - Disillusionment: resulting from disappointment, anger, frustration, disputes, red tape, loss of support and exhaustion
    - Reconstruction: following a path of facing obstacles and delays.
2) Look after leaders: More resilient organisations tend to have many leaders. Staff engagement may depend more on the leadership of their direct supervisors than more senior management.
3) Have good communication: Early communication with all stakeholders is recommended. Open, transparent and ongoing communication with staff is paramount.
4) Build and/or maintain connections: Ongoing and open communication and negotiation with suppliers can assist with the continuity of businesses.
5) Collaboration: Collaboration between all stakeholders and other outside organisations will support recovery.
6) Recovery for a new environment: Be prepared to adjust to a new environment as change is inevitable.
7) Recovery will take time: Be flexible with change and have realistic expectations.
8) Insurance: Be aware of the limitations of insurance and concentrate on future directions of the business.
9) Staff engagement: Engaged staff are part of the long-term success of the business.
10) Planning and preparedness: Having a plan to support staff, building resilience in staff, identifying and developing leadership at all levels, and building a culture that encompasses and applies lessons learned in a timely manner.

Models of Recovery

As the above research shows the impact of pandemics is multifaceted and as such needs to be considered from multiple perspectives. Specifically, the individual level, the interpersonal level, the organisational level and the societal level (88). Consequently, it is essential that these levels are considered and incorporated into any intervention and recovery design. This will enable research in this area to systematically and successfully advance. Reissman et al. (2) also extrapolated five outcome factors that should be included to measure intervention effectiveness. These include five pillars of recovery that create a shift from left to right.

1) Helplessness to efficacy (self and collective; e.g., we are all in this together)
2) Loss to Connectedness
3) Fear to Calm
4) Risk to Safety
5) Despair to Hope

Psychological interventions for front line health care workers

COVID-19

Due to the recent outbreak of COVID-19, the National Health Commission of People's Republic of China (NHC) published guidelines for psychological crisis intervention for 2019-nCoV. One of these guidelines was a circular on issuing guiding principles for emergency psychological crisis intervention for pneumonia epidemic of new coronavirus infection (72). This guideline suggested particular interventions for health care workers (HCW).

These included:

- Preparing the worker psychologically to be able to provide treatment to others through participating in crisis intervention training
- Organising logistical support including regular rotation of staff, particularly in the quarantine area
- Being realistic with staffing rosters
- Have regular relaxation and rest times
- Ensure that staff are getting enough sleep, including organising for staff to stay near the hospital when required
- Allow staff to communicate with their family and friends
- If staff start to show signs of mental health issues, such as stress and burnout, they should be given time to seek professional health from the psychological crisis intervention service or the mental health service.

It has also been suggested that hospitals should provide an environment that helps to maintain mental health (e.g., adjust lighting, keep in touch with family, provide mental health education) and to provide psychological support and crisis interventions for HCWs (e.g., understand needs of the HCW in a timely manner and respond accordingly) (73).

A hospital in west China, is using the Anticipate, Plan and Deter (APD) Responder Risk and Resilience Model to understand and manage the psychological impacts of COVID-19 on HCWs (74). In the Anticipate stage, HCWs receive pre-event stress training; the Plan stage, they develop a personal resilience plan; and the Deter stage, they learn how to use their personal resilience plan. The hospital is using a two-stage (during and after epidemic) psychological intervention model to integrate online capabilities throughout the intervention whilst combining early intervention with the later recovery phase. They are utilising many online psychological interventions which incorporate service content (e.g., educational information, relaxation and mindfulness exercises, hotline service), service platform (e.g., WeChat accounts), technical guidance (e.g., e-books), and problem feedback mechanisms (working groups, supervision groups). Although helpful, there have been issues with uptake of some of these interventions.

Two hospitals in the Hunan Province and Wuhan have developed a detailed psychological intervention plan for their staff (75). This included building a psychological medical team who provide online courses about managing common psychological issues. They have also implemented a psychological assistance hotline team as well as various group activities to alleviate stress. This has not been without its issues and psychological interventions have been adapted as problems arise.

Psychological intervention teams have also been set up by the RenMin Hospital of Wuhan University and Mental Health Center of Wuhan, which comprise four groups of health-care staff (76). These teams are:

- Psychosocial response team
- Psychological intervention support team
- Psychological intervention medical team
- Psychological assistance hotline teams

These teams have been received well and are starting to be used in other hospitals.

Pandemic Influenza

In 2012, British Columbia published a pandemic influenza psychosocial support plan for HCWs and providers (77). The purpose of this plan is to provide guidance for leaders in planning early psychosocial interventions and developing workforce resilience programs. Some key components include:

- Resources and programming (e.g., ongoing education and training, workplace buddy systems)
- Training and education (e.g., pandemic plans, stress management and coping)
- Information and communication (e.g., fact sheets on relevant pandemic topics)
- Stress management (e.g., debriefing, peer support programs)
- Assessment, triage and referral (ongoing, systematic process of assessment and referral where necessary to an outreach program)

SARS 2003

After the SARS outbreak, it was found that there was no literature on how to anticipate and respond to the psychological effects of the outbreak (78). Consequently, lessons learned after SARS included:

- Understanding and mitigating the impact of interpersonal isolation
- Ongoing communication about risk to HCWs as well as the general public
- Beware and mitigate the stigmatisation and negative portrayal of HCWs in the media
- Provide education and space for HCWs to learn and use effective coping strategies
- Provide practical support (e.g., training in the use of personal protection equipment).

After their experiences with SARS, (79) developed and implemented a one hour resilience training intervention for HCW. This was delivered by two facilitators to 1,250 staff in groups of 5-50. Participants found the session relevant to work life and personal life, helpful and informative with 76% stating they felt they would be better able to cope with a pandemic.

Ebola

In systematic review of mental health psychosocial support (MHPSS) among populations affected by the Ebola virus, four programs were found that provided MHPSS to staff and volunteers (80).

- The International Medical Corps (IMC) provided psychosocial support training to Ebola Treatment Centres (ETC) workers in Liberia and in Sierra Leone. Issues covered included fear and misinformation, interruptions to daily activities, inability to access health care, stigma and grief (81).
- The Red Cross Society of Guinea provided stress management sessions and well-being workshops for volunteers and HCWs. These workshops comprised of a number of half-day sessions for 10–15 participants. Topics included coping with stigma, discrimination, stress management and self-care (82).
- Currently, in the Democratic Republic of Congo, the Psychosocial Commission and psychologists working with the ETCs also provide support to HCWs.
- The International Red Cross and Red Crescent Movement and the Bethesda Counselling Centre provide psychosocial support to frontline staff, including safe and dignified burial teams, community engagement teams and health workers.
- Following the EVD outbreak in Sierra Leone, a three-phase CBT-based group intervention was developed by UK clinicians (83). These clinicians trained ex ETC staff to deliver CBT intervention to their peers. The results found improvements across all factors of mental health.

The APD Responder Risk and Resilience Model was implemented during the Ebola response in West Africa (84). A Behavioural Health Incident Coordination Team was also formed and using the ADP model they were able address any psychological challenges identified.

Schultz et al. (85, 86) recommended after the Ebola outbreak that a proactive response in relation to mental health was required. This should include:

- An assessment of stressors in relation to the outbreak. It was suggested that a trauma signature analysis be used. This is an evidence-based method that has shown to be effective in identifying psychological risk factors in disasters.
- Once assessment has been completed, an intervention that is consistent with the Inter-Agency Standing Committee (87) guidelines on mental health and psychosocial support in emergency settings needs to be implemented and then continued throughout the recovery process.

Key recommendations

- Have a national website which provides key information on psychological support for health care workers (HCW)
- Provide fact sheets on mental health consideration (e.g., stress management, self-care, how to prepare for a response, understanding and identifying burnout and traumatic stress)
- Provide preventative training (i.e., psychological crisis intervention) for all workers so they have personal resources to manage their stress
- Conduct a thorough analysis of the event to be able to target specific appropriate psychological interventions
- Have psychological intervention teams who provide support and treatment to HCWs
- Provide a conducive environment to reduce stress (e.g., ongoing communication and education, arrange rest and relaxation, have regular rotation of staff, allow communication with family)
- Have dedicated hotlines and online platforms for psychological intervention for staff

Limitations of current research

The current literature search identified several limitations within the existing research, including:

- limited research on other frontline facing employees, and employees generally, outside of the healthcare industry
- limited available research regarding recovery post-event

In addition, to these literature limitations, it is also important to note the significant difference in the current COVID-19 pandemic, compared to past epidemic and pandemics. More specifically, the current COVID-19 pandemic differs on:

- unique nature of the virus, including infection rate and transmission
- the current social climate, with increased online communication present prior to the pandemic
- the extent of mitigation strategies utilised, including increased enforced social isolating, closure of businesses and, national and state borders, travel restrictions and school closures, etc.
- the utilisation of working-from-home practices within businesses where possible
- the advanced technology (i.e., social media, online video meeting platforms,) accessible to a greater extent of the population

These differences in the current pandemic may have a significant impact on the implications for consequences and recovery. In particular, these changes may result in different impacts when compared to past events and future events.

Summary and recommendations for current COVID-19 situation

The current review has identified significant impacts, risk and protective factors, recovery, and psychological interventions to be noted when addressing workplace sustainability.

Impacts

Quarantine effects – Infected or due to close contact of confirmed cases

- Psychological distress
- Fear
- Loneliness
- Boredom
- Anger
- Worry about contagion to family and friends
- Guilt
- Sadness
- Nervousness
- Stigmatisation and discrimination

General Population

- Worry
- Difficulty focusing
- Vicarious trauma
- Increased substance abuse (alcohol, tobacco and marijuana)
- Stigmatisation and discrimination
- Greater inequality in living standards
- Suicide

Healthcare workers

- Mental health issues (i.e., depression, anxiety, posttraumatic stress symptoms, insomnia, and stress)
- Physical exhaustion
- Burnout
- Fear of falling ill
- Strained relationships (i.e., patient-provider, and between providers)
- Psychological distress
- Moral injury
- Stigmatisation and discrimination

Healthcare workers within quarantine

- Exhaustion
- Detachment from others
- Anger
- Anxiety when dealing with febrile patients
- Irritability
- Insomnia
- Poor concentration and indecisiveness
- Deteriorating work performance
- Reluctance to work or consideration of resignation
- Long-term effects including alcohol abuse and dependency symptoms
- Behavioural avoidance during and post-outbreak
- Stigmatisation and discrimination
- Reduced organisational commitment (i.e., reluctance to work and intention to resign)

Managers/Supervisors/Leaders

- Difficulties in setting boundaries (i.e., leaving workplace and staff)
- Increased sense of responsibility to staff
- Guilt (i.e., when instructed to stay home)
- Difficulty dealing with emotions, own and staff's, while providing support

Non-essential titled workers

- Feelings of isolation
- Feelings of hopelessness
- Organisational
- Absenteeism
- Presenteeism
- Business closure
- Smaller labour supply (due to deaths and absenteeism due to illness and workplace avoidance)
- Disruption of transport
- Reduction in demand
- Government restrictions disrupting trade, travel and commerce
- Increased online commerce

Risk factors

- Vulnerable populations: communities with low vaccination coverage and community naivety.
- Workplaces with use of common spaces, and increased social mixing, leading to greater transmission
- Workplace policies that have a lack of access to sick leave
- Lack of workplace policies and procedures regarding pandemics
- Pre-event psychopathology (i.e., childhood trauma, personality disorder traits, inadequate support, comorbid psychiatric illness and excessive alcohol intake)
- Female gender
- Excessive and repeated event-related media exposure (including social media and graphic images), leading to excessive help-seeking behaviours and excessive health-protective behaviours (i.e., panic buying)
- Low or inadequate social support
- Direct exposure (i.e., emergency department workers)
- Healthcare worker
- High perceived life threat and possible infection (i.e., high infection risk environment, with increased human interactions and frontline interactions)
- Lack of perceived safety and increased personal vulnerability
- Large families
- Occupational hazards including heavy workloads, environmental hazards, deployment, unclear instruction, ambiguous infection policy, lack of feedback and/or appreciation, being blamed for mistakes
- Inability to do one's job
- Limited job control
- Increased workload due to increased demand and also staff absenteeism
- Feelings of inadequate staffing
- Level of agreement with infection control measures
- Stigmatisation
- Role conflicts, including gatekeeper roles
- Non-essential title
- Difficult decision making
- Extreme workplace pressures
- Frequent changes to infection control policies
- Insufficient medical supplies
- Uncertainty regarding outbreak control
- Duration of quarantine
- Fear of infection
- Frustrations and boredom due to quarantine
- Loss of routine
- Reduced social and physical contact due to quarantine
- Financial stress
- Poor organisational support (i.e., inadequate insurance, poor feedback receptivity, and poor culture)
- Fear and uncertainty
- Social distancing mitigation strategies
- Self-employment
- Low income earners

Protective factors

- Access to formal psychological support
- Social support (i.e., organisational, family and friends, and community at large)
- Clear and consistent information
- Training, work task planning and preparedness (especially on PPE and infection control)
- Access to PPE
- Altruistic acceptance of work-related risks
- Extra financial compensation
- Recognition of staff
- Staff meetings
- Role clarity
- Leader support
- Increased feelings of safety, actual safety
- Pamphlets increasing awareness of signs of anxiety and stress and information about support resources
- Employee trust of organisation
- Return to work assistance for those unemployed
- Personal health behaviours including nutritious diet

Recovery

Posttraumatic growth

- increased morale and confidence if they had responded well
- a new appreciation of life
- greater emotional maturity
- compassion, sympathy and understanding of others in difficult situations
- strengthening bonds between colleagues with increased mutual understanding
- enhanced knowledge and skills including survivor needs and factors hindering rescue.

Actions to improve recovery for businesses

- Take care of staff: Be aware that everyone's experience is unique but follows a general pattern. Being aware of these patterns will help to manage and assist staff through the recovery period. The general pattern of disaster recovery is suggested to include both highs and lows.
- Look after leaders: More resilient organisations tend to have many leaders. Staff engagement may depend more on the leadership of their direct supervisors than more senior management.
- Have good communication: Early communication with all stakeholders is recommended. Open, transparent and ongoing communication with staff is paramount.
- Build and/or maintain connections: Ongoing and open communication and negotiation with suppliers can assist with the continuity of businesses.
- Collaboration: Collaboration between all stakeholders and other outside organisations will support recovery.
- Recovery for a new environment: Be prepared to adjust to a new environment as change is inevitable.
- Recovery will take time: Be flexible with change and have realistic expectations.
- Insurance: Be aware of the limitations of insurance and concentrate on future directions of the business.
- Staff engagement: Engaged staff are part of the long-term success of the business.
- Planning and preparedness: Having a plan to support staff, building resilience in staff, identifying and developing leadership at all levels, and building a culture that encompasses and applies lessons learned in a timely manner.

In addition, interventions should work to shift individuals from helplessness, loss, fear, risk, despair to efficacy, connectedness, calm, safety and hope, respectively.

Key Recommendations for Psychological Interventions for Healthcare Workers

- Have a national website which provides key information on psychological support for health care workers (HCW)
- Provide fact sheets on mental health consideration (e.g., stress management, self-care, how to prepare for a response, understanding and identifying burnout and traumatic stress)
- Provide preventative training (i.e., psychological crisis intervention) for all workers so they have personal resources to manage their stress
- Conduct a thorough analysis of the event to be able to target specific appropriate psychological interventions
- Have psychological intervention teams who provide support and treatment to HCWs
- Provide a conducive environment to reduce stress (e.g., ongoing communication and education, arrange rest and relaxation, have regular rotation of staff, allow communication with family)
- Have dedicated hotlines and online platforms for psychological intervention for staff

Recommendations

Based on the evidence reviewed throughout the current document the following recommendations are suggested. Specifically, to improve workplace sustainability is recommended that employers:

- Be aware of the psychological impacts
- Provide additional training (including preparation for critical incidents) and support for managers, supervisors, and leaders
- Comprehensively train in critical incidents, responding, infection control, psychological preparedness and disaster aspects

- Pre-event training including the physical elements as well as the potential psychological risks (i.e., recognising and addressing one's own mental health) is just as if not more important as post-event support.
- Awareness and planning for long-term effects of the event.
- Financial support to prevent financial distress, ensuring sufficiency and timely provision.
- Enhance education and support, providing quarantine rationale to minimise psychological impact, stigmatisation, and minimising duration of quarantine if possible.
- Limit media exposure as necessary, and address media coverage, including social media, role in excessive help-seeking behaviours (i.e., overburdening health systems) and health-protective behaviours (i.e., panic buying). Address spreading of misinformation and inconsistency with information provided across media platforms.
- Researchers suggest there is a need for community members to limit their exposure to repetitious media coverage of events that provide little new information, while still remaining up-to-date with critical information as it develops. In addition, public health communicators should address the role of social media in risk perceptions of community members.
- Provision of psychiatric services reduces psychological impact on healthcare workers. External services should be made available, for example confidential telephone support lines which have been reported to be especially effective for those in quarantine.
- It is important to address any employee perceptions of mental health stigma that may prevent engagement with services.
- The need for flexible work arrangements and contingency strategies including childcare arrangements in the event of school closure, to minimise the impact on the economy.
- The need for more formularised and applicable planning and policies within businesses.
- In sum, the recovery process is a multifaceted, multilayered process that will evolve with cycles and phases for the individual, communities, organisations, and society at large. It is recommended that recovery programs and interventions include scaffolding and preplanning derived from the existing literature, with the understanding that there are some unique and potentially moderating elements that COVID 19 presents
- Educational interventions should target nonmedical health care workers to ensure understanding and use of infectious control measures.
- Psychological support could include counselling services and development of support systems among colleagues

Questions remaining

In addition, based on the literature available and the uniqueness of the COVID-19 situation, the following questions are posed

- What are the specific impacts due to the COVID-19 pandemic?
- Outside of healthcare, what are the impacts, risk and protective factors within various industries?
- What are the impacts of the utilised mitigation strategies within the current COVID-19 pandemic?
- What extent of stigmatisation and discrimination will occur due to COVID-19 pandemic within the workplace?
- What organisations/industries/businesses were most impacted by the COVID-19 pandemic?

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