INTRODUCTION: This report was developed in partnership with Seattle University to support ongoing 2020 COVID-19 response efforts at the Washington State Department of Health and other public health agencies in the region. As a supplement to the daily Literature Reports created at the Department of Health on the ever-evolving scientific literature related to COVID-19, this report provides a review of current and historical literature on the psychosocial effects of large-scale outbreak response. This report includes a brief overview of the literature followed by an extended annotated bibliography.
OVERVIEW OF THE LITERATURE

In reviewing historical literature on previous outbreaks of emerging diseases and recent reports from the 2020 COVID-19 outbreak, clear patterns emerge around the psychosocial impacts of large-scale outbreak response. The implications for healthcare workers, people under quarantine, and especially vulnerable populations are highlighted across disciplines, with public health, psychology, and social science researchers coming to the same conclusions: stress, anxiety, fear, and depression, among other psychological effects, are not only common, but can and should be anticipated. These effects are seen strongly among those with direct relationships to the disease in question and among people who have direct contact. Others may experience these symptoms after vicarious exposures through media and government communications. Researchers almost unanimously call for increased preparedness for community and occupational mental health support structures during crises like the 2020 COVID-19 outbreak. To better prepare the global community for short and long-term psychosocial effects of this and future outbreaks, it is critical that we leverage the knowledge gained from prior response efforts.

Lessons from previous outbreaks

Prior research on psychosocial effects of quarantine associated with global pandemics, such as those associated with SARS and MERS, indicates an association between quarantine and higher distress, anxiety, and PTSD symptoms. Longer quarantine periods have been linked to more severe PTSD symptoms. High-risk populations include homeless individuals, run-away youth, unauthorized or undocumented immigrants, and minorities whose ethnicity matches the disease's country of origin. Healthcare workers (HCW), especially nurses, are also at particularly elevated risk of poor mental health outcomes and would benefit from both pre- and post-event mental health interventions. Loss of income has also been cited as a major social impact of quarantine, whether voluntary or involuntary.

Contributors to negative psychosocial effects of global pandemics include: lack of knowledge about the situation, limited understanding of rationale, the absence of regular communication or unclear communication from officials, and lack of reinforcement from supporting agencies. These factors may also explain noncompliance with quarantine measures. While it may seem intuitive that involuntary quarantine would create greater distress than voluntary self-quarantine, both have mixed results in terms of mental health. For example, Yoon et al. noted that those involuntarily quarantined felt more confident in the measures taken by their government. Cultural differences likely play a major role in the generalizability of these studies.

It is essential that psychosocial impacts and the restriction of civil liberties that can be associated with quarantine practices be taken into consideration when preparing for and responding to global pandemics. When quarantine is deemed a necessary step in outbreak response, government leaders should maintain constant and clear communication with community members, health care workers, the media, and all those affected by the outbreak to limit the psychosocial effects.

Current reports from China and other countries most affected by COVID-19

In the early days of China’s response to the COVID-19 outbreak, leaders recognized the behavioral health impact of the outbreak and response efforts on citizens. In Japan, COVID-19 was seen as yet another “unseen” threat, like radiation, contributing to cumulative trauma. China, South Korea and Japan all implemented interventions to attempt to address psychological distress in their populations at large and for their healthcare providers in particular, each taking different approaches.

Across these countries, citizens reported concerns about becoming infected, stigma associated with COVID-19, symptoms of anxiety and depression, insomnia, engaging in avoidance behaviors, increased hygiene behaviors, and worries about accuracy of information about the disease. These were particularly prevalent in Wuhan, the epicenter of the outbreak. Meanwhile, despite wanting more
communication about the outbreak from official sources, evidence suggests that those who spent over 3 hours a day focusing on COVID-19 had increased anxiety.28 Citizens over 80 years old and those with disabilities were also identified as particularly vulnerable due to their frequent social isolation, higher risk of death due to infection, and lack of access to the online and technical resources available to younger citizens.27 It was also determined that healthcare workers’ vulnerability to increased anxiety and depression may be exacerbated by underlying mental health issues28, female sex22, balancing family obligations with work9,22, concern about becoming infected, close contact with infected patients9,28,22, worry about isolation and stigmatization by family and friends9, and having family who are suspected of or confirmed as being infected.28 These effects of these risk factors can all be amplified by lack of social support.22

**Strategies being Used in China and Other Affected Countries**
- Development and utilization of online psychological resources13
- Tele-health utilization by psychological care providers9,13,26
- Messaging that is clear, honest, and provides detailed information about the virus and ways to mitigate risk of infection17,21
- Information and education on hygiene and social distancing17,9
- Counteracting rumors and misinformation17,9,13
- Hotlines with trained volunteers9
- Access to leisure activities which can be enjoyed while in isolation, including book clubs and chat rooms6
- Direct outreach to older citizens and those with disabilities who may have less access to or facility with technology27
- Structured written communication between concerned people and mental health providers26

**Interventions Reported to be Helpful for Healthcare Workers with COVID-19**
- Treating infection with COVID-19 as a work related injury9
- Rotating shifts in terms of higher and lower pressure roles9
- Increasing access to accurate training and information on how to mitigate risk of transmission9,6
- “Reasonable” work shifts22
- Comfortable accommodations for staff who must remain in hospitals
- Access to adequate PPE and training on how to safely don and doff6
- Adequate sleep22
- Help with patient care in the hospital from hospital administrators22
- Access to mental health providers and consultation as requested6,22
- Training and assistance in working with patients who are uncooperative or exhibit agitated or aggressive behaviors6
- Learning relaxation techniques and physical exercise6,22
- Social support22

**Preparing Communities at Large to Reduce Mental Health Effects**

Evidence from the past several global pandemics suggests several potential methods for mitigating psychosocial effects among those under quarantine during a public health crisis, including financial support for lost wages, access to childcare, and supporting increased connection to loved ones through telecommunications.6,26,11 For both the population at large and those quarantined, clear and regular communication from officials7,9,13,17,18,21 and providing access to psychological services6,13,26,29 are strongly evidence-based approaches for supporting population and individual psychosocial wellbeing which should be prioritized by public health and government officials early and consistently.

- There are moral and ethical questions about how quarantines challenge civil liberties. In the decision to invoke quarantine, the authors raise 3 key questions: 1) Do public health and medical analyses warrant the imposition of the large scale quarantine? 2) Is the implementation and maintenance of large-scale quarantine feasible? 3) Do the potential benefits of large scale quarantine outweigh the possible adverse consequences?
- They conclude that evidence-based outbreak response should ensure the public is provided with accurate and accessible behavioral guidelines to help maximize overall reliability and compliance with public health recommendations.


- Restrictions associated with quarantine limit personal freedoms. A risk-benefit analysis is necessary in managing the appropriate level of quarantine. Several examples of unintended consequences of quarantine from a 2003 SARS outbreak in Taipei are described. The authors developed a graphic decision tree to assist public health officials and policy makers.


- Authors conclude that evidence for using medical quarantine based on its effectiveness cannot be justified. Some suggestions include giving a voice to non-technical perspectives (seeking out qualitative data) on the effects and experiences of those affected by quarantine.


- Health care providers who underwent quarantine reported feeling: stigmatization; reluctance to work or considering resigning; deterioration of work performance; PTSD symptoms; higher alcohol intake; and physiological stress when feeling as though friends, family, or co-workers were treating them differently.
- The longer an individual was in quarantine, the more anger and avoidance behaviors were demonstrated
- Distress positively correlated with lack of trust in equipment or infection control procedures, belief that training was inadequate, perception of greater personal disease-related risk, being directly involved with patient care (particularly nurses), and being involuntarily deployed to high-risk
environments. Distress was negatively correlated with confidence in infection control knowledge and skills and volunteering for high-risk environments.

- The authors suggest approachable communication style with regular updates from management; specialized training for all staff, including psychological coping skills; and web-based support groups.


- There are negative psychological impacts of quarantine that must be considered in addition to the public health benefits. Studies on SARS, Ebola, the 2010 H1N1 influenza, MERS, and Equine influenza examined psychological outcomes for those who were quarantined compared to those who were not. Reported symptoms among those quarantined included psychological distress, fear, exhaustion, PTSD, depression, irritability, and emotional disturbance among other symptoms.
- Specific stressors *during* quarantine periods included duration, fears of infection, frustration/boredom, inadequate supplies, and inadequate information.
- Specific stressors *post* quarantine: finances and stigma.
- Suggestions for reducing quarantine consequences include providing the public with accurate data for reasons behind quarantine and supporting healthcare workers.


- Mental health services for healthcare workers were quickly established for 5 large healthcare organizations. These included psychologist teams and online support. However, staff requested support in terms of working conditions before accepting psychological support.


- A survey was administered to 129 people (including health care workers) who were quarantined in Toronto during the SARS outbreak. Psychological distress, such as feelings of anxiety and isolation, PTSD, and depressive symptoms were common, although no formal diagnoses were made in this study. PTSD symptoms were associated with longer quarantine duration, lower income, and knowing someone who was infected with SARS.
- The authors suggest that a lack of knowledge, inadequate reinforcement by an overwhelmed public health system, and incomplete understanding of the rationale for quarantine may contribute to mental health distress among quarantined persons. Around 50% of respondents felt they had not received sufficient information about at least one aspect of their quarantine instructions.


- Hull critiques Hawyrluck et al. (above), stating that “...although isolation and quarantine are stressful, that is an insufficient reason to hesitate when these measures are indicated.” The authors’
response emphasizes that while psychological effects of quarantine were noted, they do not give sufficient reason to refrain from using quarantine if necessary.


- Healthcare workers in Wuhan have been facing enormous pressures, including: transmission rates, inadequate protection from contamination, overwork, and exhaustion. This is resulting in mental health issues such as stress, depression, fear, denial, and anger.


- Many of the infections during the 2009 H1N1 outbreak in Australia were among school-aged children, leading to school closures, enforced home-quarantine, and social-distancing measures.
- About half of all the households were fully compliant with the quarantine recommendations.
- Authors recommend that employers should provide flexible work arrangements and compensation for individuals, especially parents, who may experience additional financial strain.


- About 1,500 participants were randomly recruited for a survey after the 2003 SARS outbreak in Taiwan. Due to the alienation that accompanies quarantine, affected individuals reported significantly higher levels of depression and encountered more economic difficulties.
- Social support, self-perceived health conditions, taking precautionary measures, and clear disease information were protective factors for exposed patients or healthcare workers.
- The authors suggest a mandatory and holistic approach to a mental health intervention program after an epidemic disaster.


- The authors discuss the benefits and risks of different communication styles from government entities during the COVID-19 outbreak.

This survey reveals significant levels of depression, anxiety and insomnia among Chinese citizens. The author believes that strategies like offering online counseling by professional mental health providers, online self-help using Cognitive Behavioral therapies, and using Artificial Intelligence programs to recognize and identify people at suicidal risks may all improve the efficacy of emergency response going forward.


- Different groups experienced different psychological effects of the 2003 SARS outbreak. SARS patients reported feelings of guilt and anger, fear for the welfare of their friends and family, and possible loss of income. Infected healthcare workers were concerned about the risk to the staff in charge of their care. Uninfected healthcare workers expressed fear of being infected and then infecting their family members. Asian patients, even ones without SARS, reported stigmatization due to their race and the virus’s connection to China.
- The authors suggest hospital responses to infectious outbreaks should include clear communication, sensitivity to individual responses to stress, a collaboration between disciplines, authoritative leadership, and provision of relevant support.


- Mowbray describes misinformation circulating in China about prevention, testing, and treatment of COVID-19 in the absence of evidence-based answers from both Chinese and Western medicine.


- The authors describe psychological stress of Korean citizens under quarantine. The authors agree with three factors as part of the mental health response that were proposed by their Chinese colleagues: multidisciplinary mental health teams, clear communication with regular and accurate updates on COVID-19, and establishment of secure ways to provide support via electronic and apps.


- In this cross-sectional study with 510 persons from Wuhan and 501 persons from Shanghai, participants completed phone interviews about symptoms of anxiety and behavior changes related to COVID-19, such as increased hand washing, use of masks, and avoidance of going out. Citizens in Wuhan reported significantly greater symptoms of moderate to severe anxiety than those in Shanghai (major city with transportation ties to Wuhan). Perception of risk and severity of disease were positively associated with behavior change, and enhanced by governmental enforcement and messaging. However, confusion about the accuracy of information provided led to increased anxiety.

- The authors suggest health officials use methods to quickly deliver information about protective measures and why quarantine is important
- Most participants in this survey reported not fully complying with all household protective measures, with about half following community protective measures and few complying with all household measures. The most difficult measure to comply with was not going out to visit friends and family.
- While most participants reported boredom, isolation, and frustration during quarantine, longer quarantine and compliance with quarantine requirements were significant contributors to PTSD symptoms. Roughly one in four participants reported loss of household income.


- The authors describe the steps of psychological adjustment to crisis and explore the reaction by characteristics of temperament and timing, suggesting that common responses such as gathering information, personalizing the risk, and taking unnecessary precautions serve as “rehearsal” for getting individuals ready to respond. They recommend understanding that these reactions are normal, and to partner with individuals to better guide them.


- The authors recommend a sequenced approach to risk messaging, starting with providing early information and moving on to preparing to increase a sense of efficacy, acknowledging that there is uncertainty, providing some specific ways for individuals to help themselves and their communities, and offering additional information on a regular basis.


- In Japan, economic and social impacts have been reported related to COVID-19, including increased public anxiety and some social stigmatization. The authors believe that COVID-19 adds to previous traumatic events in Japan involving frightening unseen agents, including the Sarin attack, pandemic H1N1, and radiation release from the Fukushima event

Psychological protective factors include exercise, access to sufficient PPE, reduced rate of nosocomial infection, reasonable shifts, and comfortable accommodations for staff. Additionally, hospital, department, and ward based care provided by hospital and department administrators were protective for acute stress, depression, and anxiety.


- The author recommends inclusive policy changes for quarantine, e.g. “the creation of safe harbors,” employment protection and income relief, revising state law-making regulations to be more effective and inclusive, and educational campaigns to raise general public awareness of the importance of following quarantine requirements. They also identify groups who may be less likely to comply with quarantine requirements, such as those experiencing homelessness.


- In this resource sheet, SAMHSA lists out information about social distancing, quarantine, and isolation; typical reactions to expect in outbreaks that require quarantining; ways to support individuals during social distancing; experiences after social distancing; and helpful resources.


- This study examined the relationship between quarantine and immediate negative psychological impacts at a Chinese university during the 2009 H1N1 outbreak.
- Researchers concluded that there was no significant difference in symptoms of PTSD and general mental health between the groups who were and were not quarantined, though those who were dissatisfied with the control measures or who perceived hazard to their health demonstrated worse psychological symptoms than those who did not.
- Findings were inconsistent with some prior literature; however, long-term psychological effects on quarantine groups were not evaluated nor were data broadly representative of the general population. The authors advise against concluding that quarantine has no connection to negative psychosocial effects, emphasizing the importance of specific circumstances.


- The author describes the difficulties of accessing timely psychological intervention during the COVID-19 outbreak, particularly when patients are under quarantine. He suggests a potential method to address this issue what is described as Structured Letter Therapy.

- Online mental health services are available, but older individuals have limited access and knowledge to take advantage of these resources. The author also notes very long wait times for these patients to access direct mental health care. He suggests more attention be paid to these vulnerable members of society.


- The authors recommend increased focus on vulnerable populations and for healthcare workers to limit time spent focused on COVID-19 to less than 2 hours daily, avoid rumors and emphasize facts, exercise to improve sleep quality, and avoid reminders of the epidemic prior to sleep.


- During the 2015 MERS outbreak in South Korea, the province of Gyeonggi was fully quarantined. Among 6,157 citizens surveyed, 19.6% demonstrated emotional difficulties (e.g., depression), 71.3% received one counseling service, and 28.7% sought ongoing counseling services. Of those requiring ongoing counseling, only about 10% were contacted by the national service providers, suggesting that despite increased need, traditional hospital systems and medical facilities were not equipped to respond. The authors called for improved psychological care referral programs and preparedness, recommendations with international relevance.

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