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Needs and gaps for e-mental health care among at-risk populations in the Asia Pacific in the context of COVID-19: A rapid scoping review

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Introduction

The ongoing novel coronavirus (COVID-19) pandemic has had unprecedented and devastating effects globally, including throughout the Asia Pacific region. The mental health effects of COVID-19 and related restrictions are proving to be substantial, with the need for enhanced and targeted mental health care identified as urgent from the beginning of the outbreak in late 2019 [1]. The mental health impacts of COVID-19 are emerging as the pandemic progresses and will become increasingly apparent as the longer-term impacts of social isolation, job and economic insecurity, experiences of illness and bereavement, physical distancing, and disrupted access to usual health and mental healthcare reverberate among populations[2]. While the effects of COVID-19 are felt globally, some populations are at higher risk of experiencing negative mental health effects without adequate access to care. Healthcare workers and others on the frontlines, essential workers, vulnerable groups such as people experiencing homelessness, migrants, and people living with existing mental health and substance use conditions, women, sexual minorities, children, the elderly, Indigenous communities and victims of domestic violence may be at higher risk of negative mental health impacts and may experience unique barriers in accessing care[3]. It is essential to understand the needs of these populations and to identify specific strategies to improve equity in access to mental health services.

The COVID-19 pandemic has contributed to a rapid shift in many aspects of society. Healthcare service delivery has, in many cases, shifted toward online, virtual and tele-health models to ensure ongoing availability of care during the pandemic[4; 5]. The spectrum of these types of interventions, referred to in this paper as 'e-mental health technologies', include mental health care and psychosocial supports offered via telephone, video conferencing, text messaging, online tracking, education and management programs including Smartphone applications (apps) and other types of care or supports delivered via telephone or Internet technoligies[5].

E-mental health technology has previously been recognized as having great potential to address gaps in access to evidence-based mental health care, with the possibility of reaching people in rural and remote areas, minimizing the effects of stigma on help-seeking, and of offering widespread and cost-effective care[6; 7]. In the context of low- and middle-income countries (LMICs), e-mental health care can help to overcome considerable gaps in standard mental health care delivery and accessibility, in part due to a shortage of mental health human resources and low help-seeking in formal healthcare settings[8]. In the context of COVID-19, there has been a call to increase the use of e-mental health care[9] and to prioritize it in the COVID-19 mental health research agenda[3]. Though e-mental health may improve access, there are also risks that it might exacerbate inequities in access to care among high-risk populations who may face poorer digital resources or other barriers[5; 10; 11]. Equity-oriented research, recognizing the intersections of sex, gender, age, ethnicity and other factors, is needed to identify needs and gaps to equitable e-mental health care delivery[10; 12].

The APEC Digital Hub for Mental Health ('the Digital Hub') was created under the Asia Pacific Economic Cooperation's (APEC) Roadmap to Promote Mental Wellness in a Healthy Asia Pacific and acts as the coordinating centre for mental health in the Asia Pacific[13]. The Digital Hub is hosted in Canada and is comprised of a network of stakeholders representing researchers, healthcare providers, policy makers

and people with lived experience (PWLE) from across the region with the goal of "strengthen[ing] the mental health and wellbeing of individuals and communities across the Asia-Pacific region in support of economic growth"[14]. The APEC region is made up of 21 countries, including Canada, and is home to close to 40% of the world's population[15]. The APEC countries represent a tremendous opportunity for generation, synthesis and mobilization of new evidence on the use of e-mental health technologies among high-risk populations in the context of COVID-19. APEC countries have had different experiences and are at varying stages of the pandemic, taking varying approaches to the development and roll-out of e-mental health care. This experience represents an important opportunity for cross-regional learning and mobilization.

This rapid scoping review has the following objectives: 1) to identify priority populations in the APEC region that are at higher risk of the negative mental health impacts of COVID-19, 2) to understand needs and gaps in access to standard and e-mental health care among these populations, and 3) to identify opportunities for the equitable delivery of e-mental health care to these populations. This review is part of a larger study that includes a three-step, modified Delphi consensus process with policy makers, service providers and PWLE across the APEC region. The overall objective of this study is to develop and disseminate a set of recommendations for the equitable delivery of e-mental health care in the region during and beyond the COVID-19 pandemic.

Methods

This scoping review combines the results of two searches. The first rapid review was conducted from June 4th-12th 2020 using PubMed and Google Scholar in addition to snowballing from reference lists. Search terms included Mental Health AND At-Risk Groups / Vulnerable Populations AND COVID-19 AND Asia-Pacific. We included papers related to mental health or psychosocial risk factors and COVID-19 among at-risk groups; that referred to one or more APEC countries or had a global, thus generalizable, scope; English language papers, and papers with full text available were included. 36 records were included in the initial review.

We conducted an updated and more expansive search of Medline, Embase and PsychInfo databases between August 8 – 10, 2020 for records published between January and July 2020. The search terms were selected to identify records that described COVID-19; mental health; at-risk groups; and countries in the Asia-Pacific region. A full list of search terms is provided in *Appendix A*. Inclusion criteria were the same as described above. Due to the emerging nature of the COVID-19 pandemic, we included a broad scope of papers including primary research studies, editorials, commentaries, research letters and brief reports. A total of 321 records were identified and 283 were eligible for the screening process after removal of duplicates. After reviewing abstracts, 136 records were identified for full-text review. Following full-text review, a total of 110 records met the inclusion criteria and were included. This review includes these 110 in addition to the 36 included in the initial rapid review, for a total of 146 records.

Results

A total of 146 records were included in the review. Table 1, in *Appendix B*, lists references, type of article, population(s) of focus, and country or region of focus. Results are described below, identifying mental health risk factors and recommendations for standard and e-mental health care for each priority population.

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Healthcare workers

Healthcare workers (HCWs) were the population most described in the literature as being at high-risk for negative mental health impacts as a result of COVID-19, including elevated symptoms of anxiety, depression and post-traumatic stress, in addition to stress, fear, burnout and insomnia. Mental health risk factors identified among HCWs include high risk of exposure to COVID-19 via direct contact with patients[1; 16-22], insufficient availability of personal protective equipment (PPE)[16; 23-28], overwork[20; 24; 25; 27; 29; 30], rapidly changing demands[27], feeling unsupported by superiors or management[23; 25; 27], uncertainty related to the virus[22; 26], concerns about infecting family members[1; 20; 26; 27; 29; 31] and financial worries[20; 26]. In several studies in China, female gender was associated with higher levels of psychological distress among HCWs[17; 22; 24; 25] as was younger age[22; 30], though one study reported higher rates of depression and post-traumatic stress disorder (PTSD) among male health workers[32].

Specific types of providers experience different stressors. Nurses were found to be particularly vulnerable to the negative mental health impacts of the pandemic[22; 25], likely due to their increased and prolonged contact with COVID-19 patients compared with other HCWs. For example physical therapists in South Korea reported fear of infection due to close proximity required by the nature of their profession[18], while radiologists working in Sichuan Province in China reported higher anxiety levels than the general population, but lower levels compared with other types of HCWs[28]. Nurses conscripted to work in Wuhan, China during the pandemic reported mental health risk factors including social isolation and being away from family, in addition to factors such as overwork and risk of infection[29]. Emergency room physicians in Canada surveyed immediately before the pandemic had high levels of burnout, leading to increased risk of depression, harmful substance use and suicidality[33], which the authors note is of great concern given the added pressures of the COVID-19 pandemic.

Several studies reported increased symptoms of anxiety[16; 18; 19; 21; 22; 25; 27-29; 34-36]. For example, one study[25] identified rates of anxiety of 44.6% among n=1257 healthcare workers in 34 hospitals treating COVID-19 patients in China, while another found that 40% of conscripted nurses in Wuhan, China reported symptoms of anxiety. Among physiotherapists in South Korea, 32.3% reported anxiety symptoms. Depression symptoms among healthcare workers were also elevated[16; 18; 19; 22; 25; 27; 29; 32-35; 37]. For example, the study of 1257 Chinese HCWs directly working with COVID-19 patients found depression rates of 50.4%, while emergency department staff in China[32] had depression rates of 25.2%. Studies also found elevated risk of PTSS and PTSD symptoms[17; 27; 38] and insomnia[19; 25; 29; 34; 37] among HCWs.

While COVID-19 has increased clinical diagnosis of several mental health conditions, many other HCWs experience sub-clinical symptoms that might also greatly impact their work functioning and quality of life[26]. For example in Lai et al.'s study of HCWs treating COVID-19 patients across China, 71.5% had symptoms of distress based on the Impact of Event Scale-Revised (IES-R)[25].

Recommendations for approaches to support the mental health and well-being of HCWs in the context of the COVID-19 pandemic include supports at several levels, including government investment in mental health strategies and support for healthcare workers[21; 33]. A number of the studies from China recommend organizational approaches taken to support HCW mental health[16; 22], including targeted support programs for the most at-risk, such as nurses, women and those that are in direct contact with COVID-19 patients[25]. Chen et. al[39] report that HCWs were initially reluctant to participate in psychosocial support programs offered by their hospital, but after consulting with HCWs the hospital was able to implement to supports that directly responded to the needs and concerns of HCWs, including provisions for them to live apart from their families and communicate via videoconferencing, opportunities for

rest, and increased training. The importance of social support for mental health was also recognized, with suggestions for hospitals to implement rotations and shifts that allowed HCWs time away from high risk wards and time to spend with family and friends[22]. A number of recommendations included using programs such as CBT[27] and peer support[26; 31; 40], many of which focus on building resilience, self-efficacy and refocusing on a sense of professional purpose. Finally, several papers noted the importance of addressing broader risk factors for poor mental health among HCWs, including by providing sufficient PPE[21; 34] and making provisions to support the basic needs of HCWS, including sufficient rest and nutrition[17; 27; 35].

Specific to e-mental health care, several papers recommend improving the availability of quality digital mental health supports, including self-management and CBT-based programs delivered via apps and online platforms[25; 34; 40]. In Wuhan, China, digital and tele-health interventions were rapidly deployed for HCWS, including online mental health courses and hotlines to provide psychological support[36; 39]. Considerations for offering e-mental health support to HCWs include ensuring private space is available for them to use computers or smartphones at work, and that interventions are culturally appropriate to respond to the needs of diverse HCWs[31].

People with existing mental, neurological and substance use (MNS) disorders

Studies describing the increased vulnerabilities of people living with existing MNS disorders cover a diverse spectrum of MNS conditions, including common mental disorders including major depressive disorder (MDD)[41; 42], PTSD[38], eating disorders[43-45], obsessive-compulsive disorder[46; 47], severe mental illness including schizophrenia and bipolar disorder[4; 48-55], substance use disorders[49; 56; 57], epilepsy[58], behavioural addictions (e.g. gambling[59], gaming disorder[60]), chronic insomnia[61], intellectual and developmental disabilities (IDD) including autism[49], and suicide risk[62-65], in addition to general considerations for mental health responses to COVID-19[66-73]. A majority of papers describe considerations for general adult populations, while some focus on children and youth[44; 49; 53; 56; 60] and older adults[41; 52].

Risk factors related to COVID-19 and people living with existing MNS disorders include increased susceptibility to COVID-19 infection and complications related to the virus. Patients with severe mental illness and/or substance use disorders may experience risk factors such as physical comorbidities, smoking, low socioeconomic status, poor housing conditions or housing instability, unemployment and social isolation[42; 43; 48; 54; 57; 72; 73]. People with existing MNS conditions might also have low health literacy, making it challenging for them to follow public health guidelines[55]. The impact of social isolation and other added stressors of the pandemic may also contribute to worsening symptoms[4; 45; 48; 52; 53; 55], including increased risk of substance misuse[56], other unhealthy behaviours[59; 60] and suicidality[53; 65]. Increased exposure to news and social media may increase distress and exacerbate symptoms[45; 58]. Stigma towards people with COVID-19 and MNS disorders might lead to 'double stigma', lowering help-seeking for both physical and mental health conditions and worsening mental health[52; 65; 72]. Patients living in in-patient and residential facilities face several risk factors, including high risk of COVID-19 transmission and severe social isolation due to limitations on family visits and group activities [48; 51]. In a commentary on risks facing psychiatric inpatients patients in China, Li et al.[51] note that electronic devices are not permitted for patients, leading to even further isolation. Interruptions in usual care and treatment course[57; 73] are also concerns facing people with MNS disorders during the pandemic. For example, a Chinese study including n=570 outpatients with depression or anxiety reports that 70% of patients had to postpone their treatment[42] as a result of the pandemic.

A number of considerations for the delivery of standard mental health care and psychosocial support for people living with MNS disorders are provided. During the pandemic, in many contexts only people experiencing severe or urgent symptoms received in-person care. The lack of access to usual care presents a challenge for many people living with MNS disorders, including for people living with eating disorders who might lack access to their usual care teams and find the increased need for self-management to be challenging[43]. Care for people with autism or severe intellectual disabilities is usually delivered in the community and with close physical contact. Maintaining access to these important services during COVID-19 is also challenging[49]. Recommendations to support people living with MNS disorders include interventions promoting self-management strategies including sleep hygiene, relaxation techniques, healthy behaviours in the context of COVID-19 (e.g hand washing), self-efficacy and problem-solving[48; 61]. Support of community, family and friends for vulnerable people, including those living alone, is also essential[65]. Specific groups might require enhanced follow-up and monitoring, including people with OCD who have previously been in remission[47; 70] and people at risk of unsafe behaviours[50].

Several considerations for e-mental health are also identified. The need for training for mental health care providers in the delivery of e-mental health is identified, as many providers have not previously used these types of interventions[4; 43; 65]. A number of barriers to the implementation of e-mental health care are also identified, including licencing regulations limiting the geographic scope of e-mental health care delivery and payment for e-mental health care by insurance plans in the United States[66]. Some providers also lack the infrastructure necessary to provide e-mental health care[73]. Barriers to access and uptake of e-mental health care are also identified, including privacy concers[66; 73], preference for in-person options[65; 68; 73], perceptions that e-mental health is not as effective or safe as in-person care[66] and lack of technological literacy or knowledge, including among older adults[73]. Access to devices such as smartphones and high speed Internet are also considerable barriers for some patients populations[4; 38; 73], with Kanzler et al.[38] warning that this might mean the most vulnerable will be excluded from care access. In some cases, e-mental health care may be limited in terms of delivery of some types of treatment, such as exposure therapy for OCD[46]. Hybrid models, where e-mental health is combined with in-person care might be more appropriate in some cases, including early psychosis intervention[53] and for patients in in-patient treatment facilities[51].

Children and Youth

Children and youth, including university aged students, face a number of mental health risk factors related to the COVID-19 pandemic. Children and youth are already at high risk of poor mental health, with COVID-19 expected to worsen this risk[74]. In a cross-sectional survey of n=3613 youth from 20 provinces in China, for example, depression rates of 22.28% were found during the pandemic, compared with pre-pandemic rates of 13.2%[75]. Social distancing requirements have a negative impact on youth mental health[75-78], in part due to separation from important social support networks[79-81]. Restrictions on leaving the home may have a negative impact on lifestyle factors such as increased screen time, poor sleep habits, less exercise, increased substance use and excessive gaming[56; 60; 76; 82-84]. COVID-19 restrictions and economic impact might also place strain on parents and caregivers, increasing conflict within families[79; 85]. The COVID-19 pandemic has also resulted in increased fear among children and youth, negatively impacting their mental health[75; 78; 83; 86-90]. Youth, such as n=530 high school and college students surveyed in the Philippines, also expressed worried about financial and food security related to the pandemic[91].

School closures also have an impact on youth mental health[79; 92; 93]. Studies from China[89] and Hong Kong[94] report that being in final year of study and taking national exams are mental health risk factors, while students in rural areas experienced poor mental health due to inability to connect remotely to classes and subsequent worry about educational success[75]. School closures may also mean that children and youth might be cut off from crucial mental health and other supports delivered at schools. This is especially true for racialized and ethnic minority youth, youth from low socioeconomic backgrounds, and youth from families with no health insurance[79; 95; 96].

Vulnerable sub-populations among youth are at high risk of negative mental health impacts. LGBTQIA+ youth might experience poor mental health related to increased discrimination and challenging relationship with peers, family and communities[81]. In a study analysing n=31 online chats on an online support service for LGBTQIA+ youth in the US, being at home with unsupportive family members and being cut off from 'safe spaces' and communities was identified as a mental health risk factor[81]. International students are also at risk. Chinese students living abroad early in the pandemic experienced fear related to the safety of their family members and experienced discrimination and stigma based on racist misconceptions about the pandemic[88].

Considerations for standard care and support for children and youth mental health in the context of COVID-19 include recommendations regarding the importance of targeted interventions and supports, by governments, universities and families. Many note the importance of ensuring support for university and college students, including providing appropriate and timely care for international students[76; 77; 88-90]. There is also an important opportunity to engage youth in the development of programs and policies that support their mental health and well-being[78].

Regarding e-mental health options, several authors state that there is a need for more research evidence on the effectiveness of e-mental health interventions for children and youth, including online trauma-informed psychotherapy[74], virtual CBT for sleep[82] and mental health apps specifically for adolescents[93]. One study found a high levels of willingness among students in Hong Kong to use online mental health supports, leading them to call for online counseling to be included in student support services[94].

E-mental health options for vulnerable sub-populations of youth must take into account considerations of safety and accessibility. Among LGBTQIA+ youth, some expressed reluctance to use online video counselling from home due to privacy concerns, but were enthusiastic about using text based mental health supports, with one participant stating that the "text thing is a game changer for folks who don't want to be overheard"[81]. Access to digital technology and high speed Internet was identified as a potential barrier for vulnerable sub-populations of children and youth[85; 91; 93; 96]. Golberstein et. al caution that when mobilizing e-mental health during the pandemic "close attention must be paid to not exacerbate inequities in access to care"[93]. Others emphasize the importance of addressing the structural determinants of health among vulnerable families, including factors such as protections for unemployment and evictions, promoting healthcare and mental health care access and provision of basic financial support[96].

Black, Indigenous and People of Colour (BIPOC) Populations

BIPOC populations face several mental health risk factors as a result of structural marginalization and discrimination in the APEC region. Many BIPOC communities face an elevated health risk due to the effects of structural marginalization and the social determinants of health, putting them at higher risk of

contracting COVID-19, of developing complications related to the virus, and of experiencing negative mental health and psychosocial effects. Indigenous Australians have higher risk of NCD's, smoking, mental illness and risk of suicide compared with the general population[97]. Black Americans are disproportionately represented among COVID-19 cases and deaths. In Michigan, for example, where Black Americans make up 13% of the populations, they represent 32% of cases and 41% of deaths related to COVID-19 [98]. Black Americans have higher rates of cardiovascular disease and are more likely to live in densely populated areas[99]. Black and Latinx communities in the US also face structural racism that means that many neighbourhoods are underserved by hospitals, pharmacies and COVID-19 testing facilities[100]. Undocumented Latinx individuals might fear accessing testing or healthcare services for fear of immigration reprecussions[100]. In the US, Black, Latinx and Asian populations make up 70% of the essential workforce, increasing their risk of exposure[100]. These jobs often have limited or no paid sick leave and health insurance coverage[99-101]. Indigenous populations in Mexico experience elevated rates of poverty and extreme poverty, lower indicators for education, food security, housing and social security. Some communities lack basic water, sanitation services and health services[102] putting them at elevated risk of COVID-19 infection and psychosocial distress.

Access to mental health care by BIPOC populations is often low[101]. Many populations, such as Black Americans[98; 103; 104] and Indigenous Australians[97], lack trust in health and mental health services due to historic experiences of trauma and structural marginalization, which might impact help-seeking. High rates of mental health related stigma[98], lack of insurance coverage and absence of culturally appropriate care[97; 98; 102] also act as barriers to mental healthcare access.

Past histories of trauma and current trauma exacerbate the mental health impact of the COVID-19 pandemic for BIPOC people. Witnessing the impact of COVID-19, including via extensive media coverage of the impact of the virus on Black people in the US[98] for example, is a mental health risk factor. In additional to historic and ongoing trauma including due to colonization[97], many communities have experienced recent traumas, including the recent bush fires in Australia[105], the water crisis in Flint, Michigan[98], and Hurricane Katrina[103]. For people with a history of trauma, measures such as stay-at-home orders may be challenging to follow and may evoke mental distress related not only to COVID-19 but also to past traumatic events[103]. The disproportionate representation of BIPOC people among COVID-19 cases and deaths means that these communities are disproportionately facing fear and bereavement, putting them under substantial psychological strain[98]. Interruptions in sociocultural practices that are important to BIPOC communities, including church services[103] and appropriate funeral services[98] can further impact mental health, including by disrupting the bereavement process for loved ones lost to COVID-19.

An increase in xenophobia and racist incidents, including at the individual, structural and political level, is a risk factor for negative mental health effects of COVID-19[97; 100; 106]. Increased anti-Asian stigma and discrimination during the COVID-19 pandemic in the US is identified as a risk factor for poor mental health outcomes including anxiety, depression and general distress, especially when combined with other pandemic-related stressors[106]. Racial discrimination in healthcare delivery, including anticipation of discrimination by healthcare providers based on racialization, has been associated with increased depression, anxiety and post-traumatic stress disorders[98].

Considerations for mental health care delivery for BIPOC communities in the context of the COVID-19 pandemic include the need to understand the intersections of mental health needs with COVID-19 related stressors and experiences of stigma, discrimination and margalization[106]. Comprehensive and accessible programs, including at the national level, that include early intervention and are targeted to

the most vulnerable communities are needed[104]. The delivery of culturally and linguistically competent and anti-racist mental health care that focuses on strengths and resiliency is also recommended[98-100; 102-104; 107], including by collaborating with trusted community members to deliver mental health and psychosocial support in a way that is acceptable, culturally meaningful and trauma-informed[98; 103]. Consulting with community leaders and members to ensure mental health care is appropriate and acceptable is also essential[98; 102]. There is a call for the COVID-19 pandemic to catalyse efforts to address the social and structural determinants of heath[99]. There is also a need for anti-racist messaging, including from national leaders, to combat race-based discrimination and stigma[106].

E-mental health options are seen as important for delivering accessible mental health care to BIPOC communities during the COVID-19 pandemic[104], though challenges in uptake and implementation may exist. E-mental health care may not be accessible due to language barriers among ethnic minority and Indigenous communities[97] and due to lack of technology and digital infrastructure, particularly among older people or people living in rural communities[97; 102]. Infrastructure, training and regulations that facilitate the deployment of e-mental health is essential, especially for community-based or publicly funded services that might lack resources and technical expertise[101].

Older Adults

Older adults are also at an elevated risk of the negative mental health effects of the COVID-19 pandemic and may experience worsening psychiatric symptoms. For example, in China, which has the world's highest population of people over 60 years, depression rates among older adults prior to COVID-19 were 23.6%[108], suggesting the added stressors of the pandemic may exacerbate symptoms. Older adults living with dementia and existing mental illnesses, including those living in long-term care homes, might experience worsening symptoms due to lack of family visitation and restrictions on social activities[109]. Disruptions in standard health and mental health care also have a negative impact of the mental health of older adults. Mental health care access for older adults has been limited due to quarantine and physical distancing [108; 110]. Disruptions in mental health and other health services such as elective surgeries might also lead to increased stress and worry[41; 109]. For older adults who are hospitalized, restrictions on certain interventions such as delirium prevention measures may lead to higher incidence of mental health and cognitive disturbance[111].

Social isolation and confinement as a result of the pandemic is a risk factor for poor mental health as well as cognitive decline among older adults[109; 112]. Many older people live alone[108], putting them at risk of loneliness and poor mental health[109]. Confinement and fear about contracting COVID-19 might contribute to increased anxiety and depression among older adults[41; 112]. Disruption of community support and social activities, including attending church services, further isolates older adults from social connection and meaningful activities[109; 112]. Older adults might also fear dying alone or be unable to properly grieve loved ones due to pandemic restrictions[112]. Ageism has also been prominent during the COVID-19 pandemic, with stigma about older people and their place in society widely expressed[109].

Some sub-populations of older adults might also experience elevated risk factors. Older adults living in poverty face added challenges. For example in the Philippines, only 30% of Filipinos receive a pension, meaning that many older adults are unable to pay healthcare costs and medical bills, especially in rural areas [112]. In Australia, deaths as a result of the severe bush fires immediately prior to the COVID-19 pandemic occurred disproportionately in people ages 60-69 years, meaning that older adults were already under enormous psychological strain. The added stressors of the COVID-19 pandemic have serious mental health implications. Among older adults living with HIV, many already experience social

isolation, loneliness and stigma. The COVID-19 pandemic may lead to interruptions in HIV and mental health treatment access, increased financial strain and double stigma which has additional mental health consequences[113].

Regarding delivery of standard mental health care to older adults in the context of COVID-19, the disruption in access to usual care as a result of pandemic related restrictions is a considerable challenge for mental health care delivery to older adults[108; 113]. One study among older adults with existing major depressive disorder in the US showed that because they had been living with depression, they were accustomed to using self-management and coping skills that were helpful given the added pressures of the pandemic. For this reason, the authors recommend implementing psychoeducation for the general population, including targeted messages for older adults on how to maintain safe social interactions and meaningful activities[41].

Regarding e-mental health, a number of considerations must be made for older adults. While some older adults were able to make use of digital technologies for both mental health care and to maintain contact with family and friends[41], many other older adults have limited access to smartphones and Internet services and limited technological literacy, meaning many may be excluded from e-mental health care[108]. Telephone options such as crisis hotlines may be more appropriate when offered for free to older adults[112]. All e-mental health options, however, can be challenging for some older adults such as people living with dementia[109]. A variety of options to meet the specific needs of older adults, including face-to-face care when safety allows, should therefore be considered[109; 113].

Additional Priority At-Risk Populations

A number of other priority at-risk populations are described in the literature, though the number of studies is lower than for the populations already discussed. *Patients with COVID-19* experience several mental health risk factors, including challenges accessing hospital care, physical and social isolation, witnessing the death of other patients or the death of family members, and negative mental health effects related to COVID-19 treatment[114; 115]. A cross-sectional survey among COVID-19 patients discharged from hospital in Wuhan, China found that severe disease was a strong risk factor for PTSD and depression, while perceived risk of discrimination based on having had COVID-19 was a risk factor for PTSD, depression and anxiety[114]. In another cross-sectional study assessing rates of depression and anxiety among COVID-19 patients in Wuhan, 35.9% of patients had depression, 38.5% had anxiety and 24.3% had both, with risk for both depression and anxiety diagnosis higher among women[116]. Given the association of discrimination with poor mental health outcomes among COVID-19 patients, efforts to reduce discrimination and increase social support were recommended[114]. There is also a call for enhanced mental health support targeted to COVID-19 patients, especially women and those who have had a family member who have also been affected[116].

People who are incarcerated often live in overcrowded conditions, already have high rates of physical and mental illness, substance use disorders and suicidality and have poor access to health and mental healthcare[117; 118]. During the COVID-19 pandemic many jury trials and court dates have been delayed, leading to longer remand time which places additional strain on the mental health of those who are incarcerated. Additionally, prison visits which can help support mental health have largely been suspended during the pandemic. Suspension of activities in prison to control the spread of COVID-19 can lead to long periods of time spent alone in cells[117]. Recommendations to support the mental health of people who are incarcerated include facilitating social support for prisoners by providing access to secure cell phones, voicemail and telephone access, and access to peer support programs. Efforts to

provide activities or mental health supports, including mindfulness, access to apps and telephone psychological support and in-cell exercise are also recommended[117].

People living with HIV (PLWH) experience elevated rates of mental health and substance use disorders related to increased marginalization and stigma[119; 120]. Older PLWH already experience social isolation, which might increase during the pandemic leading to mental and cognitive decline and reduction of self-care practices[113; 119]. Many PLWH, including sexual minority and BIPOC people, might not be able to physically distance due to work or housing circumstances[119]. Interruptions in care and medication access for PLWH during the pandemic is also a risk factor[120; 121]. A survey among n=703 PWLH in China found that 60.8% reported depression and 49.8% reported symptoms of anxiety. Disruptions in access to usual care can cause mental distress among PLWH. In China, hospitals and HIV clinics began mailing ART treatments during the pandemic, which caused distress related to the risk of disclosure to family members[120]. Practices such as contact tracing can also increase vulnerability for gay PLWH or other men who have sex with men (MSM) due to risks associated with privacy violations, homophobia and discrimination[121]. Though e-mental health options might help to mitigate some challenges in service interruptions, they might be inaccessible to the most vulnerable PLWH due to lack of access to digital technology and internet services[119]. There is a need for tailored and targeted e-mental health interventions for sub-populations of the most vulnerable PLWH, such as ethic and racial minorities, immigrants, and sex workers, to ensure they are accessible and acceptable to those most in need[121].

People who are pregnant or post-partum may experience increased fear and anxiety related to COVID-19[122], which can increase risk of pregnancy complications including antenatal depression[123; 124]. Stressors may include being forced to deviate from birth plans and give birth without family being present and limited physician visits due to fear of infection[123]. Studies in China found elevated rates of anxiety[122] and depression[125] among pregnant women during the COVID-19 pandemic. Screening for perinatal mental health is recommended generally and should be prioritized during COVID-19[125]. E-mental health is recommended as a safe and effective means of providing mental health support during pregnancy[123; 125], with one suggestion to recruit and train peer support workers who have previously experienced perinatal depression to provide e-mental health support[125].

Refugees and migrants, including migrant workers, generally experience poorer mental health compared with the general population which is likely to be exacerbated by COVID-19[115; 126-128]. Refugees might encounter language barriers and other challenges with access to information, struggle with sociocultural differences in receiving countries including in healthcare settings, and face precarious housing conditions such as overcrowding and the impossibility of social distancing in refugee camps[118; 126]. In Chile, migrants including asylum seekers from Venezuela, Bolivia, Haiti, and Peru are stuck at the border, facing economic, health and psychosocial hardship[129]. International migrant workers, particularly migrant domestic workers, face more barriers in accessing health care services compared to other migrants and have a higher burden of common mental disorders and lower quality of life compared with the general population [128]. The COVID-19 pandemic exacerbates this risk, including due to lost income and isolation away from home countries. For example, many international migrant workers in Macau and Hong Kong face economic vulnerability as a result of the pandemic[128]. The high number of migrants and refugees in some settings, combined with interruptions in services as a result of the pandemic mean there are limited mental health and psychosocial support services available[126]. Regarding international migrant workers such as those in Hong Kong and Macau, many have access to smartphones, creating an opportunity to deliver online mental health supports. Liem et al[128] call for a coordinated response to provide mental health support in a variety of languages and via multiple communication channels to

migrant workers during the pandemic, noting that international policies and conventions should be mobilized to ensure a coordinated response.

A number of risk factors face *people experiencing homelessness*, including cramped living conditions and poor access to sanitation, limiting their ability to physically distance and engage in regular hygiene practices like handwashing[130]. People experiencing homelessness have high existing prevalence of mental health and substance use disorders as well as other comorbidities[131]. Many people experiencing homelessness may be hard to reach through contact tracing due to being transient or due to fears of involuntary hospitalization or incarceration[131; 132]. Limiting support and outreach services for people experiencing homelessness due to COVID-19 may have severe mental health consequences[131]. E-mental health care options are inaccessible to people who do not have phones or access to digital technology, and there is a risk of further marginalizing people experiencing homelessness as a result of efforts to curb COVID-19[131].

For *victims of domestic violence* the conditions of lockdown or physical distancing may compound risk factors for domestic violence including isolation, economic strain, lack of access to support services and safe spaces such as libraries, schools and churches and increase in alcohol consumption at home[133-135]. These risks are likely to exacerbate existing mental health issues like anxiety, depression and PTSD[136]. Evidence from post-disaster settings shows an increase in domestic violence following emergencies[135], and Australia saw an increase in domestic violence reports and Google searches related to support seeking early in the pandemic[133]. During the pandemic there may be reduced access to victim services and victims may lack access to a secure place to call police, reach out for help or to research options for support[134]. While there are calls for increased supports for victims of domestic violence using digital support and e-mental health technology, a number of barriers exist, including concerns about privacy and safety if online access is monitored by the abuser[135; 136], lack of digital or internet access by some populations, including in LMICs where the digital divide by gender is higher[136]. E-supports that include interface-level safety protocols including passwords, emergency exit buttons and detection of cues based on behavioural or keystroke cues are essential[136].

People with disabilities and/or chronic illness also face elevated mental health risk factors related to the COVID-19 pandemic. People with disabilities often face persistent low access to care and stigma, particularly in LMICs[118], and experience increased prevalence of mental health and physical comorbidities. Interruptions in usual care and routines may cause heightened distress and anxiety[137]. Gaps in regular care, including in-home care workers, may also place a strain on the families and caregivers of people with disabilities and chronic disease, causing burnout and negative mental health impacts[137; 138]. People with intellectual disabilities such as autism might experience high levels of anxiety or exacerbation of OCD symptoms related to intense focus on COVID-19 related news, disruption in routine and need for enhanced handwashing[137]. People with chronic conditions such as chronic respiratory diseases face elevated risk of COVID-19 infection and complications, and face mental health risk factors related to isolation and loneliness[139]. There is a need to provide enhanced, individualized supports for people with disabilities and chronic conditions during the pandemic[138]. E-mental health options can offer support to people who are in isolation and to those at higher risk of COVID-19 complications[139], but must be delivered using accessible and adaptive technologies for people with different types of disabilites[137; 138]. Access to digital technology and technological literacy might also act as a barrier for people with disabilities or chronic illness and their caregivers[137], meaning flexibility in delivery options are required[139].

Discussion and Recommendations

This review identifies priority at-risk populations, mental health risk factors, needs and opportunities for standard and e-mental health care in the context of the COVID-19 pandemic in the APEC region. The APEC region is diverse, consisting of 21 countries making up 40% of the world's population[15]. Capturing experience and evidence from across the APEC region therefore represents a considerable opportunity for knowledge synthesis and dissemination. While each country has been affected significantly by the COVID-19 pandemic and its related mental health impact, some, like China, experienced the brunt of the pandemic earlier and have produced evidence that can both alert other countries to imminent challenges and inform approaches to addressing the mental health impact of the pandemic among at-risk groups across the region.

A number of cross-cutting challenges for the delivery of standard and e-mental health care to priority at-risk populations in the APEC region emerged from this review. The disruption of health and mental health care and community support services have particular impact on vulnerable populations, both raising the risk of negative mental health effects related to the pandemic and making essential care access challenging[128; 132]. Social isolation, physical distancing and changes in usual routine are considerable mental health risk factors, particularly for populations that may already experience isolation, marginalization or depend on specific routines for self-care and illness management[112; 119; 137]. Access to culturally and linguistically appropriate information and care creates a barriers for many at-risk populations, including migrants, refugees, ethnic minorities and Indigenous populations[103; 126]. The digital divide, or the gap in access to digital technologies and infrastructure, creates considerable challenges for access to e-mental health care that risks further marginalizing the most vulnerable among already high-risk populations[38; 93]. Some e-mental health options may also be inaccessible due to privacy and safety barriers for people living in challenging or unsafe environments, such as LGBTQIA+ youth at home with unsupportive families during lockdown[81] and victims of domestic violence whose abusers might monitor their use of devices or web searches[136]. Finally, the impact of persistent social and structural determinants of health such as poverty, racialization and stigma are exacerbated during the pandemic and impact physical and mental health and access to care[99].

Below we present several preliminary recommendations, which will be further elaborated based on the results of the ongoing consultation process with policy makers, healthcare providers and PWLE across the APEC region.

1. **Commit to addressing the social, structural and systemic inequalities highlighted by the COVID-19 pandemic**

The COVID-19 pandemic and its mental health impacts in the APEC region have called attention to the specific vulnerabilities faced by a number of priority at-risk populations. In almost all cases, this in turn demonstrates that existing marginalization and social inequities are being exacerbated during the pandemic. This is both a considerable challenge and opportunity to mobilize resources to address population mental health in a way that is equitable, ensures access to care by those most in need[140] and addresses many underlying risk factors contributing to mental illness and distress. COVID-19 is shedding a harsh light on the profound mental health impact of existing disparities including racist discrimination and social marginalization[99] and the need for profound societal and systemic changes. In addition to the need for more accessible mental health care for priority at-risk populations as described above, there is also a need to address the long-standing social and structural determinants of health that contribute to marginalization and poor mental health[99; 141]. Others have called attention to the critical need to address

social inequalities as part of the mental health response to COVID-19[141], and government policies and mental health responses to the pandemic must commit to addressing these entrenched inequities.

2. Ensure that a variety of e-mental health and standard care options are available

E-mental health technologies offer a substantial opportunity for continuity of evidence-based care during the COVID-19 crisis, but are not a silver bullet. The results of this review demonstrate that one size does not fit all and mental health care should be offered via a variety of modalities to ensure no one is left behind. In some cases, patients can benefit from accessing a combination of standard and e-mental health care options using a hybrid model, such as is recommended for early psychosis interventions for youth[53] and for older adults[109; 113]. In cases where privacy and safety are of concern [81; 135] text-based interventions and those that include built in privacy and safety mechanisms are needed. Accessibility considerations, including text size and adaptive technology that is targeted towards the needs of specific populations, including people with disabilities, is essential[137]. Finally, e-mental health care must be offered in a variety of languages and be culturally validated to ensure that it is accessible to diverse populations such as migrant, Indigenous communities and racial or ethnic minorities[97; 103; 126; 128].

3. Engage people with lived experience in planning for e-mental health programs

In order to provide appropriate and accessible e-mental health options for at-risk groups, people with lived experience, their caregivers and community leaders must be engaged in developing e-mental health interventions and programs that are designed for them. For example, Chen et al.[39] describe low uptake by HCWs of psychological support services at a hospital in Wuhan, China that improved after HCWs' needs were taken into account. Efuribe et al. note that COVID-19 is an opportunity to engage youth in designing mental health supports and policies that will best address their needs and call for increased youth engagement in all mental health policy design[78]. In the US, to respond to the lack of trust for formal mental health services and the cultural significance of church services among Black American, one program engaged pastors to deliver mental health supports via a series of videos that also included messages from public and mental health officials[103]. These example show that it is essential to engage those that will be accessing mental health care so that their needs are met.

4. Increase research on the effectiveness and implementation of equitable e-mental health interventions during COVID-19

Extensive literature on mental health from other emergency situations exists, but there is little existing evidence on supporting mental health during pandemics[72]. Though research evidence has been rapidly emerging since the pandemic began, the full impact and long term mental health consequences of the pandemic are as yet unknown. Ongoing research, including on the effectiveness and implementation of e-mental health care for the most at-risk populations, is needed to ensure the global community is prepared to effectively address the long-term psychosocial effects of the pandemic[72]. An equity-based approach is essential to ensuring the mental health response does not further marginalize the most vulnerable populations.

5. Develop clear guidelines for the delivery of e-mental health care with a focus on equity and accessibility

The COVID-19 pandemic and the related mental health and psychosocial impacts are unprecedented and rapidly evolving. The rapid shift to the use of e-mental health technologies, though predominantly drawing on evidence-based approaches[9], has taken place quickly and without an existing roadmap. There is thus a need for comprehensive guidelines for the delivery of e-mental health options that is tailored to diverse settings, including high, low, and middle-income contexts, rural and urban settings, different health systems, and diverse populations. These guidelines must consider accessibility and equitable access for a variety of at-risk and vulnerable populations as described in this review and provide practical guidance on the implementation of e-mental health. Training and capacity building for providers will also be needed to ensure effective implementation of evidence-based e-mental health care across the APEC region.

Conclusions

The COVID-10 ongoing pandemic will have profound and long-lasting mental health impact, which will disproportionately affect at-risk populations who are often already marginalizing and vulnerable. It is essential to understand the mental health needs and mental health care access challenges facing these populations. Given the rapid shift to the use of e-mental health care as a result of pandemic-related restrictions, access considerations for at-risk populations must be considered to ensure those most in need are not excluded from the care that they need. This review examines the mental needs, challenges and opportunities for e-mental health care delivery to priority at-risk populations in the APEC region. The size and diversity of this region means that findings from this review can inform e-mental health care delivery in a diversity of contexts. It is essential that all countries consider the needs of their most vulnerable. While the COVID-19 pandemic is an unprecedented global challenge, it also represents an opportunity to develop policies and programs that address inequities in mental health and mental health care access, and to address social and structural determinants of health that contribute to entrenched inequities in mental health and health care access.

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Appendix A
Rapid Scoping Review Database Search Terms

1. (exp coronavirus/ or coronavirus*.mp.) and (wuhan or beijing or shanghai or 2019-nCoV or nCov or COVID-19 or SARS-CoV-2).mp.
2. coronavirus*.ti. or (novel coronavirus*.mp. and (exp china/ or china.mp.)) or ((pneumonia.mp. or exp pneumonia/) and Wuhan.mp.)
3. ('COVID-19' or '2019-nCov' or 'SARS-CoV-2').mp. or exp Coronavirus Infections/
4. or/1-3
5. Mental Health/
6. mental health.tw.
7. "psychosocial".tw.
8. "mental illness".tw.
9. or/5-8
10. Vulnerable Populations/
11. (vulnerable and (people or population*)).tw.
12. (disadvantaged and (people or population*)).tw.
13. ((homeless and (people or population*)) or "homeless*" or "at risk").tw.
14. exp Homeless Persons/
15. exp Personnel, Hospital/
16. exp Medical Staff/
17. ("medical staff" or "nurse*" or "doctor*" or "health care provider*" or "care provider*" or "physician*" or "occupational therapist" or "physiotherapist*" or "respiratory therapist*" or "therapist*").tw.
18. exp Ethnic Groups/
19. ("asian" or "black" or "hispanic" or "latino*" or "african american*" or "asian american*" or "racialized people" or "racialized group" or "minority group" or "ethnic group*" or "first nation*" or "native people*").tw.
20. exp "Emigrants and Immigrants"/
21. ("emigrant*" or "immigrant*" or "refugee*").tw.
22. exp "Transients and Migrants"/
23. ("transient*" or "migrant*").tw.
24. Working Poor/
25. ("low-SES" or "low socioeconomic status" or "poverty" or "working poor" or "low-income people" or "low-income person*").tw.
26. Sex Workers/
27. "sex worker*".tw.
28. exp Women/
29. "women".tw.
30. exp Disabled Persons/
31. ("person with disabilities" or "person with disability" or "person with intellectual disability*" or "person with physical disability*").tw.
32. Homebound Persons/
33. "homebound person*".tw.

34. Caregivers/
35. "caregiver*".tw.
36. exp Aged/
37. ("elderly" or "older adult*" or "aging population*").tw.
38. exp Domestic Violence/
39. ("domestic violence" or "abusive families" or "abusive partner").tw.
40. exp Intimate Partner Violence/
41. "abusive spouse".tw.
42. Adolescent/
43. ("adolescent" or "adolescence").tw.
44. ("youth" or "juvenile" or "teenager*" or "student*").tw.
45. exp Child/
46. "children".tw.
47. exp HIV/
48. ("people with HIV" or "person with HIV" or "person with HIV/AIDS" or "person with AIDS").tw.
49. Minority Groups/
50. ("sexual minority" or "racial minority" or "ethnic minority" or "people of color" or "LGBTQIA" or "gay" or "lesbian" or "transgender" or "men who have sex with men" or "LGBT*").tw.
51. Prisoners/
52. ("prisoner*" or "inmate*").tw.
53. or/10-52
54. ("Asia Pacific" or "Asia Pacific Region" or "Australia" or "Brunei Darussalam" or "Canada" or "Chile" or "People's Republic of China" or "Hong Kong" or "China" or "Indonesia" or "Japan" or "Republic of Korea" or "Korea" or "Malaysia" or "Mexico" or "New Zealand" or "Papua New Guinea" or "Peru" or "The Philippines" or "Russia" or "Singapore" or "Chinese Taipei" or "Thailand" or "The United States" or "United States" or "Viet Nam" or "Vietnam" or "North America").tw.
55. 4 and 9 and 53 and 54

Publication date limit = 01-Jan-2020 to 31-July-2020

Appendix 2
Table 1: List of Articles Included in the Rapid Review Analysis

Reference	Type of Article	Population Type	Country or Region
Alavi et al. (2020)	Primary research - modified Delphi methodology	People living with MNS disorders	United States
Albott et al. (2020)	Review	Healthcare workers	United States
Baloran (2020)	Cross-sectional study	Children and youth	Philippines
Baptiste et al. (2020)	Editorial	Black, Indigenous and People of Colour	United States
Becker and Gregory (2020)	Editorial	Children and youth	Global
Benhamou and Piedra (2020)	Recommendations	Healthcare workers	United States
Bojdani et al. (2020)	Review	People living with MNS disorders	United States
Boyraz and Legros (2020)	Review	Multiple populations	Global
Brown and Weissman (2020)	Letter	Older adults/people living with HIV	United States/Global
Buenaventura et al. (2020)	Commentary	Older adults	Philippines
C. Liu et al. (2020)	Cross-sectional study	Healthcare workers	China
C.K.T. Lima et al. (2020)	Letter	Older adults	China
Campbell (2020)	Review	Victims of domestic violence	Australia/Canada/United States
Cao et al. (2020)	Cross-sectional study	Children and youth	China
Caqueo-Urízar et al. (2020)	Commentary	Multiple populations	Chile
Chen et al. (2020)	Correspondence	Healthcare workers	China
Courtenay and Perera (2020)	Perspective	People with disabilities, chronic or pre-existing conditions	Global
Cui et al. (2020)	Cross-sectional study	Children and youth/people living with MNS disorders	China
D. Liu et al. (2020)	Cross-sectional study	COVID-19 patients/healthcare workers/patients with low socioeconomic status	Wuhan, China

D. Yang et al. (2020)	Cross-sectional study	Children and youth	Wuhan, China
Davis et al. (2020)	Perspective	Children and youth/people living with MNS disorders	Singapore
De Sousa et al. (2020)	Review	Multiple populations	Low- and middle-income countries (LMIC)
Dell et al. (2020)	Letter	Older adults/people with existing MNS disorders	Global
DeLuca et al. (2020)	Review	Children and youth/people living with MNS disorders	United States
Druss (2020)	Viewpoint	People living with MNS disorders	United States
Duan et al. (2020)	Cross-sectional study	Children and youth	China
Duane et al. (2020)	Commentary	People living in poverty	United States
Dumas et al. (2020)	Primary research - online survey	Children and youth/people with existing MNS disorders	Canada
Efuribe et al. (2020)	Commentary	Children and youth	United States
Emezue (2020)	Viewpoint	Victims of domestic violence	Global
Fakhar-E-Alam et al. (2020)	Cross-sectional study	Children and youth	Hubei, China
Fekari and Simbar (2020)	Letter	Pregnant and post-partum people	Global
Fernandez-Aranda et al. (2020)	Editorial	People living with MNS disorders	Global
Fish et al. (2020)	Primary research	Children and youth/LGBTQ+	United States
Fitzpatrick et al. (2020)	Cross-sectional study	People living with MNS disorders	United States
Fitzpatrick et al. (2020)	Cross-sectional study	Multiple populations	United States
Fortuna et al. (2020)	Commentary	Black, Indigenous and People of Colour	United States
French and Lyne (2020)	Case study	People living with MNS disorders	Global
Furlong and Finnie (2020)	Perspective	Black, Indigenous and People of Colour	Australia
Gao et al. (2020)	Cross-sectional study	People living with MNS disorders	China
Goberstein et al. (2020)	Viewpoint	Children and youth	United States
Gordon and Borja (2020)	Commentary	General population	Global

Gunnell et al. (2020)	Commentary	People living with MNS disorders	Global
H. Huang et al. (2020)	Cross-sectional study	Healthcare workers	China
Hamm et al. (2020)	Primary research - semistructured qualitative interview	Older adults/people with existing MNS disorders	United States
Han et al. (2020)	Cross-sectional study	Healthcare workers	China
Hao et al. (2020)	Cross-sectional study	People living with MNS disorders	China (Southwest)
Hayden and Parkin (2020)	Review	Healthcare workers	Global
Hewson et al. (2020)	Commentary	Incarcerated populations	Global
Horesh and Brown (2020)	Review/recommendations	People living with MNS disorders	Global
Hou et al. (2020)	Letter	Children and youth	China
Hu et al. (2020)	Cross-sectional study	Healthcare workers	China
Huang and Zhao (2020)	Cross-sectional study	Multiple populations	China
Ijadi-Maghsoodi et al. (2020)	Commentary	Children and youth/people living in poverty	United States
Inchausti et al. (2020)	Commentary	Multiple populations	Global
J. Liu et al. (2020)	Cross-sectional study	Children and youth	China
Jobes et al. (2020)	Review	People living with MNS disorders	Global
Jorm (2020)	Editorial	People living with MNS disorders	Australia
Junior et al. (2020)	Letter	Black, Indigenous and People of Colour	Global
Junior et al. (2020)	Letter	Refugees and migrants	Global
Kang et al. (2020)	Correspondence	Healthcare workers	China
Kannarkat et al. (2020)	Viewpoint	People living with MNS disorders	United States
Kanzler and Ogbeide (2020)	Commentary	Healthcare workers/people with existing MNS disorders	United States
Karamouzian et al. (2020)	Commentary	People living with MNS disorders	Global
Kaufman et al. (2020)	Editorial	People living with MNS disorders	Global
Kaukinen (2020)	Review	Victims of domestic violence	Global

Kavoor (2020)	Letter	People living with MNS disorders	Global
Khusid et al. (2020)	Cross-sectional study	Healthcare workers	United States
Kim and Su (2020)	Viewpoint	People living with MNS disorders	Global
Klomek (2020)	Correspondence	People living with MNS disorders	Global
Ko and Yen (2020)	Commentary	Children and youth/people living with MNS disorders	Global
Kontoangelos et al. (2020)	Review	Multiple populations	China/Global
L. Huang et al. (2020)	Cross-sectional study	Healthcare workers	China
L. Yang et al. (2020)	Cross-sectional study	People living with MNS disorders	China
LaHue et al. (2020)	Letter	Older adults	United States
Lai et al. (2020)	Cross-sectional study	Healthcare workers	China
Langmaid et al. (2020)	Clinical observations	People with disabilities, chronic or pre-existing conditions	United States
Leon-Martinez et al. (2020)	Review	Black, Indigenous and People of Colour	Mexico
Li and Zhang (2020)	Commentary	People living with MNS disorders	China
Liang et al. (2020)	Cross-sectional study	Children and youth	China
Liem et al. (2020)	Commentary	Refugees and migrants	Global
Lim et al. (2020)	Cross-sectional study	Healthcare workers	Canada
Lin et al. (2020)	Letter	Healthcare workers	Hubei, China
Liu and Modir (2020)	Editorial	Black, Indigenous and People of Colour	United States
M.H. Li et al. (2020)	Letter	Children and youth	Hong Kong
McGee et al. (2020)	Recommendations	People with disabilities, chronic or pre-existing conditions	United States
Misra et al. (2020)	Commentary	Black, Indigenous and People of Colour	United States
N. Liu et al. (2020)	Cross-sectional study	Women	China
N.N.R. Lima et al. (2020)	Letter	People experiencing homelessness	Global
Nie et al. (2020)	Cross-sectional study	COVID-19 patients	Wuhan, China

Niederkrotenthaler et al. (2020)	Editorial	Multiple Populations	Global
Novacek et al. (2020)	Recommendations	Black, Indigenous and People of Colour	United States
Pachana et al. (2020)	Commentary	Older adults	Australia
Pozza et al. (2020)	Perspective	People living with MNS disorders	Global
Price (2020)	Cross-sectional study	People living with MNS disorders	Canada
Prime et al. (2020)	Review	Children and youth	Global
Rajkumar (2020)	Review	Multiple populations	China
Rodgers et al. (2020)	Commentary	People living with MNS disorders	Global
Rothstein and Olympia (2020)	Review/recommendation	Children and youth	United States
S. Yang et al. (2020)	Cross-sectional study	Healthcare workers	South Korea
Santos et al. (2020)	Cross-sectional study	People living with HIV	Global
Shakespeare-Finch et al. (2020)	Commentary	Multiple populations	Australia
Shervington and Richardson (2020)	Editorial	Multiple populations	United States
Shiau et al. (2020)	Commentary	People living with HIV	United States
Shigemura et al. (2020)	Letter	Multiple populations	Japan
Singh (2020)	Correspondence	People living with MNS disorders	Global
Sneed et al. (2020)	Commentary	Black, Indigenous and People of Colour	United States
Song et al. (2020)	Cross-sectional study	Healthcare workers	China
Stewart et al. (2020)	Feasibility study	Children and youth	United States
Sun et al. (2020)	Notes from the field	People living with HIV	China
Suzuki (2020)	Primary research - cohort study	Pregnant and post-partum people	Japan
Talevi et al. (2020)	Review	Multiple populations	Global
Tang et al. (2020)	Cross-sectional study	Children and youth	China
Taylor et al. (2020)	Commentary	people living with MNS disorders	United States
Thompkins et al. (2020)	Commentary	Black, Indigenous and People of Colour	United States

Thomson et al. (2020)	Review	Multiple populations	Australia
Tng et al. (2020)	Review	Multiple populations	Europe, China and other Asian countries
Tracy et al. (2020)	Editorial	Healthcare workers	Global
Tsai and Wilson (2020)	Commentary	People experiencing homelessness	United States/Canada
Tu et al. (2020)	Cross-sectional study	Healthcare workers	Wuhan, China
Usher et al. (2020)	Editorial	Victims of domestic violence	Australia
Van et al. (2020)	Cross-sectional study	People living with MNS disorders	Australia
Viera et al. (2020)	Brief report	Multiple populations	Global
Viswanathan et al. (2020)	Perspective	Healthcare workers	United States
W. Li et al. (2020)	Primary research - cohort study	Healthcare workers	China
W. Zhang et al. (2020)	Cross-sectional study	Healthcare workers	China
Wang et al. (2020)	Correspondence	Children and youth	China
Wood (2020)	Letter	People experiencing homelessness	Global
Wu and Wei (2020)	Cross-sectional study	Healthcare workers	China
Wu et al. (2020)	Cross-sectional study	Pregnant and post-partum people	China
Xiang et al. (2020)	Commentary	Healthcare workers	China
Xiao et al. (2020)	Cross-sectional study	Children and youth	China
Xie et al. (2020)	Cross-sectional study	Children and youth	China
Xin et al. (2020)	Cross-sectional study	Children and youth	China
Xing et al. (2020)	Cross-sectional study	Healthcare workers	China
Xu et al. (2020)	Letter	Healthcare workers	Shanghai, China
Y. Liu et al. (2020)	Correspondence	Multiple populations	China
Y. Zhang et al. (2020)	Longitudinal study	Children and youth	China
Yang et al. (2020)	Correspondence	Older adults	China
Yao et al. (2020)	Correspondence	People living with MNS disorders	China

Yin et al. (2020)	Cross-sectional study	Healthcare workers	China
Ying et al. (2020)	Cross-sectional study	Family members of healthcare workers	Ningbo, China
Yuan et al. (2020)	Letter	Parents of hospitalized children	China
Yue et al. (2020)	Cross-sectional study	Pregnant and post-partum people	China
Zhai and Du (2020)	Correspondence	Children and youth	China
Zhu et al. (2020)	Cross-sectional study	Healthcare workers	China

Final Knowledge Synthesis based on rapid review findings
November 23, 2020