The Essential Network (TEN): rapid development and implementation of a digital-first mental health solution for Australian healthcare workers during COVID-19

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INTRODUCTION
The COVID-19 pandemic has presented healthcare workers (HCWs) with extraordinary, unending stress.1 International data suggest that front-line HCWs are at increased risk of poor mental health,2 with post-traumatic stress disorder (PTSD) a significant concern.3–5 Early mental health treatment can lower the risk of HCWs developing more chronic and potentially disabling difficulties;2 however, many HCWs avoid seeking help due to concerns about stigma,2 confidentiality and negative impacts on their employment.7 8 HCWs urgently need accessible and effective mental health services that sidestep these systemic barriers.

HCW-specific services must address the unique challenges of healthcare. During a pandemic, HCWs encounter unique stressors, such as fear of infecting their families or watching colleagues die,9 10 and differ greatly in how they react to stress.11 Therefore, HCWs need a responsive, tailored mental health service that can address a range of concerns, from acute distress to moral injury12 and psychiatric disorders like PTSD.3 4 Another challenge is delivering such personalised services at the required scale in the context of an ongoing pandemic. With tens of millions of HCWs across the globe,13 researchers have called for self-guided mental health tools for HCWs that can be rapidly scaled.14 Existing national healthcare-focused services have recommended streamlined triage for HCWs with fast-tracking into person-to-person treatments.15 Only technology-driven solutions can service these needs while rapidly adapting and scaling during a crisis.

A diverse anthology of patient-focused digital mental health interventions16 17 have paved the way for multichannel digital hubs, such as Learn, Assess, Manage, Prevent, that can both personalise and centralise scalable care across states and even international borders.18 Yet despite these global innovations, few such services for HCWs exist...
Internationally, and little is known about combining the scalability of digital services with fast-track person-to-person care for this group. ‘Blended care’, which integrates digital (websites and apps) and person-to-person (including telehealth) services. Blended care can leverage the scalability and anonymity of digital health while offering a personalised choice of high-quality care options and maximises clinician availability. The capacity to rapidly adapt digital services to linguistic and cultural needs could enable blended care to deliver a truly global response to this global mental health problem. HCWs and the billions of people they care for throughout the world have much to benefit from the creation of such services.

In this paper, we will outline the design and delivery of a new blended mental health service—The Essential Network (TEN)—which aimed to provide mental health support for Australian HCWs during the COVID-19 pandemic. We describe how TEN was developed, methods of parallel design and enhancement to respond to the shifting landscape of the pandemic, service engagement results, and a summary of lessons learnt with recommendations for the future development of these urgently needed services.

**METHODS**

**Project overview**

TEN was funded by the Australian Commonwealth Department of Health (DoH) as part of their national COVID-19 response strategy. DoH identified an urgent need for a mental health service tailored to the needs of front-line HCWs and called for expressions of interest. BDI successfully partnered with leading health and research organisations across Australia (Australian College of Rural and Remote Medicine, Australian Nursing & Midwifery Federation, Australian Physiotherapy Association, Australian Psychological Society, Beyond Blue, Doctors Health Advisory Service, Drs4Drs, Exercise Sports Science Australia, Hand-n-Hand, Royal Australian and New Zealand College of Psychiatrists, Royal Australian College of General Practitioners, Royal Melbourne Hospital, St Vincent’s Hospital/THIS WAY UP, UNSW Sydney, University of Melbourne) to propose and deliver a digital-first model of care comprising a blended mental health service, which rapidly leveraged all partners’ existing digital and clinical expertise. The core project team comprised senior clinical academics from psychology and psychiatry (HC, SBH and JMN), directors of operations and strategy, services and marketing and communications (NC, JT and NS) research fellows from clinical psychology (PAB and MJB) and a marketing and communications lead (TS).

Based on the recommendations of Martínez and Farhan, our proposal outlined an ‘e-health ecosystem’ that centred the consumer in a network of existing and new services. The service model spanned four care phases: (1) prevention and well-being promotion, (2) early detection, (3) low-intensity to moderate-intensity services for HCWs experiencing subclinical distress; and (4) specialised services for HCWs with more severe symptoms. All TEN services would map onto the above care phases, with information shared digitally between service providers. Services would comprise psychoeducation, digital assessment, monitoring feedback, clinician-guided or self-guided digital interventions, or telehealth consultations and brief solution focused therapies with a clinical psychologist or psychiatrist.

**Consumer consultation**

The first round of consumer interviews was conducted in the first 2 months of the project (June 2020) and aimed to describe the needs of Australian HCWs, which could then guide service design and delivery. We conducted 15 semistructured interviews with a convenience sample comprising one general practitioner (GP), two specialist physicians, five nurses, three psychologists, one exercise physiologist, one physiotherapist, one occupational therapist and one hospital orderly. Interviews were conducted by JMN and LB, and results were coded and summarised by JMN. The second round was conducted 3 months later (September 2020) to collect feedback on the first iteration of TEN and to identify barriers to engagement with both TEN and mental health services more broadly. We conducted 11 semistructured interviews with frontline HCWs, two clinical psychologists, three GPs, two nurses, three physiotherapists and one anaesthetics registrar. MJB and PAB conducted all interviews, coded transcripts into key themes and collaboratively summarised the results. Key themes and proposed solutions gathered from both consultation rounds are summarised in Table 1.

**Stakeholder consultation**

Service and research partners from the initial proposal were invited to participate in one of two consultation committees: (1) a monthly advisory committee to provide strategic advice and service evaluation expertise; and (2) a quarterly reference group to advise on the support needs of individual professional groups and assist with dissemination of TEN throughout the healthcare community. A key role for both groups was consulting on service enhancements. The needs and proposed strategies outlined in Table 1 were presented to the TEN advisory and review committees, and members echoed the concerns raised by HCWs and endorsed the proposed solutions.

**Digital service design**

Digital platforms were developed using an agile software development model. The scrum process framework was employed to structure 2-week development ‘sprints’, a time block during which all development and review efforts are focused on a predefined set
of tasks. The tempo of this build-and-review process enabled iterative design that was responsive to the changing needs of HCWs as the pandemic unfolded.

In its first iteration, the TEN digital service comprised (1) online symptom monitoring for depression (Patient Health Questionnaire-9), anxiety (Generalised Anxiety Scale-7), health anxiety (Whiteley Index-6) and post-traumatic stress disorder (PTSD Checklist for DSM-5); (2) self-help resources and videos on topics such as stress management, self-care planning and mindfulness exercises; and (3) information about support services including crisis counselling, peer networks, online mental health courses and mental health service providers. TEN provided links to third-party services across all service streams. Consumers in crisis could initiate a call to a separate 24-hour phone counselling service (Lifeline) from within the app. For longer term care, consumers were provided with direct links to databases of mental health professionals.

The second iteration of TEN was informed by an expert user experience review conducted in November 2020, which resulted in numerous improvements. A cleaner landing page featured clear descriptions of new sections addressing the needs and concerns raised during the second round of consumer consultations. Over 20 new resources integrated text, image and video, with plain language descriptions of content to aid decision-making and practical next steps for users to consider. Articles were cross-linked to encourage deeper exploration of the TEN website and to create flexible user pathways. Page text and search engine descriptions were updated to reference ‘stress’, ‘burnout’ and ‘coping’ rather than describing mental illnesses or symptoms.

### Person-to-person service design

At launch, the TEN clinical service was a single assessment and triage consultation (lasting 50 min) with a BDI psychologist or psychiatrist to help HCWs clarify their mental health needs, get a personalised report to share with other health services, including recommendations for further care. All consumers were offered a 20 min follow-up consultation 2 weeks later. Initially, this service was only offered to app users who reported moderate to severe symptoms on either the PHQ-9 or GAD-7. In response to low service uptake, the clinical service was expanded to include up to five free consultations with a psychiatrist or clinical psychologist irrespective of symptom severity, with remit to address a broad scope of psychosocial concerns.

### Marketing and communications

Agile methodology principles underpinned a test, learn and iterate approach to both our launch campaign and phase I marketing and communication activity to monitor demand and adapt both the service and promotion to meet user needs. Phase I of the campaign was a targeted strategy, using multiple channels (eg, electronic direct mail, social media and websites) but with a staggered approach to test demand and adapt...
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to change. Messaging positioned TEN as a free, independent mental health service to address COVID-19 stress. Consumer media and social media were most successful in driving users to the TEN website and app.

Phase II of our strategy implemented learnings from our phase I strategy alongside insights from the second round of user consultation (described previously). Updated messaging moved away from TEN as a COVID-19 ‘mental health support’ service and positioned TEN as a ‘space for everything’ that is free from stigma and acknowledges HCWs’ concerns about mandatory reporting. The resulting campaign used a mix of marketing channels including the BDI website, social media, PR and media relations, electronic direct mail and search engine optimisation, all focused on driving awareness of the enhanced digital and person-to-person services.

RESULTS

As TEN delivers a self-guided digital tool to mostly anonymous consumers across web and app platforms, obtaining consistent and meaningful service usage data proved challenging. We segmented digital access data from both platforms into ‘traffic’ (visiting a digital platform and ‘engagement’ (accessing the resources within a digital platform). The app collected location and occupation data during account creation, but the website did not. Internet protocol addresses provided some geolocation data but could not include users accessing via virtual private networks and does not account for multiservice access, such as using the tool both at work and at home. Cookies allowed tracking of repeated use but were hampered by users browsing in secure browsing settings or clearing cookie data manually. Data were collated monthly and mapped against critical events throughout both the project and the COVID-19 pandemic (see figure 1).

DISCUSSION

Throughout our project, the central challenge has been engaging a nationwide group of time-poor, reluctant help-seekers with specialised needs and significant privacy concerns. Direct consultation was effective at clarifying HCWs’ unique needs, which translated into a more relevant service; for example, the expansion of tailored digital resources generated an almost 500% increase in the use of self-help resources on the website. However, engagement remains relatively low and systemic barriers to help-seeking persist. A key focus for the TEN team and our partners is resolving the apparent disconnect between high reported demand and low service uptake. This pattern has been observed in the establishment of similar services in other countries, highlighting that it is a large-scale challenge that will require large-scale solutions. In 2022, the TEN team will launch a national implementation study of TEN to address the stigma that often dissuades HCWs from adopting programmes like TEN using codesigned, peer-focused strategies, such as creating platforms for HCWs to share their lived experience of help-seeking and recovery.

Factors that limited service design and evaluation also bear consideration. Agile development helped increase responsiveness during a crisis; however, some consumers may be less inclined to return to an app throughout an iterative development cycle if it does not initially meet their needs, particularly those who are time-poor or sceptical of such services. Additionally, defining and measuring engagement with a multiplatform, self-directed service with numerous care options was problematic for service evaluation. Boosting engagement may rely more on implementation strategies than follow-up protocols employed in clinical trials, yet these remain under-researched.

Collaboration was central to TEN, yet the project was hampered by a lack of coordinated service design and delivery that linked physical and digital infrastructure. We had initially proposed a digital ecosystem that facilitated cross-platform information sharing and referral between providers to optimise both consumer experience and care delivery. This proved more difficult than anticipated, yet the need for such an ecosystem became clearer and more urgent as the project progressed. Improving digital infrastructure remains a key challenge for truly integrated digital health ecosystems.

Figure 1 Key traffic (left vertical axis, orange) and engagement (right vertical axis, blue) metrics across time mapped against milestones in the Australian COVID-19 response (lower horizontal axis). The TEN service officially launched in July 2020, approximately 5 months after the first local SARS-CoV-2 infection. Australian health policy is governed at the state level. The stats of NSW, QLD, SA, VIC and WA have used contact tracing, patient isolation, border control and lockdowns as key containment procedures throughout the pandemic. Unique visitors are defined as any visitor who has not previously accessed the website. NSW, New South Wales; QLD, Queensland; SA, South Australia; VIC, Victoria; WA, Western Australia.
CONCLUSIONS
The COVID-19 pandemic has placed great strain on HCWs and dedicated mental health services are urgently needed. Given the unique needs and sheer number of HCWs, services that blend digital with person-to-person options are well placed to deliver large-scale care that is relevant across the spectrum of healthcare professions. The TEN project rapidly designed and delivered such a service while accumulating significant knowledge about getting mental health support to HCWs. We share this knowledge here in the hope of supporting the global development of blended mental health services to provide the care that HCWs need and deserve.

In developing services like TEN, we recommend prioritising rapid user consultation before commencing service design to ensure earlier product iterations are as aligned with user needs as possible. To facilitate service evaluation, we suggest defining engagement and outcome metrics early and ensuring third-party data are fit for purpose. Creating taxonomies of digital behaviour may help track naturalistic uptake of digital mental health services.30–32 Given these services are addressing pre-existing issues exacerbated by COVID-19, we strongly encourage prospective collaboration. Consider reaching out to like-minded collaborators across industries and specialties before the next crisis. Evaluate existing services to identify overlaps and gaps between each. Establish formal channels for resource sharing to assess the systemic weaknesses that will be a barrier to integrating your services. For those with the resources and relationships, begin a conversation with partners, governing bodies and regulators to standardise patient care infrastructure so that once inside your service, consumers get the integrated support they need.

These goals are ambitious, but the impetus is clear. Across the world, HCWs have been the lifeblood of our defence against COVID-19, and they are suffering. Millions of HCWs face ongoing threats to their mental health but must navigate entrenched stigma1 6 and even professional retaliation when seeking help.17 Services such as TEN can deliver private, effective care at scale in a culturally sensitive way, but this is only the first step. The next challenge is cultivating a global healthcare workforce that acknowledges and openly supports every HCW’s right to good mental health.

Contributors PAB was responsible for the initial draft of the manuscript. PAB, MJB, JMN, LB, NS, TS, NC, JT, SBH and HC provided input on subsequent drafts of the manuscript and were responsible for the development and delivery of The Essential Network.

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