VALUE-BASED CARE

Case Study

Innovative preclinic triage system to guide Australians to the right mental health care first time

Tracey A. Davenport[1,*] eMBA, Director of Research, Governance and Analytics

Haley M. LaMonica [1,4,*] PhD, ABPP-CN, Senior Research Fellow

Shelley Rowe[1,2] PhD, Postdoctoral Fellow

Julie Sturgess[3] Chief Executive

Elizabeth M. Scott[1] MBBS, FRANZCP, Associate Professor

Grace Lee[1] MPH, MHM, Research Manager

Vanessa Wan Sze Cheng[1] PhD, Postdoctoral Fellow

Ian B. Hickie[1] AM, MD, FRANZCP, FASSA, Co-Director, Health and Policy

[1]Brain and Mind Centre, The University of Sydney, 94 Mallett Street, Camperdown, NSW 2050, Australia.
 Email: tracey.davenport@digitalhealth.gov.au; shelley.rowe@sydney.edu.au; e.scott@sydney.edu.au;
 grace.lee@sydney.edu.au; vanessa.cheng@sydney.edu.au; ian.hickie@sydney.edu.au
[2]GenHealth, 45–53 Little Street, Coffs Harbour, NSW 2450, Australia.
[3]Healthy North Coast, North Coast Primary Health Network, 106–108 Tamar Street, Ballina, NSW 2478,
 Australia. Email: jsturgess@ncphn.org.au
[4]Corresponding author. Email: haley.lamonica@sydney.edu.au

Abstract. This paper presents a case study of an innovative direct-to-consumer preclinic triage system designed to reduce predicted peak demand for Australian mental health services as a result of COVID-19 and its associated socioeconomic consequences by guiding Australians to the right mental health care first time. Our innovative, digital health solution comprises two components: (1) a highly personalised and measurement-based model of care (Brain and Mind Centre model of care) that considers both the heterogeneity of mental disorders and other underlying comorbidities, as well as clinical staging; and (2) a health information technology (i.e. the InnoWell Platform). This digital health solution has been embedded as part of standard service delivery into a community-based intake service, thus resulting in a redesigned service model. The service model is currently being implemented as part of a pilot feasibility study, the marker of acceptability at the health professional and service level, and is now under active evaluation to determine its effect on outcomes for consumers, health professionals and the service. For the purposes of this paper, this model served as a prototype for the preclinic triage system that was conceptualised for national scalability at the primary health network level. When implemented at a national level, our direct-to-consumer preclinic triage system is expected to be an effective population health demand management strategy to address the rapidly emerging mental health demand crisis in Australia, and is aligned with the recent recommendation from the Productivity Commission to develop a sustainable national digital platform to facilitate the assessment and referral process to ensure access to mental health care matched to an individual's level of need.

What is known about the topic?   Although there is increased recognition of the mental health demand crisis in Australia as a result of the COVID-19 pandemic, little has been done to 'flatten' the curve. The Australian Government committed additional funding to support the Better Access Pandemic Support measure; however, this approach to care fails to appreciate both the disparities in service availability across Australia and the gap fees that are prohibitive to some of those seeking help. Furthermore, the expansion of this program may only result in those in care remaining in care, thus further delaying access to those in need.
What does this paper add?   This paper describes a digital health solution, comprised of a highly personalised and measurement-based model of care coupled with a health information technology, that has been embedded as part of standard service delivery. Consumers seeking mental health care complete a multidimensional self-report assessment via

---

*These authors contributed equally to this work.

the technology, the results of which are available in real-time and used to facilitate triage to pathways of care as indicated by the severity of the consumer's illness and level of need to more effectively and efficiently allocate consumers to care. The redesigned service model is now under active evaluation to determine its effects on outcomes at consumer, health professional and service levels.

What are the implications for practitioners?   The redesigned local service model served as a prototype for our innovative direct-to-consumer preclinic triage system specifically designed to allocate consumers to self-management, ambulatory care or acute care based on clinical stage and level of need. It is our hypothesis that the preclinic triage system will be an effective population health demand management strategy. Importantly, the proposed preclinic triage system aligns with the recent recommendation from the Productivity Commission for the Australian Government to fund the development and sustained implementation of a digital platform to facilitate assessment and referral to evidence-based interventions matched to a consumer's level of need.

Introduction

The year 2020 proved to be one of the most challenging for Australians in living memory, resulting from a major drought, the summer bushfires and floods and the global COVID-19 pandemic, which, in and of itself, has resulted in two public health crises, both of which persist now into 2021. The first of these crises is the actual infectious disease that led to a proactive, coordinated, multifaceted and multidisciplinary global response whereby physical distancing measures were mandated to 'flatten' predicted morbidity and mortality curves; the second relates to a rapidly emerging increase in mental health service demand,[1] which, to date, has not received the same level of attention despite its acute and longer-lasting effects on the mental wealth of all Australians.

The results of a large national survey of Australian adults ($n = 13\,829$) after 1 month of COVID-19 restrictions indicated population-level increases in mild to moderate symptoms of depression (26.5%), anxiety (24.5%) and suicidal thoughts and behaviours (10%), as well as rates of clinically significant depressive symptoms sixfold higher than evidenced in a previous community-based survey.[2] Using a prototype system dynamics model, our collaborators at the University of Sydney's Brain and Mind Centre (BMC) project that there will be increases in emergency department presentations of 11.4%, self-harm hospitalisation (indicative of suicide attempts) of 12.3% and deaths by suicide of 13.7% over the next 5 years.[3] The evolving effects of physical distancing, social isolation or dislocation and fear of contagion are being further compounded by distress caused by loss of education and employment, as well as economic hardship, forecast to continue to worsen over the next 6–12 months.[4]

Although awareness programs are a favoured Australian Government strategy to combat worsening mental health, predictive modelling also estimates that this approach is likely to exacerbate negative mental health outcomes because it will serve to increase demand on a system that is already stretched beyond current capacity, thus increasing service wait lists and reducing access to quality care.[5] Furthermore, despite increased expenditure on mental health care and service delivery in recent years,[6] there has been no appreciable change in psychological distress in the Australian community.[7] In an effort to prioritise mental health, the Australian Government committed to expand the Better Access Pandemic Support measure, which doubles access to Medicare-subsidised psychological therapy sessions for those with a mental health treatment plan.[8] However, this 'more-of-the-same' approach fails to account for the unequal distribution of resources across Australia or gap fees (i.e. out-of-pocket expenses) likely to be prohibitive for some seeking help, both of which differentially affect individuals in regional and rural communities more so than in metropolitan areas. In addition, the expansion of services is expected to be of little added value to new consumers, because those in care may be inclined to extend their engagement with services, thus preventing access for those with emerging or worsening mental health disorders.[9]

With the aim of combatting issues of demand management, the objective of this paper is to present a case study of an innovative direct-to-consumer preclinic triage system designed to guide Australians to the right mental health care first time, potentially enabling a reduction in the predicted peak mental health service demand due to COVID-19 and its associated social and economic consequences.

Methods

Setting and participants

The preclinic triage system has been developed from a local redesigned service model currently being piloted in a feasibility study implementing a codesigned digital health solution (described in greater detail in the Methodology section below) into a community-based intake service located within the footprint of the North Coast NSW Primary Health Network (PHN). The service adheres to a 'no wrong door' approach, and serves as a single point of contact for consumers and their supportive others who are seeking access to care, as well as for general practitioners (GPs), allied health professionals and other agencies who want to refer people to mental health support services. Anticipating an increase in referrals from GPs as well as self-referrals as a result of extreme natural disasters (e.g. drought, bushfires and floods)

and, more recently, the negative impacts of COVID-19, the service, in collaboration with the research team, redesigned their service model to incorporate a digital health solution, with the aim of improving the efficiency and effectiveness of their existing assessment and triage processes. Importantly, while the redesigned service model maintains referrals from local GPs and other health professionals and agencies, it has also incorporated direct-to-consumer access. Results from the pilot feasibility study are expected to be available for publication in mid-2021. Importantly, this model served as a prototype for our preclinic triage system (described in greater detail below), which was conceptualised as an innovative population and web-based direct-to-consumer intake, assessment and triage tool.

Methodology

Digital health solution

With traditional in-clinic and online mental health care services in high demand, there is increasing evidence that health information technologies should play a vital role in service delivery.[10] Furthermore, the disruption caused by COVID-19 has resulted in a greater need for and reliance on digital health models of care for screening, treatment and ongoing maintenance of health.[11] Our innovative digital health solution comprises two components: (1) a highly personalised and measurement-based (data-driven) model of care (the BMC model of care), which has been generated from over 10 years of research that considers the heterogeneity of mental health disorders and other underlying comorbidities (e.g. physical health) as well as clinical staging;[12] and (2) a health information technology (the InnoWell Platform) codesigned through a process of participatory design with lived experience, health professionals and service staff (including administration and management)[13] and listed on the Australian Register of Therapeutic Goods.

In relation to the latter, the Australian Government Department of Health and InnoWell Pty Ltd (a joint venture between The University of Sydney and PwC (Australia)) entered into a 3-year funding agreement in 2017 to deliver Project Synergy (2017–20), a series of collaborative research trials with the specific purpose of codesigning in collaboration with lived experience and implementing innovative health information technology solutions, including the InnoWell Platform, to transform mental health service delivery in Australia.[14] As described in detail by Davenport *et al.*,[13] the codesigned InnoWell Platform was developed to collect, store, score and report clinical data back to a consumer and their health professional to promote person-centred care, self-management, early intervention, shared decision making and routine outcome monitoring. The InnoWell Platform uses self-reported information to develop a comprehensive understanding of a consumer's needs, including online self-reported psychometric measures assessing a range of health domains (e.g. psychological distress, suicidal thoughts and/or behaviours, daily functioning, depressed mood, cognition, sleep–wake cycle, social connectedness etc.), which can be supplemented with information provided by health professionals, as well as objective behavioural data collected via third-party integrations (e.g. Fitbit). The multidimensional assessment results promote shared decision making and coordinated care to ensure all consumers receive the right care first time.[15]

Prototype for the preclinic triage system

As noted above, the digital health solution has been embedded as part of standard service delivery into a community-based intake service, thus resulting in a redesigned service model. Specifically, before receiving a referral for care, consumers seeking mental health support are invited to create an account and then complete a self-report assessment via the InnoWell Platform. The assessment results are summarised and made immediately available via a dashboard, providing a multidimensional profile of the person's mental health and well-being and, in turn, facilitating triage to one of three recommended pathways of care. Here, triage is guided by a clinical staging model that considers the spectrum of mental ill health and aims to place consumers on a continuum, from those with risk factors and symptoms or impairment (Stage 1a) to those with attenuated disorders (Stage 1b), discrete disorders or persistent and recurrent syndromes (Stage 2+).[16,17]

Clinical stage serves to identify individuals based on differential risk of progression to more severe disorders and poorer outcomes, and is therefore an accurate and efficient guide to allocating care based on illness severity and persistence (a concept known as staged care).[18] Consumers assigned 'Stage 1a', or low need, are immediately triaged to self-management, including self-directed and clinician-supported apps and e-tools (e.g. This Way Up, MindSport Clinic), whereas those assigned 'Stage 1b+' are immediately triaged to ambulatory care services, including general practice or another primary care service, and finally, for those where a risk of self-harm is identified, an immediate clinical assessment is conducted in order to determine the consumer's level of need, including immediate triage to acute care and/or hospitalisation, as indicated. Importantly, this technology-enabled referral process is monitored by health professionals to ensure appropriateness of care. The redesigned local service model is currently being implemented, the marker of acceptability by health professionals and service managers, and is now under active evaluation to determine its effects on outcomes at the consumer, health professional and service levels. For the purposes of this paper, the model served as a prototype for the preclinic triage system that was conceptualised for national scalability at the PHN level.

Proposed national preclinic triage

The direct-to-consumer preclinic triage system would be accessible online 24/7 and available via any smart device (including computers). As with the prototype, consumers seeking help would complete an initial self-report assessment that would be used to automatically determine clinical stage and level of need in order to facilitate appropriate and real-time triage. As shown in Fig. 1, consumers assigned 'Stage 1a' or low need (~50% of consumers) would be immediately triaged to online clinical and non-clinical services, whereas those assigned 'Stage 1b' (~40% of consumers) would be immediately triaged to ambulatory care services and, reflecting an adaptation of the local model, those assigned 'Stage 2+' would be immediately triaged to acute care and/or hospitalisation.[16,17] Importantly, the InnoWell Platform allows consumers to indicate their preferences for the biopsychosocial domains on which they would like to focus, as well as the manner of intervention or treatment in
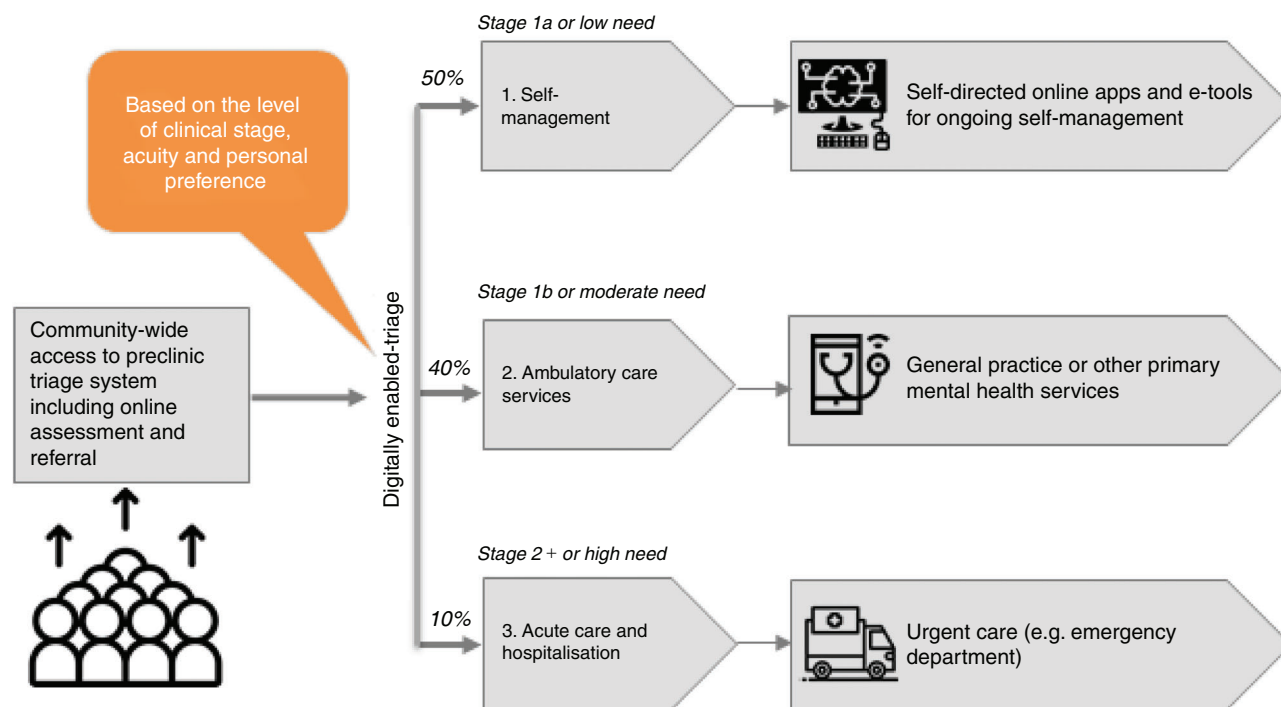
Fig. 1. An innovative direct-to-consumer preclinic triage system for mental health.

which they would like to engage, thus accounting for consumer preferences in the triage and service allocation process. The preclinic triage system would also be able to be used over time, such that consumers could continuously monitor and manage their mental health and well-being.

Importantly, similar to our pilot feasibility study, experienced health professionals would monitor the direct-to-consumer preclinic triage system in a timely manner (within 24 h of assessment completion) to ensure consumers are being triaged to the right mental health care first time. This process would include a review and validation of clinical stage and level of need as identified by the online self-report assessment and clinical staging protocol, ensuring a rapid response to and management of suicide risk, as well as at risk behaviours for those consumers identified as being 'Stage 2+'. It is expected that consumers assigned 'Stage 1b', or moderate need, will require the most extensive clinical review to ensure appropriate coordination of care in relation to the care team (i.e. clinical psychologist, psychiatrist, social worker etc.) assembled to support the consumer and to facilitate shared decision making in relation to both the health domains on which to focus care and the consumer's preferred care options.

Expected outcomes of the national preclinic triage model

By providing immediate access to self-management, ambulatory care or acute care as indicated by clinical stage and level of need, it is hypothesised that our preclinic triage system will be an effective population health demand management strategy, as evidenced by improvements in community health and well-being, reductions in local mental health service wait times, service disengagement, emergency department presentations and mental health-related hospitalisations and improved satisfaction with the

quality of mental health care. Importantly, the effects of the direct-to-consumer preclinic triage system would need to be systematically monitored, evaluated (i.e. consumer and health professional feedback on the appropriateness of referral pathways) and iteratively refined to facilitate successful, sustainable and scalable implementation.[19]

Discussion

Although the pilot feasibility study of the implementation of the digital health solution within a community organisation is expected to translate to improvements in access to and appropriateness of care within the North Coast NSW PHN footprint, it does not solve the mental health service demand crisis in Australia. As such, it is our proposal that a direct-to-consumer preclinic triage system be rapidly implemented across PHNs nationally, thus circumventing unnecessary mental health system delays and costs.

Recent predictive modelling has highlighted the extent to which technology-enabled models of care (i.e. digital health solutions) can reduce the negative effects of COVID-19. Specifically, an ideal scenario of doubling the capacity growth rate of services (i.e. an increase per year of 11% GP, psychiatrist and allied health services and a 10% increase in capacity of community mental health centre services) combined with digital health solutions and post-suicide attempt aftercare, delivers an 8–10% reduction in suicide, self-harm hospitalisations and emergency department presentations.[3] Although strengthening mental health services is imperative for demand management, it is critical that care is not exclusively focused on symptom reduction, but also prioritises social participation and the ability to pursue meaningful goals.[20] To that end, it is essential that

mental health services be organised into coordinated circles of care, enabling access to the right care based on level of need in conjunction with (rather than isolated from) supportive services relevant to the consumer (i.e. education and employment supports, support for families and carers, supportive housing services, peer support); that is, delivering personalised mental health care. Importantly, the use of technology to enable team-based care coordination has been projected to reduce healthcare costs by A\$226 million while simultaneously improving mental health outcomes and increasing economic productivity by A\$1.3 billion.[21]

Importantly, the recent Productivity Commission report called for the Australian Government to fund the development and sustained implementation of a free, person-centred digital platform to facilitate assessment and referral to evidence-based interventions matched to a consumer's level of need.[22] Consistent with the aim of our proposed preclinic triage system, the stated objective of such a digital platform is to improve consumer choice by recommending a range of interventions, including both clinical and non-clinical care options delivered by a health professional or digitally. Although a cost–benefit analysis specifically for the proposed digital platform was not conducted, the Productivity Commission estimated a net economic benefit of A\$64–168 million and an additional 1310–2390 quality-adjusted life-years (a measure of the impact of illness) resulting from the expansion of supported online treatment alone, reflecting the significant added value of digital solutions to the broader community.[22] Furthermore, and perhaps most importantly, the results of a lived-experience-led national community consultation program showed considerable consumer interest in and experience with digital health solutions, with 81% of respondents indicating they were comfortable sharing mental health experiences online and 94% having already done so.[23]

Consumer interest and the considerable potential for economic and productivity gains indicate that a pilot implementation and impact evaluation of the preclinic triage system at the PHN level is urgently required. If results support scale-up at the national level, our direct-to-consumer preclinic triage system has the potential to radically broaden first-line mental health screening capacity, facilitating independent, person-directed assessment and thus sparing more intensive mental health resources for those who require targeted assessment and intervention. Importantly, it can be rapidly translated into policy and practice to guide Australians to the right mental health care first time.

Competing interests

Ian Hickie was an inaugural Commissioner on Australia's National Mental Health Commission (2012–18). He is the Co-Director, Health and Policy at the BMC, The University of Sydney. The BMC operates an early intervention youth service at Camperdown under contract to headspace. Ian Hickie is the Chief Scientific Advisor to and a 5% equity shareholder in InnoWell Pty Ltd. InnoWell was formed by The University of Sydney (45% equity) and PwC (Australia; 45% equity) to deliver the A\$30 million Australian Government-funded Project Synergy (2017–20; a 3-year program for the transformation of mental health services) and to lead transformation of mental health services internationally through the use of innovative

technologies. Tracey Davenport is now Director (Research and Evaluation), Design and Strategy Division, Australian Digital Health Agency. The source of funding does not entail any potential conflict of interest for the other members of the Project Synergy Research and Development Group.

References

1   Liotta M. Coronavirus posing significant mental health threat newsGP, 26 March 2020. Available at: https://www1.racgp.org.au/newsgp/clinical/coronavirus-posing-significant-mental-health-impac [cited 8 July 2020].

2   Fisher JRW, Tran TD, Hammarberg K, Sastry J, Nguyen H, Rowe H, Popplestone S, Stocker R, Stubber C, Kirkman M. Mental health of people in Australia in the first month of COVID-19 restrictions: a national survey. *Med J Aust* 2020; 213: 458–64. doi:10.5694/mja2.50831

3   Brain and Mind Centre. Sounding the alarm: a post-COVID-19 curve for suicide. The University of Sydney; 2020. Available at: https://www.sydney.edu.au/content/dam/corporate/documents/brain-and-mind-centre/mental-wealth/sounding_the_alarm_usyd_ncphn.pdf [cited 24 August 2020].

4   Lowe P. Responding to the economic and financial impact of COVID-19. Reserve Bank of Australia; 2020. Avaliable at: https://www.rba.gov.au/speeches/2020/sp-gov-2020-03-19.html [cited 24 August 2020].

5   Aitkinson J-A, Skinner A, Lawson K, Song Y, Hickie I. Road to recovery: restoring Australia's mental wealth. The University of Sydney's Brain and Mind Centre; 2020. Avaliable at: https://www.sydney.edu.au/content/dam/corporate/documents/brain-and-mind-centre/youthe/road-to-recovery-v2.pdf [cited 24 August 2020].

6   Jorm AF. Australia's 'Better Access' scheme: has it had an impact on population mental health? *Aust N Z J Psychiatry* 2018; 52: 1057–62. doi:10.1177/0004867418804066

7   Meadows G, Enticott J, Rosenberg S. Three charts on: why rates of mental illness aren't going down despite higher spending. The Conversation, 28 June 2018. Available at: https://theconversation.com/three-charts-on-why-rates-of-mental-illness-arent-going-down-despite-higher-spending-97534 [cited 10 December 2020].

8   Department of Health. Budget 2020–21: prioritising mental health – doubling Better Access initiative sessions. 2020. Available at: https://www.health.gov.au/resources/publications/budget-2020-21-prioritising-mental-health-doubling-better-access-initiative-sessions [cited 15 December 2020].

9   Rosenberg S, Hickie I. Mental health needs more than more Medicare sessions. 2020. Available from: https://www.croakey.org/mental-health-needs-more-than-more-medicare-sessions/ [cited 15 December 2020].

10 O'Connor S, Hanlon P, O'Donnell CA, Garcia S, Glanville J, Mair FS. Understanding factors affecting patient and public engagement and recruitment to digital health interventions: a systematic review of

qualitative studies. *BMC Med Inform Decis Mak* 2011; 16: 120. doi:10.1186/s12911-016-0359-3

11 Wind TR, Rijkeboer M, Andersson G, Riper H. The COVID-19 pandemic: the 'black swan' for mental health care and a turning point for e-health. *Internet Interv* 2020; 20: 100317. doi:10.1016/j.invent.2020.100317

12 Hickie IB, Scott EM, Cross SP, Iorfino F, Davenport TA, Guastella AJ, Naismith SL, Carpenter JS, Rohleder C, Crouse JJ, Hermens DF. Right care, first time: a highly personalised and measurement-based care model to manage youth mental health. *Med J Aust* 2019; 211(S9): S3–46. doi:10.5694/mja2.50383

13 Davenport TA, LaMonica HM, Whittle L, English A, Iorfino F, Cross S, Hickie IB. Validation of the InnoWell Platform: protocol for a clinical trial. *JMIR Res Protoc* 2019; 8(5): e13955. doi:10.2196/13955

14 Hickie IB, Davenport TA, Burns JM. Overview of Project Synergy: building an online platform to deliver right care, first time. *Med J Aust* 2019; 211(S7): S4–7.

15 Iorfino F, Cross SP, Davenport T, Carpenter JS, Scott E, Shiran S, Hickie IB. A digital platform designed for youth mental health services to deliver personalised and measurement-based care. *Front Psychiatry* 2019; 10: 595. doi:10.3389/fpsyt.2019.00595

16 Hickie IB, Scott EM, Hermens DF, Naismith SL, Guastella AJ, Kaur M, Sidis A, Whitwell B, Glozier N, Davenport T, Pantelis C, Wood SJ, McGorry PD. Applying clinical staging to young people who present for mental health care. *Early Interv Psychiatry* 2013; 7(1): 31–43. doi:10.1111/j.1751-7893.2012.00366.x

17 McGorry PD, Hickie IB, eds. Clinical staging in psychiatry: making diagnosis work for research and treatment. Cambridge: Cambridge University Press, 2019. doi:10.1017/9781139839518

18 Sawrikar V, Stewart E, LaMonica HM, Iorfino F, Davenport TA, Cross S, Scott E, Naismith SL, Mowszowski L, Guastella A, Hickie IB. Using staged care to provide 'right care first time' to people with common affective disorders. *Psychiatr Serv* 2021. doi:10.1176/appi.ps.202000145

19 LaMonica HM, Davenport TA, Braunstein K, Ottavio A, Piper S, Martin C, Hickie IB, Cross S. Technology-enabled person-centered mental health services reform: strategy for implementation science. *JMIR Ment Health* 2019; 6(9): e14719. doi:10.2196/14719

20 Huber M, Knottnerus JA, Green L, van der Horst H, Jadad AR, Kromhout D, Leonard B, Lorig K, Loureiro MI, van der Meer JWM, Schnabel P, Smith R, van Weel C, Smid H. How should we define health? *BMJ* 2011; 343: d4163. doi:10.1136/bmj.d4163

21 Atkinson J-A, Lawson K, Skinner A, Hickie IB. Road to recovery, part 2: investing in Australia's mental wealth. The University of Sydney's Brain and Mind Centre; 2020. Available at: https://www.sydney.edu.au/content/dam/corporate/documents/brain-and-mind-centre/road-to-recovery-part-2-economic-short-report.pdf [cited 18 December 2020].

22 Productivity Commission. Mental health, report no. 95. Canberra: Australian Government; 2020.

23 InnoWell Lived Experience Advisory Function Working Group. National community consultation program final report. 2020. Available at: https://www.innowell.org/wp-content/uploads/2020/06/NCCP-June2020-Final.pdf [cited 15 December 2020].