

Beyond tinkering with the status quo: Coordinated structural reforms can deliver a substantive improvement in mental health outcomes

31st October 2021

Research Team: Dr Catherine Vacher, Dr Adam Skinner, A/Prof. Jo-An Occhipinti, Nicholas Ho, Dr Christine Song, Prof. Ian B Hickie



Key messages

- The combination of social connectedness programs, technology-enabled care, post suicideattempt care, Direct Access to specialist services, and increased capacity in psychologists, psychiatrists, mental health nurses, social workers, occupational therapists and other skilled allied service practitioners delivers the maximum benefit for reducing psychological distress, self-harm hospitalisations (10.6%), suicide deaths (11.2%), and mental health related Emergency Department (ED) presentations (9%).
- To achieve significant improvements in mental health services we need serious structural reforms that consists of three key elements:
 - IT-facilitated service delivery reform –using IT-based systems that enable the delivery of timely, coordinated, team-based care ('Right Care, First Time'), accompanied by a major shift towards measurement-based care to achieve rapid, functional outcomes in those who present for care;
 - Specialist mental health service capacity increases A substantial increase in the capacity of psychiatry, psychology, mental health nursing, social work, occupational therapists, and other skilled allied services in the order of a five-fold increase in the current capacity growth rate (which equates to approx. 71.6% absolute increase in services capacity by 2028). Service capacity increases are largely achieved by increases in service efficiency and quality improvements, which are then supplemented by slower growth in absolute workforce numbers.
 - Structural reform to enhance direct access to specialised care Direct Access programs (facilitated regionally by Primary health Networks) would enable up to 50% of people seeking mental health care to get direct access to psychologists, psychiatrists, mental health nurses and other skilled allied professionals without the requirement of consulting first with, or being referred by, a general practitioner.
- Dynamic Systems Modelling and simulation by the Brain and Mind Centre, University of Sydney, demonstrates that this strategic combination of mental health service and structural reforms (independent of other social, educational and community programs), could deliver a 5.9% reduction in mental health related emergency department (ED) presentation (43,588 presentations avoided) a 3.1% reduction in self-harm hospitalisations (1,956 hospitalisations avoided), and a 3.5% reduction in suicide deaths (258 lives saved) by 2028.
- Importantly, any of these three key Mental Health Services elements on their own does not achieve a significant impact and, in fact, some may make the situation worse against the key

set of mental health outcomes across the population, and in young people (e.g., Direct Access implemented on its own results in 12,611 additional ED presentations over the period 2022-2028). However, when implemented in combination these changes are projected to deliver synergistic effects.

- Mental health awareness campaigns were forecast to increase demand on an already strained mental health system, increase service wait times, and in consequence raise disengagement from mental health care. This results in unintended increases in mental health related ED presentations (-8.6%), self-harm hospitalisations (-0.6%) and suicide deaths (-0.7%).
- This work demonstrates the capacity of dynamic systems modelling to support smart
 planning and highlights the danger of simply implementing single elements without
 understanding their implications when introduced into a complex system. Many of the
 solutions currently favoured to address the social and economic impacts of COVID-19 on
 mental health, particularly by individual professional groups, could make the situation worse
 or not significantly improve the situation, thereby wasting valuable time and resources.
- Each of the proposed reforms is now achievable, but they require the capacity and leadership to implement them together through state and federal government coordination.

The challenge

The impact of COVID-19 on mental health, particularly for young people, has placed increased demands on the current mental health care system in NSW and has also highlighted its limitations. Australia has been relatively spared by the pandemic and the ensuing stress and grief caused by very high numbers of COVID-19 cases and deaths. However, the necessary measures put in place to contain the virus have caused uncertainty, isolation, financial insecurity, disrupted routines, increased screen time, and reduced outdoor time in large segments of the population. This caused an increase in depression and anxiety symptoms relative to usual population data, including in people without an established mental health diagnosis¹. NSW ambulance records^{2,3} show that attendances for self-injury have increased by 13% and 27% in the first quarters of 2020 and 2021 respectively, when compared with the first quarter of 2019. Similarly, NSW ambulance attendances for suicidal ideation have risen by 7% and 19% in the first quarters 2020 and 2021 respectively compared with 2019. National

ambulance statistics highlight that the most severely impacted have been individuals in the 15-19 years age group, females in particular^{2,3}.

As the emergence of the Delta variant has led the states of NSW and Victoria to abandon their strategy of elimination of COVID-19, the population of NSW is now facing the challenges of opening up, reestablishing the routines of everyday life, adjusting to the removal of temporary financial safety nets, and learning to "live with COVID". While it is a time of hope and relief for parts of the population, it brings a new disruption to vulnerable segments of the population as well as uncertainty in regard to re-engagement in social life and potential flares of COVID-19 cases.

What did we do?

To better respond to current and future needs it is vital to plan for a strong mental health system that allows patients to easily engage and receive care in the same way health system planning in response to the pandemic helped retain system flexibility and prevent system failures seen elsewhere in the world. The complexity of the interactions between socioeconomic, demographic, behavioural and health care factors affecting mental health makes it difficult for decision makers to invest in the right mix of initiatives. Therefore, we developed a system dynamics model to provide a decision support platform capable of testing the impact of mental health system strengthening and reform strategies for NSW. This model builds on the national mental health systems modelling work⁴, with updated inputs regarding the social and economic impact of COVID-19 on mental health and new interventions.

The model was customised and calibrated using NSW data from the Australian Bureau of Statistics, NSW Health and the Australian Institute of Health and Welfare, to reflect the population and demographic dynamics, key social determinants of mental health, and mental health service dynamics of NSW. The post-COVID NSW population projections correspond to the central scenario of the December 2020 population statement of the Australian Government Centre for Population. The model forecasts the likely short- and longer-term impacts of alternative scenarios on the prevalence of psychological distress, mental health-related ED presentations, self-harm hospitalisations, suicide deaths among young people (15-24 years) and total population. The appendix shows a high-level overview of the causal structure and pathways of the system dynamics model. The preliminary findings presented below report summary statistics for the impact of each scenario over the period 2021-2028, with graphs showing the impacts over the longer time horizon (to 2031).

Key model assumptions

The model assumes a progressive roadmap for easing COVID-19 restrictions following public health advice. The potential consequences of an aggressive reopening of NSW, such as overwhelmed emergency departments, psychological distress due to high levels of COVID-19 cases and detrimental mental health effects due to large numbers of individuals with long COVID, are not included in this model.

What did we find?

Projected mental health impacts of COVID-19 in NSW

Table 1: Projected mental health-related emergency department (ED) presentations, self-harm hospitalisations

 and suicide deaths over the period September 2021 to September 2026 with and without COVID-19.

	No COVID-19	COVID-19	% increase
Total NSW population (all ages)			
ED presentations	532045	525647 -1.2 (*)	
Self-harm hospitalisations	43963	45157	2.7
Suicide deaths	5248	5256	0.2
NSW population aged 15-24 years			
ED presentations	100434	101614	1.2
Self-harm hospitalisations	12483	13333	6.8
Suicide deaths	597	638	6.8

(*) This decrease occurs because of lower population growth due to COVID-19 related border closures.

The population of NSW in 2026 is projected to be 3.7% lower than what would have been the case if the pandemic had not occurred because of the impact of COVID-19 on interstate and overseas migration. Despite this population decrease, ED presentations are predicted to increase by 1.2% for the 15-24 years age group. In addition, self-harm hospitalisations are expected to increase by 2.7% for the general population (all ages), and by 6.8% in the 15-24 years age group. Suicide deaths are predicted to increase by 6.8% in the 15-24 years age group. These projections highlight the more severe impact COVID-19 disruption will have on the mental health and well-being of younger people in coming years.

Strategies for mitigating the impact of COVID-19

We evaluated the impact of several programs, service reforms, and structural system reform scenarios on key mental health outcomes including mental health-related ED presentations, self-harm hospitalisations and suicide deaths. The results are summarised for the period September 2021 to September 2028 in Table 2 and are displayed graphically for the entirety of the simulation (end 2031) in Figure 1.

Social connectedness programs: Feeling connected, or having a sense of belonging and closeness with others, is a key determinant of sustainable well-being⁵. Lockdowns, social distancing and closed borders, while protecting Australians from the large increases of morbidity and mortality seen overseas, disrupted social routines and increased isolation. This disruption particularly affected young people, at an age where increased socialisation is expected. We modelled the effect of social connectedness programs starting in 2022, with an implementation time of one year and a duration of three years. The goal of these programs is to re-engage individuals in social activities after the interruption of the pandemic, reduce isolation, and enhance resilience in the face of adversity. This intervention is projected to prevent 18626 mental health-related ED presentations, 1811 self-harm hospitalisations and 226 suicide deaths across NSW, including 3152 mental health-related ED, 492 selfharm hospitalisations and 24 suicide deaths among young people (aged 15-24 years), as well as significantly reduce psychological distress (Figure 1, run 2). Of all interventions considered in this report, social connectedness programs represent the single most effective intervention to decrease the number of mental health related ED presentations. This is particularly interesting during a pandemic as potential waves of COVID-19 cases cause peaks in ED presentations, and any initiative to reduce pressures on emergency departments is crucial.

Technology-enabled care: Service reforms such as the use of technology to facilitate better coordination of care and a shift in focus towards measurement-based care and improvement of functional outcomes has the potential to improve the quality and efficiency of mental health services. The model simulated the impact of implementing technology-enabled care from 2022, with two years to achieve scale across NSW and projected that this service reform would prevent 16706 (2.26%) ED mental health-related ED presentations by September 2028, as well as significantly decrease psychological distress, self-harm hospitalisations and suicide deaths (Figure 1, run 3).

Post attempt care: Best research evidence suggests that approximately 18% of individuals make a repeat suicide attempt in the year after a suicide attempt⁶, therefore the implementation of a post-suicide attempt active outreach program is designed to reduce readmissions after a suicide attempt. The simulation of this program commencing 2022, is assumed to take approximately two years to scale across NSW, and provide post-attempt care to a maximum of 70% of patients hospitalised after

a suicide attempt. Post-attempt care is projected to significantly reduce self-harm hospitalisations (by 4.71% for all ages, and 4.39% for youth) and suicide deaths (by 4.86% for all ages and 4.44% for youth), and slightly decrease mental health related ED presentations (Figure 1, run 4).

Direct Access: Receiving the right care at the right time can enhance recovery. The Direct Access program enables selected patients to get direct access to psychologists, psychiatrists, mental health nurses and allied professionals (Psych&Allied) without the requirement of consulting first with a general practitioner (GP). This initiative was initially modelled as commencing in 2022 with two years to achieve scale across NSW and a maximum of 10% to 50% of patients seeking care using Direct Access. While this intervention is designed to simplify and achieve timely access to care, it is forecast to significantly increase the waiting times to psychologists, psychiatrists and allied health professionals, leading to unintended increases in key mental health outcomes, particularly mental health-related ED presentations. This occurs as a result of a lack of specialist service capacity to meet the increased direct demand for assessment and care, which increases service wait times, increases service disengagement and results in increased emergency presentations for mental health care (Figure 1, run 5)

However, when the Direct Access intervention is coupled with an increase in service capacity (psychologists, psychiatrists and allied health), and is delayed to 2024 to allow the Psych&Allied capacity to increase sufficiently to meet the increased demand generated by the Direct Access program, then all outcomes are improved (Table 2, Figure 1). Many simulations were conducted to determine the best combinations of increases in Psych&Allied capacity and maximum number of patients using Direct Access. Multiplying the annual rate of increase of Psych&Allied services capacity by two (and respectively three) allowed up to 10% (respectively 20%) of patients to use Direct Access These combinations avoided bottlenecks (significant increases in wait times) in Psych&Allied services and decreased mental health-related ED presentations, self-harm hospitalisations and suicide deaths much beyond the improvements achievable by growing Psych&Allied service capacity alone (Table 2). A five-fold increase in the Psych&Allied services capacity growth rate prevented adverse impacts of Direct Access regardless of the proportion of people seeking mental health care utilising the program. We arbitrarily selected to simulate a maximum Direct Access rate of 50% (Table 2 runs 13-16,18) but could have used a higher rate.

Under current trends, Psych&Allied capacity is predicted to reach 3.7 million services in September 2028. A two-fold increase in Psych&Allied services (respectively three- and five-fold), corresponds to

568,700 (resp. 1.13M and 2.27M) additional Psych&Allied services, representing a 17.9% (resp. 35.8% and 71.6%) absolute increase in Psych&Allied services capacity compared to baseline growth over the next seven years.

The benefits delivered by the combinations of Direct Access and increased Psych&Allied services capacity are further improved with the implementation of Technology-enabled care. Technology-enabled care facilitates better coordination of care, could assist in triaging incoming patients via Direct Access directing them to appropriate services, and therefore has the potential to improve the quality and efficiency of mental health services. Figure 2 presents simulated impacts of service capacity, service reform, and system structural reform scenarios on mental health-related ED presentations (all ages) to 2031.

The results of these simulated scenarios highlight the current shortage of specialist mental health services in NSW, and the current role GPs play in preventing an exacerbation of wait times for specialist services. Direct Access represents a structural reform of the mental health system that has the potential to achieve far greater impacts than simply increasing the capacity of the current system alone. However, this structural reform is only beneficial if accompanied by an increase in psychologists, psychiatrists, mental health nurses and other allied services, and preferably with service reform that improves the efficiency and effectiveness of care such as that offered by technology-enabled, team-based care.

Combination of interventions: the combination of Social connectedness programs, Technologyenabled care, Post-attempt care, Direct Access (50%) from 2024 and increased capacity in psychologists, psychiatrists and allied services delivers the maximum benefit for reducing psychological distress (Figure 1 run 7), self-harm hospitalisations (10.6%) and suicide deaths (11.2%), while decreasing mental health related ED presentations (9%). See scenario 18 in Table 2 and run 7 in Figure 1.

Other: Mental health awareness campaigns were forecast to increase demand on an already strained mental health system, increase service wait times, and in consequence raise disengagement from mental health care. This results in unintended increases in mental health related ED presentations (-8.6%), self-harm hospitalisations (-0.6%) and suicide deaths (-0.7%). Increasing the annual growth in capacity of public and private hospital psychiatric care and private outpatient services provided very limited benefits compared to the other interventions discussed above.

What is recommended?

The combination of social connectedness programs, technology-enabled care, post-attempt care, Direct Access, and increased capacity in psychologists, psychiatrists and allied services (scenario 18 in Table 2 and run 7 in Figure 1) is recommended by the Brain and Mind Centre. This combination simplifies the care seeking process for patients by enabling direct access to specialist mental health services, provides significant benefits in terms of reduction of psychological distress across the wider NSW population, directly acts - with the Social Connectedness programs - on the deleterious longterm effects of the social and economic impacts of the pandemic, reduces mental health related ED presentations to help decongest emergency departments, improving outcomes for those that are highly distressed and exhibiting suicidal behaviour.

	MH ED presentations prevented	Youth MH ED presentations prevented	Self-harm hospitalisations prevented	Youth self-harm hospitalisations prevented	Suicide deaths prevented	Youth suicide deaths prevented
Scenarios	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
1. Baseline with COVID-19	-	-	-	-	-	-
2. Social Connectedness Program	18626 (2.52)	3152 (2.22)	1811 (2.87)	492 (2.67)	226 (3.04)	23.7 (2.67)
3. Technology-enabled care	16706 (2.26)	2687 (1.89)	715 (1.13)	144 (0.78)	92 (1.24)	6.9 (0.8)
4. Post-attempt care	3067 (0.41)	876 (0.62)	2978 (4.71)	811 (4.39)	361 (4.86)	39 (4.44)
5. Direct Access 10% of patients	-2464 (-0.33)	-94 (-0.07)	-102 (-0.16)	-4 (-0.02)	-14 (-0.19)	-0.2 (-0.02)
6. x2 Growth rate Psych&Allied	6914 (0.94)	810 (0.57)	321 (0.5)	47 (0.25)	43 (0.57)	2.3 (0.26)
7. Direct Access 10% (*) + 6	8423 (1.14)	1112 (0.78)	367 (0.58)	60 (0.33)	48 (0.64)	2.9 (0.33)
8. Direct Access 10% (*) + 6 + 3	26597 (3.6)	3991 (2.82)	1160 (1.84)	219 (1.2)	149 (2.01)	10.6 (1.19)
9. Direct Access 20% of patients	-5247 (-0.71)	-224 (-0.16)	-210 (-0.33)	-10 (-0.05)	-29 (-0.39)	-0.5 (-0.06)
10. x3 Growth rate Psych&Allied	9927 (1.34)	1049 (0.74)	456 (0.72)	56 (0.3)	62 (0.84)	2.7 (0.3)
11. Direct Access 20% (*) + 10	16127 (2.18)	2034 (1.43)	715 (1.13)	115 (0.62)	93 (1.3)	5.6 (0.63)
12. Direct Access 20% (*) + 10 + 3	34257 (4.64)	4739 (3.34)	1516 (2.4)	263 (1.43)	197 (2.66)	12.7 (1.44)
13. Direct Access 50% of patients	-12612(-1.7)	-637 (-0.45)	-494 (-0.78)	-30 (-0.16)	-68 (-0.91)	-1.5 (-0.16)
14. x5 Growth rate Psych&Allied	11956 (1.62)	1198 (0.85)	531 (0.84)	61 (0.33)	74 (0.99)	2.9 (0.33)
15. Direct Access 50% (*) + 14	26115 (3.54)	3048 (2.15)	1187 (1.88)	173 (0.94)	157 (2.11)	8.3 (0.94)
16. Direct Access 50% (*)+ 14 + 3	43588 (5.9)	5619 (3.96)	1956 (3.1)	313 (1.69)	258 (3.47)	15.1 (1.7)
17. 2 + 3 + 4 + 9 + 10	57111 (7.73)	9203 (6.49)	6269 (9.92)	1584 (8.59)	775 (10.43)	76.4 (8.62)
18. 2 + 3 + 4 + 13 + 14	66241 (8.97)	10121 (7.14)	6890 (10.6)	1638 (8.88)	832 (11.2)	79 (8.91)

Table 2: Simulated impacts of current strategies on population mental health indicators 2021-2028.

Results are for the period September 2021 to September 2028. Youth refers to individuals aged 15-24 years. The baseline COVID-19 scenario includes existing government programs (financial support payments till October 2021 and expanded Better Access till end June 2022). MH ED presentations refer to mental health-related emergency department presentations. All interventions are set to start in 2022, except the Direct Access interventions marked with (*) which start in 2024.

Figure 1: Simulated impacts of current strategies on prevalence of moderate to very high psychological distress, mental health-related ED presentations and self-harm hospitalisations across all ages and among youth (2011-2031).



Run 1: Baseline with COVID-19 and existing government programs (financial support payments till October 2021 and expanded Better Access till end June 2022).

Run 2: Social Connectedness Program commencing 2022, with one year to scale across NSW and three years duration. Run 3: Technology-enabled care commencing 2022 with two years to scale across NSW.

Run 4: Post-attempt care commencing 2022 with two years to scale across NSW.

Run 5: Direct Access alone for 50% of patients, commencing 2022 with two years to scale across NSW.

Run 6: Direct Access for 50% of patients commencing 2024, with Technology-enabled care and 5x increase in services capacity growth rate of the Psych&Allied services.

Run 7: Social Connectedness + Post-attempt care + Technology-enabled care + Direct Access 50% commencing 2024 + 5x increase in services capacity growth rate of the Psych&Allied services.



Figure 2: Simulated impacts of service capacity, service reform, and system structural reform scenarios on mental health-related ED presentations (all ages) to 2031.

Run 1: Baseline with COVID-19 and existing government programs (financial support payments till October 2021 and expanded Better Access till end June 2022).

Run 2: **Service capacity alone**: 5x increase in services capacity growth rate of the Psych&Allied services (equates to a 71.6% absolute increase in services capacity by 2026 (i.e., compared to baseline growth)

Run 3: **Service reform alone:** Technology-enabled care commencing 2022 assuming two years to scale across NSW. Run 4: **Service reform plus capacity increase:** 5x increase in services capacity growth rate of the Psych&Allied services plus technology-enabled care commencing 2022.

Run 5: **Structural reform**: Direct Access alone for 50% of patients, commencing 2022 with two years to scale across NSW. Run 6: **Strategic combination of service and structural reforms**: 5x increase in services capacity growth rate of the Psych&Allied services plus technology-enabled care plus Direct Access for 50% of patients, commencing 2022 with two years to scale across NSW.

Next steps

The model will be updated as revised estimates of migration, unemployment, underemployment, participation, psychological distress, presentations to emergency care and hospitalisations are released over the coming months. Additional interventions will be built into the model to explore novel ways to improve mental health care in NSW.

References

- 1. Dawel A, Shou Y, Smithson M, et al. The Effect of COVID-19 on Mental Health and Wellbeing in a Representative Sample of Australian Adults. *Front Psychiatry*. 2020;11:579985.
- 2. Lubman DI, Heilbronn C, Ogeil RP, et al. National Ambulance Surveillance System: A novel method using coded Australian ambulance clinical records to monitor self-harm and mental health-related morbidity. *PLoS One.* 2020;15(7):e0236344.
- 3. Australian Institute of Health and Welfare Suicide and self-harm monitoring. 2021.
- 4. Atkinson JA, Skinner A, Hackney S, et al. Systems modelling and simulation to inform strategic decision making for suicide prevention in rural New South Wales (Australia). *Aust N Z J Psychiatry*. 2020;54(9):892-901.
- 5. Baumeister RF, Leary MR. The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychol Bull.* 1995;117(3):497-529.
- 6. Carroll R, Metcalfe C, Gunnell D. Hospital presenting self-harm and risk of fatal and non-fatal repetition: systematic review and meta-analysis. *PLoS One.* 2014;9(2):e89944.

Appendix

Model summary

The core model structure included: 1) a population component, capturing changes over time in the size and composition of the NSW population resulting from births, migration, ageing, and mortality; 2) a psychological distress component that models flows of people to and from states of moderate to very high psychological distress (Kessler 10 [K10] score 16-50); 3) a developmental vulnerability component modelling exposure to childhood adversity and its effect on the risk of developing mental disorders in adolescence and adulthood; 4) a post-secondary education sector that captures participation in education and vocational training; 5) an employment sector that captures workforce participation, unemployment and underemployment across the population; 6) a mental health services component that models the movement of psychologically distressed people through one of several possible service pathways involving (potentially) general practitioners, psychiatrists and allied mental health professionals (including psychologists and mental health nurses), emergency department and psychiatric inpatient care, community- and hospital-based outpatient care, and online services; and 7) a suicidal behaviour component that captures self-harm hospitalisations and suicide deaths. Figure 2 presents a high-level map of the core model showing the (causal) connections among sectors. The model is stratified by age-groups (15-24 years, 25-44 years, 45-64 years, 65+ years), and by major cities versus regional areas to enable exploration of differential effects of strategies on these populations. Detailed information on our systems modelling approach and on each component of the model can be found in <u>a recent publication in Frontiers in Psychiatry</u>, particularly in the Supplementary materials.



Figure 2: A high-level overview of the causal structure and pathways of the system dynamics model



For more information, please contact: jo-an.occhipinti@sydney.edu.au Head, Systems Modelling, Simulation, & Data Science | Youth Mental Health and Technology Co-Director, Mental Wealth Initiative Brain and Mind Centre Faculty of Medicine and Health

CRICOS 0026A