



COVID-19 pandemic response: Every life matters

Preliminary evaluation



THE UNIVERSITY OF
SYDNEY

Brain and Mind Centre



Brain and Mind Centre: Systems modelling insights

Our team have been working in partnership with regional planners and their stakeholders applying well-validated systems modelling and simulation to inform mental health services planning and suicide prevention for several years.

These dynamic models are then owned and operated by the relevant health authorities, assisting them to make real-time and evidence-informed decisions.

Sites for which we have developed detailed models represent urban, regional, and rural areas of NSW and they have been/are being used to inform decision making:

- North Coast Primary Health Network
- Hunter New England & Central Coast Primary Health Network
- Western NSW Primary Health Network
- WentWest Primary Health Network (Greater Western Sydney)

What health interventions will help to ‘flatten the curve’ for suicidal behaviour

Drawing on insights across the regional systems models, the programs and services listed below have the greatest potential impacts on reducing suicide deaths and assisting the health system to respond more effectively to those in great distress:

- **Assertive aftercare:** all the modelling we have conducted indicates assertive aftercare will be effective in reducing rates of suicidal behaviour. However, it is unlikely to reduce psychological distress at the population level.
- **Community support programs - programs to reduce social isolation and improve community connectedness:** this initiative significantly reduces psychological distress and suicidal behaviour across all the models developed to date. While it takes longer to have an effect, its effects are amplified over time. The broad strategy (rather than any specific programs) of community support aimed at increasing social connectedness, reducing social isolation, and enhancing resilience in the face of adversity was modelled. To take these programs forward locally, regional communities need to be engaged in their design and delivery within a cultural framework of community development.
- **Information Technology (IT) - enabled care coordination:** these systems facilitate the delivery of coordinated, responsive, multidisciplinary team-based care with routine outcome monitoring. Simulation of the introduction of IT-based care coordination shows significant effects in reducing suicidal behaviour and mental health related ED presentations. If used as a tool for re-engaging those that have been lost to services (due to increased wait times or due to an experience of inadequate care from a stretched system), the modelling shows that these systems can deliver substantial increased benefit if combined with a commensurate increase in community based services capacity.
- **Safety planning:** providing all suicidal patients presenting to ED with a safety plan – this intervention has a well-defined protocol for delivery and is nearly as effective as post suicide attempt assertive aftercare in reducing suicidal behaviour.
- **Community mental health services:** responsive clinical mental health services delivered by community mental health teams. People in suicidal crisis may call and request either a home-based visit or a centre-based visit, depending on their level of functioning and risk. Increases in community mental health services capacity as well as mental health-trained GPs, psychiatrists and allied mental health services have a modest impact on psychological distress and suicidal behaviour. However, when combined with strategies to improve care coordination and re-engagement of those lost to mental health services in the past due to increased wait times and dissatisfaction with the quality of care, they have a larger impact. In addition, lived experience representatives that have contributed to our participatory modelling have shared that they think a substantial increase in the capacity and responsiveness/outreach of community mental health services is urgently needed.

** While we have modelled many of the programs and services that are currently available or being considered for funding, we have not modelled them all and hence this should not be considered a definitive list of effective strategies for reducing suicide behaviour.*

^ While these programs and services have performed well individually, their impacts in combination are not necessarily additive (some combinations have shown synergistic effects, others have shown less than additive effects), and their impacts vary by regionality.

What impacts can we expect?

Population level impacts vary by region. Here, we provide an example set of results that have been generated from a system dynamics model to support mental health services planning and suicide prevention in the North Coast NSW region. The model was commissioned and is operated by the North Coast Primary Health Network and will contribute to work being undertaken by the North Coast Collective, an approach which seeks to embed a regional collaborative model in addressing mental health needs across the continuum. In addition to Commonwealth and State-funded health service providers, the Collective involves range of community stakeholders including people with lived experience of mental ill-health and suicidal behaviour.

The impact presented below are against a conservative baseline of an unemployment rate of 11.1%, with youth unemployment reaching 24.0% with an accompanying 10% reduction in social connectedness as a result of both the current necessary social distancing measures and the likely social dislocation arising as a result of non-participation in education and work, family breakdown, changing accommodation arrangements etc.

In summary, preliminary results for the North Coast region indicate that:

- Small increases in the annual growth rate of mental health services capacity (i.e. increases in mental health GPs, psychiatrists and allied health services, and community mental healthcare services) will **not** reduce suicides.
- A doubling of the current growth rate in mental health services capacity (i.e. an increase per year of pre-COVID-19 service capacity (March 2020) equal to 11% of mental health GP, psychiatrist & allied services capacity, and a 10% CMHC services capacity) is forecast to deliver only a 2.1 percent reduction in suicide attempts and suicide deaths, but reduces mental health related emergency department presentations by almost 4% (this equates to almost 2,000 ED presentations averted in the North Coast region over the next 5 years). Figure 1 shows an amplifying affect over the longer term.
- Implementing information technology (IT)-enabled coordinated care, in addition to increasing services capacity, is forecast to reduce suicide deaths and self-harm hospitalisations by almost 5% and mental health related ED presentations by 8.5%; more than double the impact of increasing mental health services capacity alone.
- Post suicide attempt assertive aftercare (i.e. active outreach & enhanced contact to support someone after a suicide attempt) in addition to increases in services capacity and technology-enabled care coordination was forecast to deliver an 8.8% reduction in suicidal behaviour (averting 669 suicide attempts and 53 deaths) and a 9.2% reduction in mental health-related ED presentations (averting 4,516 presentations) in the region over the period 2020-2025.

Proactive, strategic investments in mental health programs and services will play a vital role in **supplementing efforts to increase community connectedness and the social and economic supports required** to help flatten this curve.



Summary

We have modelled many of the programs and services that are currently available or being considered for funding and note that there can be significant variation in their impacts across regions and on different outcome indicators. Some combinations of interventions can have large impacts on suicide outcomes while having little impact on mental health related ED presentations and psychiatric hospitalisations and visa versa. Regional variation in population demographics, drivers of mental illness and suicidal behaviour, drivers of service utilisation, and the characteristics and dynamics of the local system in which they are being introduced (including workforce capability), all of which are captured in systems models, influence the degree to which even evidence-based interventions are likely to deliver real impacts in a given region.

These results highlight that systems modelling (with transparent and interactive user interfaces) can inform the allocation of mental health spending in a way that is strategic, targeted, and efficient. They can help national, state, and regional decision makers work together to answer for a particular jurisdiction, the critical questions of: ‘what combination of responses are required, at what time, in what sequence, targeted at whom, with what intensity, and for how long?’

Serious national commitment and investment is needed in systems modelling to provide regional decision analysis capability, leveraging existing systems models already developed by the University of Sydney’s Systems Modelling and Simulation group within the Brain and Mind Centre.

Intervention analyses

Self-harm hospitalisations (proxy for suicide attempts) cumulative (total)				
Intervention	Cases simulated (Mar 2020-2025)	% increase in cases from original baseline	Self-harm hospitalisations prevented	% reduction against COVID-19 baseline
Original Baseline	6310.3	0.0	-	-
COVID-19 scenario 1 (unemployment - 11.1%, youth unemployment - 24.0%, 10% reduction in social connectedness)	7599.0	20.4	-	-
a. 20% increase in services capacity growth rate (i.e. increase per year of 6.5% GP, psychiatrists & allied services & 2% CMHC services capacity*)	7565.8	19.9	33.2	0.4
b. 50% increase in services capacity growth rate (i.e. increase per year of 8% GP, psychiatrists & allied services & 5% CMHC services capacity*)	7516.0	19.1	83.0	1.1
c. 100% increase in services capacity growth rate (i.e. increase per year of 11% GP, psychiatrists & allied services & 10% CMHC services capacity*)	7435.7	17.8	163.3	2.1
d. 100% increase in services capacity growth rate PLUS tech-enabled coordinated care	7225.4	14.5	373.6	4.9
e. 100% increase in services capacity growth rate PLUS tech-enabled coordinate care PLUS post-attempt care	6929.9	9.8	669.1	8.8
f. 20% increase in services capacity growth rate PLUS tech-enabled coordinate care PLUS post-attempt care	7071.7	12.1	527.3	6.9

* % increases of services capacity as of March 2020

Suicides cumulative (total)				
Intervention	Cases simulated (Mar 2020-2025)	% increase in cases from original baseline	Suicides prevented	% reduction against COVID-19 baseline
Original Baseline	490.3	0.0	-	-
COVID-19 scenario 1 (unemployment - 11.1%, youth unemployment - 24.0%, 10% reduction in social connectedness)	602.8	23.0	-	-
a. 20% increase in services capacity growth rate (i.e. increase per year of 6.5% GP, psychiatrists & allied services & 2% CMHC services capacity*)	600.2	22.4	2.6	0.4
b. 50% increase in services capacity growth rate (i.e. increase per year of 8% GP, psychiatrists & allied services & 5% CMHC services capacity*)	596.3	21.6	6.6	1.1
c. 100% increase in services capacity growth rate (i.e. increase per year of 11% GP, psychiatrists & allied services & 10% CMHC services capacity*)	589.9	20.3	12.9	2.1
d. 100% increase in services capacity growth rate PLUS tech-enabled coordinated care	573.3	16.9	29.5	4.9
e. 100% increase in services capacity growth rate PLUS tech-enabled coordinate care PLUS post-attempt care	549.9	12.2	52.9	8.8
f. 20% increase in services capacity growth rate PLUS tech-enabled coordinate care PLUS post-attempt care	561.1	14.5	41.7	6.9

* % increases of services capacity as of March 2020

Mental health related ED presentations cumulative (total)				
Intervention	Cases simulated (Mar 2020-2025)	% increase in cases from original baseline	ED presentations prevented	% reduction against COVID-19 baseline
Original Baseline	42773.9	0.0	-	-
COVID-19 scenario 1 (unemployment - 11.1%, youth unemployment - 24.0%, 10% reduction in social connectedness)	49256.3	15.2	-	-
a. 20% increase in services capacity growth rate (i.e. increase per year of 6.5% GP, psychiatrists & allied services & 2% CMHC services capacity*)	48862.8	14.2	393.6	0.8
b. 50% increase in services capacity growth rate (i.e. increase per year of 8% GP, psychiatrists & allied services & 5% CMHC services capacity*)	48272.3	12.9	984.0	2.0
c. 100% increase in services capacity growth rate (i.e. increase per year of 11% GP, psychiatrists & allied services & 10% CMHC services capacity*)	47317.1	10.6	1939.2	3.9
d. 100% increase in services capacity growth rate PLUS tech-enabled coordinated care	45052.5	5.3	4203.8	8.5
e. 100% increase in services capacity growth rate PLUS tech-enabled coordinate care PLUS post-attempt care	44740.5	4.6	4515.9	9.2
f. 20% increase in services capacity growth rate PLUS tech-enabled coordinate care PLUS post-attempt care	46497.8	8.7	2758.5	5.6

* % increases of services capacity as of March 2020

Figure 1: Mitigating strategy - A doubling of services capacity growth rate (an increase per year equal to 10% of current capacity)



Figure 2: Mitigating strategy - Doubling services capacity growth rate + technology enabled coordinated care

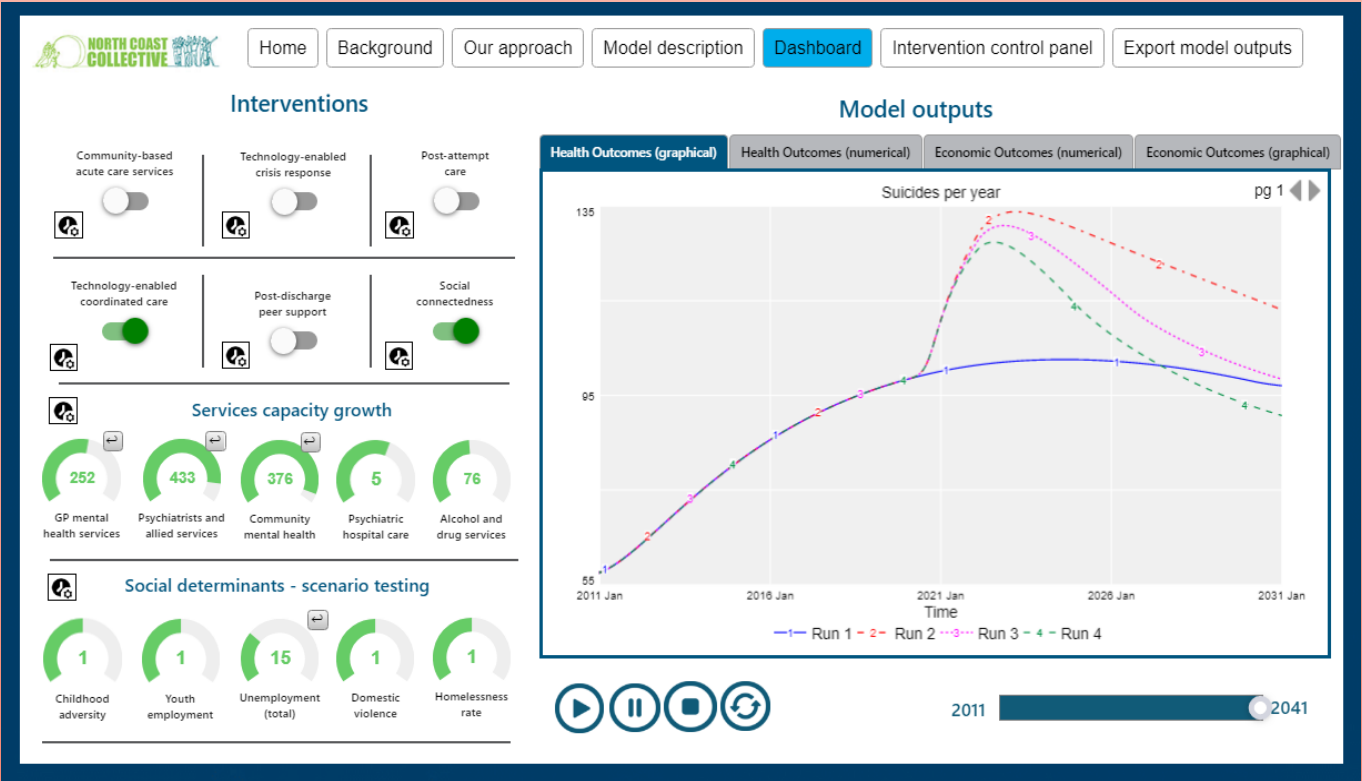


Figure 3: Mitigating strategy - Doubling services capacity growth rate + technology enabled coordinated care + post-attempt after care



References

Models are retained by the commissioning authority - relevant academic references below:

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