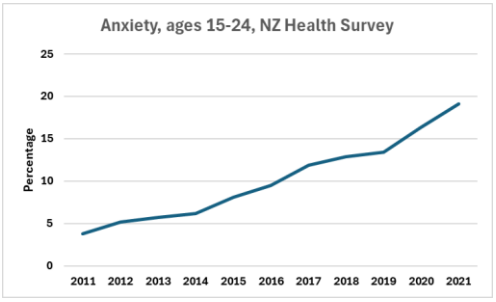
The problem

Although 75% of mental health problems emerge by the age of 24, young people typically do not use "traditional" mental health services.

To address this problem, Better Start researchers at the University of Auckland developed the HABITs (Health Advances Through Behaviour Intervention Technologies) platform, which incorporates a suite of chatbots to support young people's mental health.

One chatbot – Stress Detox (see box) – supports young people coping with anxiety, a problem which has risen steeply in young people over the past decade (see figure below).

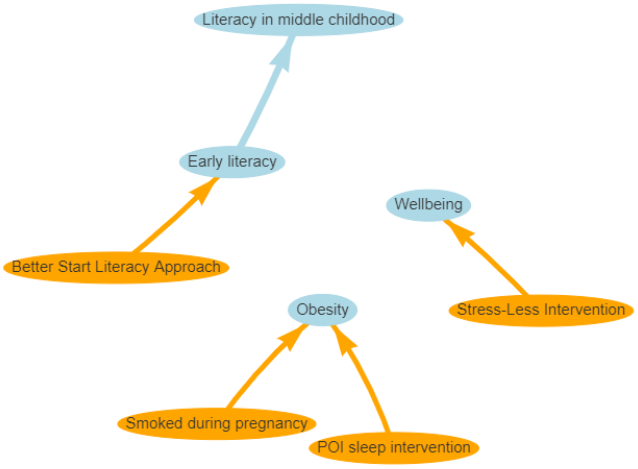
Stress Detox is delivered over 21 daily five-minute sessions, using cognitive behavioural therapy elements such as mindfulness and gratitude journaling. A trial of more than 100 young adults showed the programme improved wellbeing – how cheerful, calm and relaxed young people felt.



What would this look like if Stress Detox was rolled out widely? Or to particular population subgroups? While it is time-consuming and costly to implement these rollouts in the real world, modelling can answer this type of question. For this reason, we developed the *Better Start Model*.

Better Start Model (https://compassnz.shinyapps.io/BetterStartModelShiny/)

The Better Start Model uses simulation to model the long-term impact of interventions undertaken as part of the 'A Better Start' National Science Challenge (ABS). The model creates a virtual world of 10,000 individuals[1] – children with characteristics matching those of children born in New Zealand in 2013 – and uses results derived from interventions targeting literacy, early growth, and mental wellbeing, to simulate the effects of these interventions.

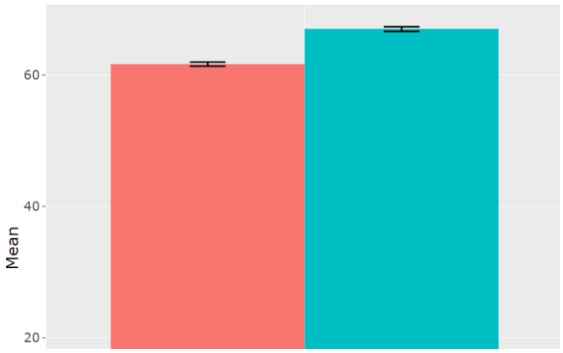


We model the impact of different levels of rollout of the Stress Detox Intervention on youth wellbeing, measured using the WHO-5 Wellbeing Index (higher scores = greater wellbeing, scores range from 0-100).

[1] These are not real people, but 'synthetic' individuals created by analysing data from the Integrated Data Infrastructure (IDI). **Disclaimer:** These results are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI) which is carefully managed by Stats NZ. For more information about the IDI please visit https://www.stats.govt.nz/integrated-data/.

Results

The models allow the impact of many different scenarios to be tested. The results of two are shown here:
First, *What if Stress Detox was rolled out to a randomly selected 75% of young adults?*



The panel to the right shows the results of this rollout. The red bar shows the 'base' scenario – if no-one had received the *Stress Detox* programme; the green bar shows the simulation we programmed – where *Stress Detox* was rolled out to a randomly selected 75% of young adults. The error bars represent the uncertainty from the simulation.

The simulation shows that the Stress Detox intervention had a large impact on wellbeing scores in young adults. The size of the effect is that found in the trial of 100 young adults – as that is what we programmed the simulation model to do. However, it is often the case that the real-world effect of an intervention is smaller than effects found in trials. The Better Start Model allows effect sizes to be varied so it is possible to model the impact of a smaller effect.

This is demonstrated in the second scenario tested:
What if Stress Detox was rolled out to a randomly selected 75% of young adults, but the effect of Stress Detox is smaller than the trial data suggests?

The panels below show the impact of the *Stress Detox* where the effect size is 25%, 50%, and 75% of the size of the effect found in the trial. The rollout would have minimal impact if the effect was only a quarter (25%) of the effect found in the trial, but would have a reasonable impact if the effect was at least half (50%) as big as the trial. This demonstrates how *sensitive* the results are to the effect sizes programmed and show that the Stress Detox programme would be beneficial even if its effect was far smaller that the evidence suggests.

25% **50%** **75%**

Take home message

A wide range of policy simulations can be run with the Better Start Model, including models targeting a greater or smaller number of people, models targeting different population groups, and models that vary assumptions - such as the varying the effect sizes as shown here. These models are useful for evaluating the impact of different policy options and providing solid evidence for future policy decisions.

Want to find out more?
Check out the model at https://compassnz.shinyapps.io/BetterStartModelShiny/, or contact Barry Milne b.milne@auckland.ac.nz