**The problem**

How do policymakers know whether a proposed policy change or intervention will work? A 'try it and see' approach is costly and time-consuming, but simulation offers a way to model policy changes or interventions in a virtual world to show what *would* happen in the population.

We developed the *Better Start Model* to simulate the impact of different policy changes and interventions to help government agencies make informed decisions.

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

The Better Start Model uses simulation to show the long-term impact of interventions undertaken as part of the 'A Better Start' National Science Challenge (ABS). It 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, mental wellbeing, and early growth, to simulate the effects of these interventions.
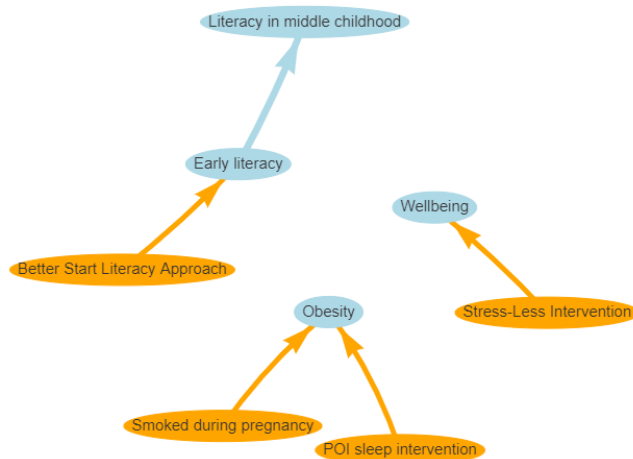
The interventions

Literacy. The *Better Start Literacy Approach (BLSA)* is a structured approach to literacy instruction for Year 0 to Year 2 classrooms. Using data from over 100 schools, the BSLA has been shown to improve early literacy for children at both typical and lower levels of oral language development, and for children of all backgrounds.

Mental wellbeing. The HABITs (Health Advances Through Behaviour Intervention Technologies) platform incorporates chatbots to support young people's mental health. One chatbot - *Stress Detox* (box right) – supports young people coping with anxiety through 21 daily five-minute sessions, using cognitive behavioural therapy techniques 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.

Early growth.
Sleep. The Prevention of Overweight in Infancy (POI.nz), study tested the effect of giving parents help to manage their children's sleep during the first two years of life. The study found that rates of obesity at age five were underlined halved among children who received this help compared with those who did not.
Smoking in pregnancy. Analyses of New Zealand data found that smoking in pregnancy increased the risk of obesity at age five by 20%.

How it works

1. Programme a simulation using 'Scenario Builder'.

Select
(i) the intervention to model – one of the four described above. Because the real-world effect of an intervention can be smaller than the effect found in trials, the Better Start Model also allows effect sizes to be varied - so it is possible to test the impact of effects of difference sizes.


(ii) who to target – the full population, a proportion of it, or a proportion (or all) of a targeted sub-population (e.g. by gender, ethnicity, neighbourhood deprivation).

2. Run a simulation. Simulation is a random process so each 'run' of a simulation produces different results. Depending on the number of runs, the simulation will take from a few seconds to a few minutes. After selecting the intervention to model, who to target, and the number of runs, clicking 'Run Scenario' will set all runs of the simulation in motion. Final results shown are an average across runs.

3. Use 'Table Builder' to check the results.

Compare your 'simulation scenario' against the 'base' simulation – the 'business as usual' case'. The panel at right shows the impact of 50% of children receiving the *BSLA*. Improvement is shown for children of all ethnicities, and particularly for Māori and Pacific children's early literacy.
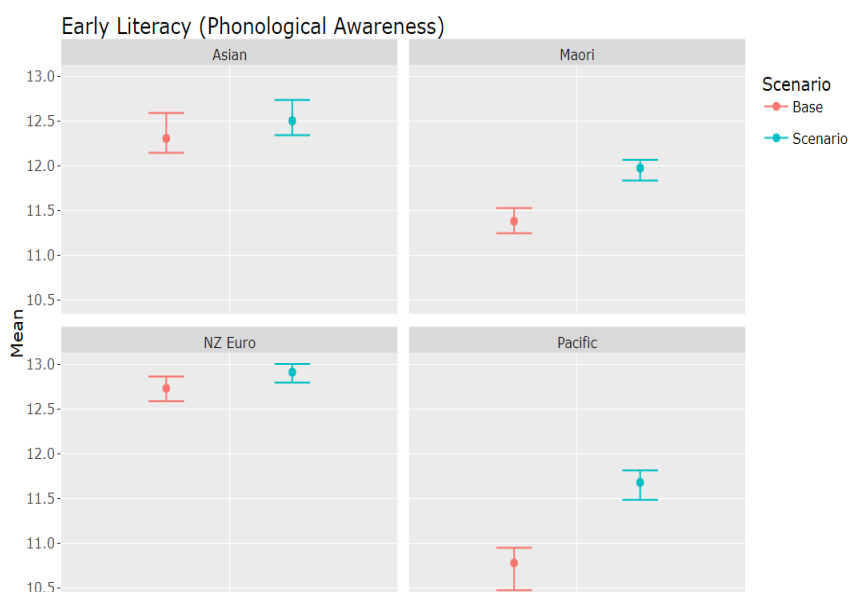
Take home message

The Better Start model is designed to evaluate the impact of different policy

options and provide solid evidence for future policy decisions. A wide range of policy simulations can be run with the model, including simulations targeting different population groups, and simulations that vary assumptions; e.g., what if the impacts of an intervention are smaller than research suggests?

Currently, the four interventions described above can be simulated. However, the Better Start Model is modular – new interventions can be added to best support policy making in Aotearoa New Zealand.

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