IN BRIEF

The Australian Prevention Partnership Centre
Systems and solutions for better health

Dynamic simulation modelling

A what-if tool to better understand complex health problems

Complex, 'wicked' problems pose a range of challenges that can prevent effective action by health decision makers. In an innovative approach, The Australian Prevention Partnership Centre uses dynamic simulation modelling to provide policy makers with a unique 'what if' tool to test the likely impact of a range of possible solutions before implementing them in the real world.

What is dynamic simulation modelling?

Dynamic simulation models are computer models that are simplified representations of the real world. Used successfully in engineering, ecology, defence and business since the 1950s, simulation modelling enables researchers to map complex problems by bringing together a variety of evidence sources such as research, expert knowledge, practice experience and data. The resulting dynamic model is a 'what-if' tool that can simulate various policy scenarios to see which is likely to have the most effect.

The Prevention Centre is using dynamic simulation modelling for chronic disease prevention, providing policy makers with a robust and low-risk way to test various policy scenarios before real-world implementation.

How can it help to prevent chronic disease?

Complex chronic health problems have many inter-related causes and it can be unclear how these factors interact. There is a broad range of possible interventions to prevent chronic disease, applied individually or in combination. Health decision makers often face the challenges of differing stakeholder and community views, limitations in research evidence, political considerations and industry lobbying.

Dynamic simulation modelling can answer important questions, such as which risk factors are the most important, when in people's lives we should target interventions, and which combinations of interventions work best, are most equitable and most cost effective. Recent advances in modelling software capability and more user-friendly interfaces have meant that simulation modelling is now more accessible. This has allowed us to embed stakeholder engagement, consultation and consensus-building processes in the development of sophisticated simulation tools, addressing some of the challenges of decision-making for complex problems.

Dynamic modelling in action: case studies of our work

A systems approach to alcohol-related harm

Alcohol-related harm is a complex problem with multiple inter-related causes. There are many ways to reduce excessive alcohol consumption, including increasing taxes on alcohol sales, restricting hours of sales, drink driving regulation, and education and social marketing. The Prevention Centre has developed simulation models of alcohol use for NSW and Tasmania to forecast the effectiveness of a variety of approaches and explore what combination of interventions is likely to produce maximum impact. These models address both binge drinking and high average consumption that leads to chronic disease.

Supporting decisions in gestational diabetes care

Gestational diabetes is becoming more common in Australia and research is needed to better understand how to effectively target resources and services to achieve the greatest health gain for investment. The Prevention Centre is using simulation modelling to explore strategies for gestational diabetes diagnosis, early intervention and management in the ACT. The modelling is exploring interaction between risk factors, the short- and long-term outcomes for mother and baby, and potential modes and timing of intervention.

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What is Dynamic simulation modelling?

A dynamic simulation model is an interactive, decision-support tool that can test the likely impact of a range of policies over time.

What can it do?

Test different policy actions	Run 'what if' scenarios	Compare predicted impact over time	Provide high quality systems analysis	Forecast cost-effective options	Identify future priorities

How is it made?

1 Gather the evidence

- Research evidence
- Primary and secondary data
- Expert knowledge
- Local practice experience

2 Use collaborative approach

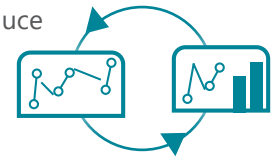
Our participatory process brings together government departments, policy agencies, program planners, academic experts, NGOs and community representatives to build a conceptual map of the problem

3 Build the model

Conceptual map is converted to a computer model

4 Validate the model

- Test that the model can reproduce historical data patterns
- Refine the model to produce a robust decision support tool.



Want to know more? Please contact Associate Professor Lucie Rychetnik, preventioncentre@saxinstitute.org.au

This factsheet was prepared by The Australian Prevention Partnership Centre

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