

# Testing Community Based System Dynamics for Obesity Prevention at Scale

**A. Brown<sup>a</sup>, M. Nichols<sup>b</sup>, J. Whelan<sup>b</sup>, J. Hayward<sup>b</sup>, C. Strugnell<sup>b</sup>, V. Brown<sup>b</sup> and S. Allender<sup>b</sup>**

*Affiliations: a. Deakin University, Institute for Health Transformation, School of Health and Social Development, Global Obesity Centre, adbr@deakin.edu.au b. Deakin University, Institute for Health Transformation, School of Health and Social Development, Global Obesity Centre*

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## 1. INTRODUCTION

Childhood obesity is a major public health concern in Australia and globally (Swinburn *et al.*, 2019). Community based system dynamics (CBSD) provides a framework to apply systems thinking to the prevention of childhood obesity (Hovmand, 2014). Applications of CBSD in childhood obesity prevention have increased over time, including in Australia and New Zealand (Swinburn *et al.*, 2019). An important consideration in CBSD is how to increase systems thinking capacity at scale. This extended abstract reports early lessons from an obesity prevention intervention using CBSD at scale through in-person and online delivery of training to health professionals across 10 local government areas in Victoria, Australia.

## 2. METHODS

Reflexive Evidence and Systems Interventions to Prevent Obesity and Non-communicable Disease (RESPOND) is a five year stepped-wedge, cluster-randomised trial testing a whole of community response to prevent childhood obesity. The project spans ten rural and regional local government areas (LGAs) in North Eastern Victoria, Australia. A research team trains approximately ten community-based professionals per LGA in CBSD in a two day in person intensive course, followed by ten online webinars each of two hours duration. Concurrently with these online webinars, the trained facilitators conduct a series of three group model building (GMB) workshops to build a causal loop diagram (CLD) of the drivers of childhood obesity with key community leaders. Within the third GMB workshop, a broader community forum, participants develop actions inspired by the CLDs. The training covers basic system dynamics concepts, GMB facilitation techniques, and use of Systems Thinking in Community Knowledge Exchange (STICK-E). STICK-E is a web-based software developed by Deakin University to build connection circles and CLDs in the context of GMB. RESPOND includes a comprehensive evaluation to measure the impact

that the capacity building and GMB have on reducing childhood obesity. Here we present a case study of the capacity building aspects of the project to date, initial observations and the evaluation plan.

## 3. PRELIMINARY INSIGHTS

### 3.1. Project Progress

The stepped-wedge design means that five communities (Step 1) receive the intervention first (2019), and the other five (Step 2) initially serve as a control. Step 2 communities receive the intervention from 2021. Professionals from two of the five Step 1 communities (Communities 1 and 2) have completed all aspects of the training (intensive and online webinars) and have successfully facilitated GMB workshops for their community leaders. The online training and GMB process is currently in progress with the remaining three Step 1 communities. Community 1 chose to run two separate GMB processes centred on two towns in the LGA. Community 2 ran one GMB process to cover the entire LGA. Initial feedback provided in qualitative surveys has been positive. The quality of the CLDs built by participants indicates increasing capacity of participants' to apply and adhere to the conventions of system dynamics in naming variables, drawing connections, identifying feedback loops, and simplifying models. Attendance at the GMB workshops (Table 1) and actions identified at the community forums are early positive indicators of engagement and action from the workshops. Attendance at the sessions has been diverse across all communities, including schools, food retail, community members, NGOs, health services, local government, sporting clubs, and more.

**Table 1.** Number of participants at GMBs

Community	GMB 1	GMB 2	GMB 3
1a	15	15	35
1b	12	14	23
2	7	5	17

### 3.2. Observations

The participants have indicated that facilitating group model building together across organisations has provided the opportunity to collaborate in a deeper way than they have before. This deep collaboration could support stronger health promotion work in the future in both obesity and other health issues. A fear expressed by the group early on was that the process would be too complex and that the combination of managing technology, group facilitation, and system dynamics conventions would be too difficult. STICK-E proved to be a major strength to reduce the complexity of managing the workshop. Participants indicated that STICK-E was easier to use than expected and that it was an effective tool to manage the group.

While there have been early positive outcomes from the study, there have been challenges as well. The aim of RESPOND was to conduct as much of the training and support as possible remotely via email, telephone, and web conferences, to demonstrate a scalable model of capacity building. However, in person meetings beyond the initially planned two-day workshops proved necessary for the relationship building needed to carry out CBSD successfully. The trained facilitators facilitated the GMB workshops independently in their own communities, but at least one representative from the research team was present at every workshop in case the trained facilitators had any questions or needed any support. The trained facilitators indicated that having this support available in the room enhanced their confidence. Additionally, significant time and effort had to be invested beyond the initially planned ten online webinars. The participants worked closely with the research team to simplify their models, adhere to system dynamics principles, and identify key feedback loops emerging. The time required to provide support across three GMB processes was greater than expected, and the research team would have likely needed further resources to support more than these three simultaneous GMB processes.

### 3.3. Evaluation Plan

Evaluation that goes beyond case studies of GMB is crucial (Scott *et al.*, 2016). The RESPOND project includes a diverse range of evaluations. The researchers will use a pre- and post-test survey to measure mental model change in participants of the workshops based on work by Scott *et al.* (2013) and qualitative surveys for feedback on the training workshops and the GMB workshops to directly evaluate the GMB workshops and training

process. A longitudinal knowledge and engagement survey focussed on obesity prevention and social network analysis will measure how GMB workshops may improve collaboration and community capacity to drive action. An economic evaluation and a childhood obesity monitoring system measuring the BMI and behaviours of most year 2, 4, and 6 students in the region will measure whether there are changes to the problem of interest in the context of the GMB and community work.

## 4. REFERENCES

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