Modelling equity impact of obesity interventions in children and adolescents: A health economic approach

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The Problem

• 25% of Australian children are overweight or obese\(^1\)
• Socioeconomic inequalities in BMI distributions & trajectories
• A huge range of interventions – no “silver bullet”

Data from Longitudinal Study of Australian Children

The Policy-Maker’s Dilemma

If I only have $5 million to spend, how can I get the best outcomes?

Should I spend it on:

- Pre-school prevention programs
- Treatment programs for children already affected by obesity

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Early Prevention Of Obesity In Childhood
How health economic evaluation can help

\[ \text{Intervention Costs} \times \text{BMI/weight status change} \times \text{Cost effectiveness} \times \text{Cost savings from improved outcomes} \times \text{Health related quality of life change} = \text{Health Equity Impact?} \]
Research Objective

Overall Objective: To develop a model that can assess long-term cost-effectiveness and health equity impact of obesity treatment and prevention strategies in children and adolescents

Sub-Aims
1. Model BMI trajectories by socioeconomic position
2. Characterise model outputs: Costs and Quality Adjusted Life Years (QALYS)
3. Evaluate the cost-effectiveness of interventions on overall outcomes and inequalities in these outcomes
1: Modelling BMI trajectories by SEP

• AIM: To model the BMI trajectories from preschool to late adolescence by socioeconomic position

• METHODS:
  - Use the Longitudinal Study of Australian Children (LSAC)
  - Adapt existing overall BMI change equations into equations for high and low socioeconomic position.
  - Sensitivity analyses: other measures of SEP, other categorisations

• OUTCOMES: A model capable of predicting changes in overall BMI distribution and socioeconomic inequalities in BMI distributions beyond measured timeframes of intervention trials.
2: Characterise model outputs: Costs and Quality of Life

• AIM: To quantify the association between weight status and costs & weight status and quality of life.

• METHODS:
  Costs – systematic review of excess costs of overweight and obesity compared with healthy weight
  Quality of Life
  - Use the Longitudinal Study of Australian Children (LSAC)
  - Calculate association between Pediatric Health Related Quality of Life (PedsQL™) and weight status by age, sex and SEP using longitudinal statistical methods
  - Convert PedsQL scores to QALYs

• OUTCOMES: Feed estimates into model to facilitate:
  - Prediction of costs avoided by interventions
  - Calculation of cost-effectiveness in terms of QALYs gained by intervention (cost-utility analysis)
Weight status & Quality of Life

Preliminary Results

[Graphs showing trends of Total PedsQL for Healthy and Underweight, Overweight, and Obese categories across different age groups.]

Healthy and Underweight

Overweight

Obese

[Legends indicating Healthy and Underweight, Overweight, and Obese categories, as well as High SEP and Low SEP.]
3: Evaluate interventions

- **AIM:** To calculate cost-effectiveness for obesity prevention and treatment interventions

- **METHODS**

  - **OUTCOMES:** A consistent comparison of interventions targeted at different ages & groups
Policy implications

Cost-effectiveness (BMI / QALYs)

I. Win-Win
- Cost-effective
  - Improves equity

II. Win-Lose
- Cost-effective
  - Harms equity

III. Lose-Lose
- Cost-ineffective
  - Harms equity

IV. Lose-Win
- Cost-ineffective
  - Improves equity

Figure Health Equity Impact Plane