

School-based intervention to reduce sedentary behaviour and/or increase physical activity

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The intervention

- *Transform-Us!* was a 30-month multi-arm primary school-based randomised controlled trial (RCT) to reduce sedentary behaviour and/or increase physical activity in 8-9 year old (Grade 3) children.
- Intervention participants were randomised by school into one of four arms: sedentary behaviour (SB), physical activity (PA), combined sedentary behaviour and physical activity (SB+PA), or current practice (C; no intervention).
- The intervention comprised a mixture of educational (learning messages, homework tasks), behavioural (standing lessons, active breaks) and environmental strategies (equipment).

What we already know

- In Australia, only 19% of children aged 5-17 years meet the national daily PA guidelines and 29% meet the SB screen time guidelines.¹

Key elements of the modelled intervention

- Effectiveness was modelled based on efficacy data from two intervention arms of the RCT (PA and SB). Participants in the SB intervention arm reported a mean reduction of 0.14 BMIz and a 33 minute reduction in sedentary time per day. Participants in the PA intervention arm reported a mean reduction of 0.13 BMIz, but no statistically significant reduction in sedentary time per day.
- Reductions in sedentary time were converted to a change in PA assuming sitting time was replaced with standing time using published values.
- Major intervention cost categories included teacher time to prepare intervention delivery, equipment costs and on-going implementation costs (newsletters reinforcing messages).
- Cost-effectiveness analyses extrapolated the costs and outcomes of the trial to the Australian population of Grade 3 students in government schools. The cost of a program administrative officer in each Australian state and territory was included.

Key findings

- When extrapolated to the Australian population, the intervention was estimated to cost \$10M (PA) or \$15M (SB).
- The PA and SB arms were both estimated to be dominant, resulting in 60,780 HALYs gained and \$641M in total healthcare cost-savings (PA); 61,989 HALYs gained and \$661M in total healthcare cost-savings (SB).
- Assuming intervention effect fully decays after 10 years, health benefits are more modest (PA: 2,479 HALYs gained, SB: 2,660 HALYs gained), however the mean ICERs remained cost-effective (PA: \$4,056 per HALY gained, SB: \$5,788 per HALY gained; probability of cost-effectiveness PA: 98%, SB: 99%).

Conclusion

The PA and SB *Transform-Us!* intervention arms have significant potential for cost-effectiveness as obesity prevention measures.

Scenarios description and cost-effectiveness results

Table 1 *Description of selected scenarios*

	Scenario 1 Physical activity intervention	Scenario 2 Sedentary behaviour intervention
Risk factor(s) addressed by intervention	BMI	BMI/PA
Population targeted	Grade 3 children in government schools in Australia	
Mean reduction in BMI z-score (95% UI)	0.13 (0.03 to 0.24)	0.14 (0.03 to 0.24)
Mean change in MET minutes per week	-	94 (49-147)
Effect decay	100% maintenance of effect	
Costs included	Teacher costs, equipment costs, implementation costs, salary costs of program administration officer	
Type of model used	Child matrix model	

Notes: BMI: body mass index; MET: metabolic equivalent task; PA: physical activity; UI: uncertainty interval

Table 2 *Cost-effectiveness results, mean (95% UI)*

	Scenario 1 (PA)	Scenario 2 (SB)	Scenario 1 with zero effect after ten years	Scenario 2 with zero effect after ten years
Total HALYs gained	60,780 (15,007 to 109,413)	61,989 (15,834 to 107,779)	2,479 (558 to 4,333)	2,660 (771 to 4,482)
Total intervention costs	\$10M (\$7M to \$15M)	\$15M (\$10M to \$25M)	\$10M (\$7M to \$15M)	\$15M (\$10M to \$25M)
Total healthcare cost savings	\$641M (\$165M to \$1.1B)	\$661M (\$173M to \$1.1B)	\$0 (\$0 to \$0)	\$23,338 (\$16K to \$30K)
Total net cost *	-\$631M (-\$1.1B to -\$155M)	-\$646M (-\$1.1B to -\$155M)	\$10M (\$7M to \$15M)	\$15M (\$10M to \$25M)
Mean ICER (\$/HALY gained)	Dominant (Dominant to Dominant)		4,056 (1,983 to 19,781)	5,788 (2,881 to 22,372)
Probability of being cost-effective #	99%	99%	98%	99%
Overall result	Dominant		Cost-effective	

Notes: Dominant: the intervention is both cost-saving and improves health; HALY: health adjusted life year; ICER: incremental cost effectiveness ratio; M: million; PA: physical activity intervention; SB: sedentary behaviour intervention; \$: 2010 Australian dollars; * Negative total net costs equate to cost savings; # The willingness-to-pay threshold for this analysis is \$50,000 per HALY.

Figure 1 *Cost-effectiveness plane*

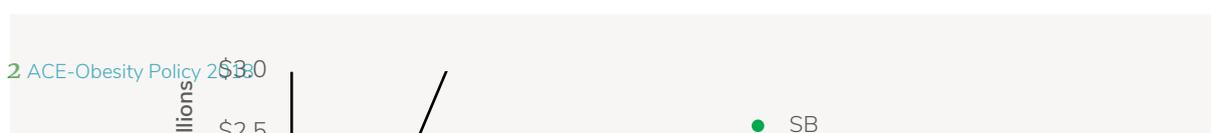
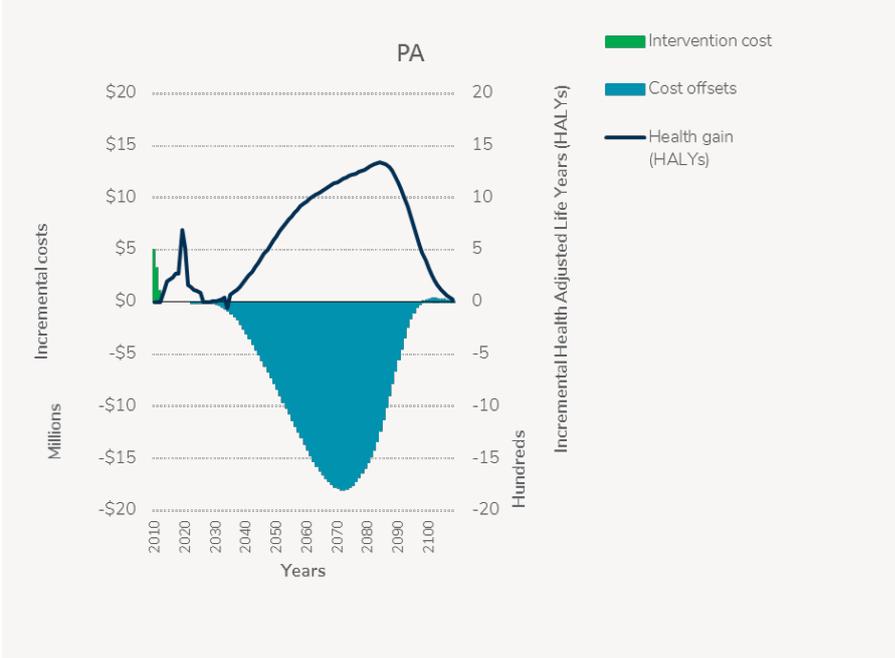


Figure 2 Costs, cost offsets and health gains over time (physical activity intervention)



Implementation considerations

Consideration	Details	Assessment
Strength of evidence	Medium certainty of BMI effect, objectively measured in one high quality RCT in the Australian-context.	Medium
	Medium certainty of PA effect, objectively measured in one high quality RCT in the Australian-context.	Medium
Equity	The intervention is delivered in schools, and therefore is likely to be equitable. Delivery in the school setting ensures broad reach to all Grade 3 students enrolled in government schools.	Positive
Acceptability	Government: Federal and State governments are generally supportive of programs designed to improve the health of school students. The intervention may help to fulfil the criteria for several Australian Curriculum guidelines, focused on health and physical education.	High
	Industry: The intervention could provide valuable resources for teachers and schools to meet the Australian Curriculum guidelines. Process evaluation of the RCT demonstrated that teachers and schools were generally receptive to the intervention, but listed time constraints and competing demands as potential barriers to program delivery.	High
	Public: The general public is likely to be supportive of programs that improve the health of school children. Process evaluation of the RCT demonstrated that the intervention was positively received by parents and children.	High
Feasibility	This intervention has been successfully delivered in the Australian school environment.	High
Sustainability	Interventions delivered in the school environment are sustainable provided there is ongoing support and appropriate funding.	Medium
Other considerations	Positive side effects: The intervention may have a positive effect on the families of children who participate, however no evidence of this effect is currently available.	
Note: BMI: Body Mass Index, PA: physical activity; RCT: randomized controlled trial		

¹ Australian Health Survey: Physical Activity 2011-12, Australian Bureau of Statistics, Canberra, Australia.