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Cost-effectiveness of community-based obesity prevention interventions in Australia

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Background: Community-based interventions (CBIs) that include multifaceted community level strategies to increase physical activity and improve nutrition, implemented in multiple settings, have been shown to be effective in reducing unhealthy weight gain in children. This study synthesises the evidence of effectiveness of CBIs and assesses the cost-effectiveness of CBIs implemented in the Australian setting.

Methods: The effectiveness of CBIs, measured by mean difference in body mass index (BMI) z-scores between intervention and control communities, was determined by undertaking a scoping literature review and meta-analysis, using a random effects model, of trials published between 1990 and 2016. Although the strategies implemented are typically unique to each CBI community, for the purposes of this economic evaluation a generic hypothetical CBI appropriate for the Australian setting, incorporating commonly implemented strategies was costed (in 2010 Australian dollars). A multiple cohort Markov model that simulates diseases associated with overweight and obesity was used to estimate the long term health benefits and cost outcomes induced by reductions in BMI. Outcome measures were health adjusted life years (HALYs) saved, healthcare-related cost savings, and the incremental cost-effectiveness ratio (ICER). Health and cost outcomes were estimated over the lifetime of the target population (5–18 year olds).

Results: The meta-analysis revealed a small but significant difference in BMI z-score (mean difference of -0.07 (95% uncertainty interval (UI): -0.13 to -0.01) favouring the CBI community compared to the control. The net cost of implementing CBIs across all local government areas in Australia was approximately AUD426 million (M) (95% UI: AUD3 M to AUD823 M) over three years and resulted in savings of 51,792 HALYs (95% UI: 6,816 to 96,972). The mean ICER was AUD8,155 per HALY saved (95% UI: AUD237 to AUD81,021).

Conclusion: CBIs are cost-effective obesity prevention initiatives, however implementation across Australia would be expensive (relative to existing investments in prevention).

<https://doi.org/10.1016/j.orcp.2018.11.231>



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Reliability and construct validity of a health behaviour questionnaire battery among children

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Background: Self-report recall questionnaires are cost efficient, low burden assessment tools commonly used in population research to examine the determinants of childhood obesity. However, self-report questionnaires typically exhibit poor to moderate psychometric properties due complexity in recalling each behaviour and bias intrinsic to self-report data (e.g. social desirability). In this study, we examined the reliability and validity of a battery of self-report recall questionnaires that examined physical activity, sedentary behaviour, dietary intake and sleep hygiene among children aged 9–12 years.

Methods: The test-retest reliability of the questionnaires was assessed among a sample of 26 Grade 4 and 6 students ($M_{age} = 11.15 \pm 1.07$) who completed the questionnaires on two occasions, one week apart in 2014. Criterion validity was assessed by comparing self-reported physical activity and sedentary behaviour against objectively measured duration spent in moderate-to-vigorous physical activity (MVPA) and sedentary time via accelerometry from a sub-sample of 19 students. Test-retest reliability of individual items and scales was determined for categorical variables using Kappa statistics. Spearman's rho assessed correlations between daily MVPA and sedentary time from self-report estimates.

Results: Preliminary analysis indicate test-retest reliability ranges from no agreement to high agreement for categorical variables with kappa coefficients ranging from -0.07 to 0.86 . Items examining dietary intake consistently showed poor to moderate reliability with kappa ranging from 0.15 – 0.48 while items indicating adherence to national PA and SB guidelines having the strong reliability when met on all 7 days ($\kappa = 0.61$, $\kappa = 0.61$). Initial results suggest the correlations between reported PA and accelerometer data were weak to moderate and non-significant ($r_s = 0.29$, $p = 0.24$).

Conclusion: Primarily analysis indicate the questionnaires psychometric properties are consistent with systematic reviews of existing international questionnaires, that examine physical activity, sedentary behaviour, dietary intake and sleep hygiene in children.

<https://doi.org/10.1016/j.orcp.2018.11.232>

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Unhealthy sport sponsorship at the 2017 AFL Grand Final: a case study of its frequency, duration and nature

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Background: Sponsorship of elite sports provides a compelling avenue for unhealthy food, alcohol and gambling companies to promote their products, allowing them to advertise with relatively few restrictions and to reach a highly-engaged mass audience, including children and young adults. Exposure to branded sponsorship is known to influence preferences and behaviours in relation to food and beverages, and emerging evidence suggests that gambling



sponsorship of sport may be particularly harmful to vulnerable groups.

Aim: To assess the extent and nature of unhealthy food, alcohol and gambling marketing during the highest rating sporting event in Australia in 2017—the AFL Grand Final.

Method: Using an existing coding framework, a content analysis of a digital recording of the 2017 AFL Grand Final television broadcast will be undertaken to identify episodes of unhealthy food, alcohol and gambling marketing. Episodes will be coded if clearly visible for at least one second, and the time each episode remains visible will be recorded to the nearest second. The brand, product type, and nature (e.g. fixed, dynamic, commercial break or integrated advertising) of each episode will also be coded. The broadcast will be double-coded by two of the researchers and any discrepancies in coding reviewed together until consensus is reached.

Results: Data collection is in progress and results will be available for presentation at the conference. Descriptive statistics will be used to present the frequency and nature of unhealthy food, alcohol and gambling marketing during the game and the total proportion of game time the marketing was present.

Conclusion: Findings from this study will provide important data on the volume of marketing for 'risky' products that viewers are exposed to while watching popular sporting events, and the types of marketing strategies that are most commonly used in this setting, to help inform public policy advocacy efforts.

<https://doi.org/10.1016/j.orcp.2018.11.233>

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Cardiac rehabilitation improves body composition in non-smokers but not smokers



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Background: Patients who participate in cardiac rehabilitation (CR) following myocardial infarction experience more effective overall secondary prevention compared to those who do not participate. However we know little of the effects of CR on major risk factors such as body composition. Moreover, while cardiac patients are encouraged to stop smoking, the effect of this change on body composition during CR is unknown. This study aimed to examine the changes in body composition following completion of a Sydney hospital-based CR program and 6-month follow-up.

Methods: Participants entering a hospital-based CR program underwent a treadmill exercise stress test (Bruce protocol) and body composition assessment (waist circumference; weight, body fat, visceral fat (VAT) assessed via bioelectrical impedance analysis). Measurements were repeated at CR-completion and 6-month follow-up. Smoking status was assessed at each time point, and confirmed by measurement of exhaled carbon monoxide. One-way ANOVA was used to examine differences across time for those reporting smoking at baseline who successfully quit smoking by 6-months, and non-smokers.

Results: Of 159 patients with complete data, $n=27$ reported smoking at baseline, all but four of whom quit smoking by 6-months. Smokers were younger than non-smokers (56.1 ± 11.4 vs. 62.4 ± 11.8 years, $p < 0.001$), with less body fat ($27.9 \pm 6.6\%$ vs. $31.3 \pm 8.7\%$, $p = 0.006$) and more skeletal muscle ($33.6 \pm 2.9\%$ vs.

$31.1 \pm 4.7\%$, $p < 0.001$). *Group × time* interactions were seen for weight ($p = 0.002$), body fat ($p = 0.037$), VAT ($p = 0.004$), muscle mass ($p = 0.012$) and waist circumference ($p = 0.010$), with non-smokers showing favourable changes at CR-completion and 6-months compared to ex-smokers. Fitness improvements were similar between groups.

Conclusions: Quitting smoking is of utmost importance for reducing cardiovascular risk. However, while CR improves body composition outcomes in non-smokers, those who quit smoking may experience adverse changes to body composition even in the face of successful CR completion. These patients may need increased support to minimise negative changes to body composition.

<https://doi.org/10.1016/j.orcp.2018.11.234>

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Children's sport sponsorship: Parent's reactions to unhealthy food vs. pro-health sponsorship options



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Background: Unhealthy food marketing in sports settings contradicts public health efforts to promote healthy eating. While there is much evidence regarding the impacts of food marketing on children, less is known about its direct effects on parents. Parents are important role models and gate-keepers for their children's diets and activities, and (like children) are susceptible to influence by food marketing.

Aim: To explore parents' responses to sponsorship of children's sporting activities by (A) non-food brands (control), (B) unhealthy food brands, (C) healthier food brands, or (D) an obesity prevention public health campaign.

Methods: Using an online survey experimental design, 1,200 Australian parents of children aged 6 to 9 years will be randomly assigned to one of four sponsorship conditions (A-D). To control for potential product type and brand effects, participants will be further randomised within condition to one of three product categories (breakfast cereal, take-away food, or non-alcoholic beverage) and then one of two brands. Participants will be shown a short video and a promotional flyer for a fictional junior sports program, with sponsor content representing their assigned brand. Following exposure to the intervention, participants will be asked a series of questions assessing their brand awareness, brand attitudes, and preference for food sponsors' products.

Results: Data collection for this study is in progress and results will be available for presentation at the conference. A combination of linear (for continuous variables), logistic (for binary variables), and Poisson (for count variables) regression analyses will be used to test for effects of sponsorship condition on each outcome measure.

Conclusion: This study will yield practical evidence on the utility of alternative, pro-health sport sponsorship options for children's sporting activities that will be immediately useful for health promotion policy and practice.

<https://doi.org/10.1016/j.orcp.2018.11.235>