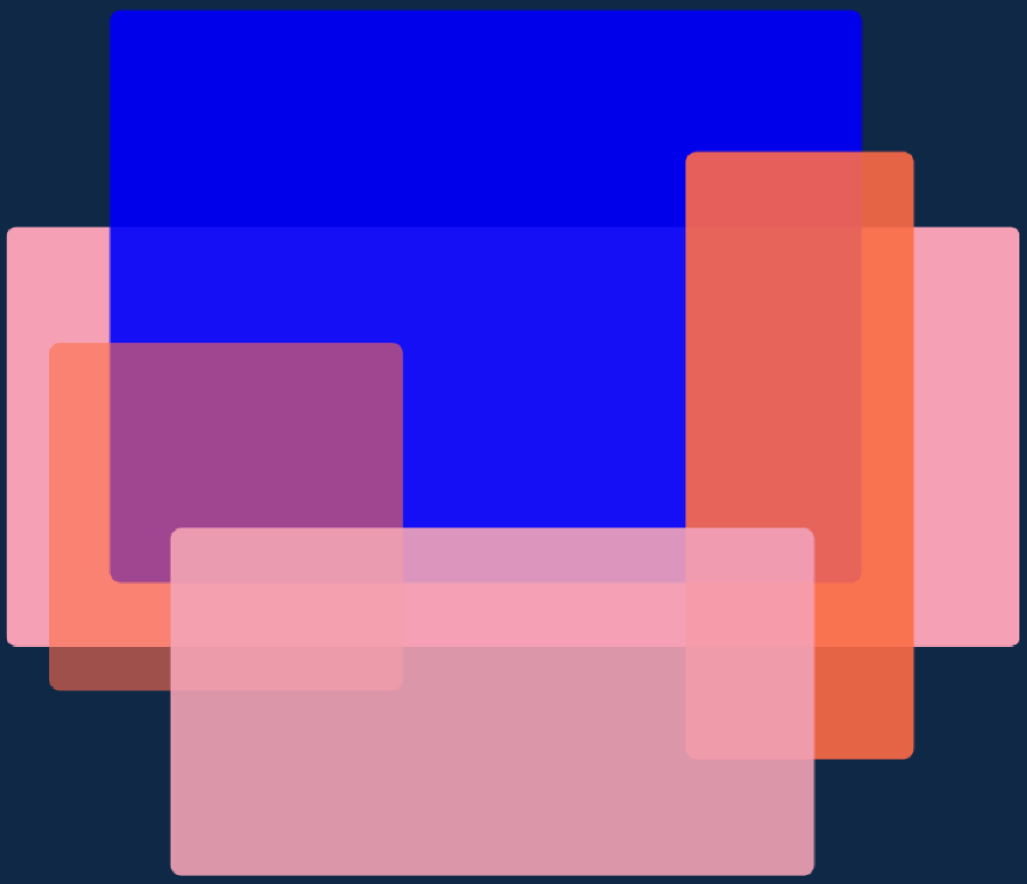
Blueprint
by nesta

Blueprint for halving obesity: rapid review

The impact of active transport interventions on obesity-related outcomes



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Summary table

Title	New walking and cycling routes and increased physical activity: One- and two-year findings from the UK iConnect study
Author and year	Goodman et al. (2014)
Type of study	A natural experimental evaluation in England
Outcome variable	Total time spent walking or cycling in the past week (self report)
Treatment	Living in close proximity to infrastructure development
Control	Living in further proximity to the infrastructure development
Effect	Within person changes in 'past week' active travel at one and two years post implementation of active travel intervention
Magnitude of effect (Adults)	At two-year follow up: For people living near the new infrastructure, there was an increase of 15.3 minutes (95% CI = 6.5, 24.2) per week of active travel (walking and cycling) for every 1 kilometre closer they lived to the infrastructure. At one-year follow up: No significant effects.
Magnitude of effect (Children)	n/a

Rapid umbrella review

Research question

What is the effect of active transport interventions on obesity-related outcomes?

Background

Obesity is a public health crisis and rates have nearly doubled in recent decades; it is estimated nearly 2 billion people are living with obesity worldwide. Excess weight is a significant risk factor for premature death from non-communicable diseases. Despite these figures, policies exist that could prevent a further rise in obesity prevalence.

The Obesity Blueprint

The Obesity Blueprint is a programme of work funded and conducted by Nesta, which aims to synthesise evidence about the effectiveness of interventions for obesity into an accessible format. The output will make it easier for those in power to make informed decisions about policies for obesity prevention. In the first stage of the project we reviewed four reports that made specific recommendations for future obesity policies (McKinsey Global Institute, Obesity Health Alliance, Dimbleby Report and World Health Organization). Collation of these recommendations resulted in a list of over 150 different (but related) interventions. With input from expert advisors, we organised this long list into a 'skeleton', with five high level categories (information provision; the food system; the health system; behavioural programmes, and physical activity) and 25-30 subcategories (NB, the skeleton is still under review at time of writing). The next step is to conduct a series of rapid systematic searches to identify the best evidence summarising the effectiveness and cost-effectiveness of these categories of interventions.

Physical inactivity is a significant risk factor for poor health, and estimated to contribute to 8% of deaths and non-communicable diseases globally (BMJ, 2018). Active travel, using modes of transportation that involve physical activity, such as walking, cycling, or non-motorised options like skateboards or scooters can make an

important contribution to improved health. In particular, there is evidence that active travel is associated with lower body weight and BMI, particularly when contrasted with car use (Wanner et al., 2012; Wu et al., 2021). For example, analysis of UK Biobank data (n=156,666) found that compared to car-commuting, active transport – either alone or in combination with public transport – was associated with significantly lower BMI for both men (men: β coefficient -1·00 kg/m2 [95% CI -1·14 to -0·87], p<0·0001) and women (women: β -0·67 kg/m2 [-0·86 to -0·47], p<0·0001). Effects on BMI were even more positive for cycling or walking alone (Flint et al., 2016). However other studies find that active commuting does not predict BMI or body weight (Zhang et al., 2020).

Active transport policies have been highlighted as a way to improve health (Schaeffer et al., 2020; Brown et al., 2021). These policies involve initiatives and strategies that promote active travel, such as building bike lanes, improving infrastructure for pedestrians, implementing traffic-calming measures, and running promotional and educational campaigns. The UK already has several active transport policies in place at both the national and local government levels.

This review aimed to evaluate the evidence on the impact of active transport policies or interventions on BMI and obesity rates. The goal was to assess the likely effectiveness of expanding such policies across the UK.

Objective

To summarise the best available evidence on active transport on outcomes relevant to calorie consumption, weight loss, obesity and general health.

Methods

Eligibility criteria

Types of study. We considered evidence from studies that examine the implementation of interventions or policies involving active travel on changes in obesity-related outcomes. Specifically, eligible studies included:

1. Systematic reviews and meta-analyses of experimental or quasi-experimental studies.

2. Primary experimental or quasi-experimental studies.
3. Reports published by government and non-government organisations that evaluate the effect of active travel policies/interventions on obesity-related outcomes.

Intervention. We defined the intervention as the introduction of a policy or standalone initiative aimed at increasing active travel rates. Policies can include numerous initiatives designed to make it easier for people to engage in active travel. Examples are improvements to pedestrian and cycle infrastructure, changes to the physical environment to enhance safety, bike-to-work schemes, and other financial incentives to promote non-motorised travel. Eligible studies will measure obesity-related outcomes, including clinical measures (eg, weight loss, BMI change) or behavioural measures (eg, dietary changes, calories consumed, products purchased).

Comparator. The comparator would be no intervention or minimal intervention (eg, active or passive control group).

Information sources and article selection

We followed search methods proposed in Godin et al. (2015), a peer reviewed publication that describes methods for conducting rigorous and systematic grey literature searches. We engaged in the following steps in the first instance: (1) grey literature database searches (2) Google and Google Scholar search, (3) targeted website search. Following screening and the identification of a single paper, we (4) consulted with members of the Expert Advisory Group (EAG) who have particular expertise in this area. We asked experts for their feedback on the article selection and requested that they suggest alternative articles if they believed there is higher quality evidence beyond the article we have selected. We discussed internally and externally the suitability of the articles and made a selection based on (a) suitability to the research question and (b) support from the EAG.

Screening

Due to the rapid nature of the reviews, a single reviewer screened titles and abstracts and discussed any uncertainty with a second reviewer. For relevant

titles/abstracts, the full text was retrieved for full text review. One reviewer reviewed full texts and discussed uncertainties with the Blueprint EAG.

Assessment of methodological quality

We did not expect that the search would result in multiple high quality studies that would require comparison. We were led first by the suitability of the study to our research question. If there were multiple relevant studies/reviews identified, we selected the best available evidence according to our expert consultation with members of the EAG.

Data extraction

The JBI Data Extraction Form for Review for Systematic Reviews and Research Syntheses was used for data extraction for the final included review. Extracted characteristics included:

- Review characteristics: author/year, objectives, participants (characteristics, total number), setting/context, interventions of interest, date range of included studies, detailed description of the included studies (number/type/country of origin), appraisal instrument and rating, type of review/method of analyses and outcomes.
- Results: findings of the review and comments.

Results

The searches did not identify any systematic reviews or meta-analyses providing evidence for the impact of active travel policies on obesity-related outcomes. We identified an evaluation of significant infrastructure projects to support walking and cycling in Cardiff, Kenilworth and Southampton, UK which was reported in Goodman et al. (2014).

What did Goodman et al. do?

An assessment of the impact of structural improvement projects under the Sustrans Connect2 initiative, aimed at constructing or enhancing walking and cycling routes

at 79 UK locations. Goodman et al. selected three locations and their associated projects as follows:

- Cardiff – included major construction of a motor vehicle free bridge built over Cardiff Bay.
- Kenilworth – included major construction of a motor vehicle free bridge over a major trunk road.
- Southampton – included conversion of a footpath to a riverside boardwalk.

The authors surveyed a large representative sample of adults living within 5km of each location at baseline (prior to commencement of major works), with follow-up surveys at 12 years and 24 months later. At one year follow up the most minor parts of the projects were completed and major construction was in progress at all three locations. By two year follow up all works were completed with all new routes opened.

The measure of intervention exposure was how close a respondent lived to the new iConnect infrastructure (postcode based). Those living further away from the Connect2 infrastructure served as a comparison group for those living closer.

At each time point, respondents were asked to self-report the total time over the previous seven days spent walking or cycling for transport purposes. They also measured recreation-only physical activity during the previous week using a standardised questionnaire which allowed the researchers to measure time spent walking or cycling which was not related to transport. The primary outcome was the total time someone spent walking or cycling in the previous week calculated by combining the walking and cycling times from two different questionnaires. There was also a secondary outcome measure of total physical activity in the past week by adding in time spent doing other moderate or vigorous activities. Participants were also asked how frequently they used the new infrastructure.

They ran statistical comparisons for within-person changes in the primary and secondary outcome measures and used linear regression to examine how proximity to the project predicted change in outcomes.

What did the study find?

This is a non-exhaustive summary of the review findings; please see the original article for more details.

The authors found that the closer participants lived to the infrastructure project the more likely they were to use it which confirmed the suitability of using proximity as a proxy for intervention exposure.

The researchers found that at one year follow up there were no differences in activity levels between those who lived close to the project compared to those who lived further away. However there were some significant effects apparent at two year follow up. For people living near the new infrastructure, there was an increase of 15.3 minutes (95% CI = 6.5, 24.2) per week of active travel (walking and cycling) for every one kilometre closer they lived to the infrastructure.

Thus, someone living one kilometre away walked and cycled around 15 minutes more per week compared to someone two kilometres away. And someone living right next to the infrastructure (eg, within 500 metres) walked and cycled nearly 46 minutes more per week than someone living four kilometres away. They found no evidence that increases in walking or cycling were offset by reductions in other kinds of physical activity. The effects of proximity were only significant for those who reported using the infrastructure and the overall effect of increased activity was consistent across the three sites.

Further analyses to examine the moderating effect of range of individual characteristics were non significant. There was however evidence of a significant large moderating effect of car ownership. If no car in the household, the effect was stronger closer to the infrastructure (adjusted effect = 46.8 mins/week per km: 95% CI = 21.6, 72.1) compared to households which did have a car (95% CI = 0.3, 20.1). Statistically significance of the interaction was p=.007.

Key strengths of this study were its cohort design, population-based sampling, use of a local comparison group, and the ability to compare across three sites. Limitations included the reliance on self-reported physical activity levels and the inability to blind participants to the infrastructure exposure. The study also had a low response

rate (16%), so self-selection bias may have skewed the sample to contain a greater proportion of people who were interested in and aware of the development.

Conclusions

This study was well-designed and provides a good indication of the potential impact a large infrastructure intervention can have on promoting walking and cycling. However, more objective physical activity measures would increase certainty in the findings. While this study does not directly assess the impact on obesity, the estimated changes in physical activity levels could be used to model the likely effect on energy expenditure and obesity prevalence in the population.