

Place-based interventions to improve public health and reduce health inequalities: a rapid umbrella review update

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1. Summary

For the context of this review, a place-based intervention was defined as “any intervention, policy, programme, or action that aimed to improve health and reduce health inequalities that was delivered at a local or regional level, excluding national-level interventions” (McGowan et al., 2021; pg. 4). This includes interventions to improve, maintain or target the **physical** ‘place’ (e.g. pedestrianisation, playgrounds, and fly tipping/littering), the **social** ‘place’ (e.g. alcohol and food licensing powers, cultural venues/activities), and the **economic** ‘place’ (e.g. subsidised public transport, welfare such as council tax discounts, and other local investment and growth strategies).

In summary, we identified evidence regarding the impacts of physical, place-based interventions, but a notable lack of evidence on social and economic place-based interventions.

We found **tentative** evidence for the positive effects of physical place-based interventions on health and health behaviour outcomes, particularly physical activity. This evidence relates to the following intervention types:

- Walking routes and cycling lanes
- Outdoor gyms and physical activity equipment
- Designated areas for exercise (e.g. fitness zones)
- Improvements to the public realm (e.g. landscaping)
- Parks and playgrounds
- Urban greenways
- Improved access and signage to parks and green spaces
- Provision of housing
- Home modifications

There is **mixed (uncertain) or weak evidence** for the health impact of the following intervention types:

- Transport
- New supermarkets
- Multi-component interventions (e.g. a community housing complex with new houses and active outdoor design, including an outdoor community area, fitness area, community gym, and more attractive stairwells).

For these intervention types, the effects on outcomes were either inconsistent and therefore inconclusive, and/or we had concerns about the quality of the reviews and/or primary studies.

We found **a lack of evidence** on the effects of place-based interventions on health inequalities, due to poor reporting of the published systematic reviews and/or insufficient data collection in primary studies. Most intervention studies included in this rapid review did not consider the demographic and socioeconomic determinants of inequality and disadvantage.

Importantly, a lack of evidence or mixed evidence for a given outcome is not equivalent to evidence of no impact or no change. Instead, it means that the evidence for the impact of an intervention on a particular outcome is uncertain or unclear, and further research may be warranted.

Our conclusions are tentative for several reasons. The following considerations are important when interpreting the evidence:

- The evidence for place-based interventions comes from studies of varying design and quality (high, moderate, and low quality), which limits the strength of evidence and conclusions that can be drawn.
- Most of the evidence (71% of studies) originated in North America, while only a minority (9% of studies) is from the UK, which restricts the generalisability of evidence in this rapid review to a UK context.
- Outcomes were measured over various time periods, ranging from a few weeks to several years. While some studies had relatively long follow-up periods, others did not, and it is not known to what extent the observed effects last over time.
- Most of the evidence relates to behaviours known to impact health but are not direct measures of health benefit. For example, it is not known whether increases in physical activity behaviours were sufficient to impact health. However, it is reasonable to assume that even minor increases sustained over time would derive some benefit to health.
- Outcomes were measured at an individual-level (not at a population-level). What works for a few individuals may not work when applied broadly, and effective interventions may not scale effectively to larger populations.
- The evidence presented in this rapid review relies on the reporting quality of the included systematic reviews, which may not have reported all the relevant data from primary studies. As such, it is possible that other relevant outcomes have not been captured by this rapid review. Notably, there was a lack of reported evidence on mental health and wellbeing outcomes. It is possible that these data exist in the primary study reports but were simply not duplicated by reviews authors and were therefore not available for synthesis in this rapid review. Some relevant study designs preclude this type of outcome measurement (e.g. natural experiments in which participant behaviour is unobtrusively observed).

Evidence profile: summary of the health impact of place-based interventions

Intervention type	Interventions	Impact on health/health behaviours ↑ increased, ↓ reduced, ? no evidence of change.	Impact on health inequalities and the social determinants of health ↑ increased, ↓ reduced, ? no evidence of change.
Physical interventions			
Infrastructure to encourage physical activity	New or improved walking and cycling routes and infrastructure.	<ul style="list-style-type: none"> ↑ walking for leisure ↑ walking for transport ↑ cyclists ↑ cycling for transport ↑ bike share · mixed findings for physical activity (↑?↓) and evidence of ↑ total physical activity (for those living closer to intervention) 	? similarly positive effects on physical activity for both men and women.
	New or improved urban greenways.	<ul style="list-style-type: none"> ↑ moderate to vigorous physical activity (only for those living closer to greenway) ↓ sedentary behaviour ↓ cycling (due to new carsharing membership) ? mental wellbeing 	
	Area designation for physical activity: 'Play Streets' (e.g. 'Play Streets', fitness zones).	<ul style="list-style-type: none"> ↑ moderate to vigorous physical activity (adults in fitness zones; children on Play Streets) ↑ step count (children on Play Streets) 	

		↑ sedentary behaviour (adolescents and adults on Play Streets)	
	Outdoor gyms for adults and physical activity equipment for children.	↑ physical activity ↑ moderate to vigorous physical activity (children)	↑ and ? boys than girls engaged in moderate to vigorous physical activity.
Improving the public realm	Greening of vacant lots, landscaping, residential street roadway improvements.	↑ pedestrians ↑ cyclists ↑ quality of life ↑ perceptions of safety ? crime rates and gun assaults ↓ heart rate	↓ heart rate for African American participants living in view of the newly greened vacant lots.
Parks and playgrounds	New parks, playgrounds, and green spaces.	↑ physical activity ↑ energy expenditure ↑ park use	
	Improvements to existing parks/playgrounds.	↑ physical activity ↑ park use	
	Removal of park seating	? physical activity	
Improved access and signage	Smoke-free signage in parks.	↓ cigarette butts	
	Installation of a park crosswalk to improve access.	↑ park use ↓ energy expenditure	
	Walking trail signage	↑ trail users (both intervention and control groups)	

Housing	Provision of housing	<ul style="list-style-type: none"> ↑ quality of life ↓ hospital admission ↓ substance use ↑ housing stability ↑ community integration ↑ and ? mental health ? employment ? income 	
	Home modifications	<ul style="list-style-type: none"> ↓ falls ↓ injuries from falls ↓ hospitalisation from falls ? asthma ↑ self-reported physical and mental health 	
Transport	New light rail transit	<ul style="list-style-type: none"> ↑ physical activity for new users and those living closer to light rail ↓ physical activity for former users of light rail 	
	Segregated bus track with cycling and walking routes	? mental health	
Supermarkets	New supermarkets and independent grocery stores	<ul style="list-style-type: none"> ? food consumption ? and ↓ BMI ? fruit and vegetable consumption ↓ amount of fruit and vegetables (in households with children) ↓ salty snacks ↑ likelihood of eating in restaurants or purchasing prepared (less healthy) food from new store 	

	New farmers market	<p>↑ fruit and vegetable consumption</p> <p>↑ physical activity (for new users and those living closer to the market)</p>	
Multicomponent interventions	Active design in housing complex	<p>↑work-related moderate to vigorous physical activity (women)</p> <p>↑ recreational moderate to vigorous physical activity (men)</p> <p>? daily steps (overall)</p> <p>? moderate to vigorous physical activity (overall)</p>	<p>↑ physical activity for both men and women, but there were differences in the nature of the activity.</p>
	Relocation to Smart Growth community	? physical activity	
	Urban renewal programme	<p>↑ perceptions of place</p> <p>? self-reported health</p>	
Economic interventions			
Traffic scheme	Traffic congestion charges	↑ active transport	

2. Methods

2.1 Description of the intervention

2.2 Key questions

Our aim was to rapidly update an existing, relevant umbrella review conducted by McGowan et al. (2021). We were interested in the following question: What can research tell us about the effectiveness of place-based strategies for improving health and reducing health inequalities?

2.3 Search

We searched Medline (Ovid) on 16th February 2024 using the same search terms as McGowan et al. (2021). The updated search was restricted to English language articles, review articles, and research published from the year 2020 onwards (McGowan et al.'s extensive searches covered the period between 2008-2020). The reference lists of relevant articles were hand-searched to find additional relevant articles.

2.4 Inclusion criteria

We applied McGowan et al.'s (2021) eligibility criteria to our search results. The criteria are summarised below.

2.4.1 Participants

We included evidence on all adults and children of any age.

2.4.2 Interventions

We included evidence on place-based interventions, as defined above in **Summary**. Place-based interventions were eligible if they focused on one or more key elements of place and health: the physical, social, or economic environment. The scope of eligible interventions was purposefully broad to allow for a wide range of interventions to be identified. Interventions implemented pre-2008 (i.e. before the global financial crash) and individual behaviour change studies were excluded.

2.4.3 Study design and comparators

We included systematic reviews comprising a range of quantitative studies, including randomised and non-randomised trials, prospective and retrospective cohort studies (with and/or without comparators), prospective repeat cross-sectional studies (with and/or without comparators), interrupted time series (with and/or without comparators), and natural experiments.

2.4.4 Outcomes

We accepted a wide range of outcomes. These included outcomes relating to:

- Health (e.g. physical, mental, and mortality)
- Health behaviours (e.g. physical activity, dietary behaviours, active travel)
- Personal and community wellbeing
- Social determinants of health (e.g. social cohesion, crime and safety, housing/neighbourhood condition, access to services, training and employment opportunities).

We excluded systematic reviews and/or their included studies if they focused on the treatment of illnesses.

Where possible, we considered differences in health outcomes according to the health equity factors set out in the PROGRESS+ framework (O'Neill et al., 2014). In summary, these include place of residence, race and ethnicity, occupation, gender and sex, religion, education, social capital, socioeconomic status, and other relevant factors ('+') such as age and disability.

2.4.5 Setting

We included systematic reviews and the primary quantitative studies (as described above) within these reviews if the studies focused on place-based interventions and were conducted in high-income countries (as defined by the World Bank list at least once since 2008).

2.5 Quality appraisal

We appraised the quality of included systematic reviews using the revised Assessment of Multiple Systematic Reviews (R-AMSTAR) tool. The R-AMSTAR tool provides a quantifiable assessment of systematic review quality (Kung et al., 2010). The tool comprises 11 questions that were assigned a score of one to four based on criteria for each question. After all questions and their criteria were completed, a total score was calculated and overall review quality was classified as low (scores 11-22), medium (scores 23-33), or high quality (scores 34-44). We accepted the systematic review authors' decisions regarding quality appraisal of the studies included in their reviews.

2.6. Evidence synthesis

Themes were identified across primary studies that reported similar intervention types. The evidence for these intervention types is narratively synthesised below.

3. Results

3.1 Search results

We identified 1042 records from our updated database search. After study screening and selection, we included 12 systematic reviews. These reviews reported 47 eligible primary studies. Additionally, McGowan et al. (2021) included a further 13 systematic reviews and 51 eligible primary studies in their review. Therefore, we have included a total of 25 systematic reviews and 98 primary studies in this RES.

3.2 Quality appraisal

Systematic reviews were graded as overall high quality (6 reviews), medium quality (13 reviews), and low quality (6 reviews).

3.2 Place-based interventions

Of the 98 eligible primary studies, 97 focused on interventions to change one or more element of the *physical* environment, either through the development of new infrastructure to provide opportunities for physical activity, by providing or modifying housing, making aesthetic or functional improvements to the public realm, creating new supermarkets and transport facilities, or through multi-component interventions. Only one primary study reported findings from an *economic* intervention (i.e. a traffic congestion pricing scheme). We found no eligible studies that assessed the impact of *social* interventions.

Studies were conducted in the USA (42 studies), Canada (28 studies), Australia (11 studies), the UK (10 studies), Belgium (1 study), Chile (1 study), Denmark (1 study), France (1 study), Sweden (1), and Uruguay (1 study).

3.2.1 Physical interventions that showed tentative evidence of a positive impact on health outcomes

3.2.1.1. Infrastructure to encourage physical activity

Eleven reviews reported the findings of 28 studies related to the development of new or modification of existing infrastructure to encourage physical activity.

Walking and cycling routes and infrastructure

Nineteen studies reported mixed but mostly positive effects of implementing new walking and cycling route or urban greenway interventions on physical activity outcomes. Thirteen of the 19 studies found positive effects on physical activity, including increased walking, cycling, moderate-to-vigorous physical activity, and total physical activity. One study also reported a reduction in sedentary behaviour. The remaining six studies reported no effects on overall physical activity or mental wellbeing outcomes.

Additionally, seven studies assessed whether participants' outcomes differed depending on their proximity to the intervention. Five of these studies found that living closer to the intervention infrastructure was associated with more walking, cycling, and active travel (walking).

Outdoor gyms and physical activity equipment

Four studies reported positive effects of offering outdoor gyms and physical activity equipment. The interventions included the installation of outdoor gyms (some of which included targeted promotional marketing and exercise sessions with professional trainers) for adults and physical activity equipment for children. All four studies reported positive effects on total physical activity and moderate-to-vigorous physical activity in children and adults, including older adult populations. One study observed that boys were significantly more active than girls.

Area designation of physical activity

Five studies reported on the establishment of new areas or 'zones' within existing green and public spaces to encourage physical activity. The interventions included the installation of fitness zones in an urban plaza, new fencing and signage in public parks to create dog 'off-leash' zones, and the creation of 'Play Streets', whereby city streets were closed to traffic to create an open space for children to play. A greater number of people engaging in moderate-to-vigorous physical activity were seen in the fitness zones. Creating dog off-leash areas led to mixed results, with some indication of reduced physical activity intensity in children in the off-leash areas. In the three 'Play Street' studies, children were significantly more physically active (light and moderate-to-vigorous activity) and less sedentary. However, adolescents and adults present to supervise children were more sedentary.

3.2.1.2 Improving the public realm

Three reviews reported the findings of five studies that assessed improvements to the public realm, and the impact on health and outcomes relating to the social determinants of health. Interventions included:

- landscaping to improve watershed function and stormwater capacity by planting trees
- residential roadway and street redesign (e.g. of pavements, crossings, cycling lanes, street furniture, tree planting, and storm water management; and to look more attractive and be safer with buildouts to slow traffic, planters, benches, and improved light)
- the greening of vacant lots (e.g. removing debris, planting trees and grass, and erecting wooden fences).

Overall, there was some indication of increased numbers of pedestrians and cyclists, quality of life, feelings of safety, and reduced heart rate (in African American participants who lived in view of the newly greened vacant lots). There was no effect on crime rates and gun assaults.

3.2.1.3 Parks and playgrounds

Seven reviews reported the findings of 14 studies that assessed physical activity outcomes following various park and playground interventions. The interventions included the development of new or improvements to existing parks, playgrounds, public green spaces, and recreational

infrastructure. Park renovations included replacing old playground equipment with new equipment, ground resurfacing, landscaping, new walking path signs, adult fitness equipment, benches and designated seating areas, pavilions, and community gardens. Most studies observed increased park use, physical activity, and energy expenditure. A small number of studies found no effects on physical activity following the installation of new parks and recreational infrastructure. In one study, removing seats in parks did not affect how often children stood or participated in moderate-to-vigorous physical activity.

3.2.1.4 Improved access and signage to parks and green space

Four reviews reported the results of three studies that assessed physical activity and other park-based behaviour after improving park access and installing new public signage. The interventions included the installation of road crosswalks designed to improve safe access to parks, the introduction of smoke-free signage in parks, and the installation of new walking trail signs (i.e. way-finding and incremental distance signage) along community trails (accompanied by a marketing campaign to promote trail use). The studies reported mixed results. There was an overall increase in park use but a reduction in total energy expenditure for participants after the new crosswalks. The smoke-free signage was associated with reduced numbers of cigarette butts in the parks. The improved walking trail signage was associated with comparable increases in the number of trail users in both the intervention group and the control site group (without signage), meaning that the increased trail users may not be due to the intervention.

3.2.1.5 Housing

Eight reviews reported the results of 34 studies related to the provision of housing or modification of housing.

Provision of housing

Thirty studies reported on Housing First interventions. Most of these studies took place in Canada. These interventions combine the provision of housing with other social support services and treatment for various addictions and mental health illnesses. Overall, the evidence suggests that those who received housing had greater quality of life and housing stability, and reduced hospital admissions and substance use. There was mixed evidence on mental health outcomes, showing both improvements and no improvements. No effects were found for employment and income outcomes. It is worth noting that most control groups received ‘treatment as usual’, which generally entailed existing housing programmes, community services, and targeted services (e.g. drop-in centres, emergency shelters, meal programmes, street outreach, supportive/alternative housing, mental health support, and substance use support).

Housing modification

Four studies investigated the impact of home modifications. Interventions included home modifications to prevent falls and injuries and housing repairs following a flood. There was a reduction in injuries, falls, and hospitalisation from falls following the home modifications. There was no effect on asthma-related outcomes for people living in homes that underwent repair work after a flood.

3.2.2 Physical interventions that showed uncertain or no evidence on the impact on health outcomes

3.2.2.1 Supermarkets

Three reviews reported six studies that found mixed effects on health behaviours and health outcomes after the opening of new food stores. The interventions included new supermarkets, a new weekly farmers market, and new independent grocery stores (one of which was in the centre of a neighbourhood that had no other food stores within walking distance). The new supermarkets showed no consistent pattern of effects on Body Mass Index (BMI), caloric intake, or fruit and vegetable consumption. The farmers' market was associated with increased self-reported fruit and vegetable consumption. The new grocery store intervention (in the neighbourhood with no other food stores within walking distance) reported reductions in BMI, whereas the control town reported increases in BMI.

3.2.2.2. Transport

Two reviews reported the results of four studies that assessed the impact of new transport facilities on health behaviours and health outcomes. The interventions included new light rail transit facilities and the development of a new purpose-built, guided, segregated bus track with cycle and walking routes included. The studies showed mixed results after the opening of new light rail lines, with some indication of reduced physical activity for existing line users and for those living further away from the light rail line, and increased physical activity for new line users and for those living closer to the light rail line. One study measured changes in the mental health of residents and found no effects of the intervention.

3.2.2.3. Multi-component interventions

Three reviews reported the results of three studies that assessed changes in health behaviours and health outcomes after implementing interventions comprising multiple elements. One intervention included moving people to a Smart Growth community, which is characterised as having greater building density, less auto-dominated form, greater non-residential land uses, fewer barriers to connectivity, more parks and playgrounds, more traffic safety and aesthetic features, and less graffiti and litter. There were no effects on physical activity in children and young people in the Smart Growth group. Another intervention assessed the impact of a new community housing complex with active outdoor design. Participants moved into houses with an outdoor community area, fitness area, community gym, and more attractive stairwells. No effects on physical activity were found between active design and non-active design residents. Women living in active design houses reported more work-related moderate-to-vigorous physical activity, while men living in active design engaged in more moderate recreational physical activity.

3.2.3 Economic interventions

One study from one review reported on changes to the economic environment, namely traffic congestion pricing schemes. The study findings suggested that traffic congestion pricing schemes led to changes in behaviours such as moving from car journeys to public transport.

However, the study authors noted these findings were unreliable due to adverse weather conditions and a small and unrepresentative sample.

3.3 Health inequalities

Overall, there was a notable lack of focus and evidence on the impact of place-based interventions on health inequalities. Most reviews did not consider the demographic and socioeconomic determinants of inequality and disadvantage. This reflects a wider issue in the public health literature, whereby health inequalities data are not routinely collected and reported.

Only three reviews explicitly considered factors related to health inequalities. One of these reviews used the PROGRESS+ tool and reported that there was insufficient evidence to draw any conclusions related to health equity. One review examined gender differences in physical activity outcomes after changing the built environment. The review authors concluded that these interventions had a similarly positive effect for men and women.

As noted above, there is some evidence from a minority of studies included in this rapid review that participants' proximity to the interventions (e.g. new cycling and walking routes) is important. There is a tentative pattern whereby those living closer to the interventions were more likely to use them and therefore more likely to disproportionately benefit from them compared with participants living further away.

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