

Physical Activity: Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions

Summary Evidence Table

This table outlines information from the studies included in the Community Guide systematic review of Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions. It details study quality, population and intervention characteristics, and study outcomes considered in this review. Complete references for each study can be found in the Included Studies section of the [review summary](#).

Abbreviations Used in This Document:

- Intervention components
 - PA: physical activity
- Measurement terms
 - RR: Relative risk or relative risk ratio
 - OR: Odds ratio
 - CI: confidence interval
 - METs: metabolic equivalent of task
 - hr: hour
 - min: minute
 - MVPA: moderate-to-vigorous physical activity
 - VPA: vigorous physical activity
 - pct pts: percentage points
 - wk: week
 - yrs: years
 - SD: Standard deviation
 - SE: Standard error
 - m: month or months
 - GPS: Global Positioning System
 - GIS: Geographic information system
 - USD: United States dollars
 - SOPARC: System for Observing Play and Recreation in Communities
 - SOPLAY: System for Observing Play and Leisure Activity in Youth
- Study design
 - RCT: randomized trial
- Other terms:
 - NA: not applicable
 - NR: not reported
 - NS: not significant
 - SES: socioeconomic status
 - F/u: follow-up
- Study groups
 - Int: Intervention
 - Cont: Control
 - Comp: Comparison

Appendix A: Additional Study Outcomes

Notes

- **Suitability of design** includes three categories: greatest, moderate, or least suitable design. [Read more](#)
- **Quality of Execution** – Studies are assessed to have good, fair, or limited quality of execution. [Read more](#)
- **Race/ethnicity and SES** of the study population: The Community Guide only summarizes race/ethnicity and SES for studies conducted in the United States.
- Tables and figures listed in this document can be found in the associated publication.

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>Author, year: Auchincloss et al. 2019</p> <p>Location: USA: Philadelphia, Pennsylvania</p> <p>Design: Before/after with a comparison</p> <p>Suitability rating: Greatest</p> <p>Intervention duration: Ongoing (16-19 months)</p> <p>Study timeframe (Int to last follow up): 16-19 month (greenway completed in late spring 2013, post data collection occurred fall 2014)</p> <p>Year(s) study was implemented: 2011-2014 (36 months)</p> <p>Baseline data collection in Fall 2011 (prior to construction) and follow up data collection in fall 2014</p> <p>Quality of Execution: Fair</p>	<p>Setting: Greenway/trail 1.5-mile section of arterial streets route through (urban) neighborhoods</p> <p>Each area had a park, a recreation center, a 2- way busy thoroughfare and 3 city bus/trolley routes</p> <p>Geographic scale: Urban (City)</p> <p>Study population: Census population (Intervention) Number of census block groups: 25 Number of people in area block groups: 21,488 Population density (per km²): 5666</p> <p>Eligibility and Recruitment: Participants who use greenway</p> <p>Sample size: Systematic observations (N=8783) Persons per hour</p> <p>Post-construction intercept surveys were</p>	<p>Description: Greenway connected residents to under-utilized neighborhood recreational facilities (two parks and a public recreation center); provided transportation infrastructure; and linked to a larger regional and national trail network</p> <p>Infrastructure interventions: Park-based: No Greenways/trails: Yes, 1.5-mile urban greenway (tree-lined asphalt paved greenway) Infrastructure (renovations) included major intersection improvements (sidewalk bump-outs, count-down pedestrian signals, ADA ramps, improved intersection markings/ paint), bus stop shelters, street trees, bicycle racks, signage, and enhancement of storm water management Playgrounds: No</p> <p>Intervention components: Programming: No Access: Connected residents to a park and local services (a mini mall with a supermarket, a ball field, a recreation center); enhanced access to/from destinations including bus/trolley stops Promotion: No Community engagement: No</p>	<p>Description: Physical activity: Yes Park use: NR Health, mental health, well-being: NR Social outcomes: Yes, Crime, aesthetics, social disorder Injury: NR Quality of life: NR Weight related (BMI): NR Environmental outcomes: NR</p> <p>Additional/other outcomes: NR</p> <p>Outcome Measurement: Moderate or vigorous physical activity (MVPA) Instrument: SOPARC Engaged in MVPA (walking fast, bicycling, or running/jogging) or engaged in activity that was lower intensity (standing, sitting, walking slow/regular pace)</p>	<p>Physical activity in the location Moderate or vigorous physical activity (MVPA; Table 2; persons per hour converted to proportion) Run, bike, or walk fast Baseline Int (n=100 persons, per hour): 16% Comp (n=128 persons, per hour): 19% 16-19-month follow-up Int (n=116 persons, per hour): 18% Comp (n=159 persons, per hour): 22% Change in % engaged in MVPA: -1% Relative % change: -3.3%</p> <p>Run or bike Baseline Int (n=100 persons, per hour): 4% Comp (n=128 persons, per hour): 5% 16-19-month follow-up Int (n=116 persons, per hour): 9% Comp (n=159 persons, per hour): 9% Change in % engaged in MVPA: +1%</p> <p>Bike Baseline Int (n=100 persons, per hour): 3% Comp (n=128 persons, per hour): 7% 16-19-month follow-up Int (n=116 persons, per hour): 4% Comp (n=159 persons, per hour): 7% Change in % engaged in MVPA: +1%</p> <p>Moderate or vigorous physical activity (MVPA; Table 3) Run, bike, walk fast OR 0.93 (95% CI 0.57 1.52) p=0.7627 Run, bike OR 1.37 (95% CI 0.74 2.56) p=0.3187</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
Limitation(s): 3	collected at the greenway (N=175) Reported Baseline Demographics: Individual Level (Intervention group N=175 , intercept survey): Post only measure Age Young adult (18<=35): 52% Mid-aged Adult (36-<=50): 24% Older Adult (> 50): 24% Post only measure Sex: Female: 46%; Male: 54% Neighborhood or community level: Census data (intervention census population N=21,488, avg density 5666 per km2): Race/ethnicity: non-Hispanic black: 91% Education: Only high school diploma/GED 44% Bachelor's Degree or higher 8% Low income: median household, \$\$27,240 Poverty (income < 150% of the Federal Poverty Level), 49%	Exposure Measurement: Asked greenway users if they were residents of the neighborhood and how they use the greenway Comparison: Comparison area was a 1-mile section of arterial streets in the northwest of the city		Bike OR 1.74 (95% CI 0.83 3.66) p=0.1456 Interaction odds ratio>1.0 indicates that MVPA was higher over time (post-pre) at the intervention site relative to the comparison area Among all users (N=175), over 60% were daily users of the greenway and almost all reported using the greenway to get from place to place (as opposed to using it for leisure activity/exercise) Adjusted odds ratios (OR, 95% confidence intervals) for observing an individual engaged in MVPA (Supplement Figure 1) Social outcomes (see Appendix A at bottom of document) Models used: Hierarchical logistic model Other variables controlled for in study: Age (age group), sex, side of the street, bus activity (person moved to/from/waited at bus stop), in a group vs. solo, weekday or weekend day, and an indicator for daylight savings SUMMARY: A greenways intervention showed mixed results for observed MVPA in disadvantaged high-crime urban communities

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	Employment: employed, 43% Census data for comparison (Table 1)			
<p>Author, year: Clark et al. 2014</p> <p>Location: USA: Southern Nevada</p> <p>Design: Other design with concurrent comparison</p> <p>Suitability rating: Greatest</p> <p>Intervention duration: Signage was ongoing, but study was 12-month post promotion and 3-4 months post signage</p> <p>Study timeframe (Int to last follow up): 12 months (promotion); 3-4 months for new signage</p> <p>Year(s) study was implemented: 2011-2012</p> <p>Quality of Execution: Fair Limitation(s): 4</p>	<p>Setting: Trails in the community</p> <p>Geographic scale: Urban Regional area with multiple trails</p> <p>Study population: Users of 10 study trails in the Las Vegas area; 6 intervention trails (with new signage and promotion) and 4 matched trails without new signage</p> <p>Eligibility and Recruitment: Selected trails in southern Nevada Any trail user counted on study trail during three 7-day count days</p> <p>Sample size and retention: 2 commuter trails 6 Park-like trails 2 drainage channel trails</p> <p>Reported Baseline Demographics:</p>	<p>Description: Southern Nevada Health District (SNHD) altered selected urban trails by adding a signage intervention (wayfinding, maps, distance) with promotion</p> <p>Infrastructure interventions: Park-based: No Greenways/trails: Signage added to selected 5 existing/previously built urban trails; way-finding signs were placed on trails at major access points mounted on square metal posts, distance markings were embossed into the surface of the trails at 0.25-mile intervals Playgrounds: No</p> <p>Intervention components: Programming: No Access: No Promotion: Yes (both groups). Trail use and physical activity marketing and media campaign Community engagement: No</p> <p>Promotion + new signage on trail (intervention group) vs Promotion + trail (no new signage; comparison group)</p> <p>Sequential intervention could be considered as separate</p>	<p>Description: Physical activity: NR Trail use: Yes (counts) Health, mental health, well-being: NR Social outcomes: NR Injury: NR Quality of life: NR Weight related (BMI): NR Environmental outcomes: NR Additional/other outcomes: NR</p> <p>Outcome Measurement: Urban trail use Instrument: Trail counters (infrared sensor). Manual audits by observation to validate sensor count accuracy</p>	<p>Park use (trail) Trail Use Counts as determined by infrared scanners during 7-day measurement periods before and after new signage: Mean number of trail users per day (Promotion period pre-signage)</p> <p>Overall: Pre-intervention to post signage f/u Baseline Int (n=6 trail mean): 79.38 (SE 10.28) Comp (n=4 trail mean): 112.0 (SE 13.51) 12 months follow-up (promotion + signage) Int (n=6 trail mean): 106.99 (SE 12.63) Comp (n=4 trail mean): 146.82 (SE 18.45) Change in mean difference: -7 users per day (95% CI NR) p=0.3226 Relative % change: +2.3%</p> <p>Mid intervention: Int (n=6 trail mean): 141 (SE 12.80) Comp (n=4 trail mean): 144 (SE 24.06) 3-4 months follow-up of new signage on trail Int (n=6 trail mean): 106.9 (SE 12.63) Comp (n=4 trail mean): 146.8 (SE 18.45) Change in mean difference: -37 users per day (95% CI NR) p=0.3226</p> <p>Models used: NA</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	Individual level: NR Age: NR: Sex: NR Race/ethnicity: NR Education: NR Low income: NR Neighborhood or community level: NR	interventions (promotion then signage), not combined interventions (promotion + signage) Exposure measurement: No measure of exposure to marketing campaign. Intervention trail users presumed to be exposed to trail signage Comparison: Selected, matched existing urban trails not improved with signage		Other variables controlled for in study: NR Note: Overall pre-post change (pre promotion to post signage) increased in both intervention trails and comparison trails. SUMMARY: Trail use increased significantly in both intervention and comparison arms during the trail use promotion campaign. New trail signage did not increase or retain trail use over 3-4 months of follow-up. No rationale was provided on why signage would be expected to increase trail use.
Author, year: Cohen 2009 et al. Location: USA: City in Southern California Design: Other design with concurrent comparison Suitability rating: Greatest Intervention duration: Sustained (f/u was 3-14m post construction) Study timeframe (Int to last follow up): Variable by park 3 months to 14 months post-construction	Setting: Parks (mean 8 acres with 12 areas for physical activity) Geographic scale: Urban (City) with multiple parks (10) Study population: Park users and residents within 2-mile radius of one of 10 urban parks Eligibility and Recruitment: Residents living within a 2-mile radius of the park were surveyed Sample size: Intervention parks: 5 Comparison parks: 5	Description: Park infrastructure improvements used City bond measures specifically allocating funds for upgrading and acquiring new open spaces for recreation Infrastructure interventions: Park-based: Yes, funded improvements with budgets in excess of \$1million: New Gyms (3 parks) Gym refurbished with landscaping (1 park) Picnic area improvements, walking path upgrade, playground enhancements (1 park) Greenways/trails: No Playgrounds: Yes, as a component of park modifications Intervention components:	Description: Physical activity: Yes Exercising at least 3x week Park use: Yes. One or more times per week Health, mental health, well-being: NR Social outcomes: NR Injury: NR Quality of life: NR Weight related (BMI): NR Environmental outcomes: NR Additional/other outcomes: NR	Other measures of PA: Park users survey self-report of exercising at least 3 times per week in their leisure time Raw data NR Propensity scores Baseline Int (n=NR): 61.6% Comp (n=NR): 66.7% 3-to-14-month follow-up propensity scores Int (n=NR): 41.9% Comp (n=NR): 48.2% Absolute difference in proportions: -1.2 percentage points (95% CI NR) p=NR Relative % change: -4.2% Logistic Regression of propensity scores Ratio of ORs 0.99 p=0.812 Park use: Park use one or more times per week Baseline

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>Year(s) study was implemented: 2003-2008</p> <p>Quality of Execution: Fair Limitation(s): 4</p>	<p>Survey respondents <u>Baseline</u> <u>Follow-up</u> Park 768 712 Household 767 620</p> <p>More women and Latinos were interviewed at f/u (p<0.0001)</p> <p>Reported Baseline Demographics: Individual level (Park Users at baseline) Age-median: 36.5 yrs. Sex: Female: 53.8%; Male:46.2% Race/ethnicity: Latino: 79.2% White 3.3% Black 16.9% Asian: 0.6% Education: NR Low income: NR</p> <p>Individual level: (Residents at baseline) Age-median: 38.5 yrs. Sex: Female:62.2%; Male: 37.8% Race/ethnicity: Latino: 74.2% White: 5.8% Black: 18.8% Asian: 1.0% Education: NR Low income: NR</p>	<p>Programming: No Access: No Promotion: No Community engagement: Park infrastructure improvements directed by community participation including input into the design of new facilities</p> <p>Exposure measurement: use of park or proximity of household to park</p> <p>Comparison: Selected parks with similar park and neighborhood characteristics not funded for improvements -Size -Features -Amenities -Similar neighborhood socio-demographics</p>	<p>Outcome Measurement: Physical activity and park use Instrument: Intercept survey of park users Interviews of adult residents living within 2 miles (4 strata by distance) Instrument: SOPARC Observation of activity in park was conducted but arms were combined for an overall pre to post change estimates</p>	<p>Int (n=NR): 58.7% Comp (n=NR): 69.2% 3-to-14-month follow-up propensity scores Int (n=NR): 48.8% Comp (n=NR): 58.2% Absolute difference in proportions: + 1.1 percentage points (95% CI NR) p=NR Relative % change: -1.2% Logistic Regression of propensity scores Ratio of ORs 1.01 p=0.850</p> <p>First time users increased significantly in intervention parks over comparison parks: ratio of OR 1.08 p=0.007</p> <p>Authors note that city budget cuts resulted in reductions in organized activities during f/u period</p> <p>Models used: Weighted logistic regression</p> <p>Other variables controlled for in study: age, gender, Latino vs non-Latino, BMI, distance home to park, MVPA at work</p> <p>SUMMARY: Community informed park improvements did not result in increased park use and physical activity compared to selected matched parks without improvements. Park use significantly declined in all study parks between baseline and follow-up, possibly due to programming budget cuts.</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	<p>Neighborhood or community level: Study parks were located predominantly in Latino and African American and low-income neighborhoods.</p> <p>Population in proximity 1-mile 67,000 average 2-miles 210,000 average</p> <p>Race/ethnicity SES: 31% households in poverty</p>			
<p>Author, year: Cohen et al. 2013</p> <p>Location: USA: Los Angeles, California</p> <p>Design: Group randomized trial</p> <p>Suitability rating: Greatest</p> <p>Intervention duration: Unclear. Minimum 2 years</p> <p>Study timeframe (Int to last follow up): Unclear, minimum 2 years Baseline: 2008-2010 F/u: 2010-2012</p>	<p>Setting: Parks</p> <p>Geographic scale: Urban and suburban (City)</p> <p>Study population: Parks in Los Angeles with neighborhood racial/ethnic diversity</p> <p>Eligibility and Recruitment: Matched selection of parks based on neighborhood demographics, specifically racial and ethnic diversity -10 parks with highest percentage Hispanic residents</p>	<p>Description: Park use data, training on outreach and park promotion, marketing consultation, and \$4000 provided to park decision-makers for activities to increase park use and physical activity.</p> <p>Intervention arms differed on the decision-making process (Park director or park director and park advisory board)</p> <p>Infrastructure interventions: Park-based: Yes, varied by park decision on how to spend \$4000 51% of funds were spent on signage (32 of 33 intervention parks purchased signs and banners to promote park use and activities)</p>	<p>Description: Physical activity: Yes, observed activity categorized and converted into METs</p> <p>Park use: Yes</p> <p>Health, mental health, well-being: NR</p> <p>Social outcomes: NR</p> <p>Injury: NR</p> <p>Quality of life: NR</p> <p>Weight related (BMI): NR</p> <p>Environmental outcomes: NR</p> <p>Additional/other outcomes: NR</p>	<p>Physical activity in the location: Intervention arms had similar results (Table 3) and were combined for difference-in-differences analyses -Park-director decision-making -Park Advisory Board + director decision-making</p> <p>Summary of results "Using a difference-in-differences analysis and comparing the combined treatment arms to the control arm, a relative increase was found in park use at the magnitude of 7-12% or 196 person-hour visits/week per park over the 28 observations (p=0.035, false discovery rate <0.10).</p> <p>Energy expenditure increased by 610 MET-hours (p=0.006, false discovery rate <0.05) Converting observation period changes to full week estimates</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>Year(s) study was implemented: 2007-2012</p> <p>Quality of Execution: Fair</p> <p>Limitation(s): 4</p> <p>(Note: Study also conducted park user and resident intercept surveys which are not reported here)</p>	<p>-10 parks with highest percentage African-American residents</p> <p>-10 parks with highest percentage Asian residents</p> <p>-11 parks with diverse resident demographics</p> <p>Parks with restricted access (gang injunction) or location (within public housing) were excluded</p> <p>Sample size:</p> <p>Parks: 51 of 183 were eligible (5 were replaced after site visits)</p> <p>Parks were matched on size, number of facilities, programs, and sociodemographic characteristics</p> <p>Board + director: Randomized Analysis 17 16</p> <p>Director: Randomized Analysis 17 16</p> <p>No interventions: Randomized Analysis 17 16</p> <p>Reported Baseline Demographics: (Table 1)</p> <p>Intervention arm</p>	<p>28% was spent on labor and materials to increase group activities (20 parks)</p> <p>21% was spent on incentive giveaways (18 parks)</p> <p>Greenways/trails: No</p> <p>Playgrounds: No</p> <p>Intervention components:</p> <p>Programming: Yes, outreach and support for group activities (hiring additional instructors; buying class/activity materials; and purchases of equipment like shades, tents)</p> <p>Access: No</p> <p>Promotion: Yes, 1) signage (banners, bulletin boards, floor mats, staff shirts, table covers, water kegs, clipboards, staff aprons, and walking path signage); (2) promotional incentives (water bottles, bags, individually targeted e-mail communications)</p> <p>Community engagement: No</p> <p>Exposure measurement:</p> <p>None. Parks and park decision-makers assigned to condition</p> <p>Comparison: Matched parks with no additional interventions</p> <p>Parks with community-based participatory research including baseline park use assessment + training on outreach and park promotion+ marketing</p>	<p>Outcome Measurement:</p> <p>Observed physical activity in study parks during observation periods</p> <p>Instrument: SOPARC methods</p> <p>7 days of observation</p> <p>4 times of observation per day</p> <p>28 total observations per park</p> <p>Observed park user activity was categorized</p> <p>-sedentary</p> <p>-walking or moderate activity</p> <p>-vigorous activity</p> <p>Instrument: Categorized activity was converted to METs for estimates of park user energy expenditures</p>	<p>600 more visits/week/park 1830 more MET-hours of physical activity/week/park</p> <p>Estimated MET-hours per week based on observed physical activity levels with conversion to MET-hours per week</p> <p>Int (n=NR): NR</p> <p>Comp (n=NR): NR</p> <p>Follow-up: Unclear, presumed 2 years minimum</p> <p>Int (n=NR): NR</p> <p>Comp (n=NR): NR</p> <p>Difference-in-differences: Energy expenditure increased by 610 MET-hours (SE 224; p=0.006, false discovery rate <0.05)</p> <p>Park use</p> <p>Observed park use during 7-day x 4 times/day observation periods</p> <p>Baseline</p> <p>Int (n=NR): NR</p> <p>Comp (n=NR): NR</p> <p>Follow-up unclear, minimum of 2 years</p> <p>Int (n=NR): NR</p> <p>Comp (n=NR): NR</p> <p>Difference-in-differences: +196 users during 28 observation times (SE 92) (p=0.035, false discovery rate <0.10)</p> <p>Covariates that were significantly associated with person-hour visits and MET-hours expended (Table 4) included Summer season, greater population density, larger number of park facilities, more accessible areas, more supervised activities, and more organized activities</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	<p>board + director (16 parks) -Park users -Park neighborhoods</p> <p>Individual: Park users N: 1,930 (SD 1,200) 7days Age: NR Sex: Male: 60.6% Race/ethnicity: African American: 9.6% White: 30.3% Hispanic: 50.0% Asian: 10.1% Education: NR Low income: NR</p> <p>Neighborhood or community level: Population within 1 mile: 35,000 (SD 17,000) Race/ethnicity African American: 12.7% (SD 16.8) White: 45.4% (25.9) Hispanic 44.7% (18.5) Asian: NR SES: Households in poverty: 22.9% (SD 12.6) Other: Park in residential area: 37.5% (control parks 52.9%)</p>	<p>consultation with site visit +\$4000 for park decision-makers to use vs. parks with no additional interventions</p>		<p>Covariates not significantly associated: park size, number of staff, land-use type, temperature</p> <p>Largest increases were among children, non-Hispanic whites, with marginally significant increase among African-Americans</p> <p>Models used: Generalized linear models, mixed and fixed effects</p> <p>Other variables controlled for in study: gender, race, age, park-level characteristics (e.g., size) and time-varying covariates (e.g., temp)</p> <p>SUMMARY: Park use and energy expenditure in physical activity increased in parks provided with baseline park use information, training on outreach and park promotion, and a marketing consultation with site visit, and \$4000 to spend on park signage, programs, and promotion.</p>
<p>Author, year: Cohen et al. 2019</p>	<p>Setting: Neighborhood parks</p>	<p>Description: Park renovations in 5 parks (extent and type of renovation varied)</p>	<p>Description: Physical activity: Yes</p>	<p>Changes in number of park users and park user physical activity levels in short-term (estimated 1-3 years, longer-term</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

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Parks, Trails and Greenways																																		
<p>Location: USA: San Francisco, California</p> <p>Design: Other design with concurrent comparison</p> <p>Suitability rating: Greatest</p> <p>Intervention duration: Estimated 1-5 years following park renovation</p> <p>Intervention Study timeframe (Int to last follow up): Baseline: 2009 Wave 1: 2012 Wave 2: 2015</p> <p>Year(s) study was implemented: 2009-2015</p> <p>Quality of Execution: Fair Limitation(s): 3</p>	<p>Geographic scale: Urban (City)</p> <p>Study population: Neighborhood park users</p> <p>Eligibility and Recruitment: NR</p> <p>Sample size: SOPARC Range 3.2 to 114.5 people in park per observation period at baseline</p> <p>Reported Baseline Demographics: Individual level: NR Age: NR Sex: NR Race/ethnicity: NR Education: NR Low income: NR</p> <p>Neighborhood or community level: Population within 0.5-mile radius Range 9,735 to 30,969 Neighborhood SES Households in poverty in 0.5-mile radius Range of 7.6%-25.1%</p>	<p>Infrastructure interventions: Park-based: 1) For two parks: Renovations included new children’s play equipment, adult fitness equipment, lawn areas, new landscaping, seating areas and community gardens. 2) At three parks: Renovations included extensive changes to playground areas, adding multiple new modern play structures, landscaping and seating areas and other features such as walking paths, athletic courts and a splash pad. Some park renovations included more specialized facilities such as fitness equipment, a skate park, and recreation center. 3) All parks: site features are Americans with Disabilities Act accessible, and new rubberized safety surfacing was installed in the play equipment areas. Greenways/trails: No Playgrounds: Yes, as a component of the park renovations</p> <p>Intervention components: Programming: Yes, after-school programming was available at three of the renovated parks, also active sports facilities and/or scheduled practices and games or other classes or programs Access: NR</p>	<p>Park use: Yes</p> <p>Health, mental health, well-being: NR</p> <p>Social outcomes: NR</p> <p>Injury: NR</p> <p>Quality of life: NR</p> <p>Weight related (BMI): NR</p> <p>Environmental outcomes: NR</p> <p>Additional/other outcomes: NR</p> <p>Outcome Measurement: PA and park use Instrument: SOPARC Observations on park users and activity levels with standardized observation periods SOPARC observations of park user activity converted into average total MET-hours per observation</p>	<p>periods [estimated 3-5 years] and overall [6 years from baseline] compared to pre or no-renovation)</p> <p>Physical activity in the location: PA in MET-hours expended in park (Table 4)</p> <table border="1" data-bbox="1495 500 1921 560"> <tr> <td>Short-term</td> <td>Long-term</td> <td>Overall</td> </tr> <tr> <td>+800%</td> <td>-60%</td> <td>+636%**</td> </tr> </table> <p>**p<0.005</p> <p>Park-specific measures (Table 3) Five intervention parks Avg. total MET-hours per observation</p> <table border="1" data-bbox="1495 738 1879 917"> <tr> <td>Parks</td> <td>Baseline 2009</td> <td>Post 2015</td> </tr> <tr> <td>HV</td> <td>11.6</td> <td>20.4</td> </tr> <tr> <td>WS</td> <td>278.6</td> <td>481.2</td> </tr> <tr> <td>BAP</td> <td>140.1</td> <td>272.2</td> </tr> <tr> <td>MP</td> <td>112.7</td> <td>199.1</td> </tr> <tr> <td>BOP</td> <td>28.5</td> <td>135.9</td> </tr> </table> <p>One comparison park</p> <table border="1" data-bbox="1495 966 1879 1031"> <tr> <td>Park</td> <td>Baseline 2009</td> <td>Post 2015</td> </tr> <tr> <td>HP</td> <td>67.5</td> <td>37.4</td> </tr> </table> <p>Park use Park-specific measures of average number of users (Table 3)</p> <p>Playground areas in the five parks 2009 (Baseline): 368 users 2015 (Post): 1226 users Seating areas only of five parks 2009 (Baseline): 219 users 2015 (Post): 757 users</p> <p>Use of five intervention parks</p>	Short-term	Long-term	Overall	+800%	-60%	+636%**	Parks	Baseline 2009	Post 2015	HV	11.6	20.4	WS	278.6	481.2	BAP	140.1	272.2	MP	112.7	199.1	BOP	28.5	135.9	Park	Baseline 2009	Post 2015	HP	67.5	37.4
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Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results																																																
Parks, Trails and Greenways																																																				
		<p>Promotion: NR Community engagement: Yes, park users participated in the design process, giving input on potential site features</p> <p>Exposure Measurement Park residents and users considered exposed</p> <p>Comparison: NA - No park renovations</p>		<p>Avg. number of people/observation period</p> <table border="0" data-bbox="1495 354 1829 526"> <tr> <td></td> <td style="text-align: center;">Baseline 2009</td> <td style="text-align: center;">Post 2015</td> </tr> <tr> <td>HV</td> <td style="text-align: center;">3.2</td> <td style="text-align: center;">10.2</td> </tr> <tr> <td>WS</td> <td style="text-align: center;">114.5</td> <td style="text-align: center;">187.5</td> </tr> <tr> <td>BAP</td> <td style="text-align: center;">61.9</td> <td style="text-align: center;">124.8</td> </tr> <tr> <td>MP</td> <td style="text-align: center;">44.0</td> <td style="text-align: center;">90.3</td> </tr> <tr> <td>BOP</td> <td style="text-align: center;">14.6</td> <td style="text-align: center;">54.5</td> </tr> </table> <p>Use of one comparison park</p> <table border="0" data-bbox="1495 586 1818 643"> <tr> <td></td> <td style="text-align: center;">Baseline 2009</td> <td style="text-align: center;">Post 2015</td> </tr> <tr> <td>HP</td> <td style="text-align: center;">24.1</td> <td style="text-align: center;">20.7</td> </tr> </table> <p>Community guide calculated relative % change by combining the intervention 5 parks and comparing use to the 1 control park Relative % change: 119.3%</p> <p>Overall summary results by follow-up period (Table 4)</p> <table border="0" data-bbox="1495 906 1995 1078"> <tr> <td></td> <td style="text-align: center;">Short-term</td> <td style="text-align: center;">Long-Term</td> <td style="text-align: center;">Overall</td> </tr> <tr> <td>Number users</td> <td style="text-align: center;">+580%</td> <td style="text-align: center;">-53%</td> <td style="text-align: center;">+480% **</td> </tr> <tr> <td>Subset children</td> <td style="text-align: center;">+600%</td> <td style="text-align: center;">-37%</td> <td style="text-align: center;">+530%**</td> </tr> <tr> <td>Subset teens</td> <td style="text-align: center;">+24%</td> <td style="text-align: center;">-75%</td> <td style="text-align: center;">-12%NS</td> </tr> <tr> <td>Subset adults</td> <td style="text-align: center;">+535%</td> <td style="text-align: center;">-44%</td> <td style="text-align: center;">+460%**</td> </tr> <tr> <td>Subset seniors</td> <td style="text-align: center;">+73%</td> <td style="text-align: center;">-64%</td> <td style="text-align: center;">+35%NS</td> </tr> </table> <p>Models used: Transformed average difference-in-differences in outcomes from parks post renovation compared to parks pre or no-renovation</p> <p>Other variables controlled for in study analyses: Park size, population density and neighborhood poverty level within 0.5 miles of park</p>		Baseline 2009	Post 2015	HV	3.2	10.2	WS	114.5	187.5	BAP	61.9	124.8	MP	44.0	90.3	BOP	14.6	54.5		Baseline 2009	Post 2015	HP	24.1	20.7		Short-term	Long-Term	Overall	Number users	+580%	-53%	+480% **	Subset children	+600%	-37%	+530%**	Subset teens	+24%	-75%	-12%NS	Subset adults	+535%	-44%	+460%**	Subset seniors	+73%	-64%	+35%NS
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Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
				<p>SUMMARY: Park renovations resulted in significant increases in both park use and total MET hours. However, most increases were in the short term follow up period (3 years) rather than the longer follow up period (6 years). There were also significant differences in park usage by age (with use by children and adults increasing, while there was little change in use by teens and seniors).</p>
<p>Author, year: Cranney et al. 2016</p> <p>Location: Sydney, Australia</p> <p>Design: Time-series</p> <p>Suitability rating: Moderate</p> <p>Intervention duration: 9 months (post installation to f/u)</p> <p>Study timeframe (Int to last follow up): 9 months (baseline to f/u was 12m)</p> <p>Year(s) study was implemented: December 2012-February 2014</p> <p>Quality of Execution: Fair Limitation(s): 3</p>	<p>Setting: Park (16 hectares in size with direct access to a beach, picnic shelters, a skate park, and children’s playground)</p> <p>Geographic scale: Suburban (1 park)</p> <p>Study population: Park users, outdoor gym users</p> <p>Eligibility and Recruitment: Use of outdoor gym and/or other areas during specified hours</p> <p>Sample size: Independent samples at each of three observation periods N park users Baseline: 8560 Post-installation: 7097 Follow-up: 8248</p>	<p>Description: Addition of an outdoor gym facility to an existing park</p> <p>Park-based: Yes, gym installed on a rubber surface with multiple equipment pieces placed in a circuit targeting aerobic fitness limb strength, and balance/flexibility within the park Greenways/trails: No Playgrounds: No</p> <p>Intervention components: Programming: No Access: No Promotion: Yes, promotional campaign targeted to older adults including exercise demonstration sessions, promotional materials: “How to Use an Outdoor Gym Guide” Community engagement: No</p> <p>Exposure measurement: Observed park use; observed gym use</p> <p>Comparison: NA</p>	<p>Description: Physical activity: Yes Park use: Yes Health, mental health, well-being: NR Social outcomes: NR Injury: NR Quality of life: NR Weight related (BMI): NR Environmental outcomes: NR Additional/other outcomes: NR</p> <p>Outcome Measurement: Observed and categorized level of physical activity in park or gym and use of park or gym Instrument: SOPARC 15 pre-determined target observation areas (including</p>	<p>Physical activity in the location: Proportion of observed park users engaged in moderate to vigorous physical activity (Figure 2) Baseline (n=804 of 8560): 9.4% 3 months Int post (n=911 of 7097): 12.8% 6 months post installation Int F/u (n=859 of 8248): 10.4%</p> <p>Change in proportion at follow-up: +1.0 pct pts (95% CI 0.1, 1.9) p=NR (NS) Relative change: +10.6%</p> <p>Subset analyses on MVPA (Table 2) significant for seniors +3.5 pct pts (95%CI 1.6, 5.4) p<0.001 but the absolute numbers were small (11 at baseline, 34 at f/u); also report analysis by sex, and for children and adults separately</p> <p>Park use: Observed Park Use (unclear if total observation times were equivalent by period. Unclear if non-park factors were equivalent by period).</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	<p>Reported Baseline Demographics: (based on observed park users) Individual level: Age (mean): NR Children: 29.9% Adults: 62.0% Seniors: 8.2% Sex: Female: 46.1%; Male: 54.0% Race/ethnicity: NR Education: NR Low income: NR</p> <p>Neighborhood or community level: NR</p>	<p>Time series points: 9 data collection periods (3 each at 3 observation periods) Pre-installation: Dec 2012-Feb 2013 Immediate post March -May 2013 Follow-up Dec. 2013-Feb 2014</p>	<p>gym, walkway, playground, skatepark) taken 4 times a day</p> <p>PA assessed with validated 3Q PA which includes the number of sessions of walking (≥30 min), moderate activity (≥30 min) and vigorous activity (≥20 min)</p>	<p>Baseline Pre: 8560 3 months Post: 7097 6 months F/u: 8248 Change total number of observed park users during observation periods (pre to follow-up): -312 (95% CI NR) p=NR Relative change at follow-up: -3.6% (95% CI NR) p=NR</p> <p>Models used: NA</p> <p>Other variables controlled for in study: NR, but two sample z- tests also looked at park users' age, gender, and use of gym area</p> <p>SUMMARY: The addition of an outdoor gym to an existing beach-view park along with a marketing campaign did not increase park use at 9-month f/u. MVPA among park users increased significantly immediately after gym installation, but only slightly at 9-month f/u.</p>
<p>Author, year: Cummins et al. 2018</p> <p>Location: London, UK</p> <p>Design: Before/after with comparison</p> <p>Suitability rating: Greatest</p> <p>Intervention duration:</p>	<p>Setting: Parks and greenway/trails London Boroughs: Newham (intervention site), Barking & Dagenham, Tower Hamlets and Hackney (comparison sites)</p> <p>Geographic scale: Urban and suburban (4 Boroughs)</p>	<p>Description: Urban regeneration primarily associated with the redevelopment of the UK Olympic Park for legacy use.</p> <p>Infrastructure interventions: Park-based: Yes see below Greenways/trails: Yes see below Playgrounds: No Urban greening: Yes see below</p> <p>2012-2014 Olympic Park area: Regenerated land (246 hectares)</p>	<p>Description: Physical activity: Yes adolescents and adults in the park</p> <p>Park use: Yes (Wave 3, Post only)</p> <p>Health, mental health, well-being: Yes</p> <p>Social outcomes: NR</p>	<p>Meeting recommended levels of PA: Baseline (wave 1) 6-month follow-up (wave 2) 18-month follow up (Wave 3)</p> <p>Percentage of parents/carers meeting the weekly recommendation of ≥ 150 minutes of vigorous or moderate exercise a week (Table 25)</p> <p>Baseline Int (n=NR): 79.9% Comp (n=NR): 81.6%</p>

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>All regeneration activities took place between 2011-2014; Building of green spaces and improved connectivity between surrounding areas occurred between 2012-2014</p> <p>Study timeframe (Int to last follow up): Baseline: January-July 2012 (prior to Olympic Games) 18-month follow-up (2014)</p> <p>Year(s) study was implemented: 2012-2014</p> <p>Quality of Execution: Fair Limitation(s): 3</p>	<p>Study population: Estimated combined population of 1.25 million, who are significantly more disadvantaged than the London average</p> <p>Eligibility and Recruitment: Residents living in the intervention area receiving regeneration and those living in adjacent areas not receiving urban regeneration</p> <p>Inclusion: Participants who were pupils aged 11–12 (school year 7) attending randomly selected schools in the intervention and comparison boroughs and their parents/carers.</p> <p>Exclusion: Special-needs schools and Pupil Referral Units, pupils attending the index school who reside outside the school's borough</p> <p>Sample size: Number of total eligible schools: Newham, N=14; Tower Hamlets, N=14; Hackney, N=11</p>	<p>comprising new green spaces and parkland, public space, and play areas; world-class sports venues (i.e., main stadium, aquatics center, velodrome, bicycle motocross and mountain bike tracks, road cycle route), and associated facilities</p> <p>2012-2014 Olympic Fringe: Fringe surrounding the Olympic Park planned to receive 90 hectares of improved green/civic space and connectivity to the main Olympic Park</p> <p>Intervention components: Programming: No Access: Yes, improved physical connectivity and accessibility to the Olympic Park from surrounding areas (i.e., foot and cycle paths, bridges, waterways, road and rail links); new housing associated with the former Athletes village (East Village) Promotion: No Community engagement: No</p> <p>Exposure measurement: Residents in intervention borough considered exposed</p> <p>Comparison: No intervention in 3 other boroughs</p>	<p>Injury: NR</p> <p>Quality of life: NR</p> <p>Weight related (BMI): NR</p> <p>Environmental outcomes: NR</p> <p>Additional/other outcomes: NR</p> <p>Outcome Measurement: Physical activity Instrument: 1) Adolescents - Physical activity & sedentary behavior Youth Physical Activity Questionnaire (Y-PAQ) 2) Adults - Recent Physical Activity Questionnaire (R-PAQ) 3) Weekly recommendation of ≥ 150 minutes of vigorous or moderate exercise a week</p> <p>Health, mental health, well-being Instrument: Adolescents 1) The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) 2) Moods and Feelings Questionnaire (MFQ) 3) Multidimensional Scale of Perceived Social Support (MSPSS) Parents/carers</p>	<p>18-month follow-up Int (n=NR): 82.9% Comp (n=NR): 81.5% Change in proportion: 3.1 pct pts (p=NR) Relative % change: +4%</p> <p>Other measures of physical activity: Adjusted relative RRs (95% CI) for intervention for physical activity per day relative to meeting recommendation of doing < 2 hours of screen time and < 1 hour of physical activity per day from wave 1 to wave 3 (Table 20)</p> <p>Remained inactive: RR=0.83 (0.58, 1.17) Became active: RR=1.22 (0.88, 1.69) Became inactive: RR=0.93 (0.71, 1.22)</p> <p>Park use: How often do you visit the Olympic Park (Wave 3, post-only after improvements), (Table 19) Number of responses (n = 2254) Never visited 1243 Less than once a month 572 More than once a month 214</p> <p>Health, mental health, well-being outcomes (see Appendix A at bottom of document)</p> <p>Models used: Multilevel linear and logistic regression (multivariate)</p> <p>Other variables controlled for in study: Age, gender, borough, ethnicity, BMI, general health, long-term illness, free school meals, home language,</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	<p>and Barking & Dagenham, N=9. Schools were selected through simple randomization within each borough.</p> <p>Sample Sizes Baseline Intervention: n=893 Control: n=2195</p> <p>Parent/carer cross-sectional sample by borough Intervention: n=389 Control: n=856</p> <p>Baseline completion rate: 50% First follow-up: 60% Second follow-up: 80%</p> <p>Reported Baseline Demographics: Individual level (total sample): Reported in Table 3 Age (range) : 11-12 years at baseline Sex: Female: 44.4%; Male: 56.6% Race/ethnicity: (Racial categories broken down further by ethnicity/nationality in Cummins 2018 paper) White: 44.9% Asian: 24.3%</p>		<p>Hospital Anxiety and Depression Scale (HADS)</p>	<p>household composition and days between surveys (adjusted relative RRs for PA)</p> <p>SUMMARY: The urban regeneration associated with the London 2012 Olympic Games showed no significant changes in physical activity as a result of the intervention in adolescents at 6 months or at 18 months (males or females) in the intervention borough compared with the control boroughs. No effects on physical activity or sedentary behavior were observed for parents/carers.</p> <p>Results also showed no positive influence on changes in adolescent mental health in terms of depressive symptoms or well-being. Attending school in the intervention borough was associated with a greater chance of maintaining depressive symptoms at follow-up.</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	Black: 24.6% Other: 5.3% Education: NR Low income: Parents' employment status: Both unemployed: 10.4% One employed: 35.1% Both employed: 39.3% Single parent employed: 8.8% Single parent unemployed: 6.5% Neighborhood or community level: NR			
<p>Author, year: Droomers et al. 2016 (See Gubbels et al. 2016 for subset analyses of adolescents and adults)</p> <p>Location: The Netherlands</p> <p>Design: Other design with concurrent comparison</p> <p>Suitability rating: Greatest</p> <p>Intervention duration: Sustained but evaluated 3 years or less</p>	<p>Setting: Neighborhoods, nationwide (including parks, greenway/trails)</p> <p>Geographic scale: Urban and suburban</p> <p>Study populations: Deprived neighborhoods funded for improvements to employment, education, housing, residential environment, social cohesion, and safety N=40 funded deprived neighborhoods (4 dropped from study leaving 36)</p>	<p>Description: Dutch national program to fund community action plans to improve the built and social environments in the 40 most deprived neighborhoods</p> <p>Improvements in each neighborhood were different and included employment, education, housing, environment, social cohesion and safety (Interventions were implemented 2008-2012)</p> <p>Infrastructure interventions: Park-based: Yes, new public parks replacing vacant land and redeveloping/refurbishing existing parks including more recreational opportunities Greenways/trails: Yes, improvement of trails</p>	<p>Description: Physical activity: Yes Park use: NR Health, mental health, well-being: Yes, self-assessed good health Social outcomes: NR Injury: NR Quality of life: NR Weight related: NR Environmental outcomes: NR Additional/other outcomes: NR Outcome Measurement:</p>	<p>Other measures of PA: Absolute proportions for most comparisons are not reported in the paper</p> <p>Any green intervention neighborhoods versus control deprived neighborhoods in same municipality comparison results are plotted in Figure 1 and estimated change in proportions are reported here.</p> <p>Leisure time walking at least once per week Baseline: 2004-2008 Int (n=24 districts): 62% Comp (n=NR): 57% follow-up maximum of 3 years 2008-2011 Int (n=24 districts): 66% Comp (n=NR): 67% Change in proportion: -3 percentage points (95% CI NR) p=NR (not significant)</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results								
Parks, Trails and Greenways												
<p>Study timeframe (Int to last follow up): 3 years or less</p> <p>Year(s) study was implemented: 2004-2011</p> <p>Quality of Execution: Fair Limitation(s): 4</p>	<p>Number of neighborhoods: Any green additions or improvements: 24 Green for use 18 Greenery 6 No greenery 12</p> <p>Dutch National Health Survey respondents in study neighborhoods</p> <p>Eligibility and Recruitment: Recruited deprived neighborhoods Respondents < 18 years excluded</p> <p>Sample size: 40 neighborhoods funded; 36 in this study</p> <p>Dutch National Health Surveys in 2004-2008 and 2008-2011 Non-response rate: 35-40% Overall N=48,132 respondents</p> <p>Intervention arms 1,018 participants in 24 intervention neighborhoods</p> <table border="0" data-bbox="405 1307 703 1429"> <tr> <td>Neigh.</td> <td>Participants</td> </tr> <tr> <td>18 green use</td> <td>870</td> </tr> <tr> <td>6 greenery</td> <td>248</td> </tr> <tr> <td>12 no green int</td> <td>229</td> </tr> </table>	Neigh.	Participants	18 green use	870	6 greenery	248	12 no green int	229	<p>Playgrounds: Yes, development of a playground (with water features) Urban greening: Yes, community gardens, vacant lots greened, landscaping (attractiveness and safety)</p> <p>Intervention components: Programming: No Access: Yes, redevelopment improved the green character of that area, the path structure, and connection with public areas Promotion: No Community engagement: Yes, neighborhood engagement to develop action plan</p> <p>Exposure measurement: Neighborhood residence</p> <p>Comparison: Different comparisons were evaluated. This assessment focuses on “similarly deprived control areas in same municipality (wide definition)”</p> <p>Intervention arm: Green for use Intervention arm: Greenery for character Comparison arm: No green interventions</p> <p>Park-based: 9 neighborhoods: new public parks replacing vacant land, thereby adding new green space</p>	<p>Physical activity Instrument: Short Questionnaire to Assess Health Enhancing Physical Activity (SQUASH) questionnaire measured frequency (days per week) and duration (minutes per day) of leisure time used for walking, cycling and sports during a typical week (self-reported PA), compared residents who are active at least once a week and residents who are not active</p> <p>Self-reported assessed health as good</p>	<p>Relative % change: -11% Trend regression coefficient: 0.04 (95%CI -0.10 to 0.18) NS</p> <p>Leisure time cycling at least once per week Baseline: 2004-2008 Int (n=24 districts): 37% Comp (n=NR): 39% follow-up maximum of 3 years 2008-2011 Int (n=24 districts): 40% Comp (n=NR): 55% Change in proportion: -13 percentage points (95% CI NR) p=NR Relative change = -33% Trend regression coefficient: 0.00 (95%CI -0.06 to 0.07) NS</p> <p>Leisure time sports at least once per week Baseline: 2004-2008 Int (n=24 districts): 33% Comp (n=NR): 43% follow-up maximum of 3 years 2008-2011 Int (n=24 districts): 35% Comp (n=NR): 44% Change in proportion: +1 percentage points (95% CI NR) p=NR Relative change = 4% Trend regression coefficient: -0.03 (95%CI -0.10 to 0.04) NS</p> <p>Self-reported assessed general health as “Good” (see Appendix A at bottom of document)</p>
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Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	<p>Comparison (deprived control areas in same municipality) 3344</p> <p>Reported Baseline Demographics: Minimal details provided regarding respondents to the Dutch National Health Interview Surveys for 2004-2011</p> <p>Individual level: NR Age: NR Sex: NR Race/ethnicity: NR Education: NR Low income: NR</p> <p>Neighborhood or community level: NR</p>	<p>9 neighborhoods: redeveloped and refurbished existing parks by adding more open areas for playing and recreation, as well as improving the paths and tracks (accessibility), drainage (usability), landscaping (attractiveness and safety) and maintenance (safety)</p>		<p>Models used: Generalized mixed models to assess the rate of change and to estimate the linear trend in prevalence of physical activity and good health</p> <p>Other variables controlled for in study: Age, sex, household composition, ethnicity, education, household income, number of interventions</p> <p>SUMMARY: Funded greening interventions (including new, redeveloped, refurbished parks) in deprived neighborhoods in Holland were not associated with self-reported changes in measures of physical activity or assessed health status over variable exposure periods up to 3 years.</p>
<p>Author, year: Evenson et al. 2005</p> <p>Location: USA: Durham, North Carolina</p> <p>Design: Before/after without a comparison</p> <p>Suitability rating: Least</p> <p>Intervention duration: Sustained, but f/u was 2 months after opening</p>	<p>Setting: Trail and trail adjacent neighborhoods in the community</p> <p>Geographic scale: City (urban and suburban but not specifically reported)</p> <p>Study population: Adult residents living within 2 miles of trail location</p> <p>Eligibility and Recruitment:</p>	<p>Description: New trail extension as part of a rails-to-trails conversion</p> <p>-Existing 3.2-mile segment completed in 2000</p> <p>-New construction added 2.8 miles with 2.0-mile spur</p> <p>-Paved 10ft wide multi-use trails</p> <p>Infrastructure interventions: Park-based: No Greenways/trails: Yes, new construction included multiple access points and passed two schools, shopping areas, apartment buildings, and</p>	<p>Description: Physical activity: Yes</p> <p>Trail use: Yes</p> <p>Health, mental health, well-being: NR</p> <p>Social outcomes: NR</p> <p>Injury: NR</p> <p>Quality of life: NR</p> <p>Weight related (BMI): Yes, not shown</p>	<p>Total physical activity: Self-reported moderate level physical activity in minutes per week median reported (Table 3 results)</p> <p>Baseline Pre (n=336): 135 min/wk. (IQI: 60-240)</p> <p>19-28-month follow-up Post (n=336): 120 min/wk. (IQI 50-225)</p> <p>Change in mean difference or proportion: -15 minutes per week (95% CI: NR) p=0.08</p> <p>Self-reported vigorous-level physical activity in minutes per week median reported (Table 3 results)</p> <p>Baseline Pre (n=352): 35 min/wk. (IQI 0-120)</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>Study timeframe (Int to last follow up): 2 months post intervention; 2 years post baseline</p> <p>Year(s) study was implemented: 2000-2002</p> <p>Quality of Execution: Fair Limitation(s): 4</p>	<p>Adult resident living within 2 miles of trail location at baseline and at f/u Excluded if moved away from trail neighborhood</p> <p>Sample size: N=2125 contacted Baseline N=685 (32%) F/u N=436 (64%) of 685 Analysis: N=366 (53%) of 685</p> <p>Reported Baseline Demographics: (reported for intervention) N=366 at 2 yr. f/u Individual level: Age: 18-29 8.9% 30-39 25% 40-49 23.6% 50-64 29.4% >65 13.1% Sex: Female: 64.7%; Male: 35.3% Race/ethnicity: Non-Hispanic white: 58.5% Non-Hispanic black: 34.2% Other: 7.4% Education: <12 years: 9.7% 13-15 years: 15.2%</p>	<p>neighborhood subdivisions covering 11 census tracts Playgrounds: No</p> <p>Intervention components Programming: No Access: Yes, enhanced access points to trails connecting school residential and retail Promotion: No Community engagement: No</p> <p>Exposure measurement: Living within 2 miles of trail location</p> <p>Comparison: NA</p> <p>Intervention - Before trail completion to 2 months after trail completion</p> <p>Baseline conducted mostly in summer/fall of 2000 and continuing through April 2001. Follow-up conducted in November 2002.</p>	<p>Environmental outcomes: NR</p> <p>Additional/other outcomes: Yes, neighborhood safety, general health (not shown)</p> <p>Outcome Measurement: PA and park use Instrument: Telephone survey - Behavioral Risk Factor Surveillance System (BRFSS) Self-reported physical activity and locations of activity for leisure activity, walking and bicycling, moderate and vigorous physical activity, transportation activity</p>	<p>19–28-month follow-up Post (n=352): 0 min/wk. (IQI 0-80) Change in mean difference or proportion: -35 min/wk. (95% CI NR) p=<0.0001</p> <p>Other measures of PA Self-reported leisure activity in minutes per week median reported (Table 3 results) Pre (n=363): 165 min/wk. (IQI 60-280) 19–28-month follow-up Post (n=363): 170 min/wk. (IQI 60-270) Change in mean difference or proportion: +5 min/wk. (95% CI NR) p=0.19</p> <p>Total walking, walking for transportation, bicycling, bicycling for transportation (see Appendix A)</p> <p>Odds ratios of participants who ever used trail (Table 4)</p> <p>No overall physical activity change outcomes were statistically significant on multivariable logistic modeling (Table 4)</p> <p>Subset analyses on trail users: Participants who used the trail were less likely to increase their walking by 30 or 45 minutes per week from baseline. Participants who used the trail were also more likely to decrease their bicycling time from baseline (note - low prevalence of bicycling)</p> <p>Park use: Self-reported ever use of trail at follow-up (2 months) Used it at least once: 23.9%</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	<p>>16 years: 75.1% Employment Yes: 70.5% No: 29.5% Low income: NR</p> <p>Neighborhood or community level: Population Race/ethnicity: Black: 41.2% White: 47.3% SES (i.e., poverty): NR HS education 91.5%</p>			<p>Had not heard about new trail: 11.3%</p> <p>At baseline, 61.3% reported any walking, jogging, or biking trails in their neighborhood, and at follow-up 66.9% Change in proportion: 5.6 pct pts Relative % change: 9.1%</p> <p>Models used: Multivariable logistic models</p> <p>Other variables controlled for in study: age, general health, gender, marital status, overweight/obese, race/ethnicity, work status, trail adjacent home, crime perception, average temperatures, education, distance from trail</p> <p>SUMMARY: Telephone survey of adults living within 2 miles of a new trail extension did not find significant improvements in any measure of physical activity. Follow-up survey was only 2 months after the opening of the trail, and use rates were low.</p>
<p>Author, year: Fitzhugh et al. 2010</p> <p>Location: USA: Knoxville Tennessee</p> <p>Design: Before/after with a comparison</p> <p>Suitability rating: Greatest</p>	<p>Setting: Neighborhood with an urban greenway/trail retrofit (For active transport to school two elementary and one high school)</p> <p>Geographic scale: Urban</p> <p>Study population: Neighborhood</p>	<p>Description: A neighborhood was retrofit with an urban greenway/trail to connect the pedestrian infrastructure with nearby retail establishments and schools (8-foot-wide and 2.9-mile-long asphalt greenway)</p> <p>Infrastructure interventions: Park-based: No Greenways/trails: Yes, infrastructure (renovations)</p>	<p>Description: Physical activity: Yes Park use: NR Health, mental health, well-being: NR Social outcomes: NR Injury: NR Quality of life: NR</p>	<p>Total physical activity: 2-hour physical activity (median) counts in neighborhood of total physical activity (walking and cycling) Int (n=NR): 4.5 Comp (n=NR): 3.0 14-month follow-up Int (n=NR): 13.0 Comp (n=NR): 1.0 Change in median difference: +10.5 counts/2 hrs. (p=0.001) Pedestrian (p=0.001), cycling (p=0.038) Relative % change: +256%</p>

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>Intervention duration: 14 months</p> <p>Study timeframe (Int to last follow up): 14 months (24 months baseline data collection and the follow-up data collection)</p> <p>Year(s) study was implemented: March 2005 and Dec 2007</p> <p>Construction of the greenway/trail ended in December 2005 (Begin in May 2005)</p> <p>Quality of Execution: Fair Limitation(s): 3</p>	<p>participants (all ages) and school-aged youth</p> <p>Eligibility and Recruitment: Identified 5 candidate neighborhoods that matched the intervention neighborhood (and 2 control neighborhoods selected)</p> <p>Sample size: 2590 people per square mile</p> <p>Reported Baseline Demographics: Individual level: Age: NR Sex: NR Race/ethnicity: NR Education: NR Low income: NR</p> <p>Neighborhood or community level (intervention group): Race/ethnicity: Black or African American: 6.9% SES: Less than high school education: 9.3% Median household income (\$): 36563 Unemployed: 5.6% Other: Female 50.2% Median age: 30.0 years</p>	<p>including improved pedestrian greenway/trail construction Playgrounds: No</p> <p>Intervention components: Programming: No Access: Enhanced connectivity to retail establishments and schools (provide pedestrian-friendly links among residences, businesses, schools, and other public spaces) Promotion: No Community engagement: No</p> <p>Exposure measurement: Unclear</p> <p>Comparison: Two control neighborhoods</p> <p>For ATS Intervention: Two elementary and one high school</p>	<p>Weight related (BMI): NR</p> <p>Environmental outcomes: NR</p> <p>Additional/other outcomes: NR</p> <p>Outcome Measurement: Physical activity Instrument: Direct observation of counts of pedestrians, cyclists, and individuals performing other forms of physical activity (e.g., skateboarding) in neighborhood Direct observation at school (school-aged youth) observed in active travel to or from school ATS)</p>	<p>Author suggested calculation (Net difference by Community Guide): 12 hours per day, then a total daily increase in physical activity of 60 counts</p> <p>Other measures of PA: 2-hour physical activity (median) counts of active transport to school Int (n=NR): 8.5 Comp (n=NR): 30.0 14-month follow-up Int (n=NR): 9.0 Comp (n=NR): 19.0 Change in mean difference: +11.5 counts/2 hrs. p=0.2061 (No change in intervention but decrease in control with high baseline)</p> <p>Author suggested calculation (Net difference by Community Guide): 12 hours per day, then increase in active transport to school of +69 counts</p> <p>Models used: NR but statistical analysis included Fisher’s exact tests, Wilcoxon rank sums</p> <p>Other variables controlled for in study: NR</p> <p>SUMMARY: Addition of a greenway/trail retrofit infrastructure significantly increased total physical activity in the intervention neighborhood compared to control.</p> <p>Addition of a greenway/trail retrofit infrastructure showed a non-significant</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results						
Parks, Trails and Greenways										
				increase in active transport to school in the intervention neighborhood compared to control.						
<p>Author, year: Frank et al. 2019</p> <p>Location: Vancouver, Canada</p> <p>Design: Prospective cohort</p> <p>Suitability rating: Greatest</p> <p>Intervention duration: Ongoing</p> <p>Study timeframe (Int to last follow up): 2 years (Baseline)</p> <p>Year(s) study was implemented: 2012-2015</p> <p>Quality of Execution: Fair Limitation(s): 4</p>	<p>Setting: Greenway/trail with street-level improvements</p> <p>Geographic scale: Urban (City, neighborhood)</p> <p>Study population: Residents within 1km of greenway</p> <p>Eligibility and Recruitment: Mailing recruitment with small incentives for participation Resident with no plans to move out of area during study period Exclusion: Lost to f/u</p> <p>Sample size: N=1744 recruitment mailings N=1113 recruited at baseline N=524 (47%) of 1113 at analysis</p> <table border="1" data-bbox="405 1312 701 1377"> <tr> <td></td> <td>Inter</td> <td>Comp</td> </tr> <tr> <td>N</td> <td>239</td> <td>285</td> </tr> </table>		Inter	Comp	N	239	285	<p>Description: Comox-Helmcken Greenway retrofit of a city street to enhance the corridor for use by cyclists and pedestrians. Connects parks, schools, community centers, neighborhoods, and retail.</p> <p>Infrastructure interventions: Park-based: No, but park-connected Greenways/trails: Yes, greenway infrastructure (corridor) for active transportation for cyclists and pedestrians, mix of cycling facilities and other streetscape improvements: one-way shared on-street with counterflow lanes; one-way protected; and two-way shared on-street Playgrounds: No</p> <p>Intervention components: Programming: No Access: Yes, greenway included multiple connections in the community (e.g., parks, schools) Promotion: No Community engagement: No</p> <p>Exposure Measurement Objective: Distance from greenway Instrument: GIS, address</p>	<p>Description: Physical activity: Yes</p> <p>Park use: NR</p> <p>Health, mental health, well-being: NR</p> <p>Social outcomes: NR</p> <p>Injury: NR</p> <p>Quality of life: NR</p> <p>Weight related (BMI): NR</p> <p>Environmental outcomes: NR</p> <p>Other: Sedentary behavior</p> <p>Outcome Measurement Instrument: International Physical Activity Questionnaire-Short Form (IPAQ-SF) survey used to measure minutes of MVPA</p> <p>Engaged in both utilitarian and recreational moderate and vigorous activity in the past seven days, active if they achieved average of 20 min daily of MVPA</p>	<p>Total physical activity: Self-reported physical activity (minutes of moderate to vigorous physical activity/day) Baseline Int (n=239): 51.9 minutes MVPA/day Comp (n=285): 58.7 minutes MVPA/day 24-month follow-up Int (n=239): 62.9 minutes MVPA/day Comp (n=285): 52.8 minutes MVPA/day Change: +16.9 minutes MVPA/day</p> <p>Meeting recommended levels of PA Self-reported physical activity categorized into proportion of participants achieving 20 minutes or more of MVPA day Baseline Int (n=239): 67.6% Comp (n=285): 68.7% 24-month follow-up Int (n=239): 69.4% Comp (n=285): 60.8% Change: +9.7 percentage points Relative % change: +14%</p> <p>Adjusted analyses Odds ratio (95%CI) N=484 MVPA > 20 min/day: OR=2.00 (95%CI 1.00, 3.98) Strongest effect for residents living within 100m of greenway</p> <p>Models used: Mixed effects logistic regression with a random intercept</p>
	Inter	Comp								
N	239	285								

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	<p>Reported Baseline Demographics: Individual Level (intervention group): Age (mean): 46.2 yrs. Sex: Female: 55.3% Race/ethnicity: white: 86.2% Education: post-secondary 72.0% Low income: NR SES-employed: 73%</p> <p>Neighborhood or community level: NR</p>	<p>Comparison: Resident participants living more than 300m from greenway (>300m to 500m)</p> <p>Other assessments: Proximity to greenway 100 meters 200 meters 300 meters 400 meters 500 meters</p>	<p>IPAQ-SE self-reported sedentary time (see Appendix A)</p>	<p>(interaction term greenway exposure x time)</p> <p>Other variables controlled for in study: age, gender, ethnicity-white, employment status, educational attainment, number of household children, weather-mean temperature</p> <p>SUMMARY: Residents living within 300meters of a new urban greenway increased self-reported MVPA and reduced self-reported sedentary behavior over 2 years compared to residents living more than 300m from the intervention in a longitudinal study.</p>
<p>Author, year: Goodman et al. 2014 (Brand et al. 2014 Environmental outcomes)</p> <p>Location: United Kingdom (3 sites) -Cardiff -Kenilworth -Southampton</p> <p>Design: Prospective cohort</p> <p>Suitability rating: Greatest</p> <p>Intervention duration: 1-2 years</p>	<p>Setting: Neighborhoods around infrastructure changes</p> <p>Geographic scale: Three cities and surrounding communities (mostly urban and suburban areas)</p> <p>Study population: Residents recruited for survey and follow-up</p> <p>Eligibility and Recruitment: Responded to mailed survey and f/u surveys Lived within 5km of study infrastructure project</p>	<p>Description: Three different walking and cycling infrastructure improvements in 3 cities: traffic-free bridge over Cardiff bay; traffic-free bridge over busy truck road; riverside footpath converted into a boardwalk</p> <p>Infrastructure interventions: Park-based: No Greenways/trails: Yes. footpath converted to boardwalk infrastructure improvement Playgrounds: No</p> <p>Intervention components: Programming: No Access: Yes, enhancements to connections and feeder routes in the 3 cities Promotion: Yes, promotion of new infrastructure (modest)</p>	<p>Description: Physical activity: Yes Park use: Yes (rates) Health, mental health, well-being: NR Social outcomes: NR Injury: NR Quality of life: NR Weight related (BMI): NR Environmental outcomes: Yes (Brand et al. 2014 study estimated Co2 emission changes associated with PA differences; see Appendix A)</p>	<p>Total Physical Activity: Total past-week walking and cycling (combined from transport and recreational surveys) Change in minutes per week per kilometer closer to the infrastructure (Table 3)</p> <p>Baseline Int (n=NR): NR Comp (n=NR): NR 12-24-month follow-up (Year 2 survey) Int (n=NR): NR Comp (n=NR): NR Change in mean difference or proportion: NR (95% CI) p=NR</p> <p>Adjusted linear regression estimate: +15.3 minutes per week total walking and cycling per kilometer closer to infrastructure (95%CI 6.5, 24.2)</p>

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>Study timeframe (Int to last follow up): 1-2 years</p> <p>Year(s) study was implemented: 2010-2012</p> <p>Quality of Execution: Fair Limitation(s): 2</p>	<p>Sample size: N=22,500 mailings (16% participation rate) N=3516 baseline N=1796 (51%) year 1 N=1465 (42%) year 2</p> <p>Reported Baseline Demographics: Individual level: Year 2 sample (n=1465, total sample) Age categories (%): 18-34 9.7% 35-49 19.9% 50-64 35.5% 65-89 34.9% Sex: Female: 56.7%; Male: 43.3% Race/ethnicity: UK White: 96.9% Non-white: 3.1% Education: UK Tertiary or equiv.: 39.5% Secondary school: 32.8% None/other: 27.7% Low income: (annual household <20k L UK): 34.3% Working: 49.2% Retired: 40.3%</p> <p>Neighborhood or community level: NR</p>	<p>Community Engagement: No</p> <p>Exposure measurement: Proximity to the study infrastructure</p> <p>Comparison: Greater distance from the infrastructure (>4km) Linear regression using the following categories of distance from infrastructure: <1km; 1-1.00km; 2-2.99km; 3-3.99km; >4km.</p>	<p>Additional/other outcomes: NR</p> <p>Outcome Measurement: Physical activity Instrument: Self-reported PA measures using two validated instruments Transport Activity: 7-day recall of travel (5 journey purposes; 7 transport modes) Recreational PA: International PA questionnaire</p> <p>Park use: Self-reported use of infrastructure</p>	<p>Total past-week physical activity Baseline Int (n=NR): NR Comp (n=NR): NR 12-24-month follow-up (Year 2 survey) Int (n=NR): NR Comp (n=NR): NR Change in mean difference or proportion: NR (95% CI) p=NR</p> <p>Adjusted linear regression estimate: +12.5 minutes per week total physical activity per kilometer closer to infrastructure (95%CI 1.9, 23.1)</p> <p>Models used: Linear regression to examine how proximity to the infrastructure predicted changes in outcomes</p> <p>Other variables controlled for in study: age, sex, site, ethnicity, having a child younger than 16 years, education, income, employment status, car, weight status, general health, long-term illness, and baseline activity</p> <p>Park use (trails) Self-reported use of infrastructure Baseline: NR Year 1: 32% Year 2: 38%</p> <p>SUMMARY: Trail infrastructure with feeder route connections did not increase total walking and cycling and physical activity at 1 year but did significantly increase these outcomes at 2 years for residents living closer to the</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results																																																
Parks, Trails and Greenways																																																				
				infrastructure compared to residents living further away.																																																
<p>Author, year: Grunseit et al. 2019</p> <p>Location: Sydney, Australia</p> <p>Design: Electronic counter (Ecounter): (Interrupted) Time series (ITS)</p> <p>Also includes Visual counts (Before after without comparison) and post-only intercept survey</p> <p>Suitability rating: Moderate</p> <p>Intervention duration: 5 months February 2015 (when final stage of the trail opened) to July 2015</p> <p>Study timeframe (Int to last follow up): 5 months or 24 months (using 2013)</p> <p>Year(s) study was implemented:</p>	<p>Setting: Greenway/trail (Narrabeen Lagoon Trail--multi-use walking and cycling loop trail) runs through bushland, parks and passes by amenities such as parking areas, other recreational activities and cafes/restaurants</p> <p>Geographic scale: Suburban (densely populated area)</p> <p>Study population: Adults and children for electronic and visual survey (children by proxy)</p> <p>Eligibility and Recruitment: Visitors to loop trail in park</p> <p>Sample size: Pre-intervention Ecounter (Table 1 Level Change from ITS analysis – change in number of passes):</p> <table border="1" data-bbox="405 1344 703 1437"> <tr> <td></td> <td>Bike</td> <td>Pedestrian</td> </tr> <tr> <td>Middle Creek</td> <td>1391</td> <td>1149</td> </tr> </table>		Bike	Pedestrian	Middle Creek	1391	1149	<p>Description: Infrastructure addition of a 8.5k looped recreational trail</p> <p>Infrastructure interventions: Park-based: Yes, trail runs through the parks Greenways/trails: Yes, infrastructure (renovations) include new bridges, 2 km of new boardwalk, reserve and car park upgrades, a boat ramp, toilet facility upgrades, park furniture, rest stops, vantage outlook points, heritage restoration, and planting of local vegetation Playgrounds: No</p> <p>Intervention components: Programming: No Access: Yes, enhanced connectivity and access to trail runs through bushland, parks and passes by amenities such as parking areas, other recreational activities and cafes/restaurants Promotion: No Community engagement: No</p> <p>Exposure Measurement: Users of Narrabeen Lagoon trail (see Figure 1 map)</p> <p>Comparison: NA (2 target areas in same park)</p>	<p>Description: Physical activity: Yes Park use: Yes Health, mental health, well-being: NR Social outcomes: NR Injury: NR Quality of life: NR Weight related (BMI): NR Environmental outcomes: NR Additional/other outcomes: NR</p> <p>Outcome Measurement PA and park use 1) Instrument: Ecounter data Instrument: Infrared electronic counters Frequency of pedestrian and bicycle traffic Counters of pedestrians and cyclists on two established sections of the trail. The counter data were in hourly format but were collapsed to weekly format for analysis.</p>	<p>Park use (and trails): 1) Ecounter data outcome (Table 1 and Figure 2, Table S1)</p> <p>Mean number of adjusted bike and pedestrian passes (encounters) clockwise direction of travel (estimated from Figure 2 by Community Guide) Weeks 9 to 28 of calendar years 2013, 2014, 2015</p> <table border="1" data-bbox="1488 706 2005 917"> <tr> <td></td> <td>Middle Creek</td> <td>Jamieson</td> </tr> <tr> <td>Bike</td> <td></td> <td></td> </tr> <tr> <td>2013</td> <td>850</td> <td>700</td> </tr> <tr> <td>2014</td> <td>950</td> <td>750</td> </tr> <tr> <td>2015</td> <td>1800</td> <td>1950</td> </tr> <tr> <td>Net Change</td> <td></td> <td></td> </tr> <tr> <td>2015 vs 2013</td> <td>+950</td> <td>+1250</td> </tr> </table> <table border="1" data-bbox="1488 933 2005 1112"> <tr> <td></td> <td>Middle Creek</td> <td>Jamieson</td> </tr> <tr> <td>Pedestrian</td> <td></td> <td></td> </tr> <tr> <td>2013</td> <td>800</td> <td>450</td> </tr> <tr> <td>2014</td> <td>900</td> <td>550</td> </tr> <tr> <td>2015</td> <td>1800</td> <td>1550</td> </tr> <tr> <td>Net Change</td> <td></td> <td></td> </tr> <tr> <td>2015 vs 2013</td> <td>+1000</td> <td></td> </tr> </table> <p>+1100Relative % change from both parks: (calculated by Community Guide) Combined pedestrian and bike: 153.4% Bike only: 141% Pedestrian only: 168%</p> <p>Modeled data: All mean counts were significantly higher in 2015 compared with 2013 and 2014 irrespective of</p>		Middle Creek	Jamieson	Bike			2013	850	700	2014	950	750	2015	1800	1950	Net Change			2015 vs 2013	+950	+1250		Middle Creek	Jamieson	Pedestrian			2013	800	450	2014	900	550	2015	1800	1550	Net Change			2015 vs 2013	+1000	
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Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>November 2012–July 2015</p> <p>Of note: the trail had been undergoing development since 2010 with the final stage of the trail opening February 2015</p> <p>Ecounter data: November 2012 to July 2015 (2 existing sites and at the new section of trail)</p> <p>Visual: Before completion October and December 2014’ Post completion March 2015 (6 weeks), Follow up: October and November 2015 (8 and 9 months)</p> <p>Intercept survey: March and May 2015 (both post)</p> <p>Authors: A year’s pre-completion Ecounter data, and up to eight months post-completion observational data</p> <p>Quality of Execution: Fair Limitation(s): 2</p>	<p>Jamieson 1899 812 Total 2540 1961 Total N= 4501</p> <p>Visual counts preintervention Total pedestrians and bikers from both sites at baseline: n=647 (Table Supplement 2)</p> <p>Post-completion intercept survey Bike Pedestrian 77 172 Total N=249</p> <p>Reported Baseline Demographics: Individual Level (Intercept survey total sample): Age (range): 18–24 2.4% 25–34 12.8% 35–44 26.0% 45–54 26.8% 55–64 18.0% 65+ 13.6% Sex: Female: 54.4%; Male: 45.6% Race/ethnicity: NR Education: NR Low income: NR Neighborhood or community SES: NR</p>	<p>Note: Ecounter data November 2012 to July 2015 at two existing locations and the new section of trail; visual count of users at the existing and new sections of trail on two occasions pre and post completion; and intercept surveys on two occasions post-completion</p>	<p>2) Visual counts Instrument: Visual observation counts using written protocols. Number, proportion of cyclists and pedestrians. Visual counts took place at two points near the electronic counter locations on the existing trail sections. Percentage increase from pre- to post-completion were calculated for the mean counts.</p> <p>3) Intercept survey instrument: Interviewer-administered survey intercept surveys with adult users of the trail (age 18+) surveys took place on the newly completed section in a clearing just off the path within approximately 150 meters of the electronic counters.</p>	<p>direction of travel or user type (all p < 0.001).</p> <p>Adjusted average number of passes by bikes approximately doubled at Middle Creek in 2015 compared with the same period in the preceding two years and were 247% to 280% higher at Jamieson Park.</p> <p>Average adjusted pedestrian counts approx. doubled at Middle Creek, but more than tripled at Jamieson Park in 2015 compared with 2013.</p> <p>Visual counts outcome (Figures 3 and 4) Additional information in supplemental Table S2)</p> <p>Net change for proportion of cyclist pre/post Child (pre: 5.3%, post: 9.6%): +4.3%, p<0.05 Adult male: -2.0% (p = 0.008) Adult female: -2.0% (p = 0.008)</p> <p>Net change for proportion of pedestrians/walkers pre/post Child: +7.2% Adult male: -8.1% (p < 0.001) Adult female: No change</p> <p>Intercept survey outcomes (Table 2) N=192, 48% reported increasing their PA after the trail was completed; 3 individuals reported doing less</p> <p>Meeting recommended levels of PA: (Not used in Community Guide analysis)</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	<p>How travelled to trail: Car: 65.6% Walking only: 18% Cycling only: 14.4% Public transport: 0.8% Other: 1.2%</p> <p>Neighborhood or community level: NR</p>			<p>58.5% of the sample were not reaching the recommended levels (i.e., 30 min of moderate-vigorous activity on fewer than 5 days)</p> <p>Not meeting current guidelines more likely than those meeting the guidelines to report doing more PA in total since the opening of the completed trail: Not meeting guidelines total PA 55.5% Meeting guidelines total PA 39.2% p=0.031</p> <p>Proportion of insufficiently and sufficiently active respondents: First survey (3.5 weeks after opening) (n=77) Insufficiently active: 60.0% Sufficiently active: 56.3% p=0.742</p> <p>Second survey (10.5 weeks after opening) (n = 103) Insufficiently active: 51.8% Sufficiently active: 27.7% p=0.013</p> <p>Models used: Autoregressive Integrated Moving Average (ARIMA/ARIMAX) regression adjusted for underlying trends, the change in trend post-loop completion, average daily rainfall, number of public holidays, and school holidays</p> <p>Other variables controlled for in study: NR</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
				<p>SUMMARY: An accessible loop trail increased trail use by pedestrians and cyclists in a suburban location. Of note, modification to the trail had a positive, significant impact on use by children and adults not currently meeting PA guidelines.</p> <p>Impact on physical activity is not clear.</p>
<p>Author, year: Gustat et al. 2012 [Playground Construction Evaluation]</p> <p>Location: USA: New Orleans, Louisiana</p> <p>Design: Other design with concurrent comparison</p> <p>Suitability rating: Greatest</p> <p>Intervention duration: Sustained, but evaluation was 1 year post construction</p> <p>Study timeframe (Int to last follow up): 12 months post construction</p> <p>Year(s) study was implemented: 2006-2009</p>	<p>Setting: Neighborhood in New Orleans (divided into 2 sections by railroad line)</p> <p>Geographic scale: City area, one neighborhood (Urban)</p> <p>Study population: 1) intervention neighborhood and 2) comparison neighborhoods selected by matching on some characteristics</p> <p>Eligibility and Recruitment: Household survey sample focused on English speaking adults 18-70 yrs. who had lived in the neighborhood at least 3m</p> <p>Sample size: Adult household survey</p>	<p>Description: Two infrastructure improvements were made in different sections of a neighborhood (path and playground)</p> <p>Playground construction the focus of this study</p> <p>New construction of school playground opened for afternoons and weekends</p> <p>Infrastructure interventions: Park-based: No Greenways/trails: No Playgrounds: Yes, but playground and walking path were in different sections of neighborhood (and were evaluated separately)</p> <p>Intervention components: Programming: No Access: No Promotion: No Community engagement: Yes, Partnership for an Active Community Environment (PACE)</p>	<p>Description: Physical activity: Yes Park use: NR Health, mental health, well-being: NR Social outcomes: NR Injury: NR Quality of life: NR Weight related (BMI): NR Environmental outcomes: NR Additional/other outcomes: NR</p> <p>Outcome Measurement: Physical activity Instrument: SOPLAY methodology using trained observers 3 days per week x 6-week observation periods to evaluate moderate and vigorous PA</p>	<p>Physical activity in the location: Playground intervention and 2 comparison groups</p> <p>Percentage of people observed engaged in MVPA Baseline Playground neighborhood (n=NR): 39.8% Comp 1 (n=NR): 36.8% estimated Comp 2 (n=NR): 38% estimated 12-month post intervention follow-up Playground neighborhood (n=NR): 39.9% Comp 1 (n=NR): 24% estimated Comp 2 (n=NR): 36% estimated</p> <p>Change in proportion: Playground vs Comp1 = +12.9 percentage points (95% CI NR) p=NR Relative % change: +37.1%</p> <p>Overall neighborhood x time interactions were significant (p=0.001)</p> <p>Other measures of PA: Self-reported physical activity: Counts are estimated based on survey counts</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>Quality of Execution: Fair Limitation(s):4</p>	<p>Baseline: 499 interviews (64.1%) of 778 households sampled F/u: 692 interviews (76.9%) of 900 households</p> <p>Reported Baseline Demographics: (Intervention neighborhood survey respondents) Individual level: Playground infrastructure (Intervention group) Age: 47.0 yrs. Sex: Female: 63.9% Male: 36.1% Race/ethnicity: African American: 91.7% Education: ≥GED/HS grad: 76.2% Income Annual income: < \$20k 53.3% BMI kg/m2 mean Male: 27.6 Female 29.6</p> <p>Neighborhood or community level: NR</p>	<p>worked with neighborhood-based community groups</p> <p>Exposure measurement: Being in neighborhood during period of observation; neighborhood resident for random household survey</p> <p>Comparison: Matched neighborhoods without infrastructure improvement during study period</p>	<p>Self-reported physical activity from respondents to household surveys.</p>	<p>Yes/No walk for transportation at least 30 min per day for at least 5 days per week (self-reported PA) Baseline: Playground (n=111): 24.8% Comp1 (n=159): 31.3% Comp2 (n=116): 19.8% 12-month post playground follow-up Playground (n=192): 36.9% Comp1 (n=169): 40.5% Comp2 (n=187): 31.1% Change in mean difference or proportion: Playground vs Comp1: +2.9 percentage points (95% CI NR) p=NR</p> <p>Yes/No walk for leisure at least 30 min per day for at least 5 days per week (self-reported PA) Baseline Playground neighborhood (n=111): 63.3% Comp1 (n=159): 61.3% Comp2 (n=116): 57.7% 12-month post playground follow-up Int (n=192): 61.5% Comp1 (n=169): 70.4% Comp2 (n=187): 68.9% Change in proportion: Playground vs Comp1: -10.9 percentage points (95% CI NR) p=NR</p> <p>No significant neighborhood-by-time interactions were found for either walking for transportation or walking for leisure</p> <p>Models used: Logistic regression</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
				<p>Other variables controlled for in study: Age, neighborhood, time and neighborhood by time interactions, weather</p> <p>SUMMARY: A new playground open outside of school time was not associated with observed MVPA or VPA or increased walking by self-report for either transportation or leisure.</p>
<p>Author, year: Gustat et al. 2012 [Path Construction Evaluation]</p> <p>Location: USA: New Orleans, Louisiana</p> <p>Design: Other design with concurrent comparison</p> <p>Suitability rating: Greatest</p> <p>Intervention duration: Sustained, but evaluation was 1 year post construction</p> <p>Study timeframe (Int to last follow up): 12 m post construction</p> <p>Year(s) study was implemented: 2006-2009</p>	<p>Setting: Neighborhood in New Orleans (divided into 2 sections by railroad line)</p> <p>Geographic scale: City area, one neighborhood (Urban)</p> <p>Study population: 1 intervention neighborhood and 2 comparison neighborhoods selected by matching on some characteristics</p> <p>Eligibility and Recruitment: Household survey sample focused on English speaking adults 18-70yrs who had lived in the neighborhood at least 3m</p> <p>Sample size: Adult household survey</p>	<p>Description: Two infrastructure improvements were made in different sections of a neighborhood (path and playground)</p> <p>Path construction the focus of this study</p> <p>Neighborhood walking path on a major transportation corridor</p> <p>Infrastructure interventions: Park-based: No, however the walking path connected to a park Greenways/trails: Yes, 6 block urban walking path in middle section of a boulevard (median had greenery) Playgrounds: No</p> <p>Intervention components: Programming: No Access: Yes, the path connected a park outside the intervention area to a commercial corridor Promotion: No Other: Community engagement: Partnership for an Active</p>	<p>Description: Physical activity: Yes, observed moderate and vigorous PA</p> <p>Park use: NR</p> <p>Health, mental health, well-being: NR</p> <p>Social outcomes: NR</p> <p>Injury: NR</p> <p>Quality of life: NR</p> <p>Weight related (BMI): NR</p> <p>Environmental outcomes: NR</p> <p>Additional/other outcomes: NR</p> <p>Outcome Measurement: Physical activity using Instrument: SOPLAY methodology using trained observers 3 days per week x 6-week observation periods</p>	<p>Physical activity in the location Path intervention and 2 comparison groups</p> <p>Percentage of people observed engaged in MVPA</p> <p>Baseline</p> <p>Path neighborhood (n=NR): 36.7%</p> <p>Comp 1 (n=NR): 36.8% estimated</p> <p>Comp 2 (n=NR): 38% estimated</p> <p>12-month post intervention follow-up</p> <p>Path neighborhood (n=NR): 41.0% (pre-post difference was significant p<0.001)</p> <p>Comp 1 (n=NR): 24% estimated</p> <p>Comp 2 (n=NR): 36% estimated</p> <p>Change in proportion: Path vs Comp2 = +6.3 percentage points (95% CI NR)</p> <p>p=NR</p> <p>Relative % change: +16.9%</p> <p>Other measures of PA</p> <p>Self-Reported Physical Activity: Counts are estimated based on survey counts</p> <p>Yes/No walk for transportation at least 30 min per day for at least 5 days per week</p> <p>Baseline:</p> <p>Path neighborhood (n=113): 29.3%</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>Quality of Execution: Fair Limitation(s):4</p>	<p>Baseline: 499 interviews (64.1%) of 778 households sampled F/u: 692 interviews (76.9%) of 900 households</p> <p>Reported Baseline Demographics: (Intervention neighborhood survey respondents) Individual level: Path infrastructure (Intervention group) Age: 41.6 years Sex: Female: 54.7% Male: 45.3% Race/ethnicity: African American: 85.7% Education: >GED/HS grad: 82.9% Income Annual income < \$20k: 64% BMI kg/m² mean Male: 27.9 Female: 27.7</p> <p>Neighborhood or community level: NR</p>	<p>Community Environment (PACE) worked with neighborhood-based community groups</p> <p>Exposure measurement: Being in neighborhood during period of observation; neighborhood resident for random household survey</p> <p>Comparison: Matched neighborhoods without infrastructure improvement during study period</p>	<p>to evaluate moderate and vigorous PA</p> <p>Self-reported physical activity from respondents to household surveys.</p>	<p>Comp1 (n=159): 31.3% Comp2 (n=116): 19.8% 12-month post path follow-up Path (n=144): 34.8% Comp1 (n=169):40.5% Comp 2 (n=187): 31.1% Change in proportion path vs Comp 2: -5.8 percentage points (95% CI NR) p=NR</p> <p>Yes/No walk for leisure at least 30 min per day for at least 5 days per week Baseline Path neighborhood (n=113): 60.0% Comp1 (n=159): 61.3 % Comp2 (n=116): 57.7% 12-month post path follow-up Path (n=144): 65.3% Comp1 (n=169): 70.4% Comp2 (n=187): 68.9% Change in proportion: Path vs Comp1: -3.8 percentage points (95% CI NR) p=NR</p> <p>No significant neighborhood-by-time interactions were found for either walking for transportation or walking for leisure</p> <p>Models used: Logistic regression</p> <p>Other variables controlled for in study: Age, neighborhood, time and neighborhood by time interactions</p> <p>SUMMARY: An urban walking path in New Orleans was associated with increased MVPA and VPA, 12 months</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
				<p>after project completion compared to two comparison neighborhoods.</p> <p>No association with increased walking by self-report for either transportation or leisure.</p>
<p>Author, year: Harding et al. 2017</p> <p>Location: USA: Lāʻie and Kahuku, Hawaii</p> <p>Design: Before/after without comparison</p> <p>Suitability rating: Least</p> <p>Intervention duration: Path built in 2011, considered on-going after finished</p> <p>Study timeframe (Int to last follow up): Unclear</p> <p>Year(s) study was implemented: Unclear</p> <p>Quality of Execution: Fair Limitation(s): 4</p>	<p>Setting: Greenway/trail including bike and pedestrian path along a highway</p> <p>Geographic scale: Rural with connections to 2 local towns (Lāʻie and Kahuku)</p> <p>Study population: Town residents; those traveling along the Kamehameha Highway</p> <p>Eligibility and Recruitment: Town residents and those traveling along the Kamehameha Highway</p> <p>Sample size: NR</p> <p>Reported Baseline Demographics: Individual level: NR Age: NR (% or yrs.): NR Sex: NR Race/ethnicity: NR Education: NR Low income: NR</p>	<p>Description: Mālaekahana Bike Path, constructed in 2011, is a 2.43-m-wide, 1.4-mile-long paved bicycle and pedestrian path that connects the towns of Lāʻie and Kahuku on Oʻahu’s north shore</p> <p>Infrastructure interventions: Park-based: No Greenways/trails: New construction of pedestrian and bike path infrastructure Playgrounds: No</p> <p>Intervention components: Programming: No Access: Yes, pedestrian and bike path built between and connects two towns Promotion: No Community engagement: Yes, the planning period enlisted the help of key stakeholders within the community. This approach incorporates an understanding of the target community and evokes a sense of stewardship for the construction and maintenance of the path</p> <p>Exposure measurement: Path users considered exposed</p>	<p>Description: Physical activity: Yes</p> <p>Park use: NR</p> <p>Health, mental health, well-being: NR</p> <p>Social outcomes: NR</p> <p>Injury: NR</p> <p>Quality of life: NR</p> <p>Weight related (BMI): NR</p> <p>Environmental outcomes: NR</p> <p>Additional/other outcomes: NR</p> <p>Outcome Measurement: Physical activity Instrument: Behavioral Risk Factor Surveillance System to measure leisure-time and recommended PA</p> <p>Total population of Hawaii used as control (comparison proxy)</p>	<p>Meeting recommended levels of PA: Individuals reporting being highly active (>300 min/wk of moderate physical activity or >150 min/wk of vigorous activity) compared to overall Hawaii population Baseline Int (n=NR): NR Cont (n=NR): NR Follow-up unclear (ongoing) Int (n=NR): 37.3% Cont (n=NR): 25.7% Change in proportion: +11.6 pct pts (Post-only)</p> <p>Individuals reporting being active (150–300 min/wk of moderate physical activity or 75–150 min/wk of vigorous activity) compared to overall Hawaii population Baseline Int (n=NR): NR Cont (n=NR): NR Follow-up unclear (ongoing) Int (n=NR): 37.0% Cont (n=NR): 19.5% Change in proportion: +17.5 pct pts (Post-only)</p> <p>Other measures of PA Individuals reporting leisure-time physical activity Baseline</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	<p>Neighborhood or community level: NR</p>	<p>Comparison: No direct comparison group; study authors do compare physical activity rates among town residents and total population of Hawaii</p>		<p>Int (n=NR): 82.6% (CI 71.3, 90.1) Follow-up unclear (ongoing) Int (n=NR): 87.6% (CI 78.6, 93.2) Change in mean difference or proportion: +5 pct pts (95% CI) p=NR Relative % change: +6.1%</p> <p>Models used: NR</p> <p>Other variables controlled for in study: NR</p> <p>SUMMARY: Intervention town residents reported higher levels of physical activity after the path was built compared to before. Study authors also reported MVPA rates among town residents compared to activity levels reported at the state level and found that the town was more active.</p>
<p>Author, year: King et al. 2015</p> <p>Location: USA: Denver, Colorado</p> <p>Design: (Interrupted) time series</p> <p>Suitability rating: Moderate</p> <p>Intervention duration: 3-7 months (park changes were completed in spring 2012; follow-up observations occurred</p>	<p>Setting: Community housing near green space area (converted to park/garden)</p> <p>Geographic scale: Urban area (with focus on one park)</p> <p>Study population: Residents of transitional housing (homeless and refugees from Burma, Somalia, Afghanistan, Iraq, and Nepal)</p> <p>Eligibility and Recruitment:</p>	<p>Description: Developed new recreational park and large community garden adjacent to transitional housing for refugees</p> <p>Infrastructure interventions: Park-based: Yes, transformation of 2-acres of undeveloped green space into a recreational park including a multipurpose playing field, playground equipment, basketball court, and benches Greenways/trails: Yes, walking path alongside a creek Playgrounds: No Greenspace: Yes, addition of community gardens</p> <p>Intervention components:</p>	<p>Description: Physical activity: Yes Park use: Yes Health, mental health, well-being: NR Social outcomes: NR Injury: NR Quality of life: NR Weight related (BMI): NR Environmental outcomes: NR</p>	<p>Physical activity in the location Activity levels for park users: Male (Table 2) Physical activity level Moderate Baseline Int (n=648): 23% 24-month follow-up Int (n=1844): 32% Change in proportion: +9 pct pts (Relative % +36.9%)</p> <p>Physical activity level Vigorous Baseline Int (n=648): 33% 24-month follow-up Int (n=1844): 42% Change in proportion: +9 pct pts (Relative % +27.2%)</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>between June and October 2012)</p> <p>Study timeframe (Int to last follow up): Approximately 7 months</p> <p>Year(s) study was implemented: June–October 2010 and June–October 2012 (24 months)</p> <p>All infrastructure changes were completed in spring of 2012</p> <p>Quality of Execution: Fair Limitation(s): 3</p>	<p>Participant within specific, predetermined activity zones in park/outside park</p> <p>Sample size: (Park users only) 2010 2012</p> <p>Male 648 1844 Female 241 1412 Total 2492 3256</p> <p>Reported Baseline Demographics: (Park and non-park users combined) 2010 N = 2888 2012 N = 4525 Park and Non-Park users combined (see Table 1) Total park users (zones 1–3) Total non-park users (zones 4–7)</p> <p>Individual level: Age (range): Children: 53.0% Adolescents: 14.4% Adults: 28.9% Older adults: 3.7% Sex: Female: 57.8%; Male: 42.2% Race/ethnicity: Non-white and/or ethnic minority 99.1% Education: NR Low income: NR</p>	<p>Programming: Centrality of growing fresh food, and supported programming provided by Denver Urban Gardens (not well described in paper)</p> <p>Access: No Promotion: No Community engagement: Yes, community members invited to participate in a park design</p> <p>Exposure measurement: Activity zones to gauge how different areas within the park and the adjacent streets, alleys and parking lots were being used before and after park construction</p> <p>Comparison: NA</p>	<p>Additional/other outcomes: Yes, sedentary activity (see Appendix A)</p> <p>Outcome Measurement: Physical activity and park use Instrument: SOPARC to document the number and activity levels of park users</p> <p>Four one-hour noncontinuous observations per day, on 4 days per month including at least 1 weekend day including non-park zones (i.e., adjacent streets, alleys and parking lots) and park zones</p>	<p>Activity levels for park users: Female (Table 2) Physical activity level Moderate Baseline Int (n=241): 41% 24-month follow-up Int (n=1412) 38% Change in proportion: - 3 pct pts (Relative % -7.9%)</p> <p>Physical activity level Vigorous Baseline Int (n=241): 0% 24-month follow-up Int (n=1412): 20% Change in proportion: +20 pct pts (Relative % +20%)</p> <p>Community Guide combined male and female vigorous activity to calculate a relative % change: Physical activity level Vigorous: 29.1%</p> <p>After construction, an increase in the proportion of park users who were engaged in moderate (P = 0.007) or vigorous activity (P = 0.04).</p> <p>Other measure of PA Total energy expended by all people observed in the park (intervention) or non-park zones (comparison; Estimated from Figure 2; kcal/kg/min) Pre/baseline (Start of June 2012) Int (n=NR): 30 Control (n=NR): 20 7-month follow-up (End of October) Int (n=NR): 55 Control (n=NR): 25</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	<p>Neighborhood or community level: NR</p>			<p>Change in mean difference: +20 kcal/kg/min</p> <p>Park Use After construction, the average monthly visitors observed using the improved park (zones 1–3) significantly increased from 180 to 651 (P=0.002) Baseline Int (n=NR): 180 24 month follow up Int (n=NR): 651 Relative % change +261.7%</p> <p>Increase in the total number of people observed using the park postconstruction (P = 0.004)</p> <p>Models used: NR</p> <p>Other variables controlled for in study: NR</p> <p>SUMMARY: Implementation of undeveloped green space into a recreational park and community garden showed evidence for significant increases in overall usage and physical activity levels.</p>
<p>Author, year: New South Wales Dept of Health 2002</p> <p>Location: New South Wales, Australia</p> <p>Design: Before/after with comparison</p>	<p>Setting: Parks (at least 1 hectare in size) with walking paths and tree cover</p> <p>Geographic scale: Urban/suburban area consisting of 5 parks</p>	<p>Description: Walk it: Active Local Parks Project 3 types of interventions in 3 parks promoting PA and park use (via advertisements, walking maps), park modifications (signage, greening, improved paths, new playground) and the establishment of walking groups</p>	<p>Description: Physical activity: Yes, PA participation rates, proportion of people adequately active</p> <p>Park use: Yes</p> <p>Health, mental health, well-being: NR</p>	<p>Meeting recommended levels of PA: 150 min and 5 sessions of moderate activity per week or 3 sessions/ 20 min of vigorous activity per week (adequately active) Baseline Int (n=NR): 49.2% Comp(n=NR): 46.4% 12m Int (n=NR): 49.0%</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>Suitability rating: Greatest</p> <p>Intervention duration: Ongoing up to 12 months</p> <p>Study timeframe (Int to last follow up): 12-month follow-up</p> <p>Year(s) study was implemented: 1997-1999</p> <p>Quality of Execution: Fair Limitation(s): 4</p>	<p>Study population: Residents aged 25-65 years living in Lachlan Macquarie ward (intervention group) and Caroline Chisholm ward (control group)</p> <p>Eligibility and Recruitment:</p> <p>Sample size: 5 parks (3 intervention, 2 control)</p> <p>Reported Baseline Demographics: Individual level (Park user survey total sample): Age: 40-59 years old: 36.8% Sex: Male 53.2% Female 46.8% Race/ethnicity: NR Education: NR Low income: NR Employment: 45.5%</p> <p>Neighborhood or community level: NR</p>	<p>(not all park modifications were completed)</p> <p>Infrastructure interventions: Park-based: Yes, signs added and repaired, gates repaired, and pruning (Park 3) Signs added, bridge erected over drain, new garbage bins, bush cleared and regenerated (Park 4) Signs added, directional arrows added, buildings painted (Park 5) Greenways/trails: Yes, (walking) paths repaired and path access added (Park 5) Playgrounds: Yes, playground added (Park 5)</p> <p>Intervention components: Programming: Yes, establishment of 6 walking groups tied into the promotion using flyers and posters Access: No (unclear if added path access increased connectivity) Promotion: Yes, campaign with advertisements in newspapers and articles (publicity plan), walking map leaflets to households Community engagement: No</p> <p>Exposure measurement: Park users considered exposed</p> <p>Comparison: 2 control parks were used (some exposure to the promotion campaign occurred in</p>	<p>Social outcomes: NR</p> <p>Injury: NR</p> <p>Quality of life: NR</p> <p>Weight related (BMI): NR</p> <p>Environmental outcomes: NR</p> <p>Additional/other outcomes: NR</p> <p>Outcome Measurement: PA and park use Instruments: Telephone survey (self-report with poor response rate 20%) Direct observation Park user survey during direct observation Infra-red counter estimation (some over estimation of counts)</p>	<p>Comp(n=NR): 42.9% Change in proportion: +3.3 pct pts (NS) Relative % change: +7%</p> <p>Proportion of respondents being adequately active for the control p=0.320 and for the intervention p=0.972 (baseline to follow up)</p> <p>Physical activity in the location: Vigorous exercise Baseline Int (n=160): 38.1% Comp(n=155): 36.9% 12m Int(n=177): 42.1% Comp (n=174): 41.4% -0.5 pct pts (NS) p=0.834</p> <p>Light to moderate physical activity Baseline Int (n=225): 53.6% Comp (n=215): 51.2% 12m Int (n=204): 48.6% Comp (n=211): 50.2% -4.0 pct pts (NS) p=0.629</p> <p>Any walking Baseline Int (n=351): 83.6% Comp (n=337): 80.2% 12m Int (n=375): 89.3% Comp (n=340): 81.0% +5.0 pct pts (NS)</p> <p>Walking for other reasons: Baseline</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results																																								
Parks, Trails and Greenways																																												
		the control group during the study)		<p>Int. (n=247): 58.8% Comp. (n=220): 52.4% 12m Int. (n=292): 69.5% Comp. (n=236): 56.2% +6.9 pct pts (NS)</p> <p>Walking for exercise/recreation Baseline Int. (n=245): 58.3% Comp. (n=223): 53.1% 12m Int. (n=241): 57.4% Comp. (n=236): 56.2% -3.8 pct pts (NS)</p> <p>Park use: Self-reported use of parks for all 5 parks combined (telephone-based survey) % visited in last 2 weeks Baseline Int. (n=NR): 51.9% Comp. (n=NR): 38.6% 12m Int (n=NR): 49.3% Comp (n=NR): 36.2% -0.2 pct pts (NS) Relative % change: +1.2% (NS)</p> <p>Infra-red counter estimation of park use for each park (Table 3.3)</p> <table border="1" data-bbox="1495 1193 1999 1424"> <thead> <tr> <th></th> <th>Baseline</th> <th>F/u</th> <th>Diff</th> <th>%change</th> </tr> </thead> <tbody> <tr> <td colspan="5">Control ward</td> </tr> <tr> <td>Park 1</td> <td>53</td> <td>80</td> <td>27</td> <td>50.94*</td> </tr> <tr> <td>Park 2</td> <td>24</td> <td>42</td> <td>18</td> <td>75.00*</td> </tr> <tr> <td colspan="5">Intervention ward</td> </tr> <tr> <td>Park 3</td> <td>82</td> <td>88</td> <td>6</td> <td>7.32</td> </tr> <tr> <td>Park 4</td> <td>30</td> <td>38</td> <td>8</td> <td>26.67*</td> </tr> <tr> <td>Park 5</td> <td>182</td> <td>203</td> <td>21</td> <td>11.54</td> </tr> </tbody> </table>		Baseline	F/u	Diff	%change	Control ward					Park 1	53	80	27	50.94*	Park 2	24	42	18	75.00*	Intervention ward					Park 3	82	88	6	7.32	Park 4	30	38	8	26.67*	Park 5	182	203	21	11.54
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Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results																																																																								
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				<p>* P<0.05</p> <p>Direct observation of park use for each park (Table 3.4)</p> <p>Mean number of people per shift</p> <table border="0"> <tr> <td></td> <td>Baseline</td> <td>Follow-up</td> </tr> <tr> <td>Control ward</td> <td></td> <td></td> </tr> <tr> <td>Park 1</td> <td>36.15</td> <td>39.90</td> </tr> <tr> <td>Park 2</td> <td>27.43</td> <td>31.67</td> </tr> <tr> <td>Intervention ward</td> <td></td> <td></td> </tr> <tr> <td>Park 3</td> <td>34.18</td> <td>29.00</td> </tr> <tr> <td>Park 4</td> <td>9.11</td> <td>9.83</td> </tr> <tr> <td>Park 5</td> <td>73.25</td> <td>92.10</td> </tr> </table> <p>Mean number of walkers per shift</p> <table border="0"> <tr> <td></td> <td>Baseline</td> <td>Follow-up</td> </tr> <tr> <td>Control ward</td> <td></td> <td></td> </tr> <tr> <td>Park 1</td> <td>24.95</td> <td>26.25</td> </tr> <tr> <td>Park 2</td> <td>10.62</td> <td>12.95</td> </tr> <tr> <td>Intervention ward</td> <td></td> <td></td> </tr> <tr> <td>Park 3</td> <td>24.12</td> <td>26.53</td> </tr> <tr> <td>Park 4</td> <td>6.61</td> <td>6.56</td> </tr> <tr> <td>Park 5</td> <td>123.35</td> <td>146.00</td> </tr> </table> <p>Comparison between infra-red counter reading and observed number of park users (Table 4.1)</p> <table border="0"> <tr> <td></td> <td>A</td> <td>B</td> <td>C</td> </tr> <tr> <td>Park 1</td> <td>53%</td> <td>116%</td> <td>90%</td> </tr> <tr> <td>Park 2</td> <td>31%</td> <td>150%</td> <td>116%</td> </tr> <tr> <td>Park 3</td> <td>69%</td> <td>114%</td> <td>95%</td> </tr> <tr> <td>Park 4</td> <td>100%</td> <td>161%</td> <td>113%</td> </tr> <tr> <td>Park 5</td> <td>59%</td> <td>178%</td> <td>100%</td> </tr> </table> <p>A: Park Counter reading compared to observed park usage B: Infra-red estimation of observed individuals C: Infra-red estimation of observed passes</p>		Baseline	Follow-up	Control ward			Park 1	36.15	39.90	Park 2	27.43	31.67	Intervention ward			Park 3	34.18	29.00	Park 4	9.11	9.83	Park 5	73.25	92.10		Baseline	Follow-up	Control ward			Park 1	24.95	26.25	Park 2	10.62	12.95	Intervention ward			Park 3	24.12	26.53	Park 4	6.61	6.56	Park 5	123.35	146.00		A	B	C	Park 1	53%	116%	90%	Park 2	31%	150%	116%	Park 3	69%	114%	95%	Park 4	100%	161%	113%	Park 5	59%	178%	100%
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Control ward																																																																												
Park 1	24.95	26.25																																																																										
Park 2	10.62	12.95																																																																										
Intervention ward																																																																												
Park 3	24.12	26.53																																																																										
Park 4	6.61	6.56																																																																										
Park 5	123.35	146.00																																																																										
	A	B	C																																																																									
Park 1	53%	116%	90%																																																																									
Park 2	31%	150%	116%																																																																									
Park 3	69%	114%	95%																																																																									
Park 4	100%	161%	113%																																																																									
Park 5	59%	178%	100%																																																																									

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
				<p>Models used: Logistic regression (some outcomes)</p> <p>Other variables controlled for in study: NR</p> <p>Summary: Results for participants receiving park interventions (signage) showed mixed effects across different measures and outcomes.</p> <p>Park use showed no effect/difference between the intervention and control groups across different measures and outcomes.</p>
<p>Author, year: Schultz 2017</p> <p>Location: USA: Columbia, Missouri</p> <p>Design: Before/after without comparison</p> <p>Suitability rating: Least</p> <p>Intervention duration: Ongoing (12 or 13 months)</p> <p>Study timeframe (Int to last follow up): 12 or 13 months from intervention completion (24 months from baseline/pre)</p>	<p>Setting: Neighborhood park (5 acres) includes a swimming pool, two basketball courts, playground, baseball field and several shelters</p> <p>5-lane major arterial highway creating a barrier between a dense residential area of low-income housing and the park</p> <p>Geographic scale: Urban and suburban (one neighborhood intersection at the park)</p> <p>Study population: Adults and children</p>	<p>Description: Addition of street crossing infrastructure modifications to increase safe access to a park</p> <p>Infrastructure interventions: Park-based: Yes, a signalized pedestrian crosswalk with a 400-ft median was completed along road adjacent to both the low-income public housing and the neighborhood park; the existing pedestrian bridge was demolished and removed Greenways/trails: No Playgrounds: No</p> <p>Intervention components: Programming: No Access: Yes, crosswalk increased safety and connectivity to access neighborhood park across heavily travelled five-lane road</p>	<p>Description: Physical activity: Yes, level of physical activity in park (sedentary, moderate, vigorous)</p> <p>Park use: Yes, frequency of use</p> <p>Health, mental health, well-being: NR</p> <p>Social outcomes: NR</p> <p>Injury: NR</p> <p>Quality of life: NR</p> <p>Weight related (BMI): NR</p> <p>Environmental outcomes: NR</p>	<p>Physical activity in the location: Park use Moderate PA (% of participants) Baseline Int (n=2080): 43% 12-month follow-up Int (n=2275): 41% 24-month follow-up Int (n=2276): 35% Change in difference/proportion: 2012 to 2013: -2 pct pts 2012 to 2014: -8 pct pts 2013 to 2014: -6 pct pts</p> <p>Park use Vigorous PA (% of participants) Baseline Int (n=2080): 4% 12-month follow-up Int (n=2275): 2% 24-month follow-up Int (n=2276): 5% Change in difference/proportion: 2012 to 2013: -2 pct pts 2012 to 2014: +1 pct pts</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>intervention timepoint to last follow up)</p> <p>Year(s) study was implemented: June 2012 – June 2014</p> <p>June 2012 (pre-crosswalk installation), June 2013 (post-crosswalk installation – crosswalk installed Spring 2013) and June 2014 (follow up).</p> <p>Quality of Execution: Fair Limitation(s) 2</p>	<p>Eligibility and Recruitment: Park users within activity areas</p> <p>Sample size: 2012 N=2080 2013 N=2275 2014 N=2276</p> <p>Reported Baseline Demographics: Individual level (Pre/baseline N=2080): Age: Child: 28% Teen: 17% Adult: 53% Senior: 3% Sex: Female: 46% Male: 54% Race/ethnicity: White 26% Black or African American: 71% Other: 3% Education: NR Low income: NR</p> <p>Neighborhood or community level: 477 households in neighborhood US Census Race/ethnicity Black or African American: 59% White: 36%</p>	<p>Promotion: No Community engagement: No</p> <p>Exposure measurement: Crosswalk users considered exposed</p> <p>Comparison: NA Changes in the park (i.e., renovated fitness equipment and new walking trails) during the fall of 2013 prevented using site as a control</p>	<p>Additional/other outcomes: Yes, sedentary behavior (see Appendix A)</p> <p>Outcome Measurement: PA and park use Instrument: SOPARC Sedentary: lying down, sitting, standing in place Moderate: moving at a slow casual pace Vigorous: engaged in an activity more vigorous than an ordinary walk</p> <p>Energy expenditure (EE) was captured by Metabolic Equivalents of Task (METs) (Sedentary: 1.5 METs, Moderate: 3 METs, Vigorous: 6 METs)</p> <p>26 park activity areas analyzed</p>	<p>2013 to 2014: +3 pct pts</p> <p>Combined MVPA measure (from park use moderate and vigorous PA measures above reported in Table 1)</p> <p>Baseline Int 889+91=970/2080 = 46.6% Post Int 791+121=912/2276 = 40.0% Relative Change in %MVPA = (40.0-46.6)/46.6= -14.2%</p> <p>Park total energy expenditure (Estimated marginal means)</p> <p>Baseline Int (n=2080): 4.613 12-month follow-up Int (n=2275): 3.934 significant difference from 2012 with p < 0.05 24-month follow-up Int (n=2276): 4.014 significant difference from 2012 with p < 0.05 Change in mean difference: 2012 to 2013: -0.679 2012 to 2014: -0.599 2013 to 2014: +0.080</p> <p>Also stratified by age, race/ethnicity, gender (Table 3)</p> <p>Park use: Park Counts (Estimated marginal means) Baseline Int (n=2080): 13.26 12-month follow-up Int (n=2275): 18.85 significant difference from 2012 with p < 0.05 24-month follow-up</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	<p>mixed-race: 3% Asian: 2% SES (i.e., poverty): Median household income: \$8359 per year Households living below the federal poverty level: 57% Residents over 16 were unemployed: 48%</p> <p>Columbia Housing Authority's (CHA) 294 family units Households living below poverty: 67% Children were raised in a single-parent household: 77% Residents over 16 unemployed: 82%</p>			<p>Int (n=2276): 15.70 significant difference from 2012 with $p < 0.05$ and from 2013 with $p < 0.05$. Change in mean difference: 2012 to 2013: +5.589 2012 to 2014: +2.433 2013 to 2014: -3.156 Relative% change: +18.3%</p> <p>Also stratified by age, race/ethnicity, gender (Table 2)</p> <p>Models used: Analysis of covariance (ANCOVA) model used to examine changes in the park's total counts and total EE to determine impact on park use and park-based physical activity.</p> <p>Other variables controlled for in study: Temperature</p> <p>SUMMARY: The addition of a crosswalk to a neighborhood park increased safe access to the park in a low income, African American population and showed increases in park use but mixed results for park-based physical activity (based on METs) and energy expenditure.</p>
<p>Author, year: Slater et al. 2016</p> <p>Location: USA: Chicago, Illinois</p> <p>Design: Other design with concurrent comparison</p>	<p>Setting: Park and park playgrounds</p> <p>Geographic scale: Urban (City with 33 neighborhoods)</p> <p>Study population: Users of city parks identified to be in need of repair through an</p>	<p>Description: Renovations replacing old playground equipment and ground surfacing in existing city/neighborhood parks</p> <p>Infrastructure interventions: Park-based: Yes, renovation of playgrounds within the park Greenways/trails: No</p>	<p>Description: Physical activity: Yes, MVPA Park use: NR Health, mental health, well-being: NR Social outcomes: Yes, neighborhood crime count – "street" crime over a 12-</p>	<p>Physical activity in the location: MVPA Baseline Int (n=38): 17.07 (SD=21.87) Comp (n=39): 12.33 (SD=19.59) 12-month follow-up Int (n=47): 24.95 (SD=23.93) Comp (n=30): 15.33 (SD=20.44) Change in average number of people engaging in MVPA =4.9 pct pts Relative % change: +21.8%</p>

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>Suitability rating: Greatest</p> <p>Intervention duration: Renovation took place between Aug-Nov 2013; availability of infrastructure would then be ongoing after completion</p> <p>Study timeframe (Int to last follow up): August 2013 through October 2014 (completed by Nov 2013-Oct 2014 = 11 months)</p> <p>Year(s) study was implemented: 2013-2014</p> <p>Quality of Execution: Fair Limitation(s): 3</p>	<p>assessment done in 2009-2011</p> <p>Eligibility and Recruitment: NR</p> <p>Sample size: 39 renovations + community engagement parks (in 33 neighborhoods) 39 matched controls (in need of renovation and matched for size, park features, and location)</p> <p>Reported Baseline Demographics: Individual level: NR Age: NR Sex: Female: NR; Male: NR Race/ethnicity: NR Education: NR Low income: NR</p> <p>Neighborhood or community level: Population: NR % of parks in neighborhoods majority: African American: 55% White: 23% Mixed race: 16% Latino: 6% SES (i.e., poverty): Neighborhood median</p>	<p>Playgrounds: Yes, new playground equipment and ground surfacing</p> <p>Intervention components: Programming: No Access: No Promotion: No Community engagement: Involvement of community groups, to (1) identify how playground renovations will benefit their community and (2) collaborate with Friends of the Park (FOTP) post renovation to successfully implement ongoing care and maintenance of playgrounds with the goal of enhancing playground renovations</p> <p>Exposure measurement: Park users considered exposed (park program database measures enrollment but not exposure)</p> <p>Comparison: Didn't receive playground renovations</p>	<p>month period within a 2-block radius of the park</p> <p>Injury: NR</p> <p>Quality of life: NR</p> <p>Weight related (BMI): NR</p> <p>Environmental outcomes: Yes, incivilities: presence of litter and graffiti and perceived safety measured on a Likert scale of 0-4: none, a little, some, a lot).</p> <p>Additional/other outcomes: sedentary behavior (see Appendix A)</p> <p>Outcome Measurement: Physical activity Instrument: SOPARC Taken one weekday and one weekend day during baseline and then two weekdays and one weekend day during follow-up July-Oct 2013 (baseline) July-Oct 2014 (post)</p> <p>Park environment observations (Bridging the Gap Park Observation form) for incivility outcomes, park program database for program use, and Chicago Police Department's</p>	<p>Park use Park Utilization (n=number of parks) Baseline Int (n=38): 35.71 (SD=39.97) Comp (n=39): 29.38 (SD=48.82) 12-month follow-up Int (n=47): 42.26 (SD=40.09) Comp (n=30): 27.33 (SD=38.01) Change in average number of people visiting parks: +8.6 pct pts Relative% change: +25.3</p> <p>Social and environmental outcomes (see Appendix A)</p> <p>Models used: Mixed-effects Poisson regression models</p> <p>Park utilization Model 1 =0.174 (SE=0.062), p<0.05 Park utilization Model 2 =0.211 (SE=0.063), p<0.05</p> <p>Park-based MVPA Model 1 =0.174 (SE=0.088), p<0.05 Park-based MVPA Model 2 =0.199 (SE=0.089), p<0.05</p> <p>Other variables controlled for in study: All models controlled for park size, daily outside temperature, distance between matched parks, neighborhood median household income, and neighborhood predominant race. Model 2 also accounted for contextual measures of park programming, safety, and maintenance.</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
	household income (range): \$12,333-\$121,541		(2013) CLEARMAP website for crime measures	<p>SUMMARY: Intervention parks showed a significant increase in park users and MVPA by park users over time compared with control parks.</p> <p>Incivilities increased in both parks, and for intervention parks this may be a result of increased park use. Street crime decreased in both intervention and control park areas but is thought to be due to community policing or other crime-reducing activities.</p>
<p>Author, year: Tester et al. 2009</p> <p>Location: USA: San Francisco, California</p> <p>Design: Other design with concurrent comparison</p> <p>Suitability rating: Greatest</p> <p>Intervention duration: Ongoing (Playfield available for ongoing use after renovation was complete; length of programming availability is unclear) Summer of 2006 (approx. 3 months) was likely the time frame in which the playfield was renovated, and</p>	<p>Setting: Parks in low-income neighborhoods</p> <p>Geographic scale: Urban in three neighborhoods</p> <p>Study population: Residents in surrounding neighborhoods; individuals involved in community collaboration with parks (Park B only)</p> <p>Eligibility and Recruitment: NR</p> <p>Sample size: 3 parks (2 intervention, 1 control)</p> <p>Reported Baseline Demographics:</p>	<p>Description: Playfield renovation (used primarily for soccer and baseball; both parks) and programming/access improvements (Park B only)</p> <p>Infrastructure interventions: Park-based: Yes, artificial turf replaced uneven dirt fields, and added new fencing, landscaping, lighting, and picnic benches Park A, permanent soccer goals installed Park B, a walkway around the field was restored Greenways/trails: No Playgrounds: No, playground/ Park C was a control (no infrastructure intervention)</p> <p>Intervention components: Programming: ReConnect Initiative designed to improve the quality of youth and family programs at public recreation centers (Park B) including professional training and skills</p>	<p>Description: Physical activity: Yes. (sedentary, moderate, and vigorous activity) reported by gender</p> <p>Park use: Yes, reported by gender</p> <p>Health, mental health, well-being: NR</p> <p>Social outcomes: NR</p> <p>Injury: NR</p> <p>Quality of life: NR</p> <p>Weight related (BMI): NR</p> <p>Environmental outcomes: NR</p> <p>Other outcomes: Yes, sedentary behavior (see Appendix A)</p> <p>Outcome Measurement:</p>	<p>Physical activity in the location Mean number of males and females per observation in moderate activity reported separately in Table 3; 7-day totals also reported (and combined here for males and females)</p> <p>Baseline Park A Renovation (n=1): 90 Park B Renovation + programming (n=1): 177 Comp (n=1): 109 9-month follow-up Park A Renovation (n=1): 437 Park B Renovation + programming (n=1): 853 Comp (n=1): 256 Change in mean difference: Park A Renovation compared to control: +200 Park B Renovation + programming compared to control: +529 Relative change: +247%</p> <p>Mean number of males and females per observation in vigorous activity reported separately in Table 3; 7-day totals also</p>

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
<p>programming first started.</p> <p>Study timeframe (Int to last follow up): Unclear, but baseline to post was 12 months</p> <p>Year(s) study was implemented: May to June 2006-2007</p> <p>Quality of Execution: Fair Limitation(s): 3</p>	<p>Individual level: NR Age NR Sex: Female: NR Male: NR Race/ethnicity: Education: NR Low income: NR</p> <p>Neighborhood or community level: (described separately for each park) Population: NR Race/ethnicity: Park A – primarily Latino neighborhood Park B – mix of Latino, African American, and Asian neighborhood Park C – primarily Latino neighborhood SES (i.e., poverty): Median household income in surrounding neighborhoods ranged from \$43,333-\$56,000 Other: NR</p>	<p>development for park and recreation program staff Promotion: No Access: Expanded hours of park operation (e.g., playfield lights kept on during later evening hours) Community engagement: Expanded programs driven by community input (e.g., dances organized by teens for teens)</p> <p>Exposure measurement: No measurement of exposure to programming/increased access; park users considered exposed</p> <p>Comparison: Playfield at Park C, no intervention implemented.</p>	<p>Physical activity and park use Instrument: SOPARC Scans were performed 8 times each day. Parks are divided into predetermined sections (target areas)</p>	<p>reported (and combined here for males and females)</p> <p>Baseline Park A Renovation (n=1): 57 Park B Renovation + programming (n=1): 36 Comp (n=1): 81 9-month follow-up Park A Renovation (n=1): 140 Park B Renovation + programming (n=1): 251 Comp (n=1): 83 Park A Change in mean difference: Park A Renovation compared to control: +81 Park B Renovation + programming compared to control: +213 Relative change: +595%</p> <p>Community Guide combined moderate and vigorous activity for relative % change: Park A v Control: +386.2% Park B v Control: +538.7%</p> <p>Park use 7-day totals at baseline and follow-up intervention park A and B and compared to Park C (control)</p> <p>Median of mean average Baseline (2006) Park A Int (N=NR): 264 Park B Int (N=NR): 259 Cont (n=NR): 483 Follow-up (2007) 12 months Park A Int (N=NR): 1365 Park B Int (N=NR): 1933 Cont (n=NR): 585</p>

Study	Population Characteristics	Intervention Characteristics	Outcomes	Results
Parks, Trails and Greenways				
				<p>Park A Net difference of park visitors: Relative % change: 395.9%</p> <p>Park B Net difference of park visitors: Relative % change: 625.2%%</p> <p>Mean number of male and female visitors present per observation Park A, B, C (Table 2 not shown)</p> <p>Models used: NR</p> <p>Other variables controlled for in study: NR</p> <p>SUMMARY: Study reports significant increases in male and female park users engaging in all activity levels in both intervention arms (but does not report there are significant differences between groups over time; only the moderately active males in the control group increased significantly).</p>

Appendix A: Additional Outcomes

Study. Author	Study Outcomes
Auchincloss 2019 et al.	<p>Median annual crime incidents/100,000 (Table 1C) Lower level: drugs, incivilities, weapons violations</p> <p>Year 2009 2014 Year 2009 2014</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

	<p>Int 3591 2254 Cont 3995 3877</p> <p>Higher level (property): theft, burglary Year 2009 2014 Year 2009 2014 Int 2872 2476 Cont 3041 2933</p> <p>Highest level (violent): homicide, assault, battery, robbery, rape Year 2009 2014 Year 2009 2014 Int 434 3519 Cont 4471 4415</p> <p>Post construction, violent crimes at the greenway were much higher than the city average, and Philadelphia is a high-crime city.</p> <p>Environmental audit data from 3 locations at each site: Better design and amenities, less social disorder (Table 1B): Self-reported health/ physical activity (post only measurements, Supplement Table 2)</p>
<p>Cummins 2018 et al.</p>	<p>Adjusted RRs for change in depressive symptoms (adjusted for sex, age, ethnicity, length of time lived in the United Kingdom, number of days since the Olympic Games, parental income, number of parents participant lives with, moved neighborhood since baseline, eligible for free school meals, family social support, friend social support, bullying, negative life events, and long-term illness. Table 38)</p> <p>Baseline to 18-month follow-up Became depressed: 1.3 (95% CI 0.97, 1.76) No longer depressed: 1.39 (95% CI 0.88, 2.18) Remain depressed: 1.93 (95% CI 1.01, 3.7)</p> <p>Baseline depressive symptoms Int (n=): 27% Comp (n=): 20% 18-month follow-up Int (n=): NR Comp (n=): NR</p> <p>Adjusted Coefficients for Associations of Urban Regeneration With Change in Well-Being (adjusted for sex, age, ethnicity, length of time lived in the United Kingdom, number of days since the Olympic Games, parental income, number of parents participants lives with, moved neighborhood since baseline, eligible for free school meals, family social support, friend social support, bullying, negative life events, and long-term illness. Table 39)</p> <p>18-month follow-up Adjusted + Baseline WEMWBS: -0.07 (-1.59, 1.44)</p> <p>Baseline well-being scores (Page 68) Int (n=): 50.7 (0.6 SE) Comp (n=): 53.0 (0.2 SE) 18-month follow-up Int (n=): NR Comp (n=): NR</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

	<p>Baseline to 18-month follow-up, $\mu = -0.04$ (0.04 SE)</p> <p>RRRs for associations between key socioeconomic variables and change in access to green space (Tables 30 and 32)</p> <p>Adjusted relative RRs for visit to the park between wave 1 and wave 3 for screen time per day relative to meeting the recommendation of doing < 2 hours per day at both waves (Tables 23 and 24)</p>																																																																
Droomers 2016 et al.	<p>Self-reported assessed general health as "Good"</p> <p>Baseline: 2004-2008 Int (n=24 districts): 65% Comp (n=NR): 71% follow-up maximum of 3 years 2008-2011 Int (n=24 districts): 67% Comp (n=NR): 74%</p> <p>Change in proportion: -1 percentage points (95% CI NR) p=NR Trend regression coefficient: -0.06 (95%CI -0.13 to 0.00) NS</p>																																																																
Evenson et al. 2005	<table border="0"> <thead> <tr> <th data-bbox="405 625 840 665">From Table 3</th> <th data-bbox="840 625 1071 665">Baseline</th> <th data-bbox="1071 625 1344 665">Follow-up</th> <th data-bbox="1344 625 2005 665"></th> </tr> <tr> <th></th> <th data-bbox="840 665 1071 706">n Median IQ range</th> <th data-bbox="1071 665 1344 706">n Median IQ range</th> <th data-bbox="1344 665 2005 706">p</th> </tr> </thead> <tbody> <tr> <td data-bbox="405 706 840 738">Total walking (minutes/wk) Overall</td> <td data-bbox="840 706 1071 738">338 90 30–180</td> <td data-bbox="1071 706 1344 738">338 90 30–180</td> <td data-bbox="1344 706 2005 738">0.48</td> </tr> <tr> <td data-bbox="405 738 840 771">Ever used trail Yes</td> <td data-bbox="840 738 1071 771">79 105 30–210</td> <td data-bbox="1071 738 1344 771">9 70 25–180</td> <td data-bbox="1344 738 2005 771">0.21</td> </tr> <tr> <td data-bbox="405 771 840 803">No</td> <td data-bbox="840 771 1071 803">241 90 20–180</td> <td data-bbox="1071 771 1344 803">241 90 30–180</td> <td data-bbox="1344 771 2005 803">0.39</td> </tr> <tr> <td data-bbox="405 803 840 836">Walking for transportation (min/wk)</td> <td></td> <td></td> <td></td> </tr> <tr> <td data-bbox="405 836 840 868">2 outliers dropped Overall</td> <td data-bbox="840 836 1071 868">353 0 0–0</td> <td data-bbox="1071 836 1344 868">353 0 0–0</td> <td data-bbox="1344 836 2005 868">0.41</td> </tr> <tr> <td data-bbox="405 868 840 901">Ever used trail Yes</td> <td data-bbox="840 868 1071 901">76 0 0–0</td> <td data-bbox="1071 868 1344 901">76 0 0–0</td> <td data-bbox="1344 868 2005 901">0.32</td> </tr> <tr> <td data-bbox="405 901 840 933">No</td> <td data-bbox="840 901 1071 933">261 0 0–0</td> <td data-bbox="1071 901 1344 933">261 0 0–0</td> <td data-bbox="1344 901 2005 933">0.32</td> </tr> <tr> <td data-bbox="405 933 840 966">Bicycling (minutes/week) Overall</td> <td data-bbox="840 933 1071 966">347 0 0–0</td> <td data-bbox="1071 933 1344 966">347 0 0–0</td> <td data-bbox="1344 933 2005 966">0.47</td> </tr> <tr> <td data-bbox="405 966 840 998">Ever used trail Yes</td> <td data-bbox="840 966 1071 998">77 0 0–30</td> <td data-bbox="1071 966 1344 998">77 0 0–0</td> <td data-bbox="1344 966 2005 998">0.16</td> </tr> <tr> <td data-bbox="405 998 840 1031">No</td> <td data-bbox="840 998 1071 1031">253 0 0–0</td> <td data-bbox="1071 998 1344 1031">253 0 0–0</td> <td data-bbox="1344 998 2005 1031">0.98</td> </tr> <tr> <td data-bbox="405 1031 840 1063">Bicycling for transportation</td> <td></td> <td></td> <td></td> </tr> <tr> <td data-bbox="405 1063 840 1096">(min/month) Overall</td> <td data-bbox="840 1063 1071 1096">360 0 0–0</td> <td data-bbox="1071 1063 1344 1096">360 0 0–0</td> <td data-bbox="1344 1063 2005 1096">0.41</td> </tr> <tr> <td data-bbox="405 1096 840 1128">Ever used trail Yes</td> <td data-bbox="840 1096 1071 1128">78 0 0–0</td> <td data-bbox="1071 1096 1344 1128">78 0 0–0</td> <td data-bbox="1344 1096 2005 1128">0.34</td> </tr> <tr> <td data-bbox="405 1128 840 1161">No</td> <td data-bbox="840 1128 1071 1161">264 0 0–0</td> <td data-bbox="1071 1128 1344 1161">264 0 0–0</td> <td data-bbox="1344 1128 2005 1161">0.01*</td> </tr> </tbody> </table> <p>*p=0.05</p>	From Table 3	Baseline	Follow-up			n Median IQ range	n Median IQ range	p	Total walking (minutes/wk) Overall	338 90 30–180	338 90 30–180	0.48	Ever used trail Yes	79 105 30–210	9 70 25–180	0.21	No	241 90 20–180	241 90 30–180	0.39	Walking for transportation (min/wk)				2 outliers dropped Overall	353 0 0–0	353 0 0–0	0.41	Ever used trail Yes	76 0 0–0	76 0 0–0	0.32	No	261 0 0–0	261 0 0–0	0.32	Bicycling (minutes/week) Overall	347 0 0–0	347 0 0–0	0.47	Ever used trail Yes	77 0 0–30	77 0 0–0	0.16	No	253 0 0–0	253 0 0–0	0.98	Bicycling for transportation				(min/month) Overall	360 0 0–0	360 0 0–0	0.41	Ever used trail Yes	78 0 0–0	78 0 0–0	0.34	No	264 0 0–0	264 0 0–0	0.01*
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Ever used trail Yes	78 0 0–0	78 0 0–0	0.34																																																														
No	264 0 0–0	264 0 0–0	0.01*																																																														
Frank 2009 e al.	<p>IPAQ-SE Self-reported sedentary time</p> <p>Baseline Int (n=239): 487.7 mins Comp (n=285): 473.8 mins 24-month follow-up Int (n=239): 457.7 mins</p>																																																																

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

	<p>Comp (n=285): 492.9 mins Change: -49.1 mins</p> <p>IPAQ-SE Self-reported sedentary time categorized into proportion sedentary >9 hours daily</p> <p>Baseline Int (n=239): 45.9% Comp (n=285): 36.7% 24-month follow-up Int (n=239): 33.3% Comp (n=285): 37.9% Change: -13.8 percentage points</p> <p>Sedentary behavior >9 hours/day OR=0.46 (95%CI 0.25, 0.85) Stronger effects for residents living 300m or 500m from greenway</p>
Goodman 2014 et al.	Brand et al. (2014) converted PA changes into CO2 emissions but did not find infrastructure-associated reductions in CO2 emissions to be meaningful.
King et al. 2015	<p>Activity levels for park users: Male (Table 2) Physical activity level Sedentary Baseline Int (n=648): 44% 24 -month follow-up Int (n=1844): 26% Change in proportion: -18 pct pts</p> <p>Activity levels for park users: Female (Table 2) Physical activity level Sedentary Baseline Int (n=241): 59% 24-month follow-up Int (n=1412): 42% Change in proportion: -17 pct pts</p>
Schultz et al. 2017	<p>Park use sedentary behavior (% of participants)</p> <p>Baseline Int (n=2080): 53% 12-month follow-up Int (n=2275): 58% 24-month follow-up Int (n=2276): 60% Change in mean difference: 2012 to 2013: +5% or pct pts 2012 to 2014: +7 pct pts 2013 to 2014: +2 pct pts</p>

Park, Trail, and Greenway Infrastructure Interventions when Combined with Additional Interventions—Summary Evidence Table

<p>Slater 2016 et al.</p>	<p>Park Maintenance Scale (0-4, none to a lot of incivilities) Baseline Int (n=38): 1.66 (SD=1.36) Comp (n=39): 1.84 (SD=1.89) 12-month follow-up Int (n=47): 2.19 (SD=2.26) Comp (n=30): 2.53 (SD=2.27) Change in mean difference: -0.16 pct pts</p> <p>Neighborhood Crime Count (total number of all street crimes) Baseline Int (n=38): 747.89 (SD=904.68) Comp (n=39): 579.41 (SD=385.11) 12-month follow-up Int (n=47): 622.68 (SD=721.28) Comp (n=30): 498.90 (SD=297.18) Change in total number: -44.7</p> <p>Sedentary Behavior Baseline Int (n=38): 18.87 (SD=21.02) Comp (n=39): 17.21 (SD=31.27) 12-month follow-up Int (n=47): 17.62 (SD=18.32) Comp (n=30): 12.6 (SD=18.15) Change in average number of people engaging in sedentary behavior: 3.36 pct pts</p> <p>Park-based sedentary behavior Model 1 =0.139 (SE=0.089), NS Park-based sedentary behavior Model 2 =0.173 (SE=0.089), p<0.10</p>
<p>Tester 2009 et al.</p>	<p>Mean number of males and females per observation in sedentary activity reported separately in Table 3; 7-day totals also reported (and combined here for males and females)</p> <p>Baseline Renovation (n=1): 117 Renovation + programming (n=1): 46 Comp (n=1): 293 9-month follow-up Renovation (n=1): 788 Renovation + programming (n=1): 657 Comp (n=1): 246 Change in mean difference or proportion: Renovation compared to control: 718 Change in mean difference or proportion: Renovation + programming compared to control: 658</p>

References

Brand C, Goodman A, Ogilvie D. Evaluating the impacts of new walking and cycling infrastructure on carbon dioxide emissions from motorized travel: a controlled longitudinal study. *Applied Energy* 2014;128:284-95.

Gubbels JS, Kremers SP, Droomers M, Hoefnagels C, Stronks K, HosmanC, de Vries S. The impact of greenery on physical activity and mental health of adolescent and adult residents of deprived neighborhoods: A longitudinal study. *Health & Place* 2016; 40: 153-60.