

# Translating active living research into policy and practice: One important pathway to chronic disease prevention

Billie Giles-Corti<sup>a,\*</sup>, James F. Sallis<sup>b</sup>, Takemi Sugiyama<sup>a,c</sup>,  
Lawrence D. Frank<sup>d</sup>, Melanie Lowe<sup>a</sup>, and Neville Owen<sup>a,e</sup>

<sup>a</sup>McCaughey VicHealth Centre for Community Wellbeing, Academic Centre for Health Equity, Melbourne School of Population and Global Health, The University of Melbourne, Level 5, 207 Bouverie Street, Melbourne, Victoria 3010, Australia.  
E-mail: b.giles-corti@unimelb.edu.au

<sup>b</sup>Department of Family and Preventive Medicine, University of California, San Diego, California.

<sup>c</sup>School of Population Health, University of South Australia, Adelaide, Australia.

<sup>d</sup>School of Community and Regional Planning and the School of Population and Public Health, The University of British Columbia, Vancouver, Canada.

<sup>e</sup>Behavioural Epidemiology Laboratory, Baker IDI Health and Diabetes Institute, Melbourne, Australia.

\*Corresponding author.

**Abstract** Global concerns about rising levels of chronic disease make timely translation of research into policy and practice a priority. There is a need to tackle common risk factors: tobacco use, unhealthy diets, physical inactivity, and harmful alcohol use. Using evidence to inform policy and practice is challenging, often hampered by a poor fit between academic research and the needs of policymakers and practitioners – notably for active living researchers whose objective is to increase population physical activity by changing the ways cities are designed and built. We propose 10 strategies that may facilitate translation of research into health-enhancing urban planning policy. Strategies include interdisciplinary research teams of policymakers and practitioners; undertaking explicitly policy-relevant research; adopting appropriate study designs and methodologies (evaluation of policy initiatives as ‘natural experiments’); and adopting dissemination strategies that include knowledge brokers, advocates, and lobbyists. Conducting more policy-relevant research will require training for researchers as well as different rewards in academia.

*Journal of Public Health Policy* (2015) 36, 231–243. doi:10.1057/jphp.2014.53;  
published online 22 January 2015

**Keywords:** built environment; physical activity; research translation; non-communicable disease; prevention; city planning

The online version of this article is available Open Access

## Introduction

Translation of research evidence into policy and practice is challenging for disease prevention researchers. This problem is not new: despite John Snow's mid-nineteenth century insights that providing clean water prevents cholera, this disease still devastates the urban poor in developing countries. A report of the World Health Organization suggests that "... toxic combination of bad policies, economics, and politics is, in large measure, responsible for the fact that a majority of people in the world do not enjoy the good health that is biologically possible".<sup>1</sup>

To reduce risk factors for major non-communicable diseases (NCD) – tobacco use, unhealthy diets, physical inactivity, and harmful use of alcohol – requires comprehensive public health action. Sometimes industries choose to create confusion. As part of a strategy to reduce pressure on food companies to change their practices, many in the food industry have attempted to over-emphasize the role of physical inactivity in the obesity epidemic.<sup>2</sup> Such industry tactics should not deter public health efforts to promote physical activity.

Physical inactivity alone is estimated to cause over 5 million deaths annually,<sup>3</sup> and there have been calls for a greater public health response.<sup>4</sup> While here we focus on activity, translation of evidence-based solutions is required for *all* four leading NCD risk factors. Principles we identify for active living research may apply to other areas. We begin with a rationale for designing cities to enhance active living; then explore factors that limit the adoption of evidence-based policy and practice. We conclude with recommendations to facilitate the translation of active living research into policy and practice.

## The Case for Urban Design that Facilitates Active Transportation and Leisure

Creating cities that facilitate physical activity through active transport and active leisure is now seen as a global priority from both



environmental sustainability<sup>5</sup> and health perspectives.<sup>6,7</sup> Walking- and cycling-friendly cities are associated with more walking,<sup>8,9</sup> less obesity,<sup>10</sup> lower rates of chronic diseases,<sup>10</sup> less sedentary time in cars,<sup>11</sup> decreased risk of motor vehicle crashes,<sup>12</sup> and reduced greenhouse gas emissions.<sup>10,13</sup>

Safe and attractive cities with access to high quality public open space also benefit health by encouraging recreational physical activity<sup>14</sup> and promoting mental health.<sup>15,16</sup>

Despite this combination of benefits from creating physical activity-friendly cities,<sup>13</sup> there remains a gap between research, and policy and practice. Sprawling low-density communities with poor access to shops, services, and public transport continue to be built around major cities worldwide.<sup>17</sup> Creating healthier communities requires the involvement of sectors beyond those responsible for health, including city and transport planning, urban design, property development, finance, landscape architecture, road engineering, parks and recreation, energy, and environmental protection.

## The Gap between Researchers and Policymakers and Practitioners

Influencing public policy and practice should be an explicit goal for active living research.<sup>18</sup> High-quality evidence can draw attention to what needs to change and to remedies likely to be effective. Yet, researchers are often frustrated that their research is ignored by policymakers and practitioners.<sup>19,20</sup> Choi *et al*<sup>21</sup> suggest that there is a ‘gap’ between researchers – and policymakers or practitioners: “scientists are sceptical about the extent to which research is used” to inform policies; and “policymakers are sceptical about the usefulness and accuracy of research”. At times, research findings do not support policymakers’ agendas.

‘Policy-relevant’ research appears to be rare, and this may contribute to the research-policy gap.<sup>19</sup> As Green<sup>22</sup> challenges: if researchers want ‘evidence-based policy and practice’, they need to produce ‘policy and practice-based evidence’. Figure 1 summarises the activities, partners, and strategies that differentiate policy-relevant research from other research, highlighting the need for partnerships between interdisciplinary research teams and policymakers/practitioners, plus a research approach explicitly designed to influence policy.

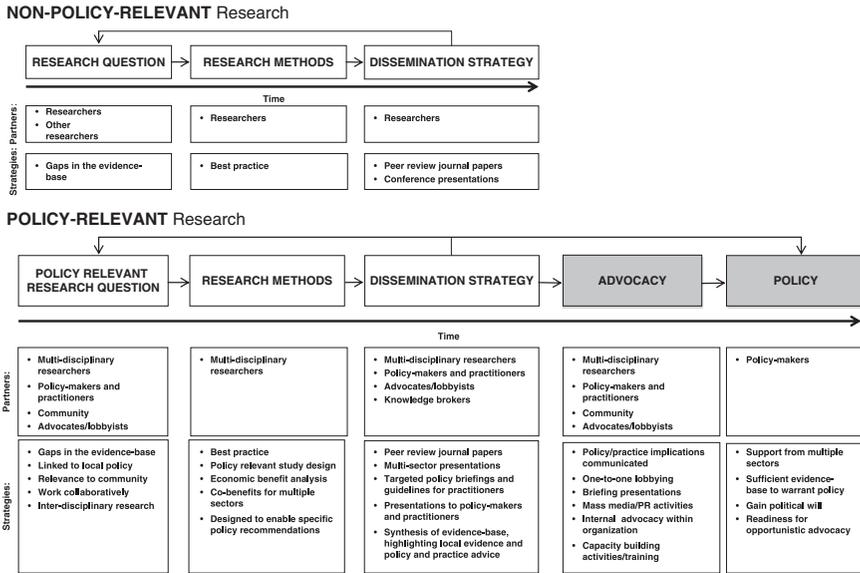


Figure 1: Processes, partners, and strategies that differentiate non-policy-relevant and policy-relevant research.

Until relatively recently, few active living researchers from the health and exercise science sectors obtained formal training related to the built environment and health; or on policy-making processes. Globally this type of training is not widespread. Thus scholars understand little about the sectors they seek to influence – transportation, urban planning, and parks and recreation. Similarly, until recently, few of those trained in urban planning, transportation, engineering, architecture, and parks and recreation learned how their sector’s influence health and wellbeing.

Researchers may have unrealistic expectations about the role of evidence in influencing policy and about the extent to which policy-making is a rational rather than a process driven by political considerations, whether ‘rational’ or not.<sup>23</sup> A single piece of evidence is rarely used directly to solve a policy problem.<sup>23</sup> Rather, it is more likely that accumulated evidence leads to changing awareness and may be used retrospectively to justify a position. Understanding the different ways that evidence is used or refuted by policymakers can help researchers when formulating research questions, summarizing key findings, and communicating research in ways that can influence policymakers and practitioners.<sup>24</sup>



## Strategies to Close the ‘Research Translation Gap’

We propose 10 strategies to help bridge the gap between active living researchers and those responsible for planning and implementing transport and land-use policies.

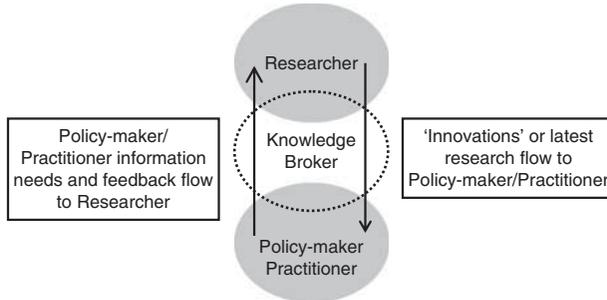
### Understand the ‘policy world’ we are attempting to shift

British transport officials and policymakers responded to public health guidance on the impact of the built environment on physical activity by saying “Tell us something we don’t know”.<sup>25</sup> Failure to translate research into policy and practice may have less to do with the evidence and more to do with ‘policy world’ realities that are inherently political and shaped by many inputs, including public opinion.<sup>26</sup> To have any impact, it is important to understand the policy context and the needs of the policymakers and practitioners responsible for the built environment. What influences decision making?<sup>26</sup>

### Establish links with policymakers and practitioners

To facilitate research translation, stronger links between active living researchers and policymakers and practitioners are essential. Innvaer and colleagues<sup>27</sup> examined factors that affected health policymakers’ use of evidence to inform policy. Three key factors appeared to be important: (i) personal contact between researchers and policymakers; (ii) timely relevance of the research; and (iii) provision of research summaries containing policy recommendations. Their findings are consistent with other research<sup>26</sup> and the literature on the diffusion of innovations.<sup>28</sup> Establishing close research-practice relationships can result in a two-way interaction and a flow of information. Researchers become aware of policy-relevant research questions and practitioners are kept up-to-date on recent research findings.<sup>26</sup> Bidirectional communication and its benefits are illustrated in Figure 2.

Researchers successful at influencing policy and practice develop ‘friendly and trusting’ relationships with policymakers and with journalists. They see these relationships as ‘critical for advancing research-informed policy’.<sup>26</sup> Attending policy briefings and built environment conferences is a first step in creating contact and building a network.



**Figure 2:** The dissemination of ideas from policymakers and practitioners to researchers, and vice versa (modified from Reference 28).

### Work with knowledge brokers, advocates, and lobbyists

For research to have an impact, it needs to be communicated to the *right people*, in the *right way*, and at the *right time*. Despite the desire for stronger links between research and policy/practice, many argue that researchers and policymakers/practitioners are “travelling in parallel universes”.<sup>19–21</sup> *Knowledge-brokers* constitute a strategy for closing the gap. They may work in scientific, advocacy, or professional organisations. They can communicate effectively with researchers, policymakers, and practitioners alike (see Figure 2). They can ensure that researchers are aware of issues confronting policymakers and practitioners, and by linking policymakers and practitioners with evidence or with the researchers themselves facilitate the dissemination of research findings.

Researchers can also work with advocacy groups to synthesise the evidence, participate in expert panels or advisory groups, and provide one-to-one briefings with policymakers.<sup>23</sup> During policy development, researchers who have well-established relationships with policymakers may work as ‘trusted experts’, helping policymakers formulate policy,<sup>29</sup> or meet with politicians to discuss proposed reforms.

### Establish research agendas jointly with policymakers and practitioners

Establishing joint research agendas requires researchers to see the world through the eyes of policymakers and practitioners. What are the crucial policy-relevant questions that they need answered, and how can researchers align their desire to advance scientific knowledge with these policy imperatives?<sup>20,26</sup> Co-creating the research questions in



conjunction with policymakers and practitioners *before* the research is undertaken is clearly ideal.<sup>18,21</sup>

### Undertake interdisciplinary collaborative research

Transforming the way cities are designed and built has been called a ‘wicked problem’ – meaning a complex multi-component problem that is difficult to solve, often because of interdependencies.<sup>30</sup> Kreuter has suggested that ‘innovation and high impact’ solutions are most likely when sought beyond disciplinary boundaries.<sup>30</sup>

Multidisciplinary research teams conducting interdisciplinary research offer two main advantages. First, they can close the gap between researchers and policymakers by increasing the policy-relevance of the research. Those trained in public health, for example, need to collaborate with researchers trained in urban planning, urban design, transportation, and parks and recreation, who may be well-versed in current policy issues within their sectors.

Second, multidisciplinary research teams that include public health professionals can increase attention to health in decision making about the built environment. Despite increasing knowledge of the health implications of their decisions,<sup>6</sup> for many academics and policymakers, the impact on ‘health’ remains a minor consideration. Working with those outside of health may have long-term benefits. Health considerations may appear on the agenda when shaping the built environment. Interdisciplinary research teams can influence how *decision-support tools* for transport and planning place more emphasis on health. Travel demand modelling used in transport planning could be modified to fully incorporate active modes of travel.<sup>31</sup>

### Study the health-economic impacts of active living infrastructure

Cost-benefit analysis plays a key role in decision-making, and could be enhanced by greater attention to health impacts.<sup>31</sup> An approach that considers the combined benefits for health from investments in walking, cycling, and other transportation infrastructure could be used when calculating the economic impacts of these investments.<sup>32,33</sup> Studies appear in leading health journals (for example, *The Lancet*),<sup>34</sup> are now creating a growing body of literature on the economics of investing in cycling infrastructure,<sup>35</sup> sidewalks,<sup>36</sup> and more walkable environments.

## Evaluate policy reform through natural experiments

Using ‘natural experiments’ to learn about the impact of policy decisions is now more common.<sup>37</sup> Natural experiments help evaluate legislation to create safe routes to school,<sup>38,39</sup> implementation of cycling infrastructure,<sup>40</sup> sub-division design codes,<sup>41</sup> or walking infrastructure;<sup>37</sup> and park renovations.<sup>42</sup> The UK Medical Research Council has published guidelines for designing natural experiments,<sup>43</sup> and the US National Cancer Institute has called for obesity policy research that includes natural experiments.<sup>44</sup> These studies can provide policy-relevant evidence, but only if they can:

- detect small effects over time;<sup>41,45</sup>
- incorporate policy-specific measures;<sup>46,47</sup> and
- monitor implementation to learn what is needed to affect health outcomes.<sup>47</sup>

Importantly, natural experiments are more likely to influence policy and practice when undertaken from the outset in partnership with policy-makers and practitioners.<sup>47,48</sup>

## Conduct research focusing on community needs and preferences

Greater attention needs to be paid to consumer preference. In what environments do people want to live? US surveys find strong support for urban design policies to increase physical activity.<sup>56,57</sup> Where people currently reside does not always reflect preferences that affect active travel. Frank and colleagues<sup>49</sup> found that many people desire, but do not live in walkable environments. In recent years, property prices in walkable neighbourhoods seem to reflect a latent demand for walkability.<sup>50</sup> Politicians may therefore promote walkability based on the expressed wishes of their constituents. Developers and their financiers may take note when trying to profit from the communities they build.

## Highlight specific policy implications

Policymakers usually want to know about the problem, the effect, *and* the solution.<sup>18</sup> When writing journal articles, it is important to keep in mind that busy policymakers and practitioners may read only the abstract.<sup>20</sup> Avoid vague statements that ‘policy implications must be



considered'. Abstracts are most useful when they include specific research-informed policy recommendations on which policymakers can act. Perhaps they will read on.

### **Create interdisciplinary built environment and health training programmes**

Formal interdisciplinary training in public health, planning, parks and recreation, transport, and related fields<sup>51</sup> may facilitate translation of active living and interdisciplinary research. For at least a decade, many have called on us to reconnect the disciplines of planning and health.<sup>52</sup> Training programmes in built environment and health, a nascent trend across universities, have emerged in North America,<sup>51</sup> the United Kingdom,<sup>53</sup> Australia,<sup>54</sup> Japan, and Canada. They are reflected in the WHO's Healthy Cities movement.<sup>55</sup> Courses on planning and transport policy should now be incorporated into public health degrees and vice versa, with the aim of building understanding across disciplines.

### **Conclusions**

To influence policy, active living researchers must work in multidisciplinary teams that generate policy-relevant research. We have proposed ten strategies to encourage more policy-relevant research and more effective translation of research into policy and practice. Active living researchers will benefit from a greater understanding of the sectors they seek to reform. Built environment professionals and researchers will also benefit from a better understanding of the health impacts of their efforts. To improve research translation, universities and research funders must alter reward systems, shifting from a focus on publications and grant successes, to reward engaging with policymakers and practitioners, asking policy-relevant research questions, and communicating findings to those who can put research into practice. If this results in health-enhancing cities, the major beneficiaries of improved active living research will be the communities we serve.

### **About the Authors**

Billie Giles-Corti, PhD, is a Professor of the McCaughey VicHealth Centre for Community Wellbeing, The University of Melbourne and

Lead of the NHMRC Centre of Research Excellence in Healthy Liveable Communities.

James F Sallis, PhD, is Distinguished Professor of Family and Preventive Medicine at University of California, San Diego and Director of Active Living Research, a programme of the Robert Wood Johnson Foundation (E-mail: jsallis@ucsd.edu).

Takemi Sugiyama, PhD, is Senior Research Fellow in Spatial Epidemiology and Evaluation Research Group at University of South Australia (E-mail: Takemi.Sugiyama@unisa.edu.au).

Lawrence D Frank, PhD, is the Bombardier Chairholder in Sustainable Transportation and Public Health at the University of British Columbia and President of Urban Design for Health, Inc (E-mail: ldfrank@urbandesign4health.com).

Melanie Lowe, MPH, is a PhD student and research assistant at the McCaughey VicHealth Centre for Community Wellbeing, Melbourne School of Population and Global Health, The University of Melbourne (E-mail: mdlowe@unimelb.edu.au).

Neville Owen, PhD, is Program Leader for Behavioural and Generational Change and Behavioural Epidemiology Laboratory Head at the Baker IDI Heart and Diabetes Institute in Melbourne, Australia (E-mail: Neville.Owen@bakeridi.edu.au).

## References

1. World Health Organization. (2008) *Closing the Gap in a Generation*. Geneva, Switzerland: World Health Organization.
2. Brownell, K.D. and Warner, K.E. (2009) The perils of ignoring history: Big tobacco played dirty and millions died. How similar is big food? *Milbank Quarterly* 87(1): 259–294.
3. Lee, I.M., Shiroma, E.J., Lobelo, F., Puska, P., Blair, S.N. and Katzmarzyk, P.T. (2012) Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *Lancet* 380(9838): 219–229.
4. Kohl, H.W. *et al* (2012) The pandemic of physical inactivity: global action for public health. *Lancet* 380(9838): 294–305.
5. Organisation for Economic Cooperation and Development. (2012) *Compact City Policies: A Comparative Assessment*. Organisation for Economic Cooperation and Development.
6. Transportation Research Board. (2005) *Does the Built Environment Influence Physical Activity? Examining the Evidence*. Washington DC: Transportation Research Board.



7. National Institute for Health and Clinical Excellence. (2008) *Promoting or Creating Built or Natural Environments that Encourage and Support Physical Activity*. London: National Institute for Health and Clinical Excellence.
8. Owen, N. *et al* (2007) Neighborhood walkability and the walking behavior of Australian adults. *American Journal of Preventive Medicine* 33(5): 387–395.
9. Christian, H.E. *et al* (2011) How important is the land use mix measure in understanding walking behaviour? Results from the RESIDE study. *International Journal of Behavioral Nutrition and Physical Activity* 8(55), doi:10.1186/1479-5868-8-55.
10. Müller-Riemenschneider, F. *et al* (2013) Neighborhood walkability and cardiometabolic risk factors in Australian adults: An observational study. *BMC Public Health* 13(755);doi:10.1186/1471-2458-13-755.
11. Frank, L.D., Andresen, M.A. and Schmid, T.L. (2004) Obesity relationships with community design, physical activity, and time spent in cars. *American Journal of Preventive Medicine* 27(2): 87–96.
12. Ewing, R., Schieber, R.A. and Zegeer, C.V. (2003) Urban sprawl as a risk factor in motor vehicle occupant and pedestrian fatalities. *American Journal of Public Health* 93(9): 1541–1545.
13. Frank, L.D., Greenwald, M.J., Winkelman, S., Chapman, J. and Kavage, S. (2010) Carbonless footprints: promoting health and climate stabilization through active transportation. *Preventive Medicine* 50(Suppl 1): S99–S105.
14. Sugiyama, T., Francis, J., Middleton, N.J., Owen, N. and Giles-Corti, B. (2010) Associations between recreational walking and attractiveness, size, and proximity of neighborhood open spaces. *American Journal of Public Health* 100(9): 1752–1757.
15. Francis, J., Wood, L.J., Knuiiman, M. and Giles-Corti, B. (2012) Quality or quantity? Exploring the relationship between public open space attributes and mental health in Perth, Western Australia. *Social Science & Medicine* 74(10): 1570–1577.
16. Annerstedt, M., Ostergren, P.O., Bjork, J., Grahm, P., Skarback, E. and Wahrborg, P. (2012) Green qualities in the neighbourhood and mental health – Results from a longitudinal cohort study in Southern Sweden. *BMC Public Health* 12(337), doi:10.1186/1471-2458-12-337.
17. Frumkin, H. (2002) Urban sprawl and public health. *Public Health Reports* 117(3): 201–217.
18. Goldstein, H. (2009) Translating research into public policy. *Journal of Public Health Policy* 30: S16–S20, doi:10.1057/jphp.2008.49.
19. Brownson, R.C., Royer, C., Ewing, R. and McBride, T.D. (2006) Researchers and policymakers: Travelers in parallel universes. *American Journal of Preventive Medicine* 30(2): 164–172.
20. Moodie, R. (2009) Where different worlds collide: Expanding the influence of research and researchers on policy. *Journal of Public Health Policy* 30(Suppl 1): S33–S37.
21. Choi, B.C.K. *et al* (2005) Can scientists and policy makers work together? *Journal of Epidemiology and Community Health* 59(8): 632–637.
22. Green, L.W. (2006) Public health asks of systems science: To advance our evidence-based practice, can you help us get more practice-based evidence? *American Journal of Public Health* 96(3): 406–409.
23. Field, P., Gauld, R. and Lawrence, M. (2012) Evidence informed health policy – The crucial role of advocacy. *International journal of clinical practice* 66(4): 337–341.
24. Ottoson, J.M. *et al* (2009) Policy-contribution assessment and field-building analysis of the Robert Wood Johnson foundation's active living research program. *American Journal of Preventive Medicine* 36(2): S34–S43.
25. Allender, S., Cavill, N., Parker, M. and Foster, C. (2009) 'Tell us something we don't already know or do!' – The response of planning and transport professionals to public health guidance on the built environment and physical activity. *Journal of Public Health Policy* 30(1): 102–116.

26. Haynes, A.S. *et al* (2011) From 'our world' to the 'real world': Exploring the views and behaviour of policy-influential Australian public health researchers. *Social Science & Medicine* 72(7): 1047–1055.
27. Innvaer, S., Vist, G., Trommald, M. and Oxman, A. (2002) Health policy-makers' perceptions of their use of evidence: A systematic review. *Journal of Health Services Research & Policy* 7(4): 239–244.
28. Rogers, E.M. (1983) *Diffusion of Innovations*, 3rd edn. New York: The Free Press.
29. Straton, J. and Giles-Corti, B. (2003) How the west was won: Abortion law reform in Western Australia. In: W. Weeks, L. Hoatson and J. Dixon (eds.) *Community Practice in Australia*. Canberra, Australia: Pearson Education Australia.
30. Kreuter, M.W., De Rosa, C., Howze, E.H. and Baldwin, G.T. (2004) Understanding wicked problems: A key to advancing environmental health promotion. *Health Education and Behavior* 31(4): 441–454.
31. Boarnet, M.G., Greenwald, M. and McMillan, T.E. (2008) Walking, urban design, and health – Toward a cost-benefit analysis framework. *Journal of Planning Education and Research* 27(3): 341–358.
32. Department of Infrastructure and Transport. (2012) *Walking, Riding and Access to Public Transport*. Canberra, Australia: Commonwealth of Australia.
33. American Public Health Association. (2010) *The Hidden Cost of Transportation*. Washington DC: American Public Health Association.
34. Woodcock, J. *et al* (2009) Public health benefits of strategies to reduce greenhouse-gas emissions: Urban land transport. *Lancet* 374(9705): 1930–1943.
35. Gotschi, T. (2011) Costs and benefits of bicycling investments in Portland, Oregon. *Journal of Physical Activity and Health* 8(Suppl 1): S49–S58.
36. McCormack, G.R. *et al* (2012) The association between sidewalk length and walking for different purposes in established neighborhoods. *International Journal of Behavioral Nutrition and Physical Activity* 9(92):doi:10.1186/1479-5868-9-92.
37. Ogilvie, D. *et al* (2012) Evaluating the travel, physical activity and carbon impacts of a 'natural experiment' in the provision of new walking and cycling infrastructure: methods for the core module of the iConnect study. *BMJ Open* 2(1): e000694.
38. Boarnet, M.G., Anderson, C.L., Day, K., McMillan, T.L. and Alfonzo, M. (2005) Evaluation of the California safe routes to school legislation. *American Journal of Preventive Medicine* 28(2S2): 134–140.
39. Stewart, O., Vernez Moudon, A. and Claybrooke, C. (2014) Multi-state evaluation of safe routes to school programs. *American Journal of Health Promotion* 28(sp3): S89–S96.
40. Pucher, J., Dill, J. and Handy, S. (2010) Infrastructure, programs, and policies to increase bicycling: An international review. *Preventive Medicine* 50(Suppl 1): S106–S125.
41. Giles-Corti, B. *et al* (2013) The influence of urban design on neighbourhood walking following residential relocation: Longitudinal results from the RESIDE study. *Social Science & Medicine* 77(January): 20–30.
42. Cohen, D. *et al* (2014) The potential for pocket parks to increase physical activity. *American Journal of Health Promotion* 28(sp3): S19–S26.
43. Medical Research Council. (2011) *Using Natural Experiments to Evaluate Population Health Interventions: Guidance for Producers and Users of Evidence*. London: Medical Research Council.
44. National Cancer Institute. (2009) *Funding Opportunity for Obesity Policy Research: Evaluation and Measures (R01/R03/R21)*. Washington, DC: US Department of Health and Human Services National Institutes of Health.
45. Craig, P. *et al* (2012) Using natural experiments to evaluate population health interventions: New Medical Research Council guidance. *Journal of Epidemiology and Community Health* 66(12): 1182–1186.



46. Durand, C., Andalib, M., Dunton, G., Wolch, J. and Pentz, M. (2012) A systematic review of built environment factors related to physical activity and obesity risk: Implications for smart growth urban planning. *Obesity Review* 12(5): e173–e182.
47. Hooper, P., Giles-Corti, B. and Knuiaman, M. (2014) Evaluating the implementation and active living impacts of a state government planning policy designed to create walkable neighborhoods in perth, Western Australia. *American Journal of Health Promotion* 28(3 Suppl): S5–S18.
48. Giles-Corti, B. and Whitzman, C. (2012) Active living research: Partnerships that count. *Health & Place* 18(1): 118–120.
49. Frank, L.D., Saelens, B.E., Powell, K.E. and Chapman, J.E. (2007) Stepping towards causation: Do built environments or neighborhood and travel preferences explain physical activity, driving, and obesity? *Social Science and Medicine* 65(9): 1898–1914.
50. Cortright, J. (2009) *Walking the Walk: How Walkability Raises Home Values in U.S. Cities*. Washington DC: CEOs for Cities.
51. Botchwey, N.D. et al (2009) A model curriculum for a course on the built environment and public health: Training for an interdisciplinary workforce. *American Journal of Preventive Medicine* 36(2 Suppl): S63–71.
52. Corburn, J. (2007) Reconnecting with our roots. American urban planning and public health in the twenty-first century. *Urban Affairs Review* 42(5): 688–713.
53. Pilkington, P., Marco, E., Grant, M. and Orme, J. (2013) Engaging a wider public health workforce for the future: A public health practitioner in residence approach. *Public Health* 127(5): 427–434.
54. Thompson, S.M., Whitehead, A. and Capon, A.G. (2010) The healthy built environments program: A joint initiative of the NSW department of health and the university of NSW. *NSW Public Health Bulletin* 21(5–6): 134–138.
55. Duhl, L.J. (1996) An eohistory of health: The role of 'healthy cities'. *American Journal of Health Promotion* 10(4): 258–261.
56. Carlson, S.A., Guide, R., Schmid, T.L., Moore, L.V., Barradas, D.T. and Fulton, J.E. (2011) Public support for street-scale urban design practices and policies to increase physical activity. *Journal of Physical Activity and Health* 8(Suppl 1): S125–S134.
57. Handy, S., Sallis, J.F., Weber, D., Maibach, E. and Hollander, M. (2008) Is support for traditionally designed communities growing? Evidence from two national surveys. *Journal of the American Planning Association* 74: 209–221.



This work is licensed under a Creative Commons Attribution 3.0 Unported License. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in the credit line; if the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit <http://creativecommons.org/licenses/by/3.0/>