

**Collaborative working to overcome barriers to active transport:  
learning from a living lab**

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*Innovative research on barriers to active transport in Palmerston North set out to “disrupt” conventional approaches to research in a number of ways. First, council managers and planners worked collaboratively with university researchers to determine the focus of research and the approach that was taken. Second, the two organisations (council and university) chose to focus on their own staff in order to be able to demonstrate leadership in the community in addressing the challenge of promoting active transport. An online questionnaire was developed and administered to staff of both organisations. Third, recognising the need to have a long-term approach, both organisations have continued to collaborate in carrying out follow-up research and implementing the findings. This paper outlines the background to the research that was initiated in 2014 and discusses the importance of the long-term relationships between planners, policy advisors and active transport researchers. It shares insights for local government, district health boards and other key agencies about working collaboratively to co-create research about and implement solutions to increase participation in active transport.*

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## 1. Introduction

Moving towards healthy communities requires cross-sectoral action. This is not new for health promotion professionals and was a central theme of the Ottawa Charter for Health Promotion in 1986. This international agreement, signed at the First International Conference on Health Promotion, organised by the World Health Organisation, had a goal of 'health for all' by 2000 (McMurray & Clendon, 2015). A key theme was that health promotion could not be achieved by the health sector alone but required cross-sectoral action by local and central government agencies with responsibilities across a number of domains, as well as by non-government organisations (business, media, etc.). Nearly 30 years later, however, cross-sectoral action remains a challenge, and the goal of health for all remains elusive.

Transport is a key sector influencing health. It is increasingly recognised that residents of urban environments that support walking and cycling have better health status than those who live in places with poorer walkability. A literature review by Genter et al. (2008) identified four health conditions for which there is robust evidence of reduced risk resulting from increased physical activity (including active transport): cardiovascular disease, cancer, Type 2 diabetes, obesity and depression. There is also a burgeoning international literature that highlights the impact of physical (in)activity on health (see, for example, Bauman et al., 2009; Brown, Diamedi, Moodie, Veerman, & Carter, 2016; Ewing, Meakins, Hamidi, & Nelson, 2014; Sjöström, Oja, Hagströmer, Smith, & Bauman, 2006; Warsow, 2015). As well, there are environmental benefits from increased use of active transport which have indirect health benefits. Yet, integration of health, transport and environmental planning is, arguably, a 'wicked issue', a term used to describe an issue characterised by complexity and requiring action by multiple agencies across legal and administrative boundaries (Rittel & Webber, 1973). Despite the challenges, collaboration amongst a range of government, business and civil society actors is now seen as not only desirable but necessary (Berkes, 2010; Gray, 1989; Healey, 1992, 1998; Selin & Chevez, 1995).

Local authorities have traditionally played a significant role in providing local leadership to foster a healthy community through their responsibility for public health, for ensuring the provision of clean water, and managing the environment. They also have responsibility for providing a safe land transport system. With more sedentary lifestyles, it has become recognised that active transport should play a more prominent role in a multi-modal transport system. Although local government does not currently have a legislative mandate to foster a

healthy community, it does have statutory responsibilities associated with liveability which indirectly, if not directly, can foster a healthier community.

The paper reports on research undertaken by transport planning researchers at Massey University in conjunction with the local city council to explore barriers to active transport in Palmerston North. The research, which was initiated in 2014, was carried out as part of the Massey University Living Lab (MULL), a mechanism for connecting university staff and, importantly, student researchers with organisations who would like research about a particular topic. First, we outline the MULL and its distinctive approach to research. After discussing the background to the Barriers to Active Transport project, we outline the research methods and briefly summarise the findings. The final part of the paper presents some insights from this mode of inquiry which we hope are helpful for people working in and with local government, district health boards and other key agencies to promote active transport. Our focus is not so much the detail of the findings but the way in which the project has continued to evolve and the unique approach which is hoped to lead to long-term positive change to support increased use of active transport.

## **2. The Living Lab approach**

Following a number of other universities, Massey University launched a 'living laboratory' in 2012 which was intended to provide the framework for a new era of partnership with local government and other external stakeholders to foster research and scholarship around the complex challenges of promoting sustainability. The concept of a living lab resonated strongly with a contemporary view of the university as the 'ecological university'. The notion of the 'ecological' university was developed by Barnett (2011) who argues that throughout its history the university has taken on different roles in society. He identifies four distinct types of university loosely associated with different chronological phases:

- Metaphysical university
- Research university
- Entrepreneurial university
- Ecological university

The term 'metaphysical university' refers to institutions of higher education that assumed the purpose of learning and inquiry was to enable scholars to access a transcendental realm of truth, enlightenment or divine knowledge. The term 'research university' refers to institutions in which the central purpose is research and knowledge (as opposed to scholarship and

learning). The term 'entrepreneurial university' refers to institutions which are concerned with their impact and especially their economic return. The 'ecological university' is described by Barnett as "a university that takes seriously both the world's interconnectedness and the university's interconnectedness with the world" (Barnett, 2011, p. 451). For planning and many professional programmes, connectedness has been critical to research and teaching which necessarily connects with professional practice. However, the value of connectedness has not always been emphasised or acknowledged in institutional reward systems such as promotion and research funding which have often placed greater priority in, for example, articles in scholarly journals rather than in practitioner publications or industry magazines. At a time when technology is rapidly evolving and the nature of work is changing, it is even more important for the university to be networked with the community and industry, and for students to be graduating with a skill set and body of knowledge that includes first-hand knowledge of wider community and its planning activities, issues and challenges.

The concept of a living laboratory and similar organisational structures connecting theoretical and practical knowledge is well-established in different higher education and other learning institutions and is found in a range of disciplines, not just urban/environmental planning or those with a sustainability focus although they are often associated with education for sustainable development (see, for example Haymaker & Chachere, 2006; Martin & Samels, 2012; Wright, 2007). The concept embodies an approach to research that is intentionally contrasted with conventional laboratory research. The latter takes place in a location removed from the real world, and even artificial. Research often is guided by the scientific method which makes a virtue of scientific objectivity and the researcher's detachment. This mode of research is often favoured by local and central government.

The living laboratory instead utilises research sites in the real world and adopts a different approach to research design – research problems or questions are developed in conjunction with stakeholders. Rather than the usual principal-agent relationship between a council and researchers (typically external consultants), the living laboratory emphasises the co-creation of knowledge through innovative projects (Miskin, 2012). Students are at the centre of the living laboratory.

As noted above, the living laboratory concept has particular resonance for urban/environmental planning academics and scholars, concerned as they are with sustainability and with development of practical skills for planning and managing the natural and built environment. Urban/environmental planning is uniquely placed to assist students

to understand and work with the interconnectedness of the world – in particular, its ecological, economic and social dimensions.

The Massey University Living Laboratory is a collaborative research and innovation space where academics and research students work with external partners to *co-create* new sustainability-related knowledge and practices. A particular focus has been developing joint research projects with local government, often on topics that are central to planning such as changing land-use, addressing housing needs, urban agriculture and transport. It is very much oriented towards defining, developing and demonstrating sustainable futures and resilient communities.

### **3. Background to the Barriers to Active Transport project**

For the Living Lab approach, this element of connectedness is reflected through connections with stakeholders external to the University to develop research questions. The genesis of the active transport project was recognition by Palmerston North City Council (PNCC) that transport was a key element in achieving its Sustainable City Strategy and several other strategic goals. In October 2014 staff from PNCC and Massey University met to discuss possible topics for student research over the 2014/15 summer. In the two previous summers, the MULL with support from PNCC offered summer scholarships to address aspects of urban sustainability. For example, a project focused on peri-urban development and the impact on good agricultural soils and provided data to inform the council's district plan review. PNCC sought to build on and consolidate this initial work and, to this end, it allocated funding in 2012 and 2015 Long Term Plans for research into sustainability issues that impact on the city and its environment. In the Long Term Plans it was clear that a major priority was:

the ongoing communication, review and monitoring of the Council's strategies. In particular, research into sustainability issues that affect the City will inform ongoing monitoring and review of the Sustainable City Strategy. As will research into the future implications for the Council of cost increases in oil and oil-related products, and how it can deliver and configure its services differently to accommodate these increases (Palmerston North City Council, 2015, p. 73).

Moreover it recognised the need to work collaboratively with key city, regional and national stakeholders with which it had built good relationships. The relationship with the university was long-established but had been considerably strengthened by the active involvement of the chief executives and senior leadership teams of the organisations during the tenure of

Massey University's Vice Chancellor, Steve Maharey, who, as a former city councillor, had in-depth knowledge of local government.

A number of factors led to consensus that active transport was an area about which much more needed to be known. At the time PNCC was preparing an Integrated Transport Strategy and there was strong political and community interest in improved infrastructure for walking and cycling. As well, less than two months earlier, in August 2014, the Prime Minister had announced that \$100 million of new funding would be spent on urban cycleways over the coming four years to accelerate cycleways in urban centres. The Transport Minister explicitly referred to the health benefits of bicycle commuting as well as the benefits of reduced congestion.

There was anecdotal evidence of increased walking and cycling for recreation. However, Palmerston North City Council, like many other local authorities in New Zealand and elsewhere, also wanted to promote increased walking and cycling for transport as well as recreation.

Between 1996 and 2006 there had been a significant decline in the percentage of people biking to work in Palmerston North from 10.5% to 5.9%. There had not been a further decline between 2006 and 2013 in numbers biking to work in Palmerston North, and Palmerston North has a higher number of people biking to work than the average nationally. However, it was of concern that there had been no increase in numbers biking to work in Palmerston North at a time when biking to work had increased significantly in some other places. Nationally, there had been an increase in the number of New Zealanders cycling to work up from 2.5% in 2006 to 2.9% in 2013. While this is not substantial it is still an increase.

The percentage of the NZ population aged 15 and over walking to work has been stable since 2001. Around 7% of New Zealanders (106,119 people) walked to work in 2013 (Statistics New Zealand, 2015, p. 9). This has been consistent since the 2001 Census. However, in Palmerston North the percentage walking or jogging to work decreased from 9.5% in 2006 to 8.9% in 2013. It was of interest that Palmerston North had not followed the national trend (i.e. no decline).

National-level trends are skewed by the trend in the centres with the largest population - in particular, Auckland. As well, and more importantly, they blur differences at the sub-national level. For example, there are some local authorities where there were increases in active transport for commuting much greater than the national average. In 2013, Nelson city had the highest percentage of people who travelled to work by bicycle, at 8.7%. This was up from

7.2% in 2006. Christchurch city was next highest, at 7% – up from 6.5% in 2006 (Statistics New Zealand, 2015, p. 15). Both of these are much higher than the national rate of use of active transport for commuting (2.9%).

Nelson and Christchurch for some years have been recognised as bike-friendly cities so perhaps the overall percentage and the rate of increase in cycling to work in those cities is not unexpected. However, it is also clear that cities that are not perceived as bike-friendly have also had an increase in the numbers cycling even if the overall percentage in 2013 is similar to the current national rate. In Auckland, which is not regarded as bike-friendly (as seen in media coverage of cycle fatalities and road rage involving motorists and cyclists), the main means of travel to work has been relatively stable since 1996, although there have been increases in public transport use and active transport. The rate of use of active transport modes (walking, jogging and cycling) in Auckland was 2013 was 6.5% (Statistics New Zealand, 2014, p. 26). Cycling's share had increased from 1% in 2006 to 1.2% in 2013.

Active modes can be used in conjunction with public transport but may be replaced by public transport where there are high-quality, affordable services. In Palmerston North City, urban bus services are free for many staff and students of the city's two largest tertiary education institutions, Massey University and UCOL. Between 2006 and 2013 there was an increase from 1.7% to 2.2% in the number of people using public transport for commuting in Palmerston North. It has been suggested that some of the increase in urban bus patronage may be people who might otherwise cycle. While this may assist in reducing congestion, the full range of health benefits of active transport may not be experienced. Without active participation in active transport the city does not have a genuinely multi-modal transport system.

There is a large body of international evidence that identifies and examines barriers to use of active transport, as well as some NZ-based studies. These studies have often been undertaken in cities with much larger populations than Palmerston North. While many of the barriers to active transport are likely to be generic to most western industrialised countries, it is also important to recognise that barriers may also be specific to an area reflecting local demographic characteristics, culture, history, the particular land transport system, topography and even weather. Understanding these features of the locality can ensure that transport planning and especially any interventions designed to increase use of active transport modes can be tailored towards the local situation.

#### **4. Researching barriers to active transport through a 'living lab'**

The research has had several phases and is continuing. The first phase, which took place over ten weeks from November 2014 to February 2015, involved a review of literature on barriers to active transport in Palmerston North and a survey of 2,456 users of the land transport system about barriers to active transport in Palmerston North. This research was undertaken with the assistance of a senior undergraduate Planning student and a senior Planning postgraduate student who had scholarship funding. This reflects the emphasis on the research being part of students' educational training as opposed to being a job or contract. Approximately half of the ten-week project was spent on literature review and questionnaire design and piloting. The other half was spent on survey administration, data collection and analysis and report-writing. Both organisations made a substantial in-kind contribution through the participation of a small number of key staff in a project reference group, senior manager 'sponsorship' and, additional funding or in-kind contributions.

As noted above, connections between staff of the organisation have been of considerable importance. In particular, there has been a long history of contact between the City Planner and his team and staff in the Planning programme which was built on strong professional ties. This meant that trust, communication and other essential ingredients of any collaboration were already present. While it is important for relationships to exist at senior levels (ideally first and second tier management) it is also vital that relationships also exist at lower tiers. Previously existing professional linkages (administrators, planners, engineers, etc.) provide a foundation for project-specific linkages. As with other successful policy and programme implementation, initiatives led by senior managers must also be 'owned' by staff at lower tiers. And it has been essential to work across professional boundaries so that not just planners but other key professionals are contributing to the design of research and the data collection and analysis.

A second phase of research involved utilising the questionnaire for a paper-based survey of Massey University students. This was conducted by students in a 300-level Transport and Urban Planning paper. The survey took place on 22nd April 2015. Students worked in groups to analyse the data and produced four group projects. Findings from this form an appendix in a report published in 2015 which contains detailed discussion of the literature review and survey of users of the land transport system undertaken in January 2015 (Cheyne, Imran, Scott, & Tien, 2015).

It was seen as important to gather information from a range of land transport users, not just those who currently use active transport. Because both organisations wanted to know more about their own staff use of active transport and because it was felt that large public sector employers in the city had responsibilities to provide leadership (especially in relation to



sustainability), it was decided that to distribute an online survey to staff at Palmerston North City Council and Massey University's Manawatu Campus in Palmerston North. The purpose of the survey was to find out about people's use of different transport modes, and their impressions of the suitability of the built environment in Palmerston North for walking and cycling for short trips. The focus was not specifically on the respondents' own travel behaviour. As well as the online questionnaire, paper copies were made available to staff at Palmerston North City Council who worked away from the Civic Administration Building and did not have email addresses. The overall response rate to the survey, which ran for two weeks in mid-January 2015, was 42.5%. Just over half of the 2,456 respondents (57%) were female. This reflects the gender composition of the workforce. Sixty per cent of respondents were aged 40-59 which is more skewed toward this age group than the age distribution of the population.

Respondents were asked to rate different areas in the city (CBD, main roads, local roads) for walking and cycling on a 5-point Likert scale from 'very good' to 'very poor'. They could also indicate if they did not know or did not live in the city. They were given a list of possible factors that discourage people from walking and cycling and asked to list the top three factors. The factors were identified from the literature and represented the various barriers discussed above.

The survey focused on walking and cycling with respondents reporting some different barriers for each although also some common barriers such as weather and safety. The most significant barriers to walking were weather, the need to transport heavy/bulky items, the time involved, lack of enthusiasm/motivation, physical effort and the need to transport children. The most significant barriers to cycling were safety, infrastructure, time, convenience, and transporting heavy/bulky loads.

When giving feedback on different parts of the land transport system (their neighbourhood streets, main roads and city centre) respondents also ranked these differently according to each mode. This reinforces the need for initiatives tailored towards each mode to be developed in order to address barriers. The survey also highlighted unevenness across the city in terms of the quality of infrastructure.

Because the age distribution of respondents to the January 2015 survey was skewed towards the 40-59 years age group, in the second phase in which 3<sup>rd</sup> year Planning students, as part of their coursework, administered the questionnaire to Manawatu campus

students on campus, and analysed the data. This allowed for information to be collected from a younger age cohorts.

In 2016, a third phase began. Third year Planning students carried out focus group research with secondary school students in semester one and this is now being written up. Two 4<sup>th</sup> year Planning students are undertaking research (to be completed in October 2016) for their Honours projects on use of shared paths. These projects have been designed through discussion by staff of both organisations and provide valuable learning opportunities for Planning students for whom transport planning and research skills are key parts of the curriculum. Demonstrating a commitment not just to research but to infrastructural improvements, Palmerston North City Council has included additional funding in its draft 2016/2017 Annual Plan for improved infrastructure for active transport.

## **5. Discussion**

Research using a 'living lab' approach emphasises co-production of the research question and research design and methods. It requires close interaction and collaboration between, and reflection by, all parties involved rather than a more common 'principal-agent' relationship in which research is purchased or outsourced from a consultant or research organisation. This co-production is important in order to ensure that the research is both rigorous *and* relevant. When researching a complex issue, such as barriers to active transport, especially when the issue is embedded in a political context, the design and reporting must take into account the 'realpolitik' of planning and decision-making processes in local government. Having a reference group which included key stakeholders within each organisation assisted with navigating the 'realpolitik' - that is, the practical reality and the real-world planning and decision-making context as opposed to academic theoretical or ideological views about what transport planning.

Understanding the barriers to active transport requires understanding the complexities of travel behaviour. Universities and city/district or regional councils are organisations that have potential to integrate diverse disciplines and professions. Staff and student transport planning researchers are able to work collaboratively not only with other researchers in other disciplines/subjects but also with professionals (e.g. transport planners, facilities managers, policy advisors). From other disciplines (e.g. social marketing/communications, psychology, sociology, engineering), planners can draw on different approaches to understanding how and why people make the transport choices they do. Within a city/district or regional council, transport planners have the opportunity to work closely with other infrastructure planners,

policy planners, asset managers, transport engineers, environmental scientists and other professionals. They are also increasingly expected to work across agency boundaries and to collaborate with relevant professionals in other public sector organisations (e.g. district health board). The nature of local government and the nature of urban/environmental planning mean that a living lab approach was very fruitful for studying this research question. Both have a focus on place-based planning and research and this study was grounded in the notion that place may be a significant factor in understanding active transport participation.

Insights about success factors for collaborative working were also reinforced by this project. In particular, trust, open and transparent communication (about any political or methodological issues) and 'thick' relationships built up and sustained over time not just through formal connections between organisations but informal random conversations and professional exchanges, assisted mutual understanding. Another key factor for successful living lab is the first-hand experience of active transport modes by people involved in the research from both organisations. Not all key people involved in the project are regular users of active transport but some are and this allowed for some 'ground-truthing'.

Contributing to the success of the Massey University Living Lab were several key factors that are recommended to other organisations:

- 1) Senior manager understanding and arms-length involvement;
- 2) A continuing relationship over time: this project built on previous summer scholarship projects but also a long history of contact which current senior managers also fostered; as well, there was a commitment to an on-going research relationship;
- 3) Lower-tier manager/officer 'buy-in' so that initiatives 'sponsored' by senior managers are also 'owned' by staff in the lower tiers of participating organisations;
- 4) Researcher familiarity with council planning processes and political drivers so that the wider context for the research is well-understood;
- 5) Well-oiled wheels of communication (to ensure clarity of roles, mutual agreement about timeframes, understanding and consensus about methods and reporting) - achieved primarily through reference group meetings with clear agendas and minutes but also by principal investigator contact with staff of both organisations;
- 6) A 'go-between' with sufficient seniority and/or access to senior managers and researchers who was a key point of contact for individuals in both (all) organisations; and
- 7) Government policy momentum with policy developments and research being mutually-reinforcing.

As noted above a commitment to an on-going relationship has been a key ingredient in the Massey University Living Lab research projects with PNCC and something to be considered by others seeking to use a similar approach. When the decision was made to focus on active transport there was also a commitment to more than a 3-4 month summer research project. Instead, the intention was to continue with further data collection and analysis to support the council's broader sustainability and active transport goals. This reflects the realisation that promoting sustainability requires a long-term strategy. Not just in relation to sustainable transport but in sustainable energy use more broadly, as well as water consumption, waste minimisation, restoring and enhancing indigenous biodiversity and improving water quality profound societal transformation is needed from the unsustainable resource use and consumption patterns that have characterised the last century. Local and central government politicians who are subject to short-term electoral cycles lack incentives to address long-term goals if there are short-term costs. Therefore, developing more sustainable communities is heavily dependent on communities themselves making different choices rather than politicians imposing change without understanding inertia that exists around transformation towards more sustainable behaviours. It is easy to point to lack of skills and knowledge in council staff and elected members but without engaging people in processes of education for sustainability which underpins much of the Massey University Living Lab approach the relevant skills and knowledge will not be sought or utilised.

## **6. Conclusion and recommendations**

The research project on barriers to active transport is not yet two years and there is much more work to do in terms of data collection and implementation of findings. Indeed, implementation of findings is something that has yet to be incorporated into the research (but with the necessary degree of independence). However, the nature of the living lab is that the project is a living activity and continues to evolve.

There are, of course, many limitations of the research to date largely emanating from the heavy demands on workloads of staff of both organisations and the time required to design and conduct research especially when working around the availability and learning requirements of student researchers. The Living Lab research project is just a very small part of the workload of staff and is inevitably subject to the funding and electoral cycles as well (reviews of long-term/ten year plans, changing strategic directions, etc).

Whilst acknowledging the many limitations it is still possible to identify some benefits. This research affirms that collaborative working results in added value beyond that associated

with a conventional approach to outsourcing research. By working with a university, the city council gained access to considerable transport planning and research expertise, the university's research infrastructure more generally (e.g. access to software for survey research and data analysis; peer reviewers); to student capability and 'labour'; and, through the university library's extensive collection and its online resources, to scholarship about the broad topic of active transport, and the specific area of barriers to use of active transport and also about new and emerging transport technologies that can potentially enhance the use of transport infrastructure). Academic researchers have obligations to disseminate the findings of their research in a range of media, not just international journals but also the popular press, thus ensuring that new insights obtained from this 'real world' research are shared widely. Disseminating the findings of the research locally has captured interest from other organisations and challenged us further to identify ways of working collaboratively across the urban planning, transport and health nexus and across different spheres of government to dismantle barriers to active transport. We emphasise this focus on 'tiers' of government but 'spheres' of responsibility as part of working collaboratively across sectors.

By working with the city council, Massey University accrued benefits in the form of funding for summer scholarships; the opportunity for staff and student researchers to have streamlined access to council planners and relevant managers and members of the council's senior leadership team; and the opportunity to gather data to inform current policy development and the planning process. The published research (which had two university researchers and two student researchers as co-authors) was promoted via PNCC's website, and via the council's regular electronic and other communications as well as via the university's website, complementing the methods of dissemination used by academic researchers.

The living lab approach offers scope for academic research projects to be more connected to current policy development and its implementation in planning processes, and to achieve better learning outcomes for students and consequently better outcomes for the University and the wider community. The focus of living labs in the university setting is on student research given the key role in training researchers but other academic research that does not involve students often seeks to have a direct relevance and impact - especially action research and research in applied fields. Similarly, research conducted outside of university settings could easily adopt a living lab approach, and some does. This is more likely to happen in non-governmental than in governmental organisations but just as it has been possible in local government research, it is quite feasible, and indeed desirable, for central government-sponsored research as well.

## References

- Barnett, R. (2011). The coming of the ecological university. *Oxford Review of Education*, 37(4), 439-455. doi:10.1080/03054985.2011.595550
- Bauman, A., Bull, F., Chey, T., Craig, C. L., Ainsworth, B. E., Sallis, J. F., . . . Pratt, M. (2009). The International Prevalence Study on Physical Activity: results from 20 countries. *International Journal of Behavioral Nutrition and Physical Activity*, 6(1), 1-11. doi:10.1186/1479-5868-6-21
- Berkes, F. (2010). Devolution of environment and resources governance: Trends and future. *Environmental Conservation*, 37(4), 489-500. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-79951768506&partnerID=40&md5=c36c4e583883dccc92fc72f8d1d84a4e>
- Brown, V., Diomed, B. Z., Moodie, M., Veerman, J. L., & Carter, R. (2016). A systematic review of economic analyses of active transport interventions that include physical activity benefits. *Transport Policy*, 45, 190-208. doi:<http://dx.doi.org/10.1016/j.tranpol.2015.10.003>
- Cheyne, C., Imran, M., Scott, M., & Tien, C. (2015). *Barriers to active transport in Palmerston North*. Palmerston North: Massey University Living Labs. Weblink [www.massey.ac.nz/livinglabs](http://www.massey.ac.nz/livinglabs)
- Ewing, R., Meakins, G., Hamidi, S., & Nelson, A. C. (2014). Relationship between urban sprawl and physical activity, obesity, and morbidity – Update and refinement. *Health & Place*, 26, 118-126. doi:<http://dx.doi.org/10.1016/j.healthplace.2013.12.008>
- Genter J. A., Donovan S., Petrenas, B., & Badland, H. (2008). *Valuing the health benefits of active transport modes*. NZ Transport Agency research report 359. Wellington: New Zealand Transport Agency. Weblink <http://www.nzta.govt.nz/assets/resources/research/reports/359/docs/359.pdf>
- Gray, B. (1989). *Collaborating. Finding common ground for multiparty problems*. San Francisco: Jossey-Bass.
- Haymaker, J., & Chachere, J. (2006). Coordinating Goals, Preferences, Options, and Analyses for the Stanford Living Laboratory Feasibility Study. In I. Smith (Ed.), (Vol. 4200, pp. 320-327): Springer Berlin / Heidelberg.
- Healey, P. (1992). Planning Through Debate: The Communicative Turn in Planning Theory. *Town Planning Review*, 63(2), 143-162.
- Healey, P. (1998). Building institutional capacity through collaborative approaches to urban planning. *Environment and Planning A*, 30(9), 1531-1546. Retrieved from <http://www.envplan.com/abstract.cgi?id=a301531>
- Martin, J., & Samels, J. E. (2012). *The sustainable university : green goals and new challenges for higher education leaders*. Baltimore, Md: Johns Hopkins University Press.
- McMurray, A., & Clendon, J. (2015). *Community Health and Wellness : Primary Health Care in Practice* (5 ed.). Chatswood: Elsevier Health Sciences APAC.
- Misken, J. (2012). *Summary of web-based investigation into Collaborative University-Municipal Partnerships - 'Living Labs'*. School of People, Environment and Planning. Massey University.
- Palmerston North City Council. (2015). *Palmerston North City Council 10 Year Plan 2015-25*. Palmerston North: Weblink <http://www.pncc.govt.nz/plans-policies-and-public-documents/plans/10-year-plan-2015-25-long-term-plan/>
- Rittel, H., & Webber, M. (1973). Dilemmas in a General Theory of Planning. *Policy Sciences*, 4(2), pp. 155–169.
- Selin, S., & Chevez, D. (1995). Developing a collaborative model for environmental planning and management. *Environmental Management*, 19(2), 189-195. doi:10.1007/bf02471990

- Sjöström, M., Oja, P., Hagströmer, M., Smith, B. J., & Bauman, A. E. (2006). Health-enhancing physical activity across European Union countries: the Eurobarometer study. *J Public Health*, 14. doi:10.1007/s10389-006-0031-y
- Statistics New Zealand. (2014). *Commuting patterns in Auckland: Trends from the Census of Population and Dwellings 2006–13*. Wellington: Statistics New Zealand Retrieved from <http://www.statistics.govt.nz/Census/2013-census/profile-and-summary-reports/commuting-patterns-auckland.aspx>.
- Statistics New Zealand. (2015). *2013 Census QuickStats about transport and communications*. Wellington: Statistics New Zealand Retrieved from <http://www.statistics.govt.nz/Census/2013-census/profile-and-summary-reports/quickstats-transport-comms.aspx>.
- Warsow, K. M. (2015). Transportation public health link: Changing perspectives...Changing a culture through cross-disciplinary collaboration. *Journal of Transport & Health*, 2(2, Supplement), S2-S4. doi:<http://dx.doi.org/10.1016/j.jth.2015.04.194>
- Wright, T. S. A. (2007). Developing research priorities with a cohort of higher education for sustainability experts. *International Journal of Sustainability in Higher Education*, 8(1), 34-43.