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# The effect of active travel interventions conducted in work settings on driving to work: A systematic review

Nick Petrunoff<sup>a,\*</sup>, Chris Rissel<sup>a</sup>, Li Ming Wen<sup>a,b</sup>

<sup>a</sup> Prevention Research Collaboration, School of Public Health, Sydney Medical School, Level 6, The Hub, University of Sydney, NSW 2006, Australia

<sup>b</sup> Health Promotion Service, Sydney Local Health District, Level 9, King Georg V Building, Royal Prince Alfred Hospital, Missenden Rd, Camperdown, NSW 2050, Australia

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## ABSTRACT

**Background:** There is increasing interest in promoting active travel for transport and health benefits. Whilst epidemiological evidence of associations between active travel and health outcomes exists intervention studies are lacking. Systematic reviews have been conducted on the effectiveness of active travel interventions, but none have focused on interventions in the work setting only.

**Objective:** The objective of this study is to systematically assess the effectiveness of active travel interventions, only including randomised controlled trials or controlled longitudinal studies, conducted in a work setting for increasing employee physical activity levels and decreasing relatively inactive forms of transport (e.g. driving) to inform interventions promoting active travel.

**Methods:** Data were sourced from English and non-English articles using 10 databases and by contacting experts. Unpublished literature was sought via databases including conference proceedings, doctoral theses and a text book. Data were extracted independently by two authors and a third author adjudicated where there was no consensus. The same two authors assessed studies for risk of bias.

**Findings:** Twelve articles were identified for inclusion. Results could not be pooled for a meta-analysis since outcome measures were heterogeneous. Given that 10 out of the 12 studies found positive results for increasing active travel or decreasing driving to work, workplace active travel interventions look promising. However, the evidence was not strong since the small number of controlled studies included were at high risk of bias.

**Conclusions:** Evaluations of active travel interventions with robust study designs such as controlled before–after studies and cluster-randomised controlled trials are needed to provide stronger evidence, and pragmatic approaches to implementing controlled trials will need to be considered. Consensus on outcome measures for intervention studies would assist future reviews and meta-analyses. Since most active travel interventions at present are not controlled studies, reviews which include uncontrolled studies are another important source of evidence to inform policy and practice.

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\* Corresponding author.

E-mail addresses: [npet8206@uni.sydney.edu.au](mailto:npet8206@uni.sydney.edu.au) (N. Petrunoff), [chris.rissel@sydney.edu.au](mailto:chris.rissel@sydney.edu.au) (C. Rissel), [lmwen@email.cs.nsw.gov.au](mailto:lmwen@email.cs.nsw.gov.au) (L.M. Wen).<http://dx.doi.org/10.1016/j.jth.2015.12.001>

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## 1. Introduction

Since 2007 the majority of the earth's population lives in urban rather than rural areas. In 2017 even within less developed countries most people will live in urban areas (WHO/UN-HABITAT, 2010). Humans occupying urban areas must reconsider the way we travel to destinations including our places of work, since it is predicted private motor vehicle use will grow more than all other transport modes (Dargay et al., 2007). With increased urbanisation the problems created by private motor vehicle traffic (e.g. congestion, pollution and inactivity) are set to intensify.

Whilst hybrid and electric vehicles may contribute to a longer term solution for mitigating problems of air pollution and greenhouse gas emissions, they will not prevent congestion, nor the global pandemic of physical inactivity and associated chronic diseases. Insufficient physical activity is a risk factor for chronic health conditions and it is the fourth leading risk factor for death worldwide (Kohl et al., 2012). Physical inactivity also incurs considerable indirect costs to economies (Pratt et al., 2014), and some of this cost is associated with higher levels of sickness and absenteeism at work (Hendriksen et al., 2000). Strategies which can provide sustained increases in population physical activity are needed urgently.

Walking and cycling are healthier than driving a car and are promoted as active travel (Banister, 2008). Whilst walking and cycling are inherently active modes of transport, public transport can be considered as active travel in contexts where the distance travelled from the nearest public transport interchange to the destination can make a significant contribution to daily physical activity for health (e.g. a 10 min walk each way). A systematic review, a recent large population-based cross sectional study from the UK and an Australian workplace-based study all found that commuting by public transport contributed to physical activity that is significant to population guidelines for physical activity for health (Flint et al., 2014; Petrunoff et al., 2013b; Rissel et al., 2012). Therefore, in this review public transport is included as a mode of transport that is promoted as active travel.

There is increasing interest from both transport and public health practitioners in promoting active travel for its potential to relieve traffic congestion, decrease parking pressure and improve health. Evidence from epidemiological research suggests that reducing driving and increasing active travel for commuting results in overall increased physical activity (Yang et al., 2012), and is associated with decreased body weight and reduced risk of myocardial infarction in both cross-sectional and longitudinal studies (Ding et al., 2014; Gordon-Larsen et al., 2009; Humphreys et al., 2013; Oja et al., 2011; Rissel et al., 2012; Sato et al., 2007; Sugiyama et al., 2012, 2013; Wannier et al., 2012; Wen et al., 2006; Wennberg et al., 2006; Xia et al., 2013; Xu et al., 2013; Yang et al., 2012).

The work setting is a logical place to promote active travel since in many developed countries the majority of adults work and a large proportion of journeys to work are made by private motor vehicles (BTS, 2013; Goodman, 2013). A shift from driving private motor vehicles towards active travel in workplace settings could achieve population level increases in physical activity and large decreases in traffic volume. A large and nationally representative survey in the United Kingdom found that active travel to work is associated with reduced cardiovascular disease risk (Laverty et al.).

Systematic reviews of all interventions to promote walking in workplaces and other settings suggest that they contribute to increases in physical activity that are meaningful to population health (Ogilvie et al., 2004, 2007). Systematic reviews of the effect of interventions to promote cycling on physical activity levels state the effect is less clear (Ogilvie et al., 2004; Yang et al., 2010), although a randomised

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