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Automobile dependence: A contributing factor to poorer health among lower-income households

Jerome N. Rachele[a,*], Takemi Sugiyama[a,b], Gavin Turrell[a], Aislinn M. Healy[a], James F. Sallis[a,c]

[a] Institute for Health and Ageing, Australian Catholic University, Australia
[b] Centre for Urban Transitions, Swinburne University of Technology, Australia
[c] Department of Family Medicine and Public Health, University of California, San Diego, United States

A B S T R A C T

Lower household income is one of the strongest predictors of poor health. In this viewpoint, we explore an understudied pathway between household income and health: automobile dependence. We argue that the provision of policies that reduce automobile dependence, and facilitate active and affordable modes of travel (i.e. walking, cycling and public transport), may mitigate poorer health among individuals from lower-income households. Policies and environments that support active travel are likely to have particularly strong health and economic benefits for lower-income residents.

1. Introduction

Living in a lower-income household is detrimentally associated with health behaviours and outcomes including: physical activity (Kari et al., 2015; Kim and So, 2014), sedentariness (Sugiyama et al., 2008), diet quality (Kamphuis et al., 2006), smoking (Casetta et al., 2016), mental health (Sareen et al., 2011), physical functioning (Loh et al., 2016), type 2 diabetes (Bird et al., 2015), cardiovascular disease (Lemstra et al., 2015), and premature mortality (Signorello et al., 2014). Despite previous individual-level approaches to improving health among those from lower-income households (Bambra et al., 2015; Turrell and Vandevijvere, 2015), large income-related health inequities remain (OECD, 2015). There is a need for interventions that can have widespread and sustainable effects (Sallis et al., 2012). Facilitating active transport through environmental and policy changes has been used as a means of improving population-level health through increases in physical activity (Community Preventive Services Task Force, 2017; Heath et al., 2012). However, research has not yet fully explored the potential role of automobile dependence in reducing health inequities. This viewpoint article argues that the provision of policies that reduce automobile dependence and facilitate active and affordable transport can address health inequities, through etiological pathways illustrated in Fig. 1. First we describe how financial strain (due to low disposable income) affects health, based on indicative research findings. Then, using Brisbane, Australia as a case study, we estimate the cost of transport under several scenarios (different income levels, with and without automobiles), and demonstrate the greater financial burden of automobile ownership among lower-income households. We then discuss strategies to reduce automobile dependence.

* Correspondence to: Institute for Health and Ageing, Australian Catholic University, Level 6, 215 Spring St, Melbourne 3000, Australia.
E-mail addresses: jerome.rachele@acu.edu.au (J.N. Rachele), takemi.sugiyama@acu.edu.au (T. Sugiyama), gavin.turrell@acu.edu.au (G. Turrell), aislinn.healy@acu.edu.au (A.M. Healy), jim.sallis@acu.edu.au (J.F. Sallis).

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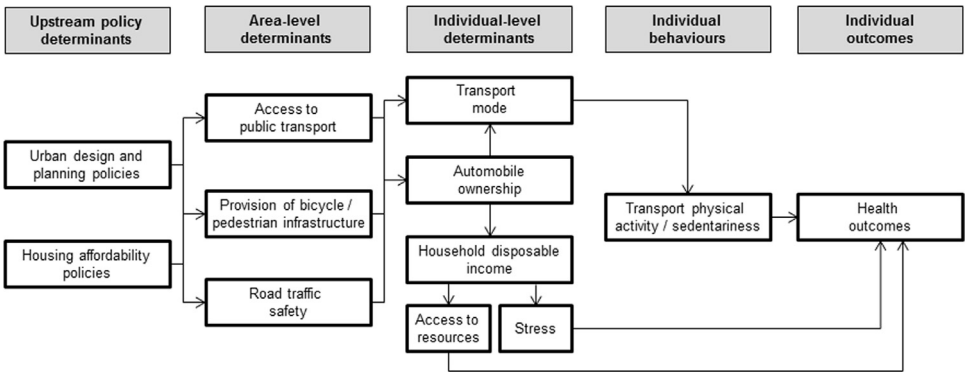

Fig. 1. Conceptual and analytic framework detailing how upstream policy influence health outcomes through the transport environment, automobile ownership, and household disposable income.

2. Household income and health

The arguments proposed are based on literature on the relations between household income and health that posits two mechanistic pathways: access to resources and stress.

2.1. Access to resources

Competing priorities in households with limited disposable income often result in poorer health-related outcomes. For example, Australian research has shown that lower-income families are more likely to experience challenges in purchasing adequate quantities of food, as well as appropriately healthy food (Turrell and Kavanagh, 2006). Even middle-income Australian families who have recently had a reduction in income (e.g. through job loss) or who have high living expenses (such as the cost of owning or maintaining one or more motor vehicles) may also experience food insecurity due to a lack of available funds to allocate to food purchases (Burns, 2004). Poor diet quality is associated with greater risk of chronic health conditions (McCullough et al., 2002). Household income is strongly associated with health care service utilisation. A study of income-related inequalities in health care services utilisation in 18 OECD countries found that, after adjusting for individuals' needs for health care, people with higher incomes were more likely to consult a physician or specialist (Devaux, 2015). Regular health checks with physicians are important for the identification and treatment of chronic disease and associated risk factors (Krogsbøll et al., 2013).

2.2. Stress

Mounting evidence supports causal relationships between socioeconomic factors and health through complex pathways involving biopsychosocial processes (Seeman et al., 2010). Individuals from lower-income households tend to experience more stress, which can be caused by insecurity in income, lack of personal safety, and exposure to poorer environments such as crowding, crime, and noise pollution, while also having fewer resources to deal with these challenges (Baum et al., 1999). The mismatch between demands that individuals live with, coupled with the reduced capacity to cope effectively, can result in greater distress (Eaton et al., 1999) that contributes to poorer health (Miller et al., 2009). For example, analyses of nationally representative U.S. data for adults aged 20 years and over from the National Health & Nutrition Survey (NHANES) found socioeconomic gradients in allostatic load (biological "wear and tear") (Sabbah et al., 2008; Seeman et al., 2008), and age-specific accumulation was greater among those in poverty (Crimmins et al., 2009). Seeman et al. (2004) found that stress-related biological dysregulation explained 34% of the difference in mortality risk between levels of socioeconomic background.

3. Household income and the cost of automobile dependence

In automobile-dependent neighbourhoods, characterized by large distances from homes to destinations (e.g. work and shops), residents must purchase and maintain one or more motor vehicles for mobility. Otherwise, living in these neighbourhoods limits employment and social engagement opportunities (Dodson and Sipe, 2008). The cost of maintaining automobiles reduces household disposable income, which is used for daily living. We demonstrate differences in the burden of automobile ownership by level of household income, using Brisbane, Australia as a case study. We present four scenarios with varying degrees of automobile ownership and estimate the costs associated with automobile maintenance in dollars and as a proportion of household income.

3.1. Scenario 1

A household with two automobiles that will be driven 15,000 km and 10,000 km, respectively, per year. The automobile driven 15,000 km per year is assumed to be less than three years old, purchased new and financed with a loan. The automobile driven