

House of Commons Transport Committee – Active travel inquiry

Written evidence submitted by the Centre for Diet and Activity Research

The Centre for Diet and Activity Research (CEDAR) at the University of Cambridge – www.cedar.iph.cam.ac.uk – studies the drivers of dietary and physical activity behaviour, and develops and evaluates interventions to inform practice and policy. We are public health researchers, who have an interest in active travel because of its potential to improve health. Much of our work focuses on understanding what works to promote active travel and better understanding the health benefits (and harms) of active travel. In doing this we work with policymakers and practitioners.

Executive Summary

- The significant health benefits of physical activity are well established
- Active travel has significant potential to enable the nation to be more active.
- Studies consistently suggest that active travel reduces the risk heart disease, strokes, type 2 diabetes and premature death, and has a role in maintaining a healthy weight.
- Studies also suggest that active travel can may improve physical wellbeing, improve mental wellbeing, and reduce sickness absence.
- For most people, the modelled benefits of cycling from being more physically activity outweigh the modelled risks of injury and effects of pollution.
- The average net health gain (physical activity gain less injury risk) is greater at older ages.
- For younger adults the average net gains may be smaller or non-existent if active travel is not maintained into later life. This suggests that injury risks should be reduced and efforts made to ensure active travel is maintained throughout life.
- The health and other benefits of active travel tend to be poorly understood and undervalued by the public and some policy makers.
- Providing safe and direct routes for cycling (and walking) is likely to be more important than trying to address people’s concerns about cycle safety through messaging.
- High-quality infrastructure does encourage people to walk and cycle – and there has been insufficient focus on providing this in the UK, particularly within existing urban areas where it is most needed.
- Sustained financial investment and political will are necessary to produce a step change in cycling.

Health benefits of active travel, including benefits and risks

Physical activity and active travel

1. Regular physical activity prevents heart disease, stroke, depression, type 2 diabetes, obesity/excess weight and some cancers.^{1,2} It is also important for physical and mental wellbeing and musculoskeletal health, and likely has a role in prevention of dementia.
2. Active travel can help people meet the recommended 150 minutes of moderate-to-vigorous intensity physical activity.³ When walking or cycling is done for travel, physical activity is integrated into daily life – people are regularly active with relatively little conscious effort.
3. The average journey to work is 28 minutes each way.⁴ Many commuters could meet recommended activity levels if they walked or cycled for at least part of their journeys. Commuters in Cambridge who included walking or cycling as part of their commute (either alone or in combination with car or public transport) on average achieved more than half of their weekly ‘dose’ of physical activity from commuting.⁵
4. Similarly several UK studies have shown the children who walk or cycle to school are much more physically active than those who are driven to school.⁶⁻⁹
5. While the health benefits of physical activity are well established, much of this evidence base comes from studying sport and recreational physical activity. The health benefits of walking and

cycling for travel are much less studied. A degree of caution is required when extrapolating the benefits of physical activity undertaken in these other contexts to active travel. Other factors like injury risk or air pollution will influence an overall assessment of benefit – and will vary by context (e.g. where somebody cycles) and be different for different forms of recreational or sporting activity.

6. At CEDAR we have studied this in two ways, first we have used observational studies to study the health benefits of active travel; and second we have used modelling studies to compare the expected benefits of active travel due to physical activity with the expected harms from exposure to air pollution and injuries. The overall message from these studies is that at a population level overall the active travel is beneficial for health

Studies of active travel and health

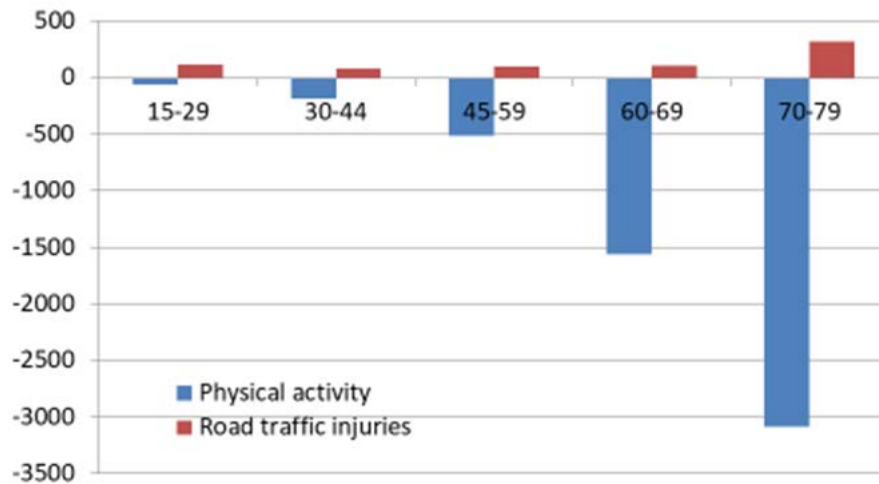
7. Studies consistently show that people who walk or cycle for travel are at lower risk of type 2 diabetes, heart disease and stroke.¹⁰⁻¹² They are less likely to be obese/overweight and likely to live longer.¹³⁻¹⁵
8. Studies also show that active travel may reduce sickness absence and improve physical and mental wellbeing.¹⁶⁻¹⁸ The impact on cancer is less clear, which partly reflects a lack of good studies addressing this question.

Modelling studies comparing risks and benefits of active travel

9. Modelling studies of active travel estimate the overall impact on health, considering physical activity, air pollution and road traffic accidents. Figure 1 below shows the benefits from physical activity and harms from injury of cycling in central London (based on data from 2005 to 2011) by age.¹⁹ This shows that overall the benefits tend to outweigh the risks. The benefits are much greater with age (because older people are more likely to develop disease), and the net benefit increases sharply with age.
10. However, at younger ages (15-29 years) the benefits are smaller as disease incidence is lower. Benefits and harms are similar at younger ages and, if anything, the harms may exceed the benefits, in central London.ⁱ This is largely due to higher risk of being killed by a HGV for a female cyclist, and the high proportion of incidents with HGVs in central London. In other places, e.g. Holland (shown in Figure 2), where cycling is much safer, even at young ages there is a very favourable ratio of benefits to risks.
11. We have only undertaken these risk benefit analyses for cycling, and not for walking. Walking is safer than cycling for a fixed travel time, but it is also a less metabolically intense activity so its beneficial impact on health per minute of activity would be less. Overall one might expect a similar pattern to emerge, in terms of favourable benefits to risks and greater net benefits with increasing age.

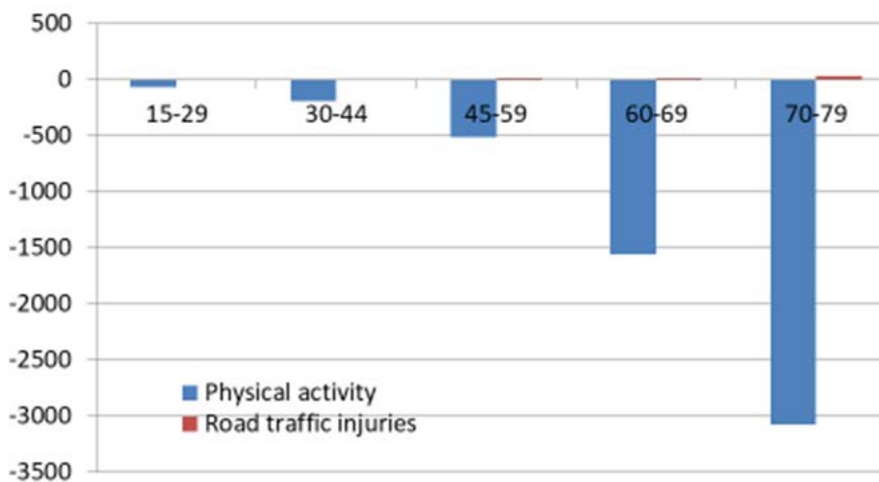
ⁱ This analysis does not account for all the benefits of health, e.g. on physical or mental wellbeing, nor does it account for lifetime benefits, e.g. if a young person cycles in their 20s they may be more likely to continue that habit into later life and/or may experience a benefit later in life from being physically active in their 20s even if they stop cycling later in life. It is also based on injury data from 2005 to 2011 since when infrastructure has been improved in central London and other efforts have been introduced the mitigated risk, so the level of risk today may be lower than it was in 2005 to 2011.

Figure 1: Benefits and harms from cycling in central London by age



Benefits and harms are measured in disability-adjusted years (DALYS)

Figure 2: Benefits and harms from cycling in Holland by age



Benefits and harms are measured in disability-adjusted years (DALYS)

12. Air pollution. Whilst there is a substantial burden of disease related to air pollution, generally the benefits of physical activity for the *average*, healthy adult from walking or cycling in urban areas in a city outweigh the harms from air pollution.²⁰ Only in the most polluted cities in the world (top 1%, none of which are in the UK) do the risks from air pollution outweigh benefits. Nonetheless there may be individual high air pollution days in UK when the benefits of physical activity could be negated particularly for people with underlying lung or heart disease or for children. Air pollution risk can in part be mitigated by route choice, i.e. walking or cycling away from the more congested routes. Whilst there may be more concern about air pollution exposure when walking or cycling, the alternative, being in a car in congested traffic also results in increased exposure to air pollution.

Potential for population health gain

13. Applying Dutch cycling rates to commute trips in England, making allowance for hilliness and commuting distance, could prevent around 800 premature deaths a year in England, with an average health economic benefit from the deaths avertedⁱⁱ of £5 million per local authority. In Birmingham, the largest metropolitan district (population 1.1 million), this translates to a potential annual health economic benefit of nearly £50 million.²¹

Understanding of benefits/risks by the public

14. In our experience the health benefits of walking and cycling for transport are under-appreciated by the public. Concerns about the risk associated with cycling are prominent whereas the benefits, which tend to be less immediate and often aren't tangible, tend to be under-valued.
15. Whilst one response to safety concerns might be messaging or education this is unlikely to be sufficient. Simply using information to persuade people to change their behaviour has – at best – produced modest effects. Much behaviour is automatic, triggered outside of conscious awareness and cued by multiple influences.²² People, particularly those who are less likely to cycle (e.g. women and older adults) need to feel safe – and this likely means providing high quality protected cycling infrastructure or keeping traffic volume and speed to very low levels.
16. Children and parents are particularly sensitive to concerns about safety - improving the safety of areas around school is likely to promote uptake and maintenance of children's walking and cycling.^{23,24} NICE guidance recommends that routes should be improved to encourage walking and cycling to school by improving safety, accessibility, connectivity, sustainability and appeal to users – particularly by improving footways and pedestrian crossings and introducing measures to reduce vehicle speed.²⁵
17. There is a risk that efforts to improve cycle safety focus on cyclists, e.g. by mandating or encouraging helmets and high visibility jackets, send out a visual message that cycling is not safe and so discourage cycling. Use of safety clothing tends to increase where cyclists feel unsafe and reduce where they feel safer.²⁶ The Netherlands has a very low accident rate and a high-level of cycle usage, which has been achieved by a focus on safe direct infrastructure, driver education and making cycling a normal activity. People in the Netherlands rarely use helmets and cycle in normal everyday clothes.

Understanding of benefits/risk by government

18. There appears to be increasing awareness of the health and wider benefits of walking and cycling amongst some parts of national and local government. However, this has yet to have the impact it should have. This may in part reflect a bias within the existing management and funding structures that give greater weight and funding to interventions that favour car use.

Increasing levels of walking and cycling for transport

19. Individually-delivered interventions to promote walking and cycling such as personalised travel planning have featured prominently in UK transport policy for several years.²⁷ Studies assessing their effects found positive effects in motivated subgroups, however they were often weak in design and may over-estimate their true benefit. Whilst politically attractive to deliver, their scope to achieve marked and sustained change in behaviour is limited.

Focus on high-quality infrastructure and focus on where it is needed

20. In two major studies, we have shown that new high quality (off-road) infrastructure can increase levels of active travel. In the iConnect study, we compared levels of walking and cycling before and after the construction of new off-road paths which connected key destinations in

ⁱⁱ Based on value of a statistical life

Southampton, Kenilworth and Cardiff. We found that residents who lived close to the new infrastructure increased their activity by an additional 46 minutes per week compared to residents who lived further away.²⁸ This is a relatively large 'dose' of physical activity, and comparable to the most successful clinical interventions for increasing physical activity.²⁹ A similar pattern emerged from our study of the off-road cycle path next to the Cambridge Guided Busway.

21. Whilst these examples (and others in the UK) provide a good template for practice (wide safe convenient direct paths), we are concerned that too often the quality of cycling provision does not meet these standards. It is relatively easy to put in cycle lanes on new housing developments on the outskirts of cities – and whilst this may be appropriate – if it does not link to high quality direct routes taking people to places they want to go (e.g. the town centre, rail stations, leisure centres), its benefits will be limited.
22. The Propensity To Cycle Tool,²¹ which considers a number of factors (e.g. journey distance, hilliness or route), can be an important tool for identifying where new infrastructure is most likely to be needed and used. The tool was developed by CEDAR, funded by the Department for Transport and included in the Cycling and Walking Investment Strategy. Putting new infrastructure into existing towns and cities may be politically harder than integrating it into new developments, but it is very important. Building new off-road cycle routes, i.e. of the form that we have studied, through existing urban areas may not always be practical, instead a combination of high-quality segregated infra-structure and use of filtered permeability to create low traffic volumes and speeds, may be the best means to create safe, attractive and convenient routes.

Lessons from the cycling cities and towns

23. In England there were six Cycling Demonstration Towns (funded 2005–2011) and 12 Cycling Cities and Towns (funded 2008–2011). Towns and cities were chosen in part based on their political commitment to promote cycling. The towns and cities increased funding to £14-17 per person per year in part from central funding and in part from matched local funds.
24. The initiatives were tailored to each setting, but all towns spent a mixture on capital investment (e.g. building cycle lanes, creating cycle parking) and revenue investment (e.g. promotional activities, cycle training), with an average capital revenue ratio of 3:1. Most investment was focused on commuter cycling, cycling to school or general infrastructure improvements.
25. In these towns and cities, we found on average that the prevalence of cycling to work rose from 5.8% in 2001 to 6.8% in 2011 (a 17% relative increase). In contrast levels of cycling were unchanged in England and in matched towns/cities during the same period.³⁰
26. Whilst there was marked variation in success between towns it was not possible to identify with confidence what were the most important factors in increasing cycling. Nonetheless overall the projects show the importance of sustained investment and political support. It is noticeable that the level of additional funding announced in the Government's Cycling and Walking Investment Strategy does not appear likely to bring investment in cycling up to this level despite having an ambitious target to double cycling activity by 2025.

Integrating active travel with car-use and public transport

27. Typically, people will not walk more than one mile or cycle more than three to six miles for a given journey. Whilst many journeys in the UK are short, many are longer. Around half of all commutes (49%) are more than 6 miles.³¹ However it is possible for people to be active on longer journeys if they use public transport or park and ride schemes. Public transport often involves walking or cycling at least one end of the journey, e.g. walking to or from bus or train stops. Some of our work in Cambridge has shown how park and ride schemes are used by people who park and cycle,⁵ and a study of park and ride in Bristol also suggested that park and ride can support active travel.³² Supporting these 'mixed mode' journeys – for example, via bicycle

parking at and cycle routes to train stations or via park and ride – may have greater scope for use in the UK.

28. Electric assist bicycles can facilitate longer and hillier journeys and might have a role in facilitating active travel.³³

Spatial planning and restrictions on car-use

29. Research shows that walking increases as population density increases.³⁴ This is likely explained by a variety of factors: greater density of services and jobs; better public transport; and increased traffic congestion.³⁵ This observation does point to a benefit from housing developments within (rather than on the edge of) existing urban areas, and siting developments near to existing services and public transport infrastructure. It also points to the importance of retro-fitting good infrastructure into existing towns.
30. London (62% of journeys by public transport or walking vs 29% for England) and Cambridge (33 % of journeys to work by bicycle vs 3% for England) achieve high levels of active transport.³⁶ This may be as much due to having environments that are relatively conducive to active travel as having an environment that is not conducive to driving the car. This is partly a result of congestion but it partly reflects strategic decisions about the cost and availability of parking and the use of other measures (e.g. traffic calming, one way systems) to deter car-use. Whilst introducing parking restrictions (or limiting the provision of new parking) can be politically challenging, our work does suggest it is likely to have an important role in discouraging car-use and thus encouraging the use of more active modes.³⁷⁻⁴⁰ Interventions around parking are best presented as part of a wider package of measures and need to be carefully introduced if they are to be accepted.^{40,41}

Recommendations

- a) While there may be benefit in raising awareness about the health and other benefits of active travel amongst the public, it will probably be more important to provide safe and convenient ways to walk or cycle the entire journey or as part of longer journey made by car or public transport. This will require investment in infrastructure.
- b) While raising awareness about the health and other benefits of active travel amongst transport officials is important, the underlying incentives and management structures that bias investment and resources to car-based travel need to be addressed.
- c) There needs to be a focus on providing high-quality infrastructure, particularly for cycling, within existing urban areas. This should address need and ensure people who cycle feel safe. This is likely to mean protected cycle space or use of traffic calming with filtered permeability to reduce traffic volumes and speed to lower levels. Political support is likely to be necessary to ensure that high-quality integrated infrastructure is delivered.
- d) There needs to be adequate investment (e.g. at least £15 per person per year) to see sustained and meaningful improvements, and likely much higher levels to achieve the goal of doubling cycling and walking stages.

References

1. Warburton, D. E., Charlesworth, S., Ivey, A., Nettlefold, L. & Bredin, S. S. A systematic review of the evidence for Canada's Physical Activity Guidelines for Adults. *Int. J. Behav. Nutr. Phys. Act.* **7**, 39 (2010).
2. Department of Health & Department of Health, T. *Start Active, Stay Active: A Report on Physical Activity for Health from the Four Home Countries' Chief Medical Officers.* (Department of Health, 2011).
3. Department for Health. UK Physical Activity Guidelines. (2011). Available at: <https://www.gov.uk/government/publications/uk-physical-activity-guidelines>. (Accessed: 8th June 2017)
4. Department for Transport. *National Travel Survey England 2014.* (2015).
5. Panter, J., Desousa, C. & Ogilvie, D. Incorporating walking or cycling into car journeys to and from work: the role of individual, workplace and environmental characteristics. *Prev. Med. (Baltim).* **56**, 211–7 (2013).
6. Panter, J., Jones, A., Van Sluijs, E. & Griffin, S. The influence of distance to school on the associations between active commuting and physical activity. *Pediatr. Exerc. Sci.* **23**, 72–86 (2011).
7. Owen, C. G. *et al.* Travel to School and Physical Activity Levels in 9–10 Year-Old UK Children of Different Ethnic Origin; Child Heart and Health Study in England (CHASE). *PLoS One* **7**, e30932 (2012).
8. Smith, L. *et al.* Is active travel to non-school destinations associated with physical activity in primary school children? *Prev Med* **54**, 224–228 (2012).
9. van Sluijs, E. M. F. *et al.* The contribution of active travel to children's physical activity levels: cross-sectional results from the ALSPAC study. *Prev. Med. (Baltim).* **48**, 519–24 (2009).
10. Panter, J. *et al.* Using alternatives to the car and risk of all-cause, cardiovascular and cancer mortality. *Heart* (2018). doi:10.1136/heartjnl-2017-312699
11. Hamer, M. & Chida, Y. Active commuting and cardiovascular risk: a meta-analytic review. *Prev Med* **46**, 9–13 (2008).
12. Panter, J. & Ogilvie, D. Cycling and Diabetes Prevention: Practice-Based Evidence for Public Health Action. *PLOS Med.* **13**, e1002077 (2016).
13. Mytton, O. T., Panter, J. & Ogilvie, D. Longitudinal associations of active commuting with body mass index. *Prev. Med. (Baltim).* **90**, 1–7 (2016).
14. Flint, E., Cummins, S. & Sacker, A. Associations between active commuting, body fat, and body mass index: population based, cross sectional study in the United Kingdom. *BMJ* **349**, g4887–g4887 (2014).
15. Martin, A., Panter, J., Suhrcke, M. & Ogilvie, D. Impact of changes in mode of travel to work on changes in body mass index: evidence from the British Household Panel Survey. *J. Epidemiol. Community Health* **69**, 753–61 (2015).
16. Mytton, O. T., Panter, J. & Ogilvie, D. Longitudinal associations of active commuting with wellbeing and sickness absence. *Prev. Med. (Baltim).* (2016). doi:10.1016/j.ypmed.2015.12.010
17. Hendriksen, I. J. M., Simons, M., Garre, F. G. & Hildebrandt, V. H. The association between commuter cycling and sickness absence. *Prev. Med. (Baltim).* **51**, 132–5 (2010).
18. Fitzsimons, C. F. *et al.* The 'Walking for Wellbeing in the West' randomised controlled trial of a pedometer-based walking programme in combination with physical activity consultation with 12 month follow-up: rationale and study design. *BMC Public Health* **8**, 259 (2008).
19. Woodcock, J., Tainio, M., Cheshire, J., O'Brien, O. & Goodman, A. Health effects of the London bicycle sharing system: health impact modelling study. *BMJ* **348**, g425 (2014).
20. Tainio, M. *et al.* Can air pollution negate the health benefits of cycling and walking? *Prev. Med. (Baltim).* **87**, 233–236 (2016).
21. CEDAR. Evidence Brief special – England's Cycling Potential.
22. Marteau, T. M., Ogilvie, D., Roland, M., Suhrcke, M. & Kelly, M. P. Judging nudging: can nudging improve population health? *BMJ* **342**, d228 (2011).
23. Panter, J., Corder, K., Griffin, S. J., Jones, A. P. & van Sluijs, E. M. Individual, socio-cultural and environmental predictors of uptake and maintenance of active commuting in children: longitudinal results from the SPEEDY study. *Int. J. Behav. Nutr. Phys. Act.* **10**, 83 (2013).
24. Mantjes, J. A. *et al.* School related factors and 1yr change in physical activity amongst 9-11 year old English schoolchildren. *Int. J. Behav. Nutr. Phys. Act.* **9**, 153 (2012).
25. NICE. *Physical activity and the environment (NG90).* (2018).
26. Aldred, R. & Woodcock, J. Reframing safety: An analysis of perceptions of cycle safety clothing. *Transp. Policy* **42**, 103–112 (2015).

27. Ogilvie, D., Egan, M., Hamilton, V. & Petticrew, M. Promoting walking and cycling as an alternative to using cars: systematic review. *BMJ* **329**, 763 (2004).
28. Sahlqvist, S., Goodman, A., Cooper, A. R. & Ogilvie, D. Change in active travel and changes in recreational and total physical activity in adults: longitudinal findings from the iConnect study. *Int. J. Behav. Nutr. Phys. Act.* **10**, 28 (2013).
29. Ogilvie, D. *et al.* Interventions to promote walking: systematic review. *BMJ* **334**, 1204 (2007).
30. Goodman, A., Panter, J., Sharp, S. J. & Ogilvie, D. Effectiveness and equity impacts of town-wide cycling initiatives in England: A longitudinal, controlled natural experimental study. *Soc. Sci. Med.* **97**, 228–237 (2013).
31. Office for National Statistics. WP702EW - Distance travelled to work (Workplace population). *Census 2011* Available at: <http://www.nomisweb.co.uk/census/2011/WP702EW/view/2092957703?cols=measures>. (Accessed: 11th August 2015)
32. Clayton, W., Ben-Elia, E., Parkhurst, G. & Ricci, M. Where to park? A behavioural comparison of bus Park and Ride and city centre car park usage in Bath, UK. *J. Transp. Geogr.* **36**, 124–133 (2014).
33. Woodcock, J. *et al.* Development of the Impacts of Cycling Tool (ICT): A modelling study and web tool for evaluating health and environmental impacts of cycling uptake. *PLOS Med.* **15**, e1002622 (2018).
34. Saelens, B. E., Sallis, J. F. & Frank, L. D. Environmental correlates of walking and cycling: findings from the transportation, urban design, and planning literatures. *Ann. Behav. Med.* **25**, 80–91 (2003).
35. Koohsari, M. J., Owen, N., Cerin, E., Giles-Corti, B. & Sugiyama, T. Walkability and walking for transport: characterizing the built environment using space syntax. *Int. J. Behav. Nutr. Phys. Act.* **13**, 121 (2016).
36. Census 2011 Travel to work by local authority. Available at: <https://www.theguardian.com/news/datablog/interactive/2013/feb/01/cycle-drive-work-map-census-2011>.
37. Knott, C. S., Sharp, S. J., Mytton, O. T., Ogilvie, D. & Panter, J. Changes in workplace car parking and commute mode: a natural experimental study. *J. Epidemiol. Community Heal.* jech-2018-210983 (2018). doi:10.1136/JECH-2018-210983
38. Dalton, A. M., Jones, A. P., Panter, J. R. & Ogilvie, D. Neighbourhood, Route and Workplace-Related Environmental Characteristics Predict Adults' Mode of Travel to Work. *PLoS One* **8**, e67575 (2013).
39. Panter, J., Griffin, S., Dalton, A. M. & Ogilvie, D. Patterns and predictors of changes in active commuting over 12 months. *Prev. Med. (Baltim.)* **57**, 776–84 (2013).
40. Petrunoff, N., Rissel, C., Wen, L. M. & Martin, J. Carrots and sticks vs carrots: Comparing approaches to workplace travel plans using disincentives for driving and incentives for active travel. *J. Transp. Heal.* **2**, 563–567 (2015).
41. Cairns, S., Newson, C. & Davis, A. Understanding successful workplace travel initiatives in the UK. *Transp. Res. Part A Policy Pract.* **44**, 473–494 (2010).