Making the shift to sustainable transport in Scotland

Abstract:
Transport sector decarbonisation is a Scottish Government policy aim. Recent legislation and funding announcements are beginning a shift away from support for habitual car use. Sustainable transport is augmented by co-benefits of active travel itself through improvements in air quality, safety, and benefits across other sectors. At a workshop, attendees identified the need for further actions including closing down the roads programme and shifting funding to sustainable transport, reducing the need for travel, and a major shift to active travel for journeys under 3km. Such actions are reflected on in the context of the current coronavirus.

Keywords: co-benefit; Scottish transport; active travel; sustainable travel

Introduction

In this think-piece we discuss the current challenges of decarbonising the Scottish transport system and highlight innovative approaches to encourage sustainable travel that have the potential to bring multiple health, social and environmental co-benefits. While this paper focusses on the Scottish context, globally, we collectively face the same issues: of how to reduce the carbon footprint of transport systems and the related blight of air pollution; and, of how to achieve health and social benefits through more sustainable methods of travel. Thus, the lessons arising from good practice and critical thinking in Scotland have relevance for other nations.

The paper draws upon a Transport & Health workshop, 'Articulating the co-benefits to key stakeholders', held in Glasgow on 22nd October 2019 convened by the Glasgow Centre for Population Health and the Transport Research Institute of Edinburgh Napier University. Its main purpose was, firstly, to explore the health, social and environmental co-benefits arising from moving to a more sustainable transport system and, secondly, to generate ideas about how to enable such a shift. Forty-three knowledgeable and experienced professionals participated, many working in strategic positions, including senior planners from Transport Scotland, local authorities and the National Health Service (NHS), academics, sustainable transport campaigners, public health practitioners, a lead politician and Scotland's Active Nation Commissioner. The workshop was structured around four keynote talks (by two senior policy makers, an academic and a public health specialist), interspersed with two workshop discussions; the first focussed on how to make the case for the co-benefits of sustainable transport and the second on identifying the key challenges and

solutions to transforming our urban transport systems. Notes were compiled from the discussions of five workshop groups and analysed thematically (Glasgow Centre for Population Health 2020).

We will discuss the ideas generated by workshop delegates later in the paper. Firstly, we discuss the Scottish policy context in relation to sustainable travel, climate change, health and now Covid-19. Secondly, we outline the challenges of making the shift away from the current car-dominated transport system to one built around sustainable transport and suggest practical ways to achieve progress, moving beyond policy rhetoric to action.

Finally, to be clear from the outset, we define a sustainable transport system as one that prioritises low carbon transport choices and comprises multiple modes, including walking, cycling, public transport, and bike, wheeling, and car sharing. A sustainable transport system minimises negative social, environmental and climate impacts and relegates private car use to a minority rather than a majority of trips. By active travel, we mean travel that requires physical effort, principally walking, cycling and wheeling.

Policy context

This paper focuses on Scottish policy in a country of 5.4 million people within the United Kingdom, which has devolved government including most aspects of transport. The Transport (Scotland) Act 2019 passed in November 2019 required a new national transport strategy, provided for the introduction of low emission zones, gave local transport authorities new powers over the operation of local bus services, prohibited double-parking and parking on pavements and gave local authorities powers to introduce a workplace parking levy (Scottish Parliament 2019a). The new National Transport Strategy (NTS2) has the vision of creating "a sustainable, inclusive and accessible transport system, helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors" (Transport Scotland 2020a). The Strategy highlights the importance of promoting active travel to improve health and wellbeing, to reduce inequalities and to contribute to action to address climate change.

The Scottish Government has previously committed to increasing active travel throughout the country in the Long-Term Active Travel Vision (Transport Scotland 2014) and Cycling Action Plan for Scotland (Transport Scotland 2017). Furthermore, funding for active travel has increased from £39 million in 2017-2018 to £80 million in 2018-2019, and with a further increase to £100million in 2020/21 committed to in the latest Scottish government budget (Scottish Government 2020). This equates to £18.30 per head of population, more than double the committed spend per head for

active travel in England (House of Commons Library 2020) and 40% higher than the equivalent figure for Wales (Drakeford 2018).[1] By way of comparison the Dutch Government spent about £22 per head of population in 2010, had done so for decades (European Cyclists Federation 2015) and continue to do so. The latest Scottish Government budget also commits to investment of over £500 million in bus priority infrastructure to improve bus journey times and raise bus usage. A further addition has been a commitment to free bus travel for under 19s (Scottish Government 2020).

Another major driver for change is the Scottish Government's strong, and internationally recognised, commitment to reducing carbon emissions. The latest Climate Change Act targets Scotland reaching net-zero emissions by 2045 and a 75% reduction by 2030 (Scottish Parliament 2019b). This commitment has been followed by Scotland's two largest cities, Glasgow and Edinburgh, committing to achieving carbon neutrality by 2030 (Glasgow City Council 2019, City of Edinburgh Council 2019a).

Various health-related policies emphasise the need to shift to more active and less polluting modes of transport. The Cleaner Air for Scotland (CAFS) strategy sets out how the Scottish Government and its partner organisations will reduce air pollution to protect human health and fulfil Scotland's legal responsibilities in relation to quality, and has the ambition that Scotland will "have the best air quality in Europe" (Scottish Government 2015). As a consequence of failing to meet air quality strategy objectives, Scotland is now committed to introducing low emission zones (LEZs) in its four largest cities. A recent review of CAFS pointed to a need for more "focus on inter-related interventions including improved transport infrastructure that encourages higher levels of active travel; improved access to accessible, affordable and better quality public transport...and greater encouragement to adopt less polluting private personal transport (e.g. low and zero emission vehicles) (Scottish Government 2019a)."

Scotland has an unenviable record of poor health and premature mortality compared to other western European countries (McCartney *et al.* 2011), and only two thirds of adults (66%) meet the guidelines for Moderate or Vigorous Physical Activity and 65% are overweight or obese (Scottish Government 2019b). Active travel is recognised as having a role in both increasing levels of physical activity (Scottish Government 2018a) and addressing overweight and obesity (Scottish Government 2018b).

Placemaking is a linked strand of government policy, influenced by the UN Sustainable Development

[1] This comparison is based on commitments made prior to Covid-19, the impact of which may change future budgets significantly

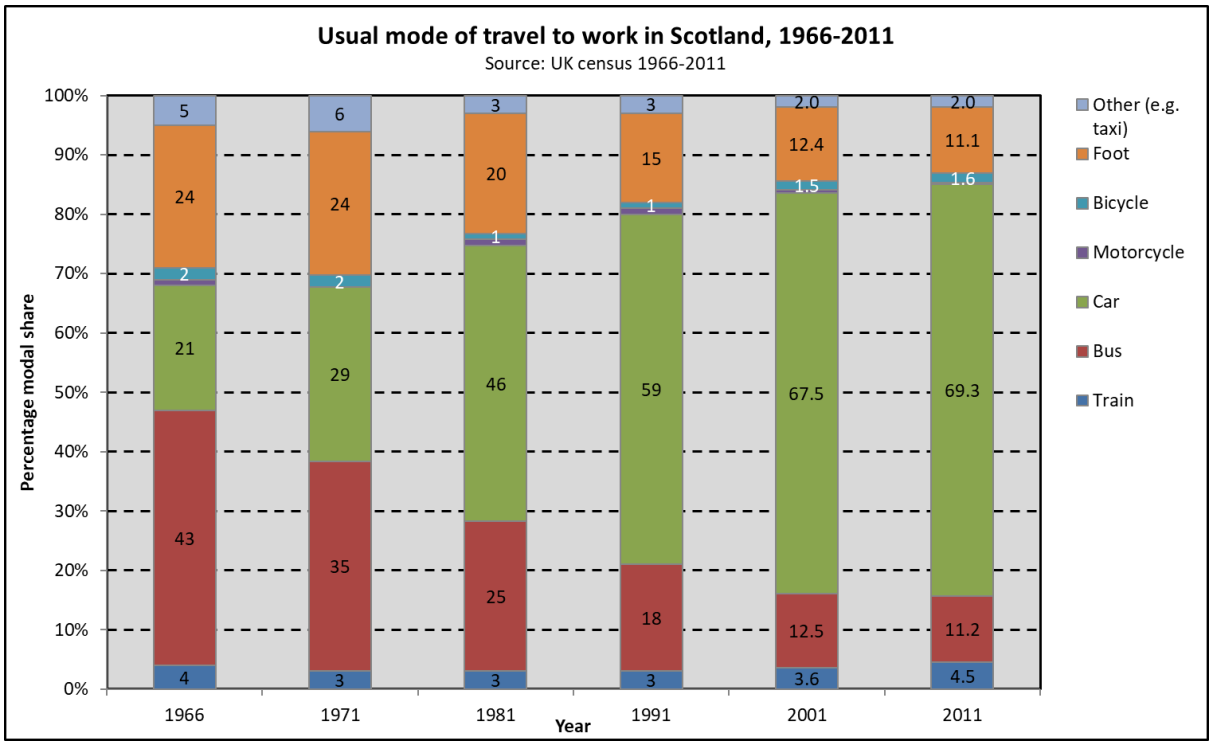
Goals and underpinned by a recognition that the environment around us can positively (or negatively) influence our wellbeing and outcomes for communities (Scottish Government 2019c). Placemaking has a growing role in planning and wellbeing policy, supporting the government's wellbeing framework, the National Performance Framework. How people relate to a place affects how they move around and use their home neighbourhood. When successfully implemented, placemaking can help encourage sustainable travel, improve air quality, support green infrastructure and mitigate climate change.

Challenges to a shift to more sustainable modes

Car use

The first and most fundamental challenge to shifting to more sustainable modes of travel is the ubiquity of the car. While commuting journeys only represent one type of journey, the growth in car use can be illustrated by the commuting trends of employed adults over a 45-year period in Scotland (1966-2011) using the UK Census (Figure 1). In this period, the proportion of car commuters trebled, rising to 69% in 2011. At the same time, commuting on foot and by bus reduced significantly, each accounting for only 11% of commuters by 2011, while train use rose marginally to account for 4.5% of commuters by 2011. Cycle commuting remained low at 1.6% of commuters in 2011 (Whyte and Waugh 2015, p16). More recent data show that car use, as measured by road distances driven (across all types of journey) or licensed motor vehicles on the road, continues to rise, while bus passengers continue to decline (Transport Scotland 2019).

Figure 1



Carbon emissions

The continued rises in private motorised transport and distances driven help explain why, despite overall reductions in carbon emissions in Scotland (by 2017 total emissions were 46.8% below the 1990 baseline of 76.3 MtCO2e), transport emissions, including international aviation and shipping, have risen and were 0.4% above the 1990 baseline year (Scottish Government 2019d). Transport is Scotland's largest greenhouse gas emitting sector, making up 37% of all Scottish emissions and road transport accounts for the largest share of this (68% of all transport emissions) (Transport Scotland 2019). Car emissions, which account for 40% of all transport emissions, have been rising since 2013 and in 2017 were 1.7% above the 1990 baseline. Additionally, emissions from new vehicles, which had been falling, started to rise in 2017. This is thought to be due, at least in part, to an increase in the proportion of larger new cars (SUVs) being registered with higher emissions (Scottish Government, 2019d).

Low emission vehicles

It is also relevant to note that while the number of Electric and Hybrid Electric motor vehicles in Scotland has increased in recent years (to 37,000 in 2018) these vehicles still account for less than 1.2% of all licensed vehicles (Transport Scotland 2019); in 2018, a total of 10,300 new electric and hybrid electric vehicles were registered in Scotland compared to an estimated 5,700 e-bike sales (Bicycle Association of Great Britain 2020).

Investment

The Scottish Government remains committed to increasing road network capacity, which runs counter to the otherwise strong policy on addressing climate change, and is despite recommendations to end increases in highway capacity made by Government convened independent bodies (Scottish Government, 2019a; Infrastructure Commission for Scotland, 2020). While the budget for active travel has increased substantially, the £100 million allocation in 2020/21 still accounts for only 3.3% of the total transport budget. Many organisations have campaigned for 10% of the transport budget to be allocated to active travel (e.g. Association of Directors of Public Health 2008) in order to bring Scotland's spending in line with countries with high levels of cycling like the Netherlands and Denmark.

Operational barriers

There are also operational barriers to making progress. The process of consulting the public on new infrastructure or speed restrictions and the need to put in place Traffic Regulation orders (TROs) can slow progress. In relation to creating new active travel infrastructure, development can be patchy with progress mainly occurring in large urban centres rather than in small rural authorities (which have less funds in the first place to allocate). Even where investment is happening there is widespread acknowledgement that safe active travel routes, particularly for cycling, are limited, disconnected, and that it will take years to create a coherent joined-up network (Connectivity Commission 2019).

Public transport

The availability, accessibility and affordability of public transport, particularly buses, varies widely across Scotland, creating barriers to use that impact socially and economically. The more limited availability and frequency of public transport in rural areas and the greater distances to travel tend to lead to a greater reliance on driving in rural households. There is acknowledgement that much more needs to be done to integrate transport services and ticketing to facilitate multi-modal journeys (Connectivity Commission 2019).

Inequalities

There are many elements of the way the current transport system operates that lead to inequalities. Public transport is particularly important for households on low income but in many areas of social deprivation public transport options can be limited and relatively expensive (Transport Scotland 2020). This is one of the factors associated with 'forced car ownership' among families in financial

difficulties, where having a car is seen as a requirement to access employment and access to public transport is restricted due to quality, frequency and reliability issues (Curl *et al.* 2018).

Public transport timetables are built around a 'nine-to-five' working pattern, and radial (i.e. along main corridors to town and cities but not orbital for cross city journeys) and therefore do not necessarily suit those in unpaid care work and part-time employment, who are predominantly women. Feelings of being unsafe and fear of violence particularly affect women and can be an additional barrier to public transport use especially at night. Disabled people face multiple barriers to travel, including not being able to access public transport vehicles and interchanges between modes, while people in rural areas find accessing services less convenient and satisfaction with public transport is much lower in accessible rural areas.

Cycling currently is skewed toward more affluent demographic groups and to men in particular, but as active travel spending increases, the design and targeting of this investment needs to be carefully planned to ensure the benefits of increased levels of active travel are shared across the population, otherwise inequalities will remain or widen.

Co-benefits of active travel

The concept of co-benefits was introduced at the workshop. Evidence was presented of how interventions to reduce transport-related carbon emissions could have wider 'co-benefits' for health, social cohesion and quality of life. Co-benefits are an outcome of climate-friendly policies, so reducing carbon-based energy in the transport sector often leads to improvements in human health. Walking and cycle commuting have been associated with a lower risk of CVD and cycle commuting is also associated with lower cancer risk and lower mortality (Celis-Morales *et al.* 2017), while switching to more active modes of commuting (from private motor transport) has been associated with significant reductions in BMI (Martin *et al.* 2015). Walking and cycling have been shown to have population-level health benefits even after adjusting for other physical activity (Kelly *et al.* 2014).

Beyond increased levels of walking and cycling and consequent improvements in cardio-vascular and mental health there may also be improvements in respiratory health as a result of reductions in motorised traffic and congestion. Further benefits discussed which span other sectors included the issue of increased academic attainment by school children who are more physically active, the biggest opportunity for which is active travel on the school journey.

Signs of progress

As noted earlier, we see positive rhetoric about the need to shift to more sustainable transport modes, and increasing recognition of the synergies between different policy areas and their potential environmental, health and social co-benefits. Transport is now a key driver for other policies. The new national transport strategy (NTS2) endorses the sustainable transport hierarchy, while the new Transport Bill has good elements (new powers for local authorities over the operation of bus services and the opportunity to introduce a Workplace Parking Levy[2]). National investment in bus prioritisation and active travel is rising.

In Scotland's two largest cities[3], Edinburgh (population= 525,000 in 2019) and Glasgow (population= 633,000 in 2019), there is evidence of increasing commitment to, and in investment in, active and sustainable travel. Since 2012/13, Edinburgh City Council has increased its financial commitment to active travel; currently 10% of the city's transport budget is spent on cycling. Even prior to this commitment, there were signs of promising modal shifts in commuting patterns in the city. Between the 2001 and 2011 Censuses, Edinburgh (uniquely among Scottish local authorities) showed an increase in the individual modal shares of walking, cycling, bus and train commutes, while car driving and being a passenger declined; indeed a higher proportion of people in the city walked, cycled and took the bus to work than anywhere else in Scotland (Whyte and Waugh, 2015, p54). More recently, there is evidence that Edinburgh's city wide 20mph limit is reducing average vehicle speed (Nightingale and Jepson, 2019), creating safer streets and encouraging more people to walk and cycle (City of Edinburgh Council, 2019b). Looking ahead, Edinburgh's city centre transformation strategy commits to deliver £420 million of benefits over a 25-year period investing in improved public spaces, inclusive access and prioritisation of active travel and of public transport (City of Edinburgh Council, 2019c).

In Glasgow, similar developments are underway. A network of radial cycling routes into the city (city cycleways) is being built, a low emission zone is being phased in and the 'Avenues' programme (with £115 million of City Deal funding) aims to establish principal avenues throughout the city centre to form an integrated network of continuous pedestrian and cycle priority routes. The Sauchiehall St pilot avenue, completed in June 2019, includes: an avenue of trees, segregated cycle lanes, increased pedestrian/cycle space, continuous footways and reduced street clutter, free Wi-Fi and intelligent street lighting (Glasgow City Council 2018). In addition, the Council has committed to

[2] A Workplace Parking Levy is a charge on employers who provide workplace parking, a type of congestion charging scheme. See https://www.nottinghamcity.gov.uk/information-for-residents/transport-parking-and-streets/parking-and-permits/workplace-parking-levy

[3] Greater Glasgow's population together with the equivalent population for Edinburgh is 2,029,000 i.e. roughly 37.5% of Scotland's population.

introducing a 20mph limit across the whole council area and to spending at least 10% of its transport budget on active travel.

Some employers have started endorsing more flexible work practices including home working. The Coronavirus pandemic looks likely to accelerate these changes, driven by the necessity for many to work from home and the swift adoption of on-line meetings (Transport Scotland 2020c). Nevertheless, we need to be aware that for people employed in shift work, in factories and on zero-hours contracts such changes are likely not to be available. Additionally, home working, while reducing the need to travel, risks social isolation and reduced physical activity.

Mitigation of Covid-19 has necessitated social distancing – in the UK people are required to stay 2 metres apart – and has led to issues of over-crowded pavements and paths where people are walking or cycling for exercise or work. This has prompted Transport Scotland to provide special funding for temporary infrastructure, via the Spaces for People programme delivered by Sustrans (Sustrans 2020), to ensure social distancing is possible. The scheme is funding local 20mph speed restrictions, road closures to motor vehicles and the building of temporary segregated cycle and walking paths on roadways. While currently temporary, these changes can help accelerate investment in the active travel infrastructure needed to support more sustainable travel in the longer term. Such changes may also become a requirement to sustain social distancing over a longer period and to 'future proof' against the possibility of future pandemics.

What else needs to happen?

Returning to our October workshop and the context of the climate emergency, a range of ideas for how to make progress toward active and sustainable travel were suggested by delegates, some strategic, some practical and some radical.

Leadership and budget shifts

Individual and organisational leadership across all sectors, political will and sustained follow-through were identified as key requirements for change to be delivered. A fundamental shift in the transport budget away from private motor vehicle use and roads towards active and sustainable transport is needed. To this end one suggestion, was to end the roads programme in the next five years and use the budget purely for maintenance with money saved going to active and sustainable transport; echoing a suggestion made in the review of the Cleaner Air For Scotland strategy, as noted earlier (Scottish Government 2019a).

Disincentivising car use and encouraging public and active transport

Many ways of reducing car use were discussed; for example, making car journeys the most expensive option for travel, highlighting the availability of public transport and active travel routes, incentivising business to encourage staff to car share, integrating car hire with public transport and more radically and making public transport free for all. This latter suggestion is coming closer to reality in Scotland with the recent budget agreement to provide free bus travel to under 19s (Scottish Government 2020), a right which is already in place for anyone aged 60 years or older. Delegates also focused on parking, suggesting closing car parks, enhanced parking restrictions and rationing the amount of car park space available.

Infrastructure and public transport improvements

We need to improve infrastructure, normalise active travel and increase public transport use, particularly the use of buses. Different models of bus ownership were favoured with a return of bus services to public ownership being a popular suggestion. Public transport providers must work together to provide an integrated transport network, integrated ticketing and affordable prices that compare favourably with the equivalent costs of car travel. However, as a result of the Coronavirus pandemic, a majority of the public in Scotland are concerned about contracting or spreading the virus while on public transport and many have indicated they will avoid public transport in future (Transport Scotland 2020c). This crisis presents very real challenges for public transport providers but is also an opportunity to redesign public transport to provide safer, less crowded, more pleasant public transport options integrated with active travel.

Key settings

There are key settings where much more progress is needed e.g. education, National Health Service facilities. Within the public sector three specific ideas were advanced: moving to shared work-places across the public sector to reduce the need for travel and encourage collaborative working; sharing pool cars and pool bikes across the public sector; and reducing public sector reimbursement for car travel. Around schools there was a suggestion that cars should be banned within two miles of schools and that walking 'buses' and organised bike rides to school should be made compulsory. Some Scottish local authorities are already piloting school street closures before and directly after school hours to enable safer active travel to school, to reduce congestion and to tackle poor air quality (Davis 2020).

Communication

We need public information campaigns with tiers of messaging; reflecting individual benefits of changes (e.g. saving money, convenience) as well as societal benefits. Climate change messages need to be strong e.g. don't drive if the journey is less than 3km and build on the fact that forty-one percent of all trips in Scotland in 2018 were under 3km and noting the potential for behaviour change because for journeys up to 1km 34% were made by car or van (Transport Scotland 2019).

Limitations

We acknowledge that the group of participants invited to this workshop represented advocates for a shift to sustainable transport and a wider dialogue is needed with other organisations and groups, so that a range of different views, which may not all be so supportive, can be represented. In addition, the workshop discussions took place over a morning and necessarily could not cover all the topics relevant to shifting to a sustainable transport system. For example, one such omission was land-use policy, which was not discussed explicitly but can have an important impact on car use and distances travelled.

Conclusions

The climate emergency can be a lever for changing how we travel and climate change targets will fundamentally change how all organisations operate. The changes necessitated by Covid-19 provide further impetus to adapt how we work, to reduce the necessity to travel and to use less carbon intensive forms of travel. The Spaces for People programme funding temporary active travel infrastructure in Scotland is a good example of what can be achieved in a short space of time (Sustrans 2020).

Nationally, the Scottish Government needs to back up its strong policy commitments toward a low carbon transport system with significantly increased investment in sustainable transport while reducing its roads budget. Local and regional transport authorities need to be given the resources to drive this investment, and the flexibility to adapt transport systems in the differing urban and rural environments across Scotland. This will require leadership at all levels and also funds.

There is strong evidence that whole town/city interventions which may contain many intervention types are more effective in creating a 'whole system' change than localised single mode interventions, and that this success has been achieved in the UK (Department for Transport, 2017). Additionally, it is important to integrate 'hard' and 'soft' transport measures, for example combining

new services or infrastructure with appropriate messaging and incentives to encourage use (Cairns *et al.* 2016).

This needs to be a just transition. Too many people suffer transport inequalities currently, not least women and ethnic minorities. Investment should support vulnerable population groups and communities most in need; without this approach these inequalities will remain or widen.

However, we need to move swiftly from policy to action. Targets for reaching net-zero emissions in Glasgow and Edinburgh by 2030 are already challenging; we have to accelerate progress toward a low carbon transport system or risk setting our sights on increasingly unattainable goals.

As a coda, as was mentioned at the workshop, the challenge posed by climate change may, ironically, provide the biggest opportunity yet to improve population health.

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References

Association of Directors of Public Health. *Press release: 10% investment in walking and cycling needed now to tackle UK obesity crisis*. Available from: http://www.adph.org.uk/wp-content/uploads/2013/08/Active_Trave_release_FINAL-_24-April-081.pdf (accessed May 2020)

Bicycle Association of Great Britain. *Personal e-mail correspondence from Peter Eland, Technical Manager, Bicycle Association of Great Britain.* May 2020.

Cairns, S., Jones, M. Sustainable travel towns: An evaluation of the longer term impacts – Main report. Department for Transport; 2016. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/738305/ppr776-sustainable-travel-towns-final-report.pdf (accessed July 2020)

Celis-Morales CA, Lyall DM, Welsh P, Anderson J, Steell L, Guo Y, Maldonado R, Mackay DF, Pell JP, Sattar N, Gill JMR. . Association between active commuting and incident cardiovascular disease, cancer, and mortality: prospective cohort study. *BMJ Clinical Research* 2017;357:j1456. (accessed May 2020)

City of Edinburgh Council. *Road map published for a net zero carbon Edinburgh by 2030.* Edinburgh: City of Edinburgh Council; 2019a. Available from: https://www.edinburgh.gov.uk/news/article/12726/road-map-published-for-a-net-zero-carbon-edinburgh-by-2030 (accessed May 2020)

Transport and Environment Committee. *Evaluation of the 20mph Speed Limit Roll Out.* Edinburgh: City of Edinburgh Council; 2019b. Available from: https://democracy.edinburgh.gov.uk/documents/s9492/Item%207.3%20-%20Evaluation%20of%2020mph%20with%20appendices.pdf (accessed May 2020)

City of Edinburgh Council. *Progressing delivery plan for Edinburgh's transformation.* Edinburgh: City of Edinburgh Council; 2019c. Available from: https://www.edinburgh.gov.uk/news/article/12677/progressing-delivery-plan-for-edinburgh-s-transformation (accessed May 2020)

Connectivity Commission. *Connecting Glasgow: creating an inclusive, thriving, liveable city.* https://glasgow.gov.uk/index.aspx?articleid=23513 (accessed May 2020)

Curl A, Clark J, Kearns A. Household car adoption and financial distress in deprived urban communities: A case of forced car ownership? *Transport Policy* 2018;65:61-71. Available from: https://www.sciencedirect.com/science/article/pii/S0967070X17300100 (accessed May 2020)

Davis. A. School Street Closures and Traffic Displacement. A Literature Review and semi-structured interviews. Transport Research Institute, Edinburgh Napier University, 2020. https://blogs.napier.ac.uk/tri/wp-content/uploads/sites/56/2020/08/School-Streets-Closure-Traffic-Displacement-Literature-Review-FINAL2.pdf (assessed August 2020)

Department for Transport. *Impact of the Local Sustainable Transport Fund.* 2017. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/886152/local-sustainable-transport-fund-impact-summary-report-document.pdf (accessed: July 2020)

Drakeford M. *Letter from Cabinet Secretary for Finance of the Welsh Government to the Welsh Assembly*; May 2018.

European Cyclists Federation, Taking the lead: national strategies on cycling, 2015. https://ecf.com/news-and-events/news/taking-lead-national-strategies-cycling (accessed August 2020)

Glasgow City Council. *Avenues – overview.* https://glasgow.gov.uk/avenues (accessed May 2020)

Glasgow City Council. *Council Sets Target Of Carbon Neutral Glasgow by 2030.* https://www.glasgow.gov.uk/article/25066/Council-Sets-Target-Of-Carbon-Neutral-Glasgow-by-2030 (accessed May 2020)

Glasgow Centre for Population Health. *Transport & Health workshop: Articulating the co-benefits to key stakeholders.* https://www.gcph.co.uk/assets/0000/7838/Active_travel_workshop_report_final.pdf (accessed May 2020)

Hirst D. *Briefing Paper CBP1097. Cycling, walking and mobility: FAQs for 2020.* London: House of Commons Library; 2020. Available from: https://commonslibrary.parliament.uk/research-briefings/sn01097/ (accessed May 2020)

Infrastructure Commission for Scotland, 2020. *Phase 1: Key Findings Report.* https://infrastructurecommission.scot/storage/278/Phase1_ExecutiveSummary.pdf (accessed August 2020)

Kelly P, Kahlmeier S, Gotschi T, Orsini N, Richards J, Roberts J, Scarborough P, Foster C. Systematic review and meta-analysis of reduction in all-cause mortality from walking and cycling and shape of dose response relationship*. International Journal of Behavioral Nutrition and Physical Activity* 2014;11:132

Martin A, Panter J, Suhrcke, Ogilvie D. Impact of changes in mode of travel to work on changes in body mass index: evidence from the British Household Panel Survey. *Journal of Epidemiology & Community Health* 2015;69(8):753-761.

McCartney G, Walsh D, Whyte B, Collins C. Has Scotland always been the 'sick man' of Europe? An observational study from 1855 to 2006. *The European Journal of Public Health* 2011; **22**(6): 756-60.

Nightingale G, Jepson R*. Report on key outcomes following the implementation of 20mph speed limits in the City of Edinburgh*. Edinburgh: City of Edinburgh Council; 2019. Available from: https://www.edinburgh.gov.uk/downloads/file/26614/report-on-key-outcomes-following-the-implementation-of-20mph-limits-in-edinburgh-nihr-sept-2019 (accessed May 2020)

Scottish Government. *Cleaner air for Scotland: the road to a healthier future.* Edinburgh: Scottish Government; 2015. Available from: https://www.gov.scot/publications/cleaner-air-scotland-road-healthier-future/ (accessed May 2020)

Scottish Government. *Active Scotland Delivery Plan*. Edinburgh: Scottish Government; 2018a. Available from: https://www.gov.scot/publications/active-scotland-delivery-plan/ (accessed May 2020)

Scottish Government. *A healthier future: Scotland's diet and healthy weight delivery plan*. Edinburgh: Scottish Government; 2018b. Available from: https://www.gov.scot/publications/healthier-future-scotlands-diet-healthy-weight-delivery-plan/ [accessed May 2020]

Scottish Government. *Cleaner Air for Scotland strategy: independent review.* Edinburgh: Scottish Government; 2019a. Available from: https://www.gov.scot/publications/cleaner-air-scotland-strategy-independent-review/pages/15/ (accessed May 2020)

Scottish Government. *Scottish Health Survey 2018: key findings.* Edinburgh: Scottish Government; 2019b. Available from: https://www.gov.scot/publications/scottish-health-survey-2018-summary-key-findings/ (accessed May 2020)

Scottish Government. *Place Standard tool Strategic Plan 2020-2023*. Edinburgh: Scottish Government; 2019c. Available from: https://placestandard.scot/docs/Place_Standard_Strategic_Plan.pdf (accessed May 2020)

Scottish Government. *Climate Change Plan: monitoring report*. Edinburgh: Scottish Government; 2019d. Available from: https://www.gov.scot/publications/climate-change-plan-monitoring-report-2019/ (accessed May 2020)

Scottish Government. *Budget agreement reached*. Edinburgh: Scottish Government; 2020/ Available from: https://www.gov.scot/news/budget-agreement-reached/ (accessed May 2020)

Scottish Parliament. *Transport (Scotland) Act 2019*. Edinburgh: Scottish Parliament; 2019a. Available from: http://www.legislation.gov.uk/asp/2019/17/contents/enacted (accessed: May 2020)

Scottish Parliament. *Climate Change (Emissions Reductions Targets) (Scotland) Bill.* Scottish Parliament; 2019b. Available from: https://www.parliament.scot/parliamentarybusiness/Bills/108483.aspx [accessed May 2020]

Sustrans. *Spaces for People: Making essential travel and exercise safer during Covid-19.* Sustrans; 2020. Available from: www.sustrans.org.uk/our-blog/projects/2020/scotland/spaces-for-people-making-essential-travel-and-exercise-safer-during-coronavirus/ (accessed: July 2020)

Transport Scotland. *A long-term vision for active travel in Scotland 2030.* Edinburgh: Transport Scotland; 2014. Available from: https://www.transport.gov.scot/media/33649/long-term-vison-for-active-travel-in-scotland-2030.pdf (accessed: May 2020)

Transport Scotland. *Cycling action plan for Scotland 2017-2020.* Edinburgh: Transport Scotland; 2017. Available from: https://www.transport.gov.scot/media/10311/transport-scotland-policy-cycling-action-plan-for-scotland-january-2017.pdf (accessed May 2020)

Transport Scotland. *Scottish transport statistics No.37 2018 edition.* Edinburgh: Transport Scotland; 2019. Available from: https://www.transport.gov.scot/media/44025/scottish-transport-statistics-no-37-2018-edition.pdf (accessed May 2020)

Transport Scotland. *National Transport Strategy 2 (NTS2): Protecting our climate improving our lives.* Edinburgh: Transport Scotland; 2020a. Available from: https://www.transport.gov.scot/our-approach/national-transport-strategy/ (accessed: May 2020)

Transport Scotland. *COVID-19 Public Attitudes Survey Data: Wave 4*. Edinburgh: Transport Scotland; 2020c. Available from: https://www.transport.gov.scot/publication/covid-19-public-attitudes-survey-data-wave-4/ (accessed July 2020)

Whyte B, Waugh C. *Trends in pedestrian and cyclist road casualties in Scotland.* Glasgow: GCPH; 2015. Available from: https://www.gcph.co.uk/publications/572_pedestrian_and_cyclist_casualty_trends_in_scotland (accessed May 2020)

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Abstract:
Transport sector decarbonisation is a Scottish Government policy aim. Recent legislation and funding announcements are beginning a shift away from support for habitual car use. Sustainable transport is augmented by co-benefits of active travel itself through improvements in air quality, safety, and benefits across other sectors. At a workshop, attendees identified the need for further actions including closing down the roads programme and shifting funding to sustainable transport, reducing the need for travel, and a major shift to active travel for journeys under 3km. Such actions are reflected on in the context of the current coronavirus.

Keywords: co-benefit; Scottish transport; active travel; sustainable travel

Introduction

In this think-piece we discuss the current challenges of decarbonising the Scottish transport system and highlight innovative approaches to encourage sustainable travel that have the potential to bring multiple health, social and environmental co-benefits. While this paper focusses on the Scottish context, globally, we collectively face the same issues: of how to reduce the carbon footprint of transport systems and the related blight of air pollution; and, of how to achieve health and social benefits through more sustainable methods of travel. Thus, the lessons arising from good practice and critical thinking in Scotland have relevance for other nations.

The paper draws upon a Transport & Health workshop, 'Articulating the co-benefits to key stakeholders', held in Glasgow on 22nd October 2019 convened by the Glasgow Centre for Population Health and the Transport Research Institute of Edinburgh Napier University. Its main purpose was, firstly, to explore the health, social and environmental co-benefits arising from moving to a more sustainable transport system and, secondly, to generate ideas about how to enable such a shift. Forty-three knowledgeable and experienced professionals participated, many working in strategic positions, including senior planners from Transport Scotland, local authorities and the National Health Service (NHS), academics, sustainable transport campaigners, public health practitioners, a lead politician and Scotland's Active Nation Commissioner. The workshop was structured around four keynote talks (by two senior policy makers, an academic and a public health

specialist), interspersed with two workshop discussions; the first focussed on how to make the case for the co-benefits of sustainable transport and the second on identifying the key challenges and solutions to transforming our urban transport systems. Notes were compiled from the discussions of five workshop groups and analysed thematically (Glasgow Centre for Population Health 2020).

We will discuss the ideas generated by workshop delegates later in the paper. Firstly, we discuss the Scottish policy context in relation to sustainable travel, climate change, health and now Covid-19. Secondly, we outline the challenges of making the shift away from the current car-dominated transport system to one built around sustainable transport and suggest practical ways to achieve progress, moving beyond policy rhetoric to action.

Finally, to be clear from the outset, we define a sustainable transport system as one that prioritises low carbon transport choices and comprises multiple modes, including walking, cycling, public transport, and bike, wheeling, and car sharing. A sustainable transport system minimises negative social, environmental and climate impacts and relegates private car use to a minority rather than a majority of trips. By active travel, we mean travel that requires physical effort, principally walking, cycling and wheeling.

Policy context

This paper focuses on Scottish policy in a country of 5.4 million people within the United Kingdom, which has devolved government including most aspects of transport. The Transport (Scotland) Act 2019 passed in November 2019 required a new national transport strategy, provided for the introduction of low emission zones, gave local transport authorities new powers over the operation of local bus services, prohibited double-parking and parking on pavements and gave local authorities powers to introduce a workplace parking levy (Scottish Parliament 2019a). The new National Transport Strategy (NTS2) has the vision of creating "a sustainable, inclusive and accessible transport system, helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors" (Transport Scotland 2020a). The Strategy highlights the importance of promoting active travel to improve health and wellbeing, to reduce inequalities and to contribute to action to address climate change.

The Scottish Government has previously committed to increasing active travel throughout the country in the Long-Term Active Travel Vision (Transport Scotland 2014) and Cycling Action Plan for Scotland (Transport Scotland 2017). Furthermore, funding for active travel has increased from £39 million in 2017-2018 to £80 million in 2018-2019, and with a further increase to £100million in

2020/21 committed to in the latest Scottish government budget (Scottish Government 2020). This equates to £18.30 per head of population, more than double the committed spend per head for active travel in England (House of Commons Library 2020) and 40% higher than the equivalent figure for Wales (Drakeford 2018).[1] By way of comparison the Dutch Government spent about £22 per head of population in 2010, had done so for decades (European Cyclists Federation 2015) and continue to do so. The latest Scottish Government budget also commits to investment of over £500 million in bus priority infrastructure to improve bus journey times and raise bus usage. A further addition has been a commitment to free bus travel for under 19s (Scottish Government 2020).

Another major driver for change is the Scottish Government's strong, and internationally recognised, commitment to reducing carbon emissions. The latest Climate Change Act targets Scotland reaching net-zero emissions by 2045 and a 75% reduction by 2030 (Scottish Parliament 2019b). This commitment has been followed by Scotland's two largest cities, Glasgow and Edinburgh, committing to achieving carbon neutrality by 2030 (Glasgow City Council 2019, City of Edinburgh Council 2019a).

Various health-related policies emphasise the need to shift to more active and less polluting modes of transport. The Cleaner Air for Scotland (CAFS) strategy sets out how the Scottish Government and its partner organisations will reduce air pollution to protect human health and fulfil Scotland's legal responsibilities in relation to quality, and has the ambition that Scotland will "have the best air quality in Europe" (Scottish Government 2015). As a consequence of failing to meet air quality strategy objectives, Scotland is now committed to introducing low emission zones (LEZs) in its four largest cities. A recent review of CAFS pointed to a need for more "focus on inter-related interventions including improved transport infrastructure that encourages higher levels of active travel; improved access to accessible, affordable and better quality public transport...and greater encouragement to adopt less polluting private personal transport (e.g. low and zero emission vehicles) (Scottish Government 2019a)."

Scotland has an unenviable record of poor health and premature mortality compared to other western European countries (McCartney *et al.* 2011), and only two thirds of adults (66%) meet the guidelines for Moderate or Vigorous Physical Activity and 65% are overweight or obese (Scottish Government 2019b). Active travel is recognised as having a role in both increasing levels of physical activity (Scottish Government 2018a) and addressing overweight and obesity (Scottish Government 2018b).

[1] This comparison is based on commitments made prior to Covid-19, the impact of which may change future budgets significantly

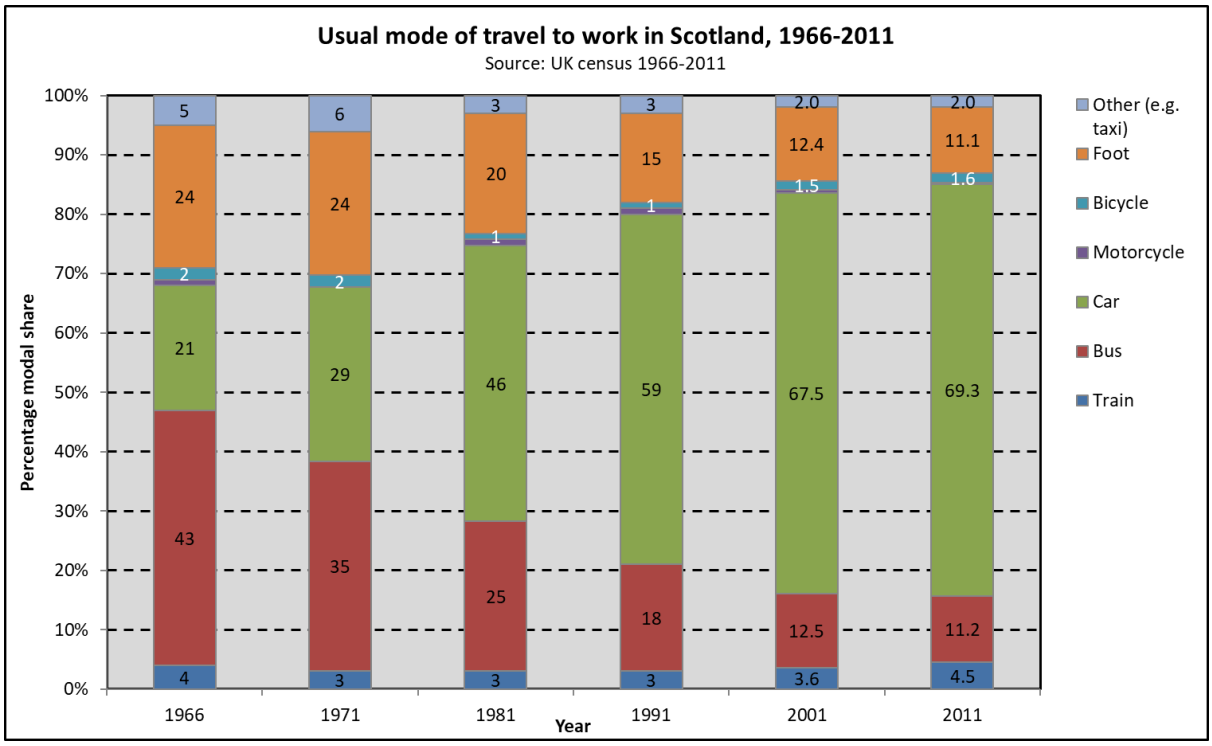
Placemaking is a linked strand of government policy, influenced by the UN Sustainable Development Goals and underpinned by a recognition that the environment around us can positively (or negatively) influence our wellbeing and outcomes for communities (Scottish Government 2019c). Placemaking has a growing role in planning and wellbeing policy, supporting the government's wellbeing framework, the National Performance Framework. How people relate to a place affects how they move around and use their home neighbourhood. When successfully implemented, placemaking can help encourage sustainable travel, improve air quality, support green infrastructure and mitigate climate change.

Challenges to a shift to more sustainable modes

Car use

The first and most fundamental challenge to shifting to more sustainable modes of travel is the ubiquity of the car. While commuting journeys only represent one type of journey, the growth in car use can be illustrated by the commuting trends of employed adults over a 45-year period in Scotland (1966-2011) using the UK Census (Figure 1). In this period, the proportion of car commuters trebled, rising to 69% in 2011. At the same time, commuting on foot and by bus reduced significantly, each accounting for only 11% of commuters by 2011, while train use rose marginally to account for 4.5% of commuters by 2011. Cycle commuting remained low at 1.6% of commuters in 2011 (Whyte and Waugh 2015, p16). More recent data show that car use, as measured by road distances driven (across all types of journey) or licensed motor vehicles on the road, continues to rise, while bus passengers continue to decline (Transport Scotland 2019).

Figure 1



Carbon emissions

The continued rises in private motorised transport and distances driven help explain why, despite overall reductions in carbon emissions in Scotland (by 2017 total emissions were 46.8% below the 1990 baseline of 76.3 MtCO2e), transport emissions, including international aviation and shipping, have risen and were 0.4% above the 1990 baseline year (Scottish Government 2019d). Transport is Scotland's largest greenhouse gas emitting sector, making up 37% of all Scottish emissions and road transport accounts for the largest share of this (68% of all transport emissions) (Transport Scotland 2019). Car emissions, which account for 40% of all transport emissions, have been rising since 2013 and in 2017 were 1.7% above the 1990 baseline. Additionally, emissions from new vehicles, which had been falling, started to rise in 2017. This is thought to be due, at least in part, to an increase in the proportion of larger new cars (SUVs) being registered with higher emissions (Scottish Government, 2019d).

Low emission vehicles

It is also relevant to note that while the number of Electric and Hybrid Electric motor vehicles in Scotland has increased in recent years (to 37,000 in 2018) these vehicles still account for less than 1.2% of all licensed vehicles (Transport Scotland 2019); in 2018, a total of 10,300 new electric and hybrid electric vehicles were registered in Scotland compared to an estimated 5,700 e-bike sales (Bicycle Association of Great Britain 2020).

Investment

The Scottish Government remains committed to increasing road network capacity, which runs counter to the otherwise strong policy on addressing climate change, and is despite recommendations to end increases in highway capacity made by Government convened independent bodies (Scottish Government, 2019a; Infrastructure Commission for Scotland, 2020). While the budget for active travel has increased substantially, the £100 million allocation in 2020/21 still accounts for only 3.3% of the total transport budget. Many organisations have campaigned for 10% of the transport budget to be allocated to active travel (e.g. Association of Directors of Public Health 2008) in order to bring Scotland's spending in line with countries with high levels of cycling like the Netherlands and Denmark.

Operational barriers

There are also operational barriers to making progress. The process of consulting the public on new infrastructure or speed restrictions and the need to put in place Traffic Regulation orders (TROs) can slow progress. In relation to creating new active travel infrastructure, development can be patchy with progress mainly occurring in large urban centres rather than in small rural authorities (which have less funds in the first place to allocate). Even where investment is happening there is widespread acknowledgement that safe active travel routes, particularly for cycling, are limited, disconnected, and that it will take years to create a coherent joined-up network (Connectivity Commission 2019).

Public transport

The availability, accessibility and affordability of public transport, particularly buses, varies widely across Scotland, creating barriers to use that impact socially and economically. The more limited availability and frequency of public transport in rural areas and the greater distances to travel tend to lead to a greater reliance on driving in rural households. There is acknowledgement that much more needs to be done to integrate transport services and ticketing to facilitate multi-modal journeys (Connectivity Commission 2019).

Inequalities

There are many elements of the way the current transport system operates that lead to inequalities. Public transport is particularly important for households on low income but in many areas of social deprivation public transport options can be limited and relatively expensive (Transport Scotland 2020). This is one of the factors associated with 'forced car ownership' among families in financial

difficulties, where having a car is seen as a requirement to access employment and access to public transport is restricted due to quality, frequency and reliability issues (Curl *et al.* 2018).

Public transport timetables are built around a 'nine-to-five' working pattern, and radial (i.e. along main corridors to town and cities but not orbital for cross city journeys) and therefore do not necessarily suit those in unpaid care work and part-time employment, who are predominantly women. Feelings of being unsafe and fear of violence particularly affect women and can be an additional barrier to public transport use especially at night. Disabled people face multiple barriers to travel, including not being able to access public transport vehicles and interchanges between modes, while people in rural areas find accessing services less convenient and satisfaction with public transport is much lower in accessible rural areas.

Cycling currently is skewed toward more affluent demographic groups and to men in particular, but as active travel spending increases, the design and targeting of this investment needs to be carefully planned to ensure the benefits of increased levels of active travel are shared across the population, otherwise inequalities will remain or widen.

Co-benefits of active travel

The concept of co-benefits was introduced at the workshop. Evidence was presented of how interventions to reduce transport-related carbon emissions could have wider 'co-benefits' for health, social cohesion and quality of life. Co-benefits are an outcome of climate-friendly policies, so reducing carbon-based energy in the transport sector often leads to improvements in human health. Walking and cycle commuting have been associated with a lower risk of CVD and cycle commuting is also associated with lower cancer risk and lower mortality (Celis-Morales *et al.* 2017), while switching to more active modes of commuting (from private motor transport) has been associated with significant reductions in BMI (Martin *et al.* 2015). Walking and cycling have been shown to have population-level health benefits even after adjusting for other physical activity (Kelly *et al.* 2014).

Beyond increased levels of walking and cycling and consequent improvements in cardio-vascular and mental health there may also be improvements in respiratory health as a result of reductions in motorised traffic and congestion. Further benefits discussed which span other sectors included the issue of increased academic attainment by school children who are more physically active, the biggest opportunity for which is active travel on the school journey.

Signs of progress

As noted earlier, we see positive rhetoric about the need to shift to more sustainable transport modes, and increasing recognition of the synergies between different policy areas and their potential environmental, health and social co-benefits. Transport is now a key driver for other policies. The new national transport strategy (NTS2) endorses the sustainable transport hierarchy, while the new Transport Bill has good elements (new powers for local authorities over the operation of bus services and the opportunity to introduce a Workplace Parking Levy[2]). National investment in bus prioritisation and active travel is rising.

In Scotland's two largest cities[3], Edinburgh (population= 525,000 in 2019) and Glasgow (population= 633,000 in 2019), there is evidence of increasing commitment to, and in investment in, active and sustainable travel. Since 2012/13, Edinburgh City Council has increased its financial commitment to active travel; currently 10% of the city's transport budget is spent on cycling. Even prior to this commitment, there were signs of promising modal shifts in commuting patterns in the city. Between the 2001 and 2011 Censuses, Edinburgh (uniquely among Scottish local authorities) showed an increase in the individual modal shares of walking, cycling, bus and train commutes, while car driving and being a passenger declined; indeed a higher proportion of people in the city walked, cycled and took the bus to work than anywhere else in Scotland (Whyte and Waugh, 2015, p54). More recently, there is evidence that Edinburgh's city wide 20mph limit is reducing average vehicle speed (Nightingale and Jepson, 2019), creating safer streets and encouraging more people to walk and cycle (City of Edinburgh Council, 2019b). Looking ahead, Edinburgh's city centre transformation strategy commits to deliver £420 million of benefits over a 25-year period investing in improved public spaces, inclusive access and prioritisation of active travel and of public transport (City of Edinburgh Council, 2019c).

In Glasgow, similar developments are underway. A network of radial cycling routes into the city (city cycleways) is being built, a low emission zone is being phased in and the 'Avenues' programme (with £115 million of City Deal funding) aims to establish principal avenues throughout the city centre to form an integrated network of continuous pedestrian and cycle priority routes. The Sauchiehall St pilot avenue, completed in June 2019, includes: an avenue of trees, segregated cycle lanes, increased pedestrian/cycle space, continuous footways and reduced street clutter, free Wi-Fi and intelligent street lighting (Glasgow City Council 2018). In addition, the Council has committed to

[2] A Workplace Parking Levy is a charge on employers who provide workplace parking, a type of congestion charging scheme. See https://www.nottinghamcity.gov.uk/information-for-residents/transport-parking-and-streets/parking-and-permits/workplace-parking-levy

[3] Greater Glasgow's population together with the equivalent population for Edinburgh is 2,029,000 i.e. roughly 37.5% of Scotland's population.

introducing a 20mph limit across the whole council area and to spending at least 10% of its transport budget on active travel.

Some employers have started endorsing more flexible work practices including home working. The Coronavirus pandemic looks likely to accelerate these changes, driven by the necessity for many to work from home and the swift adoption of on-line meetings (Transport Scotland 2020c). Nevertheless, we need to be aware that for people employed in shift work, in factories and on zero-hours contracts such changes are likely not to be available. Additionally, home working, while reducing the need to travel, risks social isolation and reduced physical activity.

Mitigation of Covid-19 has necessitated social distancing – in the UK people are required to stay 2 metres apart – and has led to issues of over-crowded pavements and paths where people are walking or cycling for exercise or work. This has prompted Transport Scotland to provide special funding for temporary infrastructure, via the Spaces for People programme delivered by Sustrans (Sustrans 2020), to ensure social distancing is possible. The scheme is funding local 20mph speed restrictions, road closures to motor vehicles and the building of temporary segregated cycle and walking paths on roadways. While currently temporary, these changes can help accelerate investment in the active travel infrastructure needed to support more sustainable travel in the longer term. Such changes may also become a requirement to sustain social distancing over a longer period and to 'future proof' against the possibility of future pandemics.

What else needs to happen?

Returning to our October workshop and the context of the climate emergency, a range of ideas for how to make progress toward active and sustainable travel were suggested by delegates, some strategic, some practical and some radical.

Leadership and budget shifts

Individual and organisational leadership across all sectors, political will and sustained follow-through were identified as key requirements for change to be delivered. A fundamental shift in the transport budget away from private motor vehicle use and roads towards active and sustainable transport is needed. To this end one suggestion, was to end the roads programme in the next five years and use the budget purely for maintenance with money saved going to active and sustainable transport; echoing a suggestion made in the review of the Cleaner Air For Scotland strategy, as noted earlier (Scottish Government 2019a).

Disincentivising car use and encouraging public and active transport

Many ways of reducing car use were discussed; for example, making car journeys the most expensive option for travel, highlighting the availability of public transport and active travel routes, incentivising business to encourage staff to car share, integrating car hire with public transport and more radically and making public transport free for all. This latter suggestion is coming closer to reality in Scotland with the recent budget agreement to provide free bus travel to under 19s (Scottish Government 2020), a right which is already in place for anyone aged 60 years or older. Delegates also focused on parking, suggesting closing car parks, enhanced parking restrictions and rationing the amount of car park space available.

Infrastructure and public transport improvements

We need to improve infrastructure, normalise active travel and increase public transport use, particularly the use of buses. Different models of bus ownership were favoured with a return of bus services to public ownership being a popular suggestion. Public transport providers must work together to provide an integrated transport network, integrated ticketing and affordable prices that compare favourably with the equivalent costs of car travel. However, as a result of the Coronavirus pandemic, a majority of the public in Scotland are concerned about contracting or spreading the virus while on public transport and many have indicated they will avoid public transport in future (Transport Scotland 2020c). This crisis presents very real challenges for public transport providers but is also an opportunity to redesign public transport to provide safer, less crowded, more pleasant public transport options integrated with active travel.

Key settings

There are key settings where much more progress is needed e.g. education, National Health Service facilities. Within the public sector three specific ideas were advanced: moving to shared work-places across the public sector to reduce the need for travel and encourage collaborative working; sharing pool cars and pool bikes across the public sector; and reducing public sector reimbursement for car travel. Around schools there was a suggestion that cars should be banned within two miles of schools and that walking 'buses' and organised bike rides to school should be made compulsory. Some Scottish local authorities are already piloting school street closures before and directly after school hours to enable safer active travel to school, to reduce congestion and to tackle poor air quality (Davis 2020).

Communication

We need public information campaigns with tiers of messaging; reflecting individual benefits of changes (e.g. saving money, convenience) as well as societal benefits. Climate change messages need to be strong e.g. don't drive if the journey is less than 3km and build on the fact that forty-one percent of all trips in Scotland in 2018 were under 3km and noting the potential for behaviour change because for journeys up to 1km 34% were made by car or van (Transport Scotland 2019).

Limitations

We acknowledge that the group of participants invited to this workshop represented advocates for a shift to sustainable transport and a wider dialogue is needed with other organisations and groups, so that a range of different views, which may not all be so supportive, can be represented. In addition, the workshop discussions took place over a morning and necessarily could not cover all the topics relevant to shifting to a sustainable transport system. For example, one such omission was land-use policy, which was not discussed explicitly but can have an important impact on car use and distances travelled.

Conclusions

The climate emergency can be a lever for changing how we travel and climate change targets will fundamentally change how all organisations operate. The changes necessitated by Covid-19 provide further impetus to adapt how we work, to reduce the necessity to travel and to use less carbon intensive forms of travel. The Spaces for People programme funding temporary active travel infrastructure in Scotland is a good example of what can be achieved in a short space of time (Sustrans 2020).

Nationally, the Scottish Government needs to back up its strong policy commitments toward a low carbon transport system with significantly increased investment in sustainable transport while reducing its roads budget. Local and regional transport authorities need to be given the resources to drive this investment, and the flexibility to adapt transport systems in the differing urban and rural environments across Scotland. This will require leadership at all levels and also funds.

There is strong evidence that whole town/city interventions which may contain many intervention types are more effective in creating a 'whole system' change than localised single mode interventions, and that this success has been achieved in the UK (Department for Transport, 2017). Additionally, it is important to integrate 'hard' and 'soft' transport measures, for example combining

new services or infrastructure with appropriate messaging and incentives to encourage use (Cairns *et al.* 2016).

This needs to be a just transition. Too many people suffer transport inequalities currently, not least women and ethnic minorities. Investment should support vulnerable population groups and communities most in need; without this approach these inequalities will remain or widen.

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However, we need to move swiftly from policy to action. Targets for reaching net-zero emissions in Glasgow and Edinburgh by 2030 are already challenging; we have to accelerate progress toward a low carbon transport system or risk setting our sights on increasingly unattainable goals.

As a coda, as was mentioned at the workshop, the challenge posed by climate change may, ironically, provide the biggest opportunity yet to improve population health.

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References

Association of Directors of Public Health. *Press release: 10% investment in walking and cycling needed now to tackle UK obesity crisis*. Available from: http://www.adph.org.uk/wp-content/uploads/2013/08/Active_Trave_release_FINAL-_24-April-081.pdf (accessed May 2020)

Bicycle Association of Great Britain. *Personal e-mail correspondence from Peter Eland, Technical Manager, Bicycle Association of Great Britain.* May 2020.

Cairns, S., Jones, M. Sustainable travel towns: An evaluation of the longer term impacts – Main report. Department for Transport; 2016. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/738305/ppr776-sustainable-travel-towns-final-report.pdf (accessed July 2020)

Celis-Morales CA, Lyall DM, Welsh P, Anderson J, Steell L, Guo Y, Maldonado R, Mackay DF, Pell JP, Sattar N, Gill JMR. . Association between active commuting and incident cardiovascular disease, cancer, and mortality: prospective cohort study. *BMJ Clinical Research* 2017;357:j1456. (accessed May 2020)

City of Edinburgh Council. *Road map published for a net zero carbon Edinburgh by 2030.* Edinburgh: City of Edinburgh Council; 2019a. Available from: https://www.edinburgh.gov.uk/news/article/12726/road-map-published-for-a-net-zero-carbon-edinburgh-by-2030 (accessed May 2020)

Transport and Environment Committee. *Evaluation of the 20mph Speed Limit Roll Out.* Edinburgh: City of Edinburgh Council; 2019b. Available from: https://democracy.edinburgh.gov.uk/documents/s9492/Item%207.3%20-%20Evaluation%20of%2020mph%20with%20appendices.pdf (accessed May 2020)

City of Edinburgh Council. *Progressing delivery plan for Edinburgh's transformation.* Edinburgh: City of Edinburgh Council; 2019c. Available from: https://www.edinburgh.gov.uk/news/article/12677/progressing-delivery-plan-for-edinburgh-s-transformation (accessed May 2020)

Connectivity Commission. *Connecting Glasgow: creating an inclusive, thriving, liveable city.* https://glasgow.gov.uk/index.aspx?articleid=23513 (accessed May 2020)

Curl A, Clark J, Kearns A. Household car adoption and financial distress in deprived urban communities: A case of forced car ownership? *Transport Policy* 2018;65:61-71. Available from: https://www.sciencedirect.com/science/article/pii/S0967070X17300100 (accessed May 2020)

Davis. A. School Street Closures and Traffic Displacement. A Literature Review and semi-structured interviews. Transport Research Institute, Edinburgh Napier University, 2020. https://blogs.napier.ac.uk/tri/wp-content/uploads/sites/56/2020/08/School-Streets-Closure-Traffic-Displacement-Literature-Review-FINAL2.pdf (assessed August 2020)

Department for Transport. *Impact of the Local Sustainable Transport Fund.* 2017. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/886152/local-sustainable-transport-fund-impact-summary-report-document.pdf (accessed: July 2020)

Drakeford M. *Letter from Cabinet Secretary for Finance of the Welsh Government to the Welsh Assembly*; May 2018.

European Cyclists Federation, Taking the lead: national strategies on cycling, 2015. https://ecf.com/news-and-events/news/taking-lead-national-strategies-cycling (accessed August 2020)

Glasgow City Council. *Avenues – overview.* https://glasgow.gov.uk/avenues (accessed May 2020)

Glasgow City Council. *Council Sets Target Of Carbon Neutral Glasgow by 2030.* https://www.glasgow.gov.uk/article/25066/Council-Sets-Target-Of-Carbon-Neutral-Glasgow-by-2030 (accessed May 2020)

Glasgow Centre for Population Health. *Transport & Health workshop: Articulating the co-benefits to key stakeholders.* https://www.gcph.co.uk/assets/0000/7838/Active_travel_workshop_report_final.pdf (accessed May 2020)

Hirst D. *Briefing Paper CBP1097. Cycling, walking and mobility: FAQs for 2020.* London: House of Commons Library; 2020. Available from: https://commonslibrary.parliament.uk/research-briefings/sn01097/ (accessed May 2020)

Infrastructure Commission for Scotland, 2020. *Phase 1: Key Findings Report.* https://infrastructurecommission.scot/storage/278/Phase1_ExecutiveSummary.pdf (accessed August 2020)

Kelly P, Kahlmeier S, Gotschi T, Orsini N, Richards J, Roberts J, Scarborough P, Foster C. Systematic review and meta-analysis of reduction in all-cause mortality from walking and cycling and shape of dose response relationship*. International Journal of Behavioral Nutrition and Physical Activity* 2014;11:132

Martin A, Panter J, Suhrcke, Ogilvie D. Impact of changes in mode of travel to work on changes in body mass index: evidence from the British Household Panel Survey. *Journal of Epidemiology & Community Health* 2015;69(8):753-761.

McCartney G, Walsh D, Whyte B, Collins C. Has Scotland always been the 'sick man' of Europe? An observational study from 1855 to 2006. *The European Journal of Public Health* 2011; **22**(6): 756-60.

Nightingale G, Jepson R. *Report on key outcomes following the implementation of 20mph speed limits in the City of Edinburgh*. Edinburgh: City of Edinburgh Council; 2019. Available from: https://www.edinburgh.gov.uk/downloads/file/26614/report-on-key-outcomes-following-the-implementation-of-20mph-limits-in-edinburgh-nihr-sept-2019 (accessed May 2020)

Scottish Government. *Cleaner air for Scotland: the road to a healthier future.* Edinburgh: Scottish Government; 2015. Available from: https://www.gov.scot/publications/cleaner-air-scotland-road-healthier-future/ (accessed May 2020)

Scottish Government. *Active Scotland Delivery Plan*. Edinburgh: Scottish Government; 2018a. Available from: https://www.gov.scot/publications/active-scotland-delivery-plan/ (accessed May 2020)

Scottish Government. *A healthier future: Scotland's diet and healthy weight delivery plan*. Edinburgh: Scottish Government; 2018b. Available from: https://www.gov.scot/publications/healthier-future-scotlands-diet-healthy-weight-delivery-plan/ [accessed May 2020]

Scottish Government. *Cleaner Air for Scotland strategy: independent review.* Edinburgh: Scottish Government; 2019a. Available from: https://www.gov.scot/publications/cleaner-air-scotland-strategy-independent-review/pages/15/ (accessed May 2020)

Scottish Government. *Scottish Health Survey 2018: key findings.* Edinburgh: Scottish Government; 2019b. Available from: https://www.gov.scot/publications/scottish-health-survey-2018-summary-key-findings/ (accessed May 2020)

Scottish Government. *Place Standard tool Strategic Plan 2020-2023*. Edinburgh: Scottish Government; 2019c. Available from: https://placestandard.scot/docs/Place_Standard_Strategic_Plan.pdf (accessed May 2020)

Scottish Government. *Climate Change Plan: monitoring report*. Edinburgh: Scottish Government; 2019d. Available from: https://www.gov.scot/publications/climate-change-plan-monitoring-report-2019/ (accessed May 2020)

Scottish Government. *Budget agreement reached*. Edinburgh: Scottish Government; 2020/ Available from: https://www.gov.scot/news/budget-agreement-reached/ (accessed May 2020)

Scottish Parliament. *Transport (Scotland) Act 2019*. Edinburgh: Scottish Parliament; 2019a. Available from: http://www.legislation.gov.uk/asp/2019/17/contents/enacted (accessed: May 2020)

Scottish Parliament. *Climate Change (Emissions Reductions Targets) (Scotland) Bill.* Scottish Parliament; 2019b. Available from: https://www.parliament.scot/parliamentarybusiness/Bills/108483.aspx [accessed May 2020]

Sustrans. *Spaces for People: Making essential travel and exercise safer during Covid-19.* Sustrans; 2020. Available from: www.sustrans.org.uk/our-blog/projects/2020/scotland/spaces-for-people-making-essential-travel-and-exercise-safer-during-coronavirus/ (accessed: July 2020)

Transport Scotland. *A long-term vision for active travel in Scotland 2030.* Edinburgh: Transport Scotland; 2014. Available from: https://www.transport.gov.scot/media/33649/long-term-vison-for-active-travel-in-scotland-2030.pdf (accessed: May 2020)

Transport Scotland. *Cycling action plan for Scotland 2017-2020.* Edinburgh: Transport Scotland; 2017. Available from: https://www.transport.gov.scot/media/10311/transport-scotland-policy-cycling-action-plan-for-scotland-january-2017.pdf (accessed May 2020)

Transport Scotland. *Scottish transport statistics No.37 2018 edition.* Edinburgh: Transport Scotland; 2019. Available from: https://www.transport.gov.scot/media/44025/scottish-transport-statistics-no-37-2018-edition.pdf (accessed May 2020)

Transport Scotland. *National Transport Strategy 2 (NTS2): Protecting our climate improving our lives.* Edinburgh: Transport Scotland; 2020a. Available from: https://www.transport.gov.scot/our-approach/national-transport-strategy/ (accessed: May 2020)

Transport Scotland. *COVID-19 Public Attitudes Survey Data: Wave 4*. Edinburgh: Transport Scotland; 2020c. Available from: https://www.transport.gov.scot/publication/covid-19-public-attitudes-survey-data-wave-4/ (accessed July 2020)

Whyte B, Waugh C. *Trends in pedestrian and cyclist road casualties in Scotland.* Glasgow: GCPH; 2015. Available from: https://www.gcph.co.uk/publications/572_pedestrian_and_cyclist_casualty_trends_in_scotland (accessed May 2020)