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*Thesis*

# Are cars the new tobacco?

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## ABSTRACT

**Background** Public health must continually respond to new threats reflecting wider societal changes. Ecological public health recognizes the links between human health and global sustainability. We argue that these links are typified by the harms caused by dependence on private cars.

**Methods** We present routine data and literature on the health impacts of private car use; the activities of the 'car lobby' and factors underpinning car dependence. We compare these with experience of tobacco.

**Results** Private cars cause significant health harm. The impacts include physical inactivity, obesity, death and injury from crashes, cardio-respiratory disease from air pollution, noise, community severance and climate change. The car lobby resists measures that would restrict car use, using tactics similar to the tobacco industry. Decisions about location and design of neighbourhoods have created environments that reinforce and reflect car dependence. Car ownership and use has greatly increased in recent decades and there is little public support for measures that would reduce this.

**Conclusions** Car dependence is a potent example of an issue that ecological public health should address. The public health community should advocate strongly for effective policies that reduce car use and increase active travel.

**Keywords** environment, public health, transport

## Are cars the new tobacco?

The history of public health reflects the problems of each age and evolving understandings of health.[1] In the late nineteenth century, the pressing problems were communicable diseases associated with environmental conditions and efforts were directed to improving water and sanitation and reducing overcrowding. In the twentieth century, the rise in non-communicable diseases associated with 'lifestyle' factors led to a focus towards strategies to persuade and empower individuals to adopt 'healthy choices' and deliver healthcare to individuals. It is argued that this focus became increasingly individualistic and ignored environmental influences.[1] There is now recognition that these types of activity are insufficient to address increasingly complex problems of the current age such as obesity and poor mental well-being. An ecological model of public health is proposed that recognizes the complex interplay of physiological, physical, social and cognitive factors that influence health at individual, community and global level, and also recognizes the relationships between human health and sustainability.[2]

Tobacco is arguably the archetypal behavioural risk factor. Smoking tobacco is a single behaviour causing many conditions including cardiovascular disease and cancer, killing more than 5 million people annually.[3] Epidemiological studies showing the harms caused by smoking date back to the 1950s. Subsequently public awareness of the risks grew steadily.[4] Research on passive smoking since the 1970s showed that exposure passively to 'sidestream' smoke is also harmful.[5] Policy responses were slow and incremental.[4] Initial actions focused on education seeking to inform

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individual choice. Legislation prohibiting smoking in public places was finally introduced in the UK in 2005.[6] Crucially, tobacco control relies on action targeting both behaviour and social structures.

This paper argues that private cars share many characteristics with tobacco and could be regarded as the archetypal ecological risk. Like tobacco, cars harm the health of users and others. Moreover, cars damage global sustainability. Like tobacco, car use is seen as an individual choice and policy responses to limit it are resisted by a powerful industry lobby. But it is over-simplistic to view car use as a simple behavioural choice. This paper will argue that the use of private cars reflects and reinforces the physical and social environment that we have created, and that an ecological approach is needed to understand and address the harms caused by car dependence.

## Cars, health and sustainability

Systematic reviews have summarized the health impacts of transport.[7–10] Cars have effects at individual, community and global levels.

### Crashes

Road traffic crashes cause 1.3 million deaths and up to 50 million injuries per year globally.[11,12] By 2030 they are expected to account for 5% of the total global disease burden. Ninety per cent of the injuries are in low- and middle-income countries and nearly half of the deaths are in vulnerable road users—pedestrians and cyclists, especially children.[13] This has led some to describe a 'war on the roads' in which the interests of vulnerable road users are pitted against a powerful motor industry.[14] Although there is often focus on child road safety education as a way to reduce child injuries, there is no evidence that these reduce crashes.[15] There is a critical mass effect: walking and cycling are safer with greater numbers of pedestrians and cyclists[16] and lower traffic volumes.[17]

Road traffic crashes have wider impacts. Traffic and fear of crashes are common reasons given for restricting children's outdoor play and driving them to school.[18] People cite fear of crashes as a reason for choosing not to cycle. Yet life years gained from regular cycling outweigh the years lost from crashes ~10-fold.[19]

### Physical inactivity and obesity

Replacing car travel with more active modes could significantly improve physical activity rates[20] and slow the rise in obesity. Physical activity has been described as the 'best buy in public health',[21] reducing the risk of cardiovascular disease,[22,23] obesity,[24] diabetes,[25] osteoporosis,[26] some cancers,[27,28] and depression.[29] Physically active adults have a 20–30% reduced risk of premature death.[24] Physical inactivity is responsible for over 3 million deaths per year globally.[30] In the UK fewer than 40% of adults achieve the recommended level of physical activity[31,32]—which is 30-min accumulated moderate physical activity (equivalent to brisk walking) at least 5 days per week.[24] Countries with higher levels of active transportation have lower obesity rates.[33] For an individual, each additional kilometre walked per day is associated with a 4.8% reduction in the likelihood of obesity, whereas each additional hour spent in a car per day is associated with a 6% increase.[34]

### Pollution

Urban air pollution causes over 1 million deaths globally each year[30] mostly through increases in cardiovascular mortality and morbidity and cancers, particularly in vulnerable groups.[35] Air pollution is a complex mix of particles and gases with small particulate matter (PM) the constituent most commonly associated with adverse health effects. Road transport accounts for an estimated 30% of the emissions of $PM_{2.5}$ and 50% of $PM_{0.1}$.[36] Pollutant levels are higher in major cities in low-income countries than cities in high-income countries.[37] For many pollutants, concentrations within vehicles are higher than background and general roadside concentrations.[38,39]

### Noise

Noise from road intersections is reported to cause sleep disturbance,[40] hypertension,[41] raised blood pressure in children[42] and minor psychiatric illness.[43]

### Severance

An important community level impact is the 'severance' effect of heavy traffic on communities. People living in more 'walkable' neighbourhoods have more social interactions, higher levels of trust and social participation than those living on busy roads.[44–46] Social participation is associated with a 4-fold difference in all-cause mortality.[47]

### Climate change

Climate change threatens global sustainability and has many adverse health consequences. It is estimated that by 2000 150 000 people were dying each year because of climate change,[48] mostly vulnerable people in low-income countries. Motorized traffic accounts for an estimated 22% of $CO_2$ emissions.[49]

### Health inequalities

Like tobacco, the harms associated with cars are disproportionately borne in disadvantaged communities. Deprived areas are more likely to be heavily congested with traffic, resulting in high levels of air pollution, noise, severance and crashes.[50,51] Rates of death and injury from crashes show a steep social gradient, with higher rates per capita in more deprived groups, especially for child pedestrian injuries.[52,53] Similarly, there is a strong correlation between poverty and air pollution with deprived populations more vulnerable to effects of air pollution.[54] Cars contribute to global inequalities, as low-income countries suffer most from climate change.[48]

Unlike tobacco, car ownership does bring individual and economic benefits. Car owners have better overall health than non-car owners, reflecting their greater affluence.[55,56] They also have better access to employment, services and amenities, though this reflects historical policies that prioritized roads for private cars above public transport and separated housing from other land uses. This significantly disadvantages non-car owners and widens inequalities.[57]

## The car lobby

The tobacco industry has used marketing strategies to increase uptake and maintenance of smoking.[58–60] The car industry adopts very similar strategies including direct advertising and sponsorship designed to create the perceptions that their products are aspirational. Car manufacturers generally spend 2.5–3.5% of their revenue on marketing.[61] The efforts tobacco manufacturers made to oppose bans on tobacco advertising and sponsorship[62] demonstrates the importance of these activities.

Both industries also use professional lobbyists and front organizations—often the same organizations. For example, Forest (Freedom Organisation for the Right to Enjoy Smoking Tobacco) claims to represent smokers but is funded mostly by tobacco companies.[63] The Taxpayers Alliance[64] has campaigned against EU anti-tobacco campaigns,[65] tobacco-licensing proposals,[66] fuel duty rises,[67] emissions targets[68] and speed cameras.[64] The Taxpayers Alliance does not disclose its funding sources but is known to be funded and supported by business interests.[69] Within the EU there are at least 70 professional car industry lobbyists, as well as public affairs consultants working for car manufacturers.[70]

Both tobacco and cars are positioned as individual choices or even rights. Forest states their arguments are about 'freedom of choice'.[63] The Drivers Alliance states, 'freedom to travel is a fundamental human right'.[71] Both lobbies use the term 'nanny state' to attack measures to restrict smoking,[72] and driving speeds.[73] This argument frames smoking and driving as individual matters that the state should not interfere with—ignoring both the wider pressures that cause people to smoke and drive, and the potential for harm to other people.

Tobacco lobbies have worked behind the scenes to oppose effective policies that would reduce smoking prevalence.[74] Similarly, the car industry works to oppose policies that would restrict cars. In 2007 a group of car manufacturers and related organizations succeeded in significantly watering down mandatory targets on $CO_2$ emissions from cars. Their tactics included an intense public relations campaign, placing misleading information in German newspapers claiming German cars would be disproportionately affected and gaining support from the German Chancellor.[70] The Commission for Global Road Safety was set up by the Federation Internationale de l'Automobile. It declared a 'decade of action' on road safety[75] but promotes individual measures like pedestrian and driver education (which are ineffective[15]) while supporting large-scale investment in road building in low-income countries.[76] The Global Road Safety Partnership includes several car manufacturers and oil companies.[77] Its documents also emphasize education campaigns and driver training with less reference to pedestrians, cyclists or speed limits.[78]

Both industries may also work together to promote shared interests. For example, a coalition of business groups and companies—including British American Tobacco, Rolls Royce, Shell and Elf Aquitane—achieved changes in EU policy-making favouring business interests over public health.[79,80]

Both industries have sought to discredit evidence about the harms caused by their products, often using paid scientific 'experts' to do so. The tobacco industry sought to discredit evidence about passive smoking.[81,82] To prevent effective action to reduce $CO_2$ emissions, ExxonMobil funded a network of organizations to present misinformation about the scientific consensus on climate change, using similar tactics.[83] Some of the same organizations and scientists previously paid to discredit evidence on passive smoking are now working to discredit evidence on climate change.[84]

Finally, both industries are moving to new markets in low- and middle-income countries, where the ability of Governments and civil society to counteract their resources and marketing activities are limited.[85–87]

There are many similarities in approach but the car lobby is more diffuse. It may include car manufacturers, car retailers, car hire companies, garages, motoring organizations, oil companies, road builders and others.

## Car dependence

Tobacco is highly addictive, so established smokers find it hard to stop.[88] Car dependence operates societally. Table 1 compares features of individual and societal dependence.

Societal car dependence is demonstrated by the gap between people's stated willingness to adopt other modes and actual behaviour. In surveys about half of respondents state willingness to walk some short journeys instead of driving.[89,90] But this belies the observed changes over time, of increased car use and reduced walking. In the UK there are over 2.5 million new car registrations annually,[91] with an estimated 470 cars per 1000 people.[91] The proportion of households with at least one car increased from 14% in 1951 to 78% in 2008.[91] Car use increased from an average of 429 trips per person in 1976[92] to 613 in 2009.[93] Walking trips declined from 325 per person in 1976[92] to 224 in 2009.[93] Cycling trips declined from 30 per person in 1976[92] to 19 in 2008.[93] Figure 1 presents trends in distance travelled by mode from 1952 to 2007,[94] showing a striking rise in distance travelled by car but not other modes. It is now hard to imagine people in high-income countries living without cars. Tony Blair summed up public attitudes in 2009, saying 'I think it is completely unrealistic to say to people you can't have a car, you can't use a motorbike. It is just not going to happen'.[95]

Winston Churchill said 'we shape our buildings—thereafter they shape us'.[96] This is even truer of neighbourhoods, towns and cities. The environments created over the last few decades assume that people use cars to access services and amenities, and must

**Table 1** Comparison of personal and societal dependence

| *Personal dependence* | *Societal dependence* |
|---|---|
| Operates through physiological or psychological mechanisms, which make it difficult for the body or psyche to function without the object of dependence. | Operates through social norms or social or economic structures, which make it difficult for individuals to function in society without the object of dependence. |
| The individual initially makes a free choice but soon becomes hooked as use of the object of dependence creates physiological or psychological addiction. | Individuals initially make a free choice but soon become hooked as this choice, made by many individuals, brings into being the social or economic structures which create dependence. |
| Initially the choice produces benefit but this benefit declines due to tolerance whilst side effects emerge. | Initially choice produces benefit to individuals but this benefit declines as others making the same choice undermine the advantage each gains (a Tragedy of the Commons) and adverse consequences emerge. |
| It is difficult for the individual to go back due to addiction or dependence. | It is difficult for the individual to go back as options have been lost due to under-use. |
| Knowing this, the individual may becomes angry at any suggestion of abstinence. | Knowing this, individuals may become angry at any suggestion of change. This makes it difficult for society to go back. |
| Although the individual is not empowered to make a free choice, liberty is asserted as the basis of a demand for non-intervention. | Although neither the individual nor society is empowered to make a free choice, liberty is asserted as the basis of a demand for non-intervention. |
| A variety of inadequate measures to address the problem are tried. They fail but are tried again. However, if you keep on doing what you are doing you keep on getting what you've got. | A variety of inadequate measures to address the problem are tried. They fail but are tried again. However, if you keep on doing what you are doing you keep on getting what you've got. |
| The first step to resolving matters is for the individual to admit the dependence and commit to change. | The first step to resolving matters is for society to admit the dependence and commit to change. |
| Those who do not want to change may seek to undermine and ridicule the efforts of those who do. | Those who do not want to change may seek to undermine and ridicule the efforts of those who do. |
| Suppliers of the object of dependence will seek to undermine change and will resist controls on marketing and expenditure on promotion of change. | Suppliers of the object of dependence will seek to undermine change and will resist controls on marketing and expenditure on promotion of change. |
| Suppliers of the object of dependence will seek to recruit new users. | Suppliers of the object of dependence will seek to recruit new users. |
| Those who believe that liberty is merely the absence of constraint will find it hard to develop effective strategies. Those who understand that liberty requires active empowerment will recognize that change is a libertarian advance. | Those who believe that liberty is merely the absence of constraint will find it hard to develop effective strategies. Those who understand that liberty requires active empowerment will recognize that change is a libertarian advance. |

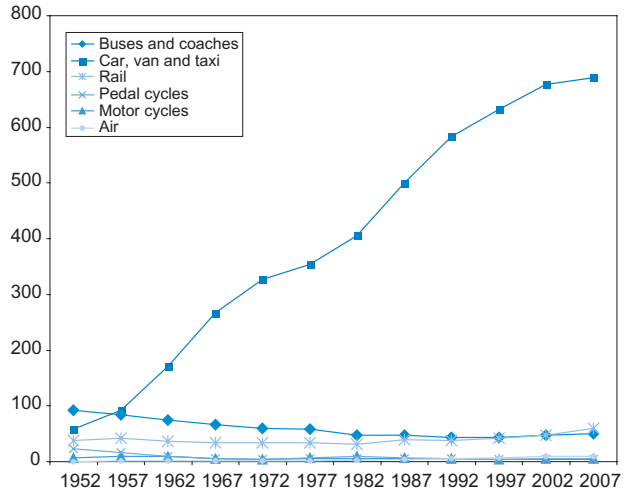


**Fig. 1** Passenger transport by mode in Great Britain in billion passenger kilometre, 1952–2007. *Source*: Transport Statistics Great Britain, 2009.

park them adjacent to their homes.[97–101] This affects both the location and design of neighbourhoods. Employment and retail are commonly separated from housing, in out of town locations easily accessible only by road.[102–105] Globally, there is a close relationship between urban density and transport emissions, as shown in Fig. 2.[106] This also demonstrates differences between countries: countries with the highest degree of car dependence are those with the most sprawl.

The design of urban and suburban areas is also important. Neighbourhoods with cul-de-sacs, gated developments and low permeability force people on foot or cycle to travel further, often across busy roads, to traverse the neighbourhood.[97,103] This disadvantages people without cars and discourages active travel.[107] Using public space for parking creates an unattractive environment that is less safe, feels threatening to pedestrians and cyclists[108] and unsuitable for children's play. These trends are self-perpetuating—both reflecting and reinforcing car ownership and use.

Many argue that increased car ownership promotes economic growth[109] and that making cars more affordable would reduce poverty.[110] There is a correlation between traffic growth and economic growth, because economic growth requires transport of goods and services and prosperity increases car use.[111,112] The car industry employs 732 000 people in the UK and contributes £34.2 billion to the economy, 0.8% of GDP.[113] But road congestion—caused by increasing car use and increased speeds—costs the UK economy an estimated £20 billion a year.[114] The UK government commissioned the Eddington Transport Study in 2006 to investigate the impact of transport on the economy. It concluded that all modes of transport should meet their full environmental costs; that congestion was a significant constraint on the economy and that reducing congestion required measures including road charging and better public transport.[115] Simply creating more road space generates increased traffic.[116] Reducing dependence on road traffic for growth will promote wider economic and environmental sustainability.[117] But public transport is unlikely to be prioritized and new routes will be deemed unaffordable unless it can be shown that people will use them. People will only use public transport if the network is comprehensive enough to cover all the places they need to travel to, and it is hard to demonstrate latent demand. Similarly, it is difficult to argue for road space for cyclists who do not currently exist. This vicious cycle is a 'Tragedy of the Commons', a situation where free choice for everybody (or at least everybody who has a car) leads to what nobody wants—congested roads with no available alternative.

## Discussion

This paper has identified similarities between tobacco and private cars in their influences on health. But while tobacco harms individual smokers, cars have greater externalities—harming the wider community and even global sustainability. Neither smoking nor car use are truly free individual choices. But whereas dependence on tobacco is a physiological addiction, car dependence is societal.

It has been argued that previous modes of public health intervention are inadequate to address new ecological health risks.[118] An ecological model of public health recognizes health as being a function of complex and inter-connected 'worlds': physiological, material, social, cognitive and life world.[2] New models need to acknowledge the interconnectedness of the ecological 'worlds' and between human health and global sustainability.[2] The ecological model has been used to understand health conditions, notably obesity,[119] climate change and global sustainability,[118] and societal and cultural trends such as increasing materialism and social inequality.[118] Car dependence lies between these: it is one of the factors causing both the obesity epidemic and climate change, and is underpinned by cultural trends such as increasing consumerism and individualism. Car dependence is a potent example of the links between human health and global sustainability, and harms caused by cars should be understood as societal and political rather than individual or personal issues.[120] These are the kinds of issues that ecological public health must address.

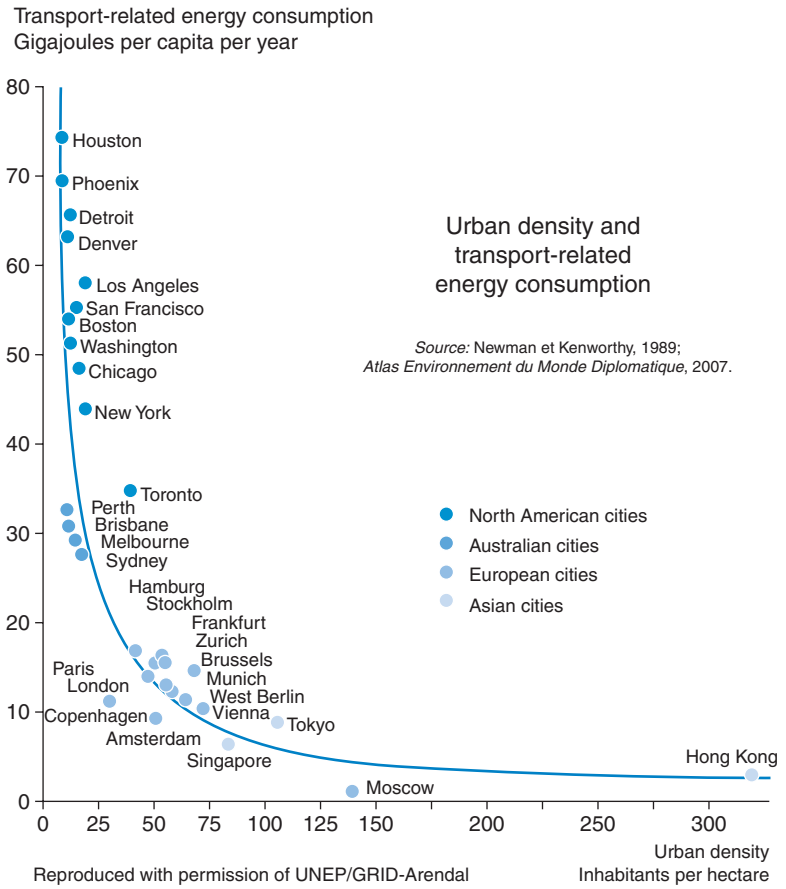


**Fig. 2** Transport-related energy consumption in gigajoules per capita per year, and urban density in inhabitants per hectare.

Public health research has focused on the health impacts of, rather than influences on, travel choices, at the micro and macro level. Considering influences in each of the ecological 'worlds' may support productive multi-disciplinary research that explores these influences more fully and informs public health advocacy. Achieving policies that reduce car use and increase active travel will require well argued, coordinated advocacy, building public awareness and engaging with policy-makers over a long time scale. This may use similar techniques to those previously used to change attitudes to tobacco, but also must counteract a more diffuse car lobby. There are also many interests and lobby groups with an interest in promoting healthier, more sustainable modes of transport. These include organizations promoting: sustainable development; sustainable transport; wider environmental issues; cycling, walking or play; better neighbourhood design; road safety; health groups and relevant corporate interests, such as cycle manufacturers and environmental consultants. None of these has the level of resources available to the car lobby. A more coherent lobby with a strong health voice, underpinned by understanding of influences in each of the 'worlds', may be more successful.

The nature of public health threats evolves to reflect wider societal changes, and the public health community continually needs to recognize, understand and respond to new threats. The public health community rightly continues to fight against the harm caused by tobacco. We should now recognize that private cars are harming individuals, communities and global sustainability. Cars are the new tobacco.

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