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1. The European Commission's communication on "Together towards competitive and resource-efficient urban mobility".

2. Declaration on Cycling as a climate friendly Transport Mode.

3. These are two of the 10 goals relating to urban mobility stated in the Transport White Paper (2011).

4. The annual number of deaths in a population for any reason.

European Commission

Science for Environment Policy

Car-free cities: healthier citizens

No cities are yet fully car-free, but many have managed or plan to restrict access to city centres for privately owned combustion-engine passenger cars. Health benefits will come from reduced traffic-related air pollution, less noise and lower levels of heat emitted from vehicles. The greatest health benefit, however, is likely to come from increased physical activity as people walk, cycle and move to catch public transport, according to a review of the potential health benefits of car-free cities.

Private motor cars are an important part of urban transport in cities, which is where 70% of Europe's citizens live. Private diesel and gasoline vehicle use contributes significantly to a city's air pollution (e.g. particulate matter, such as $PM_{2.5}$), greenhouse gas emissions (e.g. carbon dioxide (CO_2) and black carbon), noise pollution, raised urban temperatures and motor vehicle crashes, in addition to reducing the opportunity to be physically active. All of these things can raise the risk of early death and increased incidence of disease.

Furthermore, road and parking infrastructure contributes to soil sealing and takes up space that could be used to create green areas as well as pedestrian and cycling infrastructure, which are beneficial for people's mental and physical well-being.

In Europe, the European Commission actively supports sustainable urban mobility planning[1], which promotes a shift towards cleaner ways of city travelling, including walking, cycling[2] and using public transport. It also plans to halve the use of conventionally fuelled cars in urban areas by 2030 and phase them out by 2050, and to achieve CO_2-free city logistics in major urban centres by 2030[3].

This study investigated the potential health benefits of making city centres free of private diesel and gasoline cars. The researchers reviewed scientific studies and grey literature (e.g. reports by international organisations) published between 1980 and the end of 2015 on car-free policies, identified from publicly available databases on the Internet. The selected studies focused on the link between car-free initiatives in cities and urban design and planning, city transport and planning, behaviour, environmental impacts, health effects and socio-economic concerns.

In Europe, for example, primarily driven by the need to reduce greenhouse gas emissions, Oslo will invest in new bikeways, levy congestion charges during rush hour, limit parking spaces and ban all private cars from the city centre by 2019. By 2034, Hamburg plans to ban cars from a number of city roads, which will become pedestrian and bike zones. A green network, linking parks and other open spaces and covering 40% of the city is also being developed. Madrid also plans to pedestrianise the city centre with a view to making it car free by 2020. Germany recently voted to call for a ban on selling all new combustion-engine cars from 2030.

As there are no fully car-free cities at present, there is no data on any health changes in people living in car-free cities. However, the researchers reviewed studies on the health benefits of initiatives such as car-free days and vehicle restrictions in urban areas and studies on health impacts from traffic-related exposures to explore likely impacts of having city centres free of private cars.

Studies show that the greatest health benefit is likely to come from increased physical activity. A review of 28 health impact studies related to greater active transport and less car use found people who switched from using a car to active transport received substantial health benefits from increased physical activity. This benefit well outweighed any risks cyclists or pedestrians might experience from exposure to air pollution or being involved in motor vehicle crashes. Being physically inactive is associated with cardiovascular diseases, dementia, type 2 diabetes, breast and colon cancers and stress and anxiety. One study found that people who get insufficient exercise have a 20–30% increased risk of all-cause mortality[4] compared with people who exercise for 30 minutes a day.

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Car-free cities: healthier citizens *(continued)*

Walking, cycling and actively getting to public transport provide the opportunity for city dwellers, particularly those who say they do not have time for exercise, to incorporate more physical activity into their daily routines. To ensure that cities are designed around people, rather than vehicles, the researchers say new urban and transport projects should focus on environmental and health priorities, rather than on enabling private-vehicle use.

Numerous studies have linked traffic-related air pollution exposure to early deaths, as well as to lung cancer and cardiovascular diseases, and more recently to diabetes and obesity. Children are particularly vulnerable to the effects of traffic-related air pollution. The researchers say public health will improve as car-free cities reduce air pollution. They report, for example, that levels of nitrogen dioxide (a major air pollutant) fell by 40% in Paris, France and by 20% in Leeds, UK, when cars were banned for one day.

Fewer private cars in cities will mean that traffic noise will also be reduced. One report on the Brussels environment, for example, revealed that noise levels fell more than 10 decibels on a car-free Sunday. This reduction in noise should result in improved public health, as studies have associated noise exposure with early death from cardiovascular diseases, as well as an increased risk of heart disease, sleep disturbances, high blood pressure, and also with reading comprehension and memory in children.

Heat emitted from vehicles exacerbates the urban heat-island effect in cities. The researchers found no studies that had evaluated the effects of reduced heat from vehicles on urban temperatures, but less heat emitted in cities free of private cars could, for example, help to reduce cardiorespiratory problems, especially in children.

Green spaces not only make cities more attractive, but studies have shown they also encourage physical activity, enabling people to walk, cycle and reach public transport. The researchers highlight the need for integrating roads and parking-area changes into green spaces with other urban planning. Measures are needed to ensure that banning private combustion-engine cars does not shift traffic-related problems to surrounding areas, increase urban sprawl, and create socio-economic divides by making it more difficult for some people to access shops and facilities, which they used to do by private car.

Strong policy support is needed to create safe infrastructures for active and public transport, say the researchers. Citizens and businesses should be involved in planned changes, and their concerns addressed. Studies have shown, for example, that cycling and walking projects can increase retail sales by up to 30%. However, transforming a city into one centred on pedestrians and cyclists rather than private cars takes time and commitment. It has taken Copenhagen decades to implement car-free days, reduce car-parking spaces and create pedestrian zones — the researchers point out that in cities there are often silos of urban planning and development, mobility and transport, parks and green space, environmental departments, and (public) health departments that do not work together well enough, while multi-sectorial and systemic approaches are needed to tackle the multi-faceted environmental and health problems and create car-free zones.

They conclude that, in planning new urban and transport schemes, bringing together planners, environmentalists and public health professionals with policymakers and citizens is key to public acceptability and successfully guiding the decision-making process. They also posit that introducing measures incrementally may help with acceptance, and suggest a sequence of pedestrianisation, car-free days throughout the year and events to increase appeal and awareness of the measures and benefits.

The researchers also point out that if enough cities become free of private diesel and gasoline cars, there could be a collective reduction in greenhouse gas emissions, which could help to mitigate the effects of climate change.