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Cycling infrastructure: financial returns can be over 20 times the initial investment

Transport policies that produce physically segregated cycle lanes on main roads, combined with low-speed local streets, will boost numbers of cyclists and provide the best financial return on investment, new research suggests. Using Auckland, New Zealand as a case study the researchers showed that the economic benefits of this policy can outweigh the costs by more than 20 times.

Cycling to work has a number of advantages over commuting by car. Greenhouse gas (GHG) emissions, traffic congestion and air and noise pollution are all reduced, and cycling individuals benefit from increased fitness.

There are many sustainable transport policies designed to encourage cycling: however, comparison and evaluation can be difficult. For this study, researchers used 'system dynamics modelling' (SDM) to compare policy scenarios in Auckland, New Zealand: a city in which 75% of commutes are by car and only 1% by bicycle. They took a participatory approach to SDM, integrating knowledge from the community, policymakers and academics in a collaborative learning process.

The researchers interviewed 16 people from groups who designed, influenced or were affected by transport policy to identify 'feedback loops' that are important to future policy outcomes. For instance, more people cycling to work without any improvements to infrastructure will increase the number of injuries. This, in turn, may have a negative impact on the numbers of cyclists as people feel less safe on the roads. However, feedback loops can also have positive effects. As the number of cyclists rises, for example, commuting in this way becomes more 'normal' and demonstrates to the wider public that it is available to all and requires no specialist equipment or training.

The researchers then obtained extensive cost data from government and academic research as well as expert opinion on costs and rates of injuries, the health effects of air pollution, the health effects of physical inactivity, GHG emissions and fuel cost savings. These data were then used to simulate the dynamic effects of five different realistic policy options in Auckland from 2012 to 2051.

The policies included: (i) no further investment in cycling (ii) mixed infrastructure including shared paths, marked lanes and shared bus lanes on 46% of the road network; (iii) gradual implementation of physically segregated lanes for busy main roads; (iv) creating low-speed local streets using measures such as trees, art and narrower streets; (v) a combined best-practice policy integrating (iii) and (iv).

All cycle-friendly scenarios (ii – v) led to a decrease in health-related costs as a result of air pollution and an increase in health and fitness as a result of increased physical activity. Consequently, the numbers of years of life saved between 2012-2051 varied from 650 under the marked lanes policy (ii) to 4 000 under combined best practice (v).

GHG emissions were lower under cycle-friendly policies even when projected improvements to fuel efficiency were taken into account. The combined best-practice policy halved GHG emissions by 2040, compared to 2007 levels. Finally, the rate of injuries and fatalities was predicted to fall for all cycle-friendly scenarios except for the mixed infrastructure policy.

Overall, all cycle-friendly policies resulted in a net financial benefit. The researchers estimated that for each New Zealand dollar (€0.62) of investment in infrastructure, the combined best-practice policy would return $NZ 24 (€14.99).

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