

Health Co-Benefits and Transportation-Related Reductions in Greenhouse Gas Emissions in the Bay Area

EXECUTIVE SUMMARY

Background

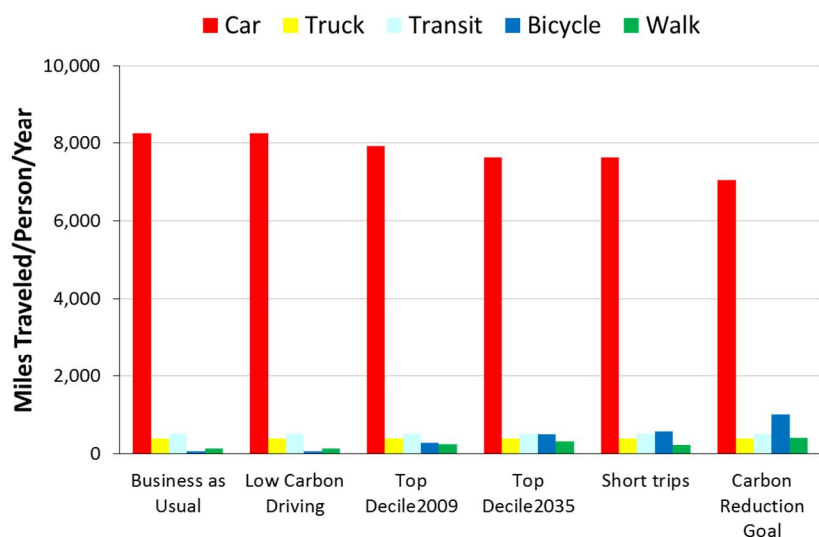
Greenhouse gas (GHG) emissions linked to global warming are a significant public health threat. In California, the transportation sector accounts for 38% of GHG emissions, and within transportation, personal passenger vehicles account for most GHGs. Strategies to reduce GHG emissions include reducing both the amount emitted per mile of travel ("low carbon driving") and reducing the overall miles traveled. Low carbon driving includes improvements in fuels and fuel efficiency, and the wider adoption of low- and zero-emissions vehicles. Bicycling and walking for transport including links to public transit is called "active" transport. Substituting active transport for short trips taken in automobiles could play an important role in decreasing GHG emissions, reducing air pollution, and increasing physical activity levels with concomitant reductions in chronic diseases. The health gains from physical activity and cleaner air are known as health co-benefits, and this "win-win" is likely attractive to both the public and policy makers who confront difficult choices in achieving carbon emission reduction goals

A public health research team recently developed the Integrated Transport and Health Impacts Model (I-THIM) that makes it possible to estimate the health co-benefits and potential harms from active transport and low carbon driving in urban populations. The California Department of Public Health partnered with the developers of I-THIM, the Metropolitan Transportation Commission, and the Bay Area Air Quality Management District to apply this model to possible scenarios of active transport and low carbon driving that could unfold in the nine county San Francisco Bay Area by 2035.

Methods

The active transport scenarios use regional travel surveys and census data to describe and project travel patterns in Bay Area cities that are already in the top decile of walking and bicycling. Substituting walking and bicycling for half of the numerous short automobile trips in the range of walking and bicycling was also considered. Ambitious, but achievable scenarios of both active transport and low carbon driving were combined to optimize GHG reductions. These scenarios were contrasted with Business-as-Usual (BAU), which envisions a 5% per capita increase in vehicle

Annual Per Capita Miles Traveled by Mode and Scenario



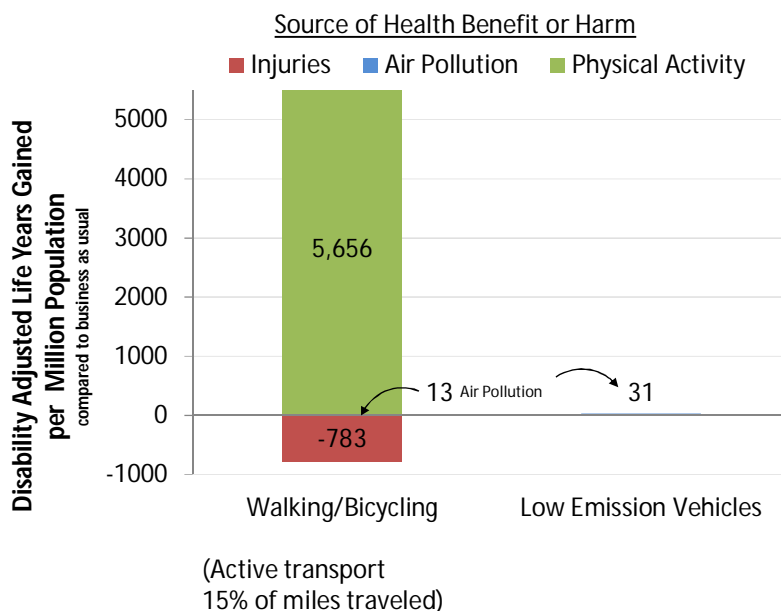
miles traveled by 2035 and little percentagewise change in walking and bicycling. As inputs, I-THIM uses regional data from health surveys, traffic collision databases, vital statistics, and the results of regional models for travel demand, vehicle emissions, and air pollution. I-THIM then relates physical activity, air pollution, and travel behaviors to specific health outcomes based on established cause-effect relationships reported in the scientific literature for heart and respiratory disease; stroke; diabetes; cancers of the breast, colon, and lung; dementia; and depression.

Findings

The health impacts model was applied to a range of active transport scenarios that from a 2% baseline would attain a combined walking and bicycling mode share of up to 15% of travel distance. This corresponds to an increase in an average person's (median) weekly walking and bicycling from 31 minutes to 154 minutes.

At high levels of active transport compared to BAU, the model predicts 13% fewer premature deaths and 15% fewer years of life lost for cardiovascular disease and diabetes and 5% reductions in each of four other chronic diseases. After accounting for a 19% increase in the disease burden from fatal and serious traffic injuries to pedestrians and bicyclists, the Bay Area would still experience 2,236 fewer deaths and 22,807 years of life gained. Almost all (99%) of the health benefit arises from increased physical activity rather than from less air pollution. While low carbon driving generated little health co-benefits, it is estimated to reduce GHG emissions 9% to 33.5% from the 2000 baseline. The most ambitious active transport scenario would achieve from 9% to 14.5% in GHG reductions.

Annual Health Benefits of Active Transport and Low Carbon Driving in the Bay Area Predictions from the Woodcock Model



Reducing risks from chronic disease of the magnitude suggested by I-THIM would rank among the most notable public health achievements in the modern era, and reduce the estimated \$34 billion annual cost in California from cardiovascular disease and other chronic conditions such as obesity. The ambitious active transport scenario would also achieve the U.S. Surgeon General's recommendation that adults engage in at least 150 minutes of at least moderate physical activity weekly. Together, the ambitious scenarios of active transport and low carbon driving could achieve a 45% GHG reduction by 2035 that puts California on track for the 80% reduction by 2050 mandated by AB32 (Global Warming Solutions Act) and Executive Order S-3-05.