HEALTH IMPACTS OF BIKE-SHARING SYSTEMS IN THE UNITED STATES

COLORADO STATE UNIVERSITY
COLORADO SCHOOL OF PUBLIC HEALTH

www.rojaslab.org
What are Bike Sharing Systems?

Bike-share systems are short-term bike rentals that allow users to borrow a bike from one location and retire it to another at the conclusion of the trip.

Why is bike-share important?

A Bike-sharing system is an active transport intervention that can increase physical activity levels and minimize negative environmental outcomes associated with motorized transport.

As more people bike, the number of motorized vehicles on the road decrease, ultimately relieving traffic congestion and reducing noise and air pollution.

In 2019 there were 136 million trips taken on shared bikes, e-bikes, and scooters, in the United States. These trips resulted in an estimated 30 million hours of additional physical activity and averted 65 million pounds of CO₂ emissions.

In the U.S., there are 72 bike-sharing systems, which include approximately 100,000 bikes, over 57,000 station-based bikes, and 109,589 trips per day. The NYC bike-share is the largest system in the nation, with 19,000 bikes, 57,000 trips per day, and over 1,000 stations.
What was assessed in this study?

**Bike-sharing systems:**
- All the systems in the U.S.
- Bike share in New York City

**Bike-share trips coming:**
- Walking
- Driving
- Public transport

**Population:**
- Adult bicyclists

**Exposures:**
- Physical activity
- Air pollution
- Traffic incidents

**Health outcomes:**
- Mortality
- Disease incidence
- Disability-adjusted life years (DALYs)
- Health economic impacts

**Method:**
- Quantitative health impact assessment

---

Modal shift reported in the U.S:
- 45% driving
- 9% public transport
- 28% walking

Quantitative Health Impact Assessment:
- Physical Activity
- Air Pollution
- Traffic Incidents

Mortality & Morbidity
- Disability-adjusted Life Years (DALYs)
- Health Economic Impacts
Bike-share and health

While these transport schemes have the potential to improve public health by increasing physical activity, some evidence has associated biking with health risks for travelers, such as exposure to air pollution and road traffic injuries.

What did the study find?

**In the U.S.**, all the bike-share trips done in the country were estimated to prevent 4 premature deaths, reduce 737 disability-adjusted life years, and an estimated reduction of USD 36,292,312 on health economic impacts each year.

**In NYC**, all the bike-share trips done in the city were estimated to prevent 2 premature deaths, 355 disability-adjusted life years, and an estimated reduction of USD 15,608,327 annually on health economic impacts.
0.06 premature deaths were estimated to be prevented annually among travelers switching from public transport to BSS

1.15 premature deaths were estimated to be prevented annually among travelers switching from car to BSS

0.16 premature deaths avoided annually among travelers switching from public transport to BSS

1.73 premature deaths prevented each year among travelers switching from walking

2.86 premature deaths avoided annually among travelers switching from car to BSS

0.83 premature deaths prevented annually among travelers switching from walking to BSS

1.15 premature deaths were estimated to be prevented annually among travelers switching from car to BSS

0.06 premature deaths were estimated to be prevented annually among travelers switching from public transport to BSS
The health benefits of bike-sharing systems are greater than the health risks in the United States and New York City. In the U.S. and NYC, shifting from car, public transport, and walk to bike-share trips reduces premature deaths, disability-adjusted life years, and economic health impacts. Improvements in air quality and traffic safety across U.S. cities will maximize the health benefits of bike-sharing systems. This study supports the implementation and expansion of bike-sharing systems across cities in the U.S.
RECOMMENDATIONS

1. Bike-share managers and micromobility officials:
   Collect and publish open access data on the number of standard and electric bikes, the average number of trips per day, substitution mode, type of user, average trip duration, distance, and speed.

2. Transport officials:
   Provide more data on overall mobility in their cities and collaborate with bike-share managers to provide access to mobility reports and snapshots of these systems.

3. City planners:
   Improve active transport infrastructure aiming to increase safety and appeal. For instance, add and widen bike lanes, place physical barriers between traffic and bike lanes, and lower traffic speeds.

4. Health Practitioners:
   Utilize bike-share as a mean of health promotion and encourage travelers to use active transport as an alternative to motorized transport.

5. Bike-share Operators:
   Equitably distribute bike-share systems. Expand bike-share into neighborhoods that serve historically underrepresented and marginalized communities. Design bike-share services to be inclusive of people with limited mobility.

Promote bike-sharing systems
Support car trip substitution
Invest in active transport infrastructure
Improve bicyclists safety
Reduce air pollution

Provide more data on overall mobility in their cities and collaborate with bike-share managers to provide access to mobility reports and snapshots of these systems.

Improve active transport infrastructure aiming to increase safety and appeal. For instance, add and widen bike lanes, place physical barriers between traffic and bike lanes, and lower traffic speeds.

Utilize bike-share as a mean of health promotion and encourage travelers to use active transport as an alternative to motorized transport.

Equitably distribute bike-share systems. Expand bike-share into neighborhoods that serve historically underrepresented and marginalized communities. Design bike-share services to be inclusive of people with limited mobility.

Collect and publish open access data on the number of standard and electric bikes, the average number of trips per day, substitution mode, type of user, average trip duration, distance, and speed.
Scientific manuscript published in
ENVIRONMENTAL RESEARCH

Raeven Lynn Clockston, MPH
Raeven.Clockston@cuanschutz.edu

David Rojas-Rueda, MD, MPH, PhD
David.Rojas@colostate.edu

www.rojaslab.org

2021