



Roadways and Health

Dr. Catherine L. Ross, Harry West Professor
Director, Center for Quality Growth and Regional
Development

Transportation 101 : Washington, D.C . : November 12-14, 2008

Connecting Roadways and Health

Roadways

Highways including roads, streets and parkways primarily link to health outcomes through **vehicular emissions, crashes and other traffic risks.**

Roadways

Transportation is one of the leading causes of death in the United States and also one of the key determinants of health. The nation suffers nearly 43,000 deaths and over 3 million injuries every year on American highways.



Health Impacts

- ❑ Emotional well-being is exacerbated by traffic congestion, commuting and noise.
- ❑ Roadways increase the incidence of asthma;
- ❑ Roadways increase the incidence of lung disease and cardio vascular disease;

Health Impacts

- Increased levels of greenhouse gases causes climate instability resulting in natural disasters, food scarcity, unhealthy ecological and weather patterns and premature deaths and degraded social and mental health.
- Limited connectivity forces use of congested roadways exposing travelers to greater risk

Road surface erosion causes higher levels of local and regional air pollution

The real culprits are the continual increase in vehicle miles traveled and the over reliance on the automobile.



The Safe, Accountable,
Flexible, Efficient
Transportation Equity Act: A
Legacy for Users (SAFETEA-
LU) expires on September 30,
2009.



A new reauthorization must expand the scope of transportation legislation to focus on;

- ❖ combating climate change,
 - ❖ mitigating negative health impacts,
 - ❖ Reducing congestion,
 - ❖ social and economic challenges,
 - ❖ constructing complete streets,
 - ❖ increasing safety,
 - ❖ expanding transit,
 - ❖ system maintenance,
 - ❖ facilitating greater social connectivity
-
- ❖ providing mobility and access within and between megaregions.



Figure 6.11 Ormewood Park Greenway Extension Before and After

Climate change presents an opportunity to **reduce** transportation related emissions, and as a result negative impacts on health as a result of poor air quality.

- ❑ The price of owning and driving a car puts jobs, educational opportunities, better housing, stores, and basic services out of the reach of low income and minority communities
- ❑ Race and ethnicity are correlated with persistent and expanding , health disparities among US populations.

The frequent merger and suburbanization of hospitals and other healthcare facilities means that citizens living in the inner city, have limited access to hospitals, community clinics, supermarkets etc..

The impact of roadways on health is summarized by examining the level of **injury, emissions (climate change and air pollution) and mode share (represents level of access, physical activity, and mental/social health)**. The results are presented in Table 1, Meta-Analysis: Roadways, Health and Equity.

Table 1: Meta-Analysis: Roadways, Health and Equity

	Mechanism	Impact	Highway Influence on Risk Ratio	
Injury	Collisions or crashes involving road users result in physical traumas. Fatal or injurious collisions and crashes are typically a function of speed, traffic operations that result in conflicts or differences in speed or direction such as turning or crossing, and other factors.	<ul style="list-style-type: none"> •41,059 deaths in 2007 •Leading cause of death, ages 5-34 •Approximately 2.5 million injuries per year •Approximately \$150 billion economic burden in the U.S.: \$52.1 billion in property damage, \$42.4 billion in lost productivity, and \$17 billion in medical expenses •4,654 pedestrians, 5,154 motorcyclists, 698 bicyclists¹ •Disparities by income, age, ethnicity, gender, urban/rural 	Facility Modal Service	<ul style="list-style-type: none"> •Greater share of bicycle facilities leads to increased presence of bicyclists which reduces per-cyclist risk •Greater share of pedestrian facilities leads to increased presence of pedestrians and reduces individual risk •Greater share of motor vehicle facilities leads to increased presence of motor vehicles which increases risk •Greater share of transit facilities increases transit ridership which lowers risk
			Roadway Design	<ul style="list-style-type: none"> •Presence of sidewalks reduces pedestrian risk •Higher vehicle speed increases risk for all road users and may increase severity of collisions •Intersection design affects the risk of crashes •Higher vehicle volume increases risk •Infrequent or absent crosswalks result in greater risk to pedestrians and motorists . •Pedestrian crashes more likely to occur outside of a crosswalk •However, marked crosswalks alone may not be sufficient to improve safety based on AADT and number of lanes •Larger corner radii at junctions increase duration of pedestrian exposure and increase vehicle speed at crosswalks elevating risk and severity of injury
			Access Management	<ul style="list-style-type: none"> •Increased conflict points can increase risk •May result in encroached pedestrian area and more cross-slope issues •Restricted left turns may reduce risk
			Streetscape	<ul style="list-style-type: none"> •Roadside trees reduce crash rates •Roadside distractions, especially billboards, may increase crash rates. •Street lighting can improve traffic safety for all users. •Vehicles can collide with fixed objects on the roadside. •Design can create obstacles or trip hazards leading to injury
			Density & Connectivity	<ul style="list-style-type: none"> •Low connectivity limits route selection which forces travelers to use busy roadways and exposes them to greater risk •Low density induces higher speed limits for travelers to reach destinations in a reasonable timeframe

Traffic presents a unique public health risk because of the toxicity of its emissions and its extensive integration within communities.

- ❑ Recent research links diesel exhaust to lung cancer, cardiopulmonary disease and other causes of death.
- ❑ Children living near busy roads are 6 to 8 times more likely to have different forms of cancer.
- ❑ The elderly are also at increased risk for negative health effects stemming from exposure to particulate matter.

- People living in immediate proximities (200 meters) of major diesel thoroughfares are more likely to suffer from respiratory ailments, childhood cancer, brain cancer, leukemia, and higher mortality rates than those who live further away.
- Many low income and minority communities are located immediately adjacent to highway facilities and have extensive exposure.

- **Highways must become entities that integrate physical activity, health impacts, social interaction, environmental quality, community health, safety, and sustainability even as they become more responsive to global demands providing equitable access to participate in daily life.**
- **The Highway Safety Improvement Program, the Environmental Review Process, and Planning are important parts of SAFE-TEA LU because they extend the possibility of integrating health considerations into transportation planning.**

- Policy Barriers

TRANSPORTATION POLICY BARRIERS

Approximately 40% of the transportation, dollars spent nationally emanates from, the U.S. Department of Transportation (USDOT) and the Federal Highway Administration (FHWA).

Approximately 50% of the monies received by the states are based on VMT, arterial lane miles, diesel fuel usage, and the ratio of lane miles to population, effectively creating an incentive to build more roads than needed and to promote vehicular travel to the maximum.

Key Recommendations

Table 2: Reauthorization and Health

Title: Health Impact Assessment (HIA)

Topics Addressed: I, E, M (Injury, Environment and Mode)

Scope: Local, State, Regional, Federal

Description: A combination of procedures, methods, and tools by which a policy, program, or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population.

Reference: <http://www.cdc.gov/healthyplaces/hia.htm>

http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/handbook-guide/vol_4/table-tableau-3-eng.php#Table-3-1a

Title: Context Sensitive Design

Topics Addressed: I, M (Injury, Mode)

Scope: Local, State, Regional, Federal

Description: A collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility.

An approach that considers the total context within which a transportation improvement project will exist.

Reference: : <http://www.cnu.org/streets>

<http://www.fhwa.dot.gov/context/index.cfm>

http://www.contextsensitivesolutions.org/content/topics/css_design/design-examples/



Title: Complete Streets

Topics Addressed: I, E, M (Injury, Environment, Mode)

Scope: State, Regional, Local

Description: Complete Streets are designed and operated to enable safe access for all users.

Pedestrians, bicyclists, motorists and bus riders of all ages and abilities are able to safely move along and across a complete street.

Reference: <http://www.completestreets.org/>
<http://www.completestreets.org/federal.html>
(S.2686/HR5951)

Title: Livable Centers Initiative

Topics Addressed: E, M (Environment, Mode)

Scope: Regional, Local

Description: The Livable Centers Initiative (LCI) is a program offered by the Atlanta Regional Commission (ARC) that encourages local jurisdictions to plan and implement strategies that link transportation improvements with land use development strategies to create sustainable, livable communities consistent with regional development policies.

Reference:

<http://www.atlantaregional.com/html/308.aspx>

Title: Road Diets

Topics Addressed: E, I, M (Environment, Injury, Mode)

Scope: State, Regional, Local

Description: "Road diets" are typically conversions of four-lane undivided roads into two through lanes and a center turn lane or two through lanes and a median. The fourth lane may be converted to bicycle lanes, sidewalks, and/or on-street parking. In other words, existing space is reallocated; the overall area remains the same.

Reference:

<http://www.walkable.org/assets/downloads/roaddiets.pdf>

<http://www.tfhrc.gov/safety/hsis/pubs/04082/index.htm>

<http://www.contextsensitivesolutions.org/content/reading/road-diets-2/>

Title: Pedestrian Impact Statement

Topics Addressed: I, M, E (Injury, Mode, Environment)

Scope: Local

Description: Evaluating a proposal for its effect on pedestrian safety and access. The criteria upon which projects are judged are connectivity, effect on the number of sidewalks and trails, and comparison with the community's existing format. The statements must include recommended improvements and account for additional costs incurred by accommodating pedestrians.

Reference:

<http://www.activeliving.org/node/391>

Title: Green Streets

Topics addressed: I, M, E (Injury, Mode, Environment)

Scope: Local, State

Description: Sustainable practices associated with the design and construction of roadways

Reference:

IA can help begin this dialogue and place health on agendas well beyond the confines of the health sector.

Title: Local Area Traffic Management (LATM)/Traffic Calming

Topics Addressed: I, M (Injury, Mode)

Scope: Local, Federal (non-U.S.)

Description: Traffic calming is a system of design and management strategies that aim to balance traffic on streets with other uses. The tools of traffic calming take a different approach from treating the street only as a conduit for vehicles passing through at the greatest possible speed.

Reference:

<http://www.cochrane.org/reviews/en/ab003110.html>

<http://www.fhwa.dot.gov/environment/tcalm/part3.htm>

<http://www.pps.org/info/placemakingtools/casesforplaces/livememtraffic>

ces/livememtraffic

Title: Environmental Review Toolkit

Topics Addressed: E, M (Environment, Mode)

Scope: Federal

Description: Environmental stewardship and streamlining resources for FHWA Division Offices, State Departments of Transportation, Resource Agencies, and Consultants. The website includes a guide to practices by state, a guide to “Planning and Environment Linkages,” and a guide to NEPA.

Reference:

<http://www.environment.fhwa.dot.gov/>

CONVERGENCE OPPORTUNITIES

Lessons from Practice

The Metropolitan Mobility Caucus

The Lieberman Warner Climate Security Act

Transportation Sector Emissions Reduction fund (TSER)

CLEAN TEA (Clean Low-Emissions Affordable New Transportation Equity Act).

Thank you!
Catherine Ross
www.cqgrd.gatech.edu