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Whose Roads?

Evaluating Bicyclists' and Pedestrians' Right to Use Public Roadways

31 May 2012

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Cyclists and pedestrians have rights to use public roads, and impose lower social costs than motorists.

Abstract

Many people believe that non-motorized modes (walking, cycling, and their variants) have less right to use public roads than motorists, based on assumptions that motor vehicle travel is more important than non-motorized travel and motor vehicle user fees finance roads. This report investigates these assumptions. It finds that non-motorized modes have clear legal rights to use public roads, that non-motorized travel is important for an efficient transport system and provides significant benefits to users and society, that less than half of roadway expenses are financed by motor vehicle user fees, and pedestrians and cyclists pay more than their share of roadway costs. Most funding for *local roads* (the roads pedestrians and cyclists use most) is from general taxes, which people pay regardless of how they travel. Since bicycling and walking impose lower roadway costs than motorized modes, people who rely on non-motorized modes tend to overpay their fair share of roadway costs and subsidize motorists.

Introduction

Motorists often assume that public roads are intended primarily for their use, and non-motorized modes (cyclists, pedestrians, and variants such as wheelchairs and skates) should be treated as inferiors or excluded altogether. Non-motorized mode users are sometimes accused of paying less than their share of roadway costs, or simply told to "*Get the #$%^@ off the road!*" Pedestrians and cyclists are sometimes forbidden from using a particular public road to avoid delaying motorized traffic.

Lack of respect for non-motorized travel often justifies policies that favor motorized over non-motorized travel, including minimal investments in walking and cycling facilities, roadway design and management that create barriers to non-motorized travel, development policies that result in more dispersed land use patterns, and traffic safety programs that give non-motorized issues little attention and place the onus for reducing risk on pedestrians and cyclists.

Are these assumptions justified? What rights *do* non-motorized modes have to use public roadways? Do non-motorized modes receive a fair share of roadway resources? Do motorists really subsidize walking and cycling? This report explores these questions.

Legal Rights

Most North American jurisdictions have traffic rules based on the *Uniform Vehicle Code and Model Traffic Ordinance* (UVCMTO, usually simply called the *Uniform Vehicle Code* or *UVC*), a standard set of traffic laws published by the National Committee on Uniform Traffic Laws and Ordinances (www.ncutlo.org), a professional organization that includes a broad spectrum of traffic safety experts. The 2000 UVC states, "*Every person propelling a vehicle by human power or riding a bicycle shall have all of the rights and all of the duties applicable to the driver of any other vehicle under chapters 10 and 11, except as to special regulations in this article and except as to those provisions which by their nature can have no application.*"[1]

The League of American Cyclists maintains the *State Bike Laws Center* (www.bikeleague.org/action/bikelaws/state_laws.php) which provides links to bicycle traffic laws in each U.S. state. Although some details vary, most state and provincial traffic laws include the following provisions:

- The right to ride a bicycle on any public road, street, or bikeway except where specifically prohibited, such as on limited access highways.
- The responsibility to obey all relevant traffic laws and regulations.
- The responsibility to use hand signals to let people know you plan stop or turn. Many states allow cyclists to use their right hand to signal right turns.
- Cyclists riding two abreast shall not impede normal traffic movement.
- The responsibility to have adequate brakes, and suitable lighting and reflectors when riding at night.
- Some states require bicyclists to use an adjacent pathway if available, but these are opposed by cyclists who want the right to decide whether or not to use a facility.
- Some jurisdictions require bicyclists to wear helmets (some just children).
- The responsibility of property owners to eliminate potential hazards such as plants or moveable object that may block the view of drivers, pedestrians or bicyclists on a road.

There is sometimes debate concerning cyclists' right to use traffic lanes. Many people have the impression that cyclists are required by law to ride as far to the right side of the roadway as possible to avoid delaying motorized traffic. Although it is true that bicycles are often slower than other vehicles, and slower vehicles are often required to right to the right side of the roadway, the legal requirements are more complex and include many exceptions.

[1] *Uniform Vehicle Code*, "Article XII.Operation Of Bicycles, Other Human-Powered Vehicles, And Mopeds," www.bikeleague.org/programs/bicyclefriendlyamerica/bicyclefriendlystate/pdfs/uvc_bike.pdf

The UVC includes the following sections:[2]

> 11-1205.Position on roadway
>
> (a) Any person operating a bicycle or a moped upon a roadway at less than the normal speed of traffic at the time and place and under the conditions then existing shall ride as close as practicable to the right-hand curb or edge of the roadway except under any of the following situations:
>
> 1. When overtaking and passing another bicycle or vehicle proceeding in the same direction.
>
> 2. When preparing for a left turn at an intersection or into a private road or driveway.
>
> 3. When reasonably necessary to avoid conditions including, but not limited to, fixed or moving objects, parked or moving vehicles, bicycles, pedestrians, animals, surface hazards, or substandard width lanes that make it unsafe to continue along the right-hand curb or edge. For purposes of this section, a "substandard width lane" is a lane that is too narrow for a bicycle and a vehicle to travel safely side by side within the lane.
>
> 4. When riding in the right turn only lane.
>
> (b) Any person operating a bicycle or a moped upon a one-way highway with two or more marked traffic lanes may ride as near the left-hand curb or edge of such roadway as practicable.
>
> 11-1206.Riding two abreast
> Persons riding bicycles upon a roadway shall not ride more than two abreast except on paths or parts of roadways set aside for the exclusive use of bicycles. Persons riding two abreast shall not impede the normal and reasonable movement of traffic and, on a laned roadway, shall ride within a single lane.

People sometimes interpret these to mean that cyclists should always right as far to the right side of the roadway as possible and are prohibited from ever delaying other traffic, but this is inaccurate. The requirement to ride to the right side of the roadway only applies when cyclists are riding slower than other traffic and if the road shoulder as adequate space. Cyclists have the right to "take a lane" when they are riding as fast as other traffic, or when space is limited, for example, if the road has no shoulder, the shoulder is hazardous due to potholes or loose gravel, or if there is a parking lane to the right of the traffic lane.[3] This provision is actually unnecessary since vehicle traffic laws contain other provisions that require slower vehicles to stay to the right side of the roadway and pull off the road if delaying more than five vehicles.

[2] For more information on UVC regulations regarding cycling see Appendix A of this report.

[3] For more information on safe and responsible cycling see the League of American Bicyclist's *Guide to Safe and Enjoyable Cycling* (LAB 2011), summarized in *Bike Sense: A Guide to the Rules of the Road,* (GVCC 2005).

The UVC also provides specific rules regarding pedestrians.[4] These include:

- Vehicular traffic shall yield the right of way to pedestrians lawfully within a crosswalk.
- Pedestrians shall obey the instructions of any applicable traffic-control device unless otherwise directed by a police officer.
- Pedestrians crossing a roadway other than within a marked crosswalk or an unmarked crosswalk at an intersection shall yield the right of way to all vehicles upon the roadway.
- Pedestrians shall not suddenly leave a curb and walk or run into the path of a vehicle which is so close as to constitute an immediate hazard.
- Between adjacent intersections at which traffic-control signals are in operation pedestrians are prohibited from crossing except at marked crosswalks.
- Where neither a sidewalk nor a shoulder is available, any pedestrian walking along and upon a highway shall walk as near as practicable to an outside edge of the roadway, and if on a two-way roadway, shall walk on the left side of the roadway (facing traffic).
- Except as otherwise indicated, any pedestrian upon a roadway shall yield the right of way to all vehicles upon the roadway.
- The driver of a vehicle crossing a sidewalk shall yield the right of way to any pedestrian and all other traffic on the sidewalk.
- No person shall drive any vehicle upon a sidewalk or sidewalk area except upon a permanent or duly authorized temporary driveway.
- Local governments may restrict pedestrians from crossing at unmarked crosswalks
- Most jurisdictions require drivers to yield to pedestrians using long canes or dog guides.
- Drivers shall exercise due care to avoid colliding with any pedestrian, any human-powered vehicle, a child or obviously confused, incapacitated or intoxicated person, and shall give an audible signal when necessary.

The American Association of State Highway and Transportation Officials (AASHTO) *Green Book* also indicates that transportation officials recognize society's responsibility to accommodate pedestrians (AASHTO 1994). It states,

> Pedestrians are a part of every roadway environment, and attention must be paid to their presence in rural as well as urban areas…Because of the demands of vehicular traffic in congested urban areas, it is often extremely difficult to make adequate provisions for pedestrians. Yet this must be done, because pedestrians are the lifeblood of our urban areas, especially in the downtown and other retail areas.

[4] For more information on UVC regulations regarding walking see Appendix B of this report.

Importance of Non-motorized Transportation

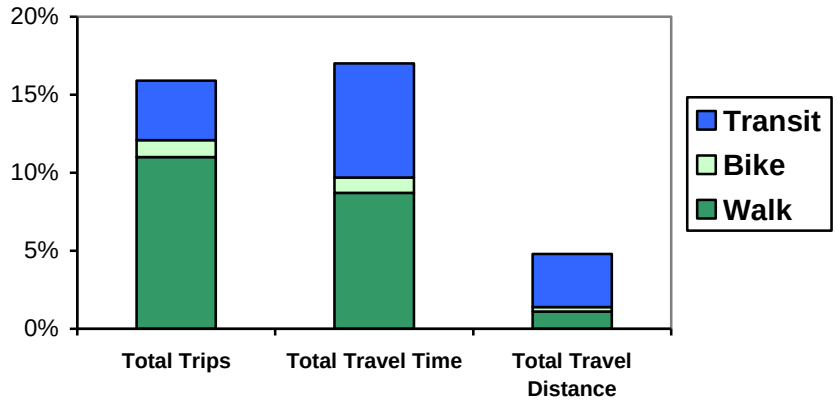
In a variety of ways, conventional transport planning practices tend to undercount and undervalue non-motorized travel (Forsyth, Krizek and Agrawal 2010; Litman 2012; Pike 2011). Conventional travel statistics typically indicate that only a few percent of travel is by walking and cycling, but this reflects undercounting since travel surveys often overlook or undercount shorter trips, non-work trips, off-peak trips, non-motorized links of motorized trips, children's travel, and recreational travel (Litman 2011). Many surveys ignore non-motorized trips to access motorized modes, for example, a bike-bus-walk trip is simply considered a *transit* commute, and a trip that involves several blocks of walking from a parked car to destinations is coded as an *automobile* trip. If instead of asking, "What portion of trips *only* involve walking," we ask, "What portion of trips involve *some* walking," walking would be recognized as a common and important mode.

Census data, which are often used for transport planning, only indicate commute travel, and only counts walking and cycling when used alone; non-motorized trips to access other modes are ignored. The 2000 U.S. Census indicates that only 2.8% of commuters walk and only 0.5% bicycle, a smaller portion than indicated by most other travel surveys. The U.S. Census' *Means Of Transportation To Work By Selected Characteristics Table*, ignores non-motorized modes altogether; it only reports motorized modes.

Some newer surveys provide more comprehensive estimates of non-motorized travel (Pucher, et al. 2011). For example, the 2009 National Household Travel Survey found that 11.1% of travel is by walking and 1.1% by cycling, much higher than previous surveys. Although this may partly reflect actual increases in travel by these modes, it may also reflected improved survey practices that collect more walking and cycling trips. Other studies also conclude that more comprehensive surveys much more walking and cycling activity than indicated by most transport statistics (ABW 2010; Rietveld 2000).

Although walking and cycling represent a small portion of travel distance, they represent a larger portion of trips and travel time, as indicated in Figure 1. As a result, improving non-motorized travel conditions can significantly improve users' travel experience.

Figure 1 **Portion of Total Trips, Travel Time and Travel Distance** (Litman 2011)



Walking, cycling and transit represent a much larger portion of trips and travel time than distance.

Non-motorized Transportation Benefits

Non-motorized modes play important and unique roles in an efficient transport system:

- Typically 10-15% of trips are entirely by non-motorized modes, and more in urban areas.
- Most motorized trips involve non-motorized links, to access public transit and parked vehicles. Improving non-motorized can improve motor vehicle access. Parking lots, transport terminals, airports, and commercial centers are all pedestrian environments.
- Walking and cycling provide affordable, basic transport. People who are physically, economically and socially disadvantaged often rely on walking and cycling, so non-motorized modes can help achieve social equity and economic opportunity objectives.
- Active transport is the most common form of physical exercise. Increasing walking and cycling is often the most practical way to improve public fitness and health.
- Non-motorized modes can achieve transport planning objectives including reduced traffic and parking congestion, facility costs and pollution emissions.
- Non-motorized modes help achieve land use planning objectives, such as urban redevelopment and compact, mixed-use community design.
- Pedestrian environments (sidewalks, paths and hallways) are a major portion of the public realm. Many beneficial activities (socializing, waiting, shopping and eating) occur in pedestrian environments, and improving walkability can support these activities.
- Walking and cycling improvements can support strategic land use development objectives by helping to create more compact, mixed, multi-modal, "smart growth" communities, where residents drive less and rely more on alternative modes.
- Walking and cycling are popular recreational activities. Improving walking and cycling conditions provides enjoyment and health benefits to users, and it can support related industries, including retail, recreation and tourism.

Mobility- Versus Accessibility-Based Planning (Handy 1993; Litman 2003)
A paradigm shift (a change in the way problems are defined and solutions evaluated) is occurring which affects the perceived value of non-motorized travel. The old paradigm assumed that *transportation* means *mobility* (physical travel), and so evaluated transport system performance based on travel speed. This perspective tends to assume that, due to its greater speed, motorized travel is inherently superior to non-motorized travel, and so deserves priority in planning decisions.

But mobility is not generally an end in itself; most travel is intended to provide *access* to desired goods and services. Many factors affect accessibility including mobility, the quality of access options available (the ease of walking, cycling, automobile travel, public transport, and even telecommunications), and land use factors (density, mix, roadway connectivity, etc.). When evaluated this way, non-motorized transport can play an important role in an efficient transport system by providing mobility and by providing access to motorized modes. For example, the new paradigm recognizes that a walkable, mixed-use neighborhood can provide a high level of accessibility by reducing the distances that people must travel to access common services such as shopping, education and recreation, and that planning decisions often involve trade-offs between different types of access; for example, streets designed to maximize automobile traffic volumes and speeds tend to create barriers to walking and cycling.

These benefits vary depending on perspective and conditions. Some result from increased walking and cycling activity, and others only result if automobile travel is reduced. Some benefits are *internal* (they directly benefit mode users), others are *external* (they benefit other people). Table 1 summarizes various walking and cycling benefits and indicates their distribution (who benefits). Not every non-motorized trip provides all these benefits, but most provide several.

Table 1 **Distribution of Non-Motorized Benefits** (Litman 2012; COWI 2009)

Benefit	Distribution
Increased user convenience, comfort, safety, accessibility and enjoyment	Mainly benefits users
Improved public fitness and health	Users benefit directly, plus external benefits from reduce medical and disability costs
Vehicle cost savings	Mainly benefits users
Reduced chauffeuring responsibilities	Benefits motorists
Reduced traffic congestion	Benefits motorists
Reduced parking congestion	Benefits motorists
Reduced roadway costs	Benefits taxpayers
Reduced parking facility costs	Benefits taxpayers and businesses
Energy conservation	Direct financial savings to users, plus economic and environmental benefits from reduced oil consumption
Air, noise and water pollution reductions	Widely distributed benefits to people and ecological systems
Economic activity associated with more walkable and bikeable communities	Widely distributed benefits to businesses and local residents

This table summarizes the distribution of walking and cycling benefits.

Various academic and government-sponsored studies have estimated the value of these benefits (Delucchi 2005; Litman 2009 and 2012; NZTA 2010; Zhang, et al. 2005). Most only consider a portion of benefits: some include health and environmental benefits, others include user savings and congestion reductions, but few include parking savings or reduced chauffeuring responsibilities. For example, Gotschi (2011) evaluated Portland, Oregon's $138-605 million bicycle facility investments based on healthcare savings ($388-594 million), increased longevity ($7-12 billion) and fuel savings ($143-218 million). Grabow, Hahn and Whited (2010) estimated the economic value of bicycling in Wisconsin, including bicycle manufacturing and sales ($593 million), tourism and recreational value ($924 million), physical activity health benefits ($320 million), and pollution emission reductions ($90 million). UK Department for Transport research estimated that an integrated program that increases walking in British towns provides benefits worth £2.59 for each £1.00 spent, considering just reduced mortality (Cavill, Cope and Kennedy 2009; DfT 2010). Including other benefit categories (reduced congestion, parking costs, user costs, etc.) could significantly increase these values.

Land Value Impacts

The portion of these non-motorized travel benefits that are directly perceived by local residents are reflected in increased property values in areas that have better walking and cycling conditions and increased non-motorized travel activity.

For example, Cortright (2009) found that in typical U.S. metropolitan regions a one point increase in Walkscore (www.walkscore.com) is associated with a $700 to $3,000 increase in home values, indicating the value consumers place on walkability. Similarly, Pivo and Fisher (2010) found that office, retail and apartment values increased 1% to 9% for each 10-point WalkScore increase. Buchanan (2007) found 5.2% higher residential property values and 4.9% higher retail rents in London neighborhoods with good walking conditions. Song and Knaap (2003) found that, all else being equal, house prices are 15.5% higher on average in walkable neighborhoods. Eppli and Tu (2000) found 11% higher property values in New Urbanist neighborhoods compared with otherwise similar homes in conventional, automobile-dependent communities.

Residential property values also tend to increase with proximity to public trails (Racca and Dhanju 2006). Karadeniz (2008) found that each foot closer to Ohio's Little Miami Scenic Trail increases single-family property sale prices $7.05, indicating that values increase 4% if located 1,000 feet closer to the trail (this paper provides a good overview of the literature on this subject). Some studies indicate that proximity to trails and bike paths reduces the value of abutting properties, due to concerns over reduced privacy and increased crime (Krizek 2006). However, Racca and Dhanju (2006) conclude, "The majority of studies indicate that the presence of a bike path/trail either increases property values and ease of sale slightly or has no effect." Paths and trail benefits are likely to be largest in communities where walking and cycling are widely accepted and supported, and if residents can self-select, so people who value walking and cycling can locate near such facilities, while people who dislike such facilities can move away.

Retailers sometimes oppose non-motorized improvements, such as streetscaping and bicycle lanes, because they assume that motorists are better customers than pedestrians and cyclists, but this is often untrue (Sztabinski 2009; TA 2006). Bicycle parking is space efficient and so generates about five times as much spending per square meter as car parking (Lee and March 2010).

Special consideration is needed to evaluate the net congestion reduction, and safety and health benefits of non-motorized transportation. These issues are discussed below.

Congestion Impacts

Motorists are occasionally delayed by pedestrians and cyclists, so people may wonder if shifts from driving to non-motorized modes reduces congestion overall. In most cases, pedestrians and cyclists prefer to avoid busy roads and so reduce congestion. To analyze this impact, bicycling conditions are divided into four classes:

1. *Uncongested roads and separated paths*. Bicycling in these conditions causes no traffic congestion.
2. *Congested roads with space for bicyclists*. Bicycling on a road shoulder (common on highways), a wide curb lane (common in suburban and urban areas), or a bike lane contributes little traffic congestion except at intersections where turning maneuvers may be delayed. Table 2 summarizes these impacts.

Table 2 **Passenger-Car Equivalents for Bicycles by Lane Width** (AASHTO 1990)

	< 11 ft. Lane	11-14 ft. Lane	> 14 ft. Lane
Riding With Traffic	1.0	0.2	0.0
Riding Against Traffic	1.2	0.5	0.0

3. *Narrow, congested roads with low speed traffic.* Bicycling on a narrow, congested road where cyclists can keep up with traffic (common on urban streets) probably causes less congestion than an average car due to bicycles' smaller size.
4. *Narrow, congested roads with moderate to high speed traffic*. Bicycling on a narrow, congested road where the rider cannot keep up with traffic and faster vehicles cannot easily pass can cause significant congestion delay.

Congestion is reduced when motorists shift to bicycling under the first three conditions. Only under condition 4 does a shift fail to reduce congestion. This represents a small portion of cycling travel because most bicyclists avoid riding under such conditions if possible, and bicycling is forbidden altogether on urban freeways.

Empirical evidence indicates that, all else being equal, improved walking and cycling conditions and shifts from driving to these modes tends to reduce traffic congestion. For example, a major study for the Arizona Department of Transportation analyzed the relationships between land use patterns and traffic conditions in Phoenix, Arizona (Kuzmyak 2012). It found significantly less congestion on roads in older, higher density areas than in newer, lower density suburban areas due to more mixed land use (particularly more retail in residential areas), more transit and nonmotorized travel, and a more connected street grid which provides more route options and enables more walking. As a result, residents of older neighborhoods generate less total vehicle travel and drive less on major roadways, reducing traffic congestion.

Safety and Health Impacts

Because pedestrians and cyclists are more vulnerable to traffic injuries than motor vehicle occupants, people may also wonder if shifts from motorized to non-motorized travel are overall safe and healthy. Although walking and cycling have higher per-mile casualty rates than automobile travel, shifting travel from automobile to non-motorized modes tends to reduce total crash costs due to the following factors (WHO 2008):

- Non-motorized travel imposes minimal risk to other road users.
- In automobile-dependent communities walking and cycling casualty rates are relatively high because many users are children and people with disabilities, who tend to have high risk factors. A pedestrian or cyclist who takes basic precautions such as observing traffic rules and wearing a cycling helmet tends to have much lower than average risk.
- Per-mile and per capita traffic casualty rates tend to decline as walking and cycling activity increases in a community, because drivers become more cautious and communities invest more in non-motorized safety improvements.
- As non-motorized travel increases, total per capita mileage declines. A local walking trip often substitutes for a longer automobile trip.
- Some walking and cycling promotion programs include education and facility improvements that reduce participants' per-mile pedestrian and bicycle crash rates.
- The substantial health benefits of walking and cycling more than offset any increase in crash risk, so longevity tends to increase with non-motorized transport.

Empirical evidence indicates that shifts from driving to non-motorized modes tends to reduce total per capita crash casualty rates: as walking and cycling activity increases in an area, total traffic accident rates tend to decline (ABW 2010), an effect called *safety in numbers* (Jacobsen 2003). Meta-analysis by de Hartog, et al. (2010) indicates that people who shift from driving to bicycling enjoy substantial health benefits (3 to 14 month longevity gains), plus external health benefits from reduced air pollution and crash risk to other road users. Grabow, et al. (2011) estimated net health impacts if 50% of short trips were made by bicycle during summer months in typical U.S. Midwest communities, reducing approximately 1,100 annual deaths cross the study region of approximately 31.3 million people. Gotschi (2011) estimated that Portland, Oregon's 40-year $138-605 million bicycle facility investments provide $388-594 million worth of healthcare savings and $7-12 billion worth of longevity value, resulting in positive net benefits.

Rabl and de Nazelle (2012) estimate the health impacts caused by shifts from car to bicycling or walking, considering four effects: changes in physical fitness, air pollution exposure and accident risk. Switching from driving to bicycling for a 5 km one way commute provides physical activity health benefits worth 1,300 € annually and air emission reduction worth 30 €/yr. overall. Commuters who switch modes bears additional air pollution costs averaging 20 €/yr, but this depends on cycling conditions and can often have the opposite sign if cyclists are separated from major roadways. Changes in bicyclists' accident risk vary. Overall, any increase in accident risk is at least an order of magnitude smaller than physical activity health benefit.

Roadway Funding

Economic efficiency and equity require that consumers bear the costs of the goods and services they use unless a subsidy is specifically justified (Wachs 2003). Many people assume that pedestrians and cyclists bear less than their fair share of roadway costs because they do not pay special fuel taxes or motor vehicle registration fees, and so argue that pedestrians and cyclists deserve less right to use roadways, and that spending transport funds on non-motorized facilities (what they call *diversions*) is unfair.[5] However, this assumption is wrong (Dutzik, Davis and Baxandall 2011).

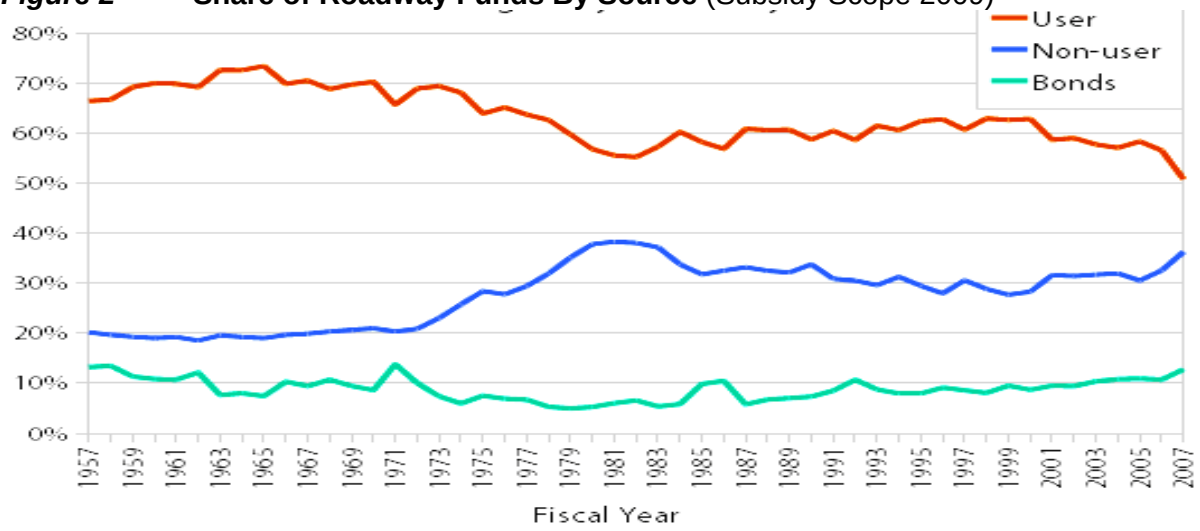
Table 3 **Roadway Expenditures by Level of Government** (2008 Billions)[6]

	User Fees	Other Taxes	Total
Federal	$30.8 (74%)	$11.1 (26%)	$41.9 (100%)
State	$59.0 (60%)	$38.7 (40%)	$97.7 (100%)
Local	$4.3 (8%)	$48.8 (92%)	$53.1 (100%)
Total	*$94.1 (49%)*	*$98.6 (51%)*	*$192.7 (100%)*
Per vehicle-mile (2,974 B. VMT)	*3.2¢/mile*	*3.3¢/mile*	*7.5¢/mile*

In 2008, vehicle user fees totaled $94.1 billion, about half of the $192.7 billion spent on road.

Currently, only about half of U.S. roadway expenditures are financed by motor vehicle user fees, as indicated in Table 3. The portion of roadway expenses funded by user fees is declining, as indicated in Figure 2, because roadway costs increase with inflation, but fuel taxes and registration fees, are fixed fees that do not. Vehicle user fees would need to double to fully fund roadway costs. The rest of highway expenses are financed by general taxes that people pay regardless of how they travel.

Figure 2 **Share of Roadway Funds By Source** (Subsidy Scope 2009)



The portion of total roadway expenditures financed by motor vehicle fees is declining.

[5] See for example, "Who's Trask Talking Bikes?" (www.bikeleague.org/action/trashtalk).

[6] FHWA (2008), *Highway Statistics*, (www.fhwa.dot.gov), Table HF-10.

Although motor vehicle user fees fund most *state highway* expenses, *local roads* are mainly funded through general taxes that residents pay regardless of how they travel. The majority (probably more than 90%) of walking and bicycling occurs on locally funded roads. General tax funds are also spent on various traffic services, such as policing, emergency services, and subsidized parking facilities (ICLEI 2005; Litman 2009). One study estimated that n average household in Wisconsin pays $779 in annual general taxes to help finance roads (SSTI 2011). Similarly, in Canada during 2009–10, all levels of government spent $28.9 billion on roads and collected $12.1 billion in fuel taxes and $4.4 billion in other transport user fees, indicating that road user fees cover about 64% of costs (TC 2010).

Various roadway cost allocation studies have estimated the roadway costs of specific vehicle types and travel conditions (Balducci and Stowers 2008; FHWA 1997; Jones and Nix 1995). Larger, faster and heavier vehicles tend to impose higher costs because they require more road space, more complex intersections, larger parking spaces, more maintenance, and more sophisticated traffic management. Walking and cycling tend to impose far lower costs per mile of travel than motorized vehicles.

It is difficult to estimate the amount governments spend on non-motorized facilities. Only 1.6% of Federal and associated stated transportation funding is devoted to pedestrian and cycling programs (ABW 2010 and 2012). Perhaps 5-10% of local transport agency budgets are spent on sidewalks and bicycle facilities, but this represents a much smaller portion of total transport spending. Of course, cyclists use regular roadways and so benefit from general roadway spending.

In addition to roadway subsidies, motor vehicle travel imposes other external costs (costs not borne directly by individual users), including parking subsidies, congestion delays and crash risk imposed on other road users, and environmental damages (Litman 2009; van Essen, et al. 2007). Table 3 summarizes estimates of these costs, which indicates that automobile use has external costs averaging about 29.3¢, while cycling costs average about 0.9¢ and walking just 0.2¢ per mile.

Table 3 **External Costs (Cents per Mile)** (Litman 2009)

Cost	Automobile	Bicycle	Walk
Roadway subsidies	3.3¢	0.3	0.0
Parking subsidies	10¢	0.2	0.0
Traffic congestion	4¢	0.2	0.0
Crash risk imposed on others	8¢	0.2	0.2
Environmental costs	4¢	0.0	0.0
Totals	*29.3¢*	*0.9¢*	*0.2¢*

This table summarizes estimates of various external costs of transportation.

Summary of User Costs and Payments

Overall, local and regional governments are estimated to spend $300-500 annually per automobile in general taxes on local roads and traffic services, averaging more than 6¢ per mile driven on local roads (Litman 2009; SSTI 2011). Only 0.7¢ of this is paid through vehicle user charges, meaning that driving is subsidized through general taxes by about 5.6¢ per mile on local roads. Automobiles also impose other external costs, including parking subsidies, congestion and crash risk imposed on other road users, and environmental damages. Pedestrians and cyclists tend to impose lower costs than motor vehicles and bear an excessive share of motor vehicle external costs, particularly crash risk and pollution exposure. A shift from driving to bicycling and walking provides various savings and benefits, including benefits to motorist, including reduced traffic and parking congestion, reduced chauffeuring burdens, and reduced accident risk and pollution emissions.

For an average household, the costs imposed approximately equals the costs they bear, but people who drive less than average and use non-motorized modes tend to overpay their share of costs, while those who drive more than average underpay. This indicates that non-drivers pay more than their share of transportation costs.

The automobile industry has published studies which claim that motorists pay more than their share of costs (Dougher 1995; Spindler 1997), but they violate standard cost allocation principles by including all vehicle taxes rather than just special user charges, and by considering only *highway* expenditures, ignoring *local roadway* costs and other external costs associated with motor vehicle use. Virtually all studies that use appropriate analysis procedures conclude that motorists significantly underpay the costs they impose on society (FHWA 1997; ICLEI 2005; Litman 2012; Parry, Walls and Harrington 2007; van Essen, et al. 2007).

Example:

Two neighbors each pay $300 annually in local taxes that fund roads and traffic services. Mike Motorist drives 10,000 miles annually on local roads, while Frances Footpower bicycles 3,000 miles. The table below compares their tax payments with their costs.

Table 4 Local Roadway Payments Versus Costs

	Mike	Frances
A. Annual local mileage	10,000 by car	3,000 by bike
B. Household's general taxes used for road related services	$300	$300
C. Motorist user fees spent on local road (0.2¢ per mile)	$24	$0
D. Total road system contribution (B + C)	$324	$300
E. Tax payment per mile of travel (B/A).	3.2¢	10¢
F. Roadway costs (cars = 5.6¢/ml, bicycles = 0.2¢/ml)	$560	$48
Net (D – F)	*Underpays $236*	*Overpays $252*

Non-drivers pay almost as much as motorists for local roads but impose lower costs. As a result, they tend to overpay their share of roadway costs.

Other Equity Issues

Of course, there are other transport equity issues besides cost recovery (user fees that repay roadway costs). As discussed previously, walking and bicycling provide basic mobility for disadvantaged people, and various savings and benefits. Accommodating non-motorized travel therefore deserves a higher priority than indicated simply by its share of total travel activity.

Basic fairness suggests that everybody should be able to use public roads without unnecessary restriction or excessive risk, since roads are a valuable public resource and basic mobility is an essential activity. Prohibiting a mode from using public roads can be considered as inequitable as excluding a particular racial or ethnic group from using public parks or restrooms.

There is inherent inequity in the accident risk, noise and pollution impacts that motor vehicles impose on non-motorized travelers (Jacobsen, Racioppi and Rutter 2009). Pedestrians and bicyclists are much more likely to be injured in collisions and so bear more crash costs than they impose. Highways and motor vehicle traffic create barriers to walking and bicycling, called "community severance" or the "barrier effect" (DfT 2009; Litman 2009). Bicycles sometimes cause traffic delays, but as previously discussed, bicyclists usually cause less congestion than the same trips made by automobile, since bicycles require less space than motor vehicles and cyclists generally avoid busy roads if alternatives exist. Where motor vehicle traffic volumes and speeds are low, non-motorized and motorized modes can safely and easily share roads; it is motorists desire to go fast that creates the need for sidewalks, paths and bike lanes. As a result, fairness requires that motorists bear much of the costs of these facilities, to help mitigate the negative impacts they impose.

Critics of pedestrian and cycling facility improvements tend to ignore the benefits they provide to motorists. For example, improving sidewalks, crosswalks and bike paths tends to reduce conflicts between vehicles, and motorists benefit directly if shifts from driving to non-motorized mode reduce traffic and parking congestion, roadway costs, crash risk and pollution emissions.

Optimal Investment In Non-motorized Transport

This section discusses ways to determine the optimal amount of transportation resources (funding and road space) that should be devoted to non-motorized modes.

Travel Demand

Based on existing mode share, about 12% of transport resources should rationally be devoted to walking and cycling facilities and programs. Although some municipal governments may devote this much of their budgets to sidewalks and paths, is about five times greater than current spending by all levels of government, and about ten times more if government-mandated parking facility costs are also considered. For most of the last century, transport planning tended to favor automobile travel over walking and cycling. Motor vehicle travel has now peaked and there is growing demand for alternative modes, including walking and cycling, provided that they are convenient, comfortable and safe to use (ABW 2012; Litman 2010). As a result, both economic efficiency and social equity justify increasing the resources devoted to walking and cycling to meet future demands. In other words, the relatively low levels of non-motorized travel in North America partly reflect a self-fulfilling prophesy: automobile-oriented planning prevents people from walking and cycling as much as they want (Pucher and Buehler 2009). Improving walking and cycling conditions can offset this, resulting in more optimal travel options.

Importance and Benefits

It could be argued that transport funding should be allocated based on each mode's importance and benefits. As previously discussed, walking and cycling play important and unique roles in an efficient transport system, including providing basic mobility, access to motorized modes, cost savings, and health and enjoyment benefits (Litman 2012). Conventional planning tends to overlook many of these benefits; performance indicators such as roadway level-of-service are inherently biased to favor motorized over non-motorized modes. This is not to suggest that motorized travel should be eliminated, but it does suggest that non-motorized travel is often undervalued. For example, transport planning should generally insure that children can safely walk and bike to schools, even if this requires limiting automobile access (such as requiring parents to park a block or two away), and sidewalks and bike lanes should generally have priority over on-street parking where roadspace is limited.

Vertical Equity

Vertical equity implies that policies should protect the interests of disadvantaged people. People who are physically, economically and socially disadvantaged tend to rely on non-motorized travel for basic mobility. This suggests that increased walking and cycling investments may be justified to support equity objectives and insure basic mobility.

User Pay

Horizontal equity implies that consumers should "get what they pay for and pay for what they get." As discussed, only about half of current roadway expenditures are financed by user fees, so applying this principle would require approximately doubling such fees, allowing substantial reductions in general taxes, particularly local taxes currently used to finance roads and traffic services, and substantial increases in funding for non-motorized modes, so people who drive less than average receive a fair return for their taxes.

Summary

Critics sometimes claim that walking and cycling have less right to use public roads than motorists, based on claims that non-motorized modes are less important than motorized travel, and that non-motorized travelers bear less than their fair share of roadway costs. These claims are inaccurate.

Bicyclists and pedestrians have legal, moral and practical rights to use public roads. Of course, pedestrians and cyclists must observe traffic laws, and their use of specific roadways may sometimes be restricted for specific reasons, but overall they have as much right to use public roadways as motor vehicles. Although most jurisdictions have adopted the Uniform Vehicle Code wording which requires bicyclists riding slower than other traffic to ride as far to the right of the roadway as *practicable*, this is a limited requirement which does not prohibit cyclists from riding in a traffic lane when they are traveling as fast as motorized travel, or when required for safety.

Non-motorized modes play an important and unique role in an efficient transport system, including affordable basic mobility, access to and connections between motorized modes, various savings and benefits, as well as exercise and enjoyment. Conventional planning tends to undercount and undervalue non-motorized travel. Walking and cycling activity are generally much more common (two to five times) than indicated by commonly-used travel statistics, and conventional evaluation overlooks many benefits. Mobility-based planning tends to favor motorized travel, while accessibility-based planning tends to recognize the important role played by non-motorized modes.

Although pedestrians and cyclists do not pay special road user fees, they do help pay for the sidewalks, paths and roads. Only about half of roadway expenses are financed by user fees. Half of all roadway costs are financed by general taxes, which people pay regardless of how they travel, and this portion is increasing. Although a major portion of highway expenses are financed by motor vehicle user fees, they fund only a small portion of local roads and traffic services. Because they are small and light, pedestrians and cyclists impose much smaller roadway costs per mile of travel than motor vehicles. Motor vehicle use also imposes a variety of external costs, including parking subsidies, congestion, uncompensated crash and environmental damages. Because they tend to travel fewer miles per year, they impose far lower total costs per capita than motorists. As a result, people who drive less than average tend to overpay their fair share of transport costs, while those who drive more than average underpay. As a result, pedestrians and bicyclists tend to subsidize motorists.

Currently about 12% of all trips are by walking and cycling, and there appears to be significant latent demand for non-motorized travel: walking and cycling activity increase when non-motorized travel conditions are improved. Current demographic and economic trends are expected to increase walking and cycling demand, yet only 2-4% of total transport funding is devoted to pedestrian and cycling facilities. As a result, it is economically efficient and equitable to increase the portion of resources (money and road space) devoted to non-motorized travel.

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Appendix A Selected UVC Provisions Related To Bicycling

The following are sections of the 2000 Uniform Vehicle Code

11-1202.Traffic laws apply to persons on bicycles and other human powered vehicles Every person propelling a vehicle by human power or riding a bicycle shall have all of the rights and all of the duties applicable to the driver of any other vehicle under chapters 10 and 11, except as to special regulations in this article and except as to those provisions which by their nature can have no application.

11-1203.Riding on bicycles
No bicycle shall be used to carry more persons at one time than the number for which it is designed or equipped, except that an adult rider may carry a child securely attached to adult rider in a back pack or sling.

11-1205.Position on roadway
(a) Any person operating a bicycle or a moped upon a roadway at less than the normal speed of traffic at the time and place and under the conditions then existing shall ride as close as practicable to the right-hand curb or edge of the roadway except under any of the following situations:

1. When overtaking and passing another bicycle or vehicle proceeding in the same direction.
2. When preparing for a left turn at an intersection or into a private road or driveway.
3. When reasonably necessary to avoid conditions including, but not limited to, fixed or moving objects, parked or moving vehicles, bicycles, pedestrians, animals, surface hazards, or substandard width lanes that make it unsafe to continue along the right-hand curb or edge. For purposes of this section, a "substandard width lane" is a lane that is too narrow for a bicycle and a vehicle to travel safely side by side within the lane.
4. When riding in the right turn only lane.

(b) Any person operating a bicycle or a moped upon a one-way highway with two or more marked traffic lanes may ride as near the left-hand curb or edge of such roadway as practicable.

11-1206.Riding two abreast
Persons riding bicycles upon a roadway shall not ride more than two abreast except on paths or parts of roadways set aside for the exclusive use of bicycles. Persons riding two abreast shall not impede the normal and reasonable movement of traffic and, on a laned roadway, shall ride within a single lane. (FORMERLY 11-1205(b))

11-1207.Carrying articles
No person operating a bicycle shall carry any package, bundle or article which prevents the use of both hands in the control and operation of the bicycle. A person operating a bicycle shall keep at least one hand on the handlebars at all times.

11-1208.Left turns
(a) A person riding a bicycle or a moped intending to turn left shall follow a course described in 11-601 or in subsection (b).
(b) A person riding a bicycle or a moped intending to turn left shall approach the turn as close as practicable to the right curb or edge of the roadway. After proceeding across the intersecting roadway to the far corner of the curb or intersection of the roadway edges, the bicyclist or moped driver shall stop, as much as practicable out of the way of traffic. After stopping the bicyclist or moped driver shall yield to any traffic proceeding in either direction along the roadway the

bicyclist had been using. After yielding, and complying with any official traffic control device or police officer regulating traffic on the highway along which he or she intends to proceed, the bicyclist or moped driver may proceed in the new direction.
(c) Notwithstanding the foregoing provisions, the state highway commission and local authorities in their respective jurisdictions may cause official traffic-control devices to be placed and thereby require and direct that a specific course be traveled by turning bicycles or mopeds, and when such devices are so placed, no person shall turn a bicycle or a moped other than as directed and required by such devices.

11-1209.Turn and stop signals
(b) A signal of intention to turn right or left when required shall be given continuously during not less than the last 100 feet traveled by the bicycle before turning, and shall be given while the bicycle is stopped waiting to turn. A signal by hand and arm need not be given continuously if the hand is needed in the control or operation of the bicycle.
[(a) was deleted during 11Jan2000 meeting. OBF and LAB will revise (b)]

11-1210.Bicycles and human powered vehicles on sidewalks
(a) A person propelling a bicycle upon and along a sidewalk, or across a roadway upon and along a crosswalk, shall yield the right of way to any pedestrian and shall give audible signal before overtaking and passing such pedestrian. (b) A person shall not ride a bicycle upon and along a sidewalk, or across a roadway upon and along a crosswalk, where such use of bicycles is prohibited by official traffic-control devices.
(c) A person propelling a vehicle by human power upon and along a sidewalk, or across a roadway upon and along a crosswalk, shall have all the rights and duties applicable to a pedestrian under the same circumstances.

11-1212.Bicycle racing
(b) Bicycle racing on a highway shall not be unlawful when a racing event has been approved by state or local authorities on any highway under their respective jurisdictions. Approval of bicycle highway racing events shall be granted only under conditions which assure reasonable safety for all race participants, spectators and other highway users, and which pent unreasonable interference with traffic flow which would seriously inconvenience other highway users.
(c) By agreement with the approving authority, participants in an approved bicycle highway racing event may be exempted from compliance with any traffic laws otherwise applicable thereto, provided that traffic control is adequate to assure the safety of all highway users.
[(a) was deleted during 11Jan2000 meeting. OBF and LAB will revise (b) and (c)]

12-702.Head lamp required at night
Every bicycle in use at the times described in 12-201 shall be equipped with a lamp on the front emitting a white light visible from a distance of at least 500 feet to the front.

12-703.Rear reflector required at all times
Every bicycle shall be equipped with a red reflector of a type approved by the department which shall be visible for 600 feet to the rear when directly in front of lawful lower beams of head lamps on a motor vehicle. (FORMER 11-1207(a))

12-704.Side reflector or light required at night
Every bicycle when in use at the times described in 12-201 shall be equipped with reflective material of sufficient size and reflectivity to be visible from both sides for 600 feet when directly

in front of lawful lower beams of head lamps on a motor vehicle, or, in lieu of such reflective material, with a lighted lamp visible from both sides from a distance of at least 500 feet.

12-705.Additional lights or reflectors authorized
A bicycle or its rider may be equipped with lights or reflectors in addition to those required by the foregoing sections.

12-706.Brake required
Every bicycle shall be equipped with a brake or brakes which will enable its driver to stop the bicycle within 25 feet from a speed of 10 miles per hour on dry, level, clean pavement. (FORMER 11-1207(c)).

Appendix B Selected UVC Provisions Related To Pedestrian Travel

UVC § 1-168 Pedestrian
Any person afoot.

UVC § 11- 202(a),(b),(c)1,(c)2,(c)4 Traffic-control signal legend
Whenever traffic is controlled by traffic-control signals exhibiting different colored lights, or colored lighted arrows, successively one at a time or in combination, only the colors Green, Red and Yellow shall be used, except for special pedestrian signals carrying a legend, and said lights shall indicate and apply to drivers of vehicles and pedestrians as follows:

(a) Green indication

1. Vehicular traffic facing a circular green signal may proceed straight through or turn right or left unless a sign at such place prohibits either such turn. But vehicular traffic, including vehicles turning right or left, shall yield the right of way to other vehicles and to pedestrians lawfully within the intersection or an adjacent crosswalk at the time such signal is exhibited.
2. Vehicular traffic facing a green arrow signal, shown alone or in combination with another indication, may cautiously enter the intersection only to make the movement indicated by such arrow, or such other movement as is permitted by other indications shown at the same time. Such vehicular traffic shall yield the right of way to pedestrians lawfully within an adjacent crosswalk and to other traffic lawfully using the intersection.
3. Unless otherwise directed by a pedestrian-control signal as provided in § 11-203, pedestrians facing any green signal, except when the sole green signal is a turn arrow, may proceed across the roadway within any marked or unmarked crosswalk.

(b) Steady yellow indication

1. Vehicular traffic facing a steady circular yellow or yellow arrow signal is thereby warned that the related green movement is being terminated or that a red indication will be exhibited immediately thereafter.
2. Pedestrians facing a steady circular yellow or yellow arrow signal, unless otherwise directed by a pedestrian-control signal as provided in § 11-203, are thereby advised that there is insufficient time to cross the roadway before a red indication is shown and no pedestrian shall then start to cross the roadway.

(c) Steady red indication

1. Vehicular traffic facing a steady circular red signal alone shall stop at a clearly marked stop line, but if none, before entering the crosswalk on the near side of the intersection, or if none, then before entering the intersection, and shall remain standing until an indication to proceed is shown except as provided in subsection (c)3.
2. Vehicular traffic facing a steady red arrow signal shall not enter the intersection to make the movement indicated by the arrow, and unless entering the intersection to make a movement permitted by another signal, shall stop at a clearly marked stop line, but if none, before entering the crosswalk on the near side of the intersection, or if none, then before entering the intersection and shall remain standing until an indication permitting the movement indicated by such red arrow is shown except as provided in subsection (c)3.

Unless otherwise directed by a pedestrian-control signal as provided in § 11-203, pedestrians facing a steady circular red or red arrow signal alone shall not enter the roadway.

It is recommended that the display of a turning green arrow alone or with another indication should indicate that during this display the turning movement is not interfered with by oncoming traffic, which simultaneously should face a red signal.
It is recommended that the color yellow be used only before red. If yellow is used following the red, traffic facing the signal has a tendency to start before the green signal appears, causing interference with cross traffic clearing the intersection.

UVC § 11- 202(c)3 Traffic-control signal legend [Right turn on red]
(c) Steady red indication

3. Except when a sign is in place prohibiting a turn, vehicular traffic facing any steady red signal may cautiously enter the intersection to turn right, or to turn left from a one-way street into a one-way street, after stopping as required by subsection (c)1 or subsection (c)2. After stopping the driver shall yield the right of way to any vehicle in the intersection or approaching on another roadway so closely as to constitute an immediate hazard during the time such driver is moving across or within the intersection or junction of roadways.Such driver shall yield the right of way to pedestrians within the intersection or an adjacent crosswalk.

UVC § 11- 203 Pedestrian-control signals
Whenever special pedestrian-control signals exhibiting the "Walk" or "Don't Walk" or symbols of a "walking person" or "upraised palm" are in place, such signals shall indicate as follows:
(a) Flashing or Steady Walk or Walking Person-Any pedestrian facing the signal may proceed across the roadway in the direction of the signal and every driver of a vehicle shall yield the right of way to such pedestrian.
(b) Flashing or Steady Don't Walk or Upraised Palm-No pedestrian shall start to cross the roadway in the direction of the signal, but any pedestrian who has partially completed crossing on the walk signal shall proceed to a sidewalk or safety island while the don't walk or upraised palm signal is showing.

In states where pedestrian-control signals using the "Wait" legend are still in use, authorization for them should be continued in the law until they are replaced.

UVC § 11- 403(b) Stop signs and yield signs [Driver procedures at stop signs]
Except when directed to proceed by a police officer, every driver of a vehicle approaching a stop sign shall stop at a clearly marked stop line, but if none, before entering the crosswalk on the near side of the intersection, or if none, then at the point nearest the intersecting roadway where the driver has a view of approaching traffic on the intersecting roadway before entering it. After having stopped, the driver shall yield the right of way to any vehicle in the intersection or approaching on another roadway so closely as to constitute an immediate hazard during the time when such driver is moving across or within the intersection or junction of roadways. Such driver shall yield the right of way to pedestrians within an adjacent crosswalk.

UVC § 11- 403(c) Stop signs and yield signs [Driver procedures at yield signs]
The driver of vehicle approaching a yield sign shall in obedience to such sign slow down to a speed reasonable for the existing conditions, and if required for safety to stop, shall stop at a clearly marked stop line, but if none, before entering the crosswalk on the near side of the intersection, or if none, then at the point nearest the intersecting roadway where the driver has a view of approaching traffic on the intersecting roadway before entering it. After slowing or stopping, the driver shall yield the right of way to any vehicle in the intersection or approaching on another roadway so closely as to constitute an immediate hazard during the time such driver is

moving across or within the intersection or junction of roadways. Such driver shall yield the right of way to pedestrians within an adjacent crosswalk. If such a driver after driving past a yield sign is involved in a collision with a vehicle in the intersection or junction of roadways or with a pedestrian in an adjacent crosswalk, such collision shall be deemed prima facie evidence of the driver's failure to yield right of way.

UVC § 11- 501(a) Pedestrian obedience to traffic-control devices and traffic regulations
A pedestrian shall obey the instructions of any official traffic-control device specifically applicable to such pedestrian, unless otherwise directed by a police officer.

UVC § 11- 502(a) Pedestrians' right of way in crosswalks [Yield to pedestrian in crosswalk]
When traffic-control signals are not in place or not in operation, the driver of a vehicle shall yield the right of way, slowing down or stopping if need be to yield to a pedestrian crossing the roadway within a crosswalk when the pedestrian is upon the half of the roadway upon which the vehicle is traveling, or when the pedestrian is approaching so closely from the opposite half of the roadway as to be in danger.

UVC § 11- 502(b) Pedestrians' right of way in crosswalks [Pedestrian can't suddenly leave curb]
No pedestrian shall suddenly leave a curb or other place of safety and walk or run into the path of a vehicle which is so close as to constitute an immediate hazard.

UVC § 11- 502(c) Pedestrians' right of way in crosswalks [§ 11-502(a) does not apply where there is a tunnel or bridge]
Paragraph (a) shall not apply under the conditions stated in § 11.503(b) [tunnel or overhead crossing exists].

UVC § 11- 502(d) Pedestrians' right of way in crosswalks [Vehicle from rear does not pass stopped vehicle]
Whenever any vehicle is stopped at a marked crosswalk or at any unmarked crosswalk at an intersection to permit a pedestrian to cross the roadway, the driver of any other vehicle approaching from the rear shall not overtake and pass such stopped vehicle.

Also see model vehicle overtaking law, particularly § 3.]

UVC § 11- 503(a) Crossing at other than crosswalks
Every pedestrian crossing a roadway at any point other than within a marked crosswalk or within an unmarked crosswalk at an intersection shall yield the right of way to all vehicles upon the roadway.

Metroped Note: Allows pedestrian to cross anywhere
UVC § 11- 503(b) Crossing at other than crosswalks [Tunnel or bridge available]
Any pedestrian crossing a roadway at a point where a pedestrian tunnel or overhead pedestrian crossing has been provided shall yield the right of way to all vehicles upon the roadway.

UVC § 11- 503(c) Crossing at other than crosswalks [Crossing between adjacent intersections]
Between adjacent intersections at which traffic-control signals are in operation pedestrians shall notcross at any place except in a marked crosswalk.

UVC § 11- 503(d) Crossing at other than crosswalks [Diagonal crossing]

No pedestrian shall cross a roadway intersection diagonally unless authorized by official traffic-control devices; and when authorized to cross diagonally, pedestrians shall cross only in accordance with the official traffic-control devices pertaining to such crossing movements

UVC § 11- 504 Drivers to exercise due care
Notwithstanding other provisions of this chapter or the provisions of any local ordinance, every driver of a vehicle shall exercise due care to avoid colliding with any pedestrian or any person propelling a human powered vehicle and shall give an audible signal when necessary, and shall exercise proper precaution upon observing any child or any obviously confused, incapacitated or intoxicated person.

UVC § 11- 505 Pedestrians to use right half of crosswalks
Whenever practicable, pedestrians shall move upon the right half of crosswalks

UVC § 11- 506(c) Pedestrians on highways [No sidewalk or shoulder available]
Where neither a sidewalk nor a shoulder is available, any pedestrian walking along and upon a highway shall walk as near as practicable to an outside edge of the roadway, and if on a two-way roadway, shall walk only on the left side of the roadway.

UVC § 11- 506(d) Pedestrians on highways [Pedestrian in roadway]
Except as otherwise provided in this chapter, any pedestrian upon a roadway shall yield the right of wayto all vehicles upon the roadway.

UVC § 11- 509 Pedestrians' right of way on sidewalks
The driver of a vehicle crossing a sidewalk shall yield the right of way to any pedestrian and all other traffic on the sidewalk.

UVC § 11-1103 Driving upon sidewalk
No person shall drive any vehicle upon a sidewalk or sidewalk area except upon a permanent or duly authorized temporary driveway. This section shall not apply to any vehicle moved exclusively by human power nor to any motorized wheelchair.

UVC § 11-1209(c), Bicycles and human powered vehicles on sidewalks [Bicyclist has rights/duties of pedestrian]
A person propelling a vehicle by human power upon and along a sidewalk, or across a roadway upon and along a crosswalk, shall have all the rights and duties applicable to a pedestrian under the same circumstances.

UVC § 15-102(a)19 Powers of local authorities [Pedestrian crossings]
(a) The provisions of this code shall not be deemed to prevent local authorities with respect to streets and highways under their jurisdiction, or with respect to private property when specifically authorized in this section and within the reasonable exercise of the police power from:
19. Restricting pedestrian crossings at unmarked crosswalks as authorized in § 15-108.

UVC § 15-102(a)21 Powers of local authorities [Toy vehicles]
(a) The provisions of this code shall not be deemed to prevent local authorities with respect to streets and highways under their jurisdiction, or with respect to private property when specifically authorized in this section and within the reasonable exercise of the police power from:

21. Regulating persons upon skates, coasters, sleds and other toy vehicles.

UVC § 15-108 Authority to close unmarked crosswalks
After an engineering and traffic investigation, the (State highway commission) and local authorities in their respective jurisdictions may designate unmarked crosswalk locations where pedestrian crossing is prohibited or where pedestrians must yield the right of way to vehicles. Such restrictions shall be effective only when official traffic-control devices indicating the restrictions are in place.

Model 7. Model law to remove visual obstructions § 1. Duty to remove visual obstructions § 2. Inspection for visual obstructions

§ 1. Duty to remove visual obstructions
(a) It shall be the duty of the owner of real property on which any tree, plant, shrub or any moveable object unreasonably obstructs the view of any driver, pedestrian or bicyclist proceeding along a highway and thereby constitutes a potential traffic hazard to eliminate such a visual obstruction.
(b) When the (state highway commission) or any local authority determines upon the basis of an engineering and traffic investigation that such a potential traffic hazard exists, it shall notify the owner and order that the hazard be removed within 10 days.
(c) The failure of the owner to remove such traffic hazard within 10 days of the notice required in subsection (b) above shall constitute an offense punishable by a penalty of _____ dollars and every day said owner shall fail to remove it shall be a separate and distinct offense.
(d) It shall be the duty of the (state highway commission) and the (city traffic engineer) to comply with subsection (a) above as to visual obstructions located on public property.

§ 2. Inspection for visual obstructions
The (state highway commission) (city traffic engineer) shall inspect (quarterly) (semi- annually) (annually) the highways and bicycle paths of this (state) (county) (city) to identify obstructions which impair any road user's view of official traffic control devices or other traffic.